An investigation into the patient management protocols of selected cervical spine conditions by chiropractors in KwaZulu-Natal

By

Barend Jacobus Lombard

A dissertation submitted to the Faculty of Health Sciences at the Durban University of Technology in partial compliance with the requirements for a Master's Degree in Technology: Chiropractic.

I, Barend Jacobus Lombard, do declare that this dissertation is representative of my own work in both concept and execution.
Approved for final submission

_____ _____

BJ Lombard Date

_____ _____

Dr NL de Busser Date

M.Tech: Chiropractic; MMed (Sports Med)

DEDICATION

To the two most influential people in my life. My loving parents Skippie and Elsabé Lombard. You have supported me throughout this long journey and your love, encouragement and guidance has made it all possible. I dedicate this dissertation to you.

ACKNOWLEDGEMENTS

I would like to make special mention of a couple of individuals:

To Kate, the influence you have had on my life cannot be described. You have helped me grow as a person in so many ways and our first five years together have been absolutely magical. I am so excited for the next chapter of our lives together. I also want to thank you for all the hours you have sacrificed in helping me with this dissertation.

To Marco, Lindi, and Duifie. Thanks for always being there for me, always just a phone call away. Your endless encouragement has helped keep me motivated throughout the years.

To the Wisemans. You guys have made me feel so welcome in your home and in your family. The beers by the pool and hours spent chatting around the dinner table have kept me sane throughout this long process.

To all my friends. Thank you all the amazing memories and times we have had. As the saying goes, it's not about the years in your life but the life in your years.

To Dr Nikki De Busser. Your supervision throughout this dissertation process has been invaluable and I cannot thank you enough for all your time and effort.

To all the DUT staff who have helped me along the way. Thank you for moulding me into the doctor I will become one day.

Finally I would like to thank the chiropractors who responded to my questionnaire, thank you for your time and effort.

ABSTRACT

Background: Neck pain is an extremely common condition and the treatment of neck pain forms an integral part of chiropractic practice. The optimal treatment of neck pain is provided when practitioners incorporate available evidence, experience, and knowledge regarding the clinical presentation of the patient into their treatment regimes. Current evidence suggests that a combination of manual therapy, specifically manipulation and/or mobilization, and rehabilitation may offer the optimum treatment for mechanical neck pain. However, numerous factors other than available evidence, experience and clinical presentation may influence treatment choices made by practitioners. Through the assessment of practice patterns, one may asses if the optimal treatment for a neck pain is being provided by practitioners and assess if factors specific to a practitioner may influence the treatment of neck pain.

Objectives: The aim of this study is to determine the chiropractic treatment and management of mechanical neck pain, to compare this to evidence based recommendations for the conservative treatment of mechanical neck pain and to assess if factors other than the available evidence may influence the treatment of mechanical neck pain.

Method: A quantitative, cross-sectional descriptive survey compiled using available literature and validated by means of a focus group and pilot testing, was administered to chiropractors practicing in KwaZulu-Natal. Upon completion of the questionnaire, the data was coded into an Excel spread sheet and imported into IBM SPSS version 20 for statistical analysis. This research protocol was approved by the Durban University of Technology Institutional Research Ethics Committee (REC 82/13) and the study took place from March to July 2014.

Results: Ninety-six practitioners responded to the study which is a response rate of greater than 70%. Practitioners favoured the use of spinal manipulation, auxiliary therapeutic techniques (specifically those which were manual in nature), rehabilitation, and numerous forms of education. Specific variations in treatment pattern existed when comparing various patient presentations indicating that practitioner based factors impacted on treatment choices made by practitioners. The most significant findings included the increased utilisation of auxiliary therapeutic techniques by female practitioners, the increased utilisation of traction by practitioners identifying with the straight philosophy of chiropractic. Other significant findings included the increased utilisation of cervical collars by practitioners of

increased age and experience and the increased utilisation of auxiliary therapeutic techniques by practitioners who did not attend health related conferences at least once every second year or did not attend short courses or subscribe to journals or magazines since qualification.

Conclusions: This study indicates that treatment for mechanical neck pain offered by chiropractors in KwaZulu-Natal is in line with current evidence based recommendations for the treatment of mechanical neck pain, with practitioners commonly using modalities which were recommended, whilst rarely using modalities which were not recommended. The use of rehabilitation was, however, slightly lower than expected. Patient presentation and practitioner based factors were found to influence the treatment of mechanical neck pain; however, as a whole these variations were small with the majority of practitioners favouring the use of modalities which were recommended within the literature. Future studies should address the gap in the literature regarding the conservative treatment of cervical radiculopathy.

Keywords: Chiropractic, Treatment, Evidence Based Guidelines, Mechanical Neck Pain, Non-Specific Neck Pain, Whiplash Associated Disorder, Degenerative Cervical Radiculopathy

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

n	:	Sample size
N	:	Total number of participants
p	:	Refers to *p*-value, which is the statistical significance of the data. The smaller the *p*-value the more significant the data
%	:	Percentage
DUT	:	Durban University of Technology
UJ	:	University of Johannesburg
D.C.	:	Doctor of Chiropractic
M.Tech	:	Masters of Technology
CPD	:	Continuous Professional Development
IFC	:	Interferential Current
TENS	:	Transcutaneus Electrical Nerve Stimulation
PNF	:	Proprioceptive Neuromuscular Facilitation
NSAIDs	:	Non-Steroidal Anti-Inflammatory Drugs
LASER	:	Light Amplification by Stimulated Emission of Radiation
AHPCSA	:	Allied Health Professions Council of South Africa
CASA	:	Chiropractic Association of South Africa
WFC	:	World Federation of Chiropractic
WHO	:	World Health Organization

1 : INTRODUCTION

1.1 Introduction

The purpose of this chapter is to introduce the topic of chiropractic treatment of mechanical neck pain and creates a background for the study.

1.2 Background of the Study

Neck pain is an extremely common condition (Hogg-Johnson *et al.* 2009) which has a strong propensity for chronicity (Guzman *et al.* 2009) and places a large toll on both the individual, and the healthcare system (Côté *et al.* 2004; Binder 2007; Hogg-Johnson *et al.* 2009). Neck pain has been found to be the second most common reason for visiting a chiropractor following lower back pain (Coulter *et al.* 2006; Hartvigsen *et al.* 2002; Mootz *et al.* 2005; Martinez, Rupert and Ndetan 2009); for this reason, the treatment of neck pain forms an integral part of chiropractic practice (Bryans *et al.* 2014).

The optimal treatment of neck pain may be provided through evidence based practice, which has, in recent years, become the gold standard for quality healthcare (Prasun 2013). Current evidence suggests that manual therapy in conjunction with rehabilitation or exercise may provide optimal treatment for mechanical neck pain, with various authors recommending this treatment combination (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013; Carlesso *et al.* 2014). Other modalities may also be effective in the treatment of neck pain; however, the evidence for the use of such modalities is inconclusive at present (Carlesso *et al.* 2014).

The chiropractic profession considers itself in support of the research process and evidence based practice, and has consciously committed itself to employing evidence based practice (Johnson *et al.* 2008; Shaw *et al.* 2010; Simpson 2012; Shreeve 2012). Despite this committment, testing whether a chiropractor is / is not practicing evidence based medicine is difficult (Wenban 2003).

Studies have been conducted assessing the perception of chiropractors' self-reported utilisation of evidence based practice. These studies have shown that chiropractors generally had a positive perception of both research and evidence based practice, however, they also showed that a positive perception did not always lead to high utilisation (Suter *et al.* 2007; Schwarz and Hondras 2007; Gordon 2012). Gordon (2012) noted a high self-reported utilisation amongst South Africa chiropractors, whilst Suter *et al.* (2007) and Schwarz and Hondras (2007) noted low levels of self-reported utilisation of research amongst Canadian and German chiropractors respectively.

A positive perception and high self-reported utilisation may not necessarily lead to the correct utilisation of research, as literature should only be incorporated once the validity of such literature has been established. This process requires considerable skills (Sackett *et al.* 1996; Delaney and Fernandez 1999) which are difficult to teach outside of university based education (Coomarasamy 2003; Khan and Coomarasamy 2006; Agrawal, Szatmari and Hanson 2008; Aiyer 2008). These skills have been found to be less than adequate in both mainstream health care practitioners (Upton, 1999; Bennett *et al*. 2003; Hadley, Hassan and Khan 2008) and complementary and alternative medical professionals (Hadley, Hassan and Khan 2008). Therefore, practitioner perception and self-reported utilisation of evidence based practice may not be an effective reliable means of indicating practitioner adherence to evidence based guidelines, and may merely show a willingness to use evidence based guidelines.

Studies which assess the practice patterns of practitioners may be an effective tool for assessing practitioner adherence, or lack of adherence, to evidence based practice and guidelines (Carlesso *et al.* 2014). However, few studies have investigated practice patterns of chiropractors for specific conditions, particularly conditions where evidence for conservative treatment exists, with the majority of studies instead focusing on practice patterns of chiropractors in general (Kopansky-Giles and Papadopoulos 1997; Coulter and Shekelle 2005; Mootz *et al.* 2005; Ailliet, Rubinstein and de Vet 2010; Humphreys *et al.* 2010; Keyter 2010; Gordon 2012). However, recently, Carlesso *et al.* (2014) conducted a study on the practice patterns of chiropractors and physical therapists in mechanical neck pain. They noted that both chiropractors and physical therapists followed evidence based recommendations for the treatment of mechanical neck pain, with manual therapy and exercise being the most commonly used modalities (Carlesso *et al.* 2014). Although this study was conducted on an international scale, it only produced a two percent response rate,

which may have the possibility of bias and lack of generalisability (Mouton 1996; Booysen 2003; Carey, Clum and Dixon 2005; Mearns and Reader 2007).

Given the fact that evidence based practice has in recent years become the gold standard for quality healthcare (Prasun 2013), it is vital that the chiropractic profession show that they are both willing to follow evidence based practice, and are in fact practicing evidence based medicince. Studies have shown that chiropractors have a positive perception of evidence based practice (Suter *et al.* 2007; Schwarz and Hondras 2007; Gordon 2012) which suggests a willingness to utilise evidence based practice. The study by Carlesso *et al.* (2014) is, to the researcher's knowledge, the only study available which has assessed chiropractors' utilisation of evidence based practice. Although preliminary results seem to suggest that chiropractors are following evidence based recomendations and practice, studies with higher response rates and thus lower possibilties of bias and increased generalisability are needed. This study therefore aims to assess the practice patterns of chiropractors in the treatment and management of mechanical neck pain, in order to determine if local chiropractors are practicing in an evidence based manner.

1.3 Aims and Objectives of the Study

The aim of this study was to assess the treatment and management protocols utilised by chiropractors in KwaZulu-Natal regarding mechanical neck pain, specifically acute and chronic types of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy.

The specific objectives of this study included the following:

1. To determine the chiropractic treatment and management of mechanical neck pain and to compare this to evidence based recommendations for the treatment of mechanical neck pain.
2. To determine the chiropractic treatment of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy.
3. To determine the chiropractic treatment of acute and chronic types of mechanical neck pain and sub-classifications of mechanical neck pain.
4. To determine the demographic, educational and philosophical profile of practitioners in KwaZulu-Natal, and assess the influence of such factors on the treatment of mechanical neck pain.

1.4 Study Hypotheses

The following non-directional null hypotheses were set to address the specific objectives identified in Section 1.3:

1. Practitioners in KwaZulu-Natal did not follow evidence based recommendations with regard to the treatment of mechanical neck pain;
2. Practitioners in KwaZulu-Natal treated non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy in a similar manner;
3. Practitioners in KwaZulu-Natal treated acute and chronic types of mechanical neck pain and its sub-classification in a similar manner.
4. Demographic, educational and philosophical factors of practitioner in KwaZulu-Natal did not influence the treatment of mechanical neck pain.

2 : LITERATURE REVIEW

2.1 Introduction

This chapter addresses literature pertaining to neck pain, the chiropractic treatment of neck pain and the various factors which may influence the treatment and management of neck pain.

2.2 Neck Pain

2.2.1 Overview of Neck Pain

Neck pain is an extremely common musculoskeletal condition within the general population with most individuals experiencing neck pain in their lifetime (Hogg-Johnson *et al.* 2009). Neck pain has a high prevalence rate (Fejer, Kyvik and Hartvigsen 2006; Hogg-Johnson *et al.* 2009; Hoy *et al.* 2010) and is chronic and episodic in nature (Carroll *et al.* 2008a; Hoy *et al.* 2010) placing a large burden on both the individual and health care systems internationally (Côté *et al.* 2004; Binder 2007; Hogg-Johnson *et al.* 2009). Evidence at present is pointing to the fact that the incidence of musculoskeletal injuries is on the rise, and is likely to increase in the years to come (Simpson 2012; Vos *et al.* 2012).

2.2.1.1 Causes of Neck Pain

Neck pain may be caused by many conditions, including pathological or systemic conditions such as spinal fractures, spinal or central cord compression, neoplastic conditions, vascular compromise, inflammatory disease, and upper cervical ligamentous instability (Boon and Davidson 2006; Guzman *et al.* 2009; Fernández-de-las-Peñas, Cleland and Huijbregts 2011). These conditions, however, only account for a small percentage of neck pain, with the majority of cases having no underlying pathological or systematic cause (Boon and Davidson 2006; Guzman *et al.* 2009; Fernández-de-las-Peñas, Cleland and Huijbregts 2011). These forms of neck pain have been labelled as non-specific or mechanical neck pain (Boon and Davidson 2006; Binder 2007; Guzman *et al.* 2009; Fernández-de-las-Peñas, Cleland and Huijbregts 2011).

There is a lack of uniformity in the literature regarding the definition of non-specific or mechanical neck pain (Fernández-de-las-Peñas, Cleland and Huijbregts 2011). Some authors have used broad definitions, such as “generalized neck and/or shoulder pain with mechanical characteristics including: symptoms provoked by maintained neck postures or by movement, or by palpation of the cervical muscles” (Fernández-de-las-Peñas, Cleland and Huijbregts 2011), whilst others have assigned the label of non-specific neck pain to any un-diagnosable symptomatic disorder of the cervical spine (Koes and Hoving 2002). With such inconsistency surrounding the definition of non-specific/mechanical neck pain, the reality is that it is mostly a diagnosis of exclusion, with the most important indicator for the diagnosis of non-specific or mechanical neck pain being the absence of pathological or systemic causes of neck pain (Boon and Davidson 2006; Binder 2007; Michaleff *et al.* 2009).

This lack of uniformity regarding neck pain was highlighted by the Bone and Joint Task Force on Neck Pain and its Associated Disorder (Guzman *et al.* 2009). Here it was found that there was great variation on how neck pain was described and reported upon in literature, which made it difficult to compare results of studies investigating neck pain. As such, an encompassing model was developed to create meaningful subgroups for individuals with neck pain. This model divided neck pain into four Grade categories, as illustrated in Table 2.1.

Table 2.1 Classification of Mechanical Neck Pain by the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders (Guzman *et al.* 2009)

Grade I neck pain	Neck pain and associated disorders with no signs or symptoms suggestive of major structural pathology and no or minor interference with activities of daily living. Major structural pathologies include (but are not limited to fracture, vertebral dislocation, injury to the spinal cord, infection, neoplasm, or systemic disease including the inflammatory arthropathies).
Grade II neck pain	No signs or symptoms of major structural pathology, but major interference with activities of daily living.
Grade III neck pain	No signs or symptoms of major structural pathology, but presence of neurologic signs such as decreased deep tendon reflexes, weakness, or sensory deficits.
Grade IV neck pain	Signs or symptoms of major structural pathology.

Although this multifactorial model was proposed by Guzman *et al.* (2009), much of the literature still refers to, or subdivides non-specific or mechanical neck pain into, five distinct path-anatomical conditions. These included neck disorder with headache of cervical origin, mechanical neck disorder, mechanical neck disorder with radicular signs and symptoms, neck disorder associated with whiplash, neck disorder associated with degenerative change (Gross *et al.* 2004; Gross *et al.* 2013a; Carlesso *et al.* 2014). To avoid ambiguity and confusion within this study the following terminology will be used: mechanical neck pain or

mechanical neck disorder will comprise the entire scope of mechanical neck disorders (Gross *et al.* 2004; Kay *et al.* 2012; Gross *et al.* 2013a; Carlesso *et al.* 2014) whilst non-specific neck pain will be used to describe mechanical neck pain without associated radiculopathy, headache, whiplash or degenerative changes as used by Bryans *et al.* (2014).

2.2.1.2 Non-Specific Neck Pain

The term non-specific neck pain has been used by several authors to describe neck pain not due to pathological and systemic conditions and neck pain not associated with radiculopathy, headache, whiplash or degenerative change (Gross *et al.* 2004; Gross *et al.* 2013a; Carlesso *et al.* 2014). This form of neck pain is localized to the neck and has no referral into the arm pain (past the acromion) and not associated with headache or whiplash injury (Anderson-Peacock *et al.* 2005). It may also be defined as Grade I or II neck pain according to the model proposed by Guzman *et al.* (2009) (Hurwitz *et al.* 2009).

Non-specific neck pain may be caused by a wide range of aetiological factors such as poor posture, work or sports related activity, anxiety, depression and previous trauma (Binder 2007; Sihawong *et al.* 2011). However the overall aetiology is considered to be multifactorial and poorly understood (Binder 2007; Sihawong *et al.* 2011). Many anatomical structures may also be affected in non-specific neck pain including but not limited to muscles, ligaments, joint structures, intervertebral discs and neural structures (Sihawong *et al.* 2011).

The multitude of anatomical and aetiological factors associated with this condition may lead to a wide range of signs and symptoms, including neck pain, stiffness, tenderness which is poorly localized, referred pain to the occiput, interscapular region and upper limbs (Binder 2007; Vincent *et al.* 2013). However, as with mechanical neck pain as a whole, one of the key signs and symptoms includes the provocation of pain by maintained neck postures, neck movement, or palpation of the cervical muscles (Fernández-de-las-Peñas, Cleland and Huijbregts 2011).

2.2.1.3 Whiplash associated disorder

Neck disorder associated with whiplash, as described by Gross *et al.* (2004), Gross *et al.* (2013b) and Carlesso *et al.* (2014) has also been referred to as whiplash associated disorder (Carroll *et al.* 2008b; Hurwitz *et al.* 2009; Fernández-de-las-Peñas, Cleland and Huijbregts 2011), and describes the symptoms and sequelae of a whiplash injury. A whiplash injury is the sudden acceleration and/or deceleration of the head and neck relative

to other body parts, typically occurring during a motor vehicle accident or other such incident (Spitzer *et al.* 1995; Holm *et al.* 2008; Shaw *et al.* 2010), which may result in bony and soft tissue damage.

As stated, the whiplash injury may lead to a variety of clinical manifestations with the most common being neck pain, headache, neck stiffness, shoulder and back pain, numbness, dizziness, sleeping difficulties, fatigue and cognitive deficit (Spitzer *et al.* 1995; Carroll *et al.* 2008b). The Quebec classification of whiplash associated disorder (WAD) has been developed and grades the severity of whiplash associated disorder based on such clinical manifestations (Spitzer *et al.* 1995). The Quebec classification of whiplash associated disorder is outlined in Table 2.2.

Table 2.2: The Quebec classification of WAD (Spitzer et al. 1995)

Grade 0: No neck complaints and no physical signs.
Grade I: Injuries involving complaints of neck pain, stiffness or tenderness, but no physical signs are noted by the examiner.
Grade II: Neck complaints accompanied by decreased range of motion and point tenderness (musculoskeletal signs)
Grade III: Neck complaints accompanied by neurologic signs such as decreased or absent deep tendon reflexes, weakness and/or sensory deficits.
Grade IV: Neck complaints are accompanied by fracture or dislocation.
Other symptoms: Such as deafness, dizziness, tinnitus, headache, memory loss, dysphagia, and temporomandibular joint pain can be present in all grades

As is evident by comparison between the Quebec classification (Spitzer *et al.* 1995) and the classification proposed by Guzman *et al.* (2009), there is much interplay between the two classification systems, with Grades I-II WAD falling into Grade I-II neck pain and Grade III and IV WAD fall into Grade III and IV neck pain respectively. This may be due to the fact that the Quebec classification was used in the development of the classification model proposed by Guzman *et al.* (2009).

2.2.1.4 Degenerative Cervical Radiculopathy

Mechanical neck disorder with radicular signs and symptoms, or cervical radiculopathy, is defined as the abnormality of a nerve root originating in the cervical spine (Polston 2007). This abnormality of the cervical nerve root, may be caused by compression or irritation of the nerve root, due to space occupying lesions, trauma or instability (Cleland *et al.* 2005; Caridi, Pumberger and Hughes 2011). However, the most common cause of radiculopathy is due to narrowing of the foraminal space, secondary to spondylosis (Kuijper *et al.* 2009; Caridi, Pumberger and Hughes 2011).

The compression and irritation of the nerve root may result in ischemia and inflammation of the nerve, which may lead to pain, which may be described as dull, aching or severe burning, and neural deficit in the distribution of the affected nerve (Caridi, Pumberger and Hughes 2011; Fernández-de-las-Peñas, Cleland and Huijbregts 2011). The most commonly affected nerve root in the cervical spine have been found to be the C6 and C7 nerve roots (Murphy 2000; Fernández-de-las-Peñas, Cleland and Huijbregts 2011). Cervical radiculopathy may be a debilitating disease resulting in significant economic loss and disability (Hoy *et al.* 2010; Caridi, Pumberger and Hughes 2011). However, the outcome of radiculopathy is generally favourable with spontaneous resolution in the majority of patients, within variable timeframes (Sampath *et al.* 1999; Kim and Kim 2010; Bono *et al.* 2011).

2.3 Treatment of Neck Pain

2.3.1 Overview

It has been suggested that the ideal treatment of neck pain involves practitioners making treatment choices based on experience, available evidence and stage and presentation of the condition (Carlesso *et al.* 2014). However, numerous other factors may influence the treatment of neck pain, including, but not limited to: scope of practice, patient preference, the degree to which providers are aware of the evidence, and the degree to which providers incorporate evidence into their practice, time management, entry-level education, postgraduate education, clinical environments, characteristics of the population treated, and experience (Carlesso *et al.* 2014).

2.3.2 Evidence Based Practice and Recommendations for the Treatment of Mechanical Neck Pain

Evidence based practice is the use of the current best evidence in making decisions about the care of individual patients, and involves the integration of the available external clinical evidence from systematic research and individual clinical expertise in providing the patients with the most appropriate treatment (Sackett *et al.* 1996). Evidence based practice, although not without critics (Saver and Kalafut 2001), has in recent years become the gold standard for quality healthcare and clinical practice (Meeker and Haldeman 2002; Haneline 2007; Prasun 2013).

Many systematic reviews and evidence based guidelines have been developed for the conservative treatment of mechanical neck pain, and recommendations have been made for

modalities such as manual therapy, exercise, physical therapeutic modalities, acupuncture, cervical collars and various forms of advice (Haldeman and Underwood 2010; Carlesso *et al.* 2014). In the following sections relevant modalities will be presented with the evidence for or against specific modalities will be presented and a brief overview of the specific modality will be given. The evidence used in the literature following includes most of the major works in the field of evidence based management of mechanical neck pain, and is based on the works by the Cochrane Collaboration and the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders.

2.3.2.1 Manual Therapy

Manual therapy is a generic therapeutic category used to describe non-surgical, conservative treatment, involving skilled hand techniques directed at the patient's body. The purpose of this therapy is the detecting and treatment of a variety of symptoms and conditions, most commonly musculoskeletal conditions and mechanical pain (Hoving *et al.* 2002; Vernon, Humphreys and Hagino 2007; Clar *et al.* 2014).

Manual therapies may be divided into two categories, manual therapies directed producing joint motion, such as mobilisation, manipulation and manual traction (discussed under traction), and those which do not, such as massage therapy or soft tissue manipulations (Vernon, Humphreys and Hagino 2007; French *et al.* 2011). It should be noted that manual therapies are utilised by practitioners in many professions, and as such the definition may vary between professions (Clar *et al.* 2014).

2.3.2.1.1 Manipulation and Mobilisation

Manipulation and mobilisation are defined as manual therapy techniques which are directed at producing joint movement (Murphy 2000; Vernon, Humphreys and Hagino 2007), with the goal of restoring optimal motion, function, and/or to reduce pain (IFOMPT 2014). Although these techniques are similar in their focus, they differ in technique. Manipulation is more commonly used by chiropractors (Haldeman and Dagenais 2012; Carlesso *et al.* 2014) and is a high-velocity low-amplitude thrust (Murphy 2000; Fernández-de-las-Peñas, Cleland and Huijbregts 2011) associated with a cavitation phenomenon, where a click or pop is heard when the patient is manipulated (Murphy 2000). Mobilisation is more commonly associated with physical therapists (Carlesso et al. 2014), and is a low velocity, high amplitude passive motion (Hengeveld, Banks and Maitland 2005) and is not associated with the cavitation phenomenon (Murphy 2000). These techniques, although different, have been said to

produce similar effect with regard to pain, function and patient satisfaction (Gross *et al.* 2010).

Manipulation and mobilisation are both recommended, and have been found to be of benefit in the treatment of mechanical neck pain, either as a single modality (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Gross *et al.* 2010; Leaver *et al.* 2010), or as part of a multimodal approach, including modalities such as advice, exercise and soft tissue techniques (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Bryans *et al.* 2014). Although evidence of benefit has been found, at present the optimal techniques of manipulation and mobilisation still need to be determined (Gross *et al.* 2010).

2.3.2.1.2 Massage and Soft Tissue Manipulation

Massage or soft tissue manipulation form the second category of manual therapies, and are manual therapies which are not directed at joint motion (Vernon, Humphreys and Hagino 2007; French *et al.* 2011) and are instead directed at soft tissues using the hands or mechanical devices (Haldeman and Dagenais 2012). Many forms of massage or soft tissue manipulation exist and may be used for a variety of functions and goals depending on patient or practitioner requirements (Sherman *et al.* 2006), however they may generally be divided into four categories which include relaxation massage, clinical massage, movement re-education and energy work (Sherman *et al.* 2006).

Relaxation massage aims to promote the general health and wellbeing of patients and comprises techniques such as Swedish massage, sports massage and spa massage (Sherman *et al.* 2006). Clinical massage has more specific goals such as the specific manipulation of muscle and fascia to reduce pain and improve movement, and utilises techniques such as myofascial trigger point therapy, myofascial release and strain-counterstrain techniques (Sherman *et al.* 2006). Movement re-education is the third form of massage and aims to restore movement, posture and body awareness through techniques such as proprioceptive neuromuscular facilitation (PNF) and strain-counterstrain techniques (Sherman *et al.* 2006). The final classification of massage is known as energy work and promotes the flow of energy around the body which utilises techniques such as acupressure, reiki, polarity, and therapeutic touch (Sherman *et al.* 2006).

Although these classification systems of massage exist many evidence based guidelines have not assessed them specifically and instead group the many forms of massage under one designation, especially when drawing conclusions (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Brosseau *et al.* 2012; Patel *et al.* 2012) and this may also be due to the fact that very few clinical trials adequately describe the form of massage used (Patel *et al.* 2012). As such only recommendations made for massage as a whole may be reported on.

Evidence for the use of massage as a standalone modality appears to be inconclusive at present, and most authors recommended that further research on the matter is required (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; Brosseau *et al.* 2012; Patel *et al.* 2012; Bryans *et al.* 2014). Some authors have however, noted some evidence of short term benefit (Brosseau *et al.* 2012; Patel *et al.* 2012). The use of massage as part of a multimodal treatment including manipulation and mobilisation, does however appear to be of benefit in the treatment of mechanical neck pain (D'Sylva *et al.* 2010; Clar *et al.* 2014).

2.3.2.2 Therapeutic Exercise and Rehabilitation

Exercise is as a planned repetitive physical activity structured to improve and maintain physical fitness (Stedman 2005). Exercise has many positive physical and psychological effects, such as improved strength, endurance, flexibility, cardiovascular fitness, blood flow, tissue repair, sleep, cognitive function and weight loss, and may help decrease stress, anxiety and depression (Kay et al. 2012).

Therapeutic exercise refers to exercise used specifically for the treatment of specific medical conditions (Haldeman and Dagenais 2012), and many forms of therapeutic exercise exist (Beam 2002; Liebenson 2007; Kay et al. 2012). These include, but are not limited to: aerobic, endurance, strength, flexibility, recruitment, proprioceptive and stabilisation exercises and each of these contains various further sub-classifications (Beam 2002; Liebenson 2007; Kay et al. 2012).

As a whole therapeutic exercise is considered to be of benefit in the treatment of mechanical neck pain, either by itself (Gross et al. 2007; Hurwitz et al. 2009; Leaver et al. 2010; Kay et al. 2012; Bryans et al. 2014), or in conjunction with manual therapy (Gross et al. 2007; Hurwitz et al. 2009; D'Sylva et al. 2010; Miller et al. 2010; Bryans et al. 2014). However, many forms of therapeutic exercise may be used in the treatment of mechanical neck pain

(Magee, Zachazewski and Quillen 2009), and rehabilitation may often not only include the cervical region but may include scapular, thoracic and upper limb regions. In addition rehabilitation of the postural system and breathing techniques are also common place in cervical rehabilitation (Liebenson 2007; Magee, Zachazewski and Quillen 2009; Kay et al. 2012).

Specific rehabilitation of the cervical and scapula-thoracic regions, including strengthening or endurance training, and stretching were recommended as being of benefit (Kay et al. 2012; Bryans et al. 2014), while strengthening or endurance of the upper limb and broad based general fitness regimes or cardiovascular training were recommended as being of no benefit (Gross et al. 2007; Hurwitz et al. 2009; Leaver et al. 2010; Kay et al. 2012). Other forms of cervical rehabilitation, such as eye fixation, postural training, neck stabilization and relaxation may be of assistance (Leaver et al. 2010); however, at present it appears that further evidence is needed regarding such rehabilitation techniques (Kay et al. 2012).

2.3.2.3 Manual Therapy and Exercise

As noted previously both manual therapy, specifically manipulation and mobilisation, and exercise, are of benefit in the treatment of mechanical neck pain either as singular modalities or as part of multimodal treatment regimes. It has, however, been suggested that the combination of manual therapy and exercise shows greater effects both in the short and long term, with stronger evidence of benefit than either manual therapy or exercise alone (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010). As such the combination of manual therapy and exercise may in fact, provide the optimal effect for the treatment of mechanical neck pain (Carlesso et al. 2014).

2.3.2.4 Physical Therapeutic Modalities

Physical therapy modalities is a broad term used to define a variety of modalities utilised in physical therapy (Haldeman and Dagenais 2012). These modalities may be divided into two categories, specifically electrotherapeutic techniques and physical agents, with physical being further subdivided into thermal agents, acoustic or sonic agents, and phototherapeutic or radiant agents (Haldeman and Dagenais 2012; Graham *et al.* 2013; Carlesso *et al.* 2014).

2.3.2.4.1 Electrotherapeutic Techniques

Electrotherapeutic techniques are modalities in which an electrical current is applied to human tissues with the goal of achieving a therapeutic effect (Robinson and Snyder-Mackler

2008) such as the production of muscle contractions, reduction in muscle spasms, pain control and promotion of tissue healing (Cameron 2013; Graham *et al.* 2013). Many forms of electrotherapeutic techniques exist, which may vary in their structure and application of current (Cameron 2013) and include variations such as transcutaneous electrical nerve stimulation (TENS), electrical muscle stimulation (EMS), interferential current (IFC), direct current (DC), pulsed electromagnetic fields (PEMF) and repetitive magnetic stimulation (rMS) (Haldeman and Dagenais 2012; Cameron 2013; Graham *et al.* 2013).

Current literature suggests that there is insufficient evidence for the use of electrical modalities in the treatment of mechanical neck pain (Hurwitz *et al.* 2009; Leaver *et al.* 2010; Kroeling *et al.* 2013; Bryans *et al.* 2014). Some authors have stated that there is no evidence of benefit for the use of electrotherapeutic techniques (Hurwitz *et al.* 2009), whilst others indicate that there was not enough evidence to make conclusions (Leaver *et al.* 2010; Kroeling *et al.* 2013; Bryans *et al.* 2014). Kroeling *et al.* (2013) did, however, suggest that some electrotherapeutic techniques, namely pulsed electromagnetic fields, repetitive magnetic stimulation and transcutaneous electrical nerve stimulation, may be of benefit although evidence at present is of low quality.

2.3.2.4.2 Thermal Therapies

Thermal therapies or superficial thermal therapies include thermotherapy and cryotherapy. These are often referred to as hot, and cold therapy respectively (Haldeman and Dagenais 2012). These modalities conduct heat towards or away from the body, resulting in local and sometimes general heating and cooling of superficial tissues. This heating and cooling of tissues may result in various physiological and therapeutic effects (Prentice 2009; Denegar, Saliba and Saliba 2010).

Cryotherapy causes local tissue cooling, which may result in decreased metabolic activity and oxygen demand of cells, initial vasoconstriction which results in decreased blood flow, decreased lymphatic and venous drainage, decreased nerve conduction velocities, reduction in muscle spasm, and decrease in the formation and accumulation of oedema and pain reduction (Prentice 2009; Denegar, Saliba and Saliba 2010). In contrast, thermotherapy causes local tissue heating, resulting in increased metabolic activity and oxygen demand of cells, vasodilation and increased blood flow, increased lymphatic and venous drainage, increased elasticity of soft tissues, decreased muscle spasm and tone, increased formation of oedema, and pain control (Prentice 2009; Denegar, Saliba and Saliba 2010).

Many therapeutic effects of both cryo- and thermotherapy have been proposed (Prentice 2009; Denegar, Saliba and Saliba 2010; Cameron 2013), including:

- Cryotherapy is most commonly indicated for use in acute conditions (Prentice 2009) and may be used for pain control as well as for control of oedema, inflammation, muscle spasm and guarding (Prentice 2009; Denegar, Saliba and Saliba 2010; Cameron 2013).
- Thermotherapy is more commonly indicated for subacute and chronic conditions (Prentice 2009), and may be used for pain control, decreased muscle spasm, improved healing, increased range of motion, and decreased joint stiffness (Prentice 2009; Denegar, Saliba and Saliba 2010; Cameron 2013).

As is evident, many effects of thermotherapies have been proposed. Current literature however, does not support the use of either thermo or cryotherapy, especially for treatment of mechanical neck pain (Hurwitz *et al.* 2009; Graham *et al.* 2013).

2.3.2.4.3 Acoustic or Sonic Agents

Acoustic agents are physical therapeutic modalities which make use of acoustic energy to produce therapeutic effects (Prentice 2009; Denegar, Saliba and Saliba 2010; Haldeman and Dagenais 2012). The most common form of acoustic energy used as a physical therapeutic modality is ultrasound therapy, which is defined as an inaudible acoustic vibration of high frequency (greater than 20000Hz), which may produce either thermal or non-thermal effects (Prentice 2009; Cameron 2013).

The thermal effects of ultrasound are produced through applying continuous ultrasound, which results in absorption of this acoustic energy and the production of tissue heating (Denegar, Saliba and Saliba 2010). This form of tissue heating produces similar physiological effects to other heating modalities, and results in increased metabolic activity and oxygen demand of cells, vasodilation and increased blood flow, lymphatic and venous drainage, increased elasticity of soft tissues, decreased muscle spasm and tone, increased formation of oedema, and pain control (Prentice 2009; Denegar, Saliba and Saliba 2010; Cameron 2013). These effects, however, occur deeper with ultrasound than that of other superficial heating modalities (Prentice 2009; Denegar, Saliba and Saliba 2010; Cameron 2013).

The non-thermal effects of ultrasound are produced through applying pulsed ultrasound, resulting in acoustic streaming or micro-streaming, and cavitation (Prentice 2009; Denegar, Saliba and Saliba 2010; Cameron 2013). Streaming or micro-streaming produces unidirectional movement of fluids which may increase cell membrane permeability, whilst cavitation results in the formation of gas bubbles, which expand and contract, facilitating fluid movement and transport (Prentice 2009; Denegar, Saliba and Saliba 2010). These non-thermal effects promote normal cell function and enhance a variety of cellular activities, which are essential components in tissue healing (Cameron 2013; Graham *et al.* 2013).

As with thermal therapies, many proposed effects of ultrasound have been presented. However, as with thermal therapies, current evidence of benefits is lacking and there is in fact moderate evidence stating that ultrasound is of no benefit in the treatment of mechanical neck pain (Gross *et al.* 2007; Hurwitz *et al.* 2009; Graham *et al.* 2013).

2.3.2.4.4 Phototherapeutic or Radiant agents

Phototherapeutic or radiant agents are a form of physical therapeutic modality which make use of light or electromagnetic energy to produce therapeutic effects. These phototherapeutic agents include modalities such as Laser (Light Amplification by Stimulated Emission of Radiation) (Haldeman and Dagenais 2012; Graham *et al.* 2013; Carlesso *et al.* 2014).

Laser may be used in a variety of industries (Steele 2005; Prentice 2009), and within the medical field, laser may serve numerous functions, commonly being utilised in surgical, cosmetic and dermatological fields (Müller, Berlien and Scholz 2006). In the field of musculoskeletal rehabilitation, the most commonly used laser is low level laser therapy (Cameron 2013; Graham *et al.* 2013), which as the name suggests, is a laser of low intensity, and does not exhibit the thermal properties of laser used for industrial or surgical proposes (Müller, Berlien and Scholz 2006; Cameron 2013). The physiological effects produced by low level laser as such is a result of the interaction occurring between UV radiation and tissues (Cameron 2013).

The radiation is absorbed by the cells in the body, specifically the mitochondria and cell membranes, and transformed into adenosine triphosphate (ATP) (Denegar, Saliba and Saliba 2010). The production of ATP is essential for normal cell function and ribonucleic acid (RNA) synthesis (Denegar, Saliba and Saliba 2010; Cameron 2013) and as such laser may

also increase mast cell degranulation, which results in histamine production and improves healing process (Denegar, Saliba and Saliba 2010). Laser has therefore, been recommended to facilitate healing of all types of tissues (Denegar, Saliba and Saliba 2010; Cameron 2013), and to help control pain and inflammation (Cameron 2013; Graham *et al.* 2013).

In contrast to thermal and sonic therapies, there is at present, evidence of benefit for the use of laser a treatment for mechanical neck pain (Gross *et al.* 2007; Chow *et al.* 2009; Hurwitz *et al.* 2009; Leaver *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a). However further evidence is required, as there is paucity whithin the literature (Gross *et al.* 2013a).

2.3.2.5 Acupuncture and Dry Needling

Acupuncture is the insertion and manipulation of fine needles into specific points around the body with the goal of achieving therapeutic effects, acupuncture originated from traditional Chinese acupuncture, which is based on Chinese medicine, and has been used for more than 4000 years (Furlan *et al.* 2005; Chon and Lee 2013). In recent years however, many other forms of acupuncture have been developed, such as Japanese Meridian Therapy, Korean Constitutional acupuncture, French Energetic acupuncture, and Lemington Five Elements acupuncture (Furlan *et al.* 2005; Haldeman and Dagenais 2012).

Traditional acupuncture is based on a belief that living beings have an inner energy known as Qi which flows around the body and that the disruption of flow, or an imbalance of Qi, manifests in disease and illness (Furlan *et al.* 2005; Haldeman and Dagenais 2012; Chon and Lee 2013). The restoration of flow and rebalancing of Qi is achieved via the insertion and stimulation of a thin acupuncture needle into specific acupuncture points associated with that specific illness or disease (Furlan *et al.* 2005; Haldeman and Dagenais 2012; Chon and Lee 2013). The western medical explanation for the mechanism of acupuncture is currently unclear, however some proposed theories include the gate control theory, where the transmission of pain sensation may be inhibited by the insertion of the acupuncture needle, and the endorphin and neurotransmitter models, in which the insertion of the needle may result in the release of endorphins, serotonin, norepinephrine and acetylcholine (Furlan *et al.* 2005; Haldeman and Dagenais 2012; Chon and Lee 2013).

Evidence based guidelines have stated that moderate evidence of benefit exists for the use of acupuncture as a treatment for mechanical neck pain. These guidelines, however do not

make differentiation between traditional Chinese acupuncture and dry needling. They instead make recommendations for both modalities under one classification, namely acupuncture (Gross *et al.* 2007; Trinh *et al.* 2007; Leaver *et al.* 2010; Graham *et al.* 2013).

Although dry needing and acupuncture both make use of fine needles (Cagnie *et al.* 2013; Chon and Lee 2013), the two techniques vary in philosophy and application (Cagnie *et al.* 2013). The dry needling technique is not based on traditional Chinese medicine but instead an expansion of the trigger point injection techniques employed by Simons *et al.* (1999), so is based on western medical principles (Fernández-de-las-Peñas, Cleland and Huijbregts 2011). Dry needling entails the insertion of needles at a much deeper tissue level than that of acupuncture (Cagnie *et al.* 2013). The needles are not directed at acupuncture points but are instead inserted directly at myofascial trigger points which are a focus of irritability within a taut band of skeletal muscle or muscle fascia (Simons *et al.* 1999), and are the main source of pain in myofascial pain syndrome (Rayegani *et al.* 2014).

The insertion of the needle into the trigger point results in a local twitch response followed by pain relief and decreased tension within the muscle (Huguenin 2004; Cagnie *et al.* 2013). The exact physiological mechanism of action of dry needling is poorly understood, and much of the literature on dry needling is derived from acupuncture literature (Cagnie *et al.* 2013). As such, many of the physiological mechanisms proposed for dry needling are similar to those of acupuncture, and include the gate control theory, and the release of endorphin and neurotransmitters (serotonin, norepinephrine and acetylcholine) theory (Cagnie *et al.* 2013). Other mechanisms have however been proposed, such as the disruption of the dysfunctional endplate noted in myofascial trigger point theories, increased blood flow, and the placebo effect (Cagnie *et al.* 2013).

2.3.2.6 Traction

Traction is a form of mechanical energy in which a mechanical force that is applied to the body separates the joint surfaces and elongates the surrounding soft tissues (Denegar, Saliba and Saliba 2010; Cameron 2013). Spinal traction results in the separation of vertebral bodies, mobilisation of the facet joints, expansion of intervertebral foramen, stretching of soft tissue and relaxation of muscle (Graham *et al.* 2013), which are thought to be of benefit in treatment of conditions such as disc protrusions or herniations, nerve root impingements, joint hypomobility, subacute joint inflammation and paraspinal muscle spasms (Haldeman and Dagenais 2012; Cameron 2013).

Traction has many sub-classifications and may be classified according to the method of application of the force, as the force may be applied via mechanical devices (mechanical traction), patient self traction or positional traction, and manual traction by the practitioner (Prentice 2009; Denegar, Saliba and Saliba 2010; Cameron 2013). Traction may also be classified according to the time for which it is applied, with the common time based classifications including intermittent, sustained and continuous traction (Haldeman and Dagenais 2012). Intermittent traction is the application of alternating cycles of traction and relaxation for a few minutes, sustained traction is traction applied for 20 to 60 minutes, while continuous traction is applied for hours to days (Haldeman and Dagenais 2012).

Evidence based guidelines make recommendations based on evidence of benefit for the use of intermittent mechanical traction (Gross *et al.* 2007; Graham *et al.* 2013), and evidence of no benefit for the use of continuous traction (Graham *et al.* 2013). There is difficulty drawing conclusions for the use of manual traction, as there are a limited number of studies assessing the effect of manual traction on mechanical neck pain (Vernon, Humphreys and Hagino 2007).

2.3.2.7 Cervical Collars

Cervical collars are medical devices which are primarily used to provide stabilization, and to limit range of motion, which has been suggested to minimize symptom onset and recurrence of mechanical neck pain (Magee, Zachazewski and Quillen 2009; Gross *et al.* 2013b). There is consistent evidence that cervical collars are not of benefit and may actually delay recovery in mechanical neck pain (Hurwitz *et al.* 2009; Gross *et al.* 2013b).

2.3.2.8 Medication

Many forms of medication may be used in the treatment of musculoskeletal conditions, and these include but are not limited to non-steroidal anti-inflammatory drugs, simple analgesics, Cox-2 inhibitors, topical agents, opioid analgesics, muscle relaxants, and adjunctive analgesics such as antidepressants, anti-epileptics, corticosteroids, topical anaesthetics, cannabinoids, and N-methyl-D aspartate (NMDA) receptor antagonists (Boon and Davidson 2006; Haldeman and Dagenais 2012). The workings of such medications are beyond the scope of this study; however, recommendations for the use of some of these forms of medications have been made regarding their use in the treatment of mechanical neck pain. Simple analgesics have been found to be of benefit in the treatment of mechanical neck pain

(Hurwitz *et al.* 2009), while evidence for the use of non-steroidal anti-inflammatory medication and other medications is inconclusive at present (Hurwitz *et al.* 2009).

2.3.2.9 Advice

Education and advice are important components of health care, and are essential elements of communication between health care provider and patient (Martz 1994; Hoving *et al.* 2010; Hanyok *et al.* 2012). Patients respond better to treatment if they are encouraged to take an active role in their recovery, and as such, should be provided with the proper motivation, skills, and knowledge to be able to participate in their recovery (Gruman *et al.* 2010).

There is, however, very limited evidence of the effectiveness of advice and education in the treatment of mechanical neck pain (Hurwitz *et al.* 2009; Gross *et al.* 2013b), and at present, there is no evidence to show that one form of education or advice is superior to another (Hurwitz *et al.* 2009). Some authors have noted a lack of evidence for specific forms of education and advice such as psychological (Gross *et al.* 2013b), postural, ergonomic advice and interventions (Bongers *et al.* 2010; Hoe *et al.* 2012). Other authors have noted benefits of specific modalities such as postural and ergonomic interventions in reducing mechanical neck pain severity (Hoe *et al.* 2012), and psychological interventions delivered by certified instructors (Gross *et al.* 2013b).

2.3.2.10 Optimal Dosage

The optimum dosage for modalities used in the conservative treatment of neck pain remains largely unanswered and more information is needed on the matter (Gross *et al.* 2007; Gross *et al.* 2010; Gross *et al.* 2013a). Hurwitz *et al.* (2009) stated that evidence for the optimum course of care in non-specific neck pain is lacking and that no conclusion, at present, may be made regarding longer versus shorter courses of care or specific courses of care (Hurwitz *et al.* 2009).

2.3.2.11 Summary of Evidence Based Recommendations for the Treatment of Mechanical Neck Pain

The recommendation made in various systematic reviews, have been summarized in Table 2.3. Although several recommendations have been made the evidence at present suggests that a combination of manual therapy and exercise may provide optimum treatment of mechanical neck pain (Carlesso *et al.* 2014).

Table 2.3: Summary of Evidence Based Recommendations

	Recommendation
Evidence of benefit	Manipulation or mobilisation (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Gross *et al.* 2010; Leaver *et al.* 2010)
	Multimodal therapy consisting of manipulation or mobilisation + advice, exercise/rehabilitation and soft tissue techniques (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Bryans *et al.* 2014).
	Exercise and rehabilitation (Gross et al. 2007; Hurwitz et al. 2009; Leaver et al. 2010; Kay et al. 2012; Bryans et al. 2014)
	Manipulation or mobilisation + exercise/ rehabilitation (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a).
	Laser (Gross *et al.* 2007; Chow *et al.* 2009; Hurwitz *et al.* 2009; Leaver *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a)
	Acupuncture and dry needling (Gross *et al.* 2007; Trinh *et al.* 2007; Leaver *et al.* 2010; Graham *et al.* 2013; Clar *et al.* 2014)
	Traction - Intermittent mechanical (Gross *et al.* 2007; Keyter 2010; Gordon 2012; Graham *et al.* 2013)
	Ergonomic interventions (Haines *et al.* 2009; Hoe *et al.* 2012)
	Psychological interventions by certified instructors (Graham *et al.* 2013; Gross *et al.* 2013b; Ford 2014)
	Medication – Analgesics (Hurwitz *et al.* 2009)
Insufficient evidence	Electrotherapeutic techniques (Hurwitz *et al.* 2009; Leaver *et al.* 2010; Kroeling *et al.* 2013; Bryans *et al.* 2014; Edwards *et al.* 2002)
	Advice alone (Mearns and Reader 2007; Hurwitz *et al.* 2009; Gordon 2012; Evans 2013; Gross *et al.* 2013b)
	Medication – Non-steroidal anti-inflammatory drugs and other medications (Hurwitz *et al.* 2009)
	Soft tissue techniques (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; Brosseau *et al.* 2012; Patel *et al.* 2012; Bryans *et al.* 2014)
Evidence of No benefit	Thermal therapies (Hurwitz *et al.* 2009; Graham *et al.* 2013)
	Ultrasound (Gross *et al.* 2007; Hurwitz *et al.* 2009; Graham *et al.* 2013)
	Traction – Continuous mechanical (Gordon 2012; Graham *et al.* 2013)
	Psychological interventions by physical therapists (Gross *et al.* 2013b)
	Cervical collars (Hurwitz *et al.* 2009; Gross *et al.* 2013b)

2.3.3 Patient Presentation and Stage of Condition

2.3.3.1 Acute and Chronic Mechanical Neck Pain

Acute conditions are defined as conditions lasting up to 10 days (Magee 2008), and generally occur as a result of injury or tissue damage (Conn 2005). Chronic conditions are defined as those lasting longer than 3 months (Magee 2008) and are generally not associated with new tissue damage, with the cause often being unknown and therefore difficult to treat (Conn 2005). Central to the treatment of acute and chronic conditions is the active and passive care continuum (Murphy 2000; Souza 2009) which is shown in Figure 2.1 which was adapted from Murphy (1996).

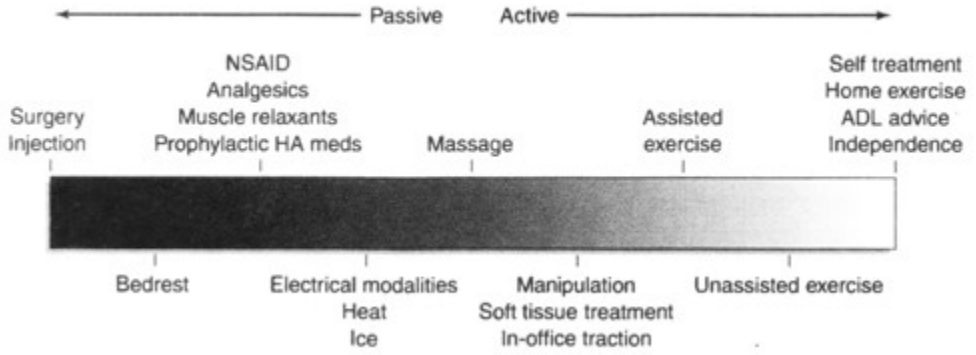

Figure 2.1: The passive/active care continuum

Active care is defined as modes of treatment requiring patient involvement and participation, in the pursuit of established treatment goals, where there is shared accountability on the part of the patient. Passive care however, is defined as modes of treatment that are delivered to a patient in which there is no patient participation or involvement required, to obtain established treatment goals (Triad Healthcare 2014). Defining modalities as active or passive is difficult (Murphy 2000). However, modalities practitioners employ themselves, such as physical therapeutic modalities, medications, manual therapies, cervical collars, acupuncture and dry needling may all be considered passive (Murphy 2000; Liebenson 2007; Souza 2009), whilst the various forms of rehabilitation, exercise and advice may be considered to be active modalities (Murphy 2000; Liebenson 2007; Souza 2009). Active care has been emphasized as being the gold standard of treatment (Murphy 2000; Liebenson 2007). This has been shown to be supported in the literature in the treatment of mechanical neck pain (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Bryans *et al.* 2014).

The active care continuum suggests that in the treatment of musculoskeletal conditions one should start the treatment as far right on the active care continuum as possible (Figure 2.1), that is to say, as active as possible, continuing in that direction as far as possible (Murphy 2000). However, the more acute or painful the condition, the more likely the practitioner would be to start the treatment in a passive manor and then transition to active care once the condition has ameliorated and the patient is able to do so (Murphy 2000; Souza 2009).

Unfortunately, authors of systematic reviews have failed to make recommendations for the treatment of acute and chronic mechanical neck pain, and instead only making recommendations for the treatment of mechanical neck pain as a whole including both acute, subacute and chronic types of this condition under the recommendations (Gross *et al.*

2007; Chow *et al.* 2009; Bongers *et al.* 2010; Miller *et al.* 2010; Brosseau *et al.* 2012; Kay *et al.* 2012; Patel *et al.* 2012; Graham *et al.* 2013; Gross *et al.* 2013b; Kroeling *et al.* 2013; Clar *et al.* 2014). Some authors have made recommendations for the treatment of acute and chronic mechanical neck pain but these recommendations are on specific topics such as manual therapy (Vernon, Humphreys and Hagino 2007; Gross *et al.* 2010).

2.3.3.2 Non-Specific Neck Pain, Whiplash Associated Disorder and Degenerative Cervical Radiculopathy

Most systematic reviews make recommendations for the treatment of mechanical neck pain as a whole (Gross *et al.* 2007; Chow *et al.* 2009; Walser, Meserve and Boucher 2009; Bongers *et al.* 2010; D'Sylva *et al.* 2010; Gross *et al.* 2010; Miller *et al.* 2010; Brosseau *et al.* 2012; Kay *et al.* 2012; Graham *et al.* 2013; Gross *et al.* 2013a; Gross *et al.* 2013b; Kroeling *et al.* 2013; Clar *et al.* 2014), choosing not to separate the specific forms of mechanical neck pain. However, in a recent systematic review by the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders, recommendations for the treatment of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy were made (Hurwitz *et al.* 2009). The findings of this study are highlighted in Table 2.4.

Recommendations for the treatment of non-specific neck pain and whiplash are similar to the recommendations for the treatment of mechanical neck pain, with evidence again pointing to the effectiveness of manual therapy and exercise (Hurwitz *et al.* 2009). However, in whiplash associated disorder mobilisation is recommended, while insufficient evidence for the use of manipulation is noted (Hurwitz *et al.* 2009). This may be due to the fact that unlike non-specific neck pain, where there is quite a large volume of good quality randomized controlled trials, whiplash associated disorder still has a relative shortage of good quality randomized controlled trials (Hurwitz *et al.* 2009).

The Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders attempted to review the literature pertaining to the treatment of degenerative cervical radiculopathy and found insufficient good quality randomized controlled trials to make appropriate recommendations for the treatment of degenerative cervical radiculopathy (Hurwitz *et al.* 2009). This lack of good quality randomized controlled trials was again noted in a subsequent systematic review (Rodine and Vernon 2012).

Table 2.4: Recommendations by the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders (Hurwitz *et al.* 2009)

	Non-specific neck pain	Whiplash associated disorder
Evidence of benefit	Manipulation	Educational video
	Mobilisation	Mobilisation
	Supervised exercises	Supervised exercises
	Manual therapy (manipulation, mobilisation, massage) + exercises	Mobilisation + exercises
	Acupuncture	Co-ordinated multidisciplinary care
	Low-level Laser therapy	Pulsed Electromagnetic Therapy
	Analgesics	
	Percutaneous neuromodular therapy	
	Brief intervention using cognitive behavioural principles	
Insufficient evidence	Magnetic stimulation	Manipulation
	Massage	Traction
	Traction	Non-steroidal anti-inflammatory drugs and other medications
	Non-steroidal anti-inflammatory drugs and other medications	
Evidence of No benefit	Advice alone	Pamphlet/neck booklet alone
	Collar	Passive modalities (TENS, Ultrasound)
	Passive modalities (heat therapy, ultrasound, TENS, electrical muscle stimulation)	Collars
	Exercise instruction	Referral to fitness or rehab program
	Botulinum toxin A	Frequent early healthcare use
		Methylprednisolone and corticosteroid injections

2.3.4 Chiropractic Scope and identity

The word ‘chiropractic’ means to “do by hand” or “hand work” (Kaptchuk and Eisenberg 1998) and the chiropractic profession is defined by The World Federation of Chiropractic as being: “A health profession concerned with the diagnosis, treatment and prevention of mechanical disorders of the musculoskeletal system, and the effects of these disorders on the function of the nervous system and general health. There is an emphasis on manual treatments including spinal adjustment and other joint and soft-tissue manipulation” (WFC 2014). As illustrated by the definition and the meaning of chiropractic, the profession mainly incorporates manual therapy done by hand and the emphasis of treatment by chiropractors has traditionally focused on high velocity low amplitude manipulation (Meeker and Haldeman 2002; Cooper and McKee 2003; Waalen and Mior 2005). However, chiropractic has come to incorporate much more than that in recent years as chiropractic has branched out and now

utilises various other forms of treatment modalities (Meeker and Haldeman 2002; Cooper and McKee 2003; Waalen and Mior 2005).

Modalities which are now used by chiropractors include, but are not limited to: mobilisation, soft tissue therapy, exercise, physical therapy modalities, acupuncture and dry needling, and various forms of advice including lifestyle advice, nutrition, stress management, posture and ergonomics, use of cervical collars and the use of medication (Kopansky-Giles and Papadopoulos 1997; Meeker and Haldeman 2002; Cooper and McKee 2003; Mootz *et al.* 2005; Waalen and Mior 2005; Souza 2009; Ailliet, Rubinstein and de Vet 2010; Humphreys *et al.* 2010; Bryans *et al.* 2014). Chiropractors in South Africa are legislated under Act 63 (1982) which allows for "The treatment or prevention of any physical defect, illness or efficiency related to spinal pelvic, spinovisceral and general neuro-musculoskeletal conditions in any person by manipulation or adjustment; electrotherapy; exercise therapy; hydrotherapy; traction therapy; thermal therapy; vibration therapy; immobilisation therapy; neuro-muscular reflex therapy; massage therapy; acupuncture or acupressure therapy; or remedies, dietary advice or dietary supplementation". As such chiropractors in the modern era have a wide variety of treatment modalities as their disposal and the use of this variety of modalities is now relatively common (Nyiendo *et al.* 2001; Waalen and Mior 2005).

Although such an assortment of modalities are available to the chiropractor, studies which have assessed the practice patterns of chiropractors both internationally (Kopansky-Giles and Papadopoulos 1997; Coulter and Shekelle 2005; Mootz *et al.* 2005; Ailliet, Rubinstein and de Vet 2010; Humphreys *et al.* 2010), and in South Africa (Keyter 2010; Gordon 2012), have shown that manual therapies and exercise are still the among most commonly used techniques within chiropractic practice, with the high velocity low amplitude manipulation being the most commonly used form of manual therapy (Kopansky-Giles and Papadopoulos 1997; Coulter and Shekelle 2005; Mootz *et al.* 2005; Ailliet, Rubinstein and de Vet 2010; Humphreys *et al.* 2010; Keyter 2010).

2.3.5 Factors Specific to the Chiropractor which may Affect Treatment

2.3.5.1 Education

The effective practice of evidence based medicine requires the practitioner to have considerable skills at appraisal and synthesis of evidence and literature, as literature should only be incorporated into practice once the validity of the information has been established (Delaney and Fernandez 1999; Banzai *et al.* 2011). It has been noted that medical

professionals may lack the skills needed to adequately appraise and synthesize research (Hadley, Hassan and Khan 2008) and this may be due to the fact that such skills are difficult to grasp if not incorporated into education programs and student curricula (Coomarasamy 2003; Khan and Coomarasamy 2006; Agrawal, Szatmari and Hanson 2008; Aiyer 2008). Banzai *et al.* (2011) posit that the most effective means of developing evidence based practitioners is through the incorporation of evidence based practice into the chiropractic curricula.

Research and evidence based practice has been incorporated into most chiropractic curricula internationally (Haldeman 2005; Hall 2011) and this is also the case in South Africa, with both the Durban University of Technology (DUT) and the University of Johannesburg (UJ) incorporating research into student curricula (C.A.S.A. 2014). Evidence at present suggests that this may be reaping rewards, as chiropractors who have had greater exposure to literature and evidence based practice in their education demonstrate greater knowledge and confidence in the appraisal of research articles (Walker *et al.* 2014).

A positive association between research training and education and a positive perception and attitude towards research has also been noted (Zhang 1996; Newell and Cunliffe 2003; McCoy 2008). Positive perception is vital in evidence based practice as this increases utilisation: a correlation between improved perception and increased utilisation was noted by Gordon (2012), who also reported a high utilisation of research in chiropractic practice in South Africa. This was attributed to the evidence based education chiropractors receive in South Africa (Gordon 2012).

Continuous professional development, which has become mandatory in South Africa as of the 1st of January 2013 (AHPCSA 2012; CASA 2014), may also be an effective means of teaching skills of appraisal and synthesis of evidence and literature (Bolton 2002; Newell and Cunliffe 2003; Haneline 2007) and ensuring that practitioners remain current and acquire new and updated knowledge and skills, improve ethical performance and enhance professional integrity (Bolton 2002; Mazmanian and Davis 2002; AHPCSA 2014). In countries where mandatory continued professional development requirements exist for chiropractors, most respondents felt that it was of benefit (Bolton 2002; Stuber *et al.* 2005). However, there is limited information regarding the effect of continued professional development on research knowledge and perception and on treatment choices made by practitioners.

2.3.5.1.1 Philosophy

Three philosophical schools of thought exist within chiropractic, namely straight, mixers, and evidence based practitioners (Keating, Cleveland III and Menke 2004). It has been suggested that evidence based or mixer chiropractors are generally in support of the research process, and make use of evidence based guidelines in the treatment and management of their patients (Keating, Cleveland III and Menke 2004). Straight chiropractors, on the other hand may not be open to examining the outcomes of their treatment, and do not consider chiropractic a testable science, viewing it rather as a belief system (Cooper and McKee 2003).

There is little research regarding the effects of philosophy on awareness and perception of research. It has also been suggested that straight chiropractors may not be opposed to research (Keating, Cleveland III and Menke 2004), but instead choose to focus on research relating to subluxation (Owens 1999) which they believe leads to interference with the innate intelligence within the nervous system and which is a primary underlying risk factor for almost all disease (Keating, Cleveland III and Menke 2004).

Philosophy may influence treatment of mechanical neck pain through means other than the awareness and perception of research. Straight chiropractors base their treatment upon the detection and correction of the vertebral subluxation, and as such, their treatment relies almost exclusively on spinal adjustments and rarely the use of other techniques or modalities (Kaptchuk and Eisenberg 1998; Keating, Cleveland III and Menke 2004). In contrast, mixer or evidence based chiropractors believe that the vertebral subluxation is one of many causes of disease, and thus their treatment pattern is varied, involving a variety of modalities such as spinal manipulation, auxiliary therapeutic techniques and rehabilitation (Keating, Cleveland III and Menke 2004). One could therefore postulate that higher levels of utilisation of manipulation may be noted amongst straight chiropractors, whilst higher levels of utilisation of auxiliary therapeutic techniques and rehabilitation may be noted amongst mixer or evidence based chiropractors; however, evidence in the literature to support this postulation is limited.

2.3.5.1.2 Age

The emphasis of undergraduate training may shift through the years which is the case regarding evidence based practice as this has only recently been added to educational programs (Haldeman 2005). Practitioners with increased age and experience are less likely

to have exposure to evidence based practice in undergraduate training, and have had less experience and training in research appraisal and synthesis (Walker *et al.* 2014). As such, age may therefore correlate with poorer skills at research appraisal and synthesis (Coomarasamy 2003; Khan and Coomarasamy 2006; Agrawal, Szatmari and Hanson 2008; Aiyer 2008) and lower perceptions of research and evidence based practice (Zhang 1996; Newell and Cunliffe 2003; McCoy 2008).

The relationship between research skills and age appears to be supported in literature with Walker *et al.* (2008) noting that younger practitioners had the highest understanding of research methodology. The same can, however, not be said of the relationship between age and perception, as Banzai *et al.* (2011) noted a positive perception of research amongst Australasian, European and North American students, whilst Rieder (2010) and Newell and Cunliffe (2003) noted less positive perception in South African and British chiropractic students respectively. Gordon (2012) also noted that in South Africa, the highest perception of the importance of research occurred in chiropractors who had 11-20 years of experience.

An association between age and philosophy may exist in South Africa. South African universities have a large evidence based focus. Keyter (2010) noted that most South African chiropractors (77.5%) identified strongly with the mixer and evidence based philosophies, while only a small percentage (10%) strongly associated with the straight philosophy. Different chiropractic institutes may teach different chiropractic philosophies (Wickes 2002) and may have different priorities regarding teaching of evidence based practice and philosophy (Wyatt *et al.* 2005). Prior to the opening of the South African Institutes in 1989 (DUT) and 1993 (UJ) (CASA 2014) practitioners received their education in foreign countries (Myburgh and Mouton 2007). As such it is possible that practitioners who studied overseas, and therefore older practitioners, may have a greater chance of being exposed to straight philosophical orientations. The correlation between increased age and straight philosophy was noted by Palmer (2009) in an investigation into the management of low back pain by chiropractors in the greater Durban area. A previous study by Fletcher (2005) noted an decreased utilisation of soft tissue therapies by chiropractors of increased age in South Africa, and this positive association between increased age and the straight philosophy may contribute to such a finding.

2.3.5.1.3 Experience

It has been suggested that increased practice experience may result in practice activities and beliefs which may be different from those learned in training institutions (Myburgh and Mouton 2007). Increased experience may also lead to more patient successes, through which the practitioner may learn their deficiencies and strengths, and improve their knowledge and practice skills in many areas of practice such as diagnosis, treatment and management of patients (Ramsey *et al.* 2004; Black 2008; McCarthy 2008). However, little evidence has been presented within literature regarding altered treatment patterns which may occur due to experience. Practitioners with more experience, have been found to have higher incomes than practitioners with less experience (Waalen and Mior 2005), and this may be due to altered treatment patterns; however, numerous other reasons for this may be postulated.

Foreign experience may also play a role in practitioner treatment choices, as the practice of chiropractic may vary from country to country (McCarthy 2008). This has also been shown through the assessment of practice patterns around the world with certain modalities or treatment options being used more frequently in certain countries (Kopansky-Giles and Papadopoulos 1997; Nyiendo *et al.* 2001; Coulter and Shekelle 2005; Mootz *et al.* 2005; Waalen and Mior 2005; Pollentier and Langworthy 2007; De Gouveia 2009; Keyter 2010). Thus, practitioners who have practiced in foreign countries may be more likely to have learned new techniques of treatment protocols when exposed to such environments. However, this has not been directly assessed.

2.3.5.1.4 Gender

Studies which assessed the influence of gender on treatment noted that some differences between male and female practitioners did exist. Male physical therapists used mobilisation and manipulation more frequently than female physical therapists (Cromie, Robertson and Best 2000) while male chiropractors used soft tissue therapies less frequently than female chiropractors (Fletcher 2005). Some authors have also noted that gender may play a role in practitioners perception of research; however, mixed findings on this matter have been noted (Newell and Cunliffe 2003; Rieder 2010; Gordon 2012). These authors did not speculate on the reasons for such findings, and preliminary observations noted in these studies were inconclusive. To the researchers knowledge little further research has been conducted on the matter.

2.4 Summary

Evidence based recommendations for optimum treatment of mechanical neck pain (Carlesso *et al.* 2014) as found in the literature are:

- Manipulation or mobilisation (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Gross *et al.* 2010; Leaver *et al.* 2010);
- Multimodal therapy consisting of manipulation or mobilisation and advice, exercise and soft tissue techniques (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Bryans *et al.* 2014);
- Exercise (Gross et al. 2007; Hurwitz et al. 2009; Leaver et al. 2010; Kay et al. 2012; Bryans et al. 2014);
- Manipulation or mobilisation and exercise (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a);
- Laser (Gross *et al.* 2007; Chow *et al.* 2009; Hurwitz *et al.* 2009; Leaver *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a)
- Acupuncture and dry needling (Gross *et al.* 2007; Trinh *et al.* 2007; Leaver *et al.* 2010; Graham *et al.* 2013; Clar *et al.* 2014);
- Intermittent mechanical traction (Gross *et al.* 2007; Keyter 2010; Gordon 2012; Graham *et al.* 2013);
- Ergonomic interventions (Haines *et al.* 2009; Hoe *et al.* 2012);
- Psychological interventions by certified instructors (Graham *et al.* 2013; Gross *et al.* 2013b; Ford 2014); and
- Analgesic medications (Hurwitz *et al.* 2009).

However, the optimum treatment for mechanical neck pain is a combination of manual therapy and rehabilitation (Carlesso *et al.* 2014).

Studies which have assessed chiropractors' perception of research have shown that practitioners have positive perceptions of research and evidence based practice, both locally (Gordon 2012) and internationally (Schwarz and Hondras 2007; Suter *et al.* 2007; Hall 2011). However, studies which directly assess practice patterns of practitioners, may be an effective tool for showing adherence to clinical practice guidelines within the clinical setting (Carlesso *et al.* 2014). Very few such studies have however, directly assessed practitioner adherence to evidence based recommendations, specifically for mechanical neck pain.

A recent study by Carlesso *et al.* (2014) did, however, assess the practice patterns of chiropractors and physical therapists in mechanical neck pain where it was noted that both

chiropractors and physical therapists followed evidence based recommendations for the treatment of mechanical neck pain, with manual therapy and exercise being the most commonly used modalities (Carlesso *et al.* 2014). Although this study was conducted on an international population, it only produced a two percent response rate, which increases the possibility of bias and lack of generalisability (Mouton 1996; Booysen 2003; Carey, Clum and Dixon 2005; Mearns and Reader 2007). The present study, therefore, aims to assess the practice patterns of chiropractors in the treatment and management of mechanical neck pain, in order to determine if local chiropractors are practicing in an evidence based manner.

3 : METHODOLODY

3.1 Introduction

The aim of this chapter is to describe the research methodology. This will include the study design, population, sample, data collection tools, data analysis methods, research procedure and ethical considerations.

3.2 Study Design

This study was a quantitative, cross-sectional descriptive survey based study design utilising a questionnaire (Fink and Kosecoff 1985; Rosnfeld, Edwards and Thomas 1997). The questionnaire was adapted (with permission) from that used in a similar study by Palmer (2009) (Appendix 2). The questionnaire was modified and adapted for the purpose of investigating the chiropractic treatment of neck pain, after which the questionnaire underwent testing and amendments through an expert group and pilot study. The study was approved by the Faculty of Health Sciences Research and Ethics committee (Appendix A3), indicating that the study complied with the requirements of the Declaration of Helsinki (Johnson 2005; WMA 2013). The final questionnaire (Appendix A3) was then delivered to the participants.

3.3 Study Population

Chiropractors practicing in KwaZulu-Natal at the time of the study (March – June 2014) were invited to participate in the study. The recruitment of participants is highlighted under sample procedure.

3.3.1 Sample Size

At the time the study was performed, 182 chiropractors were registered with the Allied Health Professions Council in KwaZulu-Natal (Terry, pers. comm., 20 January 2014). Following exclusion of those chiropractors who had participated in the expert group, pilot study and those not meeting the inclusion criteria (Consort Diagram Chapter 4 Figure 4.1),

127 chiropractors were considered eligible for participation in this study. A minimum response rate of 70% (n = 89) was selected so as to allow for generalisations to be made about the study population, and in order to avoid selection bias (Esterhuizen, pers. comm., 2013-2014).

3.3.2 Sample Characteristics

In order to qualify for participation in this study, chiropractors had to comply with certain inclusion and exclusion criteria.

Inclusion criteria:

- All participants were required to read and sign the Letter of Information and Informed Consent (Appendix E).
- All participants had to be chiropractors registered with the AHPCSA.
- All participants had to be practicing in KwaZulu-Natal at the time of the study.
- All participants had to have been practicing for a minimum of six months at the time of the study.
- Participants full contact details were required so that they could be contacted and asked if they were willing to participate in the research.

Exclusion criteria:

- All participants who participated in either the research expert group or the research pilot study were excluded from the study.
- New graduates who had been practicing for less than six months were excluded from the study.
- Chiropractors that were not currently practicing, or were employed in a field that did not include chiropractic clinical practice at the time of the study, were excluded from the study.

3.3.3 Sample Method

Total sample selection was used for the entire population of chiropractors in KwaZulu-Natal eligible for the study (Mouton 1996; Dyer 1997; Brink, Van der Walt and Van Rensburg 2012). The respondents were entitled to participate of their own will. This method of sampling is referred to as self-selection (Dyer 1997), and may be considered to be a limitation, as the entire population may not be represented (Dyer 1997). Some participants may see value, or be more interested in particular studies, and as such, be more inclined to

participate in such studies (Mouton 1996; Booysen 2003). To minimise the effect of this limitation, a minimum response rate of 70% was selected, to allow for generalisations to be made about the study population, and avoid selection bias (Esterhuizen, pers. comm., 2013-2014).

3.4 Data Collection Tools

3.4.1 Questionnaire Background and Design

Mouton (2001) stated that it is preferable to use previously validated questionnaires in questionnaire based studies, however, at the time of this study, no such questionnaires were available for utilisation, and the study by Carlesso *et al.* (2014) was published after ethical approval was given for the study to commence. The questionnaire utilised in this dissertation was therefore adapted from a questionnaire used by Palmer (2009). This questionnaire was used to assess the chiropractic treatment of low back pain in the Greater Durban Area and was not published (Palmer 2009).

After permission was granted by Palmer (2009), to utilise and adapt the questionnaire for the purposes of this study (Appendix A2). Several modifications had to be made to the questionnaire so as to meet the aims and objectives of this study; these are outlined in Appendix C1. These modifications led to the formation of the pre-expert group questionnaire (Appendix B2) containing both structured questions (answers were provided from which the participants could choose), and unstructured questions (where participants were required to answer questions on their own) (Babbie 2010). The majority of questions were structured, utilising a 5 point Likert Scale, allowing for a greater quantity of questions to be answered before participants began to fatigue (Brink, Van der Walt and Van Rensburg 2012).

3.4.2 Study Questionnaire Validity and Reliability

3.4.2.1 Expert Group

An expert group is a group of individuals who meet and exchange information, and provide feedback on a particular topic, thus providing greater understanding and further insight into the topic (Huston and Hobson 2008; Massey 2011). The expert group is utilised as a platform for the research to be guided by experts in the field, allowing any inconsistencies or failures in the questionnaire to be addressed (Brink, Van der Walt and Van Rensburg 2012). The purpose of the expert group is to ensure the face validity, content validity and construct

validity of the Pre-Expert group questionnaire (Appendix B2), thereby developing a questionnaire with limited potential for misinterpretation by the respondents (Scollon, Scollon and Jones 2012). Face validity ensures that 'on the face' the questionnaire is valid and credible (Bernard 2000), construct validity ensures that the questionnaire accurately measures what is intended to be measured, and content validity ensures that the questionnaire addresses all of the objectives set out by the researcher (Graziano and Raulin 2004).

Mouton (1996) stated that an expert group should consist of six to ten homogenous participants and as such the expert group included the researcher, the research supervisor, a chiropractic student who had previously conducted a questionnaire based study, a chiropractic student currently conducting a questionnaire based study, two practicing chiropractors, and a member of the chiropractic department at the Durban University of Technology. The expert group participants received a set of three documents. These included a Letter of Information and Informed Consent – Expert Group (Appendix D2), Code of Conduct and Confidentiality Statement (Appendix D1), and the Pre-Expert Group questionnaire (Appendix B2). Prior to commencing, participants were required to read and sign the Letter of Information and Informed Consent, Code of Conduct and Confidentiality Statement. Following this, each question in the questionnaire was discussed in sequential order, and members of the expert group were encouraged to make queries and recommendations, with changes being made on the recommendations of participants after group consensus (Morgan 1997). All changes to the Pre-Expert group questionnaire were recorded in Appendix C2. The expert group meeting was recorded, and the recording transferred to DVD. Following the expert group, the Post-Expert Group questionnaire was developed (Appendix B3).

3.4.2.2 Pilot Study

A pilot study involves using a small sample of individuals which are representative of the total population, and testing the instrument which will be utilised in the main study (Simon 2010). The purpose of the pilot study is to serve as a "trial run" prior to commencement of the main study, and to assist the researcher in determining the time required for completion of the questionnaire. In addition, it allows the researcher to identify problem areas within the questionnaire and ensures that the questions are as clear, concise, relevant and user friendly as possible. This process allows the researcher to make corrections to the

questionnaire prior to administration to the main sample group (Lancaster, Dodd and Williamson 2004; De Vos 2011).

As participants had to be representative of the total population of the study, they were also expected to meet inclusion and exclusion criteria set for the study. Four participants were given the letter of information and informed consent (Appendix E) and the Post-Expert Group questionnaire (Appendix B3). They were then asked to complete the letter of information and informed consent and were asked to complete the questionnaire and voice any concerns they may have. All changes which were then made to the Post-Expert group questionnaire were recorded in Appendix C3 after which the Final questionnaire was developed (Appendix B4).

3.4.3 Final Questionnaire

The final questionnaire (Appendix B4) consisted of six parts:

- Personal information.

Participants were questioned on their demographic factors such as age, gender and ethnicity.

- Pre- and Post-Graduate education.

Participants were questioned on their educational background.

- Philosophical outlook.

Practitioners were questioned on their philosophical outlook or orientation i.e. straight, mixer or evidence based.

- Treatment.

Practitioners were questioned regarding their approach to the treatment of acute and chronic non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy.

- Management.

Practitioners were questioned regarding their approach to the management of acute and chronic non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy.

- Patient advice and education.

Practitioners were questioned regarding the advice and educational information they provided to patients when treating acute and chronic non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy.

3.5 Research Procedure

Before commencement of this study, the Chiropractic Association of South Africa (CASA) was contacted and permission was granted to perform the study on its members (Appendix A1). The physical, postal and email addresses, as well as landline numbers of the entire population of chiropractors in KwaZulu-Natal was obtained from the Allied Health Professions Council in an email format, and via the CASA website (CASA 2013; Terry, pers. comm., 20 January 2014).

Once ethical clearance was granted (Appendix A3) the study population was contacted, either telephonically or via email, and asked if they would be willing to participate in the research study. Participants were able to decline the invitation, after which they would be recorded as a non-response (Lapane, Quilliam and Hughes 2007). Respondents willing to participate were then questioned in terms of the inclusion and exclusion criteria, and those not meeting these criteria were excluded from the total sample.

Once participants agreed to participate in the research study and fulfilled the inclusion and exclusion criteria, the method of delivery and collection of the Letter of Information and Informed consent (Appendix E) and Final Questionnaires (Appendix B4) was arranged. Participants could choose from three methods of delivery:

- Paper copy hand delivered; delivered by the researcher to the participants practice;
- Fax; and
- Email (in the form of an attachment).

Three methods of return were available to participants, depending on their preference:

- Participants could either fax (option 1) or email (option 2) the Letter of Information and Informed Consent and the Questionnaire to a neutral third party. The Letter of Information and Informed Consent and returned Questionnaire was printed out and placed into separate sealed boxes, Labelled Box A and Box B. The Letter of Information and Informed Consent containing the participants name and contact details, was used by the third party to tick off names of participants, to allow for determination of the response rate. No identifying markers were placed on the returned questionnaires, so as to maintain the participants' anonymity (Mouton 1996).
- The third option was for the documents to be collected by the researcher. The Letter of information and informed consent and questionnaire were placed into two separate

sealed boxes, Labelled Box 1 and Box 2. The Letter of Information and Informed Consent which contained the participants name and contact details, was used to tick off names of participants to allow for determination of the response rate. No identifying markers were placed on the returned questionnaires, so as to maintain the participants' anonymity (Mouton 1996).

After the initial contact, a three week period was allowed for a response. Participants were then contacted and reminded of the study. Thereafter, participants were contacted every second week, until the minimum response rate was met. A cut off period of two months for return of the questionnaire was set so as to limit the number for follow-up calls to participants thereby protecting their ethical right not to participate in the survey. After two months participants not returning the questionnaires were recorded as non-responders (Esterhuizen, pers. comm., 2013-2014).

3.6 Data Management and Analysis

3.6.1 Data Management

The data collected through the questionnaire was coded and captured into an Excel spreadsheet. For ease of statistical analysis the data was managed as follows:

Part 1 - Personal information:

- Question 1.1 - Age: Participants age was captured as the actual age specified by the participant, and then coded and placed into age categories.
- Question 1.2 - Gender: Participants were placed into two groups; male and female.
- Question 1.3 - Ethnicity: Participants were placed into one of six groups; Black, Coloured, Indian, White, Other and Non-Specified.

Part 2 - Pre- and Post-Graduate education:

- Question 2.1 - University of Qualification: Participants responses were placed into one of three groups; Durban University of Technology, University of Johannesburg and Other, with the "other" options coded based on participant responses.
- Question 2.2 - Chiropractic qualification obtained: Participants responses were placed into one of three groups; Master's Degree in Technology of Chiropractic, Doctor of Chiropractic and Other, with the "other" options coded based on participant responses.

- Question 2.3 - Other qualifications: Participants were able to choose and were coded as either yes or no. Reasons for selecting “no” were coded based on participant responses.
- Question 2.4 - Practice experience: Participants responses were based on years in practice, and were coded based on available options.
- Question 2.5 - Attendance of health related conferences: Participants responses were based on frequency of attendance of such conferences, and were coded based on available options.
- Question 2.6 - Short courses: Participants were able to choose yes or no, and were coded as yes = 1 or no = 2. If their response was yes, they were then asked to specify, with coding based on participant responses.
- Question 2.7 - Subscription to literature: Participants were able to choose yes or no, and were coded as yes = 1 or no = 2. If their response was yes, they were then asked to specify, with coding based on participant responses.
- Question 2.8 - Influence of Post-Graduate education on practice: Participants were able to choose yes or no, and were coded as yes = 1 or no = 2. If their response was yes, they were then asked to specify, with coding based on participant responses.

Part 3 - Philosophical Outlook: Responses pertaining to philosophy were coded as one of four groups, with more than one option available to participants.

Part 4, 5 and 6 - Treatment: For the remainder of the questionnaire, four types of questions were available to the participant.

- Structured questions: These questions were presented in the form of a 5 point Likert scale. These were coded according to the degree of utilisation of the modalities; Always = 1, Frequent = 2, Occasionally = 3, Rarely = 4 and Never = 5. Where other options were chosen by the participant, an extra category was added to the data and again captured according to the Likert Scale.
- Structured questions: A 15 point structured question with results coded from 1-15.
- Combined structured and unstructured questions: Participants were able to choose yes or no, and were coded as yes = 1 or no = 2. If their response was no, they were then asked to specify why, with coding based on participant responses.
- Combined structured and unstructured questions: Participants were able to choose yes or no, and were coded as yes = 1 or no = 2. If their response was yes, they were then asked to specify why, with coding based on participant responses.

These criteria were used for data analysis and presentation. However, to assess the factors influencing treatment protocols utilised by participants, the demographic, educational and philosophical factors were allocated into smaller groups:

- Age: Two groups were used - younger than 35 and over 35 years of age.
- Gender: Two groups were used - male and female.
- University of Qualification: Three groups were used - Durban University of Technology, University of Johannesburg and “Other”.
- Years in practice: Two groups were used - 10 years and less and more than 10 years.
- Post Graduate Education: Two groups were used - Participants who attended health related conferences at least once every second year, attended short courses and subscribed to journals or magazines formed one group, while those who did not meet these requirements formed a second group.
- Foreign experience: Two groups were used - Participants who had foreign experience and those who had not had any foreign experience.
- Philosophy: Three groups were used - Straight, Mixer and Evidence Based. Participants who associated with more than one philosophy were placed in the either Straight or Evidence Based groups as these are the two poles of the philosophy scale. Participants who associated with all of the philosophies were excluded.

3.6.2 Statistical Analysis

Statistical analysis was conducted using SPSS version 20. The first three objectives were descriptive in nature and mostly entailed descriptive statistics, using frequency tables with counts and proportions to describe responses to categorical variables, and shown graphically by means of bar and pie charts. The fourth and final objective involved assessing the association between demographic, educational and philosophical factors and the treatment of acute and chronic non-specific neck pain, whiplash and degenerative cervical radiculopathy and these associations were tested using the independent-samples Mann-Whitney U test and the independent-samples Kruskal-Wallis test. A p value of <0.05 was used to indicate statistical significance (Esterhuizen, pers. comm., 2013-2014).

3.7 Ethical Considerations

- Ethical clearance was granted by the Institutional Research Ethics Committee (Appendix A3).
- Before commencing the study the Chiropractic Association of South Africa (CASA) was contacted and permission was granted to perform the study on its members (Appendix A1).
- Participants were invited to participate in this study and participated of their own free will, and no form of coercion or remunerations were used or offered.
- The confidentiality and anonymity of the participants was maintained as no identifying data was placed on the questionnaire and through specific methodological steps taken to assure participant confidentiality and anonymity as highlighted sections 3.5 and 3.6.
- No risk or discomfort occurred to the participants during this study.
- Participants were also welcome to withdraw from the study at any point, until submission. Once the questionnaire had been posted into the sealed container, the container could not be opened as this would violate the confidentiality of the other respondents.
- All the above factors were also highlighted to the patient in the Letter of Information and Informed Consent (Appendix E).

4 : RESULTS AND DISCUSSION

4.1 Introduction

This chapter represents the results, statistical analysis and discussion of the quantitative data obtained from questionnaire (Appendix B4). It should be noted that this chapter will include both the results and the discussion per objective, so as to facilitate ease of review and interpretation of large volumes of data.

The results and discussion are organised according to their relationship with the respective objectives of the study. An initial description and discussion of the study response rate is followed by a description and discussion regarding the treatment, management and patient educational strategies used by the study population in their approach to mechanical neck pain. This is followed by data regarding the treatment of sub classifications of mechanical neck pain such as non-specific neck pain, whiplash associated disorder, degenerative cervical radiculopathy, acute and chronic types of these conditions, as well as acute and chronic types of mechanical neck pain. This will then be followed by a description and discussion of the demographic, educational and philosophical profile of the participants, and cross tabulation between these factors and treatment options used by the study participants.

Bar graphs and tables are used to graphically present the data, with a short description accompanying each bar graph or table. However, due to the large volume of data produced by the questionnaire, only the information most pertinent to the current topic is presented in this chapter, along with the relevant literature related to mechanical neck pain. The entirety of the statistical information can be found in the Statistical Analysis Appendix (Appendix F).

4.2 Practitioner Participation

4.2.1 Population

According to data from the Allied Health Profession Council and the Chiropractic Association of South Africa (CASA) a total of 182 chiropractors were registered in KwaZulu-Natal (CASA

2013; Terry, pers. comm., 20 January 2014). However of the 182, 55 did not meet the inclusion criteria (18 were no longer practicing or retired, 16 had relocated, nine could not be contacted (the contact detail given in the Allied Health register were incorrect and no contact details could be found on the CASA register or anywhere else online, four were used in the pilot study, four were used in the expert group, two had only recently qualified and two were on maternity leave). This meant that the total population equated to 127 possible participants. This whole group was regarded as the sample, with everyone being invited to participate. A response rate of 70% (n = 89) was required in order to avoid bias, and allow for findings to be generalised across other chiropractic populations (Lapane, Quilliam and Hughes 2007; Esterhuizen, pers. comm., 2013-2014).

4.2.2 Consort Diagram

The study population is graphically presented in Figure 4.1 below.

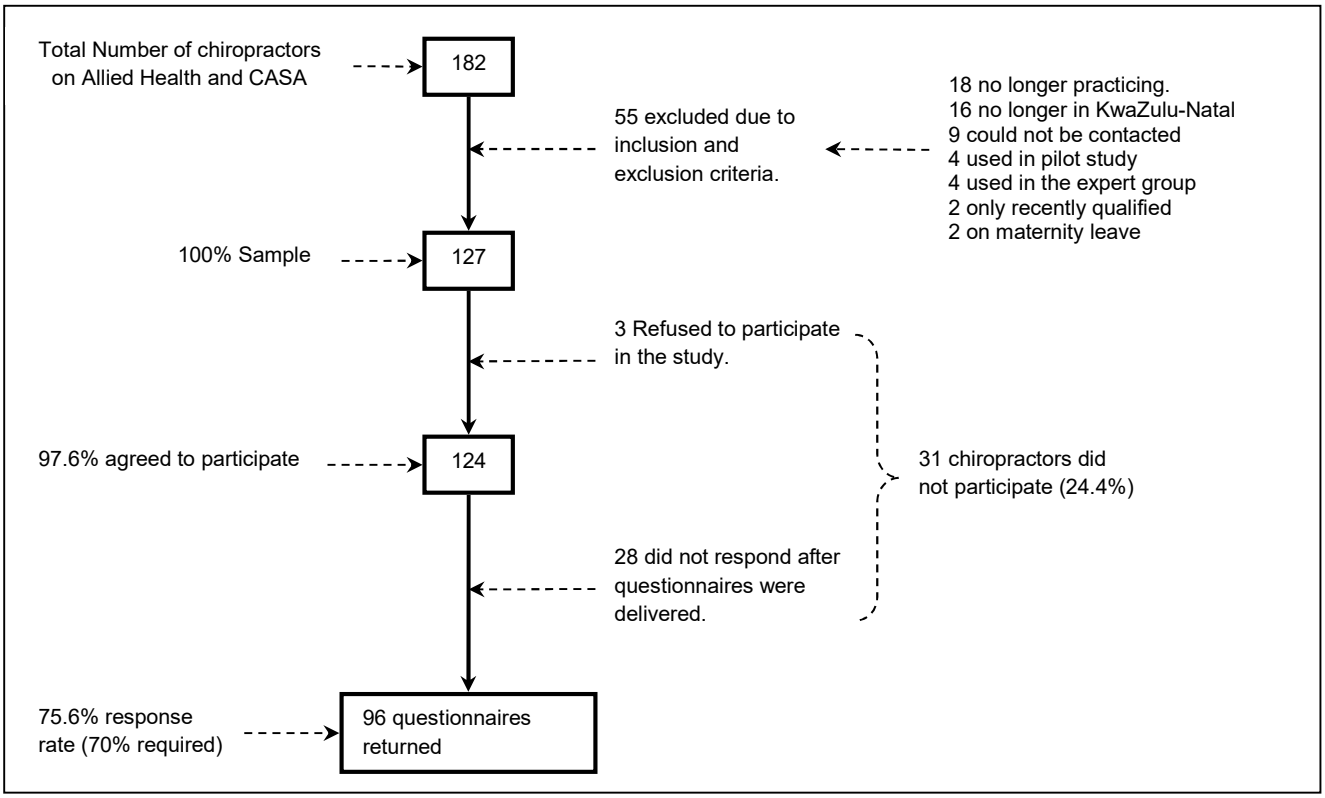

Figure 4.1: Consort diagram

4.2.3 Response Rate

Ninety six chiropractors agreed to participate in the study and completed the questionnaire, equating to a 75.6% response rate. These findings are similar to previous findings of questionnaire based studies conducted on the chosen sample population (Palmer 2009;

Slabbert 2014). However, when compared to previous studies which assessed the chiropractic treatment of neck pain, this response rate was far greater (Carlesso *et al.* 2014). Factors which may have increased practitioner response rate included:

- Participants were reminded numerous times to complete the questionnaire, which has previously been suggested to improve response rate and diversity of the response pool (Edwards *et al.* 2002; Lapane, Quilliam and Hughes 2007; Suter *et al.* 2007).
- The treatment of neck pain forms an integral part of chiropractic practice (Bryans *et al.* 2014) and as such, it is possible that more practitioners may be interested in the topic at hand, and may therefore be more likely to respond to the questionnaire, due to the self-selection nature of the recruitment process (Mouton 1996; Dyer 1997).

Factors which may have limited practitioner response rate included:

- The length of the questionnaire (2342 words), as it has been noted that questionnaires consisting of more than 1000 words (Jepson *et al.* 2005) are associated with decreased response rates (Jepson *et al.* 2005).
- Form-filling fatigue (Symon, McStea and Murphy-Black 2005), as numerous questionnaire based studies (Gordon 2012; Evans 2013; Ford 2014; Slabbert 2014) have been conducted on the population in question in recent years.
- Practitioner time constraints in practice (Symon, McStea and Murphy-Black 2005).

However these factors did not seem to have a significant affect on the participants in the current study given the favourable response rate.

Due to the fact that survey type research is associated with difficulties in obtaining responses (Dyer 1997), a response as little as 10% may be considered a strong response for a voluntary survey without reward (Carey, Clum and Dixon 2005). Whilst responses of 10% to 20% may allow for generalisability (Carey, Clum and Dixon 2005; Mearns and Reader 2007), some authors have suggested that responses of 40% to 100% are required for generalisability (Lindstrom 2007). Based on these recommendations, the response rate of this study allows for generalisability, as well as limiting the possibility of bias (Lapane, Quilliam and Hughes 2007; Lindstrom 2007; Esterhuizen, pers. comm., 2013-2014).

Data was collected by means of a self-administered questionnaire (Appendix B4), which gathered the data prospectively and enabled it to be quantified and analysed (Mouton 1996; Dyer 1997). This method of data collection may however be prone to bias, as participants with a particular interest in a topic would have been more likely to respond (Mouton 1996;

Dyer 1997), therefore it should be noted that there is a possibility that the 24.4% of non-respondents may have differing opinions to those participants who elected to participate in the study (Lapane, Quilliam and Hughes 2007; Suter *et al.* 2007). For these reasons the results cannot be regarded as representing the opinion of the entire population of chiropractors in KwaZulu-Natal.

4.3 Objective 1

Objective 1: To determine the chiropractic treatment and management of mechanical neck pain and to compare this to evidence based recommendations for the treatment of mechanical neck pain.

4.3.1 Results

This section outlines results obtained regarding the treatment and management of mechanical neck pain as well as the patient educational strategies used by participants. These results represent the calculated average of the participant responses regarding acute and chronic non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy and as such no n-values are presented.

4.3.1.1 Treatment of Mechanical Neck Pain

Q4.1.1 + Q4.1.2 + Q4.1.3 + Q5.1.1 + Q5.1.2 + Q5.1.3 = Which of the following would you use to treat the condition (Non-specific neck pain, Whiplash associated disorder and Degenerative cervical radiculopathy) if no red flags were present? The most common (always and frequent) treatment options used by the participants were spinal manipulation (92.2%), auxiliary therapeutic techniques (87.8%) and the initiation of a rehabilitation program (66.9%). There was a fairly even distribution of responses in the usage of non-steroidal anti-inflammatory drugs, analgesics and traction with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range. The least common (rarely and never) treatment options were referral to a homeopath (76.2%), the use of a cervical collar (77.2%) and referral to a medical doctor for pain control (59%) or to a medical specialist (59%) (Table 4.1).

Table 4.1: Treatment choices across various types of mechanical neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Spinal manipulation	92.2	5.9	1.9
Auxiliary therapeutic techniques.	87.8	8.7	3.6
Initiate rehabilitation program	66.9	20.9	12.3
Advise a non-steroidal anti-inflammatory or analgesic	25.5	42.7	31.8
Traction	28.4	27.3	44.2
Refer the patient to a medical doctor for pain control	11.1	29.9	59
Refer the patient to a medical specialist	8.8	37.7	53.5
Advise use of a cervical collar	8	14.8	77.2
Refer the patient to a homeopath	4.9	18.9	76.2

Q4.2.1 + Q4.2.2 + Q4.2.3 + Q5.2.1 + Q5.2.2 + Q5.2.3 = Which form of articular manipulation would you most commonly use if no red flags were present? Participants most commonly attempted to adjust a specific segment only (79.1%), followed by adjusting multiple segments throughout the spine (52.2%). Adjusting the segment on both sides (42.7%), mobilisation (41.7%) and adjust multiple segments within the cervical spine (40.2%) were used more commonly than not, whilst participants rarely used instrument assisted adjustments (74.3%) (Table 4.2).

Table 4.2: Articular manipulation used across the categories of mechanical neck

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	79.1	12.2	8.7
Adjust multiple segments throughout the spine	52.2	27.4	20.5
Adjust segment on both sides	42.7	35.6	21.8
Mobilisation	41.7	35.7	22.6
Adjust multiple segments throughout the cervical spine	40.2	34.7	25.1
Instrument assisted adjustment	11.7	14	74.3

Q4.3.1 + Q4.3.2 + Q4.3.3 + Q5.3.1 + Q5.3.2 + Q5.3.3 = Would you regard the articular manipulation as the primary intervention of your treatment protocol? Nearly 77% of participants regarded the articular manipulation as the primary intervention while 23.3% did not.

Q4.4.1 + Q4.4.2 + Q4.4.3 + Q5.4.1 + Q5.4.2 + Q5.4.3 = Which auxiliary therapeutic techniques, if any, would you use in the treatment? The most commonly used auxiliary therapeutic techniques used by participants were ischaemic compression, dry needling, massage and static stretching with 75.2%, 74.2%, 70.6% and 52.0% respectively. There was a fairly even distribution of usage of modalities such as heat therapy, cryotherapy, soft tissue

mobilisation and kinesio taping with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range. The least commonly (rarely and never) used modalities were hydrotherapy (93.1%), instrument assisted soft tissue mobilisation (80.5%) and interferential current (73.4%). Most electrical modalities were rarely used with more than 65% of participants stating that they rarely or never used such modalities (Table 4.3).

Table 4.3: Auxiliary therapeutic techniques used across the categories of mechanical neck

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Ischaemic compression – digital pressure on trigger points	75.2	16.7	8.1
Dry needling	74.2	18.5	7.3
Massage	70.6	17.1	12.3
Static stretching	52	24.5	23.5
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	43.7	31.9	24.6
Soft tissue mobilisation (active release and myofascial release)	38.5	31.8	29.7
Cryotherapy (ice pack, etc.)	35	29.6	35.4
Heat therapy (heat pack, etc.)	30.7	32.1	37.2
Kinesio taping or similar	29.7	26	44.3
Dry Needling in conjunction with electrical modalities	17.7	14.4	67.9
Ultrasound	15.5	15.8	68.7
Interferential current (I.F.C.)	15.5	11.1	73.4
Transcutaneous electrical nerve stimulation (T.E.N.S.)	15.4	18.2	66.5
Stretch and spray techniques	14.5	13.5	72
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	8.8	10.7	80.5
Refer to another therapist for myofascial component	8.8	20.7	70.5
Hydrotherapy	4	2.9	93.1
Acupuncture	1	0	0
Laser	1	0	0

4.3.1.2 Management of Mechanical Neck Pain

Q6.1.1 + Q6.1.2 + Q6.1.3 + Q7.1.1 + Q7.1.2 + Q7.1.3 = After how many days would you request your first follow-up? The majority (74.1%) of participants believed that the first follow-up should occur two to three days after the initial visit, with the majority of the participants believing that the first follow up should occur within the first 3 days (85.9%) of the initial visit (Table 4.4).

Table 4.4: Number of days at which the first follow-up be requested by participants

Days	%
1	11.8
2	40.1
3	34.0
4	4.5
5	2.8
6	0.3
7	3.3
8	0.3
9	0
10	0.5
11	0.3
12	0.3

Q6.2.1 + Q6.2.2 + Q6.2.3 + Q7.2.1 + Q7.2.2 + Q7.2.3 = After how many treatments with no relief would you consider further investigation? Eighty eight percent of participants believed that patients should have responded after two to six treatments, and that further investigation should be considered if the patient had not responded in this time period (Table 4.5).

Table 4.5: Number of treatments with no relief after which further investigation would be considered

Treatments	%
1	0.8
2	4.5
3	34
4	26.1
5	13.9
6	9.6
7	1.7
8	2.3
9	0.2
10	1
11	0
12	1.6
13	0
14	0.8
14+	0.5

Q6.3.1 + Q6.3.2 + Q6.3.3 + Q7.3.1 + Q7.3.2 + Q7.3.3 = If the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take? If patients were unresponsive to the treatment protocol used, most participants would change the treatment protocol after reassessing the patient (58.3%) or after sending the patient for further investigation (56.3%). Participants rarely or never continued to treat the patient, either

via the same treatment (91.4%) or a different treatment approach (91.4%) before reassessing the condition (Table 4.6).

Table 4.6: Actions take if patients were not responding to treatment

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Change treatment protocol after reassessing the patient	58.3	38.6	3.1
Change treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	56.3	40	3.7
Continue treating with original treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	33.3	49.7	17
Continue treating with original treatment protocol after reassessing the patient	26	40.8	33.1
Refer to another health care practitioner	17.1	60.5	18.9
Change treatment protocol without reassessment	3.8	4.8	91.4
Continue treating with original treatment protocol without reassessment	2.4	6.1	91.4

Q6.4.1 + Q6.4.2 + Q6.4.3 + Q7.4.1 + Q7.4.2 + Q7.4.3 = Once the patient has become pain free, do you advise follow-up treatments? Eight-four percent of participants said that they would advise follow-up treatments once the patients become pain free.

4.3.1.3 Patient advice and education in Mechanical Neck Pain

Q8.1.1 + Q8.1.2 + Q8.1.3 + Q9.1.1 + Q9.1.2 + Q9.1.3 = Which of the following do you advise as part of patient advice and education? Table 4.7 shows that the most common advice and education given to patients by the participants was postural and ergonomic advice (92.5%), home stretches (82.1%), home strengthening exercises (63.8%), cryotherapy (54.4%), stress management (54.4%) and heat therapy (50.2%). There was a fairly even distortion with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range (Table 4.7).

Table 4.7: Advice given to patients

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	92.5	6.8	0.7
Home stretches	82.1	9.9	8.1
Home strengthening exercises	63.8	19.7	16.6
Cryotherapy (ice pack, etc.)	54.4	27.5	18.1
Stress management	54.4	29	16.7
Heat therapy (heat pack, etc.)	50.2	27.1	22.8
Nutritional therapy (supplements and diet)	38.7	33.4	27.9
Proprioceptive exercise	35.4	38	26.7
Strengthening exercise under instruction	34	36.2	29.8

4.3.2 Discussion

4.3.2.1 Comparison Between Treatment of Mechanical Neck Pain and Evidence Based Recommendations

As is highlighted in Section 4.1.1.1 practitioners in KwaZulu-Natal favoured the use of spinal manipulation (92.2%), auxiliary therapeutic techniques (87.8%) and rehabilitation (66.8%), whilst most commonly using modalities such as ischaemic compression (75.2%), dry needling (74.2%), massage (70.6%), static stretching (52.0%) and PNF stretching (43.7%). These findings are comparable to previous studies which assessed the practice patterns of chiropractors (Kopansky-Giles and Papadopoulos 1997; Coulter and Shekelle 2005; Mootz *et al.* 2005; Ailliet, Rubinstein and de Vet 2010; Humphreys *et al.* 2010; Keyter 2010; Gordon 2012), whilst also in line with the definition of chiropractic by the World Federation of Chiropractic (WFC): “A health profession concerned with the diagnosis, treatment and prevention of mechanical disorders of the musculoskeletal system, and the effects of these disorders on the function of the nervous system and general health. There is an emphasis on manual treatments including spinal adjustment and other joint and soft-tissue manipulation” (WFC 2014).

The findings of this study were compared to the many systematic reviews which have investigated and made recommendations on the optimal treatment of mechanical neck pain (Gross *et al.* 2007; Vernon, Humphreys and Hagino 2007; Haines *et al.* 2009; Hurwitz *et al.* 2009; Walser, Meserve and Boucher 2009; Bongers *et al.* 2010; D’Sylva *et al.* 2010; Gross *et al.* 2010; Hoe *et al.* 2012; Kay *et al.* 2012; Patel *et al.* 2012; Graham *et al.* 2013; Kroeling *et al.* 2013; Clar *et al.* 2014) and this comparison is highlighted in Table 4.8.

Table 4.8: Comparison between the evidence based recommendations and participant responses

	Recommendation	Participant responses (always of frequently)	Participant responses (rarely and never)
Evidence of benefit	**Manipulation or mobilisation** (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Gross *et al.* 2010; Leaver *et al*. 2010)	**Manipulation** (92.2%) **Mobilisation** (41.7%)	**Manipulation** (1.9%) **Mobilisation** (22.6%)
	Multimodal therapy consisting of manipulation or mobilisation + advice, exercise/rehabilitation and soft tissue techniques (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Bryans *et al.* 2014).	**Manipulation** (92.2%) **Mobilisation** (41.7%) **Advice:** Postural and ergonomic (92.5%), home stretches (82.1%) and home strengthening (63.8%) **Exercise and rehabilitation: i**nitiate rehabilitation program (66.9%), advise home strengthening (63.8%) or strengthening under instruction (34%) **Soft tissue techniques: i**schemic compression (75.2%), massage (70.6%) and soft tissue mobilisation (38.5%)	**Manipulation** (1.9%) **Mobilisation** (22.6%) **Advice:** postural and ergonomic (0.7%), home stretches (8.1%) and home strengthening (16.7%) **Exercise and rehabilitation:** initiate rehabilitation program (12.3%), advise home strengthening (16.7%) or strengthening under instruction (29.8%) **Soft Tissue Techniques:** ischemic compression (8.1%), massage (12.3%) and soft tissue mobilisation (29.7%)
	Exercise and rehabilitation *(*Gross *et al.* 2007*;* Hurwitz *et al.* 2009*;* Leaver *et al.* 2010*; Kay et al. 2012;* Bryans *et al.* 2014*)*	**Exercise and rehabilitation:** Initiate rehabilitation program (66.9%), advise home strengthening (63.8%) or strengthening under instruction (34%)	**Exercise and rehabilitation: i**nitiate rehabilitation program (12.3%), advise home strengthening (16.7%) or strengthening under instruction (29.8%)
	Manipulation or mobilisation + exercise/ rehabilitation (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al*. 2013; Gross *et al.* 2013a).	**Manipulation** (92.2%) **Mobilisation** (41.7%) **Rehabilitation: i**nitiate rehabilitation program (66.9%), advise home strengthening (63.8%) or strengthening under instruction (34%)	**Manipulation** (1.9%) **Mobilisation** (22.6%) Rehabilitation: initiate rehabilitation program (12.3%), advise home strengthening (16.7%) or strengthening under instruction (29.7%)
	Laser (Gross *et al.* 2007; Chow *et al.* 2009; Hurwitz *et al.* 2009; Leaver *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a)	**Laser** (1.0%)	**Laser** (0.0%)
	Acupuncture and dry needling (Gross *et al.* 2007; Trinh *et al.* 2007; Leaver *et al.* 2010; Graham *et al.* 2013; Clar *et al.* 2014)	**Acupuncture** (1.0%) **Dry needling** (74.2%)	**Acupuncture** (0%) **Dry needling** (7.3%)
	Traction - Intermittent mechanical (Gross *et al.* 2007; Keyter 2010; Gordon 2012; Graham *et al.* 2013)	**Traction** (28.4%)	**Traction** (44.2%)
	Ergonomic interventions (Haines *et al.* 2009; Hoe *et al.* 2012)	**Ergonomic Advice** (92.5%)	**Ergonomic Advice** (0.7%)

Evidence of benefit *(Continued)*	**Psychological interventions by certified instructors** (Graham *et al.* 2013; Gross *et al.* 2013b; Ford 2014)		
	Medication – Analgesics (Hurwitz *et al.* 2009)	**Advise non-steroidal anti-Inflammatory or analgesic** (25.5%)	**Advise non-steroidal anti-Inflammatory or analgesic** (31.8%)
Insufficient evidence	**Electrotherapeutic techniques** (Hurwitz *et al.* 2009; Leaver *et al.* 2010; Kroeling *et al.* 2013; Bryans *et al.* 2014; Edwards *et al.* 2002)	**TENS** (15.4%) **IFC** (15.5%)	**TENS** (66.5%) **IFC** (73.4%)
	Advice alone (Mearns and Reader 2007; Hurwitz *et al.* 2009; Gordon 2012; Evans 2013; Gross *et al.* 2013b)	**Advice:** Postural and ergonomic (92.5%), home stretches (82.1%) and home strengthening (63.8%)	**Advice:** Postural and ergonomic (0.7%), home stretches (8.1%) and home strengthening (16.7%)
	Medication – Non-steroidal anti-inflammatory drugs and other medications (Hurwitz *et al.* 2009)	**Advise non-steroidal anti-Inflammatory or analgesic** (25.5%)	**Advise non-steroidal anti-inflammatory or analgesic** (31.8%)
	Soft tissue techniques (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; Brosseau *et al.* 2012; Patel *et al.* 2012; Bryans *et al.* 2014)	**Soft tissue techniques:** Ischemic compression (75.2%), massage (70.6%) and soft tissue mobilisation (38.5%)	**Soft tissue techniques:** Ischemic compression (8.1%), massage (12.3%) and soft tissue mobilisation (29.7%)
Evidence of No benefit	**Thermal therapies** (Hurwitz *et al.* 2009; Graham *et al.* 2013)	**Heat therapy** (30.7%) **Cryotherapy** (35%)	**Heat therapy** (37.2%) **Cryotherapy** (35.4%)
	Ultrasound (Gross *et al.* 2007; Hurwitz *et al.* 2009; Graham *et al.* 2013)	**Ultrasound** (15.5%)	**Ultrasound** (68.7%)
	Traction – Continuous mechanical (Gordon 2012; Graham *et al.* 2013)	**Traction** (28.4%)	**Traction** (44.2%)
	Psychological interventions by physical therapists (Gross *et al.* 2013b)	**Stress management** (54.4%)	**Stress management** (16.7%)
	Cervical collars (Hurwitz *et al.* 2009; Gross *et al.* 2013b)	**Cervical collars** (8%)	**Cervical collars** (77.2%)

There appears to be much overlap and agreement between the treatment options used by participants, and the evidence based recommendations. Modalities which were recommended by these systemic reviews were for the most part modalities always or frequently used by participants in the current study, whilst modalities which were not recommended or had insufficient evidence of benefit, were indicated to be rarely or never utilised by participants of the study. There was however, relatively low usage of some recommended modalities such as laser, over-the counter medications and traction. These findings may be due to numerous factors, however the most likely factors include:

- There appears to be some confusion within the literature with regards to the efficacy of some modalities. Analgesics (Hurwitz *et al.* 2009) and intermittent mechanical traction (Gross *et al.* 2007; Keyter 2010; Gordon 2012; Graham *et al.* 2013) for

example, are recommended, whilst other form of medications (Hurwitz *et al.* 2009) and continuous traction (Gordon 2012; Graham *et al.* 2013) were not recommended or had insufficient evidence. The design of the current questionnaire did not allow for the analysis of specific forms of medication and traction, and as such does not address such intricacies.

- Secondly, the questionnaire failed to assess modalities such as laser. Participants were required to include such options under the "other" section of the questionnaire, but may have failed to do so due to the length of the questionnaire, form-filling fatigue, time constraints and lack of familiarity with questionnaire based studies (Jepson *et al.* 2005; Symon, McStea and Murphy-Black 2005). As such the exclusion of such choices may be viewed as a limitation of the study.

The lower utilisation of modalities such as over-the-counter medication and laser are more likely be due to the fact that chiropractic is a manual profession, which has a focus on treatment through the use of manual therapies done by hand (WFC 2014) and which draws its identity from the use of the manipulation (Nyiendo *et al.* 2001; Waalen and Mior 2005). There is good quality evidence supporting the use of manual therapy and rehabilitation within the literature at present, and as such chiropractors may choose instead to focus their treatment on manual therapy and rehabilitation (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a). No medical professional is expected to follow all stipulated recommendations, and as stated by Sackett *et al.* (1996) "the practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research", and therefore, it is expected that practitioners in any profession will choose to follow those recommendations suitable to their professional identity. Some participants did however chose to use these modalities, and this may be due to their own interpretation of the literature, their own preference or their interpretation of the questionnaire.

Evidence suggests that the combination of manual therapy and exercise may provide the optimum treatment for mechanical neck pain (Carlesso *et al.* 2014). The utilisation of rehabilitation by participants in the current study is slightly lower than expected (66.9%), especially when compared to a similar study by Carlesso *et al.* (2014) which noted that 79% of chiropractors and physical therapists used exercise in the treatment of mechanical neck pain. Thus a possible 33.1% of practitioners within the current study, were not adhering to evidence based guidelines. This represents a 12.1% increase compared to the findings noted by Carlesso *et al.* (2014). This discrepancy may therefore indicate that an increased

adherence to evidence based guidelines existed within the population assessed by Carlesso *et al.* (2014). It may however also be a product of the low response rate obtained by Carlesso *et al.* (2014), which may have led to slight bias as participants with a particular interest in the topic and research in general would be more likely to respond to a self-administered questionnaire (1996; Dyer 1997).

Another possible reason for this finding may lie in the questionnaire construction of this study. Practitioners had several choices within the questionnaire where they may have responded regarding their use of rehabilitation, including; initiating rehabilitation; advise home strengthening, stretching, proprioceptive exercises; and refer patient for strengthening under instruction (Appendix B4). This makes it difficult to determine the use of rehabilitation by practitioners as some practitioners may feel certain forms of rehabilitation may be more pertinent in different subgroups of mechanical neck pain, whilst some may also not initiate the rehabilitation themselves, but instead choose to refer for strengthening under instruction. They may therefore recognize the importance of rehabilitation, however choose to not conduct the patient rehabilitation themselves. This section of the questionnaire could be more broadly structured in future research.

4.3.2.2 Comparison between patient management and education strategies, and evidence based recommendations for Mechanical Neck Pain

Although the study aimed to assess the chiropractic management and educational strategies of chiropractors, a comparison with the literature is difficult. This is due to the apparent paucity in literature regarding the optimum dosage (Gross *et al.* 2007; Gross *et al.* 2010; Gross *et al.* 2013a), optimum course of care (Hurwitz *et al.* 2009) and educational strategies in the treatment of mechanical neck pain (Hurwitz *et al.* 2009; Gross *et al.* 2013b). There was however, a large level of agreement amongst practitioners on how mechanical neck pain should be managed, as well as how patients should be educated, which may be of value for future research directed at such topics.

Findings within the study suggest that most practitioners (74.1%) believe that the first follow up should occur two to three days after the first treatment, and that they would consider taking further action if the patient had not responded to treatment within three to five treatments (74.0%). Practitioners also rarely refer patients with mechanical neck pain to other practitioners with only 17.1% of practitioners always or frequently referring patients to other health care practitioners if patients were not responding to treatment. They instead

chose to change their treatment approach, either after reassessing the patient (58.3%) or after sending for further investigations, such as blood work and radiographs (56.3%). These findings may suggest that the majority of practitioners expect a relatively successful outcome in patients treated for mechanical neck pain, and therefore, it is possible that dosage intervals of two to three days may in fact be the optimum dosage intervals. However limited evidence within literature exists regarding the optimal dosage and as such no such comparison or conclusion may be drawn (Gross *et al.* 2007; Hurwitz *et al.* 2009; Gross *et al.* 2010; Gross *et al.* 2013a).

Limited evidence exists to indicate that no one form of advice or education is superior to another (Hurwitz *et al.* 2009). However, the use of advice has been advocated when used as part of a multimodal treatment regime (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Bryans *et al.* 2014), which may explain the high level of usage by practitioners within this study. The most common form of advice used by practitioners included advice on posture and ergonomics (92.5%), home stretching (82.1%) and home strengthening exercises (63.8%). This may be due to the fact that poor posture has been noted to be a contributing factor to the development of neck pain (Binder 2007; Sihawong *et al.* 2011), and that some authors have stated that ergonomic interventions may be of benefit in the treatment of mechanical neck pain (Haines *et al.* 2009; Hoe *et al.* 2012). Stretching and strengthening also forms part of rehabilitation, which, as previously mentioned, is recommended in the treatment of mechanical neck pain either as a singular entity (Gross et al. 2007; Hurwitz et al. 2009; Leaver et al. 2010; Kay et al. 2012; Bryans et al. 2014) or as part of a multimodal treatment regime (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a).

4.4 Objective Two

Objective Two: To determine the chiropractic treatment of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy.

4.4.1 Results

4.4.1.1 Non-Specific Neck Pain

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants approach to non-specific neck pain as a whole. As such results represent the calculated

average of participant responses relating to both acute and chronic types of this condition and no n-values are presented.

Q4.1.1 + Q5.1.1 = Which of the following would you use to treat the condition if no red flags were present? The most common treatment options used by the participants were spinal manipulation (99.5%), auxiliary therapeutic techniques (87.4%) and initiate rehabilitation program (65.9%). The remaining treatment options were rarely used, however the least frequently used treatment options included cervical collars (92.5%), referral to a homeopath (78.1%), referral to a medical specialist (76.4%) and referral to a medical doctor for pain control (71.8%) (Table 4.9).

Table 4.9: Non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Spinal manipulation	99.5	0.5	0
Auxiliary therapeutic techniques.	87.4	8.4	4.3
Initiate rehabilitation program	65.9	20.3	14
Traction	17.8	27.6	54.7
Advise a non-steroidal anti-inflammatory	13.7	44.2	42.1
Refer the patient to a medical doctor for pain control	3.8	24.5	71.8
Refer the patient to a homeopath	2.7	19.3	78.1
Refer the patient to a medical specialist	1.6	22	76.4
Advise use of a cervical collar	1.1	6.5	92.5

Q4.2.1 + Q5.2.1 = Which form of articular manipulation would you most commonly use if no red flags were present? As is evident in Table 4.10 participants most commonly attempted to adjust a specific segment only (78%), this was followed by adjusting multiple segments throughout the spine (57.5%), adjusting segment on both sides (47.9%) and adjustment of multiple cervical spine segments (45.8%). There was a fairly even distribution of responses regarding the usage of mobilisation with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range. Instrument assisted adjustments were rarely used (75.9%).

Table 4.10: Articular manipulation used in acute non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	78	12.9	9.2
Adjust multiple segments throughout the spine	57.5	24	18.5
Adjust segment on both sides	47.9	34.5	17.8
Adjust multiple segments throughout the cervical spine	45.8	35.4	18.9
Mobilisation	29.3	41.5	29.3
Instrument assisted adjustment	9.4	14.8	75.9

Q4.3.1 + Q5.3.1 = Would you regard the articular manipulation as the primary intervention of your treatment protocol? Eighty-nine percent of participants regarded the articular manipulation as the primary intervention.

*Q4.4.1 + Q5.4.1 = W*hich auxiliary therapeutic techniques, if any, would you use in the treatment of this condition? The three most common auxiliary therapeutic techniques used by participants were dry needling, ischaemic compression, massage, static and PNF stretching with 76.3%, 76.2%, 69.2%, 54.5% and 48.2% respectively. A fairly even distribution of responses was noted regarding the use of soft tissue mobilisation, cryotherapy, heat therapy and kinesio taping with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst other modalities were rarely ever used as is presented in Table 4.11 below.

Table 4.11: Auxiliary therapeutic techniques used in the acute non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Dry needling	76.3	17.4	6.4
Ischaemic compression – digital pressure on trigger points	76.2	16.4	7.4
Massage	69.2	18.1	12.8
Static stretching	54.5	25.4	20.2
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	48.2	34.3	17.7
Soft tissue mobilisation (active release and myofascial release)	39.3	32.8	28
Cryotherapy (ice pack, etc.)	33.6	30.3	36.3
Heat therapy (heat pack, etc.)	30.2	33.9	36.1
Kinesio taping or similar	26.1	29.9	44.1
Dry needling in conjunction with electrical modalities	15.8	15.2	69
Stretch and spray techniques	14.8	14.8	70.5
Interferential current (I.F.C.)	14.2	10.4	75.4
Transcutaneous electrical nerve stimulation (T.E.N.S.)	13.2	17.6	69.3
Ultrasound	11	18.8	70.2
Refer to another therapist for myofascial component	9.1	21.6	69.3
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	8.1	12.4	79.6
Hydrotherapy	3.3	3.3	93.5

Q8.1.1 + Q9.1.1 = Which of the following do you advise as part of patient advice and education? Figure 4.12 shows that the most common advice and education given to patients by the participants was postural and ergonomic advice (93.6%), home stretches (88.8%), home strengthening exercises (64.4%), stress management (61.9%), cryotherapy (58.5%) and heat therapy (47.9%). There was a fairly even distribution for the usage of nutritional therapy, proprioceptive exercises and strengthening under instruction with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range.

Table 4.12: Advice and education given in acute non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	93.6	6.4	0
Home stretches	88.8	7.5	3.7
Home strengthening exercises	64.4	20.2	15.5
Stress management	61.9	26.5	11.6
Cryotherapy (ice pack, etc.)	58.5	24.9	16.7
Heat therapy (heat pack, etc.)	47.9	28.3	23.9
Nutritional therapy (supplements and diet)	33.8	34.4	31.8
Proprioceptive exercise	32.6	40.8	26.8
Strengthening exercise under instruction	31.4	39.2	29.5

4.4.1.2 Whiplash Associated Disorder

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants approach to Whiplash Associated Disorder as a whole. As such results represent the calculated average of both acute and chronic types of this condition and therefore no n-values are presented.

Q4.1.2 + Q5.1.2 = Which of the following would you use to treat the condition if no red flags were present? In whiplash associated disorder the most common treatment options were spinal manipulation (93.8%, auxiliary therapeutic techniques (87.9%), and initiation of a rehabilitation program (69%). Practitioners rarely referred patients to homeopaths (78.3%), advised the use of cervical collars (64.8%), referred to medical doctor for pain control (61.6%) or referred to a medical specialist (57.5%). These findings are represented in Table 4.13.

Table 4.13: Treatment of acute whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Spinal manipulation	93.8	4.2	2.1
Auxiliary therapeutic techniques.	87.9	9	3.2
Initiate rehabilitation program	69	19.1	12
Advise a non-steroidal anti-inflammatory	32	42.1	25.9
Traction	26.8	22.5	50.9
Advise use of a cervical collar	14	21.4	64.8
Refer the patient to a medical doctor for pain control	10.9	27.6	61.6
Refer the patient to a homeopath	6	15.8	78.3
Refer the patient to a medical specialist	5.6	36.9	57.5

*Q4.2.2 + Q5.2.2 = W*hich form of articular manipulation would you most commonly use if no red flags were present? As shown in Table 4.14 participants most commonly attempted to only adjust specific segments (83.4%); followed by adjusting multiple segments throughout the spine (50.00%), mobilisation (44.4%), and adjust the segment on both sides (42.1%). Instrument assisted adjustments were rarely used (73.9%) and there was a fairly even distribution of responses regarding adjusting multiple segments within the cervical spine with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range.

Table 4.14: Articular manipulation used in acute whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	83.4	7.2	9.4
Adjust multiple segments throughout the spine	50	28.9	21.3
Mobilisation	44.4	34.8	20.8
Adjust segment on both sides	42.1	34.4	23.6
Adjust multiple segments throughout the cervical spine	40.6	31.1	28.4
Instrument assisted adjustment	13.4	12.8	73.9

Q4.3.2 = In Acute Whiplash Associated Disorder would you regard the articular manipulation as the primary intervention of your treatment protocol? Nearly 72% of participants regarded the articular manipulation as the primary intervention in whiplash associated disorder.

Q4.4.2 = In Acute Whiplash Associated Disorder which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition? The three most common auxiliary therapeutic techniques used by participants were ischaemic compression, massage, dry needling and static stretching with 75.5%, 72.2%, 71.9% and 55% respectively. There was a fairly even distribution of usage of PNF stretching, soft tissue mobilisation, cryotherapy, kinesio taping and heat therapy with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the remaining modalities were rarely used. These findings are presented in Table 4.15.

Table 4.15: Auxiliary techniques used in acute whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Ischaemic compression – digital pressure on trigger points	75.5	16.4	8.2
Massage	72.2	16.1	11.8
Dry needling	71.9	20.8	7.5
Static stretching	55	22.1	23
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	42.3	30	27.8
Soft tissue mobilisation (active release and myofascial release)	40.3	30.5	29.4
Cryotherapy (ice pack, etc.)	38.7	26.9	34.4
Kinesio taping or similar	35.5	23.5	41.1
Heat therapy (heat pack, etc.)	26.9	32.8	40.4
Dry needling in conjunction with electrical modalities	18.6	12.6	68.9
Transcutaneous electrical nerve stimulation (T.E.N.S.)	17.5	17	65.6
Ultrasound	17	15.3	67.8
Stretch and spray techniques	16	12.2	71.9
Interferential current (I.F.C.)	15.8	11.4	72.8
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	9.8	9.9	80.4
Refer to another therapist for myofascial component	9.7	19.9	70.5
Hydrotherapy	3.8	3.3	92.9

Q8.1.2 + Q9.1.2 = W*hich of the following do you advise as part of patient advice and education?* As shown in Table 4.16 the most common advice and education given to patients was postural and ergonomic advice (91.4%), home stretches (82.4%), home strengthening (64.1%) and cryotherapy (57%). Stress management, heat therapy and proprioceptive exercises were also commonly used, and a fairly even distribution of responses was noted for the use of strengthening under instruction and nutritional therapy with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range.

Table 4.16: Advice and education given to patients with acute whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	91.4	8.1	0.6
Home stretches	82.4	8.6	9.2
Home strengthening exercises	64.1	19.3	16.6
Cryotherapy (ice pack, etc.)	57	27.3	15.8
Stress management	49.5	28.4	22.2
Heat therapy (heat pack, etc.)	49.2	26.8	24.1
Proprioceptive exercise	40.4	35.5	24.2
Strengthening exercise under instruction	34.2	35.9	30.1
Nutritional therapy (supplements and diet)	32.2	35.5	32.4

4.4.1.3 Degenerative Cervical Radiculopathy

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants approach to Degenerative Cervical Radiculopathy as a whole. Results represent the calculated average of both acute and chronic types of this condition and therefore no n-values are presented.

Q4.1.3 + Q5.1.3 = Which of the following would you use to treat the condition if no red flags were present? The most common treatment options used by participants were auxiliary therapeutic techniques (88.3%), spinal manipulation (83.3%) and initiating a rehabilitation program (66%). There was a fairly even distribution for the use of traction, non-steroidal anti-inflammatory drugs and analgesics and referral to a medical specialists with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the least common (rarely or never) treatment options employed by participants were advising the use of a cervical collar (74.3%) and referral to a homeopath (72.4%). These findings may be noted in Table 4.17.

Table 4.17: Treatment of acute degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Auxiliary therapeutic techniques.	88.3	8.6	3.2
Spinal manipulation	83.3	13.1	3.7
Initiate rehabilitation program	66	23.3	10.8
Traction	40.5	31.9	27
Advise a non-steroidal anti-inflammatory	30.9	41.9	27.3
Refer the patient to a medical specialist	19.2	54.1	26.7
Refer the patient to a medical doctor for pain control	18.6	37.8	43.6
Advise use of a cervical collar	9.1	16.6	74.3
Refer the patient to a homeopath	6	21.8	72.4

Q4.2.3 + Q5.2.3 = Which form of articular manipulation would you most commonly use if no red flags were present? As is evident in Table 4.17 participants most commonly attempted to adjust specific segments only (76.1%), followed by mobilisation (51.5%) and adjust multiple segments throughout the spine (49.2%) as shown in Table 4.18. There was a fairly even distribution for the use of adjustments applied to the segment on both sides or as multiple segments within the cervical spine with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range. Instrument assisted adjustments were rarely used (73.3%).

Table 4.18: Articular manipulation used in acute degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	76.1	16.5	7.4
Mobilisation	51.5	30.8	17.8
Adjust multiple segments throughout the spine	49.2	29.3	21.7
Adjust segment on both sides	38.1	38	24
Adjust multiple segments throughout the cervical spine	34.3	37.6	28.1
Instrument assisted adjustment	12.3	14.5	73.3

Q4.3.3 + Q5.3.3 = Would you regard the articular manipulation as the primary intervention of your treatment protocol? Sixty-nine percent of participants regarded the articular manipulation as the primary intervention.

Q4.4.3 + Q5.4.3 = Which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition? The three most common auxiliary therapeutic techniques used by participants were dry needling, ischaemic compression, massage and static stretching with 74.6%, 73.9%, 70.6% and 46.6% respectively (Table 4.19). A fairly even distribution was noted for the use of PNF stretching, soft tissue mobilisation, cryotherapy, heat therapy with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, with the remaining modalities being used rarely.

Table 4.19: Auxiliary therapeutic techniques used in acute degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Dry needling	74.6	17.5	8
Ischaemic compression – digital pressure on trigger points	73.9	17.4	8.8
Massage	70.6	17.1	12.3
Static stretching	46.6	25.9	27.5
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	40.6	31.4	28.2
Soft tissue mobilisation (active release and myofascial release)	36.1	32.3	31.7
Heat therapy (heat pack, etc.)	35.1	29.7	35.2
Cryotherapy (ice pack, etc.)	32.8	31.7	35.5
Kinesio taping or similar	27.5	24.8	47.9
Dry needling in conjunction with electrical modalities	18.7	15.4	66
Ultrasound	18.6	13.2	68.3
Interferential current (I.F.C.)	16.4	11.5	72.1
Transcutaneous electrical nerve stimulation (T.E.N.S.)	15.5	19.9	64.7
Stretch and spray techniques	12.6	13.7	73.8
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	8.7	9.8	81.7
Refer to another therapist for myofascial component	7.5	20.7	71.9
Hydrotherapy	5.0	2.2	92.9

Q8.1.3 + Q9.1.3 = Which of the following do you advise as part of patient advice and education? As shown in Table 4.20, the most common advice and education given to patients by the participants was postural and ergonomic advice (92.4%), home stretches (75.2%) and home strengthening (62.8%). Other forms of advice were frequently used included heat therapy (53.6%), stress management (51.7%), nutritional therapy (50%) and cryotherapy (47.9%). There was a fairly even distribution in responses regarding strengthening under instruction and proprioceptive exercises with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range (Table 4.20).

Table 4.20: Advice and education given to patients with acute degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	92.4	6	1.7
Home stretches	75.2	13.5	11.4
Home strengthening exercises	62.8	19.5	17.8
Heat therapy (heat pack, etc.)	53.6	26.2	20.3
Stress management	51.7	32.1	16.3
Nutritional therapy (supplements and diet)	50	30.5	19.6
Cryotherapy (ice pack, etc.)	47.9	30.2	21.9
Strengthening exercise under instruction	36.4	33.7	29.9
Proprioceptive exercise	33.2	37.6	29.3

4.4.2 Discussion

Non-specific neck pain, whiplash associated disorder, and degenerative cervical radiculopathy fall under the wider classification of mechanical neck pain (Gross *et al.* 2004; Gross *et al.* 2013a; Carlesso *et al.* 2014). These conditions are all mechanical in nature and may have much overlap however, they are distinct conditions which vary in aetiology and symptomatology. The level of evidence available within literature, regarding the treatment of each condition as a distinct entity also varies. There is an abundance of literature regarding the treatment of non-specific neck pain (Hurwitz *et al.* 2009), less evidence regarding the treatment of whiplash associated disorder (Hurwitz *et al.* 2009) and insufficient evidence for the conservative treatment of cervical radiculopathy (Hurwitz *et al.* 2009; Rodine and Vernon 2012). Some recommendations have been made for the treatment of non-specific neck pain and whiplash associated disorder (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; Leaver *et al.* 2010; Bryans *et al.* 2014), however, recommendations were of a similar nature to those made for mechanical neck pain with the combination of manual therapy, exercise and rehabilitation being most highly recommended modalities (Hurwitz *et al.* 2009). As the practitioner's adherence to evidence was discussed previously, this section instead

was used to assess the effect of the level of available evidence on the treatment choices made by practitioners.

In the case of non-specific neck pain, where evidence was abundant, practitioners rarely used modalities other than those which were highly recommended in the literature, that is they rarely strayed from the manual therapy and exercise treatment combination as recommended by authors for the treatment of mechanical neck pain (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a) and non-specific neck pain (Hurwitz *et al.* 2009). The frequency of utilisation of manipulation, rehabilitation and auxiliary therapeutic techniques however, remained high throughout all three conditions, which may be due to the recommendations for the conservative treatment of mechanical neck pain (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a). However, as is evident in Figure 4.2, which graphically presents the treatment modalities used by practitioners in KwaZulu-Natal, the treatment patterns of whiplash associated disorder and degenerative cervical radiculopathy included a much wider variation of treatment options.

Practitioners used traction, advised non-steroidal anti-inflammatory drugs and analgesics, referral to medical doctors for pain control, referral to homeopaths, referral to medical specialist or advising the use of cervical collars more frequently in treating whiplash associated disorder and degenerative cervical radiculopathy, when compared to non-specific neck pain. It may therefore be possible that the lower levels of evidence available for the conservative treatment of whiplash associated disorder and degenerative cervical radiculopathy may have lead practitioner to utilise a wider range of modalities as current evidence for optimal treatment of these conditions is inconclusive, especially when compared to that of non-specific neck pain (Hurwitz *et al.* 2009). It may however. also indicate that practitioners felt that these other modalities utilised may serve a purpose in the treatment of whiplash associated disorder and degenerative cervical radiculopathy and as such may require need further investigation.

Again, as is evident in Figure 4.2, as the level of evidence for specific conditions decreased, so too the frequency of utilisation of manipulation decreased. The utilisation of modalities such as mobilisation and traction, and referral to medical doctors for pain control, referral to homeopaths and referral to medical doctors however, increased (Hurwitz *et al.* 2009). These fluctuations of utilisation may be a product of several factors (Carlesso *et al.* 2014) however,

it is important to highlight some key findings relating to the literature, regarding the conservative treatment of these conditions.

The utilisation of mobilisation has been recomended in both non-specific neck pain and whiplash associated disorder, however the use of manipulation has only been recommended in non-specific neck pain (Hurwitz *et al.* 2009). This may have prompted the higher utilisation of mobilisation amongst study participants, as mobilisation was recommended in the treatment of whiplash associated disorder whilst manipulation was not. This finding may also explain the increased utilisation of traction, as traction is classified as being similar in nature to both manipulation and mobilisation as a form of manual therapy aimed at inducing joint movement, and as such practitioners may increase the utilisation of traction as levels of evidence for the use of manipulation decreases (Vernon, Humphreys and Hagino 2007; French *et al.* 2011). The levels of utilisation of traction may however, also be explained by the suggested physiological and biomechanical mechanisms of traction. Spinal traction has been said to results in the separation of vertebral bodies which results in mobilisation of the facet joints, expansion of intervertebral foramen, stretching of soft tissue and relaxation of muscle (Graham *et al.* 2013). As such, spinal traction may be of benefit in the treatment of conditions such as disc protrusions or herniations, nerve root impingements, joint hypomobility, subacute joint inflammation and paraspinal muscle spasms. This could explain the increased utilisation in both whiplash associated disorder and degenerative cervical radiculopathy (Haldeman and Dagenais 2012; Cameron 2013).

The increased referral of whiplash associated disorder and degenerative cervical radiculopathy by practitioners within the study may again be a product of the decreasing levels of evidence for conservative treatment of whiplash associated disorder and degenerative cervical radiculopathy. Practitioners may feel that evidence for the conservative treatment of these conditions may not be as conclusive as evidence for the conservative treatment of non-specific neck pain, and as therefor may have referred such conditions to other practitioners more frequently (Hurwitz *et al.* 2009). It should however be noted that levels of referral of all three types of mechanical neck pain remained relatively low across all these conditions and this may be a product of recommendations of effectiveness for the conservative treatment of mechanical neck pain, specifically manual therapy and rehabilitation (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a).

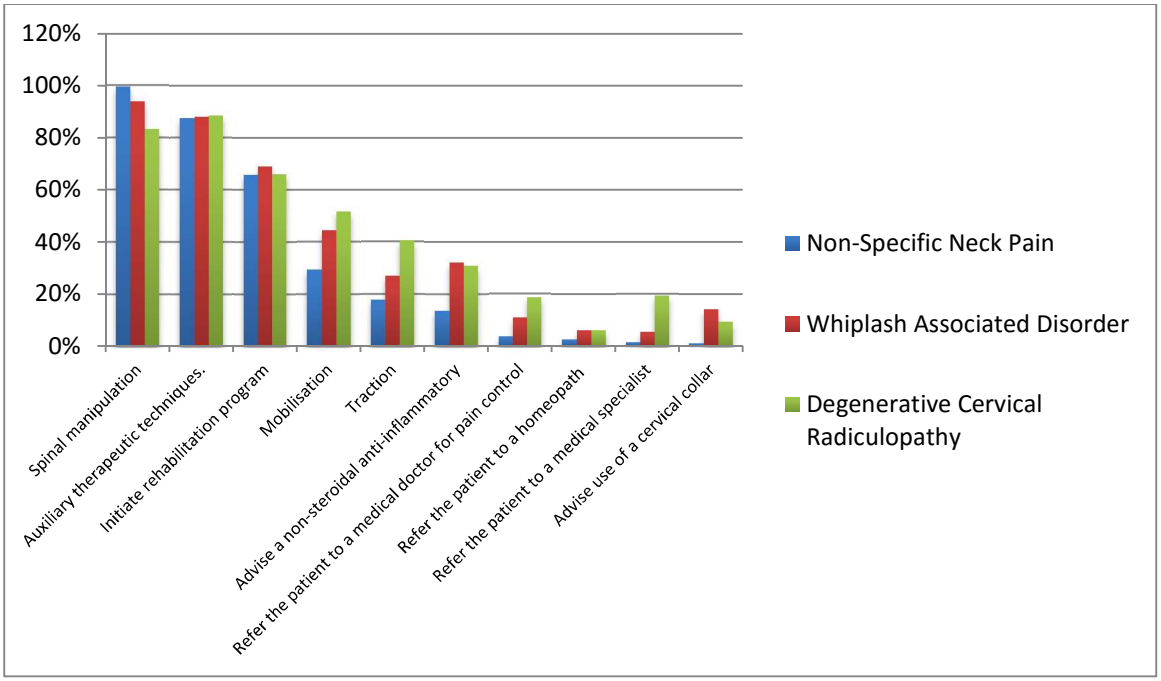

Figure 4.2: Usage (always and frequently) of treatment modalities by practitioners

When assessing variation in utilisation of auxiliary therapeutic modalities by practitioners, the variations appeared small and insignificant in nature. Practitioners again chose to most frequently utilise modalities which were manual in nature. This, as in mechanical neck pain, appears to be either a product of the evidence based recommendations for the utilisation of manual therapies in conjunction with exercise (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a), or due to the manual therapy tradition of chiropractic (WFC 2014). These findings are presented in Figure 4.3, which graphically presents the utilisation of auxiliary therapeutic techniques by participants.

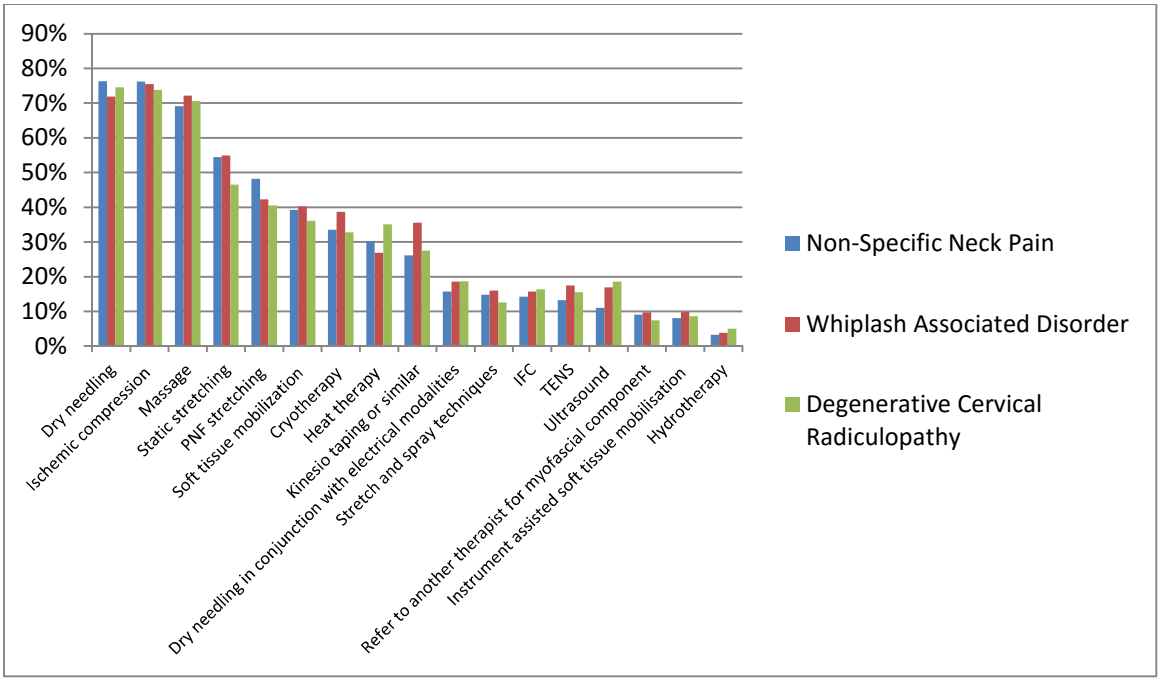

Figure 4.3: Usage (always and frequently) of auxiliary therapeutic techniques by practitioners

As with mechanical neck pain, the most commonly used forms of education and advice across all categories of mechanical neck pain included posture and ergonomic advice, home stretching and strengthening exercises (Figure 4.4). The reasons for the utilisation of these auxiliary therapies may be linked to the fact that poor posture has been noted to be a contributing factor to the development of neck pain (Binder 2007; Sihawong *et al.* 2011), and that some authors have stated that ergonomic interventions may be of benefit in the treatment of mechanical neck pain (Haines *et al.* 2009; Hoe *et al.* 2012). Stretching and strengthening, as with the treatment of mechanical neck pain, form part of rehabilitation, and as such, may be frequently used due to the recommendation of their usage in the treatment of mechanical neck pain either as a singular entity (Gross et al. 2007; Hurwitz et al. 2009; Leaver et al. 2010; Kay et al. 2012; Bryans et al. 2014) or as part of a multimodal treatment regime (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a). Some variation does exist in the utilisation of specific forms of advice or education in the different types of mechanical neck pain however, as no form of advice or education has been shown to be superior to another (Hurwitz *et al.* 2009) in the treatment of mechanical neck pain, and no specific recommendations have been made regarding educational strategies used in the specific conditions (Hurwitz *et al.* 2009), it is difficult to ascertain the exact reason for such shifts in utilisation.

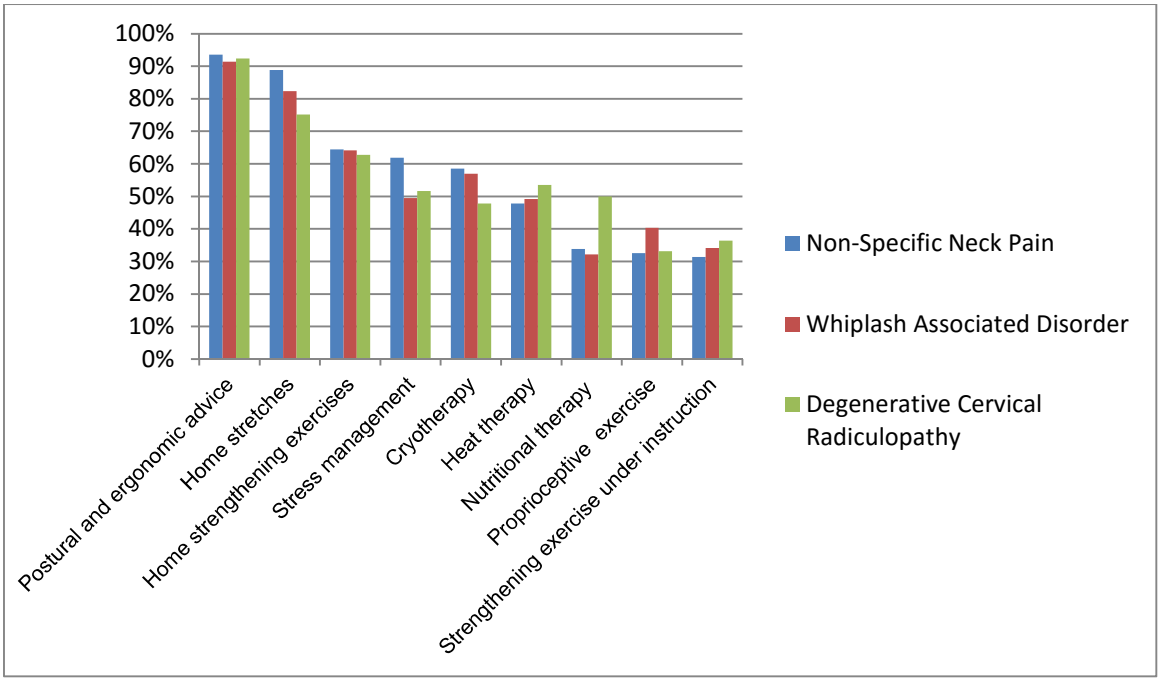

Figure 4.4: Usage (always and frequently) of advice and educational techniques by practitioners

4.5 Objective Three

Objective Three: To determine the chiropractic treatment of acute and chronic types of mechanical neck pain and sub-classifications of mechanical neck pain.

4.5.1 Results

4.5.1.1 Acute Mechanical Neck Pain

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants' approach to acute mechanical neck pain as a whole. Results represent the calculated average of acute non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy and therefore no n-values are presented.

Q4.1.1 + Q4.1.2 + Q4.1.3 = Which of the following would you use to treat Acute Mechanical Neck Pain (Acute non-specific neck pain, Acute Whiplash Associated Disorder and Acute Degenerative Cervical Radiculopathy) if no red flags were present? The most common (always and frequent) treatment options used by the participants were auxiliary therapeutic techniques (91.2%), spinal manipulation (89.9%) and the initiation of a rehabilitation program (58.6%). There was a fairly even distribution for non-steroidal anti-inflammatory drugs and analgesics with participant responses (always and frequently, occasionally, and rarely and

never) being within ±15% range. Other treatment options were rarely or never used as seen in Table 4.21.

Table 4.21: Treatment choices used across the various types of acute mechanical neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Auxiliary therapeutic techniques.	91.2	4.9	3.9
Spinal manipulation	89.9	6.9	3.1
Initiate rehabilitation program	58.6	25.6	15.9
Advise a non-steroidal anti-inflammatory	32.3	43.6	24.1
Traction	28.8	23.8	47.0
Refer the patient to a medical doctor for pain control	12.8	30.4	56.7
Advise use of a cervical collar	9.6	18.5	71.9
Refer the patient to a medical specialist	8.8	39.2	52
Refer the patient to a homeopath	3.9	18.7	77.4

Q4.2.1 + Q4.2.2 + Q4.2.3 = Which form of articular manipulation would you most commonly use if no red flags were present? Participants most commonly attempted to adjust the specific segment only (79.5%). This was followed by adjust multiple segments throughout the spine (48.2%), adjust the segment bilaterally (42.8%) and mobilisation (41.7%). Instrument assisted adjustments were rarely or never used (73.5%), whilst there was a fairly even distribution of the usage of the adjustment of multiple segments throughout the cervical spine with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range (Table 4.22).

Table 4.22: Articular manipulation used across various categories of acute mechanical neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	79.5	11.1	9.4
Adjust multiple segments throughout the spine	48.2	29.4	22.4
Adjust segment on both sides	42.8	37.1	20.1
Mobilisation	41.7	38.2	20.2
Adjust multiple segments throughout the cervical spine	38.1	34	27.9
Instrument assisted adjustment	13.1	13.4	73.5

Q4.3.1 + Q4.3.2 + Q4.3.3 = Would you regard the articular manipulation as the primary intervention of your treatment protocol? Nearly 74% of participants regarded articular manipulation as the primary intervention in acute mechanical neck pain.

Q4.4.1 + Q4.4.2 + Q4.4.3 = Which auxiliary therapeutic techniques, if any, would you use in the treatment? The most commonly used auxiliary therapeutic techniques used by

participants were dry needling, ischaemic compression, massage, static stretching and PNF stretching (73.5%, 72.9%, 71.9%, 51.9% and 45.7% respectively). As with mechanical neck pain there was a fairly even distribution of usage of heat therapy, cryotherapy, soft tissue mobilisation and kinesio taping with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the remaining modalities were rarely or never used (Table 4.23).

Table 4.23: Auxiliary therapeutic techniques used across various categories of acute mechanical neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Dry needling	73.5	19.1	7.5
Ischaemic compression – digital pressure on trigger points	72.9	18.8	8.3
Massage	71.9	16.7	11.4
Static stretching	51.9	21.8	26.3
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	45.7	26.8	27.5
Soft tissue mobilisation (active release and myofascial release)	42	29	29
Cryotherapy (ice pack, etc.)	41.8	29.5	28.8
Kinesio taping or similar	29.6	27.8	42.7
Heat therapy (heat pack, etc.)	27.4	32.7	39.9
Dry needling in conjunction with electrical modalities	19.3	15.6	65.1
Interferential current (I.F.C.)	16.4	10.9	72.7
Transcutaneous electrical nerve stimulation (T.E.N.S.)	15.1	16.9	68
Stretch and spray techniques	15.1	13.6	71.3
Ultrasound	15	16.9	68.1
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	8.7	10.9	80.5
Refer to another therapist for myofascial component	7.8	22.8	69.3
Hydrotherapy	4.7	2.6	92.7

Q8.1.1 + Q8.1.2 + Q8.1.3 = Which of the following do you advise as part of patient advice and education? The most common advice and education given to patients by the participants was postural and ergonomic advice (92%), home stretches (76%), cryotherapy (67.7%), home strengthening exercises (52.5%) and stress management (50.4%). There was a fairly even distribution of usage for the remaining forms of advice with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, as seen in Table 4.24.

Table 4.24: Advice given to patients with the various categories of acute mechanical neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	92	6.9	1.1
Home stretches	76	12.2	11.8
Cryotherapy (ice pack, etc.)	67.7	22.8	9.5
Home strengthening exercises	52.5	22.9	24.6
Stress management	50.4	30.4	19.3
Heat therapy (heat pack, etc.)	46	23	31
Nutritional therapy (supplements and diet)	33.9	32.5	33.6
Proprioceptive exercise	29.2	37.6	33.2
Strengthening exercise under instruction	27.5	35.3	37.2

4.5.1.2 Chronic Mechanical Neck Pain

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants approach to chronic mechanical neck pain as a whole. Results represent the calculated average of chronic non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy and therefore no n-values are presented.

Q5.1.1 + Q5.1.2 + Q5.1.3 = Which of the following would you use to treat the condition if no red flags were present? As is evident in Table 4.25, the most common (always and frequent) treatment options used by the participants were spinal manipulation (94.4%), auxiliary therapeutic techniques (84.5%) and the initiation of a rehabilitation program (75.3%). There was a fairly even distribution of usage of traction with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the remaining treatment options were rarely used.

Table 4.25: Treatment choices across the various categories of chronic mechanical neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Spinal manipulation	94.4	4.9	0.7
Auxiliary therapeutic techniques.	84.5	12.4	3.2
Initiate rehabilitation program	75.3	16.1	8.6
Traction	27.9	30.8	41.3
Advise a non-steroidal anti-inflammatory	18.7	41.9	39.4
Refer the patient to a medical doctor for pain control	9.3	29.4	61.2
Refer the patient to a medical specialist	8.8	36.1	55
Advise use of a cervical collar	6.5	11.1	82.4
Refer the patient to a homeopath	5.8	19.2	75.1

Q5.2.1 + Q5.2.2 + Q5.2.3 = Which form of articular manipulation would you most commonly use if no red flags were present? Participants most commonly attempted to adjust a specific segment only (78.8%). The remaining forms of articular manipulation, not including instrument assisted manipulation, were more frequently used than not. These findings are presented in Table 4.26.

Table 4.26: Articular manipulation used across the categories of mechanical neck

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	78.8	13.2	7.9
Adjust multiple segments throughout the spine	56.2	25.3	18.5
Adjust segment on both sides	42.5	34.1	23.5
Adjust multiple segments throughout the cervical spine	42.3	35.4	22.3
Mobilisation	41.7	33.2	25.1
Instrument assisted adjustment	10.2	14.6	75.2

Q5.3.1 + Q5.3.2 + Q5.3.3 = Would you regard the articular manipulation as the primary intervention of your treatment protocol? Nearly 80% of participants regarded the articular manipulation as the primary intervention in the treatment of chronic mechanical neck pain.

Q5.4.1 + Q5.4.2 + Q5.4.3 = Which auxiliary therapeutic techniques, if any, would you use in the treatment? The most commonly used auxiliary therapeutic techniques used by participants included ischaemic compression, dry needling, massage, static stretching and PNF stretching (77.5%, 75%, 69.4%, 52.1% and 41.6% respectively). A fairly even distribution of usage was noted for soft tissue mobilisation and heat therapy with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the remaining modalities were rarely used (Table 4.27).

Table 4.27: Auxiliary therapeutic techniques used across the categories of mechanical neck

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Ischaemic compression – digital pressure on trigger points	77.5	14.7	7.9
Dry needling	75	17.9	7.1
Massage	69.4	17.4	13.2
Static stretching	52.1	27.1	20.8
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	41.6	36.9	21.6
Soft tissue mobilisation (active release and myofascial release)	35	34.7	30.3
Heat Therapy (heat pack, etc.)	34.1	31.5	34.4
Kinesio taping or similar	29.8	24.3	46
Cryotherapy (ice pack, etc.)	28.2	29.7	42
Dry needling in conjunction with electrical modalities	16.1	13.1	70.8
Ultrasound	16	14.6	69.4
Transcutaneous electrical nerve stimulation (T.E.N.S.)	15.7	19.4	65
Interferential current (I.F.C.)	14.5	11.3	74.2
Stretch and spray techniques	13.9	13.4	72.7
Refer to another therapist for myofascial component	9.7	18.5	71.8
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	9	10.4	80.6
Hydrotherapy	3.3	3.3	93.4

Q9.1.1 + Q9.1.2 + Q9.1.3 = Which of the following do you advise as part of patient advice and education? Table 4.28 shows that all forms of advice and education were used more often than not. However, the most common advice and education given to patients by the participants was postural and ergonomic advice (92.9%), home stretches (88.2%), home strengthening exercises (75%), stress management (58.3%) and heat therapy (54.4%).

Table 4.28: Advice given to patients

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	92.9	6.8	0.4
Home stretches	88.2	7.5	4.3
Home strengthening exercises	75	16.4	8.6
Stress management	58.3	27.5	14.1
Heat therapy (heat pack, etc.)	54.4	31.1	14.5
Nutritional therapy (supplements and diet)	43.4	34.4	22.2
Proprioceptive exercise	41.5	38.3	20.3
Cryotherapy (ice pack, etc.)	41.2	32.1	26.7
Strengthening exercise under instruction	40.5	37.1	22.4

4.5.1.3 Acute Non-Specific Neck Pain

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants

approach to acute non-specific neck pain. These results represent the raw data obtained through the questionnaire and thus n-values are presented.

Q4.1.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which of the following would you use to treat the condition if no red flags were present? The most common treatment options used by the participants were spinal manipulation (98.9%; n = 95), auxiliary therapeutic techniques (91.5%; n = 87) and initiate rehabilitation program (53.8%; n = 50). The least commonly used treatment options included the use of cervical collars (91.4%; n = 85), referral to a homeopath (78.7%; n = 74), medical specialist (78.5%; n = 73) and medical doctor for pain control (70.7%; n = 65). These findings are presented in Table 4.29.

Table 4.29: Treatment of acute non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Spinal manipulation	98.9	1	0
Auxiliary therapeutic techniques.	91.5	4.2	4.2
Initiate rehabilitation program	53.8	26.9	19.4
Advise a non-steroidal anti-inflammatory	14.7	48.4	36.9
Traction	18.4	20.7	60.9
Refer the patient to a medical doctor for pain control	4.3	25	70.7
Advise use of a cervical collar	1	7.5	91.4
Refer the patient to a homeopath	1	20.2	78.7
Refer the patient to a medical specialist	1	20.4	78.5

Q4.2.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which form of articular manipulation would you most commonly use if no red flags were present? As is evident in Table 4.30 participants most commonly attempted to adjust a specific segment only (77.4%; n = 72) and this was followed by adjusting multiple segments throughout the spine (52.2%; n = 47), adjusting segment on both sides (48.90%; n = 43) and adjusting multiple segments throughout the cervical spine (41.6%; n = 37). There was a fairly even distribution in the usage of mobilisation with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst instrument assisted adjustments were rarely utilised (76.7%; n = 69).

Table 4.30: Articular manipulation used in acute non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	77.4	14	8.7
Adjust multiple segments throughout the spine	52.2	26.7	21.1
Adjust segment on both sides	48.9	36.4	14.8
Adjust multiple segments throughout the cervical spine	41.6	37.1	21.4
Mobilisation	23.4	46.7	30
Instrument assisted adjustment	10	13.3	76.7

Q4.3.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) would you regard the articular manipulation as the primary intervention of your treatment protocol? Eighty-six (89.6%) participants regarded the articular manipulation as the primary intervention in the treatment of acute non-specific neck pain.

Q4.4.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition? The three most common auxiliary therapeutic techniques used by participants were dry needling, ischaemic compression, massage and static stretching with 75.8% (n = 72), 74.7% (n = 71), 71.3% (n = 67) and 53.6% (n = 51). A fairly even distribution of responses was noted regarding the use of cryotherapy and heat therapy, with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst remaining modalities were rarely or never uses as is presented in Table 4.31 below.

Table 4.31: Auxiliary therapeutic techniques used in the acute non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Dry needling	75.8	17.9	6.3
Ischaemic compression – digital pressure on trigger points	74.7	18.9	6.3
Massage	71.3	18.1	10.7
Static stretching	53.6	25.3	21.1
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	52.2	28.7	19.1
Soft tissue mobilisation (active release and myofascial release)	41.9	31.2	26.9
Cryotherapy (ice pack, etc.)	39.6	33.0	27.5
Heat therapy (heat pack, etc.)	26.9	35.5	37.6
Kinesio taping or similar	25.8	31.2	43.1
Dry needling in conjunction with electrical modalities	17.4	16.3	66.3
Stretch and spray techniques	15.4	15.4	69.2
Interferential current (I.F.C.)	15.2	10.9	73.9
Transcutaneous electrical nerve stimulation (T.E.N.S.)	13.2	16.5	70.3
Ultrasound	12	17.6	70.3
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	8.6	12.9	78.5
Refer to another therapist for myofascial component	7.7	23.3	68.9
Hydrotherapy	4.3	2.2	93.5

Q8.1.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome), which of the following do you advise as part of patient advice and education? The most common advice and education given to patients by participants was postural and ergonomic advice (92.5%; n = 86), home stretches (82.9%; n = 76), cryotherapy (76.1%; n = 70), stress management (58.2%; n = 53), home strengthening exercises (53.2%; n = 50) and heat therapy (42.4%; n = 39) as is presented in Table 4.32.

Table 4.32: Advice and education given in acute non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	92.5	7.5	0
Home stretches	82.9	11.7	5.3
Cryotherapy (ice pack, etc.)	76.1	18.5	5.4
Stress management	58.3	28.6	13.2
Home strengthening exercises	53.2	23.4	23.4
Heat therapy (heat pack, etc.)	42.4	25	32.6
Nutritional therapy (supplements and diet)	28.9	33.3	37.8
Strengthening exercise under instruction	24.5	38.9	36.6
Proprioceptive exercise	24.2	42.9	33

4.5.1.4 Chronic Non-Specific Neck Pain

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants approach to chronic non-specific neck pain. These results represents the raw data obtained through the questionnaire and thus n-values are presented.

Q5.1.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which of the following would you use to treat the condition if no red flags were present? The most commonly used treatment options were spinal manipulation (100%; n = 96), auxiliary therapeutic techniques (83.2%; n = 79) and initiating a rehabilitation program (77.9%; n = 74). Other treatment options were rarely employed in the treatment of chronic non-specific neck pain as is evident in Table 4.33.

Table 4.33: Treatment of chronic non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Spinal manipulation	100	0	0
Auxiliary therapeutic techniques.	83.2	12.6	4.3
Initiate rehabilitation program	77.9	13.7	8.5
Traction	17.2	34.4	48.4
Advise a non-steroidal anti-inflammatory	12.7	40	47.3
Refer the patient to a homeopath	4.3	18.3	77.4
Refer the patient to a medical doctor for pain control	3.3	23.9	72.8
Refer the patient to a medical specialist	2.2	23.6	74.2
Advise use of a cervical collar	1.1	5.4	93.5

Q5.2.1: In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which form of articular manipulation would you most commonly use if no red flags were present? Table 4.34 shows that participants most commonly attempted to adjust the specific segment only(78.5%; n = 73), followed by adjusting multiple segments throughout the spine (62.5%; n = 59), adjusting multiple segments throughout the cervical spine (50%; n = 46) and adjusting the segment on both sides (46.8%; n = 43). A fairly even distribution was noted in the use of mobilisation with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst participants rarely used instrument assisted adjustments (75%; n = 69).

Table 4.34: Articular manipulation used in chronic non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	78.5	11.8	9.7
Adjust multiple segments throughout the spine	62.7	21.3	15.9
Adjust multiple segments throughout the cervical spine	50	33.7	16.3
Adjust segment on both sides	46.8	32.6	20.7
Mobilisation	35.2	36.3	28.6
Instrument assisted adjustment	8.7	16.3	75

Q5.3.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) would you regard the articular manipulation as the primary intervention of your treatment protocol? Eighty-five (88.5%) participants regarded the articular manipulation as the primary intervention.

Q5.4.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition? As presented in Table 4.35, the three most common auxiliary therapeutic techniques used by participants were ischaemic compression by digital pressure on trigger points, dry needling and massage with 77.7% (n = 73), 76.8% (n = 73) and 67.0% (n = 63) respectively. Static stretching and PNF stretching or similar stretching techniques were also commonly used with 55.3% (n = 52) and 44.1% (n = 41) stating that they always or frequently used these modalities. A fairly even distribution of responses was noted for the use of soft tissue mobilisation and heat therapy with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the remaining modalities were rarely used.

Table 4.35: Auxiliary therapeutic techniques used in chronic non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Ischaemic compression – digital pressure on trigger points	77.7	13.8	8.5
Dry needling	76.8	16.8	6.4
Massage	67	18.1	14.9
Static stretching	55.3	25.5	19.2
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	44.1	39.8	16.2
Soft tissue mobilisation (active release and myofascial release)	36.6	34.4	29
Heat therapy (heat pack, etc.)	33.4	32.3	34.5
Cryotherapy (Ice pack, etc.)	27.5	27.5	45.1
Kinesio taping or similar	26.4	28.6	45.1
Stretch and spray techniques	14.2	14.1	71.7
Dry needling in conjunction with electrical modalities	14.1	14.1	71.7
Transcutaneous electrical nerve stimulation (T.E.N.S.)	13.2	18.7	68.2
Interferential current (I.F.C.)	13.2	9.9	76.9
Refer to another therapist for myofascial component	10.5	19.8	69.7
Ultrasound	10	20	70
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	7.5	11.8	80.6
Hydrotherapy	2.2	4.4	93.4

Q9.1.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome), which of the following do you advise as part of patient advice and education? The most common advice and education given to patients was postural and ergonomic advice (94.7%; n = 90) and home stretches (94.7%; n = 89), this was followed by home strengthening exercises (75.6%; n = 71), stress management (65.5%; n = 59), heat therapy (53.3%; n = 49) and proprioceptive exercises (40.9%; n = 38) as seen in Table 4.36.

Table 4.36: Advice and education given to patients with chronic non-specific neck pain

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	94.7	5.3	0
Home stretches	94.7	3.2	2.1
Home strengthening exercises	75.6	17	7.5
Stress management	65.5	24.4	10
Heat therapy (heat pack, etc.)	53.3	31.5	15.2
Proprioceptive exercise	40.9	38.7	20.5
Cryotherapy (ice pack, etc.)	40.9	31.2	28
Nutritional therapy (supplements and diet)	38.7	35.5	25.8
Strengthening exercise under instruction	38.3	39.4	22.4

4.5.1.5 Acute Whiplash Associated Disorder

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants approach to acute whiplash associated disorder. These results represents the raw data obtained through the questionnaire and thus n-values are presented.

Q4.1.2 = In Acute Whiplash Associated Disorder which of the following would you use to treat the condition if no red flags were present? In acute whiplash associated disorder the most common treatment options were auxiliary therapeutic techniques (90.5%; n = 86), spinal manipulation (89.6%; n = 86) and initiation of a rehabilitation program (62.7%; n = 57), however practitioners also commonly recommended that the patient use non-steroidal anti-inflammatory drugs and analgesics. Practitioners rarely referred patients to homeopaths (80.5%; n = 74), medical doctor for pain control (59.1%; n = 55) or referral to a medical specialist (58.5%; n = 55). Traction and cervical collars were also rarely used. These findings are represented in Table 4.37.

Table 4.37: Treatment of acute whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Auxiliary therapeutic techniques.	90.5	6.3	3.2
Spinal manipulation	89.6	7.3	3.1
Initiate rehabilitation program	62.7	23.1	14.3
Advise a non-steroidal anti-inflammatory	46.9	38.5	14.6
Traction	26.1	19.6	54.4
Advise use of a cervical collar	19.2	30.9	50
Refer the patient to a medical doctor for pain control	13	28	59.1
Refer the patient to a homeopath	6.4	13	80.5
Refer the patient to a medical specialist	5.3	36.2	58.5

Q4.2.2 = In Acute Whiplash Associated Disorder which form of articular manipulation would you most commonly use if no red flags were present? As shown in Table 4.38 participants most commonly attempted to only adjust specific segment (84.4%; n = 76); this was followed by mobilisation (47.2%; n = 42), adjusting multiple segments throughout the spine (46.2%; n = 42) and adjust the segment on both sides (40.2%; n = 37). Instrument assisted adjustments were rarely used (73%; n = 65) and there was a fairly even distribution of responses regarding adjusting multiple segments within the cervical spine with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range.

Table 4.38: Articular manipulation used in acute whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	84.4	5.6	10
Mobilisation	47.2	34.8	18
Adjust multiple segments throughout the spine	46.2	29.7	24.2
Adjust segment on both sides	40.2	36.8	22.9
Adjust multiple segments throughout the cervical spine	38.2	29.2	32.5
Instrument assisted adjustment	14.6	12.4	73

Q4.3.2 = In Acute Whiplash Associated Disorder would you regard the articular manipulation as the primary intervention of your treatment protocol? Sixty-two (64.6%) participants regarded the articular manipulation as the primary intervention, whilst the remaining 34 (35.4%) did not.

Q4.4.2 = In Acute Whiplash Associated Disorder which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition? The three most common auxiliary therapeutic techniques used by participants were massage, ischaemic compression by digital pressure on trigger points and dry needling with 73.5% (n = 69), 71.7% (n=66) and 70.3% (n = 66) respectively. This was followed by static stretching (53.1%; n = 51) and cryotherapy (48.4%; n = 45). There was a fairly even distribution of usage of PNF stretching, soft tissue mobilisation and kinesio taping, with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the remaining modalities were rarely used. These findings are presented in Table 4.39

Table 4.39: Auxiliary Techniques used in acute whiplash associated disorder.

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Massage	73.5	14.9	11.7
Ischaemic compression – digital pressure on trigger points	71.7	19.6	8.7
Dry needling	70.3	21.3	8.6
Static stretching	53.1	16.7	30.2
Cryotherapy (ice pack, etc.)	48.4	24.7	26.9
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	43.6	23.4	33
Soft tissue mobilisation (active release and myofascial release)	43.5	26.1	30.4
Kinesio taping or similar	35.5	26.9	37.6
Heat therapy (heat pack, etc.)	22.6	32.3	45.2
Dry needling in conjunction with electrical modalities	19.5	15.2	65.2
Transcutaneous electrical nerve stimulation (T.E.N.S.)	18.7	14.3	67.1
Interferential current (I.F.C.)	17.4	9.8	72.8
Stretch and spray techniques	16.6	12.2	71.2
Ultrasound	16.5	17.6	65.9
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	8.8	9.9	81.3
Refer to another therapist for myofascial component	7.9	22.5	69.7
Hydrotherapy	4.3	3.3	92.3

Q8.1.2 = *In Acute Whiplash Associated disorder, which of the following do you advise as part of patient advice and education?* As shown in Table 4.40 the most common advice and education given to patients was postural and ergonomic advice (91.3%; n = 84), home stretches (75.3%; n = 70) and cryotherapy (70.4%; n = 74). Advice and home strengthening, heat therapy and stress management was also commonly given whilst a fairly even distribution of responses were given for proprioceptive exercises, strengthening under instruction and nutritional therapy with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range.

Table 4.40: Advice and education given to patients with acute whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	91.3	7.6	1.1
Home stretches	75.3	10.8	14
Cryotherapy (ice pack, etc.)	70.4	22	7.7
Home strengthening exercises	50.5	23.7	25.8
Heat therapy (heat pack, etc.)	45.1	22	33
Stress management	43.4	31.1	25.6
Proprioceptive exercise	35.5	34.4	30
Strengthening exercise under instruction	28.5	33	38.6
Nutritional therapy (supplements and diet)	27.8	33.3	38.9

4.5.1.6 Chronic Whiplash Associated Disorder

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants approach to chronic whiplash associated disorder. These results represents the raw data obtained through the questionnaire and thus n-values are presented.

Q5.1.2 = In Chronic Whiplash Associated Disorder which of the following would you use to treat the condition if no red flags were present? Spinal manipulation was the most common treatment option (97.9%; n = 94) followed by auxiliary therapeutic techniques (85.2%; n = 80) and initiate rehabilitation program (75.2%; n = 70) as is shown in Table 4.41. Practitioners rarely advised the use of a cervical collar (79.6%; n = 74) or referred patients to either homeopaths (76.0%; n = 70), medical doctors for pain control (64.1%; n = 59) or a medical specialist (56.4%; n = 48).

Table 4.41: Treatment of chronic whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Spinal manipulation	97.9	1	1
Auxiliary therapeutic techniques.	85.2	11.7	3.2
Initiate rehabilitation program	75.2	15.1	9.7
Traction	27.5	25.3	47.3
Advise a non-steroidal anti-inflammatory	17	45.7	37.2
Advise use of a cervical collar	8.7	11.8	79.6
Refer the patient to a medical doctor for pain control	8.7	27.2	64.1
Refer the patient to a medical specialist	5.9	37.6	56.4
Refer the patient to a homeopath	5.5	18.5	76

Q5.2.2 = in Chronic Whiplash Associated Disorder which form of articular manipulation would you most commonly use if no red flags were present? Participants most commonly attempted to adjust a specific segment only (82.4%; n = 75); followed by adjusting multiple segments throughout the spine (53.7%; n = 50). Instrument assisted manipulation was rarely used by practitioners (74.7%; n = 68) (Table 4.42).

Table 4.42: Articular manipulation used in chronic whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	82.4	8.8	8.8
Adjust multiple segments throughout the spine	53.7	28	18.3
Adjust segment on both sides	44	31.9	24.2
Adjust multiple segments throughout the cervical spine	42.9	33	24.2
Mobilisation	41.5	34.8	23.6
Instrument assisted adjustment	12.1	13.2	74.7

Q5.3.2 = In Chronic Whiplash Associated Disorder would you regard the articular manipulation as the primary intervention of your treatment protocol? Seventy-six participants (79.2%) regarded the articular manipulation as the primary intervention in chronic whiplash associated disorder.

Q5.4.2 = In Chronic Whiplash Associated Disorder which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition? The three most common auxiliary therapeutic techniques used by participants were ischaemic compression by digital pressure on trigger points, dry needling and massage with 79.2% (n = 72), 73.4% (n = 69) and 70.9% (n = 66) respectively with static stretching (56.8%; n = 54) and PNF stretching (40.9%; n = 38) also being used commonly. Soft tissue mobilisation, kinesio taping, heat therapy and cryotherapy had a fairly even distribution in usage with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the remaining modalities rarely being used. These findings are presented in Table 4.43.

Table 4.43: Auxiliary Therapeutic Techniques used in chronic whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Ischaemic compression – digital pressure on trigger points	79.2	13.2	7.7
Dry needling	73.4	20.2	6.4
Massage	70.9	17.2	11.9
Static stretching	56.8	27.4	15.8
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	40.9	36.6	22.6
Soft tissue mobilisation (active release and myofascial release)	37	34.8	28.3
Kinesio taping or similar	35.5	20	44.5
Heat therapy (heat pack, etc.)	31.2	33.3	35.5
Cryotherapy (ice pack, etc.)	29	29	41.9
Dry needling in conjunction with electrical modalities	17.6	9.9	72.5
Ultrasound	17.4	13	69.6
Transcutaneous electrical nerve stimulation (T.E.N.S.)	16.3	19.6	64.1
Stretch and spray techniques	15.4	12.1	72.5
Interferential current (I.F.C.)	14.1	13	72.8
Refer to another therapist for myofascial component	11.5	17.2	71.2
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	10.8	9.8	79.4
Hydrotherapy	3.3	3.3	93.4

Q9.1.2 = *In Chronic Whiplash Associated disorder, which of the following do you advise as part of patient advice and education?* As is evident in Table 4.44, the most common advice and education given to patients by the participants was postural and ergonomic advice (91.5%; n = 86), home stretches (89.4%; n = 84) and home strengthening exercises (77.7%; n = 73). The remaining forms of advice and education were also more commonly used than not.

Table 4.44: Advice and education given to patients with chronic whiplash associated disorder

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	91.5	8.5	0.0
Home stretches	89.4	6.4	4.3
Home strengthening exercises	77.7	14.9	7.4
Stress management	55.6	25.6	18.8
Heat therapy (heat pack, etc.)	53.3	31.5	15.2
Proprioceptive exercise	45.2	36.6	18.3
Cryotherapy (ice pack, etc.)	43.5	32.6	23.9
Strengthening exercise under instruction	39.8	38.7	21.5
Nutritional therapy (supplements and diet)	36.6	37.6	25.8

4.5.1.7 Acute Degenerative Cervical Radiculopathy

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants approach to acute degenerative cervical radiculopathy. These results represents the raw data obtained through the questionnaire and thus n-values are presented.

Q4.1.3 = In Acute Degenerative Cervical Radiculopathy which of the following would you use to treat the condition if no red flags were present? As is evident in Table 4.45, the most common treatment options used by participants were auxiliary therapeutic techniques (91.6%; n = 87), spinal manipulation (81.2%; n = 88), initiating a rehabilitation program (59.2%; n = 55) and traction (41.9%; n = 39). There was a fairly even distribution for the use of non-steroidal anti-inflammatory drugs and analgesics, referral to medical doctor for pain control and referral to medical specialists with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the least common (rarely or never) treatment options employed by participants were advising the use of a cervical collar (74.4%; n = 70) and referral to a homeopath (72.9%; n = 67).

Table 4.45: Treatment of acute degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Auxiliary therapeutic techniques.	91.6	4.2	4.2
Spinal manipulation	81.2	12.5	6.2
Initiate rehabilitation program	59.2	26.9	14
Traction	41.9	31.2	25.8
Advise a non-steroidal anti-inflammatory	35.4	43.8	20.9
Refer the patient to a medical doctor for pain control	21.2	38.3	40.4
Refer the patient to a medical specialist	20	61.1	18.9
Advise use of a cervical collar	8.5	17	74.4
Refer the patient to a homeopath	4.4	22.8	72.9

Q4.2.3 = in Acute Degenerative Cervical Radiculopathy which form of articular manipulation would you most commonly use if no red flags were present? Participants most commonly attempted to adjust a specific segment only (76.6%; n = 72), this was followed by mobilisation (54.5%; n = 48), adjust multiple segments throughout the spine (46.2%; n = 42) and adjust the segment on both sides (39.4%; n = 35) as shown in Table 4.46. There was a fairly even distribution for the use of adjustments applied to multiple segments within the cervical spine with participant responses (always and frequently, occasionally, and rarely

and never) being within ±15% range, whilst instrument assisted adjustments were rarely used (70.8%; n = 63).

Table 4.46: Articular manipulation used in acute degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	76.6	13.8	9.5
Mobilisation	54.5	33	12.5
Adjust multiple segments throughout the spine	46.2	31.9	22
Adjust segment on both sides	39.4	38.2	22.5
Adjust multiple segments throughout the cervical spine	34.5	35.6	29.8
Instrument assisted adjustment	14.6	14.6	70.8

Q4.3.3 = In Acute Degenerative Cervical Radiculopathy would you regard the articular manipulation as the primary intervention of your treatment protocol? Sixty-four participants (66.7%) regarded the articular manipulation as the primary intervention in the treatment of acute whiplash associated disorder.

Q4.4.3 = In Acute Degenerative Cervical Radiculopathy which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition? The three most common auxiliary therapeutic techniques used by participants were dry needling, ischaemic compression by digital pressure on trigger points and massage with 74.4% (n = 70), 72.2% (n=65) and 70.9% (n = 66) respectively. A fairly even distribution was noted for the use of PNF stretching, soft tissue mobilisation, cryotherapy and heat therapy with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the remaining modalities being used rarely as is evident in Table 4.47.

Table 4.47: Auxiliary therapeutic techniques used in acute degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Dry needling	74.4	18.1	7.5
Ischaemic compression – digital pressure on trigger points	72.2	17.8	10
Massage	70.9	17.2	11.8
Static stretching	48.9	23.4	27.6
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	41.3	28.3	30.5
Soft tissue mobilisation (active release and myofascial release)	40.7	29.7	29.7
Cryotherapy (ice pack, etc.)	37.4	30.8	31.9
Heat Therapy (heat pack, etc.)	32.6	30.4	37
Kinesio taping or similar	27.5	25.3	47.3
Dry needling in conjunction with electrical modalities	20.9	15.4	63.8
Interferential current (I.F.C.)	16.5	12.1	71.4
Ultrasound	16.5	15.4	68.1
Transcutaneous electrical nerve stimulation (T.E.N.S.)	13.4	20	66.7
Stretch and spray techniques	13.2	13.2	73.6
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	8.7	9.8	81.6
Refer to another therapist for myofascial component	7.9	22.7	69.3
Hydrotherapy	5.6	2.2	92.3

Q8.1.3 = In Acute Degenerative Cervical Radiculopathy, which of the following do you advise as part of patient advice and education? As shown in Table 4.48, the most common advice and education given to patients by the participants was postural and ergonomic advice (92.3%; n = 84) and home stretches (69.9%; n = 65). Other forms of advice were, however, also common such as cryotherapy (56.6%; n = 5151), home strengthening exercises (53.8%;n = 50), heat therapy (50.6%; n = 46), stress management (49.4%; n = 44) and nutritional therapy (45,1%; n = 41). There was a fairly even distribution in responses regarding strengthening under instruction and proprioceptive exercises with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range.

Table 4.48: Advice and education given to patients with acute degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	92.3	5.5	2.2
Home Stretches	69.9	14	16.2
Cryotherapy (Ice pack, etc.)	56.6	27.8	15.5
Home strengthening exercises	53.8	21.5	24.7
Heat therapy (Heat pack, etc.)	50.6	22	27.5
Stress management	49.4	31.5	19.1
Nutritional therapy (supplements and diet)	45.1	30.8	24.2
Strengthening exercise under instruction	29.5	34.1	36.4
Proprioceptive exercise	27.8	35.6	36.6

4.5.1.8 Chronic Degenerative Cervical Radiculopathy

This section outlines the results obtained from the questionnaire (Appendix B4) regarding participant responses to the treatment and educational strategies used in the participants approach to chronic degenerative cervical radiculopathy. These results represents the raw data obtained through the questionnaire and thus n-values are presented.

Q5.1.3 = In Chronic Degenerative Cervical Radiculopathy which of the following would you use to treat the condition if no red flags were present? The most common treatment options chosen by the participants were spinal manipulation (85.3%; n = 81), auxiliary therapeutic techniques (85%; n = 79) and initiate rehabilitation program (72.8%; n = 67) as shown in Table 4.49. The least commonly (used treatment option was advise the use of a cervical collar (74.2%; n = 69) followed by referral to a homeopath (71.8%; n = 66) or medical doctor for pain control (46.8%; n = 44). There was a fairly even distribution of responses with regard to traction and non-steroidal anti-inflammatory drugs and analgesics with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range.

Table 4.49: Treatment of chronic degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Spinal Manipulation	85.3	13.7	1.1
Auxiliary therapeutic techniques.	85	12.9	2.2
Initiate Rehabilitation Program	72.8	19.6	7.6
Traction	39.1	32.6	28.2
Advise a Non-Steroidal Anti-inflammatory	26.3	40	33.7
Refer the patient to a medical specialist	18.4	47.1	34.5
Refer the patient to a Medical Doctor for pain control	16	37.2	46.8
Advise use of a cervical Collar	9.7	16.1	74.2
Refer the patient to a Homeopath	7.6	20.7	71.8

Q5.2.3 = in Chronic Degenerative Cervical Radiculopathy which form of articular manipulation would you most commonly use if no red flags were present? Table 4.50 shows that participants most commonly attempted to adjust a specific segment (75.5%; n = 71), followed by adjusting multiple segments throughout the spine (52.1%; n = 49) and mobilisation (48.4%; n = 44). Instrument assisted adjustments were rarely used (75.8%; n = 69), while adjustment of multiple segments within the cervical spine and adjustment of the segment bilaterally received a fairly even distribution of responses with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range.

Table 4.50: Articular manipulation used in chronic degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Attempt to adjust specific segment only	75.5	19.1	5.3
Adjust multiple segments throughout the spine	52.1	26.6	21.3
Mobilisation	48.4	28.6	23.1
Adjust segment on both sides	36.7	37.8	25.5
Adjust multiple segments throughout the cervical spine	34.1	39.6	26.4
Instrument assisted adjustment	9.9	14.3	75.8

Q5.3.3 = In Chronic Degenerative Cervical Radiculopathy would you regard the articular manipulation as the primary intervention of your treatment protocol? Sixty-nine participants (71.9%) regarded the articular manipulation as the primary intervention in the treatment of chronic degenerative cervical radiculopathy.

Q5.4.3 = In Chronic Degenerative Cervical Radiculopathy which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition? Figure 4.51 shows that the three most common auxiliary therapeutic techniques used by participants in the treatment of chronic degenerative cervical radiculopathy were ischaemic compression by digital pressure on trigger points, dry needling and massage with 75.5% (n = 71), 74.7% (n = 71) and 70.2% (n = 66) respectively. PNF stretching, cryotherapy and heat therapy, soft tissue mobilisation and kinesio taping received a fairly even distribution of usage with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range, whilst the other modalities were rarely used.

Table 4.51: Auxiliary therapeutic modalities used in chronic degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Ischaemic compression – digital pressure on trigger points	75.5	17	7.5
Dry needling	74.7	16.8	8.4
Massage	70.2	17	12.8
Static stretching	44.2	28.4	27.3
Proprioceptive neuromuscular facilitation (P.N.F.) stretching or similar techniques	39.8	34.4	25.9
Heat therapy (heat pack, etc.)	37.6	29	33.3
Soft tissue mobilisation (active release and myofascial release)	31.5	34.8	33.7
Cryotherapy (ice pack, etc.)	28.2	32.6	39.1
Kinesio taping or similar	27.5	24.2	48.4
Ultrasound	20.6	10.9	68.5
Transcutaneous electrical nerve stimulation (T.E.N.S.)	17.6	19.8	62.7
Dry needling in conjunction with electrical modalities	16.5	15.4	68.1
Interferential current (I.F.C.)	16.3	10.9	72.8
Stretch and spray techniques	12	14.1	73.9
Instrument assisted soft tissue mobilisation (e.g. Graston Technique/FAKTR)	8.6	9.7	81.7
Refer to another therapist for myofascial component	7.0	18.6	74.4
Hydrotherapy	4.4	2.2	93.4

Q9.1.3 = In Chronic Degenerative Cervical Radiculopathy, which of the following do you advise as part of patient advice and education? Table 4.52 shows that the most common advice and education given to patients by the participants was postural and ergonomic advice (92.5%; n = 86), home stretches (80.5%; n = 74) and home strengthening exercises (71.8%; n = 66). However, advice on heat therapy (56.5%; n = 52), nutritional therapy (54.9%; n = 51) and stress management (53.9%; n = 48) was also commonly given while there was a fairly even distribution of response regarding cryotherapy and proprioceptive training with participant responses (always and frequently, occasionally, and rarely and never) being within ±15% range.

Table 4.52: Advice and education given to patients with chronic degenerative cervical radiculopathy

	Always and frequently (%)	Occasionally (%)	Rarely and never (%)
Postural and ergonomic advice	92.5	6.5	1.1
Home stretches	80.5	13	6.5
Home strengthening exercises	71.8	17.4	10.8
Heat therapy (heat pack, etc.)	56.5	30.4	13
Nutritional therapy (supplements and diet)	54.9	30.1	15
Stress management	53.9	32.6	13.5
Strengthening exercise under instruction	43.3	33.3	23.3
Cryotherapy (ice pack, etc.)	39.1	32.6	28.3
Proprioceptive exercise	38.5	39.6	22

4.5.2 Discussion

This section assesses the general trends existing in participant treatment, as the patient's condition moves from acute to chronic, instead of attempting to compare findings to recommendations for acute and chronic mechanical neck pain. This was done for the following reasons:

- Authors of systematic reviews fail to make recommendations for the treatment of acute and chronic mechanical neck pain and instead choose only to make recommendations for the treatment of mechanical neck pain as a whole, including both acute, sub-acute and chronic forms of this condition under the recommendations (Gross *et al.* 2007; Chow *et al.* 2009; Bongers *et al.* 2010; Miller *et al.* 2010; Brosseau *et al.* 2012; Kay *et al.* 2012; Patel *et al.* 2012; Graham *et al.* 2013; Gross *et al.* 2013b; Kroeling *et al.* 2013; Clar *et al.* 2014).
- The above authors that did make recommendations for the treatment of acute and chronic mechanical neck pain, but these recommendations were in relation to specific therapies such as manual therapy, and did not include the entire scope of conservative treatment (Vernon, Humphreys and Hagino 2007; Gross *et al.* 2010).
- Some authors made recommendations for the treatment of acute and chronic neck pain, however these were again for specific forms of mechanical neck pain such as whiplash associated disorder (Hurwitz *et al.* 2009) and non-specific neck pain (Bryans *et al.* 2014).
- Varying inclusion criteria were also utilised for what constituted acute and chronic mechanical neck pain, non-specific neck pain and whiplash associated disorder, making direct comparison difficult (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; Gross *et al.* 2010; Bryans *et al.* 2014).

In this study practitioners generally followed the recommendation that treatment should move from passive to active as patients moved from acute to chronic types of the condition (Murphy 2000; Souza 2009). For acute mechanical neck pain participants mostly used modalities which may be considered more passive in nature (Murphy 2000; Liebenson 2007; Souza 2009), such as auxiliary therapeutic techniques (91.2% vs. 84.5%) and recommending non-steroidal anti-inflammatory medication usage (32.3% vs. 18.7%) while for chronic neck pain modalities which may be considered more active in nature (Murphy 2000; Liebenson 2007; Souza 2009) such as rehabilitation (75.3% vs. 58.6%) were used more frequently (Figure 4.5).

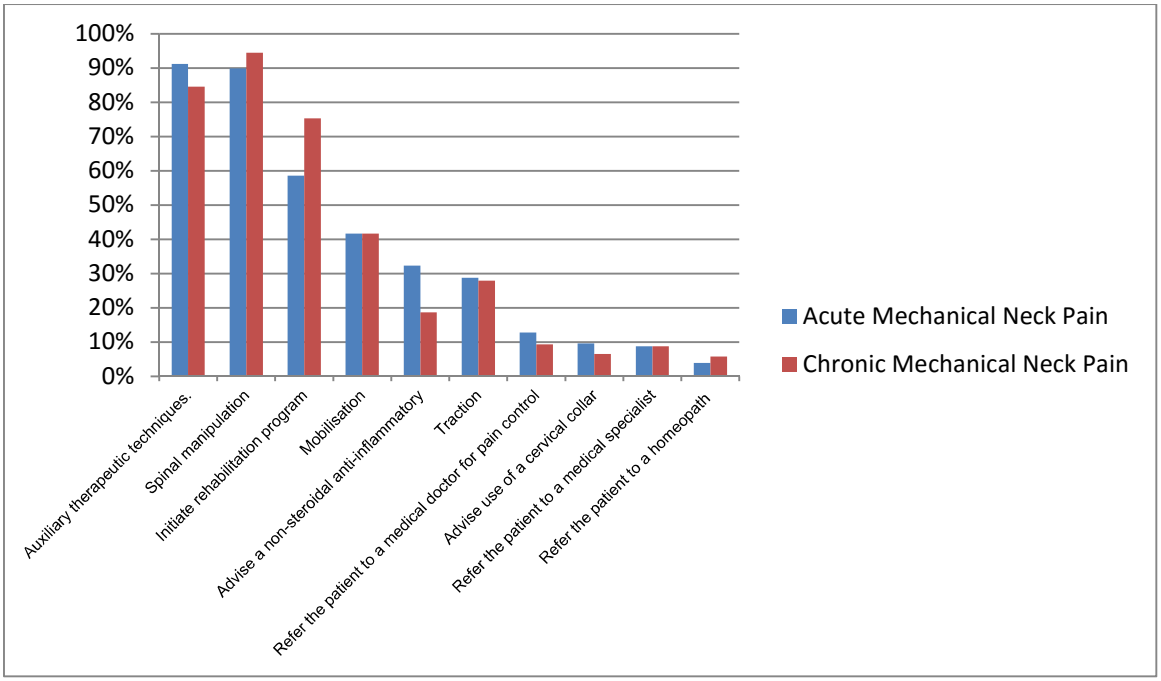

Figure 4.5: Usage (always and frequently) of treatment modalities by practitioners

Active care is defined as modes of treatment requiring patient involvement and participation, in the pursuit of established treatment goals, where there is shared accountability on the part of the patient (Triad Healthcare 2014), and as such, education and advice forms a vital role in active care (Murphy 2000; Liebenson 2007; Souza 2009). It is therefore expected that advice and education should be used more frequently in chronic conditions. Participants in this study increased their levels of education and advice as patients moved from acute to chronic types of the condition, with all forms of advice being used more frequently in chronic mechanical neck pain, with the exclusion of cryotherapy (Figure 4.6). Cryotherapy was however also the only major variation (greater than 10%) with regard to auxiliary therapy utilisation, between acute and chronic mechanical neck pain. The increased utilisation of cryotherapy as either a form of education or auxiliary therapy may be expected, as it is most commonly indicated for use in acute conditions (Prentice 2009) and may be indicated for pain control as well as treatment of swelling, oedema, inflammation, muscle spasm and guarding (Prentice 2009; Denegar, Saliba and Saliba 2010; Cameron 2013).

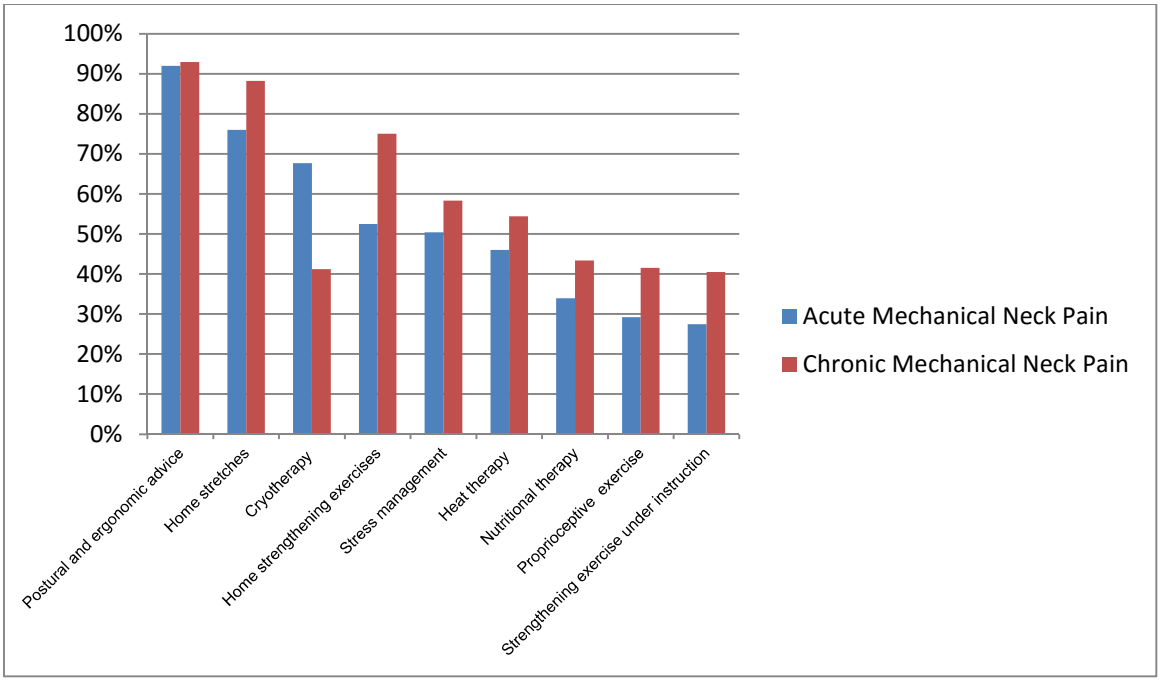

Figure 4.6: Usage (always and frequently) of advice and educational techniques by practitioners

Although practitioners followed the recommendation that treatment should move from passive to active as patients moved from acute to chronic (Murphy 2000; Souza 2009), it appears that most practitioners were mindful of the evidence based recommendations for the treatment of mechanical neck pain (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a) because the most frequently used modalities in both acute and chronic mechanical neck pain were a combination of manual therapy and rehabilitation as recommended by evidence based guidelines (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a).

These trends also persisted when analysing treatment options used by participants for acute and chronic types of mechanical neck pain as seen in Table 4.53.

Table 4.53: Usage (always and frequently) of treatment modalities by practitioners

	Acute NSNP (%)	Chronic NSNP (%)	Acute WAD (%)	Chronic WAD (%)	Acute DCR (%)	Chronic DCR (%)
Spinal manipulation	98.9	100	89.6	97.9	81.2	85.3
Auxiliary therapeutic techniques.	91.5	83.2	90.5	85.2	91.6	85
Initiate rehabilitation program	53.8	77.9	62.7	75.2	59.2	72.8
Mobilisation	23.4	35.2	47.2	41.5	54.5	48.4
Traction	18.4	17.2	26.1	27.5	41.9	39.1
Advise a non-steroidal anti-inflammatory	14.7	12.7	46.9	17	35.4	26.3
Refer the patient to a medical doctor for pain control	4.3	3.3	13	8.7	21.2	16
Advise use of a cervical collar	1	1.1	19.2	8.7	8.5	9.7
Refer the patient to a homeopath	1	4.3	6.4	5.5	4.4	7.6
Refer the patient to a medical specialist	1	2.2	5.3	5.9	20	18.4

***NSNP = Non-Specific neck pain, WAD = Whiplash Associated Disorder and DCR = Degenerative cervical radiculopathy**

Table 4.54 illustrates the increased utilisation of education and advice as patients moved from acute to chronic types of the non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy. This is similar to findings of acute and chronic mechanical neck pain as a whole.

Table 4.54: Usage (always and frequently) of education and advice by practitioners

	Acute NSNP (%)	Chronic NSNP (%)	Acute WAD (%)	Chronic WAD (%)	Acute DCR (%)	Chronic DCR (%)
Postural and ergonomic advice	92.5	94.7	91.3	91.5	92.3	92.5
Home stretches	82.9	94.7	75.3	89.4	69.9	80.5
Cryotherapy (ice pack, etc.)	76.1	40.9	70.4	43.5	56.6	39.1
Stress management	58.3	65.5	43.4	55.6	49.4	53.9
Home strengthening exercises	53.2	75.6	50.5	77.7	53.8	71.8
Heat therapy (heat pack, etc.)	42.4	53.3	45.1	53.3	50.6	56.5
Nutritional therapy (supplements and diet)	28.9	38.7	27.8	36.6	45.1	54.9
Strengthening exercise under instruction	24.5	38.3	28.5	39.8	29.5	43.3
Proprioceptive exercise	24.2	40.9	35.5	45.2	27.8	38.5

***NSNP = Non-Specific neck pain, WAD = Whiplash Associated Disorder and DCR = Degenerative cervical radiculopathy**

4.6 Objective Four

Objective Four: To determine the demographic, educational and philosophical profile of practitioners in KwaZulu-Natal, and assess the influence of such factors on the treatment of mechanical neck pain.

4.6.1 Results

4.6.1.1 Education

4.6.1.1.1 Chiropractic Education

Q2.1 = From which institute did you receive your chiropractic qualification? The majority of the participants qualified at the Durban University of Technology (89%; n = 85). In the "other" group (6.3%; n = 6), four participants (4.2%) received their qualifications from Palmer College of Chiropractic and two participants (2.1%) received their qualifications from the National Chiropractic College. The remaining 5 participants (5.2%) received their qualifications at the University of Johannesburg.

Q2.2 = What chiropractic qualification have you obtained? The majority of the participants held Masters of Technology: Chiropractic qualifications (89.6%; n = 86). The remaining participants held a Doctor of Chiropractic (D.C.) qualification (10.4%; n = 10). It must be noted that 4 participants qualified at the Durban University of Technology but stated that they obtained D.C. degrees.

To assess any possible effect the University of qualification may have on treatment choices made by participants, participants were divided into one of three groups, those who had qualified at DUT, UJ or other universities and this was compared to participant responses. The total findings of the statistical analysis are presented in Appendix F and the statistically significant findings are presented in Table 4.55 and Table 4.56.

Table 4.55: Treatment choices influenced by university of qualification

	Local group (DUT and UJ)	P-Value	Foreign group (other)
Chronic NSNP	Decreased usage of cervical collars	*0.010 Independent Samples Kruskal-Wallis Test*	Increased usage of cervical collars

***NSNP = non-specific neck pain, WAD = Whiplash Associated Disorder and DCR = Degenerative Cervical Radiculopathy**

Participants who had qualified in other universities had an increased propensity to use cervical collars in chronic non-specific neck pain than their locally trained counterparts (Table 4.56). However, this was only noted in chronic non-specific neck pain (p = 0.01).

Table 4.56: Statistically significant participant responses separated by university of qualification

		Local group (DUT and UJ)		Foreign experience (other)	
		n	%	n	%
Cervical collar (chronic non-specific neck pain)	Always	0	0.0	0	0
	Frequently	1	1.1	0	0
	Occasionally	5	5.7	0	0
	Rarely	20	22.7	4	80
	Never	62	70.5	1	20

4.6.1.1.2 Other Qualifications Held

Q2.3 = Do you hold any other qualifications (Diploma or higher)? Fifteen participants had obtained other qualification (15.6%). Of this group of 15, three obtained more than one other qualification, hence the discrepancy between the number of participants who had obtained other qualifications and number of qualifications obtained. The exact detail regarding type of other qualifications held by participants may be found in the statistical analysis appendix (Appendix F).

4.6.1.1.3 Continuous Professional Development

Q2.5 = How regularly have you attended health related conferences since qualification? The majority (58.8%; n = 56) of the participants attended health related conferences at least once a year and almost all participants (88%; n = 84) attended health related conferences at least every second year. A minority of participants (12.5%; n = 12) attended conferences less frequently.

Q2.6 = Have you taken any chiropractic/health related short course since qualification (e.g. Kinesio Taping, Extremity Courses)? Seventy-six participants (79.2%) attended chiropractic/health related short courses since qualification. With 20 participants (20.8%) stating that they have not attended since qualification. Participants were asked to list the courses which they attended. The courses attended were categorized into groups which were similar in nature. The chiropractic/health related short courses attended by the participants may be found in the Statistical analysis appendix (Appendix F).

Q2.7 = Do you subscribe to or have access to any medical/chiropractic professional journal publications or magazines? Forty-three participants (44.8%) said that they subscribed to medical/chiropractic journals. Of the remaining 53 participant, 51 participants (53.1%) stated that they did not and two participants (2.1%) left the question unanswered. The medical/chiropractic journals subscribed to may be found in Appendix F.

Q2.8 = Have any of the conferences, health related short courses, journals or magazines influenced the way you practice? The majority (78.1%; n = 75) of participants felt that conferences, health related short courses, journals and magazines did influence the way they practiced. Of the 75 participants there was a relatively even distribution amongst the reasons given for how these influenced practice activity. Thirty-one participants (41.3%) believed that it improved their treatment, management and diagnosis, 27 participants (36%) stated that they used the new or improved techniques learned, 23 participants (30.6%) stated that it improved their knowledge, 19 participants (25.3%) listed the specific courses attended without specifying how these influenced their practice activity and five participants (6.6%) did not specify a specific reason. This was an open ended question and as such the answers given by the participants were placed into one of four categories which represented similar answers.

To assess any possible effect continuous professional development may have on treatment choices made by practitioners, participants were divided into two groups. Participants who attended health related conferences at least once every second year, attended short courses as well as subscribed to journals or magazines since qualification were grouped into one group (High CPD), and those who did not meet these requirements were grouped into another group (Low CPD). These groups were then compared to treatment choices made by practitioners. The total findings of the statistical analysis is presented in Appendix F and the statistically significant findings are presented in Table 4.57 and Table 4.58.

Table 4.57: Treatment choices influenced by post graduate education

	Low CPD group	P-Value	High CPD group
Acute NSNP	Increased usage of manipulation	*0.008 - Independent Samples Mann Whitney U test*	Decreased usage of manipulation
Acute NSNP	Increased usage of auxiliary therapeutic techniques	*0.043 - Independent Samples Mann-Whitney U test*	Decreased usage of auxiliary therapeutic techniques
Acute WAD	Increased usage of auxiliary therapeutic techniques	*0.004 - Independent Samples Mann Whitney U test*	Decreased usage of auxiliary therapeutic techniques
Acute DCR	Increased usage of auxiliary therapeutic techniques	*0.020 - Independent Samples Mann Whitney U test*	Decreased usage of auxiliary therapeutic techniques
Chronic DCR	Increased usage of manipulation	*0.019 - Independent Samples Mann Whitney U test*	Decreased usage of manipulation

***NSNP = non-specific neck pain, WAD = Whiplash Associated Disorder and DCR = Degenerative Cervical Radiculopathy**

As illustrated in Table 4.57 and Table 4.58, auxiliary therapeutic techniques were used less frequently by practitioners in the high CPD group. This finding was noted in acute types of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy. Participants in the high CPD group also used manipulation frequently in acute non-specific neck pain and chronic degenerative cervical radiculopathy.

Table 4.58: Statistically significant participant responses separated by continuous professional development

		Low CPD group		High CPD group	
		n	%	n	%
Auxiliary therapeutic techniques (acute non-specific neck pain + acute whiplash associate disorder + acute degenerative cervical radiculopathy)	Always	121	64	40	41.7
	Frequently	61	32.3	38	39.6
	Occasionally	3	1.6	11	11.5
	Rarely	3	1.6	7	7.3
	Never	1	0.5	0	0
Manipulation (acute non-specific neck pain + chronic degenerative cervical radiculopathy)	Always	91	71.7	31	48.4
	Frequently	30	23.6	24	37.5
	Occasionally	5	3.9	9	14.1
	Rarely	1	0.8	0	0
	Never	0	0	0	0

4.6.1.2 Philosophical Outlook

Q3.1 Which chiropractic philosophy do you subscribe to? (More than one answer may be provided). Sixty-two participants (64.6%) identified with the evidence based philosophy, 53 participants (55.2%) identified with the mixer philosophy and seven participants (7.3%) identified with the straight philosophy. Twenty-five participants identified with more than one philosophy, with the most commonly combined philosophies being mixer and evidence based (n = 21; 21.9%). One chiropractor identified with all three philosophies. The definitions of these philosophical classifications may be found in Chapter 2.

To assess the possible effect philosophical outlook may have on treatment choices, participants were grouped into straight, mixer and evidence based groups and this was then compared to participant responses. Participants who associated with more than one philosophy were however, placed in the either Straight or Evidence Based groups as these may be considered to be the two poles of the philosophy scale (Kaptchuk and Eisenberg 1998; Cooper and McKee 2003; Keating, Cleveland III and Menke 2004). The total findings of the statistical analysis is presented in Appendix F and the statistically significant findings are presented in Table 4.59 and Table 4.60.

Table 4.59: Treatment choices influenced by philosophy

	Evidence based and mixer	P-Value	Straight
Acute NSNP	Increased usage of auxiliary therapeutic techniques	*0.043 Independent Samples Kruskal-Wallis Test*	Decreased usage of auxiliary therapeutic techniques
Acute NSNP	Decreased usage of traction	*0.026 - Independent Samples Kruskal-Wallis Test*	Increased usage of traction
Chronic NSNP	Decreased usage of traction	*0.019 Independent Samples Kruskal-Wallis Test*	Increased usage of traction
Acute WAD	Decreased usage of spinal manipulation	*0.019 Independent Samples Kruskal-Wallis Test*	Increased usage of spinal manipulation
Acute WAD	Decreased usage of traction	*0.036 Independent Samples Kruskal-Wallis Test*	Increased usage of traction
Acute DCR	Decreased usage of traction	*0.027 Independent Samples Kruskal-Wallis Test*	Increased usage of traction
Acute DCR	Increased usage of auxiliary therapeutic techniques	*0.013 Independent Samples Kruskal-Wallis Test*	Decreased usage of auxiliary therapeutic techniques
Chronic DCR	Decreased usage of traction	*0.021 Independent Samples Kruskal-Wallis Test*	Increased usage of traction

***NSNP = non-specific neck pain, WAD = Whiplash Associated Disorder and DCR = Degenerative Cervical Radiculopathy**

An increased usage of traction was noted among practitioners who associated with the straight philosophy across acute and chronic non-specific neck pain, acute whiplash associated disorder and acute and chronic degenerative cervical radiculopathy (Table 4.59 and Table 4.60). A decreased usage of auxiliary therapeutic techniques by straight practitioners was also noted in acute nonspecific neck pain and degenerative cervical radiculopathy whilst an increased usage of spinal manipulation was also noted amongst straight practitioners in acute whiplash associated disorder.

Table 4.60: Statistically significant participant responses separated by philosophical orientation

		Evidence Based and Mixer		Straight	
		n	%	n	%
Traction (acute and chronic non-specific neck pain + acute and chronic degenerative cervical radiculopathy + acute whiplash associated disorder)	Always	27	6.3	3	15
	Frequently	88	20.4	9	45
	Occasionally	120	27.8	8	40
	Rarely	76	17.6	0	0
	Never	120	27.8	0	0
Auxiliary therapeutic techniques (acute non-specific neck pain + acute degenerative cervical radiculopathy)	Always	107	60.1	0	0
	Frequently	59	33.1	6	66.7
	Occasionally	7	3.9	1	11.1
	Rarely	5	2.8	2	22.2
	Never	0	0	0	0
Manipulation (acute whiplash associated disorder)	Always	31	34.8	3	60
	Frequently	49	55.1	2	40
	Occasionally	7	7.9	0	0
	Rarely	2	2.2	0	0
	Never	0	0	0	0

4.6.1.3 Age

Q1.1 = Age? The majority (54.3%; n = 51) of participants were between the ages of 30-39. There were 19 participants (19.8%) between the age of 40-49, 17 participants (17.7%) between the ages of 20-29 and 7 participants (7.3%) older than 50. The ages ranged from 25-71 and the average age of participants was 37.

To assess the possible effect of age on treatment choices made by participants, participants were divided into one of two groups, those less than 35 years of age and those 35 years of age and older. Statistical analysis was then performed to assess the possible effects age may exert on treatment choices made by practitioners. The total findings of the statistical analysis are presented in Appendix F with the statistically significant findings presented in Table 4.55 and Table 4.61.

Table 4.61: Treatment choices influenced by age

	Below 35 group	P-Value	35 and above group
Acute NSNP	Decreased usage of cervical collars	*0.050 - Independent Samples Mann Whitney U test)*	Increase usage of cervical collars
Chronic NSNP	Decreased referral to medical specialists	*0.022 - Independent Samples Mann Whitney U test*	Increased referral to medical specialists
Acute DCR	Decreased usage of cervical collars	*0.018 - Independent Samples Mann Whitney U test*	Increased usage of cervical collars
Chronic DCR	Increase usage of auxiliary therapeutic techniques	*0.031 - Independent Samples Mann Whitney U test*	Decreased usage of auxiliary therapeutic techniques
Chronic DCR	Decreased usage of cervical collars	*0.046 - Independent Samples Mann Whitney U test*	Increased usage of cervical collars

***NSNP = non-specific neck pain, WAD = Whiplash Associated Disorder and DCR = Degenerative Cervical Radiculopathy**

As is evident from Table 4.61 and Table 4.62 the major statistically significant findings include the increased usage of cervical collars by practitioners 35 years of age and older, with this finding being noted in acute non-specific neck pain and acute and chronic degenerative cervical radiculopathy. Other findings included increased referral to medical specialists in chronic non-specific neck pain and the decreased usage of auxiliary therapeutic techniques in chronic degenerative cervical radiculopathy by practitioners 35 years of age and older.

Table 4.62: Statistically significant participant responses separated into age groups

		Below 35		Above 35	
		n	%	n	%
Auxiliary therapeutic techniques (chronic degenerative cervical radiculopathy)	Always	26	59.1	15	31.9
	Frequently	11	25	25	53.2
	Occasionally	7	15.9	5	10.6
	Rarely	0	0	0	0
	Never	0	0	2	4.3
Advice use of a cervical collar (acute non-specific neck pain + acute and chronic degenerative cervical radiculopathy)	Always	0	0	3	2.1
	Frequently	2	1.5	13	9.2
	Occasionally	14	10.6	24	16.9
	Rarely	38	28.8	43	30.3
	Never	78	59.1	59	41.5
Refer to medical specialist (chronic non-specific neck pain)	Always	2	4.7	0	0
	Frequently	4	9.3	9	21.4
	Occasionally	20	46.5	20	47.6
	Rarely	13	30.2	13	31
	Never	4	9.3	0	0

4.6.1.4 Experience

4.6.1.4.1 Total Practice Experience

Q2.4 = How long have you been practicing? The majority of participants had been in practice for 10 years or less (57.2%; n = 55). Of those 3.1% (n = 3) had been in practice for less than 1 year, 29.2% (n = 28) had been in practice between 1 to 5 years and 25% (n = 24) between 6 to 10 years. Thirty-six participants (37.5%) had been in practice for 11 to 20 years with only five participants (5.2%) having been in practice for more than 20 years.

To assess the possible effect experience may have on treatment choices made by participants, participants were divided into one of two groups, those with 10 years or less experience and those with more than 10 years of experience. This was then compared to participant responses. The total findings of the statistical analysis are presented in Appendix F, however the statistically significant findings presented in Table 4.63 and Table 4.64.

Table 4.63: Treatment choices influenced by experience

	10 years or less	P-Value	More than 10 years
Acute NSNP	Increased usage of auxiliary therapeutic techniques	*0.040 - Independent Samples Mann-Whitney U test*	Decreased usage of auxiliary therapeutic techniques
Acute NSNP	Decreased usage of cervical collars	*0.032 Independent Samples Mann Whitney U test*	Increased usage of cervical collars
Chronic NSNP	Decreased usage of cervical collars	*0.010 - Independent Samples Mann Whitney U test*	Increased usage of cervical collars
Acute DCR	Decreased usage of cervical collars	*0.009 - Independent Samples Mann Whitney U test*	Increased usage of cervical collars
Acute DCR	Decreased usage of medications	*0.011 - Independent Samples Mann Whitney U test*	Increased usage of medications
Chronic DCR	Increased usage of auxiliary therapeutic techniques	*0.009 - Independent Samples Mann-Whitney U test*	Decreased usage of auxiliary therapeutic techniques
Chronic DCR	Decreased usage of cervical collars	*0.023 - Independent Samples Mann Whitney U test*	Increased usage of cervical collars

***NSNP = non-specific neck pain and DCR = Degenerative Cervical Radiculopathy**

As is evident in Table 4.63 and Table 4.64, there was increased usage of cervical collars amongst practitioners who have more than 10 years of experience and this was noted in acute and chronic non-specific neck pain, acute whiplash associated disorder and chronic degenerative cervical radiculopathy. A decreased usage of auxiliary therapeutic techniques in acute whiplash associated disorder and chronic degenerative cervical radiculopathy is also noted in practitioners with more than 10 years of experience, while results showed an

increased usage of medications in acute degenerative cervical radiculopathy by this age group.

Table 4.64: Statistically significant participant responses separated into experience groups

		10 years or less		More than 10 years	
		n	%	n	%
Advice use of a cervical collar (acute and chronic non-specific neck pain + acute and chronic degenerative cervical radiculopathy)	Always	0	0	12	7.1
	Frequently	4	1.9	29	17.1
	Occasionally	14	6.6	47	27.6
	Rarely	60	28.3	70	41.2
	Never	134	63.2	12	7.1
Auxiliary therapeutic techniques (acute non-specific neck pain + chronic degenerative cervical radiculopathy)	Always	67	62.6	29	35.8
	Frequently	29	27.1	41	50.6
	Occasionally	9	8.4	7	8.6
	Rarely	1	0.9	2	2.5
	Never	1	0.9	2	2.5
Medications (acute degenerative cervical radiculopathy)	Always	3	5.6	7	16.7
	Frequently	12	22.2	12	28.6
	Occasionally	23	42.6	19	45.2
	Rarely	13	24.1	3	7.1
	Never	3	5.6	1	2.4

4.6.1.4.2 Foreign practice experience

Q2.9 = Have you ever practiced outside of South Africa? The majority of participants had not had any foreign experience (82.3%; n = 79) with only 17 participants (17.7%) having practiced outside of South Africa. Of these 17 participants, two practiced in more than one country. The most common countries practiced in were the United Kingdom (41.2%; n = 7) and Ireland (29.4%; n = 5). Two had practice experience in Namibia, two in Malaysia, one in the USA, one in Italy and one in the Netherlands.

To assess the possible effect foreign experience may have on treatment choices made by participants, participants were divided into one of two groups, those who had foreign experience and those who did not. This was then compared to participant responses. The total findings of the statistical analysis are presented in Appendix F and the statistically significant findings are presented in Table 4.65 and Table 4.66.

Table 4.65: Treatment choices influenced by foreign experience

	No foreign experience	P-Value	Foreign experience
Acute DCR	Decreased usage of manipulation	*0.014 - Independent Samples Mann Whitney U test*	Increased usage of manipulation
Chronic DCR	Increased referral to medical specialist	*0.031 - Independent Samples Mann Whitney U test*	Decreased referral to medical specialist

***NSNP = non-specific neck pain, WAD = Whiplash Associated Disorder and DCR = Degenerative Cervical Radiculopathy**

Foreign experience resulted in an increased usage of manipulation by participants in the treatment of acute degenerative cervical radiculopathy and a decreased referral to medical specialists in chronic degenerative cervical radiculopathy (Table 4.65 and Table 4.66).

Table 4.66: Statistically significant participant responses separated by foreign experience

		No foreign experience		Foreign experience	
		n	%	n	%
Manipulation (acute degenerative cervical radiculopathy)	Always	23	29.1	11	64.7
	Frequently	40	50.6	4	23.5
	Occasionally	10	12.7	2	11.8
	Rarely	5	6.3	0	0.0
	Never	1	1.3	0	0.0
Refer to medical specialist (chronic degenerative cervical radiculopathy)	Always	5	6.4	0	0.0
	Frequently	12	15.4	2	11.8
	Occasionally	49	62.8	9	52.9
	Rarely	8	10.3	4	23.5
	Never	4	5.1	2	11.8

4.6.1.5 Gender

Q1.2 = Gender? There was an equal gender distribution among the participants with 48 males (50%) and 48 females (50%).

To assess the possible effect gender may exert on treatment choices made by participants, participants were divided into one of two groups, male and female, and this was statistically compared to treatment choices made by practitioners. The total findings of the statistical analysis are presented in Appendix F, with the statistically significant findings presented in Table 4.67 and Table 4.68.

Table 4.67: Treatment choices influenced by gender

	Male group	P-Value	Female group
Acute NSNP	Decreased use of manipulation	*0.025 - Independent Samples Mann Whitney U test*	Increased use of manipulation
Acute NSNP	Increased usage of traction	*0.012 - Independent Samples Mann Whitney U test*	Decreased usage of traction
Acute NSNP	Decreased usage of auxiliary therapeutic techniques	*< 0.001 - Independent Samples Mann Whitney U test*	Increased usage of auxiliary therapeutic techniques
Chronic NSNP	Decreased use of manipulation	*0.016 - Independent Samples Mann Whitney U test*	Increased use of manipulation
Chronic NSNP	Increased usage of traction	*0.028 - Independent Samples Mann Whitney U test*	Decreased usage of traction
Chronic NSNP	Decreased usage of auxiliary therapeutic techniques	*0.020 - Independent Samples Mann Whitney U test*	Increased usage of auxiliary therapeutic techniques
Chronic NSNP	Increased referral to medical specialists	*0.040 - Independent Samples Mann Whitney U test*	Decreased referral to medical specialists
Acute WAD	Decreased usage of auxiliary therapeutic techniques	*0.002 - Independent Samples Mann Whitney U test*	Increased usage of auxiliary therapeutic techniques
Chronic WAD	Decreased usage of auxiliary therapeutic techniques	*0.043 - Independent Samples Mann Whitney U test*	Increased usage of auxiliary therapeutic techniques
Acute DCR	Decreased usage of auxiliary therapeutic techniques	*0.002 - Independent Samples Mann Whitney U test*	Increased usage of auxiliary therapeutic techniques
Chronic DCR	Decreased usage of auxiliary therapeutic techniques	*0.039 - Independent Samples Mann Whitney U test*	Increased usage of auxiliary therapeutic techniques

***NSNP = non-specific neck pain, WAD = Whiplash Associated Disorder and DCR = Degenerative Cervical Radiculopathy**

Female practitioners more frequently used auxiliary therapeutic techniques across all six conditions (acute and chronic types of non-specific neck pain, whiplash and degenerative cervical radiculopathy), as well as using manipulation more frequently while using traction less frequently on both acute and chronic non-specific neck pain (Table 4.67 and Table 4.68). Female practitioners less frequently referred patients with chronic non-specific neck pain to medical specialists when compared to their male counterparts.

Table 4.68: Statistically significant participant responses separated into gender groups

		Female		Male	
		n	%	n	%
Auxiliary therapeutic techniques (acute and chronic non-specific neck pain + acute and chronic whiplash associated disorder + acute and chronic degenerative cervical radiculopathy)	Always	182	63.9	104	36.9
	Frequently	85	29.8	127	45
	Occasionally	10	3.5	39	13.8
	Rarely	0	0	12	4.3
	Never	8	2.8	0	0
Manipulation (acute and chronic non-specific neck pain)	Always	84	87.5	65	67.7
	Frequently	12	12.5	30	31.3
	Occasionally	0	0	1	1
	Rarely	0	0	0	0
	Never	0	0	0	0
Traction (acute and chronic non-specific neck pain)	Always	5	5.3	4	4.4
	Frequently	5	5.3	19	21.1
	Occasionally	21	22.1	30	33.3
	Rarely	25	26.3	14	15.6
	Never	39	41.1	23	25.6
Refer to medical specialist (chronic non-specific neck pain)	Always	0	0	0	0
	Frequently	0	0	2	4.7
	Occasionally	6	13.0	15	34.9
	Rarely	31	67.4	18	41.9
	Never	9	19.6	8	18.6

4.6.1.6 Ethnic Group

Q1.3 = Ethnic Group (For statistical purposes only)? The majority of respondents were white (80.2%; n = 77), with the Indian ethnic group making up the second largest group (15.6%; n= 15). There were only two black (2.1%) and one coloured (1%) participants in the study. One participant did not specify their ethnicity (1%; n = 1).

4.6.2 Discussion

Findings noted in this study demonstrated that various factors individual to the chiropractor may influence the treatment of mechanical neck pain, as was suggested by Carlesso *et al.* (2014). These findings have been summarized and are shown in Table 4.69.

Table 4.69: Statistically significant factors in patient treatment

Modality	Increased utilisation noted in
Manipulation	Low CPD group Straight group Foreign chiropractic education Female group
Traction	Straight group Male group
Auxiliary therapeutic techniques	Low CPD group Mixer and evidence based groups Below 35 age group Less than 10 years Female group
Initiate rehabilitation	None
Advice the use of a cervical collar	Foreign trained practitioner Above 35 group More than 10 years of experience group
Advise a non-steroidal anti-inflammatory drug or analgesics	More than 10 years of experience group
Refer the patient to a medical doctor for pain control	None
Refer to a medical specialist	35 and above group No foreign experience Male group

Many of these findings however, only occurred in one or two conditions, and as such may be incidental in nature and not relate to a general trend in the treatment of mechanical neck pain. Factors which occurred in three or more conditions have been highlighted below in Table 4.70

Table 4.70: Statistically significant factors in patient treatment across three or more conditions

Modality	Increased utilisation noted in	Number of conditions
Auxiliary therapeutic techniques	Female group	6
Traction	Straight group	5
Advice the use of a cervical collar	More than 10 years of experience group	4
Advice the use of a cervical collar	Above 35 group	3
Auxiliary therapeutic techniques	Low CPD group	3

An increased utilisation of auxiliary therapeutic techniques was noted in female practitioners. Furthermore, this was noted across acute and chronic types of all forms of mechanical neck pain, and was also noted in a previous study which assessed the treatment patterns of South Arican chiropractors (Fletcher 2005). The increased utilisation of auxillairy therapeutic techniques by female practitioners could be attributed to the fact that female practitioners have a greater interest in preventative care than their male counterparts (Rupert 2000; Frank

et al. 2010), and it was postulated that female practitioners may take more time treating their patients, so as to have a longer lasting effect and prevent future recurrence due to their increased interest in preventative care (Fletcher 2005). However, this study did not assess the total time which practitioners spent with their patients and therefore drawing such a conclusion is difficult. However, the increased usage of auxiliary therapeutic techniques amongst female practitioners has now been noted in two studies amongst South African chiropractors, and therefore this finding does appear to be significant and may require further assessment (Fletcher 2005).

Another trend that was noted was the increased utilisation of traction amongst practitioners who associated with the straight philosophy. The entire population of participants who associated with the straight philosophy utilised traction always, frequently or occasionally across five conditions, whilst the majority (73.2%) of practitioners who associated with evidence or mixer philosophies, never, rarely, or occasionally used traction. To the researchers knowledge, this finding has not been noted in previous studies which assessed the practice patterns of chiropractors. However, it may be postulated that this increased utilisation of traction may be due to its close relation to manipulation and mobilisation, as a manual therapy aimed at producing joint movement (Vernon, Humphreys and Hagino 2007; French *et al.* 2011). Straight chiropractors base their treatment upon the detection and correction of the vertebral subluxation, and their treatment relies almost exclusively on spinal manipulations, with rare utilisation of other techniques or modalities, possibly leading to this increased utilisation of traction (Kaptchuk and Eisenberg 1998; Keating, Cleveland III and Menke 2004). It should however be noted that very few (n = 7; 7.3%) practitioners associated with the straight philosophy, and therefore this finding should be interpreted with caution.

The increased utilisation of cervical collars amongst practitioners of increased age and experience was noted in three and four conditions respectively. The majority of practitioners in all age and experience groups used cervical collars rarely to never; however, more practitioners of increased age and experience used cervical collars in their appracoach to mechanical neck pain (always, frequently and occasionally) as represented in Tables 4.62 and Tables 4.64.

It has been suggested that a practitioners' education may play a vital role in their awareness (Coomarasamy 2003; Khan and Coomarasamy 2006; Agrawal, Szatmari and Hanson 2008; Aiyer 2008; Walker *et al.* 2014) and perception of evidence based practice (Zhang 1996;

Newell and Cunliffe 2003; McCoy 2008). Evidence based practice has only recently been added to educational programs (Haldeman 2005), resulting in lower levels of experience and training in research appraisal and synthesis, which has been found to result in a lower understanding of research methodology, when compared to their younger less experienced counterparts (Walker *et al.* 2014). This may explain the higher utilisation of a modality (cervical collar) which has been found to be of little or no benefit in the treatment of mechanical neck pain, and may delay recovery (Hurwitz *et al.* 2009; Gross *et al.* 2013b).

These finding should however be interpreted with caution as they were noted in fewer conditions than the previously discussed trends. These findings were also found in acute and chronic degenerative cervical radiculopathy, for which evidence regarding recommendations for conservative treatment is limited, and no specific recomendation has been made for cervical collars (Hurwitz *et al.* 2009; Gross *et al.* 2013b).

The final statistically significant trend identified was the increased utilisation of auxiliary therapeutic techniques amongst practitioners who were classified into a “Low CPD” group. Although both groups of practitioners always or frequently used auxiliary therapeutic techniques, practitioners who were included into the “High CPD” group, more frequently stated that they would occasionally (11.5%) or rarely (7.3%) use auxiliary therapeutic techniques, when compared to their “Low CPD” counterparts. Continuous professional development may be an effective means of teaching skills of appraisal and synthesis of evidence and literature (Bolton 2002; Newell and Cunliffe 2003; Haneline 2007) and may also help the practitioner remain current, acquiring new and updated knowledge and skills (Bolton 2002; Mazmanian and Davis 2002; AHPCSA 2014). One would therefore expect practitioners who were classified as a “High CPD” practitioners to use evidence based modalities more frequently than their “Low CPD” counterparts. As the combination of manual therapy (specifically manipulation and mobilisation) and rehabilitation may provide the optimal effect for the treatment of mechanical neck pain (Carlesso *et al*. 2014), practitioners in the *“*High CPD” groups may therefore choose to instead focus on these modalities. As a result, practitioners may neglect the use of auxiliary therapeutic techniques where current evidence for its utilisation is mixed, with some forms being recommended, such as laser (Gross *et al.* 2007; Chow *et al.* 2009; Hurwitz *et al.* 2009; Leaver *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a), acupuncture and dry needling (Gross *et al.* 2007; Trinh *et al.* 2007; Leaver *et al.* 2010; Graham *et al.* 2013; Clar *et al.* 2014) whilst other forms were inconclusive or of no benefit, such as electrotherapeutic techniques (Hurwitz *et al.* 2009; Leaver *et al.* 2010; Kroeling *et al.* 2013; Bryans *et al.* 2014; Edwards *et al.* 2002), soft tissue

techniques (Vernon, Humphreys and Hagino 2007; Hurwitz *et al.* 2009; Brosseau *et al.* 2012; Patel *et al.* 2012; Bryans *et al.* 2014), thermal therapies (Hurwitz *et al.* 2009; Graham *et al.* 2013) and ultrasound (Gross *et al.* 2007; Hurwitz *et al.* 2009; Graham *et al.* 2013).

Numerous factors have been suggested to be influential in the practice of evidence based medicine. These include factors which may influence the awareness of evidence based practice, such as education (Coomarasamy 2003; Khan and Coomarasamy 2006; Agrawal, Szatmari and Hanson 2008; Aiyer 2008), continuous professional development (Bolton 2002; Newell and Cunliffe 2003; Haneline 2007) and age (Haldeman 2005; Walker *et al.* 2014), and factors which may influence the perception of evidence based practice, such as age (Zhang 1996; Newell and Cunliffe 2003; McCoy 2008), gender (Newell and Cunliffe 2003; Rieder 2010; Gordon 2012), education (Zhang 1996; Newell and Cunliffe 2003; McCoy 2008; Gordon 2012) and philosophy (Kaptchuk and Eisenberg 1998; Cooper and McKee 2003; Keating, Cleveland III and Menke 2004). It is of interest to note that the use of rehabilitation, one of the most supported modalities for the treatment of mechanical neck pain *(*Gross *et al.* 2007*;* Hurwitz *et al.* 2009*;* Leaver *et al.* 2010*;* Kay *et al.* 2012*;* Bryans *et al.* 2014*),* particularly in combination with manual therapies (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a), remained constant throughout all statistical analysis. Thus, it would appear that the chiropractic population, regardless of demographic, educational or philosophical factors recognised the importance of rehabilitation, and that the practitioners who chose to not always or frequently use rehabilitation in the treatment of mechanical neck pain, did so of their own accord and not due to specific trends.

4.7 Conclusion

Ninety-six practitioners (75.5%) responded to this questionnaire, and the findings obtained as well as the discussion thereof have been outlined in this chapter. The following conclusions have been drawn with regards to the aims, objectives and null hypotheses of this study:

The chiropractic treatment and management protocols utilised in the treatment of mechanical neck pain, specifically acute and chronic types of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy has been assessed as per the aim of the study.

From the data obtained from the study the following objectives were achieved:

1. A profile of the chiropractic treatment and management of mechanical neck pain was developed and compared to the evidence based recommendations for the treatment of mechanical neck pain (Section 4.4).
2. A profile of the chiropractic treatment of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy was developed (Section 4.5).
3. A profile of the chiropractic treatment of acute and chronic types of mechanical neck pain, and its sub-classifications was developed (Section 4.6).
4. The demographic, educational and philosophical profile of practitioners in KwaZulu-Natal was developed and the influence of such factors on the treatment of mechanical neck pain was assessed (Section 4.7).

Null Hypothesis One:
The null hypothesis was that practitioners in KwaZulu-Natal did not follow evidence based recommendations with regard to the treatment of mechanical Neck Pain. This null hypothesis was rejected as significant overlap between evidence based recommendations and practitioner practices existed (Section 4.4).

Null Hypothesis Two:
The null hypothesis was that practitioners in KwaZulu-Natal treated non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy in a similar manner. This null hypothesis was accepted as significant overlap existed for the treatment of these three conditions. This overlap coincided with current evidence based recommendations in the literature for the treatment of mechanical neck pain (Section 4.5).

Null Hypothesis Three:
Practitioners in KwaZulu-Natal treated acute and chronic types of mechanical neck pain, and its sub-classifications in a similar manner. This null hypothesis was rejected due to the trend for greater utilisation of passive therapies in acute conditions and of active therapies in chronic conditions as highlighted in (Section 4.6).

Null Hypothesis Four:
Demographic, educational and philosophical factors of practitioners in KwaZulu-Natal did not influence the treatment of mechanical neck pain. This Null hypothesis was rejected as certain demographic, educational and philosophical factors did influence the treatment of mechanical neck pain across several conditions (Section 4.7).

5: CONCLUSIONS AND RECOMMENDATIONS

4.8 Conclusion

The aim of this study was to assess the treatment and management protocols utilised by chiropractors in KwaZulu-Natal in the treatment of mechanical neck pain, specifically acute and chronic types of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy. Secondary objectives included the following: to determine the chiropractic treatment and management of mechanical neck pain and to compare this to evidence based recommendations for the treatment of mechanical neck pain; to determine the chiropractic treatment of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy; to determine the chiropractic treatment of acute and chronic types of mechanical neck pain as well as acute and chronic types of non-specific neck pain, whiplash associated disorder and degenerative cervical radiculopathy and to determine the demographic, educational and philosophical profile of practitioners in KwaZulu-Natal, and assess the influence of such factors on the treatment of mechanical neck pain.

In the treatment of mechanical neck pain, practitioners in KwaZulu-Natal favoured the use of spinal manipulation, soft tissue therapies, rehabilitation and education as is outlined in Chapter 4. This finding was both in keeping with findings of previous studies which assessed the practice patterns of chiropractors (Kopansky-Giles and Papadopoulos 1997; Coulter and Shekelle 2005; Mootz *et al.* 2005; Ailliet, Rubinstein and de Vet 2010; Humphreys *et al.* 2010; Keyter 2010; Gordon 2012), the manual therapy tradition of chiropractic (WFC 2014), and evidence based recommendations as outlined in chapter 2.

Practitioners treated non-specific neck pain, whiplash associated disorder, and degenerative cervical radiculopathy in a similar manner, with the use of manipulation, soft tissue therapy, rehabilitation and education being the most commonly used modalities. This is again in keeping with recommendations made for the treatment of mechanical neck pain, however, some differences between the various conditions were noted. Most notably, the wider

variation of treatment modalities used by practitioners, as the strength of evidence for the treatment of the conditions decreased. This would imply that as the strength of evidence for the conservative treatment of specific conditions decreased, so too did the level of confidence amongst practitioners regarding the correct course of action in the treatment of the condition (Section 4.5).

For acute and chronic types of mechanical neck pain, practitioners followed the recommendation that treatment should move from passive to active as patients moved from acute to chronic types of the condition. Modalities which were considered more passive in nature such as auxiliary therapeutic techniques and medication, were used more frequently in acute mechanical neck pain, whilst modalities which were considered to be more active in nature such as education and rehabilitation, were used more frequently in chronic neck pain. It appears that most practitioners were mindful of the evidence based recommendations for the treatment of mechanical neck pain, as the most frequently used modalities in both acute and chronic mechanical neck pain were a combination of manual therapy and rehabilitation, as recommended by the evidence based guidelines (Gross *et al.* 2007; Hurwitz *et al.* 2009; D'Sylva *et al.* 2010; Miller *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013).

The study also demonstrates that various factors individual to the chiropractor may influence the treatment of mechanical neck pain in terms of the usage of manipulation, auxiliary therapeutic techniques, traction, cervical collars, non-steroidal anti-inflammatory medications and analgesics and referral to medical specialists. The most statistically significant findings included the increased utilisation of auxiliary therapeutic techniques by female practitioners, the increased utilisation of traction by practitioners identifying with the straight philosophy of chiropractic, the increased utilisation of cervical collars by practitioners of increased age and experience and the increased utilisation of auxiliary therapeutic techniques by practitioners who did not attend health related conferences at least once every second year, and those who did not attend short courses or subscribe to journals or magazines since qualification.

4.9 Limitations of this study

1. The study relied on a sample limited to practitioners in KwaZulu-Natal, and although the response rate was high (75.6%) this may not be representative of the whole population of South Africa.
2. This study was formulated through the adaptation of the questionnaire developed by Palmer (2009), which lacks global verification and was not designed to assess the

chiropractic management of neck pain. However, at the time of the study, no other questionnaires were available for use. The questionnaire used by Carlesso *et al.* (2014) would have been ideal for use in this study, however, this study was released after data collection commenced and its utilisation was therefore not possible.

3. The current questionnaire lacked specificity in the use of certain modalities, which might warrant investigation in future studies:
    - Rehabilitation, the structure of the current questionnaire was ambiguous and requires more direct questioning related to rehabilitation.
    - Laser and traditional acupuncture should be questioned directly as they have been recommended in the literature (Gross *et al.* 2007; Trinh *et al.* 2007; Chow *et al.* 2009; Hurwitz *et al.* 2009; Leaver *et al.* 2010; Graham *et al.* 2013; Gross *et al.* 2013a; Clar *et al.* 2014).
    - Medications, namely non-steroidal anti-inflammatory medications and analgesics should be assessed separately as levels of evidence for the use of each varies within the literature (Hurwitz *et al.* 2009)
    - Traction, namely continous and intermittent mechanical traction, should be assessed seperately as levels of evidence vary depending on subclassification (Gross *et al.* 2007; Keyter 2010; Gordon 2012; Graham *et al.* 2013).
4. The mechanism through which some results were obtained, i.e. the calculation of averages of participant responses for mechanical neck pain as a whole and acute and chronic versions of mechanical neck pain may be viewed as a limitation and lack specificity. However this method of obtaining results was used as:
    - Assessing each condition specifically may have resulted in a reduced response rate due to the extreme length of the questionnaire (Jepson *et al.* 2005).
    - At present confusion exists regarding the definition of mechanical neck pain (Fernández-de-las-Peñas, Cleland and Huijbregts 2011). This confusion may have resulted in practitioner uncertainty regarding the exact meaning of the term mechanical neck pain and therefore inapropriate responses may have been obtained in this study.

4.10 Recommendations

1. One of the difficulties in the current research was the lack of quality literature available for the production of evidence based guidelines for the conservative treatment of whiplash associated disorder and degenerative cervical radiculopathy. Further studies, specifically randomized clinical trials of sound methodology would

generate clearer guidelines thus providing practitioners with the ability to make better informed decision on the management of whiplash associated disorder and degenerative cervical radiculopathy (Hurwitz *et al.* 2009; Rodine and Vernon 2012).

2. Research should be directed at assessing the optimum dosage and course of care in mechanical neck pain, as limited evidence exists at present (Gross *et al.* 2007; Hurwitz *et al.* 2009; Gross *et al.* 2010; Gross *et al.* 2013).
3. This study could be improved upon and repeated to include the entire chiropractic population of South Africa.
4. Studies of this nature should also be repeated, and should include the treatment and management of other regions of the body, especially those regions for which evidence of conservative treatment exists. This should be done so as to assess if trends in treatment and management of conditions commonly seen by chiropractors reflect evidence based recommendations.

4.11 Conclusion

The importance of a combined approach consisting of manual therapy and rehabilitation has been revealed within evidence based recommendations. This study showed that despite the various factors which may influence practitioner treatment choices, most practitioners practiced in a manner which was in line with evidence based recommendations for the treatment of mechanical neck pain. Levels of utilisation of rehabilitation were however slightly lower than expected and as such further effort should be made by the chiropractic community to include rehabilitation in the management of mechanical neck pain.

REFERENCES

Agrawal, S., Szatmari, P. and Hanson, M. 2008. Teaching evidence-based psychiatry: integrating and aligning the formal and hidden curricula. *Academic Psychiatry : the journal of the American Association of Directors of Psychiatric Residency Training and the Association for Academic Psychiatry*, 32 (6): 470-474.

Allied Health Professions Council of South Africa (AHPCSA). 2012. Board Notices: Continued Professional Developement. Available: http://www.ahpcsa.co.za/pdf_files/cpd/board_notice_188_2012.pdf (Accessed 12 April 2013)

Allied Health Professions Council of South Africa (AHPCSA). 2014. Continuing professional development: Guidelines for the professions of ayurveda, Chineses medicine and acupuncture, chiropractic, homeopathy, naturopathy, osteopathy, phytotherapy, therapeutic aromatherapy, therapeutic massage, therapeutic reflexology and unani-tibb Available: http://www.ahpcsa.co.za/pdf_files/cpd/cpd_guidelines.pdf (Accessed 2 January 2015)

Ailliet, L., Rubinstein, S. M. and de Vet, H. C. W. 2010. Characteristics of chiropractors and their patients in Belgium. *Journal of Manipulative and Physiological Therapeutics*, 33 (8): 618-625.

Aiyer, M. K. 2008. The transformation of an EBM curriculum: a 10-year experience. *Medical Teacher*, 30 (4): 377-383.

Anderson-Peacock, E., White, E., Blouin, J.-S., Bryans, R., Danis, N., Furlan, A., Marcoux, H., Potter, B., Ruegg, R., Stein, J. G. 2005. Chiropractic clinical practice guideline: evidence-based treatment of adult neck pain not due to whiplash. *The Journal of the Canadian Chiropractic Association*, 49 (3): 158-209.

Babbie, E. R. 2010. *The practice of social research*. Belmont, CA: Wadsworth Cengage Learning.

Banzai, R., Derby, D. C., Long, C. R. and Hondras, M. A. 2011. International web survey of chiropractic students about evidence-based practice: a pilot study. *Chiropractic & Manual Therapies*, 19 (6): 1-9.

Beam, J. 2002. Rehabilitation including sport-specific functional progression for the competitive athlete. *Journal of Bodywork and Movement Therapies*, 6 (4): 205-219.

Bennett, S., Tooth, L., McKenna, K., Rodger, S., Strong, J., Ziviani, J., Mickan, S. and Gibson, L. 2003. Perceptions of evidence-based practice: a survey of Australian occupational therapists. *Australian Occupational Therapy Journal,* 50 (1): 13-22.

Bernard, H. 2000. *Social Research Methods: Qualitative and Quantitative Approaches.* Thousand Oaks, CA: Sage Publications.

Binder, A. 2007. The diagnosis and treatment of nonspecific neck pain and whiplash. *Europa Medicophysica*, 43 (1): 79.

Black, E. 2008. A retrospective survey of the career paths and demographics of Durban University of Technology (DUT) chiropractic graduates. M.Tech: Chiropractic. Durban University of Technology.

Bolton, J. E. 2002. Chiropractors' attitudes to, and perceptions of, the impact of continuing professional education on clincial practice. *Medical Education*, 36 (4): 317.

Bongers, P. M., Beek, v. d. A. J., essen, M. T., Anema, J. R., Tulder, v. M. W. and Proper, K. I. 2010. The effectiveness of physical and organisational ergonomic interventions on low back pain and neck pain: a systematic review. *Occupational and Environmental Medicine*, 67 (4): 277-285.

Bono, C. M., Lamer, T., Matz, P. G., Mazanec, D. J., Resnick, D. K., Shaffer, W. O., Sharma, A. K., Timmons, R. B., Toton, J. F., Ghiselli, G., Gilbert, T. J., Kreiner, D. S., Reitman, C., Summers, J. T., Baisden, J. L., Easa, J., Fernand, R. 2011. An evidence-based clinical guideline for the diagnosis and treatment of cervical radiculopathy from degenerative disorders. *The Spine Journal*, 11 (1): 64-72.

Boon, N. A. and Davidson, S. S. 2006. *Davidson's principles & practice of medicine*. 20th ed. Edinburgh: Elsevier/Churchill Livingstone.

Booysen, S. 2003. Designing a questionnaire. In: Rossouw, D. *Intellectual tools: skills for the human sciences*. 2nd ed. Pretoria: Van Schaik.

Brink, H., Van der Walt, C. and Van Rensburg, G. H. 2012. *Fundamentals of research methodology for health care professionals*. Cape Town: Juta.

Brosseau, L., Hua, K., Kresic, D., Lakic, A., Ménard, G., Côté, P., Leblanc, G., Sonier, M., Cloutier, A., McEwan, J., Poitras, S., Wells, G. A., Furlan, A., Gross, A., Dryden, T., Muckenheim, R., Côté, R., Paré, V., Rouhani, A., Léonard, G., Finestone, H. M., Laferrière, L., Tugwell, P., Dagenais, S., De Angelis, G., Cohoon, C., Casimiro, L., Novikov, M., Loew, L., Sredic, D., Clément, S. and Gravelle, A. 2012. Ottawa Panel evidence-based clinical practice guidelines on therapeutic massage for neck pain. *Journal of Bodywork and Movement Therapies*, 16 (3): 300.

Bryans, R., White, E., Decina, P., Descarreaux, M., Duranleau, M., Marcoux, H., Potter, B., Ruegg, R. P., Shaw, L. and Watkin, R. 2014. Evidence-based guidelines for the chiropractic treatment of adults with neck pain. *Journal of Manipulative and Physiological Therapeutics*, 37 (1): 42.

Chiropractic Association of South Africa (CASA). 2013. Available: http://www.chiropractic.co.za/home/?&re=1 (Accessed 12 September 2013).

Chiropractic Assocation of South Africa (CASA). 2014. Chiropractic History in SA. Available: http://www.chiropractic.co.za/history/index.html?&re=1 (Accessed 20 Febuary 2014).

Cagnie, B., Dewitte, V., Barbe, T., Timmermans, F., Delrue, N. and Meeus, M. 2013. Physiologic Effects of Dry Needling. *Current Pain and Headache Reports*, 17 (8): 1-8.

Cameron, M. H. 2013. *Physical agents in rehabilitation: from research to practice*. 4th ed. St. Louis, MO: Elsevier Saunders.

Carey, P.F. Clum, G. and Dixon, P. 2005. Final report of the identity consult task force (online). Available: http://www.wfc.org (Accessed January 2015).

Caridi, J. M., Pumberger, M. and Hughes, A. P. 2011. Cervical radiculopathy: a review. *HSS Journal : the musculoskeletal journal of Hospital for Special Surgery*, 7 (3): 265-272.

Carlesso, L. C., Macdermid, J. C., Gross, A. R., Walton, D. M. and Santaguida, P. L. 2014. Treatment preferences amongst physical therapists and chiropractors for the management of neck pain: results of an international survey. *Chiropractic & Manual Therapies*, 22 (1): 11.

Carroll, L. J., Peloso, P. M., Guzman, J., Cassidy, J. D., Hogg-Johnson, S., van der Velde, G., Haldeman, S., Holm, L. W., Carragee, E. J., Hurwitz, E. L., Côté, P. and Nordin, M. 2008a. Course and prognostic factors for neck pain in the general population: results of the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders. *European Spine Journal*, 17 (S1): 75-82.

Carroll, L. J., van der Velde, G., Peloso, P. M., Guzman, J., Holm, L. W., Hogg-Johnson, S., Côté, P., Cassidy, J. D., Haldeman, S., Nordin, M., Hurwitz, E. L. and Carragee, E. J. 2008b. Course and prognostic factors for neck pain in whiplash-associated disorders (WAD): results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *European Spine Journal*, 17 (1): 83-92.

Chon, T. Y. and Lee, M. C. 2013. Acupuncture. *Mayo Clinic Proceedings*, 88 (10): 1141-1146.

Chow, R. T., Johnson, M. I., Lopes-Martins, R. A. B. and Bjordal, J. M. 2009. Efficacy of low-level laser therapy in the management of neck pain: a systematic review and meta-analysis of randomised placebo or active-treatment controlled trials. *The Lancet*, 374 (9705): 1897-1908.

Clar, C., Tsertsvadze, A., Court, R., Hundt, G. L., Clarke, A. and Sutcliffe, P. 2014. Clinical effectiveness of manual therapy for the management of musculoskeletal and non-musculoskeletal conditions: systematic review and update of UK evidence report. *Chiropractic & Manual Therapies*, 22 (1): 12.

Cleland, J. A., Whitman, J. M., Fritz, J. M. and Palmer, J. A. 2005. Manual physical therapy, cervical traction, and strengthening exercises in patients with cervical radiculopathy: A case series. *Journal of Orthopaedic & Sports Physical Therapy*, 35 (12): 802-811.

Conn, D. A. 2005. Assessment of acute and chronic pain. *Anaesthesia & Intensive Care Medicine*, 6 (1): 14-15.

Coomarasamy, A. 2003. A systematic review of postgraduate teaching in evidence-based medicine and critical appraisal. *Medical Teacher*, 25 (1): 77-81.

Cooper, R. A. and McKee, H. J. 2003. Chiropractic in the United States: Trends and Issues. *The Milbank Quarterly*, 81 (1): 107-138.

Côté, P., Cassidy, J. D., Carroll, L. J. and Kristman, V. 2004. The annual incidence and course of neck pain in the general population: a population-based cohort study. *Pain*, 112 (3): 267-273.

Coulter, I. D. and Shekelle, P. G. 2005. Chiropractic in North America: a descriptive analysis. *Journal of Manipulative and Physiological Therapeutics*, 28 (2): 83-89.

Cromie, J. E., Robertson, V. J. and Best, M. O. 2000. Work-related musculoskeletal disorders in physical therapists: prevalence, severity, risks, and responses. *Physical Therapy*, 80 (4): 336-351.

D'Sylva, J., Miller, J., Gross, A., Burnie, S. J., Goldsmith, C. H., Graham, N., Haines, T., Brønfort, G. and Hoving, J. L. 2010. Manual therapy with or without physical medicine modalities for neck pain: a systematic review. *Manual Therapy*, 15 (5): 415-433.

De Gouveia, N. 2009. The knowledge, perception and utilisation of vitamin and mineral supplements, natural medicines and pharmacological agents as adjuncts to chiropractic practice in South Africa. M.Tech: Chiropractic. Durban University of Technology.

De Vos, A. S. 2011. *Research at grass roots: for the social sciences and human services professions*. Pretoria: Van Schaik.

Delaney, P. M. and Fernandez, C. E. 1999. Toward an evidence-based model for chiropractic education and practice. *Journal of Manipulative and Physiological Therapeutics*, 22 (2): 114-118.

Denegar, C. R., Saliba, E. and Saliba, S. F. 2010. *Therapeutic modalities for musculoskeletal injuries*. Champaign, Ill: Human Kinetics.

Dyer, C. 1997. *Beginning research in psychology: a practical guide to research methods and statistics*. Oxford: Blackwell.

Edwards, P., Roberts, I., Clarke, M., DiGuiseppi, C., Pratap, S., Wentz, R. and Kwan, I. 2002. Increasing response rates to postal questionnaires: systematic review. *British Medical Journal*, 324 (7347): 1183.

Evans, K. 2013. The status of paediatric care in chiropractic practices in KwaZulu-Natal. M.Tech: Chiropractic, Durban Univirsity of Technology.

Fejer, R., Kyvik, K. O. and Hartvigsen, J. 2006. The prevalence of neck pain in the world population: a systematic critical review of the literature. *European Spine Journal: official publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society*, 15 (6): 834-848.

Fernández-de-las-Peñas, C. S., Cleland, J. and Huijbregts, P. 2011. *Neck and arm pain syndromes: evidence-informed screening, diagnosis, and management*. Philadelphia, Pa.: Elsevier/Churchill Livingstone.

Fletcher, J. 2005. A survey of treatment regimes of chiropractic in South Africa. M.Tech: Chiropractic, University of Johannesburg.

Fink, A. and Kosecoff, J. B. 1985. *How to conduct surveys: a step-by-step guide*. Newbury Park, CA: Sage.

Ford, T. W. 2014. Chiropractic and public health: a study on the perceptions and attitudes of chiropractors on health promotion and disease prevention in South Africa. M.Tech: Chiropractic. Durban University of Technology.

Frank, E., Segura, C., Shen, H. and Oberg, E. 2010. Predictors of Canadian physicians' prevention counseling practices. *Canadian Journal of Public Health,* 101 (5): 390-395.

French, H. P., Brennan, A., White, B. and Cusack, T. 2011. Manual therapy for osteoarthritis of the hip or knee – A systematic review. *Manual Therapy*, 16 (2): 109-117.

Furlan, A. D., van Tulder, M., Cherkin, D., Tsukayama, H., Lao, L., Koes, B. and Berman, B. 2005. Acupuncture and dry-needling for low back pain: an updated systematic review within the framework of the cochrane collaboration. *Spine*, 30 (8): 944-963.

Gordon, J. 2012. A study to explore the perceptions that South African chiropractors have regarding the perceived role and impact of research within the profession. M.Tech: Chiropractic. Durban University of Technology.

Graham, N., Gross, A. R., Carlesso, L. C., Santaguida, P. L., Macdermid, J. C., Walton, D. 2013. An ICON overview on physical modalities for neck pain and associated disorders. *The Open Orthopaedics Journal*, 7 (1): 440-460.

Graziano, A. M. and Raulin, M. L. 2004. *Research methods: a process of inquiry*. 5th ed Boston, MA: Pearson/Allyn and Bacon.

Gross, A., Miller, J., D'Sylva, J., Burnie, S. J., Goldsmith, C. H., Graham, N., Haines, T., Brønfort, G., Hoving, J. L. 2010. Manipulation or mobilisation for neck pain: a Cochrane Review. *Manual Therapy*, 15 (4): 315-333.

Gross, A. R., Dziengo, S., Boers, O., Goldsmith, C. H., Graham, N., Lilge, L., Burnie, S. and White, R. 2013. Low level laser therapy (LLLT) for neck pain: a systematic review and meta-regression. *The Open Orthopaedics Journal*, 7 (1): 396-419.

Gross, A. R., Goldsmith, C., Hoving, J. L., Haines, T., Peloso, P., Aker, P., Santaguida, P., Myers, C. 2007. Conservative management of mechanical neck disorders: A systematic review. *Journal of Rheumatology,* 34 (5): 1083-1102.

Gross, A. R., Hoving, J. L., Haines, T. A., Goldsmith, C. H., Kay, T., Aker, P., Bronfort, G. 2004. A Cochrane review of manipulation and mobilization for mechanical neck disorders. *Spine*, 29 (14): 1541-1548.

Gross, A. R., Söderlund, A., Verhagen, A., Hartvigsen, J., Kaplan, F., Huang, S., Khan, M., Santaguida, P. L., Carlesso, L. C., Macdermid, J. C., Walton, D. M. and Kenardy, J. 2013. Psychological care, patient education, orthotics, ergonomics and prevention strategies for neck pain: a systematic overview update as part of the ICON project. *The Open Orthopaedics Journal*, 7 (1): 530-561.

Gruman, J., Rovner, M. H., French, M. E., Jeffress, D., Sofaer, S., Shaller, D. and Prager, D. J. 2010. From patient education to patient engagement: Implications for the field of patient education. *Patient Education and Counseling*, 78 (3): 350-356.

Guzman, J., Hogg-Johnson, S., Nordin, M., Cassidy, J. D., Hurwitz, E. L., Carroll, L. J., Haldeman, S., Côté, P., Carragee, E. J., Peloso, P. M., van der Velde, G. and Holm, L. W. 2009. A new conceptual model of neck pain: linking onset, course, and care: the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *European Spine Journal,* 17 (Suppl 1): S14-S23.

Hadley, J., Hassan, I. and Khan, K. S. 2008. Knowledge and beliefs concerning evidence-based practice amongst complementary and alternative medicine health care practitioners and allied health care professionals: A questionnaire survey. *BMC Complementary and Alternative Medicine*, 8 (1): 45-45.

Haines, T., Gross, A. R., Burnie, S., Goldsmith, C. H., Perry, L. and Graham, N. 2009. A Cochrane review of patient education for neck pain. *The Spine Journal*, 9 (10): 859-871.

Haldeman, S. 2005. *Principles and practice of chiropractic.* 3rd ed. New York, NY: McGraw Hill.

Haldeman, S. and Dagenais, S. 2012. *Evidence based management of lower back pain*. St. Louis, MO: Elsevier (Mosby).

Haldeman, S. and Underwood, M. 2010. Commentary on the United Kingdom evidence report about the effectiveness of manual therapies. *Chiropractic & Osteopathy*, 18 (1): 4-4.

Hall, G. 2011. Attitudes of chiropractors to evidence-based practice and how this compares to other healthcare professionals: a qualitative study. *Clinical Chiropractic*, 14 (3): 106-111.

Haneline, M. T. 2007. *Evidence-based chiropractic practice*. Sudbury, MA: Jones and Bartlett Publishers.

Hanyok, L. A., Hellmann, D. B., Rand, C. and Ziegelstein, R. C. 2012. Practicing patient-centered care. *The Patient*, 5 (3): 141.

Hartvigsen, J., Sorensen, L. P., Graesborg, K. and Grunnet-Nilsson, N. 2002. Chiropractic patients in Denmark: a short description of basic characteristics. *Journal of Manipulative and Physiological Therapeutics*, 25 (3): 162-167.

Triad Healthcare. 2014. TMMP 10 - USE OF PASSIVE AND ACTIVE CARE. Available: http://www.triadhealthcareinc.com/providers/PDFview.aspx?fld=Cur%5CCurrent%20Policies&fn=TMMP%20010%20-%20Use%20of%20Passive%20and%20Active%20Care.pdf (Accessed 1 January 2015).

Hengeveld, E., Banks, K. and Maitland, G. D. 2005. *Maitland's peripheral manipulation*. 4th ed. Edinburgh: Elsevier/Butterworth Heinemann.

Hoe, V. C. W., Urquhart, D. M., Kelsall, H. L. and Sim, M. R. 2012. Ergonomic design and training for preventing work-related musculoskeletal disorders of the upper limb and neck in adults. *Cochrane Database of Systematic Reviews*, 15 (8): 1-109.

Hogg-Johnson, S., Carragee, E., Hurwitz, E., Nordin, M., Peloso, P., van der Velde, G., Carroll, L. J., Holm, L. W., Cassidy, J. D., Guzman, J., Côté, P., Haldeman, S. and Ammendolia, C. 2009. The burden and determinants of neck pain in the general population. *Journal of Manipulative and Physiological Therapeutics*, 32 (2): S46-S60.

Holm, L. W., van der Velde, G., Carragee, E., Haldeman, S., Carroll, L. J., Cassidy, J. D., Hogg-Johnson, S., Côté, P., Guzman, J., Peloso, P., Nordin, M. and Hurwitz, E. 2008. The burden and determinants of neck pain in whiplash-associated disorders after traffic collisions: results of the Bone and Joint Decade 2000 –2010 Task Force on Neck Pain and Its Associated Disorders. *European Spine Journal*, 17 (1): 52-59.

Hoving, C., Visser, A., Mullen, P. D. and van den Borne, B. 2010. A history of patient education by health professionals in Europe and North America: from authority to shared decision making education. *Patient Education and Counseling*, 78 (3): 275-281.

Hoving, J. L., Koes, B. W., de Vet, H. C. W., van der Windt, D. A. W. M., Assendelft, W. J. J., van Mameren, H., Devillé, W. L. J. M., Pool, J. J. M., Scholten, R. J. P. M. and Bouter, L. M. 2002. Manual therapy, physical therapy, or continued care by a general practitioner for patients with neck pain. A randomized, controlled trial. *Annals of Internal Medicine*, 136 (10): 713-722.

Hoy, D. G., Protani, M., De, R. and Buchbinder, R. 2010. The epidemiology of neck pain. *Best Practice & Research: Clinical Rheumatology*, 24 (6): 783-792.

Huguenin, L. K. 2004. Myofascial trigger points: the current evidence. *Physical Therapy in Sport*, 5 (1): 2-12.

Humphreys, B. K., Peterson, C. K., Muehlemann, D. and Haueter, P. 2010. Are Swiss chiropractors dDifferent than other chiropractors? Results of the Job Analysis Survey 2009. *Journal of Manipulative and Physiological Therapeutics*, 33 (7): 519-535.

Hurwitz, E. L., Carragee, E. J., van der Velde, G., Carroll, L. J., Nordin, M., Guzman, J., Peloso, P. M., Holm, L. W., Côté, P., Hogg-Johnson, S., Cassidy, J. D. and Haldeman, S. 2009. Treatment of neck pain: noninvasive interventions: results of the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders. *Journal of Manipulative and Physiological Therapeutics*, 32 (2, Supplement): S141-S175.

Huston, S. A. and Hobson, E. H. 2008. Using focus groups to inform pharmacy research. *Research in Social and Administrative Pharmacy*, 4 (3): 186-205.

International Federation of Orthopaedic Manipulative Physical Therapist (IMFOPT). 2014. Glossary of Terminology. Available: http://www.ifompt.com/Educational+Standards/SC+Glossary.html (Accessed 4 Jabuary 2015).

Jepson, C., Asch, D.A., Hershey, J.C. and Ubel, P.A. 2005. In a mailed physician survey, questionnaire length had a threshold effect on response rate. *Journal of Clinical Epidemiology,* 58(1):103-5.

Johnson, C. D. 2005. On the subject of human subjects - response. *Journal of Manipulative and Physiological Therapeutics*, 28 (9): 730-731.

Johnson, C., Kopansky-Giles, D., Lisi, A. J., Mior, S. A., Smith, M., Baird, R., Dougherty, P. E., Globe, G., Green, B. N., Haneline, M., Hawk, C., Injeyan, H. S. and Killinger, L. 2008. Chiropractic and public health: current state and future vision. *Journal of Manipulative and Physiological Therapeutics*, 31 (6): 397-410.

Kaptchuk, T. J. and Eisenberg, D. M. 1998. Chiropractic: origins, controversies, and contributions. *Archives of Internal Medicine*, 158 (20): 2215-2224.

Kay, T. M., Gross, A., Goldsmith, C. H., Rutherford, S., Voth, S., Hoving, J. L., Bronfort, G. and Santaguida, P. L. 2012. Exercises for mechanical neck disorders. *Cochrane Database of Systematic Reviews*, 15(8): 1-103.

Keating, J. C., Cleveland III, C. S. and Menke, M. 2004. *Chiropractic history: a primer*. Davenport, Iowa: Association for the History of Chiropractic.

Keyter, K. 2010. The perceptions of South African chiropractors, regarding their professional identity. M.Tech: Chiropractic, Durban Univirsity of Technology.

Khan, K. S. and Coomarasamy, A. 2006. A hierarchy of effective teaching and learning to acquire competence in evidenced-based medicine. *BMC Medical Education*, 6 (1): 59-59.

Kim, K.-T. and Kim, Y.-B. 2010. Cervical radiculopathy due to cervical degenerative diseases: anatomy, diagnosis and treatment. *Journal of Korean Neurosurgical Society*, 48 (6): 473-479.

Koes, B. and Hoving, J. 2002. Efficacy of manual therapy in the treatment of neck p*Physical Therapy of the Cervical and Thoracic Spine*. 3rd ed. Edinburgh: Churchill Livingstone. 399-412.

Kopansky-Giles, D. and Papadopoulos, C. 1997. Canadian Chiropractic Resources Databank (CCRD): a profile of Canadian chiropractors. *The Journal of the Canadian Chiropractic Association*, 41 (3): 155-191.

Kroeling, P., Gross, A., Graham, N., Burnie, S. J., Szeto, G., Goldsmith, C. H., Haines, T. and Forget, M. 2013. Electrotherapy for neck pain. *Cochrane Database of Systematic Reviews, 15* (8): 1-103.

Kuijper, B., Tans, J. T. J., Schimsheimer, R. J., van der Kallen, B. F. W., Beelen, A., Nollet, F. and de Visser, M. 2009. Degenerative cervical radiculopathy: diagnosis and conservative treatment. a review. *European Journal of Neurology*, 16 (1): 15-20.

Lancaster, G. A., Dodd, S. and Williamson, P. R. 2004. Design and analysis of pilot studies: recommendations for good practice. *Journal of Evaluation in Clinical Practice*, 10 (2): 307-312.

Lapane, K. L., Quilliam, B. J. and Hughes, C. M. 2007. A comparison of two distribution methods on response rates to a patient safety questionnaire in nursing homes. *Journal of American Medical Directors Association,* 8 (7): 446-452.

Leaver, A. M., Refshauge, K. M., Maher, C. G. and McAuley, J. H. 2010. Conservative interventions provide short-term relief for non-specific neck pain: a systematic review. *Journal of Physiotherapy*, 56 (2): 73-85.

Liebenson, C. 2007. *Rehabilitation of the spine: a practitioner's manual*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins.

Lindstrom, M. 2007. Social capital, anticipated ethnic discrimination and self-reported psychological health: A population-based study. *Social Science and Medicine*, 66(1):1-13.

Magee, D. J. 2008. *Orthopedic physical assessment*. 5th ed. Philadelphia, PA: Saunders.

Magee, D. J., Zachazewski, J. E. and Quillen, W. S. 2009. *Pathology and intervention in musculoskeletal rehabilitation*. 1st ed. St. Louis, MO: Saunders/Elsevier.

Martinez, D. A., Rupert, R. L. and Ndetan, H. T. 2009. A demographic and epidemiological study of a Mexican chiropractic college public clinic. *Chiropractic & Osteopathy*, 17 (1): 4-4.

Martz, T. J. 1994. Through the patient's eyes: understanding and promoting patient-centered care. *Journal of Psychosocial Nursing & Mental Health Services*, 32 (8): 47.

Massey, O. T. 2011. A proposed model for the analysis and interpretation of focus groups in evaluation research. *Evaluation and Program Planning*, 34 (1): 21-28.

Mazmanian, P. E. and Davis, D. A. 2002. Continuing medical education and the physician as a learner: guide to the evidence. *Journal of the American Medical Association*, 288 (9): 1057.

McCarthy, P. W. 2008. Scope of practice: what should be included and what not? *Clinical Chiropractic*, 11 (3): 115-119.

McCoy, M. 2008. Professional attitudes regarding research--changing the culture one student at a time. *The Journal of the Canadian Chiropractic Association*, 52 (3): 143-148.

Mearns, K. J. and Reader, T. 2007. Organizational support and safety outcomes: An un-investigated relationship? *Safety Science*, (46): 388-397.

Meeker, W. C. and Haldeman, S. 2002. Chiropractic: a profession at the crossroads of mainstream and alternative medicine. *Annals of Internal Medicine*, 136 (3): 216-227.

Michaleff, Z. A., Maher, C. G., Jull, G., Latimer, J., Connelly, L. B., Lin, C.-W. C., Rebbeck, T. and Sterling, M. 2009. A randomised clinical trial of a comprehensive exercise program for chronic whiplash: trial protocol. *BMC Musculoskeletal Disorders*, 10 (1): 149-149.

Miller, J., Gross, A., D'Sylva, J., Burnie, S. J., Goldsmith, C. H., Graham, N., Haines, T., Brønfort, G. and Hoving, J. L. 2010. Manual therapy and exercise for neck pain: a systematic review. *Manual Therapy*, 15 (4): 334-354.

Mootz, R. D., Cherkin, D. C., Odegard, C. E., Eisenberg, D. M., Barassi, J. P. and Deyo, R. A. 2005. Characteristics of chiropractic practitioners, patients, and encounters in Massachusetts and Arizona. *Journal of Manipulative and Physiological Therapeutics*, 28 (9): 645-653.

Morgan, D. L. 1997. *The focus group guidebook*. Portland, OR: SAGE Publications Ebsco Publishing.

Mouton, J. 1996. *Understanding Social Research.* Pretoria: J.L. van Schaik Publishers.

Mouton, J. 2001. *How to succeed in your masters and doctoral studies: a South African guide and resource book.* Pretoria: Van Schaik Publishers.

Müller, G. J., Berlien, P. and Scholz, C. 2006. The medical laser. *Medical Laser Application*, 21 (2): 99-108.

Murphy, D. 1996. The passive/active care continuum: a model for the treatment of spine related disorders. . *Journal of Neuromusculoskeletal Sytem*, 4 (1): 1-7.

Murphy, D. R. 2000. *Conservative management of cervical spine syndromes*. New York: McGraw-Hill.

Myburgh, C. and Mouton, J. 2007. Developmental Issues in Chiropractic: a South African practitioner and patient perspective. *Journal of Manipulative and Physiological Therapeutics*, 30 (3): 206-214.

Newell, D. and Cunliffe, C. 2003. Attitudes toward research in undergraduate chiropractic students. *Clinical Chiropractic*, 6 (3-4): 109-119.

Nyiendo, J., Haas, M., Goldberg, B. and Sexton, G. 2001. Patient characteristics and physicians' practice activities for patients with chronic low back pain: a practice-based study of primary care and chiropractic physicians. *Journal of Manipulative and Physiological Therapeutics*, 24 (2): 92-100.

Owens, E. 1999. *Vertebral subluxation-centred straight chiropractic research* (online). Available: http://www.sherman.edu.research.archives.EOWENS.strat.Chiro.res (Accessed 1 April 2014).

Palmer, R. 2009. An investigation into patient management protocols for low back pain by chiropractors in the greater Durban area. M.Tech Dissertation, Durban University of Technology.

Patel, K. C., Gross, A., Graham, N., Goldsmith, C. H., Ezzo, J., Morien, A. and Peloso, P. M. 2012. Cochrane Database Systematic Reviews: massage for mechanical neck disorders. *Journal of the Australian Traditional-Medicine Society*, 18 (4): 241.

Pollentier, A. and Langworthy, J. M. 2007. The scope of chiropractic practice: a survey of chiropractors in the UK. *Clinical Chiropractic*, 10 (3): 147-155.

Polston, D. W. 2007. Cervical radiculopathy. *Neurologic Clinics*, 25 (2): 373-385.

Prasun, M. A. 2013. Evidence-based practice. *Heart & Lung: The Journal of Acute and Critical Care*, 42 (2): 84.

Prentice, W. E. 2009. *Therapeutic modalities: for sports medicine and athletic training*. 6th ed. Boston, MA: McGraw-Hill.

Ramsey, A. H., Haq, C., Gjerde, C. L. and Rothenberg, D. 2004. Career influence of an international health experience during medical school. *Family Medicine*, 36 (6): 412-416.

Rayegani, S. M., Bayat, M., Bahrami, M. H., Raeissadat, S. A. and Kargozar, E. 2014. Comparison of dry needling and physiotherapy in treatment of myofascial pain syndrome. *Clinical Rheumatology*, 33 (6): 859-864.

Rieder, R. 2010. The attitudes of chiropractic students towards research at Durban University of Technology. M.Tech: Chiropractic. Durban University of Technology.

Robinson, A. J. P. D. and Snyder-Mackler, L. 2008. *Clinical electrophysiology: electrotherapy and electrophysiologic testing*. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins.

Rodine, R. J. and Vernon, H. 2012. Cervical radiculopathy: a systematic review on treatment by spinal manipulation and measurement with the Neck Disability Index. *The Journal of the Canadian Chiropractic Association*, 56 (1): 18-28.

Rosnfeld, P., Edwards, J. E. and Thomas, M. D. 1997. *How to conduct organizational surveys: a step-by-step guide*. Thousand Oaks, CA: Sage.

Rupert, R. L. 2000. A survey of practice patterns and the health promotion and prevention attitudes of US chiropractors. Maintenance Care: Part I. *Journal of Manipulative and Physiological Therapeutics*, 23 (1): 1-9.

Sackett, D., Rosenberg, W., Gray, J., Haynes and Richardson, W. 1996. Evidence based medicine: what it is and what it isn't. *BMJ (Clinical Research Edition)*, 312 (7023): 71-72.

Sampath, P., Bendebba, M., Davis, J. D. and Ducker, T. 1999. Outcome in patients with cervical radiculopathy. Prospective, multicenter study with independent clinical review. *Spine*, 24 (6): 591-597.

Saver, J. L. and Kalafut, M. 2001. Combination therapies and the theoretical limits of evidence-based medicine. *Neuroepidemiology*, 20 (2): 57-64.

Schwarz, I. and Hondras, M. A. 2007. A survey of chiropractors practicing in Germany: practice characteristics, professional reading habits, and attitudes and perceptions toward research. *Chiropractic and Osteopathy*, 15 (6).

Scollon, R., Scollon, S. B. K. and Jones, R. H. 2012. *Intercultural communication: a discourse approach*. 3rd ed. Malden, MA: Wiley-Blackwell.

Shaw, L., Descarreaux, M., Bryans, R. and Duranleau, M. 2010. A systematic review of chiropractic management of adults with whiplash-associated disorders: recommendations for advancing evidence-based practice and research. *Work*, 35 (3): 369-394.

Sherman, K. J., Dixon, M. W., Thompson, D. and Cherkin, D. C. 2006. Development of a taxonomy to describe massage treatments for musculoskeletal pain. *BMC Complementary and Alternative Medicine*, 6 (1): 24-24.

Shreeve, M. W. 2012. Evidence-based chiropractic education: are we equipping graduates for clinical practice with improved patient outcomes? *Journal of Chiropractic Education*, 26 (2): 184-187.

Sihawong, R., Janwantanakul, P., Sitthipornvorakul, E. and Pensri, P. 2011. Exercise therapy for office workers with nonspecific neck pain: a systematic review. *Journal of Manipulative and Physiological Therapeutics*, 34 (1): 62-71.

Simons, D. G., Travell, J. G., Simons, L. S. and Cummings, B. D. 1999. *Travell and Simons' myofascial pain and dysfunction: the trigger point manual*. Baltimore, MD: Williams & Wilkins.

Simon, M. K. 2010. *Dissertation and scholarly research: recipes for success : a practical guide to start and complete your dissertation, thesis, or formal research project*. Cottage Grove, OR: Dissertation Success, LLC.

Simpson, J. K. 2012. The Five Eras of Chiropractic & the future of chiropractic as seen through the eyes of a participant observer. *Chiropractic & Manual Therapies*, 20 (1): 1-1.

Slabbert, J.G.L. 2014. An investigation of the factors affecting referral of patients between chiropractors and physiotherapists in the eThekwini municipality. M.Tech: Chiropractic. Durban University of Technology.

Souza, T. A. 2009. *Differential diagnosis and management for the chiropractor: protocols and algorithms*. 4th ed. Sudbury, MA: Jones and Bartlett Publishers Inc.

Spitzer, W. O., Skovron, M. L., Salmi, L. R., Cassidy, J. D., Duranceau, J., Suissa, S. and Zeiss, E. 1995. Scientific monograph of the Quebec Task Force on Whiplash-Associated Disorders: redefining "whiplash" and its management. *Spine,* 20 (8 Suppl): 1s-73s.

Stedman, T. 2005. Stedman's medical dictionary for the health professions and nursing. 5th ed. Baltimore: Lippencott Williams & Wilkins.

Steele, R. 2005. *Consumer applications boost laser sales 10%.* Tulsa, OK: PennWell Corporation.

Stuber, K. J., Grod, J. P., Smith, D. L. and Powers, P. 2005. An online survey of chiropractors' opinions of Continuing Education. *Chiropractic & Osteopathy*, 13 (1): 22-22.

Suter, E., Vanderheyden, L. C., Trojan, L. S., Verhoef, M. J. and Armitage, G. D. 2007. How important is research-based practice to chiropractors and massage therapists? *Journal of Manipulative and Physiological Therapeutics*, 30 (2): 109-115.

Symon, A. G., McStea, B. and Murphy-Black, T. 2005. An exploratory mixed-methods study of Scottish midwives' understanding and perceptions of clinical near misses in maternity care. *Midwifery* [online], 22: 125-136.

Trinh, K., Graham, N., Gross, A., Goldsmith, C., Wang, E., Cameron, I. and Kay, T. 2007. Acupuncture for neck disorders. *Spine*, 32 (2): 236-243.

Upton, D. 1999. Clinical effectiveness and EBP 2: attitudes of health-care professionals. *British Journal of Therapy and Rehabilitation*. 6 (1): 26-30.

Vernon, H., Humphreys, K. and Hagino, C. 2007. Chronic mechanical neck pain in adults treated by manual therapy: a systematic review of change scores in randomized clinical trials. *Journal of Manipulative and Physiological Therapeutics*, 30 (3): 215-227.

Vincent, K., Maigne, J.-Y., Fischhoff, C., Lanlo, O. and Dagenais, S. 2013. Systematic review of manual therapies for nonspecific neck pain. *Joint Bone Spine*, 80 (5): 508-515.

Vos, T., Aboyans, V., Dherani, M., Abraham, J., Ackerman, I., Aggarwal, R., Ahn, S. Y., Ali, M. K., Alvarado, M., Anderson, H. R., Anderson, L. M., Andrews, K. G., Flaxman, A. D., Atkinson, C., Baddour, L. M., Bahalim, A. N., Barker-Collo, S., Barrero, L. H., Bartels, D. H., Basáñez, M.-G., Baxter, A., Bell, M. L., Benjamin, E. J., Naghavi, M., Bennett, D., Bernabé, E., Bhalla, K., Bhandari, B., Bikbov, B., Bin Abdulhak, A., Birbeck, G., Black, J. A., Blencowe, H., Blore, J. D., Lozano, R., Blyth, F., Bolliger, I., Bonaventure, A., Boufous, S., Bourne, R., Boussinesq, M., Braithwaite, T., Brayne, C., Bridgett, L., Brooker, S., Michaud, C., Brooks, P., Brugha, T. S., Bryan-Hancock, C., Bucello, C., Buchbinder, R., Buckle, G., Budke, C. M., Burch, M., Burney, P., Burstein, R., Ezzati, M., Calabria, B., Campbell, B., Canter, C. E., Carabin, H., Carapetis, J., Carmona, L., Cella, C., Charlson, F., Chen, H., Cheng, A. T.-A., Shibuya, K., Chou, D., Chugh, S. S., Coffeng, L. E., Colan, S. D., Colquhoun, S., Colson, K. E., Condon, J., Connor, M. D., Cooper, L. T., Corriere, M., Salomon, J. A., Cortinovis, M., de Vaccaro, K. C., Couser, W., Cowie, B. C., Criqui, M. H., Cross, M., Dabhadkar, K. C., Dahiya, M., Dahodwala, N., Damsere-Derry, J., Abdalla, S., Danaei, G., Davis, A., De Leo, D., Degenhardt, L., Dellavalle, R., Delossantos, A., Denenberg, J., Derrett, S., Des Jarlais, D. C., Dharmaratne, S. D. 2012. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 380 (9859): 2163.

Waalen, J. K. and Mior, S. A. 2005. Practice patterns of 692 Ontario chiropractors (2000-2001). *The Journal of the Canadian Chiropractic Association*, 49 (1): 21-31.

Walker, B. F., Stomski, N. J., Hebert, J. J. and French, S. D. 2014. Evidence-based practice in chiropractic practice: a survey of chiropractors' knowledge, skills, use of research literature and barriers to the use of research evidence. *Complementary Therapies in Medicine*, 22 (2): 286-295.

Walker, M. J., Boyles, R. E., Young, B. A., Strunce, J. B., Garber, M. B., Whitman, J. M., Deyle, G. and Wainner, R. S. 2008. The effectiveness of manual physical therapy and exercise for mechanical neck pain: a randomized clinical trial. *Spine*, 33 (22): 2371-2378.

Walser, R. F., Meserve, B. B. and Boucher, T. R. 2009. The effectiveness of thoracic spine manipulation for the management of musculoskeletal conditions: a systematic review and meta-analysis of randomized clinical trials. *The Journal of Manual & Manipulative Therapy*, 17 (4): 237-246.

World Federation of Chiropractic (WFC). 2014. Definitions of Chriropractic. Available: https://www.wfc.org/website/index.php?option=com_content&view=article&id=90&Itemid=110 (Accessed 15 February 2014).

Wickes, D. 2002. Educating primary care chiropractic physicians. *Journal of Chiropractic Medicine*, 1 (4): 175-179.

World Medical Association (WMA). 2013. Declaration of Helsinki. Available: http://www.wma.net/en/20activities/10ethics/10helsinki/ (Accessed March 2013).

Wyatt, L. H., Perle, S. M., Murphy, D. R. and Hyde, T. E. 2005. The necessary future of chiropractic education: a North American perspective. *Chiropractic & Osteopathy*, 13 (1): 10-10.

Zhang, J. Q. 1996. Research attitudes among chiropractic college students. *Journal of Manipulative and Physiological Therapeutics*, 19 (7): 446.

APPENDICES

Appendix A1: Permission from Chiropractic Association of South Africa

Date: 20 September 2013
From: Dr. Reg Engelbrecht info@chiropractic.co.za
Subject: Research
To: Jaco Lombard jacolombard86@gmail.com

Dear Jaco
You certainly do have our permission to embark upon this very interesting study. We wish you well and look forward to the outcome of your research.
Sincerely

Date: 20 September 2013
From: Jaco Lombard jacolombard86@gmail.com
Subject: Research
To: Dr. Reg Engelbrecht info@chiropractic.co.za

Greetings Dr. Engelbrecht.

My name is Jaco Lombard and I am a 6th year chiropractic student at DUT.
I am currently in the process of doing my dissertation titled "An investigation into patient management protocols of selected cervical spine conditions by chiropractors in KwaZulu-Natal". This will be a survey based study and will compare the chiropractors demographic, educational and philosophical factors with the treatment and management protocols used in the treatment of 3 common cervical spine conditions. This survey will be done to assess how chiropractors are treating these common causes of neck pain and to assess which factors (demographic, educational or philosophical) influence these choices.

I will need the permission of the Chiropractic Association of South Africa to conduct the study. No harm will befall the practitioners and total confidentiality will be maintained at all times.

Thank you for your time

Appendix A2: Permission from Dr. R.H. Palmer

Date: 16 May 2013
From: Dr. R.H. Palmer robpalmer.chiro@gmail.com
Subject: Subject: RE: Research
To: Jaco Lombard jacolombard86@gmail.com

Hi Jaco,
For some reason the email didn't send. You are more than welcome to use my questionnaire. Please let me know if there is anything else you need.
All the best for your research.
Cheers
Rob

Date: 16 May 2013
From: Jaco Lombard jacolombard86@gmail.com
Subject: Research
To: Dr. R.H. Palmer robpalmer.chiro@gmail.com

Hello Dr. Palmer.
Thank you so much for letting my use your questionnaire.
Thanks for the wishes as well.
Much appreciated.

Date: 10 May 2013
From: Jaco Lombard jacolombard86@gmail.com
Subject: Research
To: Dr. R.H. Palmer robpalmer.chiro@gmail.com

Hello Dr. Palmer.
My name is Jaco Lombard and I am a 6th year chiropractic intern at the DUT.
I am currently in the process of writing my research dissertation, titled "An investigation into the patient management protocols of selected cervical spine conditions by chiropractors in KwaZulu-Natal".

As you can see this topic is based on your 2009 dissertation titled "An investigation into patient management protocols for low back pain by chiropractors in the greater Durban area." The research department at DUT thought that this was an area that greatly needed exploring.

I am writing this email to request your permission to use the questionnaire you developed in your dissertation. The questionnaire will not be copied directly. It will be used and altered making it applicable to treatment and management of selected cervical spine conditions.

If you would like any further information regarding my topic, I would be more than willing to share any information with you.

Thank you for your time.

Appendix A3: Permission from IREC

DUT
DURBAN
UNIVERSITY OF
TECHNOLOGY

Institutional Research Ethics Committee
Faculty of Health Sciences
Room MS 49, Mansfield School Site
Gate 8, Ritson Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2900
Fax: 031 373 2407
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

27 February 2014

IREC Reference Number: **REC 82/13**

Mr B J Lombard
11 Landsdowne Road
Grahamstown
6139

Dear Mr Lombard

An investigation into the patient management protocols of selected cervical spine conditions by Chiropractors in KwaZulu-Natal

I am pleased to inform you that Full Approval has been granted to your proposal REC 82/13.

The Proposal has been allocated the following Ethical Clearance number **IREC 014/14**. Please use this number in all communication with this office.

Approval has been granted for a period of one year, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures [SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's. In addition, you will be responsible to ensure gatekeeper permission.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely

[redacted]

Prof J K Adam
Chairperson: IREC

Appendix B1: Questionnaire Palmer 2009

Please Note: This questionnaire is anonymous, please do not write your name or make any other markings that may identify you.
Please complete the questionnaire by marking the appropriate block or printing on the lines provided.

Part 1:
Personal Information:

1) Age: _____yrs

2) Gender: *(Please tick the appropriate box)*

Male		Female	

3) Ethnic group?

Black		Indian		White		Other.....

4) From which institution did you receive your qualification?

_____

5) What qualification have you obtained?

_____

6) How long have you been practicing? _____ months _____yrs

7) Have you attended any health related conferences since you qualified?

Yes		No	

If yes please specify

_____

_____

8) Have you taken any health related short courses since you qualified? (E.g. ICSSD)

Yes		No	

If yes please specify

9) Do you subscribe to any chiropractic specific journal publications or magazines?

Yes		No	

If yes please specify

_____

_____

10) Have any health related short courses, journals, articles or conferences influenced the way you practice today?

Yes		No	

If yes, please specify

_____

_____

11) Have you ever practiced outside of South Africa?

Yes		No	

If yes please specify

_____

_____

Part 2:
Treatment Protocols

1a) Which chiropractic **philosophy** do you subscribe to?

		Yes	No
a)	Straight (to remove vertebral subluxations to facilitate healing)		
b)	Mixer (to remove vertebral subluxations to restore functionality)		
c)	Evidence based (treatment based on scientific literature)		

1b) Which **adjustment/s**, would you most commonly use in your treatment of Lower back pain? Please tick the appropriate boxes for each of the methods mentioned.

	Always	Frequently	Occasionally	Rarely	Never
Attempt to adjust specific segments only.					
Adjust the segment on both sides					
Adjust multiple segments within the lumbar spine					
Adjust multiple segments throughout the spine and sacroiliac joints					
Adjust Sacroiliac joints					
Use Instrument adjustment methods (Activator)					
Mobilizations					
Toggle recoil					

Drop piece					

Other: _____

1c) Would you regard manual articular manipulation the primary focus of your treatment protocols, for mechanical lower back pain?

Yes		No	

*If you answered **No** to question 1c, please answer question 1d.*

1d) Please select adequate reasoning for, not regarding manual articular manipulation as your primary focus for mechanical lower back pain treatment protocols. Please tick the appropriate boxes

Lack of positive results within personal experience	
Personal interpretations of current literature	
Lack of strength or ability to adjust the lumbar and sacral regions.	
Lack of experience	
Lack of confidence	
The college you attended did not place emphasis on manual articular manipulation	
Prefer the use of electrical modalities	
Focus on soft tissue as the primary focus	
Fear of injuring the patient	
Due to disability	
Prefer the use of other therapeutic approaches	

Other: _____

2) Which of the following do you personally use if manual **manipulation is contra indicated**? Please tick the appropriate boxes for each of the methods mentioned.

	Always	Frequently	Occasionally	Rarely	Never
Leander traction					
Use pelvic blocking					
Advise a Non Steroidal Anti Inflammatory Drug					
Administer an intramuscular anti inflammatory injection yourself					
Refer the patient to their Medical Doctor for an anti inflammatory injection					
Use electric modalities (e.g. IFC, TENS, US etc.) to decrease pain					
Use Instrument adjustment methods (Activator)					
Use Cryotherapy (Use of Ice Pack)					
Use heat pack					
Inversion table					
Mobilizations					
Refer to another healthcare					

practitioner					

Other: _____

3) Which of the following do you use for the treatment of a patient who has a **severe**, **acute** lower back pain? Please tick the appropriate boxes for each of the methods mentioned.

	Always	Frequently	Occasionally	Rarely	Never
Attempt to adjust restrictions or subluxations found throughout the spine.					
Mobilizations					
Use pelvic blocking					
Advise a Non Steroidal Anti Inflammatory Drug					
Administer an intramuscular anti inflammatory injection yourself					
Refer the patient to their Medical Doctor for an anti inflammatory injection					
Use electric modalities (e.g. IFC, TENS, US etc.) to decrease pain					
Use Instrument adjustment methods (e.g. Activator)					
Use Cryotherapy (Use of Ice Pack)					
Inversion table					
Leander traction					

Other: _____

4) Which of the following do you use for the treatment of a patient who has a **severe**, **chronic** lower back pain? Please tick the appropriate boxes for each of the methods mentioned.

	Always	Frequently	Occasionally	Rarely	Never
Attempt to adjust restrictions or subluxations found throughout the spine.					
Mobilizations					
Use pelvic blocking					
Advise a Non Steroidal Anti Inflammatory Drug					
Administer an intramuscular anti inflammatory injection yourself					
Refer the patient to their Medical Doctor for an anti inflammatory injection					
Use electric modalities (e.g. IFC, TENS, US etc.) to decrease pain					
Use Instrument adjustment methods (e.g. Activator)					
Use Cryotherapy (Use of Ice Pack)					
Inversion table					
Leander traction					

Other: _____

5) What myofascial treatment would you use for myofasciitis of the Quadratus Lumborum muscle? Please tick the appropriate boxes for each of the methods mentioned.

	Always	Frequently	Occasionally	Rarely	Never
Ischemic compression – Digital pressure on trigger points					
Massage					
Interferential Current (I.F.C.)					
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Ultra sound (U/S)					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Acupuncture (Note: meridian based)					
Proprioceptive Neuromuscular Facillitation (P.N.F)					
Static Stretching					
Refer to another therapist for myofascial component					
Injection of anaesthetic (e.g. Lignocaine)					
Stretch and Spray techniques					
Cryotherapy (Ice pack)					
Heat pack					
Hydro therapy					
Spinal Adjustments					

Other: _____

Part 3:
Patient Management and Education:

1a) Do you explain your treatment plan to your patients

Yes		No	

1b) Do you explain your working diagnosis to your patient

Yes		No	

2a) After **how many days** would you request the first follow up for **acute** lower back pain? Please tick the box below the number of days you would request.

0	1	2	3	4	5	6	7	8	9	10	11	12+

2b) After **how many treatments** with no relief on an **acute** presentation of lower back pain would you consider further investigations necessary? Please tick the box below the number of days you would request.

0	1	2	3	4	5	6	7	8	9	10	11	12+

3a) In **how many days** would you request the first follow up for **chronic** lower back pain? Please tick the box below the number of days you would request.

0	1	2	3	4	5	6	7	8	9	10	11	12+

3b) After **how many treatments** with no relief on a **chronic** presentation of lower back pain would you consider further investigations necessary? Please tick the box below the number of days you would request.

0	1	2	3	4	5	6	7	8	9	10	11	12+

4a) Do you advise on follow up/s once your patient has become **pain free**? Please tick the appropriate box.

Yes		No	

Only if you answered yes to the above question (4a) please answer questions 4b and 4c.

4b) How many pain free follow ups would you suggest? Please tick the appropriate box.

0	1	2	3	4	5	6	7	8	9	10	11	12+

4c) What period between treatment/s would you follow in a patient that has become **pain free**? Please tick the appropriate box.

1 week	2 weeks	3 weeks	4 weeks	5 weeks	6 weeks	7weeks	8+weeks

5a) Would you suggest a pain free check up, for people without a history of back pain? Please tick the appropriate box.

Yes		No	

5b) If a person presents with no pain and no history of back pain, but subluxations or restrictions were located, would you manipulate them? Please tick the appropriate box.

Yes		No	

Only if you answered yes to the above question (5b), please answer question 5c.
5c) What period between treatment/s would you follow in a patient that is pain free and has no history of lower back pain, but subluxations or restrictions were located and manipulated? Please tick the appropriate box.

1 week	2 weeks	3 weeks	4 weeks	5 weeks	6 weeks	7weeks	8+weeks

6) What post treatment **advice or education** do you give for lower back pain conditions? Please tick the appropriate boxes for each of the methods mentioned.

	Always	Frequently	Occasionally	Rarely	Never
Home stretches					
Home strengthening exercises focused on *core stability*					
Home strengthening exercises focused on *global muscles*					
Adjunctive Nutritional therapy or advice (Supplements, diets, traumeel etc.)					
Advise on starting an exercise program under instruction (gym, Pilates, yoga etc.)					
Postural or ergonomic advice (sleeping, seated and standing)					
Proprioceptive exercises					
Power plate rehabilitation					
Foot Orthotics					
Stress management techniques					

Other: _____

7) If your patient isn't meeting the aims of your treatment protocol after your proposed prognostic period has been exceeded, what steps do you take? Please tick the appropriate boxes for each of the methods mentioned.

	Always	Frequently	Occasionally	Rarely	Never
Assess the patient as a new patient					
Reassess all previous positive findings					
Refer to another health care practitioner					
Refer to another chiropractor					
Change treatment methods					
Continue treating with original					

treatment protocol					
Send for further investigations, e.g. blood work, radiographs, C.T. or M.R.I.					

Other: _____

Appendix B2: Pre-Expert Group Questionnaire

Part 1: Personal information

1.1 What is your age? _____ years.

1.2 Gender *(Please tick the appropriate box):*

- ☐ Female
- ☐ Male

1.3 Ethnic Group *(For statistical purposes only):*

- ☐ Black
- ☐ Indian
- ☐ White
- ☐ Other _____

Part 2: Pre and Post graduate Education

2.1 From which institute did you receive your Chiropractic qualification?

- ☐ Durban University of Technology
- ☐ University of Johannesburg
- ☐ Other_____

2.2 What Chiropractic qualification have you obtained?

- ☐ Doctor of Chiropractic
- ☐ M.Tech Chiropractic

2.3 Do you hold any other qualifications?

- ☐ Yes
- ☐ No

2.4 If yes to question 2.3, please specify *(Please specify the qualification and the institute):*

_____
_____
_____
_____
_____

2.5 How long have you been practicing?

- ☐ Less than 1 year
- ☐ Less than 5 years
- ☐ 6-10 years
- ☐ 11-20 years
- ☐ More than 20 years

2.6 Have you attended health related conferences since qualification?

- ☐ Yes
- ☐ No

2.7 If yes to question 2.6, please specify *(if you have been to a conference more than once roughly specify the number of times attended):*

_____
_____
_____
_____
_____

2.8 Have you taken any Chiropractic/ health related short course since qualification *(e.g. ICSSD)?*

- ☐ Yes
- ☐ No

2.9 If yes to question 2.8, please specify:

_____
_____
_____
_____
_____

2.10 Do you subscribe to or have access to any medical/chiropractic professional journal publications or magazines?

- ☐ Yes
- ☐ No

2.11 If yes to question 2.10, please specify:

_____
_____
_____
_____
_____

2.12 Have any of the conferences, health related short courses, journals or magazines influenced the way you practice?

- ☐ Yes
- ☐ No

2.13 If yes to question 2.12, please specify:

_____
_____
_____
_____
_____

2.14 Have you ever practiced outside of South Africa?

- ☐ Yes
- ☐ No

2.15 If yes to question 2.14, please specify *(Where, when and for how long):*

_____
_____
_____
_____
_____

Part 3: Philosophical Outlook

3.1 Which Chiropractic Philosophy do you subscribe to?

		Yes	No
A	Straight		
B	Mixer		
C	Evidence based		

Definitions:

Straight Chiropractor

Believes that a vertebral subluxation leads to interference with the innate intelligence within the nervous system and is a primary underlying risk factor for almost all disease. Their treatment is based upon the detection and correction of the vertebral subluxation. They prefer to remain separate from mainstream medicine.

Mixer Chiropractor

Believes that the vertebral subluxation is one of many causes of disease. Their treatment pattern is varied and involves a variety of treatments that are not solely based on the removal on the subluxation. They generally want to be integrated into mainstream medicine.

Evidence Based Chiropractor

Makes use of the best available scientific literature, accumulated clinical knowledge and expertise to formulate a diagnosis and communicate different treatment plans to the patient. Scope of practice is based on the scientific literature. Evidence based chiropractors want to be incorporated into mainstream medicine.

Part 4: Treatment

With regard to treatment of **Neck pain not due to whiplash and with no associated Radiculopathy (e.g. Facet Syndrome with associated Myofascial pain).**

4.1.1 Which of the following do you use to treat the **acute** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____

_____

_____

_____

_____

_____

With regard to treatment of **Whiplash Associated Disorder.**

4.2.1 Which of the following do you use to treat the **acute** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____

_____

_____

_____

_____

_____

With regard to treatment of **Neck and Arm pain due to Degenerative Cervical Radiculopathy (e.g. narrowing of the foraminal space due to spondylarthosis).**

4.3.1 Which of the following do you use to treat an **acute exacerbation** of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____

_____

_____

_____

_____

_____

Facet Syndrome with associated Myofascial pain

4.1.2 Which of the following do you use to treat the **chronic** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

Whiplash Associated Disorder

4.2.2 Which of the following do you use to treat the **chronic** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

Degenerative Cervical Radiculopathy

4.3.2 Which of the following do you use to treat the **chronic** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

Facet Syndrome with associated Myofascial pain

4.1.3 In the **acute** form of this condition

4.1.3.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.1.3.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.1.3.3 If No, please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Whiplash Associated Disorder

4.2.3 In the **acute** form of this condition

4.2.3.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.2.3.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.2.3.3 If No, please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Degenerative Cervical Radiculopathy

4.3.3 In an **acute exacerbation** of this condition

4.3.3.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.3.3.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.3.3.3 If No, please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Facet Syndrome with associated Myofascial pain

4.1.4 In the **chronic** form of this condition

4.1.4.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.1.4.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.1.4.3 If No, please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Whiplash Associated Disorder

4.2.4 In the **chronic** form of this condition

4.2.4.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.2.4.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.2.4.3 If No, please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Degenerative Cervical Radiculopathy

4.3.4 In the **chronic** form of this condition

4.3.4.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.3.4.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.3.4.3 If No, please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Facet Syndrome with associated Myofascial pain

4.1.6 In the **acute** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Continued on text page

Whiplash Associated Disorder

4.2.6 In the **acute** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Continued on text page

Degenerative Cervical Radiculopathy

4.3.6 In an **acute exacerbation** of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Continued on text page

Facet Syndrome with associated Myofascial pain

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Thermotherapy (Heat pack etc.)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

Whiplash Associated Disorder

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Thermotherapy (Heat pack etc.)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

Degenerative Cervical Radiculopathy

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Thermotherapy (Heat pack etc.)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

Facet Syndrome with associated Myofascial pain

4.1.7 In the **chronic** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Continued on next page

Whiplash Associated Disorder

4.2.7 In the **chronic** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Continued on next page

Degenerative Cervical Radiculopathy

4.3.7 In the **chronic** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Continued on next page

Facet Syndrome with associated Myofascial pain

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Thermotherapy (Heat pack etc)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Whiplash Associated Disorder

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Thermotherapy (Heat pack etc)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Degenerative Cervical Radiculopathy

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Thermotherapy (Heat pack etc)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

With regard to management of **Neck pain not due to whiplash and with no associated Radiculopathy (e.g. Facet Syndrome with associated Myofascial pain).**

5.1.1 In the **acute** Form of this condition:

5.1.1.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.1.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.2 In the **Chronic** form of this condition:

5.1.2.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.2.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.3 Once the patient has become pain free:

5.1.3.1 Do you advise follow up treatments?

☐ Yes

☐ No

If you answered yes in question 5.1.3.1 please answer question 5.1.3.2, 5.1.3.3 and 5.1.3.4

5.1.3.2 How many follow ups would you suggest?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.3.3 What period between treatments would you suggest (weeks)?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.3.4 If pain free treatments are staggered, please indicate how this would be done.

Treatment	1	2	3	4	5	6	7	8+
Week								

With regard to management of **Whiplash Associated Disorder.**

5.2.1 In the **acute** Form of this condition:

5.2.1.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.1.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.2 In the **chronic** form of this condition:

5.2.2.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.2.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.3 Once the patient has become pain free:

5.2.3.1 Do you advise follow up treatments?

☐ Yes

☐ No

If you answered yes in question 5.2.3.1 please answer question 5.2.3.2, 5.2.3.3 and 5.2.3.4

5.2.3.2 How many follow ups would you suggest?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.3.3 What period between treatments would you suggest (weeks)?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.3.4 If pain free treatments are staggered, please indicate how this would be done.

Treatment	1	2	3	4	5	6	7	8+
Week								

With regard to treatment of **Neck and Arm pain due to Degenerative Cervical Radiculopathy (e.g. narrowing of the foraminal space due to spondylarthosis).**

5.3.1 In an **acute** exacerbation of this condition

5.3.1.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.1.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.2 In the **chronic** form of this condition:

5.3.2.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.2.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.3 Once the patient has become pain free:

5.3.3.1 Do you advise follow up treatments?

☐ Yes

☐ No

If you answered yes in question 5.3.3.1 please answer question 5.3.3.2, 5.3.3.3 and 5.3.3.4

5.3.3.2 How many follow ups would you suggest?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.3.3 What period between treatments would you suggest (weeks)?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.3.4 If pain free treatments are staggered, please indicate how this would be done.

Treatment	1	2	3	4	5	6	7	8+
Week								

Facet Syndrome with associated Myofascial pain

5.2.5 If the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	Always	Frequent	Occasionally	Rarely	Never
Continue treating with original treatment protocol					
Change treatment methods					
Assess the patient as a new patient					
Reassess all previous positive findings					
Send for further investigations, e.g. blood work, radiographs, ultrasound					
Refer to another health care practitioner					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Whiplash Associated Disorder

5.2.4 If the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	Always	Frequent	Occasionally	Rarely	Never
Continue treating with original treatment protocol					
Change treatment methods					
Assess the patient as a new patient					
Reassess all previous positive findings					
Send for further investigations, e.g. blood work, radiographs, ultrasound					
Refer to another health care practitioner					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Degenerative Cervical Radiculopathy

5.3.4 If the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	Always	Frequent	Occasionally	Rarely	Never
Continue treating with original treatment protocol					
Change treatment methods					
Assess the patient as a new patient					
Reassess all previous positive findings					
Send for further investigations, e.g. blood work, radiographs, ultrasound					
Refer to another health care practitioner					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Part 6: Post Treatment Advice and Education

With regard to post treatment advice and education of **Neck pain not due to whiplash and with no associated Radiculopathy (e.g. Facet Syndrome with associated Myofascial pain).**

6.1 What post treatment advice and education do you commonly give?

	Always	Frequent	Occasionally	Rarely	Never
Home Stretches					
Home strengthening exercises					
Strengthening exercise under instruction					
Proprioceptive exercise					
Nutritional therapy (supplements and Diet)					
Postural and ergonomic Advice					
Orthotics					
Stress management					

Other_____

_____

_____

_____

_____

_____

_____

With regard to post treatment advice and education **Whiplash Associated Disorder.**

6.2 What post treatment advice and education do you commonly give?

	Always	Frequent	Occasionally	Rarely	Never
Home Stretches					
Home strengthening exercises					
Strengthening exercise under instruction					
Proprioceptive exercise					
Nutritional therapy (supplements and Diet)					
Postural and ergonomic Advice					
Orthotics					
Stress management					

Other_____

_____

_____

_____

_____

_____

_____

With regard to post treatment advice and education **Neck and Arm pain due to Degenerative Cervical Radiculopathy (e.g. narrowing of the foraminal space due to spondylarthosis).**

6.3 What post treatment advice and education do you commonly give?

	Always	Frequent	Occasionally	Rarely	Never
Home Stretches					
Home strengthening exercises					
Strengthening exercise under instruction					
Proprioceptive exercise					
Nutritional therapy (supplements and Diet)					
Postural and ergonomic Advice					
Orthotics					
Stress management					

Other_____

_____

_____

_____

_____

_____

_____

Appendix B3: Post-Expert Group Questionnaire

Part 1: Personal information

1.4 What is your age? _____ years.

1.5 Gender *(Please tick the appropriate box):*

- ☐ Female
- ☐ Male

1.6 Ethnic Group *(For statistical purposes only):*

- ☐ Black
- ☐ Indian
- ☐ White
- ☐ Other _____

Part 2: Pre and Post graduate Education

2.16 From which institute did you receive your Chiropractic qualification?

- ☐ Durban University of Technology
- ☐ University of Johannesburg
- ☐ Other_____

2.17 What Chiropractic qualification have you obtained?

- ☐ Doctor of Chiropractic
- ☐ M.Tech Chiropractic

2.18 Do you hold any other qualifications?

- ☐ Yes
- ☐ No

2.19 If yes to question 2.3, please specify *(Please specify the qualification and the institute):*

_____
_____
_____
_____
_____

2.20 How long have you been practicing?

- ☐ Less than 1 year
- ☐ Less than 5 years
- ☐ 6-10 years
- ☐ 11-20 years
- ☐ More than 20 years

2.21 Have you attended health related conferences since qualification?

- ☐ Yes
- ☐ No

2.22 If yes to question 2.6, please specify *(if you have been to a conference more than once roughly specify the number of times attended):*

_____
_____
_____
_____
_____

2.23 Have you taken any Chiropractic/ health related short course since qualification *(e.g. ICSSD)?*

- ☐ Yes
- ☐ No

2.24 If yes to question 2.8, please specify:

_____
_____
_____
_____
_____

2.25 Do you subscribe to or have access to any medical/chiropractic professional journal publications or magazines?

- ☐ Yes
- ☐ No

2.26 If yes to question 2.10, please specify:

_____
_____
_____
_____
_____

2.27 Have any of the conferences, health related short courses, journals or magazines influenced the way you practice?

- ☐ Yes
- ☐ No

2.28 If yes to question 2.12, please specify:

_____
_____
_____
_____
_____

2.29 Have you ever practiced outside of South Africa?

- ☐ Yes
- ☐ No

2.30 If yes to question 2.14, please specify *(Where, when and for how long):*

_____
_____
_____
_____
_____

Part 3: Philosophical Outlook

3.2 Which Chiropractic Philosophy do you subscribe to? More than one answer may be provided.

		Yes	No
A	Straight		
B	Mixer		
C	Evidence based		
D	Other		

Definitions:

Straight Chiropractor

Believes that a vertebral subluxation leads to interference with the innate intelligence within the nervous system and is a primary underlying risk factor for almost all disease. Their treatment is based upon the detection and correction of the vertebral subluxation. They prefer to remain separate from mainstream medicine.

Mixer Chiropractor

Believes that the vertebral subluxation is one of many causes of disease. Their treatment pattern is varied and involves a variety of treatments that are not solely based on the removal on the subluxation. They generally want to be integrated into mainstream medicine.

Evidence Based Chiropractor

Makes use of the best available scientific literature, accumulated clinical knowledge and expertise to formulate a diagnosis and communicate different treatment plans to the patient. Scope of practice is based on the scientific literature. Evidence based chiropractors want to be incorporated into mainstream medicine.

(Keating, JC., Cleveland, CS. and Menke M. 2005. Chiropractic History: a Primer. *Association for the history of Chiropractic.*)

Part 4: Treatment

With regard to treatment of **Neck pain not due to whiplash and with no associated Radiculopathy (e.g. Facet Syndrome with associated Myofascial pain).**

4.1.2 Once red flag conditions have been ruled out, which of the following do you use to treat the **acute** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy etc.					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-Steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____
_____
_____
_____

With regard to treatment of **Whiplash Associated Disorder.**

4.2.2 Once red flag conditions have been ruled out, which of the following do you use to treat the **acute** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy etc.					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-Steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____
_____
_____
_____

With regard to treatment of **Neck and Arm pain due to Degenerative Cervical Radiculopathy (e.g. narrowing of the foraminal space due to spondylarthosis).**

4.3.2 Once red flag conditions have been ruled out, which of the following do you use to treat an **acute exacerbation** of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy etc.					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-Steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____
_____
_____
_____

Facet Syndrome with associated Myofascial pain

4.1.3 Once red flag conditions have been ruled out, which of the following do you use to treat the **chronic** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy etc.					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-Steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____

_____

_____

_____

_____

_____

Whiplash Associated Disorder

4.2.3 Once red flag conditions have been ruled out, which of the following do you use to treat the **chronic** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy etc.					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-Steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____

_____

_____

_____

_____

_____

Degenerative Cervical Radiculopathy

4.3.3 Once red flag conditions have been ruled out, which of the following do you use to treat the **chronic** form of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Spinal manipulation					
Traction					
Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy etc.					
Initiate Rehabilitation Program					
Advise use of a cervical collar					
Advise a Non-Steroidal Anti-Inflammatory Drug or analgesics					
Refer the patient to a Homeopath for pain control.					
Refer the patient to a Medical Doctor for pain control					
Refer to a medical specialist					

Other_____

_____

_____

_____

_____

_____

Facet Syndrome with associated Myofascial pain

4.1.5 In the **acute** form of this condition

4.1.5.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.1.5.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.1.5.3 If No, please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Whiplash Associated Disorder

4.2.5 In the **acute** form of this condition

4.2.5.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.2.5.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.2.5.3 If No, please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Degenerative Cervical Radiculopathy

4.3.5 In an **acute exacerbation** of this condition

4.3.5.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.3.5.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.3.5.3 If No, please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Facet Syndrome with associated Myofascial pain

4.1.6 In the **chronic** form of this condition

4.1.6.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.1.6.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.1.6.3 If No please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Whiplash Associated Disorder

4.2.6 In the **chronic** form of this condition

4.2.6.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.2.6.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.2.6.3 If No please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Degenerative Cervical Radiculopathy

4.3.6 In the **chronic** form of this condition

4.3.6.1 Which form of articular manipulation would you use most commonly if no red flags were present?

	Always	Frequent	Occasionally	Rarely	Never
Attempt to adjust specific segment only					
Adjust segment on both sides					
Adjust multiple segments within the Cervical Spine					
Adjust multiple segments throughout the Spine					
Instrument assisted Adjustment					
Mobilization					

4.3.6.2 Would you regard the articular manipulation as the primary focus of your treatment protocol

- ☐ Yes
- ☐ No

4.3.6.3 If No please specify why.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Facet Syndrome with associated Myofascial pain

4.1.8 In the **acute** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with Electrical modalities					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Continued on next page.

Whiplash Associated Disorder

4.2.8 In the **acute** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with Electrical modalities					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Continued on next page.

Degenerative Cervical Radiculopathy

4.3.8 In an **acute exacerbation** of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with Electrical modalities					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Continued on next page.

Facet Syndrome with associated Myofascial pain

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Heat therapy (Heat pack etc)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

Whiplash Associated Disorder

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Heat therapy (Heat pack etc.)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

Degenerative Cervical Radiculopathy

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Heat therapy (Heat pack etc.)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

Facet Syndrome with associated Myofascial pain

4.1.9 In the **chronic** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Whiplash Associated Disorder

4.2.9 In the **chronic** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Degenerative Cervical Radiculopathy

4.3.9 In the **chronic** form of this condition, which auxiliary therapeutic techniques, if any would you use in the treatment of this condition?

	Always	Frequent	Occasionally	Rarely	Never
Massage					
Ischemic compression – Digital pressure on trigger points					
Dry needling					
Dry needling in conjunction with T.E.N.S.					
Stretch and Spray techniques					
Soft tissue mobilization (e.g. Active release and Myofascial release etc.)					
Instrument assisted soft tissue mobilization (e.g. Graston Technique/ FAKTR etc.)					
Static Stretching					
Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques					
Supportive taping					
Kinesio Taping or similar					

Facet Syndrome with associated Myofascial pain

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc.)					
Thermotherapy (Heat pack etc)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

Whiplash Associated Disorder

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack etc)					
Thermotherapy (Heat pack etc.)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

Degenerative Cervical Radiculopathy

	Always	Frequent	Occasionally	Rarely	Never
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)					
Interferential Current (I.F.C.)					
Ultrasound (U/S)					
Cryotherapy (Ice pack)					
Thermotherapy (Heat pack etc.)					
Hydrotherapy					
Refer to another therapist for myofascial component					

Other_____

Part 5: Management

With regard to management of **Neck pain not due to whiplash and with no associated Radiculopathy (e.g. Facet Syndrome with associated Myofascial pain).**

5.1.4 In the **acute** Form of this condition:

5.1.4.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.4.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.5 In the **Chronic** form of this condition:

5.1.5.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.5.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.1.6 Once the patient has become pain free:

5.1.6.1 Do you advise maintenance treatments?

☐ Yes

☐ No

5.1.6.2 If you answered yes in question 5.1.3.1, briefly state why?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

With regard to management of **Whiplash Associated Disorder.**

5.2.4 In the **acute** Form of this condition:

5.2.4.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.4.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.5 In the **chronic** form of this condition:

5.2.5.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.5.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.2.6 Once the patient has become pain free:

5.2.6.1 Do you advise maintenance treatments?

☐ Yes

☐ No

5.2.6.2 If you answered yes in question 5.2.3.1, briefly state why?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

With regard to treatment of **Neck and Arm pain due to Degenerative Cervical Radiculopathy (e.g. narrowing of the foraminal space due to spondylarthosis).**

5.3.3 In an **acute** exacerbation of this condition

5.3.3.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.3.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.4 In the **chronic** form of this condition:

5.3.4.1 After how many days would you usually request your first follow up?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.4.2 After how many treatments with no relief would you consider further investigation?

0	1	2	3	4	5	6	7	8	9	10	11	12+

5.3.4 Once the patient has become pain free:

5.3.4.1 Do you advise maintenance treatments?

☐ Yes

☐ No

5.3.4.2 If you answered yes in question 5.3.3.1, briefly state why?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Facet Syndrome with associated Myofascial pain

5.1.4 In the **acute** form of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	Always	Frequent	Occasionally	Rarely	Never
Continue treating with original treatment protocol					
Change treatment methods					
Assess the patient as a new patient					
Reassess all previous positive findings					
Send for further investigations, e.g. blood work, radiographs, ultrasound					
Refer to another health care practitioner					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Whiplash Associated Disorder

5.2.4 In the **acute** form of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	Always	Frequent	Occasionally	Rarely	Never
Continue treating with original treatment protocol					
Change treatment methods					
Assess the patient as a new patient					
Reassess all previous positive findings					
Send for further investigations, e.g. blood work, radiographs, ultrasound					
Refer to another health care practitioner					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Degenerative Cervical Radiculopathy

5.3.4 In an **acute** exacerbation of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	Always	Frequent	Occasionally	Rarely	Never
Continue treating with original treatment protocol					
Change treatment methods					
Assess the patient as a new patient					
Reassess all previous positive findings					
Send for further investigations, e.g. blood work, radiographs, ultrasound					
Refer to another health care practitioner					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Facet Syndrome with associated Myofascial pain

5.1.5 In the **chronic** form of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	Always	Frequent	Occasionally	Rarely	Never
Continue treating with original treatment protocol					
Change treatment methods					
Assess the patient as a new patient					
Reassess all previous positive findings					
Send for further investigations, e.g. blood work, radiographs, ultrasound					
Refer to another health care practitioner					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

Whiplash Associated Disorder

5.2.5 In the **chronic** form of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	Always	Frequent	Occasionally	Rarely	Never
Continue treating with original treatment protocol					
Change treatment methods					
Assess the patient as a new patient					
Reassess all previous positive findings					
Send for further investigations, e.g. blood work, radiographs, ultrasound					
Refer to another health care practitioner					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

Degenerative Cervical Radiculopathy

5.3.5 In the **chronic** form of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	Always	Frequent	Occasionally	Rarely	Never
Continue treating with original treatment protocol					
Change treatment methods					
Assess the patient as a new patient					
Reassess all previous positive findings					
Send for further investigations, e.g. blood work, radiographs, ultrasound					
Refer to another health care practitioner					

Other_____

_____

_____

_____

_____

_____

_____

_____

_____

Part 6: Patient Advice and Education

With regard to patient advice and education of **Neck pain not due to whiplash and with no associated Radiculopathy (e.g. Facet Syndrome with associated Myofascial pain).**

6.1 What patient advice and education do you commonly give?

	Always	Frequent	Occasionally	Rarely	Never
Home Stretches					
Home strengthening exercises					
Strengthening exercise under instruction					
Proprioceptive exercise					
Nutritional therapy (supplements and Diet)					
Postural and ergonomic Advice					
Orthotics					
Stress management					

Other_____
_____
_____
_____
_____
_____

With regard to patient advice and education **Whiplash Associated Disorder.**

6.2 What patient advice and education do you commonly give?

	Always	Frequent	Occasionally	Rarely	Never
Home Stretches					
Home strengthening exercises					
Strengthening exercise under instruction					
Proprioceptive exercise					
Nutritional therapy (supplements and Diet)					
Postural and ergonomic Advice					
Orthotics					
Stress management					

Other_____
_____
_____
_____
_____
_____

With regard to patient advice and education **Neck and Arm pain due to Degenerative Cervical Radiculopathy (e.g. narrowing of the foraminal space due to spondylarthosis).**

6.3 What patient advice and education do you commonly give?

	Always	Frequent	Occasionally	Rarely	Never
Home Stretches					
Home strengthening exercises					
Strengthening exercise under instruction					
Proprioceptive exercise					
Nutritional therapy (supplements and Diet)					
Postural and ergonomic Advice					
Orthotics					
Stress management					

Other_____
_____
_____
_____
_____
_____

Appendix B4: Final Questionnaire

Thank you for agreeing to participate in this study. Please read and answer each question to the best of your ability. Answer by placing an 'X' in the appropriate box, unless otherwise stated mark only one box per question.
Please Note: This questionnaire is anonymous, please do not write your name or make any other markings that may identify you.

1. Personal Information

1.1 Age	_____ Years				
1.2 Gender	□ Male			□ Female	
1.3 Ethnic Group *(For statistical purposes only):*	□ Black	□ Coloured	□ Indian	□ White	□ Other:

2. Pre and Post graduate Education

2.1 From which institute did you receive your chiropractic qualification?	□ Durban University of Technology (Formerly Technikon Natal)	□ University of Johannesburg (Formerly Technikon Witwatersrand)	□ Other. Please specify:		
2.2 What chiropractic qualification have you obtained?	□ Doctor of Chiropractic (D.C.)	□ M.Tech: Chiropractic	□ Other. Please specify:		
2.3 Do you hold any other qualifications *(Diploma or higher)?*	□ Yes. Please specify *(Qualification and the Institute):* _____ _____ _____ _____ _____				□ No
2.4 How long have you been practicing?	□ Less than 1 year	□ 1-5 years	□ 6-10 years	□ 11-20 years	□ More than 20 years
2.5 How regularly have you attended health related conferences since qualification?	□ More than 1 per year	□ 1 per year	□ 1 every second year	□ Less frequently. Please specify:	
2.6 Have you taken any chiropractic/ health related short course since qualification *(E.g. Kinesio Taping, Extremity Courses)?*	□ Yes. Please specify*:* _____ _____ _____ _____ _____				□ No
2.7 Do you subscribe to or have access to any medical/ chiropractic professional journal publications or magazines?	□ Yes. Please specify*:* _____ _____ _____ _____ _____				□ No

2.8 Have any of the conferences, health related short courses, journals or magazines influenced the way you practice?	□ Yes. Please specify*:* _____ _____ _____ _____ _____	□ No
2.9 Have you ever practiced outside of South Africa?	□ Yes. Please specify *(Where, when and for how long):* _____ _____ _____ _____ _____	□ No

3. Philosophical Outlook

3.1 Which chiropractic philosophy do you subscribe to? *(More than one answer may be provided)*	□ Straight	□ Mixer	□ Evidence Based	□ Other. Please Specify:
Definitions (Keating, Cleveland and Menke M. 2005.)	<u>Straight Chiropractor</u> Believes that a vertebral subluxation leads to interference with the innate intelligence within the nervous system and is a primary underlying risk factor for almost all disease. Their treatment is based upon the detection and correction of the vertebral subluxation. They prefer to remain separate from mainstream medicine.	<u>Mixer Chiropractor</u> Believes that the vertebral subluxation is one of many causes of disease. Their treatment pattern is varied and involves a variety of treatments that are not solely based on the removal on the subluxation. They generally want to be integrated into mainstream medicine.	<u>Evidence Based Chiropractor</u> Makes use of the best available scientific literature, accumulated clinical knowledge and expertise to formulate a diagnosis and communicate different treatment plans to the patient. Scope of practice is based on the scientific literature. Evidence based chiropractors want to be incorporated into mainstream medicine.	

TREATMENT

4. Acute: Condition lasting up to 10 days (Magee. 2008.)

4.1 In the **ACUTE** form of this condition, which of the following would you use to treat the condition if no red flags were present?

	4.1.1. Neck pain not due to whiplash and with no associated Radiculopathy (e.g. Facet Syndrome with associated Myofascial pain)					**4.1.2. Whiplash Associated Disorder**					**4.1.3. Neck and Arm pain due to Degenerative Cervical Radiculopathy (e.g. narrowing of the foraminal space due to spondylosis)**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Spinal manipulation															
.2 Traction															
.3 Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy, etc.															
.4 Initiate Rehabilitation Program															
.5 Advise use of a cervical collar															
.6 Advise a Non-Steroidal Anti Inflammatory Drug or analgesics															
.7 Refer the patient to a Homeopath for pain control															
.8 Refer the patient to a Medical Doctor for pain control															
.9 Refer to a medical specialist															
.10 Other:															

4.2 In the **ACUTE** form of this condition, which form of articular manipulation would you most commonly use if no red flags were present?

	4.2.1. Facet Syndrome with associated Myofascial pain					**4.2.2. Whiplash Associated Disorder**					**4.2.3. Degenerative Cervical Radiculopathy**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Attempt to adjust specific segment only															

.2 Adjust segment on both sides															
.3 Adjust multiple segments within the Cervical Spine															
.4 Adjust multiple segments throughout the Spine															
.5 Instrument assisted Adjustment															
.6 Mobilisation															

4.3 In the **ACUTE** form of this condition, would you regard the articular manipulation as the primary intervention of your treatment protocol?

4.3.1. Facet Syndrome with associated Myofascial pain	☐ Yes	☐ No. Please Specify why. _____ _____ _____ _____ _____
4.3.2. Whiplash Associated Disorder	☐ Yes	☐ No. Please Specify why. _____ _____ _____ _____ _____
4.3.3. Degenerative Cervical Radiculopathy	☐ Yes	☐ No. Please Specify why. _____ _____ _____ _____ _____

4.4 In the **ACUTE** form of this condition, which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition?

	4.4.1. Facet Syndrome with associated Myofascial pain					**4.4.2. Whiplash Associated Disorder**					**4.4.3. Degenerative Cervical Radiculopathy**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Massage															
.2 Ischemic compression – Digital pressure on trigger points															
.3 Dry needling															
.4 Dry needling in conjunction with Electrical modalities															
.5 Stretch and Spray techniques															

.6 Soft tissue mobilisation (e.g. Active release and Myofascial release, etc.)															
.7 Instrument assisted soft tissue mobilisation (e.g. Graston Technique/ FAKTR, etc.)															
.8 Static Stretching															
.9 Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques															
.10 Kinesio Taping or similar															
.11 Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)															
.12 Interferential Current (I.F.C.)															
.13 Ultrasound (U/S)															
. 14 Cryotherapy (Ice pack, etc.)															
.15 Heat therapy (Heat pack, etc)															
.16 Hydrotherapy															
.17 Refer to another therapist for myofascial component															
.18 Other:															

5. Chronic: Condition lasting longer than 7 weeks (Magee. 2008.)

5.1 In the **CHRONIC** form of this condition, which of the following would you use to treat the condition if no red flags were present?

	5.1.1. Facet Syndrome with associated Myofascial pain					**5.1.2. Whiplash Associated Disorder**					**5.1.3. Degenerative Cervical Radiculopathy**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Spinal manipulation															
.2 Traction															
.3 Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy, etc.															
.4 Initiate Rehabilitation Program															
.5. Advise use of a cervical collar															

.6 Advise a Non-Steroidal Anti Inflammatory Drug or analgesics															
.7 Refer the patient to a Homeopath for pain control															
.8 Refer the patient to a Medical Doctor for pain control															
.9 Refer to a medical specialist															
.10 Other:															

5.2. In the **CHRONIC** form of this condition, which form of articular manipulation would you most commonly use if no red flags were present?

	5.2.1. Facet Syndrome with associated Myofascial pain					**5.2.2. Whiplash Associated Disorder**					**5.2.3. Degenerative Cervical Radiculopathy**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Attempt to adjust specific segment only															
.2 Adjust segment on both sides															
.3 Adjust multiple segments within the Cervical Spine															
.4 Adjust multiple segments throughout the Spine															
.5 Instrument assisted Adjustment															
.6 Mobilisation															

5.3 In the **CHRONIC** form of this condition, would you regard the articular manipulation as the primary intervention of your treatment protocol?

5.3.1 Facet Syndrome with associated Myofascial pain	☐ Yes	☐ No. Please Specify why. _____ _____ _____ _____ _____
5.3.2 Whiplash Associated Disorder	☐ Yes	☐ No. Please Specify why. _____ _____ _____ _____ _____

5.3.3 Degenerative Cervical Radiculopathy	□ Yes	□ No. Please Specify why. _____ _____ _____ _____ _____

5.4. In the **CHRONIC** form of this condition, which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition?

	5.4.1. Facet Syndrome with associated Myofascial pain					**5.4.2. Whiplash Associated Disorder**					**5.4.3. Degenerative Cervical Radiculopathy**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Massage															
.2 Ischemic compression – Digital pressure on trigger points															
.3 Dry needling															
.4 Dry needling in conjunction with Electrical modalities															
.5 Stretch and Spray techniques															
.6 Soft tissue mobilisation (e.g. Active release and Myofascial release, etc.)															
.7 Instrument assisted soft tissue mobilisation (e.g. Graston Technique/ FAKTR, etc.)															
.8 Static Stretching															
.9 Proprioceptive Neuromuscular Facilitation (P.N.F) stretching or similar techniques															
.10 Kinesio Taping or similar															
.11 Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)															
.12 Interferential Current (I.F.C.)															
.13 Ultrasound (U/S)															
. 14 Cryotherapy (Ice pack, etc.)															
.15 Heat therapy (Heat pack, etc)															
.16 Hydrotherapy															
.15 Refer to another therapist for myofascial component															
.16 Other:															

Management

6. Acute: Condition lasting up to 10 days.

6.1 In the **ACUTE** Form of this condition, after how many days would you usually request your first follow-up?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14+
6.1.1 Facet Syndrome with associated Myofascial pain															
6.1.2 Whiplash Associated Disorder															
6.1.3 Degenerative Cervical Radiculopathy															

6.2 In the **ACUTE** Form of this condition, after how many treatments with no relief would you consider further investigation?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14+
6.2.1 Facet Syndrome with associated Myofascial pain															
6.2.2 Whiplash Associated Disorder															
6.2.3 Degenerative Cervical Radiculopathy															

6.3 In the **ACUTE** form of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	6.3.1 Facet Syndrome with associated Myofascial pain					**6.3.2 Whiplash Associated Disorder**					**6.3.3 Degenerative Cervical Radiculopathy**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Continue treating with original treatment protocol without reassessment															
.2 Continue treating with original treatment protocol after reassessing the patient															
.3 Continue treating with original treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound															
.4 Change treatment protocol without reassessment															

.5 Change treatment protocol after reassessing the patient															
.6 Change treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound															
.7 Refer to another health care practitioner															
.8 Other:															

6.4 In the **ACUTE** form of this condition, once the patient has become pain free, do you advise follow-up treatments?

6.4.1 Facet Syndrome with associated Myofascial pain	☐ Yes. Please specify: _____ _____ _____ _____ _____	☐ No
6.4.2 Whiplash Associated Disorder	☐ Yes. Please specify: _____ _____ _____ _____ _____	☐ No
6.4.3 Degenerative Cervical Radiculopathy	☐ Yes. Please specify: _____ _____ _____ _____ _____	☐ No

7. Chronic: Condition lasting longer than 7 weeks.

7.1 In the **CHRONIC** Form of this condition, after how many days would you usually request your first follow-up?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14+
7.1.1 Facet Syndrome with associated Myofascial pain															
7.1.2 Whiplash Associated Disorder															
7.1.3 Degenerative Cervical Radiculopathy															

7.2 In the **CHRONIC** Form of this condition, after how many treatments with no relief would you consider further investigation?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14+

7.2.1 Facet Syndrome with associated Myofascial pain															
7.2.2 Whiplash Associated Disorder															
7.2.3 Degenerative Cervical Radiculopathy															

7.3 In the **CHRONIC** form of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

	7.3.1 Facet Syndrome with associated Myofascial pain					**7.3.2 Whiplash Associated Disorder**					**7.3.3 Degenerative Cervical Radiculopathy**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Continue treating with original treatment protocol without reassessment															
.2 Continue treating with original treatment protocol after reassessing the patient															
.3 Continue treating with original treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound															
.4 Change treatment protocol without reassessment															
.5 Change treatment protocol after reassessing the patient															
.6 Change treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound															
.7 Refer to another health care practitioner															
.8 Other:															

7.4 In the **CHRONIC** form of this condition, once the patient has become pain free, do you advise follow up treatments?

7.4.1 Facet Syndrome with associated Myofascial pain	☐ Yes. Please specify: _____ _____ _____ _____ _____	☐ No
7.4.2 Whiplash Associated Disorder	☐ Yes. Please specify: _____ _____ _____ _____ _____	☐ No
7.4.3 Degenerative Cervical Radiculopathy	☐ Yes. Please specify: _____ _____ _____ _____ _____	☐ No

8. Acute: Condition lasting up to 10 days.

8.1. In the **ACUTE** form of this condition, which of the following do you advise as part of patient advice and education?

	8.1.1 Facet Syndrome with associated Myofascial pain					**8.1.2 Whiplash Associated Disorder**					**8.1.3 Degenerative Cervical Radiculopathy**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Home Stretches															
.2 Home strengthening exercises															
.3 Strengthening exercise under instruction															
.4 Proprioceptive exercise															
.5 Nutritional therapy (supplements and diet)															
.6 Postural and ergonomic advice															
.7 Cryotherapy (Ice pack, etc.)															
.8 Heat therapy (Heat pack, etc.)															
.9 Stress management															
.10 Other:															

9. Chronic: Condition lasting longer than 7 weeks.

9.1. In the **CHRONIC** form of this condition, which of the following do you advise as part of patient advice and education

	9.1.1. Facet Syndrome with associated Myofascial pain					**9.1.2. Whiplash Associated Disorder**					**Degenerative Cervical Radiculopathy**				
	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never	Always	Frequent	Occasionally	Rarely	Never
.1 Home Stretches															
.2 Home strengthening exercises															
.3 Strengthening exercise under instruction															
.4 Proprioceptive exercise															
.5 Nutritional therapy (supplements and diet)															
.6 Postural and ergonomic advice															
.7 Cryotherapy (Ice pack, etc.)															
.8 Heat therapy (Heat pack, etc.)															
.9 Stress management															
.10 Other:															

THANK YOU FOR YOUR TIME. YOUR FEEDBACK IS HIGHLY APPRECIATED

Appendix C1: Changes to Palmer (2009) questionnaire

Palmer Part 1

This section was divided into three sections. Part 1: Personal information, Part 2: Pre- and Post-graduate education, Part 3: Philosophical outlook.

Palmer Part 2

Treatment was structured into tabular form so as to decrease the size of the questionnaire. The questionnaire used by Palmer (2009) was a nine page document and as this study looked at three conditions where Palmer (2009) only assessed one, this would have resulted in a document in excess of 25 pages. This was neither feasible financially nor would it have been acceptable to participants resulting in a poor response rate.

Modalities were rearranged so as to make the document more user friendly. Modalities were added whilst others were removed so as to be more usable for the treatment of neck pain.

Palmer Part 3

This section was divided into two parts Part 5: Management and Part 6: Post Treatment advice and education. As with the section on treatment these sections were structured into tabular form and adapted so as to be more usable for assessing the treatment of neck pain.

Appendix C2: Expert Group Concerns

Questionnaire Structure.

Unchanged

Part 1: Personal information

Unchanged

Part 2: Pre- and Post-Graduate Education

Unchanged

Part 3: Philosophical Outlook

Question 3.1 Question altered from 'Which Chiropractic Philosophy do you subscribe to?' to 'Which Chiropractic Philosophy do you subscribe to? More than one answer may be provided.'

Table 3.1 an option of 'other' was added to the table.

Definitions 3.1 References were added.

Part 4: Treatment

Question 4.1.1, 4.2.1 and 4.3.1.

- 'Which of the following do you use to treat the acute form of this condition?' was altered to 'Once red flag conditions have been ruled out, which of the following do you use to treat the acute form of this condition?'
- Table option 'Auxiliary Therapeutic Techniques' was altered to 'Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy etc.'

Question 4.1.2, 4.2.2 and 4.3.2.

- Which of the following do you use to treat the chronic form of this condition?' was altered to 'Once red flag conditions have been ruled out, which of the following do you use to treat the chronic form of this condition?'
- Table option 'Auxiliary Therapeutic Techniques' was altered to 'Auxiliary Therapeutic Techniques e.g. ultrasound, IFC, Trigger point therapy etc.'

Question 4.1.6, 4.2.6. and 4.3.6.

- Table option 'Dry needling in conjunction with T.E.N.S.' altered to 'Dry needling in conjunction with Electrical modalities.'

- Table option ‘Thermotherapy (Heat pack etc.)’ altered to ‘Heat therapy(Heat pack etc.)’.

Question 4.1.7, 4.2.7. and 4.3.7.

- Table option ‘Dry needling in conjunction with T.E.N.S.’ altered to ‘Dry needling in conjunction with Electrical modalities.’
- Table option ‘Thermotherapy (Heat pack etc.)’ altered to ‘Heat therapy(Heat pack etc.)’.

Part 5: Management

Question 5.1.3, 5.2.3. and 5.3.3.

- Question 5.1.3.1, 5.2.3.1 and 5.3.3.1 altered from ‘Do you advise follow up treatments?’ to ‘Do you advise maintenance treatments?’

  Question 5.1.3.2, 5.2.3.2 and 5.3.3.2 replaced by ‘If you answered yes in question 5.1.3.1/5.2.3.2 and 5.3.3.2, briefly state why?’

- Question 5.1.3.3, 5.1.3.4, 5.2.3.3, 5.2.3.4, 5.3.3.3 and 5.3.3.4 removed.

Question 5.1.4, 5.2.4 and 5.3.4.

- Question 5.1.5, 5.2.5 and 5.3.5 added to allow for the assessment of acute and chronic forms of the conditions.
- 5.1.4, 5.2.4 and 5.3.4 now reads ‘In the acute form of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?’
- 5.1.5, 5.2.5 and 5.3.5 now reads ‘In the chronic form of this condition, if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?’

Part 6: Post treatment advice and Education

‘Post treatment advice and education’ altered to ‘Patient advice and education’ in the heading and in questions 6.1, 6.2 and 6.3.

Appendix C3: Pilot Study Concerns

Questionnaire Structure: Questionnaire changed to tabular form to decrease size and number of pages used. Numbering changed subsequent to the change to tabular form.

Question 1.3: Coloured ethnicity added.

Question 2.1: Former names added to Durban University of Technology and University of Johannesburg.

Question 2.2: (D.C) added following Doctor of Chiropractic

Question 2.5: Less than 5 years changed to 1-5 years

Question 2.6: Have you attended health related conferences since qualification changed to How regularly have you attended health related conferences since qualification. Option 1 = More than 1 per year, Option 2 = 1 per year, Option 3 = 1 every second year, Option 4 = Less Frequently. Please Specify:

Question 2.8: Examples of short courses given.

Question 3.1: Option D changed from other too Other. Please Specify.

Question 4.3.1: Spondylarthosis changed to spondylosis

Question 4.1.3.2/4.2.3.2/4.3.3.2: Would you regard the manipulation as the primary focus of your treatment protocol. Changed to: In the **ACUTE**, form of this condition, would you regard the articular manipulation as the primary intervention of your protocol.

Question 4.1.6/4.2.6/4.2.6: Supportive taping removed.

Question 5.1.3.1/5.2.3.1/5.3.3.1: The word maintenance removed and replaced with follow up.

Question 5.1.4/5.2.4/5.3.4: Options available were removed and replaced with more appropriate responses

Question 5.1.5/5.2.5/5.3.5: Options available were removed and replaced with more appropriate responses

Question 6.1: Acute and Chronic sections were added.

Appendix D1: Code of Conduct and Confidentiality Statement – Expert Group

This form needs to be completed by every member of the expert group prior to the commencement of the expert group meeting.

As a member of this committee I agree to abide by the following conditions:

1. All information contained in the research documents and any information discussed during the expert group meeting will be kept private and confidential. This is especially binding to any information that may identify any of the participants in the research process.
2. None of the information shall be communicated to any other individual or organisation outside of this specific expert group as to the decisions of this expert group.
3. The information gathered from this expert group by the researcher will be made public in terms of a dissertation and journal publication. The researcher will ensure that any participants in the expert group and research remain anonymous and confidential.
4. The expert group may be either voice or video recorded, as a transcript of the proceedings will need to be made. The data will be stored securely under password protection.
5. All data generated from this expert group (including the recording) will be kept for 15 years in a secure location at Durban University of Technology and thereafter will be destroyed.

Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Full name of the participant	**Signature**
Full name of the Witness	**Signature**
Full name of the Researcher	**Signature**
Full name of Supervisor	**Signature**

Appendix D2: Letter of Information and Informed Consent - Expert Group

Dear participant

I would like to welcome you to the Expert Group of my research study.

Title of research Study: An investigation into the patient management protocols of selected cervical spine conditions by chiropractors in KwaZulu-Natal.

Principle Investigator: Barend Jacobus Lombard (B.Tech: Chiropractic)

Co-Investigator: Dr. N.L. de Busser (M.Tech Chiropractic. MMed (Sports Med))

Brief Introduction and Purpose of the Study:

Neck pain is a very common problem within the general population. Evidence based guidelines for the chiropractic and conservative treatment of neck pain have been established. However it has been suggested that treatment protocols chosen by the chiropractor are influenced mainly by philosophical orientation and training of the chiropractor, rather than the available evidence based literature.

There are two institutes of training for chiropractors in South Africa, the Durban University of Technology and the University of Johannesburg. Both of these institutes follow the same curriculum with qualifications including a research component. This is done to introduce a research component to the chiropractic student and as such introducing the student to the concept of the evidence based chiropractic. The chiropractic program was however only established in South Africa in 1989 at the Technikon Natal (now known as The Durban University of Technology), and as such, many of the older generation of chiropractors would have had no choice but to study at foreign institutes which may follow different curriculum and different philosophical orientation. Many local chiropractors may also have practiced in foreign counties. Both of these factors are said to influence practice activities of chiropractors. This may affect the chiropractors' choice to include any number of the physical therapeutic modalities within the chiropractic scope of practice, to complement the traditional spinal manipulative techniques. These may include soft tissue manipulation, electrical modalities, exercise therapy and rehabilitation, as well as lifestyle, nutritional and postural advice.

With such variation among chiropractors, the purpose of this study is to identify any trends in treatment and management strategies employed by chiropractors in KwaZulu-Natal, in the treatment of three common cervical spine conditions. This data will be used to analyse how chiropractors treat and manage neck pain, to identify if philosophical, demographic and educational factors influence these choices and to ascertain whether certain trends exist regardless of these factors.

Objectives:

To determine the following factors with regard to the study population:

1) Demographics.
2) Pre- and post-graduate education.
3) Philosophical outlook.
4) Manipulation protocols employed in the treatment of neck pain not due to whiplash, whiplash associated disorder and cervical radiculopathy.
5) Auxiliary therapeutic modalities employed in the treatment of neck pain not due to whiplash, whiplash associated disorder and cervical radiculopathy.
6) Management strategies employed in the treatment of neck pain not due to whiplash, whiplash associated disorder and cervical radiculopathy.
7) Post treatment advice and education strategies employed in the treatment of neck pain not due to whiplash, whiplash associated disorder and cervical radiculopathy.
8) The association between the chiropractors' demographic factors and the treatment and management protocols used.
9) The association between the chiropractors' educational factors and the treatment and management protocols used.

Outline of the Procedures: Please read and sign the informed consent form, confidentiality statement and code of conduct, before the start of the Expert Group discussion. Members will each receive a copy of the questionnaire, after which the questions will be discussed. Each question will be discussed in sequential order. Your input and recommendation on how the questionnaire may be altered and enhanced would be much appreciated.

Risks of Discomfort to the Participant: There is no risk or discomfort associated with participating in the study as the results are strictly confidential and will only be used for research purposes.

Benefits: This data will be used to analyse how chiropractors treat neck pain; to identify if philosophical, demographic and educational factors influencing these choices; and to ascertain whether trends exist in the treatment of neck pain regardless of these factors. This would benefit the greater medical and scientific community as well as chiropractic students, interns, educators and practitioners.

Reason/s why the Participant May Be Withdrawn from the Study: Participants are free to withdraw from the study at any time.

Remuneration: Participation is voluntary and there are no remuneration associated with participation.

Cost of the Study: There are no costs associated with participation in the study.

Confidentiality: All information you supply throughout the Expert Group will be regarded as confidential, your name will not appear in any report or publication of the research.

Research Related Injury: There are no physical interventions in this study and as such there is no risk of injury.

Persons to Contact in the Event of any Problem or Queries:
Supervisor: Dr. N.L. de Busser Cell: 083 666 8606 Tel: 031 201 9569
Principle investigator: Barend Jacobus Lombard Cell: 082 773 2601 Tel: 031 303 7926
Institutional Research Ethics administrator Tel: 031 373 2900

Complaints can be reported to the DVC: TIP Prof. F. Otieno Tel: 031 373 2382 or email: dvctip@dut.ac.za

CONSENT

Statement of Agreement to Participate in the Research Study:

I…….., ID number……., have read this Document in its entirety and understand its contents. Where I have had any questions or queries, these have been explained to me by…… to my satisfaction. Furthermore, I fully understand that I may withdraw from this study at any stage without any adverse consequences and my future health care will not be compromised. I, therefore voluntarily agree to participate in this study.

_____	_____
Full name of the participant	**Signature**
_____	_____
Full name of the Witness	**Signature**
_____	_____
Full name of the Researcher	**Signature**
_____	_____
Full name of Supervisor	**Signature**

Thank you for participating in my Expert Group.

Sincerely,

Barend Jacobus Lombard

Appendix E: Letter of Information and Informed Consent

Dear Participant:

I would like to welcome you to my research study.

Title of research Study: An investigation into the patient management protocols of selected cervical spine conditions by chiropractors in KwaZulu-Natal.

Principle Investigator: Barend Jacobus Lombard (B.Tech: Chiropractic)

Co-Investigator: Dr. N.L. de Busser (M.Tech: Chiropractic, M.Med (Sports Med))

Brief Introduction and Purpose of the Study:

Neck pain is a very common problem within the general population. Evidence based guidelines for the conservative management, of neck pain have been established. However it has been suggested that treatment protocols chosen by the chiropractor are influenced by philosophical orientation and training of the chiropractor, and not just on the available evidence based literature.

There are two institutes of training for chiropractors in South Africa, namely the Durban University of Technology and the University of Johannesburg. Both of these institutions follow the same curriculum with qualifications including a research component. This is done to introduce a research component to the chiropractic student and as such introducing the student to the concept of evidence based chiropractic. The chiropractic program was, however, only established in South Africa in 1989 at the Technikon Natal (now known as The Durban University of Technology), and as such, many chiropractors would have had no choice but to study at foreign institutes which may follow a different curriculum and different philosophical orientation. Many local chiropractors may also have practiced in foreign counties. Both of these factors are said to influence practice activities of chiropractors. This may affect the chiropractors' choice to include any number of the physical therapeutic modalities, to complement the traditional spinal manipulative techniques. These may include soft tissue manipulation, electrical modalities, exercise therapy and rehabilitation, as well as lifestyle, nutritional and postural advice.

With such variation among chiropractors, the purpose of this study is to identify any trends in treatment and management strategies employed by chiropractors in KwaZulu-Natal, in the treatment of three common cervical spine conditions. This data will be used to analyse how chiropractors treat and manage neck pain, to identify if philosophical, demographic and educational factors influence these choices and to ascertain whether certain trends exist regardless of these factors.

Objectives:

To determine the following factors with regard to the study population:

1) Demographics.
2) Pre- and post-graduate education.
3) Philosophical outlook.
4) Manipulation protocols employed in the treatment of neck pain not due to whiplash, whiplash associated disorder and cervical radiculopathy.
5) Auxiliary therapeutic modalities employed in the treatment of neck pain not due to whiplash, whiplash associated disorder and cervical radiculopathy.
6) Management strategies employed in the treatment of neck pain not due to whiplash, whiplash associated disorder and cervical radiculopathy.
7) Post treatment advice and education strategies employed in the treatment of neck pain not due to whiplash, whiplash associated disorder and cervical radiculopathy.
8) The association between the chiropractors' demographic factors and the treatment and management protocols used.
9) The association between the chiropractors' educational factors and the treatment and management protocols used.

Outline of the Procedures: This questionnaire will only take 20-25 minutes of your time. Once you have filled out the questionnaire please place the questionnaire and Letter of Information and Informed Consent into the boxes provided by the researcher or email them to wendyd@dut.ac.za (with subject = Lombard) or fax them to 0866785148. To be eligible to participate in the study please complete the consent form below.

Risks of Discomfort to the Participant: There is no risk or discomfort associated with participating in the study as the results are strictly confidential and will only be used for research purposes.

Benefits: This data will be used to analyse how chiropractors treat neck pain; to identify if philosophical, demographic and educational factors influencing these choices; and to ascertain whether trends exist in the treatment of neck pain regardless of these factors. This would benefit the greater medical and scientific community as well as chiropractic students, interns, educators and practitioners.

Reason/s why the Participant May Be Withdrawn from the Study: Participants are free to withdraw from the study at any time. However, once the questionnaire has been posted into the sealed container it may not be opened as this will violate the confidentiality of the other respondents.

Remuneration: Participation is voluntary and there are no remuneration associated with participation.

Cost of the Study: There are no costs associated with participation in the study.

Confidentiality: All responses that are returned will go to an independent member of the Department of Chiropractic at DUT who will remove identifying information from the responses, before forwarding these on to the researcher. All answers are confidential and your identity will not be linked to the questionnaire. This questionnaire will be analysed by an independent statistician and will only be used for research purposes.

Research Related Injury: There are no physical interventions in this study and as such there is no risk of injury.

Persons to Contact in the Event of any Problem or Queries:
Supervisor: Dr. N.L. de Busser Tel: 031 201 9569
Principle investigator: Barend Jacobus Lombard Cell: 082 773 2601 Tel: 031 303 7926
Institutional Research Ethics administrator Tel: 031 373 2900

Complaints can be reported to the DVC: TIP Prof. F. Otieno Tel: 031 373 2382 or email: dvctip@dut.ac.za

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Barend Jacobus Lombard, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: REC 82/13.
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full name of the participant	**Date**	**Time**	**Signature**

I Barend Jacobus Lombard herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Full name of the Researcher	**Date**	**Signature**
Full name of the Witness	**Date**	**Signature**
Full name of the Legal Guardian (If applicable)	**Date**	**Signature**

Appendix F: Statistical Analysis

1. Treatment and Management of Non-Specific Neck Pain

1.1 Acute Non-Specific Neck Pain

Treatment of Acute Non-Specific Neck Pain

Q4.1.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which of the following would you use to treat the condition if no red flags were present?

Treatment of Acute Non-Specific Neck pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Spinal Manipulation	75	78.1	20	20.8	1	1.0	0	0	0	0
Traction	5	5.4	12	13.0	19	20.7	19	20.7	37	40.2
Auxiliary therapeutic techniques.	54	56.8	33	34.7	4	4.2	3	3.2	1	1.0
Initiate Rehabilitation Program	21	22.6	29	31.2	25	26.9	14	15.1	4	4.3
Advise use of a cervical Collar	0	0	1	1.0	7	7.5	29	31.2	56	60.2
Advise a Non-Steroidal Anti-inflammatory	1	1.0	13	13.7	46	48.4	24	25.3	11	11.6
Refer the patient to a Homeopath	0	0	1	1.0	19	20.2	27	28.7	47	50.0
Refer the patient to a Medical Doctor for pain control	1	1.0	3	3.3	23	25.0	39	42.4	26	28.3
Refer the patient to a medical specialist	0	0	1	1.0	19	20.4	47	50.5	26	28.0
Other (Refer the patient for Acupuncture)	0	0	1	1.0	0	0	0	0	0	0

Q4.2.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which form of articular manipulation would you most commonly use if no red flags were present?

Articular manipulation used in Acute Non-Specific Neck Pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Attempt to adjust specific segment only	51	54.8	21	22.6	13	14.0	6	6.5	2	2.2
Adjust segment on both sides	13	14.8	30	34.1	32	36.4	6	6.8	7	8.0
Adjust multiple segments throughout the cervical spine	11	12.4	26	29.2	33	37.1	12	13.5	7	7.9
Adjust multiple segments throughout the spine	18	20.0	29	32.2	24	26.7	12	13.3	7	7.8
Instrument assisted adjustment	2	2.2	7	7.8	12	13.3	16	17.8	53	58.9
Mobilization	7	7.8	14	15.6	42	46.7	21	23.3	6	6.7

Q4.3.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) would you regard the articular manipulation as the primary intervention of your treatment protocol?

Articular manipulations as primary intervention in Acute Non-Specific Neck pain

n	%
86	89.6
10	10.4
96	100.0

Reasons for not regarding the manipulation as the primary intervention in Acute Non-Specific Neck pain

	n	%
Broader Management program employed (multiple modalities used and other factors such as psychological factors taken into consideration).	4	40
Soft tissue component is of equal importance.	2	20
Soft tissue component is more important.	2	20
Pain may be too severe to introduce manipulation at this stage.	2	20
Clinical presentation and investigations (e.g. X-ray and blood tests) will determine the protocol employed.	2	20

Q4.4.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition?

Auxiliary therapeutic techniques used in Acute Non-Specific Neck pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Massage	42	44.7	25	26.6	17	18.1	6	6.4	4	4.3
Ischemic compression – digital pressure on trigger points	37	38.9	34	35.8	18	18.9	6	6.3	0	0
Dry Needling	20	21.1	52	54.7	17	17.9	2	2.1	4	4.2
Dry Needling in conjunction with electrical modalities	6	6.5	10	10.9	15	16.3	18	19.6	43	46.7
Stretch and Spray techniques	4	4.4	10	11.0	14	15.4	17	18.7	46	50.5
Soft tissue mobilization (Active release and myofascial release)	8	8.6	31	33.3	29	31.2	14	15.1	11	11.8
Instrument assisted soft tissue mobilization (e.g. Graston Technique/FAKTR)	3	3.2	5	5.4	12	12.9	8	8.6	65	69.9
Static Stretching	18	18.9	33	34.7	24	25.3	9	9.5	11	11.6
Proprioceptive Neuromuscular Facilitation (P.N.F.) stretching or similar techniques	12	12.8	37	39.4	27	28.7	13	13.8	5	5.3
Kinesio taping or similar	0	0	24	25.8	29	31.2	18	19.4	22	23.7
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)	5	5.5	7	7.7	15	16.5	18	19.8	46	50.5
Interferential Current (I.F.C.)	5	5.4	9	9.8	10	10.9	7	7.6	61	66.3
Ultrasound	1	1.0	10	11.0	16	17.6	12	13.2	52	57.1
Cryotherapy (Ice pack, etc.)	6	6.6	30	33.0	30	33.0	10	11.0	15	16.5
Heat Therapy (Heat pack, etc.)	6	6.5	19	20.4	33	35.5	8	8.6	27	29.0
Hydrotherapy	0	0	4	4.3	2	2.2	6	6.5	80	87.0
Refer to another therapist for myofascial component	1	1.0	6	6.7	21	23.3	14	15.6	48	53.3
Laser Therapy	0	0	1	1.0	0	0.0	0	0	0	0
Acupuncture	0	0	1	1.0	0	0	0	0	0	0
Winks Machine	0	0	0	0	1	1.0	0	0	0	0

Management of Acute Non-Specific Neck Pain

Q6.1.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) after how many days would you request your first follow-up?

Number of days at which the first follow up be requested in Acute Non-Specific Neck pain

Days	N	%
1	24	25.0
2	47	49.0
3	20	20.8
4	2	2.1
7	1	1.0
10	1	1.0
Non-Specified	1	1.0

Q6.2.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) after how many treatments with no relief would you consider further investigation?

Number of treatments with no relief after which further investigation be considered in Acute Non-Specific Neck pain

Treatments	n	%
2	11	11.5
3	46	47.9
4	23	24.0
5	4	4.2
6	7	7.3
7	1	1.0
10	1	1.0
12	1	1.0
14	1	1.0
Non-Specified	1	1.0

Q6.3.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

Actions taken if patients is not meeting the aims of the treatment protocol in Acute Non-Specific Neck pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Continue treating with original treatment protocol without reassessment	0	0	1	1.1	4	4.4	20	22.2	65	72.2
Continue treating with original treatment protocol after reassessing the patient	8	8.6	17	18.3	37	39.8	19	20.4	12	12.9
Continue treating with original treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	7	8.0	29	33.0	33	37.5	15	17.0	4	4.5
Change treatment protocol without reassessment	0	0	3	3.4	5	5.7	15	17.0	65	73.9
Change treatment protocol after reassessing the patient	16	17.6	43	47.3	31	34.1	0	0	1	1.1
Change treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	11	12.2	38	42.2	36	40.0	5	5.6	0	0
Refer to another health care practitioner	2	2.5	6	7.4	51	63.0	18	22.2	4	4.9

Q6.4.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) once the patient has become pain free, do you advise follow-up treatments?

Recommend Pain Free Treatments

	n	%
yes	71	74.0
No	24	25.0
Non-Specified	1	1.0
Total	96	100.0

Reasons for requesting, follow up treatments once the patient has become pain free in Acute Non-Specific Neck pain

	n	%
Preventative or Maintenance Care (prevent pain or other signs and symptoms returning/prevent deterioration of the condition)	23	32.4
Advise patients to return if pain or other symptoms return	9	12.7
To monitor for the reappearance of pain of other symptoms and monitor if condition is stable.	5	7
Only in selected cases	5	7
Long term management of the condition	2	2.8
To administer or monitor rehabilitation	2	2.8
Unspecified	34	49

Patient advice and education in of Acute Non-Specific Neck Pain

Q8.1.1 = In Acute Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome), which of the following do you advise as part of patient advice and education?

Advice and education given to patients with Acute Non-Specific Neck pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Home Stretches	46	48.9	32	34.0	11	11.7	3	3.2	2	2.1
Home strengthening exercises	19	20.2	31	33.0	22	23.4	14	14.9	8	8.5
Strengthening exercise under instruction	5	5.6	17	18.9	35	38.9	22	24.4	11	12.2
Proprioceptive exercise	8	8.8	14	15.4	39	42.9	21	23.1	9	9.9
Nutritional therapy (supplements and diet)	8	8.9	18	20.0	30	33.3	24	26.7	10	11.1
Postural and ergonomic advice	44	47.3	42	45.2	7	7.5	0	0	0	0
Cryotherapy (Ice pack, etc.)	28	30.4	42	45.7	17	18.5	5	5.4	0	0
Heat therapy (Heat pack, etc.)	14	15.2	25	27.2	23	25.0	17	18.5	13	14.1
Stress management	18	19.8	35	38.5	26	28.6	9	9.9	3	3.3
CBP Mirror image Exercise protocol	1	1	0	0	0	0	0	0	0	0
Home Traction/Remodelling Devices	0	0	1	1	0	0	0	0	0	0

1.2 Chronic Non-Specific Neck Pain

Treatment of Chronic Non-Specific Neck Pain

Q5.1.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which of the following would you use to treat the condition if no red flags were present?

Treatment of Chronic Non-Specific Neck pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Spinal Manipulation	74	77.1	22	22.9	0	0	0	0	0	0
Traction	4	4.3	12	12.9	32	34.4	20	21.5	25	26.9
Auxiliary therapeutic techniques.	43	45.3	36	37.9	12	12.6	1	1.1	3	3.2
Initiate Rehabilitation Program	33	34.7	41	43.2	13	13.7	5	5.3	3	3.2
Advise use of a cervical Collar	0	0.0	1	1.1	5	5.4	24	25.8	63	67.7
Advise a Non-Steroidal Anti-inflammatory	3	3.2	9	9.5	38	40.0	33	34.7	12	12.6
Refer the patient to a Homeopath	0	0	4	4.3	17	18.3	23	24.7	49	52.7
Refer the patient to a Medical Doctor for pain control	1	1.1	2	2.2	22	23.9	45	48.9	22	23.9
Refer the patient to a medical specialist	0	0.0	2	2.2	21	23.6	49	55.1	17	19.1
Other (Refer the patient for Acupuncture)	0	0.0	1	1.0	0	0	0	0	0	0

Q5.2.1: In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which form of articular manipulation would you most commonly use if no red flags were present?

Articular manipulation used in Chronic Non-Specific Neck Pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Attempt to adjust specific segment only	51	54.8	22	23.7	11	11.8	6	6.5	3	3.2
Adjust segment on both sides	10	10.9	33	35.9	30	32.6	11	12.0	8	8.7
Adjust multiple segments throughout the cervical spine	15	16.3	31	33.7	31	33.7	9	9.8	6	6.5
Adjust multiple segments throughout the spine	18	19.1	41	43.6	20	21.3	8	8.5	7	7.4
Instrument assisted adjustment	5	5.4	3	3.3	15	16.3	13	14.1	56	60.9
Mobilization	8	8.8	24	26.4	33	36.3	19	20.9	7	7.7

Q5.3.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) would you regard the articular manipulation as the primary intervention of your treatment protocol?

Articular Manipulation as the Primary intervention In Chronic Non-Specific Neck Pain

	n	%
Yes	85	88.5
No	11	11.5
Total	96	100.0

Q5.4.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition?

Auxiliary therapeutic techniques used in chronic Non-Specific Neck pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Massage	39	41.5	24	25.5	17	18.1	8	8.5	6	6.4
Ischemic compression – digital pressure on trigger points	40	42.6	33	35.1	13	13.8	7	7.4	1	1.1
Dry Needling	17	17.9	56	58.9	16	16.8	1	1.1	5	5.3
Dry Needling in conjunction with electrical modalities	6	6.5	7	7.6	13	14.1	14	15.2	52	56.5
Stretch and Spray techniques	2	2.2	11	12.0	13	14.1	14	15.2	52	56.5
Soft tissue mobilization (Active release and myofascial release)	8	8.6	26	28.0	32	34.4	11	11.8	16	17.2
Instrument assisted soft tissue mobilization (e.g. Graston Technique/FAKTR)	4	4.3	3	3.2	11	11.8	11	11.8	64	68.8

Static Stretching	17	18.1	35	37.2	24	25.5	9	9.6	9	9.6
Proprioceptive Neuromuscular Facilitation (P.N.F.) stretching or similar techniques	12	12.9	29	31.2	37	39.8	9	9.7	6	6.5
Kinesio taping or similar	2	2.2	22	24.2	26	28.6	17	18.7	24	26.4
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)	4	4.4	8	8.8	17	18.7	17	18.7	45	49.5
Interferential Current (I.F.C.)	4	4.4	8	8.8	9	9.9	8	8.8	62	68.1
Ultrasound	4	4.4	5	5.6	18	20.0	10	11.1	53	58.9
Cryotherapy (Ice pack, etc.)	4	4.4	21	23.1	25	27.5	18	19.8	23	25.3
Heat Therapy (Heat pack, etc.)	10	10.8	21	22.6	30	32.3	14	15.1	18	19.4
Hydrotherapy	0	0	2	2.2	4	4.4	5	5.6	79	87.8
Refer to another therapist for myofascial component	1	1.2	8	9.3	17	19.8	15	17.4	45	52.3
Laser Therapy	0	0	1	1.0	0	0.0	0	0	0	0
Acupuncture	0	0	1	1.0	0	0.0	0	0	0	0
Winks Machine	0	0	0	0	1	100.0	0	0	0	0

Management of Chronic Non-Specific Neck Pain

Q7.1.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) after how many days would you request your first follow-up?

Number of days at which the first follow up be requested in Chronic Non-Specific Neck pain

Days	n	%
1	4	4.2
2	37	38.5
3	40	41.7
4	5	5.2
5	3	3.1
7	4	4.2
10	1	1.0
Unspecified	2	1.0

Q7.2.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) after how many treatments with no relief would you consider further investigation?

Number of treatments with no relief after which further investigation be considered in Chronic Non-Specific Neck pain

Days	n	%
1	1	1.0
2	3	3.1
3	27	28.1
4	25	26.0
5	19	19.8
6	9	9.4
7	3	3.1
8	1	1.0
10	1	1.0
12	3	3.1
Unspecified	4	4.2

Q7.3.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

Actions taken if patients is not meeting the aims of the treatment protocol in Chronic Non-Specific Neck pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Continue treating with original treatment protocol without reassessment	1	1.1	2	2.3	8	9.2	17	19.5	59	67.8
Continue treating with original treatment protocol after reassessing the patient	5	5.7	19	21.8	37	42.5	18	20.7	8	9.2

Continue treating with original treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	2	2.3	25	28.7	49	56.3	9	10.3	2	2.3
Change treatment protocol without reassessment	0	0	4	4.7	4	4.7	20	23.3	58	67.4
Change treatment protocol after reassessing the patient	7	7.7	45	49.5	37	40.7	2	2.2	0	0
Change treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	5	5.7	43	48.9	37	42.0	3	3.4	0	0
Refer to another health care practitioner	0	0	11	14.7	43	57.3	20	26.7	1	1.3

Q7.4.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome) once the patient has become pain free, do you advise follow-up treatments?

Advice on Pain free follow ups in Chronic Non-Specific Neck Pain

	Frequency	Percent
Yes	80	83.3
No	15	15.6
Non-Specified	1	1.0
Total	96	100.0

Reasons for requesting, follow up treatments once the patient has become pain free in Chronic Non-Specific Neck pain

	n	%
Preventative or Maintenance Care (prevent pain or other signs and symptoms returning/prevent deterioration of the condition)	28	35
Long term management of the condition	5	6.3
To administer or monitor rehabilitation	4	5
Unspecified	37	46.3
Advise patients to return if pain or other symptoms return	4	5
To monitor for the reappearance of pain of other symptoms and monitor if condition is stable.	5	6.3
Only in selected cases	7	8.8

Patient advice and education in Chronic Non-Specific Neck Pain

Q9.1.1 = In Chronic Non-Specific Neck pain (Neck pain not due to whiplash and with no associated Radiculopathy e.g. Facet Syndrome), which of the following do you advise as part of patient advice and education?

Advice and education given to patients with Chronic Non-Specific Neck pain

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Home Stretches	59	62.8	30	31.9	3	3.2	2	2.1	0	0
Home strengthening exercises	34	36.2	37	39.4	16	17.0	4	4.3	3	3.2
Strengthening exercise under instruction	16	17.0	20	21.3	37	39.4	12	12.8	9	9.6
Proprioceptive exercise	17	18.3	21	22.6	36	38.7	14	15.1	5	5.4
Nutritional therapy (supplements and diet)	15	16.1	21	22.6	33	35.5	17	18.3	7	7.5
Postural and ergonomic advice	52	54.7	38	40.0	5	5.3	0	0	0	0
Cryotherapy (Ice pack, etc.)	18	19.4	20	21.5	29	31.2	20	21.5	6	6.5
Heat therapy (Heat pack, etc.)	16	17.4	33	35.9	29	31.5	9	9.8	5	5.4
Stress management	20	22.2	39	43.3	22	24.4	7	7.8	2	2.2
CBP Mirror image Exercise protocol	1	1.0	0	0	0	0	0	0	0	0
Home Traction/Remodelling Devices	0	0	1	1.0	0	0	0	0	0	0

2. Treatment and Management of Whiplash Associated Disorder

2.1 Acute Whiplash Associated disorder

Treatment of Acute Whiplash Associated disorder

Q4.1.2 = In Acute Whiplash Associated Disorder which of the following would you use to treat the condition if no red flags were present?

Treatment of Acute Whiplash Associated Disorder

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Spinal Manipulation	35	36.5	51	53.1	7	7.3	3	3.1	0	0
Traction	7	7.6	17	18.5	18	19.6	18	19.6	32	34.8
Auxiliary therapeutic techniques.	54	56.8	32	33.7	6	6.3	3	3.2	0	0.0
Initiate Rehabilitation Program	28	30.8	29	31.9	21	23.1	9	9.9	4	4.4
Advise use of a cervical Collar	3	3.2	15	16.0	29	30.9	29	30.9	18	19.1
Advise a Non-Steroidal Anti-inflammatory	9	9.4	36	37.5	37	38.5	11	11.5	3	3.1
Refer the patient to a Homeopath	1	1.0	5	5.4	12	13.0	26	28.3	48	52.2
Refer the patient to a Medical Doctor for pain control	2	2.2	10	10.8	26	28.0	35	37.6	20	21.5
Refer the patient to a medical specialist	2	2.1	3	3.2	34	36.2	41	43.6	14	14.9
Other (Refer the patient for Acupuncture)	1	1.0	0	0.	0	0	0	0	0	0

Q4.2.2 = In Acute Whiplash Associated Disorder which form of articular manipulation would you most commonly use if no red flags were present?

Articular manipulation used in Acute Whiplash Associated Disorder

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n		%	n	%	n
Attempt to adjust specific segment only	45	50.0	31	34.4	5	5.6	8	8.9	1	1.1
Adjust segment on both sides	10	11.5	25	28.7	32	36.8	15	17.2	5	5.7
Adjust multiple segments throughout the cervical spine	9	10.1	25	28.1	26	29.2	19	21.3	10	11.2
Adjust multiple segments throughout the spine	14	15.4	28	30.8	27	29.7	16	17.6	6	6.6
Instrument assisted adjustment	2	2.2	11	12.4	11	12.4	14	15.7	51	57.3
Mobilization	8	9.0	34	38.2	31	34.8	12	13.5	4	4.5

Q4.3.2 = In Acute Whiplash Associated Disorder would you regard the articular manipulation as the primary intervention of your treatment protocol?

Manipulation as the primary intervention in Acute Whiplash Associated Disorder

	n	%
Yes	62	64.6
No	34	35.4
Total	96	100.0

Reasons for not regarding the manipulation as the primary intervention in Acute Whiplash Associated disorder

	n	%
Soft tissue component is of equal importance.	11	30.60
Pain may be too severe to introduce manipulation at this stage.	7	19.40
Fear of Aggravating the Condition	6	16.70
Clinical presentation and investigations (e.g. X-ray and blood tests) will determine the protocol employed.	6	16.70
Soft tissue component is more important.	5	13.90
Broader Management program employed (multiple modalities used and other factors such as psychological factors taken into consideration).	4	11.10
Other Auxiliary Techniques used	2	5.60
Rule out Red Flags (The example used of this condition stated if no red flags were present. Individual did not read the question correctly)	2	5.60
Request Further Testing (X-ray, MRI, Bloods etc.)	1	2.80
Factors associated with the condition are not conducive to Manipulative Therapy	1	2.80

Q4.4.2 = In Acute Whiplash Associated Disorder which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition?

Auxiliary therapeutic techniques used in Acute Whiplash Associated Disorder

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Massage	40	42.6	29	30.9	14	14.9	6	6.4	5	5.3
Ischemic compression – digital pressure on trigger points	29	31.5	37	40.2	18	19.6	7	7.6	1	1.1
Dry Needling	15	16.0	51	54.3	20	21.3	4	4.3	4	4.3
Dry Needling in conjunction with electrical modalities	5	5.4	13	14.1	14	15.2	17	18.5	43	46.7
Stretch and Spray techniques	4	4.4	11	12.2	11	12.2	14	15.6	50	55.6
Soft tissue mobilization (Active release and myofascial release)	10	10.9	30	32.6	24	26.1	13	14.1	15	16.3
Instrument assisted soft tissue mobilization (e.g. Graston Technique/FAKTR)	2	2.2	6	6.6	9	9.9	13	14.3	61	67.0

Static Stretching	17	17.7	34	35.4	16	16.7	19	19.8	10	10.4
Proprioceptive Neuromuscular Facilitation (P.N.F.) stretching or similar techniques	11	11.7	30	31.9	22	23.4	19	20.2	12	12.8
Kinesio taping or similar	5	5.4	28	30.1	25	26.9	16	17.2	19	20.4
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)	7	7.7	10	11.0	13	14.3	16	17.6	45	49.5
Interferential Current (I.F.C.)	8	8.7	8	8.7	9	9.8	5	5.4	62	67.4
Ultrasound	7	7.7	8	8.8	16	17.6	11	12.1	49	53.8
Cryotherapy (Ice pack, etc.)	13	14.0	32	34.4	23	24.7	10	10.8	15	16.1
Heat Therapy (Heat pack, etc.)	5	5.4	16	17.2	30	32.3	14	15.1	28	30.1
Hydrotherapy	1	1.0	3	3.3	3	3.3	7	7.7	77	84.6
Refer to another therapist for myofascial component	3	3.4	4	4.5	20	22.5	16	18.0	46	51.7
Laser Therapy	0	0	1	1.0	0	0	0	0	0	0
Acupuncture	0	0	1	1.0	0	0	0	0	0	0
Winks Machine	0	0	0	0	1	1.0	0	0	0	0

Management of Acute Whiplash Associated disorder

Q6.1.2 = In Acute Whiplash associated disorder after how many days would you request your first follow-up?

Number of days at which the first follow up be requested in Acute Whiplash Associated Disorder

Days	n	%
1	7	7.3
2	39	40.6
3	34	35.4
4	7	7.3
5	2	2.1
7	3	3.1
10	1	1.0
12	1	1.0
Unspecified	2	2.1

Q6.2.2 = In Acute Whiplash Associated disorder after how many treatments with no relief would you consider further investigation?

Number of treatments with no relief after which further investigation be considered in Acute Whiplash Associated Disorder

Days	n	%
1	1	1.0
2	5	5.2
3	29	30.2
4	27	28.1
5	14	14.6
6	8	8.3
7	1	1.0
8	2	2.1
9	1	1.0
12	2	2.1
14	1	1.0
Unspecified	5	5.2

Q6.3.2 = In Acute Whiplash Associated disorder if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

Actions taken if patients is not meeting the aims of the treatment protocol in Acute Whiplash Associated Disorder

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	n	%	n	%	n
Continue treating with original treatment protocol without reassessment	1	1.1	2	2.3	6	6.8	20	22.7	59	67.0
Continue treating with original treatment protocol after reassessing the patient	5	5.7	20	23.0	36	41.4	17	19.5	9	10.3
Continue treating with original treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	3	3.4	25	28.4	48	54.5	9	10.2	3	3.4
Change treatment protocol without reassessment	0	0	3	3.4	3	3.4	26	29.9	55	63.2

Change treatment protocol after reassessing the patient	7	7.7	45	49.5	36	39.6	3	3.3	0	0
Change treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	7	7.8	43	47.8	39	43.3	1	1.0	0	0
Refer to another health care practitioner	2	2.6	10	13.2	46	60.5	17	22.4	1	1.0

Q6.4.2 = In Acute Whiplash Associated disorder once the patient has become pain free, do you advise follow-up treatments?

Pain Free treatments in Acute Whiplash Associated Disorder

	n	%
Yes	74	77.1
No	21	21.9
Non-Specified	1	1.0
	96	100.0

Reasons for requesting, follow up treatments once the patient has become pain free in Acute Whiplash Associated Disorder

	n	%
Preventative or Maintenance Care (prevent pain or other signs and symptoms returning/prevent deterioration of the condition)	25	29.8
Long term management of the condition	9	10.8
To administer or monitor rehabilitation	5	6.0
Unspecified	37	44
Advise patients to return if pain or other symptoms return	4	4.8
To monitor for the reappearance of pain of other symptoms and monitor if condition is stable.	5	6
Only in selected cases	6	7.1

Patient advice and education in Acute Whiplash Associated Disorder

Q8.1.2 = *In Acute Whiplash Associated disorder, which of the following do you advise as part of patient advice and education?*

Advice and education given to patients with Acute Whiplash

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Home Stretches	38	40.9	32	34.4	10	10.8	9	9.7	4	4.3
Home strengthening exercises	20	21.5	27	29.0	22	23.7	16	17.2	8	8.6
Strengthening exercise under instruction	7	8.0	18	20.5	29	33.0	23	26.1	11	12.5
Proprioceptive exercise	13	14.4	19	21.1	31	34.4	19	21.1	8	8.9
Nutritional therapy (supplements and diet)	7	7.8	18	20.0	30	33.3	24	26.7	11	12.2
Postural and ergonomic advice	37	40.2	47	51.1	7	7.6	0	0.0	1	1.1
Cryotherapy (Ice pack, etc.)	30	33.0	34	37.4	20	22.0	7	7.7	0	0
Heat therapy (Heat pack, etc.)	16	17.6	25	27.5	20	22.0	18	19.8	12	13.2
Stress management	15	16.7	24	26.7	28	31.1	18	20.0	5	5.6
CBP Mirror image Exercise protocol	1	1.0	0	0	0	0	0	0	0	0
Home Traction/Remodelling Devices	0	0	1	1.0	0	0	0	0	0	0

2.2 Chronic Whiplash Associated disorder

Treatment of Chronic Whiplash Associated disorder

Q5.1.2 = In Chronic Whiplash Associated Disorder which of the following would you use to treat the condition if no red flags were present?

Treatment of Chronic Whiplash Associated Disorder

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Spinal Manipulation	61	63.5	33	34.4	1	1.0	1	1.0	0	0
Traction	7	7.7	18	19.8	23	25.3	20	22.0	23	25.3
Auxiliary therapeutic techniques.	40	42.6	40	42.6	11	11.7	1	1.1	2	2.1
Initiate Rehabilitation Program	39	41.9	31	33.3	14	15.1	7	7.5	2	2.2
Advise use of a cervical Collar	2	2.2	6	6.5	11	11.8	33	35.5	41	44.1

Advise a Non-Steroidal Anti-inflammatory	3	3.2	13	13.8	43	45.7	25	26.6	10	10.6
Refer the patient to a Homeopath	2	2.2	3	3.3	17	18.5	20	21.7	50	54.3
Refer the patient to a Medical Doctor for pain control	3	3.3	5	5.4	25	27.2	38	41.3	21	22.8
Refer the patient to a medical specialist	1	1.2	4	4.7	32	37.6	37	43.5	11	12.9
Other (Refer the patient for Acupuncture)	0	0	1	1.0	0	0	0	0.0	0	0

Q5.2.2 = in Chronic Whiplash Associated Disorder which form of articular manipulation would you most commonly use if no red flags were present?

Articular manipulation used in Chronic Whiplash Associated Disorder

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Attempt to adjust specific segment only	48	52.7	27	29.7	8	8.8	6	6.6	2	2.2
Adjust segment on both sides	8	8.8	32	35.2	29	31.9	14	15.4	8	8.8
Adjust multiple segments throughout the cervical spine	12	13.2	27	29.7	30	33.0	15	16.5	7	7.7
Adjust multiple segments throughout the spine	15	16.1	35	37.6	26	28.0	9	9.7	8	8.6
Instrument assisted adjustment	4	4.4	7	7.7	12	13.2	13	14.3	55	60.4
Mobilization	10	11.2	27	30.3	31	34.8	15	16.9	6	6.7

Q5.3.2 = In Chronic Whiplash Associated Disorder would you regard the articular manipulation as the primary intervention of your treatment protocol?

Articular Manipulation as the primary intervention

	n	%
Yes	76	79.2
No	20	20.8
Total	96	100.0

Reasons for not regarding the manipulation as the primary intervention in Chronic Whiplash Associated Disorder

	n	%
Soft tissue component is of equal importance.	10	50
Broader Management program employed (multiple modalities used and other factors such as psychological factors taken into consideration).	6	30
Soft tissue component is more important.	2	10
Fear of Aggravating the Condition	1	5
Other Auxiliary Techniques used	1	5
Request Further Testing (X-ray, MRI, Bloods etc.)	1	5
Pain may be too severe to introduce manipulation at this stage.	1	5
Rehabilitation Component More Important than Manipulative Component	1	5
Clinical presentation and investigations (e.g. X-ray and blood tests) will determine the protocol employed.	1	5

Q5.4.2 = In Chronic Whiplash Associated Disorder which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition?

Auxiliary therapeutic techniques used in Chronic Whiplash Associated Disorder

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Massage	43	46.2	23	24.7	16	17.2	6	6.5	5	5.4
Ischemic compression – digital pressure on trigger points	33	36.3	39	42.9	12	13.2	7	7.7	0	0
Dry Needling	17	18.1	52	55.3	19	20.2	2	2.1	4	4.3
Dry Needling in conjunction with electrical modalities	7	7.7	9	9.9	9	9.9	15	16.5	51	56.0
Stretch and Spray techniques	2	2.2	12	13.2	11	12.1	14	15.4	52	57.1
Soft tissue mobilization (Active release and myofascial release)	8	8.7	26	28.3	32	34.8	10	10.9	16	17.4
Instrument assisted soft tissue mobilization (e.g. Graston Technique/FAKTR)	4	4.3	6	6.5	9	9.8	11	12.0	62	67.4
Static Stretching	21	22.1	33	34.7	26	27.4	6	6.3	9	9.5
Proprioceptive Neuromuscular Facilitation (P.N.F.) stretching or similar techniques	10	10.8	28	30.1	34	36.6	14	15.1	7	7.5
Kinesio taping or similar	4	4.4	28	31.1	18	20.0	17	18.9	23	25.6
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)	5	5.4	10	10.9	18	19.6	12	13.0	47	51.1
Interferential Current (I.F.C.)	5	5.4	8	8.7	12	13.0	6	6.5	61	66.3
Ultrasound	8	8.7	8	8.7	12	13.0	10	10.9	54	58.7
Cryotherapy (Ice pack, etc.)	7	7.5	20	21.5	27	29.0	16	17.2	23	24.7
Heat Therapy (Heat pack, etc.)	7	7.5	22	23.7	31	33.3	14	15.1	19	20.4
Hydrotherapy	0	0	3	3.3	3	3.3	6	6.6	79	86.8

Refer to another therapist for myofascial component	2	2.3	8	9.2	15	17.2	17	19.5	45	51.7
Laser Therapy	0	0	1	1.0	0	0	0	0.0	0	0
Acupuncture	0	0	1	1.0	0	0	0	0.0	0	0
Winks Machine	0	0	0	0	1	1.0	0	0.0	0	0

Management of Chronic Whiplash Associated disorder

Q7.1.2 = In Chronic Whiplash associated disorder after how many days would you request your first follow-up?

Number of days at which the first follow up be requested in Chronic Whiplash Associated Disorder

Days	n	%
1	8	8.3
2	32	33.3
3	37	38.5
4	5	5.2
5	5	5.2
6	1	1.0
7	5	5.2
8	1	1.0
11	1	1.0
Unspecified	1	1.0

Q7.2.2 = In Chronic Whiplash associated disorder after how many treatments with no relief would you consider further investigation?

Number of treatments with no relief after which further investigation be considered in Chronic Whiplash Associated Disorder

Days	n	%
1	1	1.0
2	1	1.0
3	28	29.2
4	26	27.1
5	17	17.7
6	10	10.4
7	1	1.0
8	4	4.2
10	2	2.1
12	2	2.1
14	1	1.0
14+	1	1.0
Unspecified	2	2.1

Q7.3.2 = In Chronic Whiplash Associated disorder if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

Actions taken if patients is not meeting the aims of the treatment protocol in Chronic Whiplash Associated Disorder

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Continue treating with original treatment protocol without reassessment	1	1.1	1	1.1	6	6.9	17	19.5	62	71.3
Continue treating with original treatment protocol after reassessing the patient	5	5.7	15	17.2	39	44.8	18	20.7	10	11.5
Continue treating with original treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	4	4.6	23	26.4	48	55.2	9	10.3	3	3.4
Change treatment protocol without reassessment	0	0	3	3.5	5	5.8	21	24.4	57	66.3
Change treatment protocol after reassessing the patient	7	7.8	42	46.7	37	41.1	4	4.4	0	0
Change treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	9	10.0	42	46.7	36	40.0	3	3.3	0	0
Refer to another health care practitioner	4	5.3	16	21.3	46	61.3	9	12.0	0	0

Q7.4.2 = In Chronic Whiplash Associated disorder once the patient has become pain free, do you advise follow-up treatments?

Pain Free Treatments in Chronic whiplash associated disorder

	n	%
Yes	84	87.5
No	11	11.5
Non-Specified	1	1.0
Total	96	100.0

Reasons for requesting, follow up treatments once the patient has become pain free in Acute Non-Specific Neck pain

	n	%
Preventative or Maintenance Care (prevent pain or other signs and symptoms returning/prevent deterioration of the condition)	33	37.5
Long term management of the condition	10	11.4
To monitor for the reappearance of pain of other symptoms and monitor if condition is stable.	5	5.7
Only in selected cases	5	5.7
To administer or monitor rehabilitation	4	4.6
Advise patients to return if pain or other symptoms return	4	4.6
Unspecified	39	44.3

Patient advice and education in Chronic Whiplash Associated Disorder

Q9.1.2 = *In Chronic Whiplash Associated disorder, which of the following do you advise as part of patient advice and education?*

Advice and education given to patients with Acute Whiplash Associated Disorder

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Home Stretches	55	58.5	29	30.9	6	6.4	3	3.2	1	1.1
Home strengthening exercises	37	39.4	36	38.3	14	14.9	5	5.3	2	2.1
Strengthening exercise under instruction	16	17.2	21	22.6	36	38.7	11	11.8	9	9.7
Proprioceptive exercise	18	19.4	24	25.8	34	36.6	12	12.9	5	5.4
Nutritional therapy (supplements and diet)	13	14.0	21	22.6	35	37.6	17	18.3	7	7.5
Postural and ergonomic advice	47	50.0	39	41.5	8	8.5	0	0	0	0
Cryotherapy (Ice pack, etc.)	17	18.5	23	25.0	30	32.6	16	17.4	6	6.5
Heat therapy (Heat pack, etc.)	16	17.4	33	35.9	29	31.5	9	9.8	5	5.4
Stress management	17	18.9	33	36.7	23	25.6	13	14.4	4	4.4
CBP Mirror image Exercise protocol	1	1.0	0	0	0	0	0	0	0	0
Home Traction/Remodelling Devices	0	0	1	1.0	0	0	0	0	0	0

3. Treatment and Management of Degenerative Cervical Radiculopathy

3.1 Acute Degenerative Cervical Radiculopathy

Treatment of Acute Degenerative Cervical Radiculopathy

Q4.1.3 = In Acute Degenerative Cervical Radiculopathy which of the following would you use to treat the condition if no red flags were present?

Treatment of Acute Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Spinal Manipulation	34	35.4	44	45.8	12	12.5	5	5.2	1	1.0
Traction	12	12.9	27	29.0	29	31.2	7	7.5	17	18.3
Auxiliary therapeutic techniques.	53	55.8	34	35.8	4	4.2	4	4.2	0	0
Initiate Rehabilitation Program	26	28.0	29	31.2	25	26.9	10	10.8	3	3.2
Advise use of a cervical Collar	1	1.1	7	7.4	16	17.0	32	34.0	38	40.4
Advise a Non-Steroidal Anti-inflammatory	10	10.4	24	25.0	42	43.8	16	16.7	4	4.2
Refer the patient to a Homeopath	2	2.2	2	2.2	21	22.8	26	28.3	41	44.6
Refer the patient to a Medical Doctor for pain control	2	2.1	18	19.1	36	38.3	19	20.2	19	20.2

Refer the patient to a medical specialist	5	5.3	14	14.7	58	61.1	12	12.6	6	6.3
Other (Refer the patient for Acupuncture)	1	1.0	0	0	0	0	0	0	0	0

Q4.2.3 = in Acute Degenerative Cervical Radiculopathy which form of articular manipulation would you most commonly use if no red flags were present?

Articular manipulation used in Acute Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Attempt to adjust specific segment only	39	41.5	33	35.1	13	13.8	7	7.4	2	2.1
Adjust segment on both sides	7	7.9	28	31.5	34	38.2	12	13.5	8	9.0
Adjust multiple segments throughout the cervical spine	8	9.2	22	25.3	31	35.6	17	19.5	9	10.3
Adjust multiple segments throughout the spine	12	13.2	30	33.0	29	31.9	15	16.5	5	5.5
Instrument assisted adjustment	5	5.6	8	9.0	13	14.6	12	13.5	51	57.3
Mobilization	12	13.6	36	40.9	29	33.0	8	9.1	3	3.4

Q4.3.3 = In Acute Degenerative Cervical Radiculopathy would you regard the articular manipulation as the primary intervention of your treatment protocol?

Articular Manipulation as the Primary intervention in Acute Degenerative Radiculopathy

	n	%
Yes	64	66.7
No	32	33.3
Total	96	100.0

Reasons for not regarding the manipulation as the primary intervention in Acute Degenerative Cervical Radiculopathy

	n	%
Clinical presentation and investigations (e.g. X-ray and blood tests) will determine the protocol employed.	11	34.4
Soft tissue component is of equal importance.	7	21.9
Fear of Aggravating the Condition	6	18.8
Broader Management program employed (multiple modalities used and other factors such as psychological factors taken into consideration).	6	18.8
Other Auxiliary Techniques used	5	15.6
Pain may be too severe to introduce manipulation at this stage.	2	6.3
Request Further Testing (X-ray, MRI, Bloods etc.)	1	3.1
Rehabilitation Component More Important than Manipulative Component	1	3.1
Unspecified	1	3.1
Rule out Red Flags (The example used of this condition stated if no red flags were present. Individual did not read the question correctly)	1	3.1

Q4.4.3 = In Acute Degenerative Cervical Radiculopathy which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition?

Auxiliary therapeutic techniques used in Acute Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Massage	43	46.2	23	24.7	16	17.2	4	4.3	7	7.5
Ischemic compression – digital pressure on trigger points	30	33.3	35	38.9	16	17.8	7	7.8	2	2.2
Dry Needling	16	17.0	54	57.4	17	18.1	3	3.2	4	4.3
Dry Needling in conjunction with electrical modalities	6	6.6	13	14.3	14	15.4	15	16.5	43	47.3
Stretch and Spray techniques	5	5.5	7	7.7	12	13.2	17	18.7	50	54.9
Soft tissue mobilization (Active release and myofascial release)	8	8.8	29	31.9	27	29.7	14	15.4	13	14.3
Instrument assisted soft tissue mobilization (e.g. Graston Technique/FAKTR)	2	2.2	6	6.5	9	9.8	11	12.0	64	69.6
Static Stretching	14	14.9	32	34.0	22	23.4	13	13.8	13	13.8
Proprioceptive Neuromuscular Facilitation (P.N.F.) stretching or similar techniques	12	13.0	26	28.3	26	28.3	17	18.5	11	12.0
Kinesio taping or similar	1	1.1	24	26.4	23	25.3	17	18.7	26	28.6
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)	7	7.8	5	5.6	18	20.0	17	18.9	43	47.8
Interferential Current (I.F.C.)	7	7.7	8	8.8	11	12.1	5	5.5	60	65.9
Ultrasound	4	4.4	11	12.1	14	15.4	10	11.0	52	57.1
Cryotherapy (Ice pack, etc.)	8	8.8	26	28.6	28	30.8	11	12.1	18	19.8
Heat Therapy (Heat pack, etc.)	8	8.7	22	23.9	28	30.4	10	10.9	24	26.1
Hydrotherapy	0	0	5	5.6	2	2.2	5	5.6	78	86.7

Refer to another therapist for myofascial component	3	3.4	4	4.5	20	22.7	14	15.9	47	53.4
Laser Therapy	0	0	1	1.0	0	0	0	0	0	0
Acupuncture	0	0	1	1.0	0	0	0	0	0	0
Winks Machine	0	0	0	0	1	1.0	0	0	0	0

Management of Acute Degenerative Cervical Radiculopathy

Q6.1.3 = In Acute Degenerative Cervical Radiculopathy after how many days would you request your first follow-up?

Number of days at which the first follow up be requested in In Acute Degenerative Cervical Radiculopathy

Days	n	%
1	17	17.7
2	44	45.8
3	28	29.2
4	2	2.1
5	1	1.0
7	1	1.0
12	1	1.0
Unspecified	2	2.1

Q6.2.3 = In Acute Degenerative Cervical Radiculopathy after how many treatments with no relief would you consider further investigation?

Number of treatments with no relief after which further investigation be considered in Acute Degenerative Cervical Radiculopathy

Treatments	n	%
1	1	1.0
2	5	5.2
3	38	39.6
4	23	24.0
5	9	9.4
6	11	11.5
7	3	3.1
8	2	2.1
12	1	1.0
14	1	1.0
14+	1	1.0
Unspecified	1	1.0

Q6.3.3 = In Acute Degenerative Cervical Radiculopathy If the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

Actions taken if patients are not meeting the aims of the treatment protocol in Acute Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Continue treating with original treatment protocol without reassessment	1	1.0	1	1.0	2	2.2	19	21.3	66	74.2
Continue treating with original treatment protocol after reassessing the patient	8	8.7	17	18.5	29	31.5	23	25.0	15	16.3
Continue treating with original treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	6	7.0	23	26.7	34	39.5	20	23.3	3	3.5
Change treatment protocol without reassessment	1	1.0	3	3.4	3	3.4	16	18.4	64	73.6
Change treatment protocol after reassessing the patient	14	15.9	40	45.5	31	35.2	2	2.3	1	1.0
Change treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	13	14.4	41	45.6	31	34.4	5	5.6	0	0
Refer to another health care practitioner	3	3.7	21	25.6	49	59.8	8	9.8	1	1.0

Q6.4.3 = In Acute Degenerative Cervical Radiculopathy once the patient has become pain free, do you advise follow-up treatments?

Pain free follow ups in Acute Degenerative Cervical Radiculopathy

	n	%
Yes	88	91.7
No	7	7.3
Non-Specified	1	1.0
Total	96	100.0

Reasons for requesting, follow up treatments once the patient has become pain free Acute Degenerative Cervical Radiculopathy

	n	%
Preventative or Maintenance Care (prevent pain or other signs and symptoms returning/prevent deterioration of the condition)	35	39.8
Long term management of the condition	11	12.5
To administer or monitor rehabilitation	3	3.4
Unspecified	35	39.8
Advise patients to return if pain or other symptoms return	7	8.0
To monitor for the reappearance of pain of other symptoms and monitor if condition is stable.	5	5.7
Only in selected cases	3	3.4

Patient advice and education in Acute Degenerative Cervical Radiculopathy

Q8.1.3 = In Acute Degenerative Cervical Radiculopathy, which of the following do you advise as part of patient advice and education?

Advice and education given to patients with Acute Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Home Stretches	38	40.9	27	29.0	13	14.0	9	9.7	6	6.5
Home strengthening exercises	22	23.7	28	30.1	20	21.5	12	12.9	11	11.8
Strengthening exercise under instruction	6	6.8	20	22.7	30	34.1	18	20.5	14	15.9
Proprioceptive exercise	10	11.1	15	16.7	32	35.6	22	24.4	11	12.2
Nutritional therapy (supplements and diet)	10	11.0	31	34.1	28	30.8	14	15.4	8	8.8
Postural and ergonomic advice	36	39.6	48	52.7	5	5.5	1	1.1	1	1.1
Cryotherapy (Ice pack, etc.)	20	22.2	31	34.4	25	27.8	11	12.2	3	3.3
Heat therapy (Heat pack, etc.)	15	16.5	31	34.1	20	22.0	17	18.7	8	8.8
Stress management	18	20.2	26	29.2	28	31.5	13	14.6	4	4.5
CBP Mirror image Exercise protocol	1	1.0	0	0	0	0	0	0	0	0
Home Traction/Remodelling Devices	0	0	1	1.0	0	0	0	0	0	0

3.2 Degenerative Cervical Radiculopathy

Treatment of Chronic Degenerative Cervical Radiculopathy

Q5.1.3 = In Chronic Degenerative Cervical Radiculopathy which of the following would you use to treat the condition if no red flags were present?

Treatment of Chronic Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Spinal Manipulation	47	49.5	34	35.8	13	13.7	1	1.1	0	0
Traction	5	5.4	31	33.7	30	32.6	12	13.0	14	15.2
Auxiliary therapeutic techniques.	42	45.2	37	39.8	12	12.9	0	0	2	2.2
Initiate Rehabilitation Program	30	32.6	37	40.2	18	19.6	5	5.4	2	2.2
Advise use of a cervical Collar	2	2.2	7	7.5	15	16.1	22	23.7	47	50.5
Advise a Non-Steroidal Anti-inflammatory	7	7.4	18	18.9	38	40.0	24	25.3	8	8.4
Refer the patient to a Homeopath	1	1.1	6	6.5	19	20.7	17	18.5	49	53.3
Refer the patient to a Medical Doctor for pain control	3	3.2	12	12.8	35	37.2	25	26.6	19	20.2
Refer the patient to a medical specialist	2	2.3	14	16.1	41	47.1	26	29.9	4	4.6
Other (Refer the patient for Acupuncture)	0	0	1	1.0	0	0	0	0	0	0.0

Q5.2.3 = in Chronic Degenerative Cervical Radiculopathy which form of articular manipulation would you most commonly use if no red flags were present?

Articular manipulation used in Chronic Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Attempt to adjust specific segment only	47	50.0	24	25.5	18	19.1	3	3.2	2	2.1
Adjust segment on both sides	5	5.6	28	31.1	34	37.8	13	14.4	10	11.1
Adjust multiple segments throughout the cervical spine	11	12.1	20	22.0	36	39.6	15	16.5	9	9.9
Adjust multiple segments throughout the spine	16	17.0	33	35.1	25	26.6	12	12.8	8	8.5
Instrument assisted adjustment	2	2.2	7	7.7	13	14.3	15	16.5	54	59.3
Mobilization	13	14.3	31	34.1	26	28.6	14	15.4	7	7.7

Q5.3.3 = In Chronic Degenerative Cervical Radiculopathy would you regard the articular manipulation as the primary intervention of your treatment protocol?

Articular Manipulation in Chronic Degenerative Cervical Radiculopathy

	n	%
Yes	69	71.9
No	27	28.1
Total	96	100.0

Reasons for not regarding the manipulation as the primary intervention in Chronic Degenerative Cervical Radiculopathy

	n	%
Clinical presentation and investigations (e.g. X-ray and blood tests) will determine the protocol employed.	11	40.8
Soft tissue component is of equal importance.	7	26
Broader Management program employed (multiple modalities used and other factors such as psychological factors taken into consideration).	7	26
Fear of Aggravating the Condition	5	18.5
Other Auxiliary Techniques used	3	11.1
Request Further Testing (X-ray, MRI, Bloods etc.)	2	7.4
Pain may be too severe to introduce manipulation at this stage.	1	3.7

Q5.4.3 = In Chronic Degenerative Cervical Radiculopathy which auxiliary therapeutic techniques, if any, would you use in the treatment of this condition?

Auxiliary therapeutic techniques used in Chronic Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Massage	41	43.6	25	26.6	16	17.0	6	6.4	6	6.4
Ischemic compression – digital pressure on trigger points	35	37.2	36	38.3	16	17.0	6	6.4	1	1.1
Dry Needling	16	16.8	55	57.9	16	16.8	4	4.2	4	4.2
Dry Needling in conjunction with electrical modalities	7	7.7	8	8.8	14	15.4	14	15.4	48	52.7
Stretch and Spray techniques	2	2.2	9	9.8	13	14.1	16	17.4	52	56.5
Soft tissue mobilization (Active release and myofascial release)	7	7.6	22	23.9	32	34.8	15	16.3	16	17.4
Instrument assisted soft tissue mobilization (e.g. Graston Technique/FAKTR)	3	3.2	5	5.4	9	9.7	12	12.9	64	68.8
Static Stretching	14	14.7	28	29.5	27	28.4	16	16.8	10	10.5
Proprioceptive Neuromuscular Facilitation (P.N.F.) stretching or similar techniques	10	10.8	27	29.0	32	34.4	14	15.1	10	10.8
Kinesio taping or similar	1	1.1	24	26.4	22	24.2	19	20.9	25	27.5
Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)	6	6.6	10	11.0	18	19.8	13	14.3	44	48.4
Interferential Current (I.F.C.)	4	4.3	11	12.0	10	10.9	7	7.6	60	65.2
Ultrasound	6	6.5	13	14.1	10	10.9	8	8.7	55	59.8
Cryotherapy (Ice pack, etc.)	5	5.4	21	22.8	30	32.6	15	16.3	21	22.8
Heat Therapy (Heat pack, etc.)	11	11.8	24	25.8	27	29.0	15	16.1	16	17.2
Hydrotherapy	0	0	4	4.4	2	2.2	6	6.7	78	86.7
Refer to another therapist for myofascial component	2	2.3	4	4.7	16	18.6	19	22.1	45	52.3
Laser Therapy	0	0	1	1.0	0	0	0	0.0	0	0
Acupuncture	0	0	1	1.0	0	0	0	0.0	0	0
Winks Machine	0	0	1	1.0	0	0	0	0.0	0	0

Management of Chronic Degenerative Cervical Radiculopathy

Q7.1.3 = In Chronic Degenerative Cervical Radiculopathy after how many days would you request your first follow-up?

Number of days at which the first follow up be requested in Chronic Degenerative Cervical Radiculopathy

Days	n	%
1	8	8.3
2	32	33.3
3	37	38.5
4	5	5.2
5	5	5.2
6	1	1.0
7	5	5.2
8	1	1.0
11	1	1.0
Unspecified	1	1.0

Q7.2.3 = In Chronic Degenerative Cervical Radiculopathy after how many treatments with no relief would you consider further investigation?

Number of treatments with no relief after which further investigation be considered in Chronic Degenerative Cervical Radiculopathy

Treatments	n	%
1	1	1.0
2	1	1.0
3	28	29.2
4	26	27.1
5	17	17.7
6	10	10.4
7	1	1.0
8	4	4.2
10	2	2.1
12	2	2.1
14	1	1.0
14+	1	1.0
Unspecified	2	2.1

Q7.3.3 = In Chronic Degenerative Cervical Radiculopathy if the patient is not meeting the aims of the treatment protocol after the proposed prognostic period, what steps do you take?

Actions taken if patients is not meeting the aims of the treatment protocol in Chronic Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Continue treating with original treatment protocol without reassessment	1	1.1	1	1.1	6	6.9	17	19.5	62	71.3
Continue treating with original treatment protocol after reassessing the patient	5	5.7	15	17.2	39	44.8	18	20.7	10	11.5
Continue treating with original treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	4	4.6	23	26.4	48	55.2	9	10.3	3	3.4
Change treatment protocol without reassessment	0	0	3	3.5	5	5.8	21	24.4	57	66.3
Change treatment protocol after reassessing the patient	7	7.8	42	46.7	37	41.1	4	4.4	0	0
Change treatment protocol after sending for further investigations, e.g. blood work, radiographs, ultrasound	9	10.0	42	46.7	36	40.0	3	3.3	0	0
Refer to another health care practitioner	4	5.3	16	21.3	46	61.3	9	12.0	0	0

Q7.4.3 = In Chronic Degenerative Cervical Radiculopathy once the patient has become pain free, do you advise follow-up treatments?

Pain free Treatments in Chronic Degenerative Cervical Radiculopathy

	n	%
Yes	88	91.7
No	7	7.3
Non-Specified	1	1.0
Total	96	100.0

Reasons for requesting follow up treatments once the patient has become pain free in Chronic Degenerative Cervical Radiculopathy

	n	%
Preventative or Maintenance Care (prevent pain or other signs and symptoms returning/prevent deterioration of the condition)	33	37.5
Long term management of the condition	10	11.4
To monitor for the reappearance of pain of other symptoms and monitor if condition is stable.	5	5.7
Only in selected cases	5	5.7
To administer or monitor rehabilitation	4	4.6
Advise patients to return if pain or other symptoms return	4	4.6
Unspecified	38	43.2

Patient advice and education in Chronic Degenerative Cervical Radiculopathy

Q9.1.3 = In Chronic Degenerative Cervical Radiculopathy, which of the following do you advise as part of patient advice and education?

Advice and education given to patients with Chronic Degenerative Cervical Radiculopathy

	Always		Frequently		Occasionally		Rarely		Never	
	n	%	n	%	n	%	n	%	n	%
Home Stretches	42	45.7	32	34.8	12	13.0	6	6.5	0	0.0
Home strengthening exercises	26	28.3	40	43.5	16	17.4	6	6.5	4	4.3
Strengthening exercise under instruction	11	12.2	28	31.1	30	33.3	12	13.3	9	10.0
Proprioceptive exercise	12	13.2	23	25.3	36	39.6	14	15.4	6	6.6
Nutritional therapy (supplements and diet)	18	19.4	33	35.5	28	30.1	11	11.8	3	3.2
Postural and ergonomic advice	48	51.6	38	40.9	6	6.5	1	1.1	0	0
Cryotherapy (Ice pack, etc.)	13	14.1	23	25.0	30	32.6	19	20.7	7	7.6
Heat therapy (Heat pack, etc.)	20	21.7	32	34.8	28	30.4	8	8.7	4	4.3
Stress management	18	20.2	30	33.7	29	32.6	9	10.1	3	3.4
CBP Mirror image Exercise protocol	1	1.0	0	0	0	0	0	0	0	0
Home Traction/Remodelling Devices	0	0	1	1.0	0	0	0	0	0	0

4. Demographic, Educational and Philosophical Factors of Practitioners

Age

Q1.1 = Age?

Age of Participants

	n	%
20-29	17	17.7
30-39	51	53.1
40-49	19	19.8
>=50	7	7.3
Total	94	97.9
Non-Specified	2	2.1
Total	96	100.0

Gender

Q1.2 = Gender?

Gender distribution of respondents

	n	%
Female	48	50.0
Male	48	50.0
Total	96	100.0

Ethnicity

Q1.3 = Ethnic Group (For statistical purposes only)?

Ethnic distribution of respondents

	n	5
Black	2	2.1
Coloured	1	1.0
Indian	15	15.6
White	77	80.2
Not specified	1	1.0
Total	96	100.0

Practice experience

Q2.4 = How long have you been practicing?

Years in Practice

	n	%
6month -10 years	55	57.2
11-20 years	36	37.5
>20 years	5	5.2
Total	96	100.0

Institute of Qualification

Institute of qualification

	n	%
DUT	85	88.5
UJ	5	5.2
Other	6	6.3
Total	96	100.0

Other institutions

	n	%
Palmer College	4	4.2
National Chiropractic College	2	2.1
Total	6	6.3%

Chiropractic Qualification obtained

Q2.2 = What chiropractic qualification have you obtained?

Chiropractic qualification obtained

	n	%
Doctor of Chiropractic (D.C.)	10	10.4
M.Tech: Chiropractic	86	89.6
Total	96	100.0

Other Qualifications held

Q2.3 = Do you hold any other qualifications (Diploma or higher)?

Other qualifications held

	Frequency	Percent
Yes	15	15.6%
No	68	70.8%
Unanswered	13	13.5%
Total	96	100.0%

List of other qualifications held

	Frequency	Percent
Bachelor of Science	4	22.20
Master of Medical Science (Sport Science)	3	16.70
Bachelor of Commerce	2	11.10
Bachelor of Education	2	11.10
Bachelor of Arts (Human Movement Science)	1	5.60
Bachelor of Science (National C.C)	1	5.60
Bachelor of Social Science	1	5.60
Diploma (Chiropractic Radiology)	1	5.60
Diploma (Therapeutic Aromatherapy)	1	5.60
Diploma (Ultrasonography)	1	5.60
Masters of Technology: Homeopathy	1	5.60

Health related conferences

Q2.5 = How regularly have you attended health related conferences since qualification?

Attendance at health related conferences since qualification

	n	%
	23	24.0
1 per year	33	34.4
every 2nd year	28	29.2
less often	12	12.5
Total	96	100.0

Health related short courses

Q2.6 = Have you taken any chiropractic/health related short course since qualification (E.g. Kinesio Taping, Extremity Courses)?

Attendance of health related short courses

	n	%
Yes	76	79.2
No	20	20.8
Total	96	100.0

Short courses Attended

	n	%
Strapping	42	55.3
Adjustment Techniques and Systems	21	27.6
Extremity	19	25.0
Sport Courses	13	17.1
Other Treatment systems	11	14.5
Paediatric	9	11.8
NSAID	7	9.2
Biopuncture	6	7.9
Manual Auxiliary Modalities	5	6.6
Nutrition and Supplementation	4	5.2
Diagnostic Imagining	3	4.0
Dry Needling	3	4.0
Acupuncture	2	2.6

First Aid	2	2.6
Unspecified	2	2.6
Exercise	2	2.6
Pain education	2	2.6
Animal Chiropractic	1	1.3
Electrical Modality	1	1.3
Surgical education	1	1.3
Spinal Courses	1	1.3

Medical and chiropractic professional journals or magazines.

Q2.7 = Do you subscribe to or have access to any medical/chiropractic professional journal publications or magazines?

Subscription medical/chiropractic professional journal publications or magazines

	Frequency	Percent
Yes	43	44.8
No	51	53.1
Unanswered	2	97.9
Total	96	100.0

Medical/Chiropractic Journals and magazines subscribed to

	n	%
The Chiropractic Report	18	41.90
Journal of Manipulative and Physiological Therapeutics	5	11.60
Free Online Journals	5	11.60
The Spine Journal	4	9.30
Unspecified	4	9.30
DUT Library Access (Multiple Journals via DUT)	3	7.0
WebMD	2	4.70
Medscape	2	4.70
Dynamic Chiropractic	2	4.70
South African Sports Medicine Association Journal	2	4.70
Nestle Nutrition Institute	1	2.30
Journal of Neurologic Physical Therapy	1	2.30
Journal of Neurosurgery: Spine	1	2.30
Journal of Neurosurgery: Paediatrics	1	2.30
Clinical Solutions	1	2.30
Medical News Today	1	2.30
Neuro Orthopaedic Institute: NOI	1	2.30
BodyinMind Research Group	1	2.30
South African Medical Journal	1	2.30
FIMS - International Federation of Sports Medicine Journal	1	2.30
New England Journal of Medicine	1	2.30
Research Review Service	1	2.30
Natural Health Magazine	1	2.30

Influence of conferences, health related short courses, journals and magazines on practice activity.

Q2.8 = Have any of the conferences, health related short courses, journals or magazines influenced the way you practice?

Participant belief on Influence of conferences, health related short courses, journals and magazines on practice activity

	Frequency	Percent
Yes	75	78.1
No	21	21.9
Total	96	100.0

Participant belief on how conferences, health related short courses, journals and magazines influence on practice activity

	n	%
Improved Treatment/Diagnosis/ Management	31	41.3
New or Improved Techniques	27	36.0
Improved Knowledge	23	30.6
Specific Courses/Journals Mentioned	19	25.3
Unspecified	5	6.6
Total	96	100.0

Descriptive analysis of the practice experience outside of South Africa of Chiropractors practicing in KwaZulu-Natal

Q2.9 = Have you ever practiced outside of South Africa?

Practice activity outside South Africa

	n	%
Yes	17	17.7
No	79	82.3
Total	96	100.0

Countries practiced in outside South Africa

	n	%
United Kingdom	7	41.2
Ireland	5	29.4
Namibia	2	11.8
Malaysia	2	11.8
USA	1	5.9
Italy	1	5.9
Netherlands	1	5.9
Total	19	100

Descriptive analysis of the Philosophical outlook of Chiropractors practicing in KwaZulu-Natal.

Q3.1 Which chiropractic philosophy do you subscribe to? (More than one answer may be provided. The options available were:

Philosophical orientation

	n	%
Straight	3	3.1
Mixer	29	30.2
Evidence Based	39	40.6
Combination (Straight + Mixer)	2	2.1
Combination (Straight + Mixer + Evidence based)	1	1.0
Combination (Straight + Evidence Based)	1	1.0
Combination (Mixer + Evidence Based)	21	21.9
Total	96	

5. Influence of demographic, educational or philosophical factors on treatment protocols

5.1 Acute Non-Specific Neck pain

Factors influencing treatment of Acute Non-Specific Neck Pain

	Test	Utilisation of spinal manipulation	Utilisation of traction	Utilisation of Auxiliary therapeutic techniques	Utilisation of Rehabilitation	Utilisation of cervical collar	Utilisation of Non-Steroidal Anti-inflammatory Drug or analgesics	Referral to Medical Doctor for pain control	Referral to medical specialist
Age	*Independent Samples Mann Whitney U test*	.292 Retain Null Hypothesis	.573 Retain Null Hypothesis	.113 Retain Null Hypothesis	.685 Retain Null Hypothesis	.050 Reject Null Hypothesis	.309 Retain Null Hypothesis	.287 Retain Null Hypothesis	.199 Retain Null Hypothesis
Gender	*Independent Samples Mann Whitney U test*	.025 Reject Null Hypothesis	.012 Reject Null Hypothesis	.000 Reject Null Hypothesis	.081 Retain Null Hypothesis	.343 Retain Null Hypothesis	.321 Retain Null Hypothesis	.891 Retain Null Hypothesis	.436 Retain Null Hypothesis
University of Qualification	*Independent Samples Kruskal-Wallis Test*	.939 Retain Null Hypothesis	.215 Retain Null Hypothesis	.067 Retain Null Hypothesis	.077 Retain Null Hypothesis	.579 Retain Null Hypothesis	.744 Retain Null Hypothesis	.531 Retain Null Hypothesis	.213 Retain Null Hypothesis
Experience	*Independent Samples Mann Whitney U test*	.343 Retain Null Hypothesis	.947 Retain Null Hypothesis	.040 Reject Null Hypothesis	.618 Retain Null Hypothesis	.032 Reject Null Hypothesis	.063 Retain Null Hypothesis	.057 Retain Null Hypothesis	.408 Retain Null Hypothesis
Continuous Professional Development	*Independent Samples Mann Whitney U test*	.008 Reject Null Hypothesis	.651 Retain Null Hypothesis	.043 Reject Null Hypothesis	.547 Retain Null Hypothesis	.863 Retain Null Hypothesis	.557 Retain Null Hypothesis	.119 Retain Null Hypothesis	.125 Retain Null Hypothesis
Foreign Experience	*Independent Samples Mann Whitney U test*	.878 Retain Null Hypothesis	.761 Retain Null Hypothesis	.231 Retain Null Hypothesis	.173 Retain Null Hypothesis	.842 Retain Null Hypothesis	,224 Retain Null Hypothesis	.728 Retain Null Hypothesis	.996 Retain Null Hypothesis
Philosophy	*Independent Samples Kruskal-Wallis Test*	.210 Retain Null Hypothesis	.026 Reject Null Hypothesis	.043 Reject Null Hypothesis	.688 Retain Null Hypothesis	.256 Retain Null Hypothesis	.795 Retain Null Hypothesis	.346 Retain Null Hypothesis	.616 Retain Null Hypothesis

Age

		Under 35 Count	Column N %	Over 35 Count	Column N %
Spinal Manipulation	Always	37	82.2%	36	73.5%
	Frequently	8	17.8%	12	24.5%
	Occasionally	0	0.0%	1	2.0%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	2	4.5%	3	6.5%
	Frequently	4	9.1%	8	17.4%
	Occasionally	10	22.7%	9	19.6%
	Rarely	11	25.0%	8	17.4%
	Never	17	38.6%	18	39.1%
Auxiliary Therapeutic Techniques	Always	30	66.7%	23	47.9%
	Frequently	11	24.4%	21	43.8%
	Occasionally	2	4.4%	2	4.2%
	Rarely	1	2.2%	2	4.2%
	Never	1	2.2%	0	0.0%

Initiate Rehabilitation Program	Always	8	17.8%	13	28.3%
	Frequently	17	37.8%	11	23.9%
	Occasionally	11	24.4%	13	28.3%
	Rarely	6	13.3%	8	17.4%
	Never	3	6.7%	1	2.2%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	2.1%
	Occasionally	1	2.3%	6	12.8%
	Rarely	13	29.5%	16	34.0%
	Never	30	68.2%	24	51.1%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	0	0.0%	1	2.1%
	Frequently	4	8.9%	9	18.8%
	Occasionally	23	51.1%	22	45.8%
	Rarely	14	31.1%	10	20.8%
	Never	4	8.9%	6	12.5%
Refer to Medical Doctor for Pain Control	Always	1	2.3%	0	0.0%
	Frequently	0	0.0%	3	6.5%
	Occasionally	11	25.0%	10	21.7%
	Rarely	16	36.4%	23	50.0%
	Never	16	36.4%	10	21.7%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	2.1%
	Occasionally	7	16.3%	11	22.9%
	Rarely	22	51.2%	25	52.1%
	Never	14	32.6%	11	22.9%

Gender

		Female Count	Column N %	Male Count	Column N %
Spinal Manipulation	Always	42	87.5%	33	68.8%
	Frequently	6	12.5%	14	29.2%
	Occasionally	0	0.0%	1	2.1%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	2	4.2%	3	6.8%
	Frequently	3	6.3%	9	20.5%
	Occasionally	8	16.7%	11	25.0%
	Rarely	11	22.9%	8	18.2%
	Never	24	50.0%	13	29.5%
Auxiliary Therapeutic Techniques	Always	36	75.0%	18	38.3%
	Frequently	11	22.9%	22	46.8%
	Occasionally	0	0.0%	4	8.5%
	Rarely	0	0.0%	3	6.4%
	Never	1	2.1%	0	0.0%
Initiate Rehabilitation Program	Always	14	29.2%	7	15.6%
	Frequently	15	31.3%	14	31.1%
	Occasionally	12	25.0%	13	28.9%
	Rarely	6	12.5%	8	17.8%
	Never	1	2.1%	3	6.7%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%
	Frequently	1	2.1%	0	0.0%
	Occasionally	1	2.1%	6	13.0%
	Rarely	15	31.9%	14	30.4%
	Never	30	63.8%	26	56.5%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	0	0.0%	1	2.1%
	Frequently	6	12.5%	7	14.9%
	Occasionally	22	45.8%	24	51.1%
	Rarely	14	29.2%	10	21.3%
	Never	6	12.5%	5	10.6%
Refer to Medical Doctor for Pain Control	Always	1	2.1%	0	0.0%
	Frequently	1	2.1%	2	4.4%
	Occasionally	12	25.5%	11	24.4%
	Rarely	19	40.4%	20	44.4%
	Never	14	29.8%	12	26.7%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	1	2.1%	0	0.0%
	Occasionally	7	14.6%	12	26.7%
	Rarely	26	54.2%	21	46.7%
	Never	14	29.2%	12	26.7%

University of Qualification

		DUT Count	Column N %	UJ Count	Column N %	Other Count	Column N %
Spinal Manipulation	Always	66	77.6%	4	80.0%	5	83.3%
	Frequently	18	21.2%	1	20.0%	1	16.7%
	Occasionally	1	1.2%	0	0.0%	0	0.0%
	Rarely	0	0.0%	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%	0	0.0%
Traction	Always	4	4.9%	0	0.0%	1	20.0%
	Frequently	9	11.0%	2	40.0%	1	20.0%
	Occasionally	17	20.7%	1	20.0%	1	20.0%
	Rarely	17	20.7%	1	20.0%	1	20.0%
	Never	35	42.7%	1	20.0%	1	20.0%
Auxiliary Therapeutic Techniques	Always	51	60.0%	2	40.0%	1	20.0%
	Frequently	29	34.1%	1	20.0%	3	60.0%
	Occasionally	4	4.7%	0	0.0%	0	0.0%
	Rarely	1	1.2%	1	20.0%	1	20.0%
	Never	0	0.0%	1	20.0%	0	0.0%
Initiate Rehabilitation Program	Always	19	22.6%	0	0.0%	2	40.0%
	Frequently	27	32.1%	1	25.0%	1	20.0%
	Occasionally	24	28.6%	0	0.0%	1	20.0%
	Rarely	12	14.3%	1	25.0%	1	20.0%
	Never	2	2.4%	2	50.0%	0	0.0%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%	0	0.0%
	Frequently	1	1.2%	0	0.0%	0	0.0%
	Occasionally	6	7.2%	0	0.0%	1	20.0%
	Rarely	25	30.1%	2	40.0%	2	40.0%
	Never	51	61.4%	3	60.0%	2	40.0%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	1.2%	0	0.0%	0	0.0%
	Frequently	11	12.9%	1	20.0%	1	20.0%
	Occasionally	40	47.1%	3	60.0%	3	60.0%
	Rarely	24	28.2%	0	0.0%	0	0.0%
	Never	9	10.6%	1	20.0%	1	20.0%
Refer to Medical Doctor for Pain Control	Always	1	1.2%	0	0.0%	0	0.0%
	Frequently	2	2.4%	1	20.0%	0	0.0%
	Occasionally	22	26.8%	0	0.0%	1	20.0%
	Rarely	34	41.5%	1	20.0%	4	80.0%
	Never	23	28.0%	3	60.0%	0	0.0%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%	0	0.0%
	Frequently	1	1.2%	0	0.0%	0	0.0%
	Occasionally	18	21.7%	0	0.0%	1	20.0%
	Rarely	42	50.6%	2	40.0%	3	60.0%
	Never	22	26.5%	3	60.0%	1	20.0%

Years in Practice

		<10 years Count	Column N %	>10 years Count	Column N %
Spinal Manipulation	Always	44	81.5%	31	73.8%
	Frequently	10	18.5%	10	23.8%
	Occasionally	0	0.0%	1	2.4%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	4	7.5%	1	2.6%
	Frequently	5	9.4%	7	17.9%
	Occasionally	11	20.8%	8	20.5%
	Rarely	12	22.6%	7	17.9%
	Never	21	39.6%	16	41.0%
Auxiliary Therapeutic Techniques	Always	36	66.7%	18	43.9%
	Frequently	14	25.9%	19	46.3%
	Occasionally	2	3.7%	2	4.9%
	Rarely	1	1.9%	2	4.9%
	Never	1	1.9%	0	0.0%
Initiate Rehabilitation Program	Always	10	18.5%	11	28.2%
	Frequently	19	35.2%	10	25.6%
	Occasionally	15	27.8%	10	25.6%
	Rarely	6	11.1%	8	20.5%
	Never	4	7.4%	0	0.0%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	2.5%
	Occasionally	1	1.9%	6	15.0%
	Rarely	16	30.2%	13	32.5%
	Never	36	67.9%	20	50.0%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	0	0.0%	1	2.4%
	Frequently	5	9.3%	8	19.5%
	Occasionally	26	48.1%	20	48.8%
	Rarely	15	27.8%	9	22.0%

	Never	8	14.8%	3	7.3%
Refer to Medical Doctor for Pain Control	Always	1	1.9%	0	0.0%
	Frequently	0	0.0%	3	7.5%
	Occasionally	13	25.0%	10	25.0%
	Rarely	18	34.6%	21	52.5%
	Never	20	38.5%	6	15.0%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	2.4%
	Occasionally	10	19.2%	9	22.0%
	Rarely	26	50.0%	21	51.2%
	Never	16	30.8%	10	24.4%

Continuous Professional Development

		yes Count	Column N %	no Count	Column N %
Spinal Manipulation	Always	20	62.5%	55	85.9%
	Frequently	11	34.4%	9	14.1%
	Occasionally	1	3.1%	0	0.0%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	1	3.3%	4	6.5%
	Frequently	6	20.0%	6	9.7%
	Occasionally	5	16.7%	14	22.6%
	Rarely	7	23.3%	12	19.4%
	Never	11	36.7%	26	41.9%
Auxiliary Therapeutic Techniques	Always	14	43.8%	40	63.5%
	Frequently	13	40.6%	20	31.7%
	Occasionally	3	9.4%	1	1.6%
	Rarely	2	6.3%	1	1.6%
	Never	0	0.0%	1	1.6%
Initiate Rehabilitation Program	Always	8	25.0%	13	21.3%
	Frequently	7	21.9%	22	36.1%
	Occasionally	9	28.1%	16	26.2%
	Rarely	7	21.9%	7	11.5%
	Never	1	3.1%	3	4.9%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%
	Frequently	1	3.1%	0	0.0%
	Occasionally	2	6.3%	5	8.2%
	Rarely	10	31.3%	19	31.1%
	Never	19	59.4%	37	60.7%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	3.1%	0	0.0%
	Frequently	4	12.5%	9	14.3%
	Occasionally	13	40.6%	33	52.4%
	Rarely	10	31.3%	14	22.2%
	Never	4	12.5%	7	11.1%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	1	1.6%
	Frequently	1	3.2%	2	3.3%
	Occasionally	9	29.0%	14	23.0%
	Rarely	17	54.8%	22	36.1%
	Never	4	12.9%	22	36.1%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	1.6%
	Occasionally	9	28.1%	10	16.4%
	Rarely	17	53.1%	30	49.2%
	Never	6	18.8%	20	32.8%

Foreign Experience

		yes Count	Column N %	no Count	Column N %
Spinal Manipulation	Always	13	76.5%	62	78.5%
	Frequently	4	23.5%	16	20.3%
	Occasionally	0	0.0%	1	1.3%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	1	6.7%	4	5.2%
	Frequently	2	13.3%	10	13.0%
	Occasionally	4	26.7%	15	19.5%
	Rarely	2	13.3%	17	22.1%
	Never	6	40.0%	31	40.3%
Auxiliary Therapeutic Techniques	Always	7	41.2%	47	60.3%

	Frequently	9	52.9%	24	30.8%
	Occasionally	0	0.0%	4	5.1%
	Rarely	1	5.9%	2	2.6%
	Never	0	0.0%	1	1.3%
Initiate Rehabilitation Program	Always	7	41.2%	14	18.4%
	Frequently	4	23.5%	25	32.9%
	Occasionally	3	17.6%	22	28.9%
	Rarely	2	11.8%	12	15.8%
	Never	1	5.9%	3	3.9%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%
	Frequently	1	6.3%	0	0.0%
	Occasionally	2	12.5%	5	6.5%
	Rarely	3	18.8%	26	33.8%
	Never	10	62.5%	46	59.7%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	5.9%	0	0.0%
	Frequently	2	11.8%	11	14.1%
	Occasionally	10	58.8%	36	46.2%
	Rarely	3	17.6%	21	26.9%
	Never	1	5.9%	10	12.8%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	1	1.3%
	Frequently	1	5.9%	2	2.7%
	Occasionally	2	11.8%	21	28.0%
	Rarely	10	58.8%	29	38.7%
	Never	4	23.5%	22	29.3%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	1.3%
	Occasionally	4	23.5%	15	19.7%
	Rarely	8	47.1%	39	51.3%
	Never	5	29.4%	21	27.6%

Philosophy

		Straight		Mixer		Evidence Based	
		Count	Column N %	Count	Column N %	Count	Column N %
Spinal Manipulation	Always	5	100.0%	20	69.0%	49	81.7%
	Frequently	0	0.0%	9	31.0%	10	16.7%
	Occasionally	0	0.0%	0	0.0%	1	1.7%
	Rarely	0	0.0%	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%	0	0.0%
Traction	Always	0	0.0%	1	3.7%	4	6.8%
	Frequently	2	50.0%	1	3.7%	8	13.6%
	Occasionally	2	50.0%	5	18.5%	12	20.3%
	Rarely	0	0.0%	6	22.2%	13	22.0%
	Never	0	0.0%	14	51.9%	22	37.3%
Auxiliary Therapeutic Techniques	Always	0	0.0%	17	58.6%	37	61.7%
	Frequently	3	75.0%	11	37.9%	18	30.0%
	Occasionally	0	0.0%	0	0.0%	4	6.7%
	Rarely	1	25.0%	1	3.4%	1	1.7%
	Never	0	0.0%	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	1	25.0%	8	27.6%	12	20.7%
	Frequently	2	50.0%	5	17.2%	22	37.9%
	Occasionally	1	25.0%	10	34.5%	13	22.4%
	Rarely	0	0.0%	5	17.2%	9	15.5%
	Never	0	0.0%	1	3.4%	2	3.4%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	3.7%	0	0.0%
	Occasionally	1	25.0%	1	3.7%	5	8.3%
	Rarely	2	50.0%	7	25.9%	19	31.7%
	Never	1	25.0%	18	66.7%	36	60.0%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	0	0.0%	0	0.0%	1	1.7%
	Frequently	0	0.0%	4	13.8%	9	15.0%
	Occasionally	3	75.0%	13	44.8%	29	48.3%
	Rarely	1	25.0%	8	27.6%	15	25.0%
	Never	0	0.0%	4	13.8%	6	10.0%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	1	3.6%	0	0.0%
	Frequently	0	0.0%	1	3.6%	2	3.4%
	Occasionally	0	0.0%	5	17.9%	17	29.3%
	Rarely	2	50.0%	13	46.4%	24	41.4%
	Never	2	50.0%	8	28.6%	15	25.9%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%	0	0.0%
	Frequently	0	0.0%	0	0.0%	1	1.7%
	Occasionally	1	25.0%	6	21.4%	11	18.6%

		Rarely	2	50.0%	17	60.7%	28	47.5%
		Never	1	25.0%	5	17.9%	19	32.2%

5.2 Chronic Non-Specific Neck pain

Factors influencing treatment of Chronic Non-Specific Neck Pain

	Test	Utilisation of spinal manipulation	Utilisation of traction	Utilisation of Auxiliary therapeutic techniques	Utilisation of Rehabilitation	Utilisation of cervical collar	Utilisation of Non-Steroidal Anti-inflammatory Drug or analgesics	Referral to Medical Doctor for pain control	Referral to medical specialist
Age	*Independent Samples Mann Whitney U test*	.311 Retain Null Hypothesis	.683 Retain Null Hypothesis	.181 Retain Null Hypothesis	.405 Retain Null Hypothesis	.064 Retain Null Hypothesis	.507 Retain Null Hypothesis	.215 Retain Null Hypothesis	.022 Reject Null Hypothesis
Gender	*Independent Samples Mann Whitney U test*	.016 Reject Null Hypothesis	.028 Reject Null Hypothesis	.020 Reject Null Hypothesis	.200 Retain Null Hypothesis	.530 Retain Null Hypothesis	.699 Retain Null Hypothesis	.704 Retain Null Hypothesis	.040 Reject Null Hypothesis
University of Qualification	*Independent Samples Kruskal-Wallis Test*	.247 Retain Null Hypothesis	.587 Retain Null Hypothesis	.078 Retain Null Hypothesis	.311 Retain Null Hypothesis	.010 Reject Null Hypothesis	.956 Retain Null Hypothesis	.352 Retain Null Hypothesis	.161 Retain Null Hypothesis
Experience	*Independent Samples Mann Whitney U test*	.247 Retain Null Hypothesis	.587 Retain Null Hypothesis	.078 Retain Null Hypothesis	.311 Retain Null Hypothesis	.010 Reject Null Hypothesis	.956 Retain Null Hypothesis	.352 Retain Null Hypothesis	.161 Retain Null Hypothesis
Post Graduate Education	*Independent Samples Mann Whitney U test*	.393 Retain Null Hypothesis	.798 Retain Null Hypothesis	.427 Retain Null Hypothesis	.189 Retain Null Hypothesis	.061 Retain Null Hypothesis	.473 Retain Null Hypothesis	.175 Retain Null Hypothesis	.120 Retain Null Hypothesis
Foreign Experience	*Independent Samples Mann Whitney U test*	.947 Retain Null Hypothesis	.181 Retain Null Hypothesis	.792 Retain Null Hypothesis	.146 Retain Null Hypothesis	.246 Retain Null Hypothesis	.148 Retain Null Hypothesis	.916 Retain Null Hypothesis	.706 Retain Null Hypothesis
Philosophy	*Independent Samples Kruskal-Wallis Test*	.959 Retain Null Hypothesis	.019 Reject Null Hypothesis	.105 Retain Null Hypothesis	.113 Retain Null Hypothesis	.134 Retain Null Hypothesis	.653 Retain Null Hypothesis	.981 Retain Null Hypothesis	.244 Retain Null Hypothesis

Age

		Under 35 Count	Column N %	Over 35 Count	Column N %
Spinal Manipulation	Always	37	82.2%	36	73.5%
	Frequently	8	17.8%	13	26.5%
	Occasionally	0	0.0%	0	0.0%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	3	6.8%	1	2.1%
	Frequently	3	6.8%	9	19.1%
	Occasionally	18	40.9%	14	29.8%
	Rarely	7	15.9%	13	27.7%

	Never	13	29.5%	10	21.3%
Auxiliary Therapeutic Techniques	Always	24	53.3%	17	35.4%
	Frequently	13	28.9%	23	47.9%
	Occasionally	7	15.6%	5	10.4%
	Rarely	0	0.0%	1	2.1%
	Never	1	2.2%	2	4.2%
Initiate Rehabilitation Program	Always	14	31.1%	18	37.5%
	Frequently	19	42.2%	21	43.8%
	Occasionally	8	17.8%	5	10.4%
	Rarely	3	6.7%	2	4.2%
	Never	1	2.2%	2	4.2%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	2.1%
	Occasionally	0	0.0%	5	10.6%
	Rarely	11	25.0%	13	27.7%
	Never	33	75.0%	28	59.6%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	2.2%	2	4.2%
	Frequently	5	11.1%	4	8.3%
	Occasionally	20	44.4%	18	37.5%
	Rarely	14	31.1%	17	35.4%
	Never	5	11.1%	7	14.6%
Refer to Medical Doctor for Pain Control	Always	1	2.3%	0	0.0%
	Frequently	2	4.5%	0	0.0%
	Occasionally	9	20.5%	13	28.3%
	Rarely	17	38.6%	27	58.7%
	Never	15	34.1%	6	13.0%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	1	2.4%	1	2.2%
	Occasionally	7	16.7%	14	31.1%
	Rarely	22	52.4%	26	57.8%
	Never	12	28.6%	4	8.9%

Gender

		Female Count	Column N %	Male Count	Column N %
Spinal Manipulation	Always	42	87.5%	32	66.7%
	Frequently	6	12.5%	16	33.3%
	Occasionally	0	0.0%	0	0.0%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	3	6.4%	1	2.2%
	Frequently	2	4.3%	10	21.7%
	Occasionally	13	27.7%	19	41.3%
	Rarely	14	29.8%	6	13.0%
	Never	15	31.9%	10	21.7%
Auxiliary Therapeutic Techniques	Always	28	58.3%	15	31.9%
	Frequently	14	29.2%	22	46.8%
	Occasionally	3	6.3%	9	19.1%
	Rarely	0	0.0%	1	2.1%
	Never	3	6.3%	0	0.0%
Initiate Rehabilitation Program	Always	21	43.8%	12	25.5%
	Frequently	17	35.4%	24	51.1%
	Occasionally	4	8.3%	9	19.1%
	Rarely	5	10.4%	0	0.0%
	Never	1	2.1%	2	4.3%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	2.2%
	Occasionally	2	4.3%	3	6.5%
	Rarely	12	25.5%	12	26.1%
	Never	33	70.2%	30	65.2%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	2.1%	2	4.3%
	Frequently	4	8.3%	5	10.6%
	Occasionally	19	39.6%	19	40.4%
	Rarely	19	39.6%	14	29.8%
	Never	5	10.4%	7	14.9%
Refer to Medical Doctor for Pain Control	Always	1	2.1%	0	0.0%
	Frequently	1	2.1%	1	2.2%
	Occasionally	10	21.3%	12	26.7%
	Rarely	23	48.9%	22	48.9%
	Never	12	25.5%	10	22.2%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	2	4.7%
	Occasionally	6	13.0%	15	34.9%

	Rarely	31	67.4%	18	41.9%
	Never	9	19.6%	8	18.6%

University of Qualification

		DUT Count	Column N %	UJ Count	Column N %	Other Count	Column N %
Spinal Manipulation	Always	66	77.6%	3	60.0%	5	83.3%
	Frequently	19	22.4%	2	40.0%	1	16.7%
	Occasionally	0	0.0%	0	0.0%	0	0.0%
	Rarely	0	0.0%	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%	0	0.0%
Traction	Always	2	2.4%	1	20.0%	1	20.0%
	Frequently	10	12.0%	1	20.0%	1	20.0%
	Occasionally	30	36.1%	1	20.0%	1	20.0%
	Rarely	18	21.7%	1	20.0%	1	20.0%
	Never	23	27.7%	1	20.0%	1	20.0%
Auxiliary Therapeutic Techniques	Always	40	47.1%	1	20.0%	2	40.0%
	Frequently	33	38.8%	2	40.0%	1	20.0%
	Occasionally	10	11.8%	0	0.0%	2	40.0%
	Rarely	0	0.0%	1	20.0%	0	0.0%
	Never	2	2.4%	1	20.0%	0	0.0%
Initiate Rehabilitation Program	Always	30	35.3%	1	20.0%	2	40.0%
	Frequently	38	44.7%	1	20.0%	2	40.0%
	Occasionally	10	11.8%	2	40.0%	1	20.0%
	Rarely	5	5.9%	0	0.0%	0	0.0%
	Never	2	2.4%	1	20.0%	0	0.0%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%	0	0.0%
	Frequently	1	1.2%	0	0.0%	0	0.0%
	Occasionally	5	6.0%	0	0.0%	0	0.0%
	Rarely	20	24.1%	0	0.0%	4	80.0%
	Never	57	68.7%	5	100.0%	1	20.0%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	2	2.4%	0	0.0%	1	20.0%
	Frequently	9	10.6%	0	0.0%	0	0.0%
	Occasionally	34	40.0%	2	40.0%	2	40.0%
	Rarely	31	36.5%	1	20.0%	1	20.0%
	Never	9	10.6%	2	40.0%	1	20.0%
Refer to Medical Doctor for Pain Control	Always	1	1.2%	0	0.0%	0	0.0%
	Frequently	2	2.4%	0	0.0%	0	0.0%
	Occasionally	20	24.4%	0	0.0%	2	40.0%
	Rarely	41	50.0%	2	40.0%	2	40.0%
	Never	18	22.0%	3	60.0%	1	20.0%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%	0	0.0%
	Frequently	2	2.5%	0	0.0%	0	0.0%
	Occasionally	19	23.8%	0	0.0%	2	50.0%
	Rarely	45	56.3%	2	40.0%	2	50.0%
	Never	14	17.5%	3	60.0%	0	0.0%

Years in Practice

		<10 years Count	Column N %	>10 years Count	Column N %
Spinal Manipulation	Always	44	81.5%	30	71.4%
	Frequently	10	18.5%	12	28.6%
	Occasionally	0	0.0%	0	0.0%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	3	5.7%	1	2.5%
	Frequently	5	9.4%	7	17.5%
	Occasionally	19	35.8%	13	32.5%
	Rarely	10	18.9%	10	25.0%
	Never	16	30.2%	9	22.5%
Auxiliary Therapeutic Techniques	Always	29	53.7%	14	34.1%
	Frequently	17	31.5%	19	46.3%
	Occasionally	7	13.0%	5	12.2%
	Rarely	0	0.0%	1	2.4%
	Never	1	1.9%	2	4.9%
Initiate Rehabilitation Program	Always	17	31.5%	16	39.0%
	Frequently	23	42.6%	18	43.9%
	Occasionally	9	16.7%	4	9.8%
	Rarely	3	5.6%	2	4.9%
	Never	2	3.7%	1	2.4%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%

	Frequently	0	0.0%	1	2.5%
	Occasionally	0	0.0%	5	12.5%
	Rarely	12	22.6%	12	30.0%
	Never	41	77.4%	22	55.0%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	1.9%	2	4.9%
	Frequently	5	9.3%	4	9.8%
	Occasionally	23	42.6%	15	36.6%
	Rarely	18	33.3%	15	36.6%
	Never	7	13.0%	5	12.2%
Refer to Medical Doctor for Pain Control	Always	1	1.9%	0	0.0%
	Frequently	2	3.8%	0	0.0%
	Occasionally	11	20.8%	11	28.2%
	Rarely	23	43.4%	22	56.4%
	Never	16	30.2%	6	15.4%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	1	2.0%	1	2.6%
	Occasionally	10	19.6%	11	28.9%
	Rarely	28	54.9%	21	55.3%
	Never	12	23.5%	5	13.2%

Continuous Professional Development

		yes Count	Column N %	no Count	Column N %
Spinal Manipulation	Always	23	71.9%	51	79.7%
	Frequently	9	28.1%	13	20.3%
	Occasionally	0	0.0%	0	0.0%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	1	3.1%	3	4.9%
	Frequently	5	15.6%	7	11.5%
	Occasionally	10	31.3%	22	36.1%
	Rarely	9	28.1%	11	18.0%
	Never	7	21.9%	18	29.5%
Auxiliary Therapeutic Techniques	Always	13	40.6%	30	47.6%
	Frequently	12	37.5%	24	38.1%
	Occasionally	6	18.8%	6	9.5%
	Rarely	1	3.1%	0	0.0%
	Never	0	0.0%	3	4.8%
Initiate Rehabilitation Program	Always	15	46.9%	18	28.6%
	Frequently	10	31.3%	31	49.2%
	Occasionally	5	15.6%	8	12.7%
	Rarely	2	6.3%	3	4.8%
	Never	0	0.0%	3	4.8%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%
	Frequently	1	3.1%	0	0.0%
	Occasionally	3	9.4%	2	3.3%
	Rarely	10	31.3%	14	23.0%
	Never	18	56.3%	45	73.8%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	3.1%	2	3.2%
	Frequently	3	9.4%	6	9.5%
	Occasionally	14	43.8%	24	38.1%
	Rarely	12	37.5%	21	33.3%
	Never	2	6.3%	10	15.9%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	1	1.7%
	Frequently	0	0.0%	2	3.3%
	Occasionally	10	31.3%	12	20.0%
	Rarely	18	56.3%	27	45.0%
	Never	4	12.5%	18	30.0%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	2	3.3%
	Occasionally	8	27.6%	13	21.7%
	Rarely	20	69.0%	29	48.3%
	Never	1	3.4%	16	26.7%

Foreign Experience

		yes Count	Column N %	no Count	Column N %
Spinal Manipulation	Always	13	76.5%	61	77.2%
	Frequently	4	23.5%	18	22.8%

	Occasionally	0	0.0%	0	0.0%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	1	6.3%	3	3.9%
	Frequently	4	25.0%	8	10.4%
	Occasionally	5	31.3%	27	35.1%
	Rarely	3	18.8%	17	22.1%
	Never	3	18.8%	22	28.6%
Auxiliary Therapeutic Techniques	Always	7	41.2%	36	46.2%
	Frequently	7	41.2%	29	37.2%
	Occasionally	3	17.6%	9	11.5%
	Rarely	0	0.0%	1	1.3%
	Never	0	0.0%	3	3.8%
Initiate Rehabilitation Program	Always	8	47.1%	25	32.1%
	Frequently	7	41.2%	34	43.6%
	Occasionally	2	11.8%	11	14.1%
	Rarely	0	0.0%	5	6.4%
	Never	0	0.0%	3	3.8%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	1.3%
	Occasionally	2	12.5%	3	3.9%
	Rarely	5	31.3%	19	24.7%
	Never	9	56.3%	54	70.1%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	0	0.0%	3	3.8%
	Frequently	2	11.8%	7	9.0%
	Occasionally	11	64.7%	27	34.6%
	Rarely	2	11.8%	31	39.7%
	Never	2	11.8%	10	12.8%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	1	1.3%
	Frequently	0	0.0%	2	2.6%
	Occasionally	4	25.0%	18	23.7%
	Rarely	9	56.3%	36	47.4%
	Never	3	18.8%	19	25.0%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%
	Frequently	0	0.0%	2	2.7%
	Occasionally	5	33.3%	16	21.6%
	Rarely	7	46.7%	42	56.8%
	Never	3	20.0%	14	18.9%

Philosophy

		straight		Mixer		Evidence Based	
		Count	Column N %	Count	Column N %	Count	Column N %
Spinal Manipulation	Always	4	80.0%	22	75.9%	47	78.3%
	Frequently	1	20.0%	7	24.1%	13	21.7%
	Occasionally	0	0.0%	0	0.0%	0	0.0%
	Rarely	0	0.0%	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%	0	0.0%
Traction	Always	0	0.0%	0	0.0%	3	5.0%
	Frequently	1	25.0%	2	7.4%	9	15.0%
	Occasionally	3	75.0%	6	22.2%	23	38.3%
	Rarely	0	0.0%	9	33.3%	11	18.3%
	Never	0	0.0%	10	37.0%	14	23.3%
Auxiliary Therapeutic Techniques	Always	0	0.0%	14	48.3%	29	48.3%
	Frequently	2	50.0%	11	37.9%	22	36.7%
	Occasionally	2	50.0%	3	10.3%	7	11.7%
	Rarely	0	0.0%	0	0.0%	1	1.7%
	Never	0	0.0%	1	3.4%	1	1.7%
Initiate Rehabilitation Program	Always	0	0.0%	8	27.6%	25	41.7%
	Frequently	3	75.0%	12	41.4%	25	41.7%
	Occasionally	1	25.0%	4	13.8%	8	13.3%
	Rarely	0	0.0%	4	13.8%	1	1.7%
	Never	0	0.0%	1	3.4%	1	1.7%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%	0	0.0%
	Frequently	0	0.0%	0	0.0%	1	1.7%
	Occasionally	1	25.0%	2	7.4%	2	3.3%
	Rarely	2	50.0%	5	18.5%	17	28.3%
	Never	1	25.0%	20	74.1%	40	66.7%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	0	0.0%	2	6.9%	1	1.7%
	Frequently	0	0.0%	3	10.3%	6	10.0%
	Occasionally	2	50.0%	12	41.4%	23	38.3%
	Rarely	2	50.0%	9	31.0%	22	36.7%

	Never	0	0.0%	3	10.3%	8	13.3%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	1	3.7%	0	0.0%
	Frequently	0	0.0%	1	3.7%	1	1.7%
	Occasionally	1	25.0%	7	25.9%	13	22.0%
	Rarely	2	50.0%	10	37.0%	33	55.9%
	Never	1	25.0%	8	29.6%	12	20.3%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%	0	0.0%
	Frequently	0	0.0%	1	3.8%	1	1.8%
	Occasionally	2	50.0%	7	26.9%	11	19.3%
	Rarely	1	25.0%	16	61.5%	32	56.1%
	Never	1	25.0%	2	7.7%	13	22.8%

5.3 Acute Whiplash associated Disorder

Factors influencing treatment of Acute Whiplash Associated Disorder

	Test	Utilisation of spinal manipulation	Utilisation of traction	Utilisation of Auxiliary therapeutic techniques	Utilisation of Rehabilitation	Utilisation of cervical collar	Utilisation of Non-Steroidal Anti-inflammatory Drug or analgesics	Referral to Medical Doctor for pain control	Referral to medical specialist
Age	*Independent Samples Mann Whitney U test*	.818 Retain Null Hypothesis	.927 Retain Null Hypothesis	.349 Retain Null Hypothesis	.821 Retain Null Hypothesis	.525 Retain Null Hypothesis	.529 Retain Null Hypothesis	.400 Retain Null Hypothesis	.224 Retain Null Hypothesis
Gender	*Independent Samples Mann Whitney U test*	.084 Retain Null Hypothesis	.229 Retain Null Hypothesis	.002 Reject Hypothesis	.263 Retain Null Hypothesis	.094 Retain Null Hypothesis	.935 Retain Null Hypothesis	.520 Retain Null Hypothesis	.245 Retain Null Hypothesis
University of Qualification	*Independent Samples Kruskal-Wallis Test*	.658 Retain Null Hypothesis	.209 Retain Null Hypothesis	.130 Retain Null Hypothesis	.135 Retain Null Hypothesis	.103 Retain Null Hypothesis	.817 Retain Null Hypothesis	.393 Retain Null Hypothesis	.329 Retain Null Hypothesis
Experience	*Independent Samples Mann Whitney U test*	.238 Retain Null Hypothesis	.729 Retain Null Hypothesis	.156 Retain Null Hypothesis	.913 Retain Null Hypothesis	.223 Retain Null Hypothesis	.339 Retain Null Hypothesis	.565 Retain Null Hypothesis	.700 Retain Null Hypothesis
Post Graduate Education	*Independent Samples Mann Whitney U test*	.869 Retain Null Hypothesis	.676 Retain Null Hypothesis	.004 Reject Null Hypothesis	.275 Retain Null Hypothesis	.487 Retain Null Hypothesis	.362 Retain Null Hypothesis	.155 Retain Null Hypothesis	.443 Retain Null Hypothesis
Foreign Experience	*Independent Samples Mann Whitney U test*	.272 Retain Null Hypothesis	.647 Retain Null Hypothesis	.248 Retain Null Hypothesis	.753 Retain Null Hypothesis	.913 Retain Null Hypothesis	.308 Retain Null Hypothesis	519 Retain Null Hypothesis	.399 Retain Null Hypothesis
Philosophy	*Independent Samples Kruskal-Wallis Test*	.019 Reject Null Hypothesis	.036 Reject Null Hypothesis	.213 Retain Null Hypothesis	.478 Retain Null Hypothesis	.131 Retain Null Hypothesis	.987 Retain Null Hypothesis	.449 Retain Null Hypothesis	.609 Retain Null Hypothesis

Gender

		Gender Female Count	Column N %	Male Count	Column N %
Spinal Manipulation	Always	21	43.8%	14	29.2%
	Frequently	24	50.0%	27	56.3%
	Occasionally	2	4.2%	5	10.4%
	Rarely	1	2.1%	2	4.2%
	Never	0	0.0%	0	0.0%
Traction	Always	5	10.4%	2	4.5%
	Frequently	5	10.4%	12	27.3%
	Occasionally	7	14.6%	11	25.0%
	Rarely	13	27.1%	5	11.4%
	Never	18	37.5%	14	31.8%
Auxiliary Therapeutic Techniques	Always	34	70.8%	20	42.6%

	Frequently	13	27.1%	19	40.4%
	Occasionally	1	2.1%	5	10.6%
	Rarely	0	0.0%	3	6.4%
	Never	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	18	37.5%	10	23.3%
	Frequently	13	27.1%	16	37.2%
	Occasionally	11	22.9%	10	23.3%
	Rarely	5	10.4%	4	9.3%
	Never	1	2.1%	3	7.0%
Advice use of a Cervical Collar	Always	1	2.1%	2	4.3%
	Frequently	5	10.6%	10	21.3%
	Occasionally	15	31.9%	14	29.8%
	Rarely	14	29.8%	15	31.9%
	Never	12	25.5%	6	12.8%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	2	4.2%	7	14.6%
	Frequently	21	43.8%	15	31.3%
	Occasionally	19	39.6%	18	37.5%
	Rarely	5	10.4%	6	12.5%
	Never	1	2.1%	2	4.2%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	2	4.3%
	Frequently	4	8.5%	6	13.0%
	Occasionally	13	27.7%	13	28.3%
	Rarely	21	44.7%	14	30.4%
	Never	9	19.1%	11	23.9%
Refer to Medical Specialist	Always	1	2.1%	1	2.2%
	Frequently	1	2.1%	2	4.3%
	Occasionally	15	31.3%	19	41.3%
	Rarely	23	47.9%	18	39.1%
	Never	8	16.7%	6	13.0%

University of Qualification

		DUT Count	Column N %	UJ Count	Column N %	Other Count	Column N %
Spinal Manipulation	Always	30	35.3%	2	40.0%	3	50.0%
	Frequently	46	54.1%	2	40.0%	3	50.0%
	Occasionally	6	7.1%	1	20.0%	0	0.0%
	Rarely	3	3.5%	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%	0	0.0%
Traction	Always	4	4.9%	1	20.0%	2	40.0%
	Frequently	15	18.3%	1	20.0%	1	20.0%
	Occasionally	17	20.7%	0	0.0%	1	20.0%
	Rarely	17	20.7%	1	20.0%	0	0.0%
	Never	29	35.4%	2	40.0%	1	20.0%
Auxiliary Therapeutic Techniques	Always	50	59.5%	3	60.0%	1	16.7%
	Frequently	27	32.1%	1	20.0%	4	66.7%
	Occasionally	6	7.1%	0	0.0%	0	0.0%
	Rarely	1	1.2%	1	20.0%	1	16.7%
	Never	0	0.0%	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	26	31.3%	1	25.0%	1	25.0%
	Frequently	26	31.3%	0	0.0%	3	75.0%
	Occasionally	21	25.3%	0	0.0%	0	0.0%
	Rarely	8	9.6%	1	25.0%	0	0.0%
	Never	2	2.4%	2	50.0%	0	0.0%
Advice use of a Cervical Collar	Always	3	3.6%	0	0.0%	0	0.0%
	Frequently	12	14.5%	0	0.0%	3	50.0%
	Occasionally	27	32.5%	1	20.0%	1	16.7%
	Rarely	25	30.1%	2	40.0%	2	33.3%
	Never	16	19.3%	2	40.0%	0	0.0%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	9	10.6%	0	0.0%	0	0.0%
	Frequently	30	35.3%	3	60.0%	3	50.0%
	Occasionally	32	37.6%	2	40.0%	3	50.0%
	Rarely	11	12.9%	0	0.0%	0	0.0%
	Never	3	3.5%	0	0.0%	0	0.0%
Refer to Medical Doctor for Pain Control	Always	2	2.4%	0	0.0%	0	0.0%
	Frequently	9	10.8%	1	20.0%	0	0.0%
	Occasionally	25	30.1%	1	20.0%	0	0.0%
	Rarely	30	36.1%	1	20.0%	4	80.0%
	Never	17	20.5%	2	40.0%	1	20.0%
Refer to Medical Specialist	Always	2	2.4%	0	0.0%	0	0.0%
	Frequently	3	3.6%	0	0.0%	0	0.0%
	Occasionally	31	36.9%	1	20.0%	2	40.0%
	Rarely	37	44.0%	2	40.0%	2	40.0%

	Never	11	13.1%	2	40.0%	1	20.0%

Years in Practice

		<10 years		>10 years	
		Count	Column N %	Count	Column N %
Spinal Manipulation	Always	18	33.3%	17	40.5%
	Frequently	28	51.9%	23	54.8%
	Occasionally	6	11.1%	1	2.4%
	Rarely	2	3.7%	1	2.4%
	Never	0	0.0%	0	0.0%
Traction	Always	4	7.5%	3	7.7%
	Frequently	9	17.0%	8	20.5%
	Occasionally	11	20.8%	7	17.9%
	Rarely	13	24.5%	5	12.8%
	Never	16	30.2%	16	41.0%
Auxiliary Therapeutic Techniques	Always	34	63.0%	20	48.8%
	Frequently	16	29.6%	16	39.0%
	Occasionally	3	5.6%	3	7.3%
	Rarely	1	1.9%	2	4.9%
	Never	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	16	29.6%	12	32.4%
	Frequently	18	33.3%	11	29.7%
	Occasionally	13	24.1%	8	21.6%
	Rarely	3	5.6%	6	16.2%
	Never	4	7.4%	0	0.0%
Advice use of a Cervical Collar	Always	1	1.9%	2	4.9%
	Frequently	4	7.5%	11	26.8%
	Occasionally	21	39.6%	8	19.5%
	Rarely	16	30.2%	13	31.7%
	Never	11	20.8%	7	17.1%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	5	9.3%	4	9.5%
	Frequently	18	33.3%	18	42.9%
	Occasionally	22	40.7%	15	35.7%
	Rarely	6	11.1%	5	11.9%
	Never	3	5.6%	0	0.0%
Refer to Medical Doctor for Pain Control	Always	1	1.9%	1	2.4%
	Frequently	5	9.6%	5	12.2%
	Occasionally	15	28.8%	11	26.8%
	Rarely	18	34.6%	17	41.5%
	Never	13	25.0%	7	17.1%
Refer to Medical Specialist	Always	1	1.9%	1	2.4%
	Frequently	2	3.8%	1	2.4%
	Occasionally	17	32.1%	17	41.5%
	Rarely	26	49.1%	15	36.6%
	Never	7	13.2%	7	17.1%

Continuous Professional Development

		yes		No	
		Count	Column N %	Count	Column N %
Spinal Manipulation	Always	11	34.4%	24	37.5%
	Frequently	18	56.3%	33	51.6%
	Occasionally	2	6.3%	5	7.8%
	Rarely	1	3.1%	2	3.1%
	Never	0	0.0%	0	0.0%
Traction	Always	1	3.2%	6	9.8%
	Frequently	7	22.6%	10	16.4%
	Occasionally	6	19.4%	12	19.7%
	Rarely	9	29.0%	9	14.8%
	Never	8	25.8%	24	39.3%
Auxiliary Therapeutic Techniques	Always	13	40.6%	41	65.1%
	Frequently	11	34.4%	21	33.3%
	Occasionally	6	18.8%	0	0.0%
	Rarely	2	6.3%	1	1.6%
	Never	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	8	25.8%	20	33.3%
	Frequently	9	29.0%	20	33.3%
	Occasionally	8	25.8%	13	21.7%
	Rarely	5	16.1%	4	6.7%
	Never	1	3.2%	3	5.0%
Advice use of a Cervical Collar	Always	1	3.1%	2	3.2%
	Frequently	8	25.0%	7	11.3%
	Occasionally	6	18.8%	23	37.1%

	Rarely	13	40.6%	16	25.8%
	Never	4	12.5%	14	22.6%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	3	9.4%	6	9.4%
	Frequently	9	28.1%	27	42.2%
	Occasionally	15	46.9%	22	34.4%
	Rarely	5	15.6%	6	9.4%
	Never	0	0.0%	3	4.7%
Refer to Medical Doctor for Pain Control	Always	1	3.1%	1	1.6%
	Frequently	3	9.4%	7	11.5%
	Occasionally	12	37.5%	14	23.0%
	Rarely	12	37.5%	23	37.7%
	Never	4	12.5%	16	26.2%
Refer to Medical Specialist	Always	0	0.0%	2	3.2%
	Frequently	2	6.3%	1	1.6%
	Occasionally	13	40.6%	21	33.9%
	Rarely	13	40.6%	28	45.2%
	Never	4	12.5%	10	16.1%

Foreign Experience

		yes		no	
		Count	Column N %	Count	Column N %
Spinal Manipulation	Always	8	47.1%	27	34.2%
	Frequently	8	47.1%	43	54.4%
	Occasionally	1	5.9%	6	7.6%
	Rarely	0	0.0%	3	3.8%
	Never	0	0.0%	0	0.0%
Traction	Always	2	12.5%	5	6.6%
	Frequently	4	25.0%	13	17.1%
	Occasionally	2	12.5%	16	21.1%
	Rarely	2	12.5%	16	21.1%
	Never	6	37.5%	26	34.2%
Auxiliary Therapeutic Techniques	Always	7	41.2%	47	60.3%
	Frequently	9	52.9%	23	29.5%
	Occasionally	0	0.0%	6	7.7%
	Rarely	1	5.9%	2	2.6%
	Never	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	5	31.3%	23	30.7%
	Frequently	6	37.5%	23	30.7%
	Occasionally	3	18.8%	18	24.0%
	Rarely	1	6.3%	8	10.7%
	Never	1	6.3%	3	4.0%
Advice use of a Cervical Collar	Always	0	0.0%	3	3.8%
	Frequently	5	31.3%	10	12.8%
	Occasionally	2	12.5%	27	34.6%
	Rarely	6	37.5%	23	29.5%
	Never	3	18.8%	15	19.2%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	5.9%	8	10.1%
	Frequently	9	52.9%	27	34.2%
	Occasionally	6	35.3%	31	39.2%
	Rarely	1	5.9%	10	12.7%
	Never	0	0.0%	3	3.8%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	2	2.6%
	Frequently	1	5.9%	9	11.8%
	Occasionally	5	29.4%	21	27.6%
	Rarely	7	41.2%	28	36.8%
	Never	4	23.5%	16	21.1%
Refer to Medical Specialist	Always	0	0.0%	2	2.6%
	Frequently	0	0.0%	3	3.9%
	Occasionally	10	58.8%	24	31.2%
	Rarely	4	23.5%	37	48.1%
	Never	3	17.6%	11	14.3%

Philosophy

		straight		Mixer		Evidence Based	
		Count	Column N %	Count	Column N %	Count	Column N %
Spinal Manipulation	Always	3	60.0%	16	55.2%	15	25.0%
	Frequently	2	40.0%	11	37.9%	38	63.3%
	Occasionally	0	0.0%	0	0.0%	7	11.7%
	Rarely	0	0.0%	2	6.9%	0	0.0%
	Never	0	0.0%	0	0.0%	0	0.0%

Traction	Always	1	25.0%	1	3.6%	4	6.9%
	Frequently	2	50.0%	4	14.3%	11	19.0%
	Occasionally	1	25.0%	5	17.9%	12	20.7%
	Rarely	0	0.0%	6	21.4%	12	20.7%
	Never	0	0.0%	12	42.9%	19	32.8%
Auxiliary Therapeutic Techniques	Always	1	20.0%	17	58.6%	35	59.3%
	Frequently	3	60.0%	10	34.5%	18	30.5%
	Occasionally	0	0.0%	1	3.4%	5	8.5%
	Rarely	1	20.0%	1	3.4%	1	1.7%
	Never	0	0.0%	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	1	25.0%	12	41.4%	15	26.8%
	Frequently	3	75.0%	7	24.1%	19	33.9%
	Occasionally	0	0.0%	6	20.7%	14	25.0%
	Rarely	0	0.0%	3	10.3%	6	10.7%
	Never	0	0.0%	1	3.4%	2	3.6%
Advice use of a Cervical Collar	Always	0	0.0%	0	0.0%	3	5.0%
	Frequently	2	40.0%	4	14.8%	9	15.0%
	Occasionally	2	40.0%	8	29.6%	19	31.7%
	Rarely	1	20.0%	6	22.2%	21	35.0%
	Never	0	0.0%	9	33.3%	8	13.3%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	0	0.0%	3	10.3%	6	10.0%
	Frequently	3	60.0%	11	37.9%	21	35.0%
	Occasionally	1	20.0%	10	34.5%	25	41.7%
	Rarely	1	20.0%	2	6.9%	8	13.3%
	Never	0	0.0%	3	10.3%	0	0.0%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	0	0.0%	2	3.3%
	Frequently	0	0.0%	5	17.9%	5	8.3%
	Occasionally	0	0.0%	5	17.9%	20	33.3%
	Rarely	2	66.7%	13	46.4%	20	33.3%
	Never	1	33.3%	5	17.9%	13	21.7%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%	2	3.3%
	Frequently	0	0.0%	2	7.1%	1	1.7%
	Occasionally	2	50.0%	11	39.3%	20	33.3%
	Rarely	2	50.0%	12	42.9%	27	45.0%
	Never	0	0.0%	3	10.7%	10	16.7%

5.4 Chronic Whiplash Associated Disorder

Factors influencing treatment of Chronic Whiplash Associated Disorder

	Test	Utilisation of spinal manipulation	Utilisation of traction	Utilisation of Auxiliary therapeutic techniques	Utilisation of Rehabilitation	Utilisation of cervical collar	Utilisation of Non-Steroidal Anti-inflammatory Drug or analgesics	Referral to Medical Doctor for pain control	Referral to medical specialist
Age	*Independent Samples Mann Whitney U test*	.700 Retain Null Hypothesis	.768 Retain Null Hypothesis	.339 Retain Null Hypothesis	.886 Retain Null Hypothesis	.707 Retain Null Hypothesis	.396 Retain Null Hypothesis	.093 Retain Null Hypothesis	.258 Retain Null Hypothesis
Gender	*Independent Samples Mann Whitney U test*	.064 Retain Null Hypothesis	.120 Retain Null Hypothesis	.043 Reject Null Hypothesis	.287 Retain Null Hypothesis	.782 Retain Null Hypothesis	.664 Retain Null Hypothesis	.550 Retain Null Hypothesis	.492 Retain Null Hypothesis
University of Qualification	*Independent Samples Kruskal-Wallis Test*	.577 Retain Null Hypothesis	.358 Retain Null Hypothesis	.157 Retain Null Hypothesis	.253 Retain Null Hypothesis	.057 Retain Null Hypothesis	.774 Retain Null Hypothesis	.579 Retain Null Hypothesis	.079 Retain Null Hypothesis
Experience	*Independent Samples Mann Whitney U test*	.498 Retain Null Hypothesis	.944 Retain Null Hypothesis	.152 Retain Null Hypothesis	.601 Retain Null Hypothesis	.967 Retain Null Hypothesis	.658 Retain Null Hypothesis	.203 Retain Null Hypothesis	.781 Retain Null Hypothesis
Post Graduate	*Independent*	.636 Retain Null	.539 Retain	.725 Retain Null	.144 Retain Null	.821 Retain	.616 Retain Null	.508 Retain	.239 Retain

Education	*Samples Mann Whitney U test*	Hypothesis	Null Hypothesis	Hypothesis	Hypothesis	Null Hypothesis	Hypothesis	Null Hypothesis	Null Hypothesis
Foreign Experience	*Independent Samples Mann Whitney U test*	.210 Retain Null Hypothesis	.338 Retain Null Hypothesis	.732 Retain Null Hypothesis	.192 Retain Null Hypothesis	.282 Retain Null Hypothesis	.388 Retain Null Hypothesis	.497 Retain Null Hypothesis	.475 Retain Null Hypothesis
Philosophy	*Independent Samples Kruskal-Wallis Test*	.834 Retain Null Hypothesis	.057 Retain Null Hypothesis	.108 Retain Null Hypothesis	.185 Retain Null Hypothesis	.148 Retain Null Hypothesis	.675 Retain Null Hypothesis	.950 Retain Null Hypothesis	.438 Retain Null Hypothesis

Age

		Under 35 Count	Column N %	Over 35 Count	Column N %
Spinal Manipulation	Always	28	62.2%	32	65.3%
	Frequently	16	35.6%	17	34.7%
	Occasionally	0	0.0%	0	0.0%
	Rarely	1	2.2%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	3	7.1%	4	8.5%
	Frequently	11	26.2%	7	14.9%
	Occasionally	7	16.7%	16	34.0%
	Rarely	12	28.6%	7	14.9%
	Never	9	21.4%	13	27.7%
Auxiliary Therapeutic Techniques	Always	21	47.7%	17	35.4%
	Frequently	16	36.4%	24	50.0%
	Occasionally	7	15.9%	4	8.3%
	Rarely	0	0.0%	1	2.1%
	Never	0	0.0%	2	4.2%
Initiate Rehabilitation Program	Always	19	43.2%	19	40.4%
	Frequently	14	31.8%	16	34.0%
	Occasionally	6	13.6%	8	17.0%
	Rarely	4	9.1%	3	6.4%
	Never	1	2.3%	1	2.1%
Advice use of a Cervical Collar	Always	0	0.0%	2	4.2%
	Frequently	1	2.3%	4	8.3%
	Occasionally	5	11.6%	6	12.5%
	Rarely	19	44.2%	14	29.2%
	Never	18	41.9%	22	45.8%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	2	4.5%	1	2.1%
	Frequently	6	13.6%	7	14.6%
	Occasionally	22	50.0%	20	41.7%
	Rarely	10	22.7%	14	29.2%
	Never	4	9.1%	6	12.5%
Refer to Medical Doctor for Pain Control	Always	1	2.3%	2	4.3%
	Frequently	3	7.0%	2	4.3%
	Occasionally	10	23.3%	14	29.8%
	Rarely	14	32.6%	24	51.1%
	Never	15	34.9%	5	10.6%
Refer to Medical Specialist	Always	0	0.0%	1	2.3%
	Frequently	3	7.5%	1	2.3%
	Occasionally	14	35.0%	18	41.9%
	Rarely	14	35.0%	22	51.2%
	Never	9	22.5%	1	2.3%

Gender

		Female Count	Column N %	Male Count	Column N %
Spinal Manipulation	Always	35	72.9%	26	54.2%
	Frequently	12	25.0%	21	43.8%
	Occasionally	1	2.1%	0	0.0%
	Rarely	0	0.0%	1	2.1%
	Never	0	0.0%	0	0.0%
Traction	Always	3	6.7%	4	8.7%
	Frequently	7	15.6%	11	23.9%

	Occasionally	8	17.8%	15	32.6%
	Rarely	15	33.3%	5	10.9%
	Never	12	26.7%	11	23.9%
Auxiliary Therapeutic Techniques	Always	25	53.2%	15	31.9%
	Frequently	17	36.2%	23	48.9%
	Occasionally	3	6.4%	8	17.0%
	Rarely	0	0.0%	1	2.1%
	Never	2	4.3%	0	0.0%
Initiate Rehabilitation Program	Always	22	47.8%	17	36.2%
	Frequently	14	30.4%	17	36.2%
	Occasionally	6	13.0%	8	17.0%
	Rarely	3	6.5%	4	8.5%
	Never	1	2.2%	1	2.1%
Advice use of a Cervical Collar	Always	0	0.0%	2	4.3%
	Frequently	3	6.5%	3	6.4%
	Occasionally	8	17.4%	3	6.4%
	Rarely	15	32.6%	18	38.3%
	Never	20	43.5%	21	44.7%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	2.1%	2	4.3%
	Frequently	6	12.8%	7	14.9%
	Occasionally	24	51.1%	19	40.4%
	Rarely	13	27.7%	12	25.5%
	Never	3	6.4%	7	14.9%
Refer to Medical Doctor for Pain Control	Always	1	2.1%	2	4.4%
	Frequently	2	4.3%	3	6.7%
	Occasionally	17	36.2%	8	17.8%
	Rarely	16	34.0%	22	48.9%
	Never	11	23.4%	10	22.2%
Refer to Medical Specialist	Always	0	0.0%	1	2.4%
	Frequently	2	4.5%	2	4.9%
	Occasionally	17	38.6%	15	36.6%
	Rarely	17	38.6%	20	48.8%
	Never	8	18.2%	3	7.3%

University of Qualification

		DUT Count	Column N %	UJ Count	Column N %	Other Count	Column N %
Spinal Manipulation	Always	53	62.4%	3	60.0%	5	83.3%
	Frequently	30	35.3%	2	40.0%	1	16.7%
	Occasionally	1	1.2%	0	0.0%	0	0.0%
	Rarely	1	1.2%	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%	0	0.0%
Traction	Always	5	6.2%	1	20.0%	1	20.0%
	Frequently	15	18.5%	2	40.0%	1	20.0%
	Occasionally	21	25.9%	0	0.0%	2	40.0%
	Rarely	19	23.5%	1	20.0%	0	0.0%
	Never	21	25.9%	1	20.0%	1	20.0%
Auxiliary Therapeutic Techniques	Always	38	45.2%	0	0.0%	2	40.0%
	Frequently	35	41.7%	4	80.0%	1	20.0%
	Occasionally	9	10.7%	0	0.0%	2	40.0%
	Rarely	0	0.0%	1	20.0%	0	0.0%
	Never	2	2.4%	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	35	42.2%	1	20.0%	3	60.0%
	Frequently	29	34.9%	1	20.0%	1	20.0%
	Occasionally	12	14.5%	2	40.0%	0	0.0%
	Rarely	6	7.2%	0	0.0%	1	20.0%
	Never	1	1.2%	1	20.0%	0	0.0%
Advice use of a Cervical Collar	Always	1	1.2%	0	0.0%	1	16.7%
	Frequently	6	7.3%	0	0.0%	0	0.0%
	Occasionally	11	13.4%	0	0.0%	0	0.0%
	Rarely	30	36.6%	0	0.0%	3	50.0%
	Never	34	41.5%	5	100.0%	2	33.3%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	3	3.6%	0	0.0%	0	0.0%
	Frequently	12	14.3%	0	0.0%	1	20.0%
	Occasionally	38	45.2%	3	60.0%	2	40.0%
	Rarely	23	27.4%	1	20.0%	1	20.0%
	Never	8	9.5%	1	20.0%	1	20.0%
Refer to Medical Doctor for Pain Control	Always	3	3.7%	0	0.0%	0	0.0%
	Frequently	5	6.1%	0	0.0%	0	0.0%
	Occasionally	22	26.8%	1	20.0%	2	40.0%
	Rarely	34	41.5%	2	40.0%	2	40.0%
	Never	18	22.0%	2	40.0%	1	20.0%

Refer to Medical Specialist	Always	1	1.3%	0	0.0%	0	0.0%
	Frequently	4	5.2%	0	0.0%	0	0.0%
	Occasionally	30	39.0%	0	0.0%	2	50.0%
	Rarely	33	42.9%	2	50.0%	2	50.0%
	Never	9	11.7%	2	50.0%	0	0.0%

Years in Practice

		<10 years Count	Column N %	>10 years Count	Column N %
Spinal Manipulation	Always	33	61.1%	28	66.7%
	Frequently	19	35.2%	14	33.3%
	Occasionally	1	1.9%	0	0.0%
	Rarely	1	1.9%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	3	5.9%	4	10.0%
	Frequently	12	23.5%	6	15.0%
	Occasionally	10	19.6%	13	32.5%
	Rarely	15	29.4%	5	12.5%
	Never	11	21.6%	12	30.0%
Auxiliary Therapeutic Techniques	Always	26	49.1%	14	34.1%
	Frequently	20	37.7%	20	48.8%
	Occasionally	7	13.2%	4	9.8%
	Rarely	0	0.0%	1	2.4%
	Never	0	0.0%	2	4.9%
Initiate Rehabilitation Program	Always	22	41.5%	17	42.5%
	Frequently	16	30.2%	15	37.5%
	Occasionally	9	17.0%	5	12.5%
	Rarely	4	7.5%	3	7.5%
	Never	2	3.8%	0	0.0%
Advice use of a Cervical Collar	Always	0	0.0%	2	4.9%
	Frequently	2	3.8%	4	9.8%
	Occasionally	8	15.4%	3	7.3%
	Rarely	20	38.5%	13	31.7%
	Never	22	42.3%	19	46.3%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	2	3.8%	1	2.4%
	Frequently	7	13.2%	6	14.6%
	Occasionally	26	49.1%	17	41.5%
	Rarely	12	22.6%	13	31.7%
	Never	6	11.3%	4	9.8%
Refer to Medical Doctor for Pain Control	Always	1	1.9%	2	5.0%
	Frequently	3	5.8%	2	5.0%
	Occasionally	14	26.9%	11	27.5%
	Rarely	18	34.6%	20	50.0%
	Never	16	30.8%	5	12.5%
Refer to Medical Specialist	Always	0	0.0%	1	2.8%
	Frequently	3	6.1%	1	2.8%
	Occasionally	21	42.9%	11	30.6%
	Rarely	16	32.7%	21	58.3%
	Never	9	18.4%	2	5.6%

Continuous Professional Development

		yes Count	Column N %	no Count	Column N %
Spinal Manipulation	Always	19	59.4%	42	65.6%
	Frequently	13	40.6%	20	31.3%
	Occasionally	0	0.0%	1	1.6%
	Rarely	0	0.0%	1	1.6%
	Never	0	0.0%	0	0.0%
Traction	Always	4	12.5%	3	5.1%
	Frequently	4	12.5%	14	23.7%
	Occasionally	10	31.3%	13	22.0%
	Rarely	8	25.0%	12	20.3%
	Never	6	18.8%	17	28.8%
Auxiliary Therapeutic Techniques	Always	14	43.8%	26	41.9%
	Frequently	11	34.4%	29	46.8%
	Occasionally	6	18.8%	5	8.1%
	Rarely	1	3.1%	0	0.0%
	Never	0	0.0%	2	3.2%
Initiate Rehabilitation Program	Always	17	54.8%	22	35.5%
	Frequently	7	22.6%	24	38.7%
	Occasionally	5	16.1%	9	14.5%

	Rarely	2	6.5%	5	8.1%
	Never	0	0.0%	2	3.2%
Advice use of a Cervical Collar	Always	1	3.1%	1	1.6%
	Frequently	3	9.4%	3	4.9%
	Occasionally	3	9.4%	8	13.1%
	Rarely	11	34.4%	22	36.1%
	Never	14	43.8%	27	44.3%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	3.1%	2	3.2%
	Frequently	4	12.5%	9	14.5%
	Occasionally	13	40.6%	30	48.4%
	Rarely	12	37.5%	13	21.0%
	Never	2	6.3%	8	12.9%
Refer to Medical Doctor for Pain Control	Always	2	6.3%	1	1.7%
	Frequently	0	0.0%	5	8.3%
	Occasionally	10	31.3%	15	25.0%
	Rarely	15	46.9%	23	38.3%
	Never	5	15.6%	16	26.7%
Refer to Medical Specialist	Always	1	3.6%	0	0.0%
	Frequently	2	7.1%	2	3.5%
	Occasionally	10	35.7%	22	38.6%
	Rarely	14	50.0%	23	40.4%
	Never	1	3.6%	10	17.5%

Foreign Experience

		yes		no	
		Count	Column N %	Count	Column N %
Spinal Manipulation	Always	13	76.5%	48	60.8%
	Frequently	4	23.5%	29	36.7%
	Occasionally	0	0.0%	1	1.3%
	Rarely	0	0.0%	1	1.3%
	Never	0	0.0%	0	0.0%
Traction	Always	3	18.8%	4	5.3%
	Frequently	3	18.8%	15	20.0%
	Occasionally	4	25.0%	19	25.3%
	Rarely	2	12.5%	18	24.0%
	Never	4	25.0%	19	25.3%
Auxiliary Therapeutic Techniques	Always	6	35.3%	34	44.2%
	Frequently	9	52.9%	31	40.3%
	Occasionally	2	11.8%	9	11.7%
	Rarely	0	0.0%	1	1.3%
	Never	0	0.0%	2	2.6%
Initiate Rehabilitation Program	Always	9	52.9%	30	39.5%
	Frequently	6	35.3%	25	32.9%
	Occasionally	1	5.9%	13	17.1%
	Rarely	1	5.9%	6	7.9%
	Never	0	0.0%	2	2.6%
Advice use of a Cervical Collar	Always	1	6.3%	1	1.3%
	Frequently	2	12.5%	4	5.2%
	Occasionally	0	0.0%	11	14.3%
	Rarely	3	18.8%	30	39.0%
	Never	10	62.5%	31	40.3%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	5.9%	2	2.6%
	Frequently	2	11.8%	11	14.3%
	Occasionally	10	58.8%	33	42.9%
	Rarely	2	11.8%	23	29.9%
	Never	2	11.8%	8	10.4%
Refer to Medical Doctor for Pain Control	Always	1	5.9%	2	2.7%
	Frequently	1	5.9%	4	5.3%
	Occasionally	5	29.4%	20	26.7%
	Rarely	7	41.2%	31	41.3%
	Never	3	17.6%	18	24.0%
Refer to Medical Specialist	Always	1	7.1%	0	0.0%
	Frequently	0	0.0%	4	5.6%
	Occasionally	6	42.9%	26	36.6%
	Rarely	6	42.9%	31	43.7%
	Never	1	7.1%	10	14.1%

Philosophy

		straight		Mixer		Evidence Based	
		Count	Column N %	Count	Column N %	Count	Column N %
Spinal Manipulation	Always	3	60.0%	20	69.0%	37	61.7%
	Frequently	2	40.0%	8	27.6%	22	36.7%
	Occasionally	0	0.0%	0	0.0%	1	1.7%
	Rarely	0	0.0%	1	3.4%	0	0.0%
	Never	0	0.0%	0	0.0%	0	0.0%
Traction	Always	0	0.0%	0	0.0%	6	10.2%
	Frequently	2	50.0%	3	11.5%	13	22.0%
	Occasionally	2	50.0%	7	26.9%	14	23.7%
	Rarely	0	0.0%	8	30.8%	12	20.3%
	Never	0	0.0%	8	30.8%	14	23.7%
Auxiliary Therapeutic Techniques	Always	0	0.0%	13	44.8%	27	45.8%
	Frequently	2	50.0%	13	44.8%	23	39.0%
	Occasionally	2	50.0%	2	6.9%	7	11.9%
	Rarely	0	0.0%	0	0.0%	1	1.7%
	Never	0	0.0%	1	3.4%	1	1.7%
Initiate Rehabilitation Program	Always	0	0.0%	11	37.9%	28	48.3%
	Frequently	3	75.0%	10	34.5%	18	31.0%
	Occasionally	0	0.0%	3	10.3%	10	17.2%
	Rarely	1	25.0%	4	13.8%	2	3.4%
	Never	0	0.0%	1	3.4%	0	0.0%
Advice use of a Cervical Collar	Always	1	20.0%	0	0.0%	1	1.7%
	Frequently	1	20.0%	1	3.7%	4	6.8%
	Occasionally	1	20.0%	7	25.9%	2	3.4%
	Rarely	1	20.0%	6	22.2%	26	44.1%
	Never	1	20.0%	13	48.1%	26	44.1%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	0	0.0%	1	3.4%	2	3.4%
	Frequently	0	0.0%	5	17.2%	8	13.6%
	Occasionally	3	75.0%	14	48.3%	24	40.7%
	Rarely	1	25.0%	6	20.7%	18	30.5%
	Never	0	0.0%	3	10.3%	7	11.9%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	1	3.6%	2	3.4%
	Frequently	0	0.0%	3	10.7%	2	3.4%
	Occasionally	2	50.0%	7	25.0%	14	24.1%
	Rarely	1	25.0%	9	32.1%	28	48.3%
	Never	1	25.0%	8	28.6%	12	20.7%
Refer to Medical Specialist	Always	0	0.0%	0	0.0%	1	1.9%
	Frequently	0	0.0%	3	11.5%	1	1.9%
	Occasionally	2	50.0%	10	38.5%	19	35.8%
	Rarely	2	50.0%	11	42.3%	24	45.3%
	Never	0	0.0%	2	7.7%	8	15.1%

5.5 Acute Degenerative Cervical Radiculopathy

Factors influencing treatment of Acute Degenerative Cervical Radiculopathy

	Test	Utilisation of spinal manipulation	Utilisation of traction	Utilisation of Auxiliary therapeutic techniques	Utilisation of Rehabilitation	Utilisation of cervical collar	Utilisation of Non-Steroidal Anti-inflammatory Drug or analgesics	Referral to Medical Doctor for pain control	Referral to medical specialist
Age	*Independent Samples Mann Whitney U test*	.172 Retain Null Hypothesis	.199 Retain Null Hypothesis	.104 Retain Null Hypothesis	.061 Retain Null Hypothesis	.018 Reject Null Hypothesis	.082 Retain Null Hypothesis	.272 Retain Null Hypothesis	.152 Retain Null Hypothesis
Gender	*Independent Samples Mann Whitney U test*	.831 Retain Null Hypothesis	.620 Retain Null Hypothesis	.002 Reject Null Hypothesis	.326 Retain Null Hypothesis	.267 Retain Null Hypothesis	.515 Retain Null Hypothesis	.771 Retain Null Hypothesis	.569 Retain Null Hypothesis

University of Qualification	*Independent Samples Kruskal-Wallis Test*	.617 Retain Null Hypothesis	.468 Retain Null Hypothesis	.067 Retain Null Hypothesis	.372 Retain Null Hypothesis	.569 Retain Null Hypothesis	.971 Retain Null Hypothesis	.756 Retain Null Hypothesis	.122 Retain Null Hypothesis
Experience	*Independent Samples Mann Whitney U test*	.488 Retain Null Hypothesis	.138 Retain Null Hypothesis	.080 Retain Null Hypothesis	.057 Retain Null Hypothesis	.009 Reject Null Hypothesis	.011 Reject Null Hypothesis	.139 Retain Null Hypothesis	.262 Retain Null Hypothesis
Post Graduate Education	*Independent Samples Mann Whitney U test*	.298 Retain Null Hypothesis	.503 Retain Null Hypothesis	.020 Reject Null Hypothesis	.678 Retain Null Hypothesis	.136 Retain Null Hypothesis	.645 Retain Null Hypothesis	.552 Retain Null Hypothesis	.565 Retain Null Hypothesis
Foreign Experience	*Independent Samples Mann Whitney U test*	.014 Reject Null Hypothesis	.962 Retain Null Hypothesis	.112 Retain Null Hypothesis	.281 Retain Null Hypothesis	.390 Retain Null Hypothesis	.761 Retain Null Hypothesis	.233 Retain Null Hypothesis	.068 Retain Null Hypothesis
Philosophy	*Independent Samples Kruskal-Wallis Test*	.909 Retain Null Hypothesis	.027 Reject Null Hypothesis	.013 Reject Null Hypothesis	.389 Retain Null Hypothesis	.666 Retain Null Hypothesis	.259 Retain Null Hypothesis	.454 Retain Null Hypothesis	.779 Retain Null Hypothesis

Age

		Under 35 Count	Column N %	Over 35 Count	Column N %
Spinal Manipulation	Always	19	42.2%	15	30.6%
	Frequently	20	44.4%	23	46.9%
	Occasionally	4	8.9%	8	16.3%
	Rarely	2	4.4%	3	6.1%
	Never	0	0.0%	0	0.0%
Traction	Always	5	11.4%	7	14.9%
	Frequently	15	34.1%	11	23.4%
	Occasionally	17	38.6%	12	25.5%
	Rarely	3	6.8%	4	8.5%
	Never	3	6.8%	13	27.7%
	22.0	1	2.3%	0	0.0%
Auxiliary Therapeutic Techniques	Always	29	65.9%	23	46.9%
	Frequently	11	25.0%	22	44.9%
	Occasionally	3	6.8%	1	2.0%
	Rarely	1	2.3%	3	6.1%
	Never	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	14	31.1%	11	23.9%
	Frequently	19	42.2%	10	21.7%
	Occasionally	7	15.6%	18	39.1%
	Rarely	3	6.7%	6	13.0%
	Never	2	4.4%	1	2.2%
Advice use of a Cervical Collar	Always	0	0.0%	1	2.1%
	Frequently	1	2.3%	6	12.5%
	Occasionally	6	13.6%	10	20.8%
	Rarely	15	34.1%	16	33.3%
	Never	22	50.0%	15	31.3%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	3	6.7%	6	12.2%
	Frequently	10	22.2%	14	28.6%
	Occasionally	19	42.2%	23	46.9%
	Rarely	12	26.7%	3	6.1%
	Never	1	2.2%	3	6.1%
Refer to Medical Doctor for Pain Control	Always	2	4.5%	0	0.0%
	Frequently	5	11.4%	12	25.0%
	Occasionally	18	40.9%	18	37.5%
	Rarely	7	15.9%	11	22.9%
	Never	12	27.3%	7	14.6%
Refer to Medical Specialist	Always	3	6.7%	2	4.2%

	Frequently	3	6.7%	10	20.8%
	Occasionally	29	64.4%	29	60.4%
	Rarely	6	13.3%	5	10.4%
	Never	4	8.9%	2	4.2%

Gender

		Female Count	Column N %	Male Count	Column N %
Spinal Manipulation	Always	18	37.5%	16	33.3%
	Frequently	19	39.6%	25	52.1%
	Occasionally	7	14.6%	5	10.4%
	Rarely	3	6.3%	2	4.2%
	Never	1	2.1%	0	0.0%
Traction	Always	7	14.6%	5	11.1%
	Frequently	13	27.1%	14	31.1%
	Occasionally	13	27.1%	16	35.6%
	Rarely	3	6.3%	4	8.9%
	Never	11	22.9%	6	13.3%
	22.0	1	2.1%	0	0.0%
Auxiliary Therapeutic Techniques	Always	33	70.2%	20	41.7%
	Frequently	13	27.7%	21	43.8%
	Occasionally	1	2.1%	3	6.3%
	Rarely	0	0.0%	4	8.3%
	Never	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	17	35.4%	9	20.0%
	Frequently	13	27.1%	16	35.6%
	Occasionally	10	20.8%	15	33.3%
	Rarely	7	14.6%	3	6.7%
	Never	1	2.1%	2	4.4%
Advice use of a Cervical Collar	Always	1	2.1%	0	0.0%
	Frequently	2	4.3%	5	10.6%
	Occasionally	8	17.0%	8	17.0%
	Rarely	14	29.8%	18	38.3%
	Never	22	46.8%	16	34.0%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	4	8.3%	6	12.5%
	Frequently	14	29.2%	10	20.8%
	Occasionally	22	45.8%	20	41.7%
	Rarely	7	14.6%	9	18.8%
	Never	1	2.1%	3	6.3%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	2	4.3%
	Frequently	8	16.7%	10	21.7%
	Occasionally	22	45.8%	14	30.4%
	Rarely	8	16.7%	11	23.9%
	Never	10	20.8%	9	19.6%
Refer to Medical Specialist	Always	2	4.2%	3	6.4%
	Frequently	10	20.8%	4	8.5%
	Occasionally	27	56.3%	31	66.0%
	Rarely	4	8.3%	8	17.0%
	Never	5	10.4%	1	2.1%

University of Qualification

		DUT Count	Column N %	UJ Count	Column N %	Other Count	Column N %
Spinal Manipulation	Always	29	34.1%	2	40.0%	3	50.0%
	Frequently	39	45.9%	3	60.0%	2	33.3%
	Occasionally	11	12.9%	0	0.0%	1	16.7%
	Rarely	5	5.9%	0	0.0%	0	0.0%
	Never	1	1.2%	0	0.0%	0	0.0%
Traction	Always	10	12.0%	1	20.0%	1	20.0%
	Frequently	24	28.9%	2	40.0%	1	20.0%
	Occasionally	25	30.1%	2	40.0%	2	40.0%
	Rarely	7	8.4%	0	0.0%	0	0.0%
	Never	16	19.3%	0	0.0%	1	20.0%
	22.0	1	1.2%	0	0.0%	0	0.0%
Auxiliary Therapeutic Techniques	Always	49	57.6%	3	75.0%	1	16.7%
	Frequently	31	36.5%	0	0.0%	3	50.0%
	Occasionally	3	3.5%	0	0.0%	1	16.7%
	Rarely	2	2.4%	1	25.0%	1	16.7%
	Never	0	0.0%	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	24	28.6%	0	0.0%	2	40.0%
	Frequently	27	32.1%	2	50.0%	0	0.0%

	Occasionally	22	26.2%	0	0.0%	3	60.0%
	Rarely	9	10.7%	1	25.0%	0	0.0%
	Never	2	2.4%	1	25.0%	0	0.0%
Advice use of a	Always	1	1.2%	0	0.0%	0	0.0%
Cervical Collar	Frequently	7	8.4%	0	0.0%	0	0.0%
	Occasionally	12	14.5%	1	20.0%	3	50.0%
	Rarely	30	36.1%	1	20.0%	1	16.7%
	Never	33	39.8%	3	60.0%	2	33.3%
Advise a Non-steroidal	Always	8	9.4%	1	20.0%	1	16.7%
Anti-inflammatory Drug	Frequently	23	27.1%	0	0.0%	1	16.7%
or Analgesic	Occasionally	36	42.4%	3	60.0%	3	50.0%
	Rarely	15	17.6%	1	20.0%	0	0.0%
	Never	3	3.5%	0	0.0%	1	16.7%
Refer to Medical Doctor	Always	2	2.4%	0	0.0%	0	0.0%
for Pain Control	Frequently	17	20.2%	1	20.0%	0	0.0%
	Occasionally	32	38.1%	1	20.0%	3	60.0%
	Rarely	16	19.0%	2	40.0%	1	20.0%
	Never	17	20.2%	1	20.0%	1	20.0%
Refer to Medical	Always	5	6.0%	0	0.0%	0	0.0%
Specialist	Frequently	14	16.7%	0	0.0%	0	0.0%
	Occasionally	51	60.7%	3	60.0%	4	66.7%
	Rarely	9	10.7%	2	40.0%	1	16.7%
	Never	5	6.0%	0	0.0%	1	16.7%

Years in Practice

		<10 years Count	Column N %	>10 years Count	Column N %
Spinal Manipulation	Always	20	37.0%	14	33.3%
	Frequently	26	48.1%	18	42.9%
	Occasionally	4	7.4%	8	19.0%
	Rarely	3	5.6%	2	4.8%
	Never	1	1.9%	0	0.0%
Traction	Always	6	11.3%	6	15.0%
	Frequently	19	35.8%	8	20.0%
	Occasionally	18	34.0%	11	27.5%
	Rarely	4	7.5%	3	7.5%
	Never	5	9.4%	12	30.0%
	22.0	1	1.9%	0	0.0%
Auxiliary Therapeutic	Always	34	64.2%	19	45.2%
Techniques	Frequently	15	28.3%	19	45.2%
	Occasionally	3	5.7%	1	2.4%
	Rarely	1	1.9%	3	7.1%
	Never	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	17	31.5%	9	23.1%
	Frequently	21	38.9%	8	20.5%
	Occasionally	10	18.5%	15	38.5%
	Rarely	3	5.6%	7	17.9%
	Never	3	5.6%	0	0.0%
Advice use of a Cervical Collar	Always	0	0.0%	1	2.4%
	Frequently	2	3.8%	5	12.2%
	Occasionally	6	11.3%	10	24.4%
	Rarely	19	35.8%	13	31.7%
	Never	26	49.1%	12	29.3%
Advise a Non-steroidal Anti-	Always	3	5.6%	7	16.7%
inflammatory Drug or Analgesic	Frequently	12	22.2%	12	28.6%
	Occasionally	23	42.6%	19	45.2%
	Rarely	13	24.1%	3	7.1%
	Never	3	5.6%	1	2.4%
Refer to Medical Doctor for Pain	Always	2	3.8%	0	0.0%
Control	Frequently	7	13.2%	11	26.8%
	Occasionally	20	37.7%	16	39.0%
	Rarely	10	18.9%	9	22.0%
	Never	14	26.4%	5	12.2%
Refer to Medical Specialist	Always	3	5.7%	2	4.8%
	Frequently	5	9.4%	9	21.4%
	Occasionally	34	64.2%	24	57.1%
	Rarely	7	13.2%	5	11.9%
	Never	4	7.5%	2	4.8%

Continuous Professional Development

		yes		no	
		Count	Column N %	Count	Column N %
Spinal Manipulation	Always	11	34.4%	23	35.9%
	Frequently	11	34.4%	33	51.6%
	Occasionally	8	25.0%	4	6.3%
	Rarely	2	6.3%	3	4.7%
	Never	0	0.0%	1	1.6%
Traction	Always	5	16.1%	7	11.3%
	Frequently	5	16.1%	22	35.5%
	Occasionally	11	35.5%	18	29.0%
	Rarely	5	16.1%	2	3.2%
	Never	5	16.1%	12	19.4%
	22.0	0	0.0%	1	1.6%
Auxiliary Therapeutic Techniques	Always	13	40.6%	40	63.5%
	Frequently	14	43.8%	20	31.7%
	Occasionally	2	6.3%	2	3.2%
	Rarely	3	9.4%	1	1.6%
	Never	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	10	31.3%	16	26.2%
	Frequently	7	21.9%	22	36.1%
	Occasionally	9	28.1%	16	26.2%
	Rarely	5	15.6%	5	8.2%
	Never	1	3.1%	2	3.3%
Advice use of a Cervical Collar	Always	1	3.1%	0	0.0%
	Frequently	5	15.6%	2	3.2%
	Occasionally	5	15.6%	11	17.7%
	Rarely	10	31.3%	22	35.5%
	Never	11	34.4%	27	43.5%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	3	9.4%	7	10.9%
	Frequently	7	21.9%	17	26.6%
	Occasionally	15	46.9%	27	42.2%
	Rarely	6	18.8%	10	15.6%
	Never	1	3.1%	3	4.7%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	2	3.2%
	Frequently	6	18.8%	12	19.4%
	Occasionally	15	46.9%	21	33.9%
	Rarely	7	21.9%	12	19.4%
	Never	4	12.5%	15	24.2%
Refer to Medical Specialist	Always	2	6.3%	3	4.8%
	Frequently	2	6.3%	12	19.0%
	Occasionally	23	71.9%	35	55.6%
	Rarely	1	3.1%	11	17.5%
	Never	4	12.5%	2	3.2%

Foreign Experience

		yes		no	
		Count	Column N %	Count	Column N %
Spinal Manipulation	Always	11	64.7%	23	29.1%
	Frequently	4	23.5%	40	50.6%
	Occasionally	2	11.8%	10	12.7%
	Rarely	0	0.0%	5	6.3%
	Never	0	0.0%	1	1.3%
Traction	Always	3	18.8%	9	11.7%
	Frequently	4	25.0%	23	29.9%
	Occasionally	4	25.0%	25	32.5%
	Rarely	1	6.3%	6	7.8%
	Never	4	25.0%	13	16.9%
	22.0	0	0.0%	1	1.3%
Auxiliary Therapeutic Techniques	Always	6	35.3%	47	60.3%
	Frequently	10	58.8%	24	30.8%
	Occasionally	0	0.0%	4	5.1%
	Rarely	1	5.9%	3	3.8%
	Never	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	5	29.4%	21	27.6%
	Frequently	7	41.2%	22	28.9%
	Occasionally	5	29.4%	20	26.3%
	Rarely	0	0.0%	10	13.2%
	Never	0	0.0%	3	3.9%
Advice use of a Cervical Collar	Always	1	6.3%	0	0.0%
	Frequently	0	0.0%	7	9.0%
	Occasionally	2	12.5%	14	17.9%

	Rarely	5	31.3%	27	34.6%
	Never	8	50.0%	30	38.5%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	5.9%	9	11.4%
	Frequently	5	29.4%	19	24.1%
	Occasionally	7	41.2%	35	44.3%
	Rarely	3	17.6%	13	16.5%
	Never	1	5.9%	3	3.8%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	2	2.6%
	Frequently	2	11.8%	16	20.8%
	Occasionally	6	35.3%	30	39.0%
	Rarely	5	29.4%	14	18.2%
	Never	4	23.5%	15	19.5%
Refer to Medical Specialist	Always	0	0.0%	5	6.4%
	Frequently	2	11.8%	12	15.4%
	Occasionally	9	52.9%	49	62.8%
	Rarely	4	23.5%	8	10.3%
	Never	2	11.8%	4	5.1%

Philosophy

		straight		Mixer		Evidence Based	
		Count	Column N %	Count	Column N %	Count	Column N %
Spinal Manipulation	Always	2	40.0%	11	37.9%	21	35.0%
	Frequently	2	40.0%	13	44.8%	27	45.0%
	Occasionally	1	20.0%	4	13.8%	7	11.7%
	Rarely	0	0.0%	1	3.4%	4	6.7%
	Never	0	0.0%	0	0.0%	1	1.7%
Traction	Always	1	25.0%	2	7.1%	8	13.6%
	Frequently	2	50.0%	5	17.9%	20	33.9%
	Occasionally	1	25.0%	10	35.7%	18	30.5%
	Rarely	0	0.0%	2	7.1%	5	8.5%
	Never	0	0.0%	8	28.6%	8	13.6%
	22.0	0	0.0%	1	3.6%	0	0.0%
Auxiliary Therapeutic Techniques	Always	0	0.0%	18	62.1%	35	58.3%
	Frequently	3	60.0%	9	31.0%	21	35.0%
	Occasionally	1	20.0%	1	3.4%	2	3.3%
	Rarely	1	20.0%	1	3.4%	2	3.3%
	Never	0	0.0%	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	1	25.0%	5	17.2%	20	34.5%
	Frequently	2	50.0%	11	37.9%	16	27.6%
	Occasionally	1	25.0%	8	27.6%	15	25.9%
	Rarely	0	0.0%	4	13.8%	6	10.3%
	Never	0	0.0%	1	3.4%	1	1.7%
Advice use of a Cervical Collar	Always	0	0.0%	1	3.7%	0	0.0%
	Frequently	0	0.0%	0	0.0%	7	11.7%
	Occasionally	2	40.0%	6	22.2%	8	13.3%
	Rarely	2	40.0%	8	29.6%	21	35.0%
	Never	1	20.0%	12	44.4%	24	40.0%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	0	0.0%	5	17.2%	5	8.3%
	Frequently	0	0.0%	6	20.7%	18	30.0%
	Occasionally	3	60.0%	13	44.8%	24	40.0%
	Rarely	2	40.0%	2	6.9%	12	20.0%
	Never	0	0.0%	3	10.3%	1	1.7%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	1	3.6%	1	1.7%
	Frequently	0	0.0%	5	17.9%	13	21.7%
	Occasionally	1	25.0%	12	42.9%	21	35.0%
	Rarely	2	50.0%	4	14.3%	13	21.7%
	Never	1	25.0%	6	21.4%	12	20.0%
Refer to Medical Specialist	Always	0	0.0%	1	3.6%	4	6.7%
	Frequently	0	0.0%	5	17.9%	9	15.0%
	Occasionally	4	80.0%	17	60.7%	35	58.3%
	Rarely	1	20.0%	2	7.1%	9	15.0%
	Never	0	0.0%	3	10.7%	3	5.0%

5.6 Chronic Degenerative Cervical Radiculopathy

Factors influencing treatment of Chronic Degeneratve Cervical Radiculopathy

	Test	Utilisation of spinal manipulation	Utilisation of traction	Utilisation of Auxiliary therapeutic techniques	Utilisation of Rehabilitation	Utilisation of cervical collar	Utilisation of Non-Steroidal Anti-inflammatory Drug or analgesics	Referral to Medical Doctor for pain control	Referral to medical specialist
Age	*Independent Samples Mann Whitney U test*	.612 Retain Null Hypothesis	.671 Retain Null Hypothesis	.039 Reject Null Hypothesis	.397 Retain Null Hypothesis	.046 Reject Null Hypothesis	.815 Retain Null Hypothesis	.103 Retain Null Hypothesis	.239 Retain Null Hypothesis
Gender	*Independent Samples Mann Whitney U test*	.945 Retain Null Hypothesis	.192 Retain Null Hypothesis	.031 Reject Null Hypothesis	.153 Retain Null Hypothesis	.577 Retain Null Hypothesis	.580 Retain Null Hypothesis	.616 Retain Null Hypothesis	.308 Retain Null Hypothesis
University of Qualification	*Independent Samples Kruskal-Wallis Test*	.295 Retain Null Hypothesis	.325 Retain Null Hypothesis	.514 Retain Null Hypothesis	.670 Retain Null Hypothesis	.242 Retain Null Hypothesis	.268 Retain Null Hypothesis	.573 Retain Null Hypothesis	.449 Retain Null Hypothesis
Experience	*Independent Samples Mann Whitney U test*	.798 Retain Null Hypothesis	.993 Retain Null Hypothesis	.009 Reject Null Hypothesis	.840 Retain Null Hypothesis	.023 Reject Null Hypothesis	.476 Retain Null Hypothesis	.087 Retain Null Hypothesis	.558 Retain Null Hypothesis
Post Graduate Education	*Independent Samples Mann Whitney U test*	.019 Reject Null Hypothesis	.698 Retain Null Hypothesis	.350 Retain Null Hypothesis	.239 Retain Null Hypothesis	.120 Retain Null Hypothesis	.792 Retain Null Hypothesis	.267 Retain Null Hypothesis	.698 Retain Null Hypothesis
Foreign Experience	*Independent Samples Mann Whitney U test*	.282 Retain Null Hypothesis	.513 Retain Null Hypothesis	.420 Retain Null Hypothesis	.069 Retain Null Hypothesis	.454 Retain Null Hypothesis	.677 Retain Null Hypothesis	.227 Retain Null Hypothesis	.031 Reject Null Hypothesis
Philosophy	*Independent Samples Kruskal-Wallis Test*	.941 Retain Null Hypothesis	.021 Reject Null Hypothesis	.306 Retain Null Hypothesis	.375 Retain Null Hypothesis	.294 Retain Null Hypothesis	.468 Retain Null Hypothesis	.627 Retain Null Hypothesis	.442 Retain Null Hypothesis

Age

		Under 35 Count	Column N %	Over 35 Count	Column N %
Spinal Manipulation	Always	23	51.1%	23	47.9%
	Frequently	17	37.8%	17	35.4%
	Occasionally	5	11.1%	8	16.7%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	2	4.5%	3	6.5%
	Frequently	16	36.4%	15	32.6%
	Occasionally	14	31.8%	15	32.6%
	Rarely	9	20.5%	3	6.5%
	Never	3	6.8%	10	21.7%
Auxiliary Therapeutic Techniques	Always	26	59.1%	15	31.9%
	Frequently	11	25.0%	25	53.2%
	Occasionally	7	15.9%	5	10.6%
	Rarely	0	0.0%	0	0.0%

	Never	0	0.0%	2	4.3%
Initiate Rehabilitation Program	Always	15	33.3%	14	31.1%
	Frequently	21	46.7%	16	35.6%
	Occasionally	6	13.3%	12	26.7%
	Rarely	2	4.4%	2	4.4%
	Never	1	2.2%	1	2.2%
Advice use of a Cervical Collar	Always	0	0.0%	2	4.3%
	Frequently	1	2.3%	6	12.8%
	Occasionally	7	15.9%	8	17.0%
	Rarely	10	22.7%	11	23.4%
	Never	26	59.1%	20	42.6%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	3	6.7%	3	6.3%
	Frequently	8	17.8%	10	20.8%
	Occasionally	19	42.2%	18	37.5%
	Rarely	13	28.9%	11	22.9%
	Never	2	4.4%	6	12.5%
Refer to Medical Doctor for Pain Control	Always	2	4.5%	1	2.1%
	Frequently	3	6.8%	8	16.7%
	Occasionally	16	36.4%	18	37.5%
	Rarely	9	20.5%	16	33.3%
	Never	14	31.8%	5	10.4%
Refer to Medical Specialist	Always	2	4.7%	0	0.0%
	Frequently	4	9.3%	9	21.4%
	Occasionally	20	46.5%	20	47.6%
	Rarely	13	30.2%	13	31.0%
	Never	4	9.3%	0	0.0%

Gender

		Female Count	Column N %	Male Count	Column N %
Spinal Manipulation	Always	24	50.0%	23	48.9%
	Frequently	17	35.4%	17	36.2%
	Occasionally	6	12.5%	7	14.9%
	Rarely	1	2.1%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	2	4.3%	3	6.7%
	Frequently	13	27.7%	18	40.0%
	Occasionally	17	36.2%	13	28.9%
	Rarely	7	14.9%	5	11.1%
	Never	8	17.0%	6	13.3%
Auxiliary Therapeutic Techniques	Always	26	55.3%	16	34.8%
	Frequently	17	36.2%	20	43.5%
	Occasionally	2	4.3%	10	21.7%
	Rarely	0	0.0%	0	0.0%
	Never	2	4.3%	0	0.0%
Initiate Rehabilitation Program	Always	20	42.6%	10	22.2%
	Frequently	15	31.9%	22	48.9%
	Occasionally	8	17.0%	10	22.2%
	Rarely	3	6.4%	2	4.4%
	Never	1	2.1%	1	2.2%
Advice use of a Cervical Collar	Always	0	0.0%	2	4.3%
	Frequently	3	6.4%	4	8.7%
	Occasionally	9	19.1%	6	13.0%
	Rarely	10	21.3%	12	26.1%
	Never	25	53.2%	22	47.8%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	2	4.2%	5	10.6%
	Frequently	8	16.7%	10	21.3%
	Occasionally	22	45.8%	16	34.0%
	Rarely	13	27.1%	11	23.4%
	Never	3	6.3%	5	10.6%
Refer to Medical Doctor for Pain Control	Always	1	2.1%	2	4.3%
	Frequently	7	14.6%	5	10.9%
	Occasionally	19	39.6%	16	34.8%
	Rarely	12	25.0%	13	28.3%
	Never	9	18.8%	10	21.7%
Refer to Medical Specialist	Always	1	2.2%	1	2.4%
	Frequently	10	22.2%	4	9.5%
	Occasionally	20	44.4%	21	50.0%
	Rarely	11	24.4%	15	35.7%
	Never	3	6.7%	1	2.4%

University of Qualification

		DUT Count	Column N %	UJ Count	Column N %	Other Count	Column N %
Spinal Manipulation	Always	39	46.4%	3	60.0%	5	83.3%
	Frequently	32	38.1%	2	40.0%	0	0.0%
	Occasionally	12	14.3%	0	0.0%	1	16.7%
	Rarely	1	1.2%	0	0.0%	0	0.0%
	Never	0	0.0%	0	0.0%	0	0.0%
Traction	Always	3	3.7%	1	20.0%	1	20.0%
	Frequently	27	32.9%	2	40.0%	2	40.0%
	Occasionally	28	34.1%	1	20.0%	1	20.0%
	Rarely	11	13.4%	1	20.0%	0	0.0%
	Never	13	15.9%	0	0.0%	1	20.0%
Auxiliary Therapeutic Techniques	Always	39	46.4%	1	25.0%	2	40.0%
	Frequently	34	40.5%	2	50.0%	1	20.0%
	Occasionally	9	10.7%	1	25.0%	2	40.0%
	Rarely	0	0.0%	0	0.0%	0	0.0%
	Never	2	2.4%	0	0.0%	0	0.0%
Initiate Rehabilitation Program	Always	27	32.9%	1	20.0%	2	40.0%
	Frequently	34	41.5%	2	40.0%	1	20.0%
	Occasionally	15	18.3%	1	20.0%	2	40.0%
	Rarely	5	6.1%	0	0.0%	0	0.0%
	Never	1	1.2%	1	20.0%	0	0.0%
Advice use of a Cervical Collar	Always	1	1.2%	0	0.0%	1	16.7%
	Frequently	7	8.5%	0	0.0%	0	0.0%
	Occasionally	14	17.1%	0	0.0%	1	16.7%
	Rarely	19	23.2%	1	20.0%	2	33.3%
	Never	41	50.0%	4	80.0%	2	33.3%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	5	6.0%	0	0.0%	2	33.3%
	Frequently	18	21.4%	0	0.0%	0	0.0%
	Occasionally	34	40.5%	2	40.0%	2	33.3%
	Rarely	21	25.0%	2	40.0%	1	16.7%
	Never	6	7.1%	1	20.0%	1	16.7%
Refer to Medical Doctor for Pain Control	Always	2	2.4%	0	0.0%	1	16.7%
	Frequently	11	13.3%	1	20.0%	0	0.0%
	Occasionally	32	38.6%	1	20.0%	2	33.3%
	Rarely	23	27.7%	0	0.0%	2	33.3%
	Never	15	18.1%	3	60.0%	1	16.7%
Refer to Medical Specialist	Always	2	2.6%	0	0.0%	0	0.0%
	Frequently	12	15.4%	1	20.0%	1	25.0%
	Occasionally	40	51.3%	1	20.0%	0	0.0%
	Rarely	20	25.6%	3	60.0%	3	75.0%
	Never	4	5.1%	0	0.0%	0	0.0%

Years in Practice

		<10 years Count	Column N %	>10 years Count	Column N %
Spinal Manipulation	Always	27	50.0%	20	48.8%
	Frequently	20	37.0%	14	34.1%
	Occasionally	6	11.1%	7	17.1%
	Rarely	1	1.9%	0	0.0%
	Never	0	0.0%	0	0.0%
Traction	Always	2	3.8%	3	7.7%
	Frequently	18	34.0%	13	33.3%
	Occasionally	18	34.0%	12	30.8%
	Rarely	10	18.9%	2	5.1%
	Never	5	9.4%	9	23.1%
Auxiliary Therapeutic Techniques	Always	31	58.5%	11	27.5%
	Frequently	15	28.3%	22	55.0%
	Occasionally	7	13.2%	5	12.5%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	2	5.0%
Initiate Rehabilitation Program	Always	17	31.5%	13	34.2%
	Frequently	24	44.4%	13	34.2%
	Occasionally	9	16.7%	9	23.7%
	Rarely	2	3.7%	3	7.9%
	Never	2	3.7%	0	0.0%
Advice use of a Cervical Collar	Always	0	0.0%	2	5.0%
	Frequently	2	3.8%	5	12.5%
	Occasionally	7	13.2%	8	20.0%

	Rarely	13	24.5%	9	22.5%
	Never	31	58.5%	16	40.0%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	3	5.6%	4	9.8%
	Frequently	9	16.7%	9	22.0%
	Occasionally	23	42.6%	15	36.6%
	Rarely	15	27.8%	9	22.0%
	Never	4	7.4%	4	9.8%
Refer to Medical Doctor for Pain Control	Always	2	3.8%	1	2.4%
	Frequently	4	7.5%	8	19.5%
	Occasionally	20	37.7%	15	36.6%
	Rarely	12	22.6%	13	31.7%
	Never	15	28.3%	4	9.8%
Refer to Medical Specialist	Always	2	3.8%	0	0.0%
	Frequently	6	11.5%	8	22.9%
	Occasionally	26	50.0%	15	42.9%
	Rarely	14	26.9%	12	34.3%
	Never	4	7.7%	0	0.0%

Continuous Professional Development

		yes Count	Column N %	no Count	Column N %
Spinal Manipulation	Always	11	34.4%	36	57.1%
	Frequently	13	40.6%	21	33.3%
	Occasionally	8	25.0%	5	7.9%
	Rarely	0	0.0%	1	1.6%
	Never	0	0.0%	0	0.0%
Traction	Always	3	9.4%	2	3.3%
	Frequently	8	25.0%	23	38.3%
	Occasionally	11	34.4%	19	31.7%
	Rarely	5	15.6%	7	11.7%
	Never	5	15.6%	9	15.0%
Auxiliary Therapeutic Techniques	Always	13	40.6%	29	47.5%
	Frequently	12	37.5%	25	41.0%
	Occasionally	7	21.9%	5	8.2%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	2	3.3%
Initiate Rehabilitation Program	Always	13	43.3%	17	27.4%
	Frequently	10	33.3%	27	43.5%
	Occasionally	4	13.3%	14	22.6%
	Rarely	3	10.0%	2	3.2%
	Never	0	0.0%	2	3.2%
Advice use of a Cervical Collar	Always	1	3.1%	1	1.6%
	Frequently	5	15.6%	2	3.3%
	Occasionally	6	18.8%	9	14.8%
	Rarely	6	18.8%	16	26.2%
	Never	14	43.8%	33	54.1%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	2	6.3%	5	7.9%
	Frequently	7	21.9%	11	17.5%
	Occasionally	12	37.5%	26	41.3%
	Rarely	10	31.3%	14	22.2%
	Never	1	3.1%	7	11.1%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	3	4.8%
	Frequently	5	15.6%	7	11.3%
	Occasionally	15	46.9%	20	32.3%
	Rarely	8	25.0%	17	27.4%
	Never	4	12.5%	15	24.2%
Refer to Medical Specialist	Always	1	3.6%	1	1.7%
	Frequently	4	14.3%	10	16.9%
	Occasionally	14	50.0%	27	45.8%
	Rarely	9	32.1%	17	28.8%
	Never	0	0.0%	4	6.8%

Foreign Experience

		yes Count	Column N %	no Count	Column N %
Spinal Manipulation	Always	10	58.8%	37	47.4%
	Frequently	6	35.3%	28	35.9%
	Occasionally	1	5.9%	12	15.4%
	Rarely	0	0.0%	1	1.3%

	Never	0	0.0%	0	0.0%
Traction	Always	3	18.8%	2	2.6%
	Frequently	5	31.3%	26	34.2%
	Occasionally	3	18.8%	27	35.5%
	Rarely	1	6.3%	11	14.5%
	Never	4	25.0%	10	13.2%
Auxiliary Therapeutic Techniques	Always	6	35.3%	36	47.4%
	Frequently	8	47.1%	29	38.2%
	Occasionally	3	17.6%	9	11.8%
	Rarely	0	0.0%	0	0.0%
	Never	0	0.0%	2	2.6%
Initiate Rehabilitation Program	Always	7	43.8%	23	30.3%
	Frequently	8	50.0%	29	38.2%
	Occasionally	1	6.3%	17	22.4%
	Rarely	0	0.0%	5	6.6%
	Never	0	0.0%	2	2.6%
Advice use of a Cervical Collar	Always	1	6.3%	1	1.3%
	Frequently	2	12.5%	5	6.5%
	Occasionally	0	0.0%	15	19.5%
	Rarely	3	18.8%	19	24.7%
	Never	10	62.5%	37	48.1%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	5.9%	6	7.7%
	Frequently	4	23.5%	14	17.9%
	Occasionally	7	41.2%	31	39.7%
	Rarely	4	23.5%	20	25.6%
	Never	1	5.9%	7	9.0%
Refer to Medical Doctor for Pain Control	Always	0	0.0%	3	3.9%
	Frequently	1	5.9%	11	14.3%
	Occasionally	6	35.3%	29	37.7%
	Rarely	6	35.3%	19	24.7%
	Never	4	23.5%	15	19.5%
Refer to Medical Specialist	Always	0	0.0%	2	2.8%
	Frequently	0	0.0%	14	19.4%
	Occasionally	7	46.7%	34	47.2%
	Rarely	7	46.7%	19	26.4%
	Never	1	6.7%	3	4.2%

Philosophy

		straight		Mixer		Evidence based	
		Count	Column N %	Count	Column N %	Count	Column N %
Spinal Manipulation	Always	3	60.0%	14	48.3%	29	49.2%
	Frequently	1	20.0%	10	34.5%	22	37.3%
	Occasionally	1	20.0%	5	17.2%	7	11.9%
	Rarely	0	0.0%	0	0.0%	1	1.7%
	Never	0	0.0%	0	0.0%	0	0.0%
Traction	Always	1	25.0%	0	0.0%	4	6.8%
	Frequently	2	50.0%	5	18.5%	23	39.0%
	Occasionally	1	25.0%	12	44.4%	17	28.8%
	Rarely	0	0.0%	5	18.5%	7	11.9%
	Never	0	0.0%	5	18.5%	8	13.6%
Auxiliary Therapeutic Techniques	Always	1	25.0%	15	51.7%	26	44.1%
	Frequently	1	25.0%	11	37.9%	24	40.7%
	Occasionally	2	50.0%	2	6.9%	8	13.6%
	Rarely	0	0.0%	0	0.0%	0	0.0%
	Never	0	0.0%	1	3.4%	1	1.7%
Initiate Rehabilitation Program	Always	0	0.0%	9	31.0%	21	36.8%
	Frequently	3	75.0%	10	34.5%	24	42.1%
	Occasionally	1	25.0%	7	24.1%	9	15.8%
	Rarely	0	0.0%	2	6.9%	3	5.3%
	Never	0	0.0%	1	3.4%	0	0.0%
Advice use of a Cervical Collar	Always	1	20.0%	0	0.0%	1	1.7%
	Frequently	1	20.0%	2	7.4%	4	6.8%
	Occasionally	0	0.0%	6	22.2%	9	15.3%
	Rarely	2	40.0%	4	14.8%	16	27.1%
	Never	1	20.0%	15	55.6%	29	49.2%
Advise a Non-steroidal Anti-inflammatory Drug or Analgesic	Always	1	20.0%	3	10.3%	3	5.1%
	Frequently	1	20.0%	4	13.8%	13	22.0%
	Occasionally	2	40.0%	15	51.7%	19	32.2%
	Rarely	1	20.0%	4	13.8%	19	32.2%
	Never	0	0.0%	3	10.3%	5	8.5%
Refer to Medical Doctor for Pain Control	Always	1	20.0%	2	7.1%	0	0.0%
	Frequently	0	0.0%	3	10.7%	9	15.3%

	Occasionally	3	60.0%	9	32.1%	21	35.6%
	Rarely	0	0.0%	6	21.4%	19	32.2%
	Never	1	20.0%	8	28.6%	10	16.9%
Refer to Medical Specialist	Always	0	0.0%	1	3.8%	1	1.8%
	Frequently	0	0.0%	5	19.2%	9	16.4%
	Occasionally	2	50.0%	13	50.0%	24	43.6%
	Rarely	2	50.0%	6	23.1%	18	32.7%
	Never	0	0.0%	1	3.8%	3	5.5%