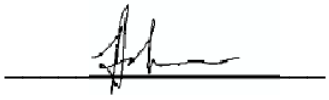
An investigation into patient management protocols for low back pain by chiropractors in the greater Durban area

A Dissertation presented to the Faculty of Health Sciences at the Durban University of Technology in partial compliance for a Masters Degree in Technology: Chiropractic

By

Robert H. Palmer

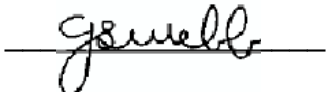
I, Robert H. Palmer, do declare that this dissertation is a representation of my own work in both conception and execution



12/08/09

Robert H. Palmer **Date**

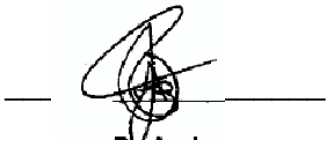
Approved for final submission



12-8-09

Dr Grant S. Webb **Date**

M.Tech: Chiropractic



12/08/09

Dr Andrew Jones **Date**

M.Tech: Chiropractic; MMedSci (Sportsmed)

DEDICATION

I dedicate this to my incredible parents, for their love and continued support throughout the years. At last Mom, you can stop worrying now!

ACKNOWLEDGEMENTS

It's been a life time of meeting and mingling with some of the most amazing people, thank you all for having such a positive influence in my life. The last 7 years has been some of my most challenging years, not being a natural academic, in this academically demanding course. I have come to realize more and more, that if you have a dream, through hard dedicated work it can come true. My motto, "*You can do it*", although so simple, has been repeated so many times in my mind, that I do believe my dreams will come true again and again in the future.

With the encouragements and continued support from my father and mother, my dream of becoming a chiropractor could not have even been considered, thank you so much.

To my sister for all her prayers and my brother for his unconditional love, it made all the difference.

To my supervisors Dr Grant Webb and Dr Andrew Jones for all the long hours of sifting through my work again and again, I thank you sincerely! Mrs. Tonya Esterhuizen, thank you for your assistance with the statistical methodology.

To Bruce, to your solid character, your belief in me and all the good times, thank you again and again you are an incredible role model to me (Y.W.S.P still rules!).

To Torin, tea time will always be spent with you in mind, thank you for your friendship and all the support it will always be remembered.

Thank you to the Douglas's for always believing in me throughout the years of studying.

Thank you to all my other close friends for putting up with random manipulations and mostly for believing in me.

And to Meg, thank you for your encouragement, consistent belief in me and for your undying love and friendship, I Love you.

ABSTRACT

The aim of this study was to investigate patient management protocols of low back pain (LBP) by chiropractors in the greater Durban metropolitan area. In this investigation a more generalized approach was chosen to investigate trends within the field of patient management and education for LBP.

The study population of 80 chiropractors in the greater Durban metropolitan area, required a minimum response rate of 70% to obtain statistical significance (Esterhuizen, 2008), which was achieved.

This study involved a quantitative descriptive design utilizing a questionnaire developed and validated by the researcher and focus group. The questionnaire was comprised of three sections, including personal information, treatment protocols and patient management with advice and education.

Statistical analysis involved the use of SPSS version 15.0 (SPSS Inc., Chicago, Illinois, USA), a data analysis tool. Descriptive objectives were analysed with frequency tables and cross-tabulation tables (Esterhuizen, 2008). Demographic variables and practice variables were assessed for association with responses to the questionnaire using Pearson's Chi square test in the case of categorical demographics and responses (Esterhuizen, 2008). Bar graphs were included to reflect the treatments that were always or frequently used by respondents (Esterhuizen, 2008).

There appeared to be a wide range of influences on practice philosophy and methods, independent of demographics and training institute. A chiropractor's age was regarded as significant with regard to philosophical orientation. However, the majority of these chiropractors obtained their qualifications from international colleges.

Spinal manipulations directed at quadratus lumborum myofascial trigger points were strongly advocated by respondents. Specific short lever manipulations were the preferred manipulation technique for treatment of LBP. Sacroiliac joint manipulation was also considered important by a significant proportion of respondents. Respondents most commonly recommended the use of mobilizations and cryotherapy when contra-indications to manipulation were evident.

There was consensus in the number of days before the first follow-up after an initial treatment for a presentation of acute LBP, where 96.42% of respondents recommended follow-up at day 1 or 2. In chronic LBP first follow-up after initial treatment was recommended by 41.1% of respondents on day 2; 28.6% day 3 and 8.9% on day 1. Management protocols for acute LBP appeared to be more uniform when compared to management of chronic LBP.

Despite the variances in philosophy and management protocols amongst respondents, there remains consensus that manual articular manipulation remains the mainstay in chiropractic treatment protocols for both acute and chronic LBP.

TABLE OF CONTENTS PAGE

LIST OF TABLES

LIST OF FIGURES

KEY

AHPCSA	- Allied Health Professions Council of South Africa
Cox-2	- Cyclooxygenase-2
CPD	- Continued Professional Development
HVLA	- High Velocity Low Amplitude
IFC	- Interferential Current
IVF	- Intervertebral Foramina
LBP	- Low Back Pain
MPS	- Myofascial Pain Syndrome
NSAIDs	- Non-Steroidal Anti-Inflammatory Drugs
PNF	- Proprioceptive Neuromuscular Facilitation
SI	- Sacroiliac
TENS	- Transcutaneus Electrical Nerve Stimulation
TP	- Trigger Point

CHAPTER 1

1.0 INTRODUCTION

1.1 THE PROBLEM AND ITS SETTING

There are many documented epidemiological and statistical studies revealing high incidence and prevalence of low back pain (Manga, *et al*., 1993; Hills 2005 and Hurwitz and Shekelle, 2006). Unfortunately no convincing consensus exists among physicians, physical therapists, or chiropractors concerning the most appropriate treatment and management of low back pain (LBP) (Hills, 2005).

Chiropractic has taken on many of the attributes of an established profession and has become one of the largest alternative medicines to have access into private and public health care financing systems and is increasingly viewed as an effective specialty by many in the medical profession (Meeker and Haldeman, 2002). Chiropractic treatments include mainly manipulative techniques, but may also include auxiliary approaches such as exercise therapy, lifestyle modification, nutritional advice (Gatterman, 1990) and a host of electrical modalities and soft tissue manipulative treatments (Souza, 2005). Chiropractic treatment of LBP has been shown to be very effective (Manga *et al.*, 1993), especially in comparison to other therapies (Giles and Muller, 1999 and Nyiendo *et al.*, 2000). Research has found that a vast number of interventions might prevent common LBP (Burton, 2005). However no single treatment intervention is likely to be effective in treating the overall problem, such as chronic LBP because of its multidimensional nature (Airaksinen *et al.*, 2004). With the advent of new therapies and new developments in the chiropractic profession, it is important to keep up to date with what is being practiced and to find out what is successfully being used with success as part of a LBP treatment protocol.

Studies have shown that patients appear to respond best to a more holistic approach to treatments (Opperman, 1997) which include patient education, environmental considerations and other possible aggravating factors, in combination with spinal manipulation (Tardif, 1994). It has been suggested that chiropractors universally should integrate a more preventative approach to their practices (Evans and Rupert, 2006). Patients also require confirmation of what they have heard or been told by others; this will confirm the practitioner's ability to the patient and most probably facilitate compliance as well as any associated placebo effect (McCarthy, 2008).

Hurwitz and Shekelle, (2006) highlighted that many biomechanical, psychosocial and compensatory factors have been found to affect the risk and prognosis of LBP. The responsibility rests on chiropractors as to what philosophical orientations should be integrated into their practices as the current literature is diverse. Bolton (2003) states that as the result of years of continuing professional development (CPD), self extended knowledge and personal experiences by practitioners there has been a large impact on what is being implemented within private practice. Although there has been consensus that CPD, and possibly other learning interventions have improved up-to-date knowledge and understanding within chiropractic, it is however unknown whether it has had a large impact on clinical practice and outcomes.

In a research study involving 920 patients presenting with low back pain, 84 percent received spinal manipulation, 79 percent received non-thrust manual therapies such as mobilization, massage, and heat packs, and only 5 percent received other forms of therapy such as acupuncture (Hurwitz *et al.*, 1998). Although chiropractic care tends to be individualized, with a wide variety of diagnostic and treatment methods available, it is still necessary to categorise and define the profession more clearly to be able to make specific recommendations for the future of the profession (Cramer *et al*., 2006).

.

Mootz *et al*. (2005) state that a mature profession can be identified by the unity within it. Meeker and Haldeman (2002) state that chiropractors are divided about how to define the profession, however what the public experiences as chiropractic defines their identity within public realms. This identity is formed by the profession as a whole, its treatment protocols, its philosophies of practice and most importantly the individuals in practice (Davis and Bove, 2008).

This study aimed to establish a generalized foundation of what is being practiced in private chiropractic practice in the greater Durban metropolitan area for non-specific LBP and relate it to possible influential demographic factors. This will assist student chiropractors and practicing chiropractors with developing their own practices and to assess which other available resources and treatment modalities are available and being used by chiropractors in the field. It will also open up new research possibilities to refine the search for a more unified treatment methodology into the treatment of LBP.

1.2 AIMS AND OBJECTIVES OF THE STUDY

The aim of this study was to determine the patient management protocols used by chiropractors in the greater Durban metropolitan area for the treatment of non-specific low back pain.

Objectives included were:

1. To determine the demographics of chiropractors in the greater Durban area.
2. To determine what manipulation protocols are used in patients with acute and chronic low back pain.
3. To determine what treatment protocols are used in patients who have contra-indications to manual spinal manipulation.

4. To determine which physical therapeutic modalities are being used in private chiropractic practice as part of a treatment intervention for low back pain with an associated muscular component.
5. To determine what patient education and management is used as part of a holistic approach to the treatment of low back pain.
6. To determine the association between demographic factors and management protocols.

1.3 THE RATIONALE

1.3.1 The scope of chiropractic treatments for low back pain is wide. The manipulation has, according to Mootz and Shekelle (2005), become the chiropractor's identity. Carey *et al*. (2005) proposed that their expertise lie in spinal health care. It is important to keep up to date with developments within the chiropractic profession and to notice any trends developing within treatment protocols and patient management.

1.3.2 Continuing professional development (CPD) by practitioners could have an impact on what is being implemented within private practice. There is an abundance of knowledge available to chiropractors today in the form of courses, congresses and literature, which may influence factors within practice. Although there has been consensus that CPD has improved up-to-date knowledge and understanding within the field of chiropractic, it is unknown whether it has had an impact on clinical practice (Bolton, 2003).

1.3.3 The development of chiropractic within private practice will, through experiences, evolve to suit each individual. No comparative studies have been done on what is being practiced in South Africa. By creating a clearer model of what is being practiced in the greater Durban

metropolitan area by chiropractors, other possibilities to enhance treatment outcomes may become evident.

1.3.4 There are numerous exercise therapies, stretching and strengthening techniques that a chiropractor may employ to enhance the treatment efficacy for non-specific low back pain. It has yet to be established which of these techniques are used in practice in the greater Durban area. This knowledge may be used as a base to build or adapt treatment protocols in the management of low back pain.

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

The scope of chiropractic is wide within the treatment of low back pain. Each individual chiropractor within private practice will devise general management approaches to low back pain conditions. There are numerous factors which could lead to each individual chiropractor's method of practice, the responsibility resting on each chiropractor to make certain that the care they provide is of benefit to their patients (Haneline, 2007). Age, stature, and pathological conditions of patients will require obvious adaptations to accomplish effective and safe treatment (Triano, 2005).

Chiropractic treatment includes mainly manipulative techniques, but may also include auxiliary approaches such as exercise therapy, lifestyle modification, nutritional advice (Gatterman, 1990) and many electrical modalities and soft tissue manipulative treatments. Chiropractic treatment of low back pain has been shown to be very effective (Manga *et al*., 1993) especially in comparison to other therapies (Giles and Muller, 1999; Nyiendo *et al.,* 2000). However no single treatment intervention is likely to be effective in treating the overall problem, in particular, in chronic LBP due to its multidimensional nature (Airaksinen *et al.,* 2004).

Triano (2005) asserts that successful treatment ultimately relies on two variables, the patient and the chiropractor. With the rapid advancement of the chiropractic profession, there are numerous variances in each sphere within chiropractic practices. Certain trends, recent literature or post graduate courses and congresses will, through time, mould the profession into what it will become.

Chiropractic has taken on many of the attributes of an established profession, improving its educational and licensing systems substantially in the past two decades, yet the theory of chiropractic is still controversial (Meeker and Haldeman, 2002).

This chapter deals with the available literature on varied treatments for LBP, with the attempt to make the reader aware of the number of varied opinions and occasional contradictions, which have been discovered in recent trials to very commonly practiced interventions. These interventions are what form part of the investigation in the research questionnaire (Appendix A). Even with the amount of available knowledge on chiropractic, specificities were difficult to locate with regards to manipulation protocols. It must be remembered that each therapy has been investigated individually; however, chiropractic treatments invariably involve a combination of treatment methods. Topics reviewed include: personal information, which may play a role in choice of management protocols; treatment protocols available to chiropractors and patient management with advice and education.

2.2 PERSONAL INFORMATION

2.2.1 AGE OF CHIROPRACTOR

With an increase in age there are numerous factors which may influence practice methods. The “right manipulation” according to Cooperstein *et al*. (2001), is a specific high velocity, low-amplitude (HVLA) thrust that corrects an area of dysfunction. The chiropractors’ size, strength or speed may lead towards a lower velocity manipulation (Bergmann, 2005) which could be a factor to consider with old age. There appears to be no current literature on the influences of the age of the chiropractor on the effectiveness of treatment outcomes or the choice of management protocol, although the number of years of experience may have a large impact on the efficacy of patient management protocols.

2.2.2 GENDER OF CHIROPRACTOR

Peak thrust forces applied during spinal manipulative treatments can be quite high and factors such as weight, frame size and muscle mass of the chiropractor would be considered to be necessary to produce adequate forces (Forand *et al*., 2004). There appears to be little experimental evidence that thrust manipulation is better than simple mobilization, yet most clinical studies have focused on thrust manipulation, which is felt by most chiropractors to increase the efficacy (Maigne and Vautravers, 2003). An investigation involving a comparison of forces applied by male and female chiropractors specifically for the thoracic spine, revealed that female chiropractors appeared to be as effective as their male counterparts (Forand *et al.,* 2004). Preload forces by females were significantly smaller, but according to Forand *et al*. (2004) this would not result in a physical limitation to produce the forces required for an effective manipulation. It was concluded that the mechanics of spinal manipulative treatments were performed similarly by female and male chiropractors.

2.2.3 ETHNIC GROUP OF THE CHIROPRACTOR

Currently there appears to be no literature on the variances of chiropractic patient management protocols with varying ethnicity in South Africa or around the world. A local epidemiological investigation of LBP in a formal Black South African township revealed just over half of the LBP sufferers were receiving treatment for their LBP and the general treatment approaches appeared to rely heavily on allopathic medication (Van der Meulen, 1997). In the Indian and Coloured communities in South Africa the lifetime incidence of low back pain was found to be at 78.2% and 76.6% respectively (Docrat, 1999). Within the local South African context, the value of chiropractic among Black South Africans appears to be underappreciated (Myburgh and Mouton, 2007).

2.2.4 INSTITUTE OF QUALIFICATION

The World Federation of Chiropractic (WFC) has become the profession's primary medium for developing a consistent basis for chiropractic principles, scope of practice, laws and education in all world regions (Chapman-Smith and Cleveland, 2005). However the clinical experience and philosophical orientations vary widely among the chiropractic institutions (Wickes, 2002). Chiropractic in South Africa is a Legislated Profession (Amended Act 63 of 1982) and is controlled by the Allied Health Professions Council of South Africa (AHPCSA). According to Wickes (2002), although there is some moderate control within the profession globally, treatment techniques differ more on the basis of the philosophy and training of the chiropractor rather than the validity of all the available evidence-based literature. Thus, there will be variations according to the institute of qualification by the chiropractor (Wickes, 2002).

2.2.5 NUMBER OF YEARS OF EXPERIENCE

A study by Foster and Bagust (2004) was conducted using Two-point discrimination and palpatory thresholds of first and final year students of a chiropractic course and practicing chiropractors. Two-point discrimination evidently improved throughout the chiropractic training program. However, it appeared to decline post-training, suggesting possible age-related changes which could not be controlled for during the study.

McCarthy (2008) highlights that after five years in practice there is a considerable degree of similarity between chiropractors when they perform the same manipulative task on the same mechanical device, which may be the result of practice experiences, irrespective of patient problems and educational background.

2.2.6 VARIOUS POSSIBLE INFLUENCES ON PATIENT MANAGEMENT

Establishing consensus of standards profession-wide was perhaps never meant to be enforced in the daily practice of chiropractors (Villanueva-Russell, 2005) as the variety of practice alternatives are wide. Clinical experience and philosophical orientations vary widely among the chiropractic institutions (Wickes, 2002) courses, congresses or conferences and literature.

2.2.7 PRACTICING ABROAD

The practice of chiropractic varies from country to country or even from state to state with in the USA (McCarthy, 2008). According to van Tulder *et al.* (1997), cultural differences may partially explain the differences in interpretation of the available evidence. These authors' explanation was that if there was moderate or limited evidence that an intervention was effective, this intervention might be promoted in a country where the intervention was not frequently used, especially if there were few alternatives. However, in a country where the intervention was used frequently, the lack of strong evidence may reduce its use in practice. There appears to be little or no evidence on specific practice management protocols of chiropractors with varying exposure to other countries.

2.3 TREATMENT PROTOCOLS

It is difficult to list what chiropractic scope of practice includes (McCarthy, 2008) as the complexities and uniqueness of each patient requires adaptation of skills to address the patients clinical and emotional needs (Davis and Bove, 2008). Nevertheless the complex interaction between physician and patient remains at the very core of the healing process (Davis and Bove, 2008).

The evidenced-based medicine movement is conceptualized as part of a larger political economy surrounding the health care system (Villanueva-Russell, 2005). This has created a new set of standards for orthodox medicine and also branches of alternative medicine that are in the process of “professionalization,” such as chiropractic. The assumptions of evidence-based medicine dictate which approaches to treatments are justifiable. This is an attempt to shape the strategies of the chiropractic profession to co-exist with orthodox medicine. This has led to much debate, with evidence-based strategies sometimes not being an accurate reflection of actual practice and somewhat limiting to varied ideologies and philosophies (Villanueva-Russell, 2005).

Significant differences in treatment effectiveness for varied conditions is predictable, especially when regarding LBP with associated buttock, leg pain or neurological deficits and herniated discs (Gatterman *et al*., 2001).

2.3.1 CHIROPRACTIC PHILOSOPHY

Philosophical orientation according to Keating (2005), influences methods of practice, of which there are two main sub-groups within chiropractic: the “mixers and the straights”. “Straight” chiropractors believe in the inherent healing ability of the body and that vertebral subluxations or restrictions lead to interferences within the nervous system. These interferences were believed to be the primary risk factors for almost all disease states. “Straight” chiropractor’s target the detection and correction of these vertebral subluxations and prefer to remain distinctively separate from mainstream health care (Keating, 2005). The “mixers” however generally want to be integrated into mainstream medicine and believe the subluxation is one of the many causes of disease (Keating, 2005). Incorporated into this approach would be different treatment protocols which include varied focuses to treatments and not only manipulations.

Since the commencement of evidence-based medicine in the last two decades, many ‘mixer’ chiropractors now prefer the term evidence-based practitioner to describe their style of practice and philosophical orientation (Keating, 2005). Evidence-based chiropractors rely on the use of available scientific literature to accumulate clinical knowledge to establish a diagnosis and formulate a treatment protocol for their patients (Keating, 2005 and Haneline, 2007).

Within chiropractic, that which constitutes “legitimate knowledge” is not necessarily judged as accurate due to the conflicting agendas of the “straights” versus the “mixers” (Villanueva-Russell, 2004). Evaluating specific technique procedures and technique systems by using rigorous research methodology is necessary for chiropractors to understand which procedures maximally benefit patients and for which conditions (Gatterman *et al.,* 2001). But, the fear of practice guidelines limiting chiropractors’ discretion to the point of “cookbook chiropractic” has also been echoed by critics of evidence-based medicine (Villanueva-Russell, 2004). These critics have noted that the objective principles that were formulated through science could not always be applied neatly or wholly into practice (Villanueva-Russell, 2004). The next generation of chiropractors according to Davis and Bove (2008) would be forged from a superior comprehensive information base of methodical clinically based evidence.

2.3.2 MANIPULATION PROTOCOLS

Even though guidelines have been formulated by health-care agencies, advisory groups or family medicine groups in many countries, recommendations vary considerably (Bronfort *et al*., 2004). The application of the manipulation technique may be highly variable (Maigne and Vautravers, 2003), but the underlying principles appear to be fairly consistent (Bergmann, 2005). This

section attempts to highlight the various manipulation protocols which are utilized most commonly in chiropractic practice.

2.3.2.1 SPECIFIC VERSUS NON-SPECIFIC MANIPULATION

A specific manipulation attempts to focus the force of the thrust on one articulation or joint complex (Plaugher and Lopes, 1993). Non-specific manipulations use a more broad contact on the patient and affect a region or group of articulations (Plaugher and Lopes, 1993). Specific contact in reference to a patients spine means a contact is made on a spinous process or lateral mass (Mammillary processes in the lumbar spine) via the overlying tissue (Bergmann, 2005). The force and amplitude of a short lever specific thrust required to move one segment or joint within the spine is less than with a non-specific contact covering multiple segments or joints (Bergmann, 2005). This would make the specific manipulation less traumatic to related joints and surrounding tissues. The specificity, according to Plaugher and Lopes, (1993) of a manipulation of a motion segment that "needs" a manipulation is a key to limiting variables and predicting outcomes for the patient. However, often specific contact points are difficult to locate on certain obese or very muscular patients and there is a necessity to sacrifice specificity and patient comfort in the manipulation and a greater amount of force is required (Bergmann, 2005). With regards to specificity of a manipulation, according to Bronfort *et al*. (2004), there was little agreement signifying the necessity of adjusting specific segments only.

Ross *et al*. (2004) in an investigation to determine the joint pop or cavitation location during lumbar and thoracic manipulation, used accelerometers secured to the skin over the spinal column. The accelerometers detected the vibrations from the cavitations associated with the manipulation and calculated the source of the vibration. They concluded that in most cases many cavitations occur during a single manipulative procedure. They commented further saying; the

specific manipulative treatment to a joint may not be necessary, but if accuracy is required, other techniques should be employed.

2.3.2.2 MANIPULATION OF THE SAME SEGMENT ON BOTH SIDES

The effectiveness of manipulation of the symptomatic Sacroiliac (SI) joint compared to the manipulation of both the asymptomatic and symptomatic SI joints in the treatment of unilateral SI syndrome was investigated by Marszalek (2002). It was concluded that there were no added benefits on pain rating scales and digital algometer readings in the treatment of both symptomatic and asymptomatic joints. There appears to be a significant lack of research done on this subject.

2.3.2.3 THE MANIPULATION OF MULTIPLE SEGMENTS WITHIN THE SPINE

Dysfunction at one level can trigger compensatory changes at other levels or areas of the muscloskeletal system (Redwood, 2003). The theory of compensation is that the site of pain may not be the site of the cause of the pain (Redwood, 2003). When a motion segment within the spine becomes restricted in a particular direction, adjacent articulations will compensate with increasing mobility, so that total overall range of motion is preserved (Plaugher, 1993). If the primary lesion or restriction is present for an extended length of time, the hypermobile state, being the secondary reaction to the restricted joint, may present as the primary source of symptomatology and management related to symptomatology can often lead to inappropriate treatment (Plaugher, 1993). In a rating of specific chiropractic technique procedures for LBP by Gatterman *et al*. (2001) some of the least effective treatments for general LBP were an upper cervical manipulation and lower extremity manipulation. There does however appear to be more of a coupling pattern related to closer segments within the

spine, namely the lower thoracic segments (Enebo and Gatterman, 2005) and sacroiliac joints (Plaugher, 1993, Walters, 1993) with regards to LBP.

2.3.2.4 THE MANIPULATION OF THE SACROILIAC (SI) JOINTS

SI joints must be considered within the differential diagnosis of low back pain (Forst *et al*., 2006). Standard clinical evaluation techniques are often limited in producing substantial evidence of SI joint pain, especially due to a highly variable amount of movement even in the SI joints of the same person (Mierau, 2005). The shape, interlocking surfaces and strong dense ligaments make the SI joints stable and capable of very little movement (Mierau, 2005). There is considerable controversy and debate over joint dysfunctions within the SI joint, its effects on axes of rotation and translation, unilateral joint dysfunctions, short leg syndromes, patterns of pain, the role of the muscles spanning the joint and its biomechanical involvement in LBP (Mierau, 2005). Mechanical dysfunctions of the sacroiliac joints can lead to altered mechanics of the hips, pelvis and spine (Walters, 1993) which makes it an important area to treat as part of a LBP treatment protocol (Mierau, 2005).

2.3.2.5 USING INSTRUMENT ADJUSTING METHODS

Using instrument adjusting methods, a force is applied by a handheld percussion device featuring a rubber tip that is in direct contact with the chosen segmental contact point of the subject (Gatterman *et al.*, 2001). Advocates of instrument adjusting procedures regard the reproducible and very controlled, predetermined force, a significant factor for safety and some regard it as being superior to manual contact manipulations (Plaugher and Lopes, 1993).

Kawchuk *et al.* (2006) investigated the variability of force magnitude and force duration in manual and instrument-based manipulation techniques. They found

instrument angulations and opposition to instrument recoil, was likely to influence variability of the force produced by the instrument as well as varying significantly in terms of magnitude, duration, and the site of the application of the force. According to Gillespie (2004), the activator adjusting instrument can be used with confidence when managing low back pain, but manually administered chiropractic manipulations appear to show greater overall improvements within pain rating scales. Furthermore, manual articular manipulation distracts the facet joints, with a fast separation and an auditory cavitation is heard, leading to more of a psychological feeling that the vertebra has been “returned to its normal position” and very often spontaneous improvement is experienced (Maigne and Vautravers, 2003).

2.3.2.6 MOBILIZATIONS

Mobilizations are movements applied singularly or repetitively within or at the physiological range of joint motion, without imparting a thrust (Gatterman *et al*., 2001, Scaringe and Kawaoka, 2005). Joint mobilizations are used to restore the physiologic articular relationship within a joint (Dutton, 2002). Mobilizations can decrease pain, decrease muscle guarding, lengthen tissue around the joint, increase proprioceptive awareness and influence muscle tone via neuromuscular influences (Dutton, 2002). According to Bronfort *et al*. (2004), spinal manipulative therapy or mobilizations provide either similar or better pain outcomes in the short and long term when compared with placebo and other treatments for both chronic and acute LBP. For acute LBP, there is moderate evidence that spinal manipulative therapy provides more short-term pain relief than mobilization (Bronfort *et al.,* 2004).

It is important to be aware that mobilizations are not a substitute for manipulation (Gatterman *et al*., 2001); however both have been regarded as effective in the treatment of chronic LBP (Airaksinen *et al.,* 2004).

2.3.2.7 DROP PIECE OR TABLE ASSISTED MANIPULATIONS

Drop piece treatment tables feature movable segments which are capable of being cocked upwards and released downwards once a set release threshold is reached thus creating a high velocity low amplitude thrust (Gatterman *et al*., 2001). The release of the movable segment offers a conservative biomechanical advantage (Triano, 2005), often referred to as a toggle recoil effect (Hooper, 2005).

Jacobs (2005) investigated the efficacy of a single toggle recoil drop piece manipulation technique on sacroiliac joints for sacroiliac dysfunction. The symptomatic sacroiliac joint was manipulated using a drop piece. The results with both subjective and objective findings were in favour of the technique which was deemed effective for the treatment of sacroiliac dysfunction.

Drop piece tables have a variety of applications, including the treatment of large patients by small chiropractors to overcome “inertia” of the patient’s body, patient sensitivity to pressure at the application site, and often where manual articular manipulation may be contraindicated such as in cases of extreme osteoporosis, disc herniation, internal disc derangement and instability (Triano, 2005). According to Gatterman *et al.,* (2001) a prone drop piece assisted manipulation was rated as one of the top three chiropractic techniques used for the treatment of LBP.

2.3.3 THE MANUAL ARTICULAR SPINAL MANIPULATION

The manual articular spinal manipulation is frequently referred to as high velocity low amplitude (HVLA) procedure or as an adjustment or manipulation (Triano, 2005, Lawrence *et al*., 2008). The indications of spinal manipulation and its various techniques differ across schools of thought (Maigne and Vautravers, 2003). The mechanisms of action of a manipulation focus on the relative stiffness of joint tissues and the effects of the distribution of local joint stress to maximize normal joint motion (Triano, 2005). Although the application of the manipulation technique may be highly variable (Maigne and Vautravers, 2003) the underlying principles are fairly consistent (Bergmann, 2005). Mechanical and reflex mechanisms are thought to be the dominant effects of a manipulation but psychological responses can be expected (Triano, 2005).

According to Redwood, (2003) only spinal manipulation can relieve both pain and restore function. Cooperstein *et al*. (2001) stated that the "right manipulation" was a specific, HVLA thrust that corrected a subluxation, and with it the associated nerve interference, but due to variations in chiropractor's size, strength, or speed, some varied manipulations may be practiced (Bergmann, 2005).

Spinal manipulative therapy reduces symptoms and improves function in patients with acute and chronic LBP (Lawrence *et al*., 2008). The manually administered chiropractic manipulation has shown greater overall improvements within pain rating scales compared to the use of adjusting instruments for LBP (Gillespie, 2004), where rotational type maneuvers have been concluded to be most effective, with decreasing pain and increasing function in patients with central or paravertebral LBP (DiFabio, 1992). Outcomes of spinal manipulation are either similar or better in the short or long term when compared with placebo and with other treatments (Bronfort *et al*., 2004). However manipulation alone in the treatment of LBP should form part of an entire management program which should include varied patient education strategies (Nyberg and Basmajian,

2005). The European Guidelines for acute LBP advised spinal manipulation for patients who were failing to return to normal activities (van Tulder *et al*., 2005), whereas the European Guidelines for chronic LBP suggested a short course of spinal manipulation a satisfactory treatment (Airaksinen *et al*., 2004).

2.3.4 MANAGEMENT OF PATIENTS WITH CONTRA-INDICATIONS TO HIGH VELOCITY LOW AMPLITUDE (HVLA) MANIPULATION

Spinal manipulative therapy appears to be one of the most conservative, least invasive and safest procedures in provision of health care services (Terrett, 2005). The loads that are generated during a maximum effort lumbar spine HVLA manual articular manipulation procedure are consistent with common daily tasks on jobs requiring lifting and twisting movements, yet most manipulations are on sub maximal levels of effort (Triano, 2005). Nevertheless, light force techniques, such as pelvic blocking, distraction techniques, instrument adjusting and soft tissue approaches (which are dealt with in detail further on in this chapter) are some of the modifications necessary for certain high risk or contra-indicated patients to manipulation techniques (Souza, 2005).

Some of the contra-indications to manipulation include high doses of anticoagulants, recent back surgery, spinal infection, spinal cancer, neurological signs, unstable spinal segments, bowel or bladder incontinence, severe osteoporosis, signs of acute myelopathy or cauda equine syndrome and acute inflammatory arthritis (Souza, 2005, Nyberg and Basmajian, 2005).

2.3.4.1 DISTRACTION AND TRACTION TECHNIQUES

According to Gatterman *et al.,* (2001) in a review of rating technique procedures for LBP conditions, distraction techniques are one of the top three most

successful chiropractic techniques. Distraction techniques are one of the many "Light Force" techniques which can be considered when the risk factors of using HVLA manipulation techniques are in question (Souza, 2005). The long lever action can place the lumbar spine through the normal ranges of motion of flexion, extension, lateral flexion, rotation and combined movements of circumduction and a specific contact by the therapist can lead to a more specific, short lever action with segmental pressure applied upwards assisting the long lever actions (Bergmann, 2005). However, in a review of the literature for the use of spinal manipulation for LBP, the high velocity low amplitude chiropractic manipulation was shown to have better outcomes than traction in the treatment of LBP (Lawrence *et al*., 2008).

Classification of traction therapy is generally based on the duration of the application, which may be continuous (hours to days), sustained (20–60 minutes), or intermittent (alternating traction and relaxation with cycles of a few minutes or less) (Gay and Brault, 2008). However the apparent lack of dose-response relationship according to Cox and Gudavalli (2005) suggests that low doses are probably sufficient to achieve benefit.

2.3.4.1a LEANDER TRACTION

Leander traction is a hybrid mechanism of traction often referred to as a distraction manipulation, having characteristics of both manipulation and mobilization (Gay *et al*., 2005). It is a non-thrust mechanically assisted technique using specially designed treatment tables that have been adapted for wide uses, primarily within the chiropractic profession (Gay *et al*., 2005). Gay *et al.* (2005) in a review of the literature of distraction manipulations of the lumbar spine found a Y-axis distraction force applied to the spine coupled with passive flexion distraction resulted in temporary decompression of the lower lumbar disc spaces and facet joints thereby opening up the intervertebral foraminae (IVF). This is

proposed to lead to diminishing disc protrusions in patients with herniated discs and increase space for neural elements passing through the IVF (Cox and Gudavalli, 2005).

Leander traction generally uses intermittent traction, which is usually 10-15 rhythmic distractions per minute for a ten minute period, but variations according to patient presentation are taken into consideration (Cox and Gudavalli, 2005). The exact mechanism by which distraction manipulation may influence spinal disorders is at present unknown (Gay *et al*., 2005).

An investigation involving manually controlled, intermittent, multi-directional traction for mechanical LBP, Oswestry back disability Index and numeric pain rating scales revealed no significant differences in spinal manipulative therapy with or without the traction (Kretzmann, 1995).

With approximately 5% of patients unable to tolerate distractive manipulation (Cox and Gudavalli, 2005), the safety of this procedure should be questioned. Gay *et al*. (2005) rated distractive manipulation to be equal or safer than side-posture spinal manipulation because distraction manipulation does not involve a forceful rotary motion. Further investigations are still necessary to determine if distraction manipulation is safe and as effective as other treatments for LBP (Gay *et al*., 2005).

2.3.4.1b INVERSION TABLE

Inversion tables use the gravitational pull of the patient's body, which is inverted, to induce a traction mechanism (Cox and Gudavalli, 2005). Gravitational pull establishes a built-in safety factor, as opposed to intermittent uncontrolled forces being applied to the body (Lancourt, 1998). Besides discomfort experienced by patients during this type of traction, it has been found to be an effective method

to distracting the lumbar vertebrae (Ibrahim *et al.,* 1998). There is little evidence that simple intermittent axial traction differs in effectiveness from the more complex and mechanized forms of traction (Gay and Brault, 2008). However guidelines constructed by some reputable organizations and governing bodies indicate that there is no convincing evidence for the effectiveness of lumbar traction compared with other treatments in the treatment of both chronic (Airaksinen *et al.,* 2004) and more acute LBP (van Tulder *et al*., 1997 and 2004).

2.3.4.2 PELVIC BLOCKING

Pelvic blocking uses a pair of padded wedges which are inserted under each hemipelvis in specific positions for a presenting condition for various periods of time, in the prone or supine position (Gatterman *et al*., 2001). It is based on the theory that dysfunction in the sacroiliac ligament (especially the interosseous and posterior ligaments), results in a decreased ability of the subject to bear weight in a balanced fashion (Hochman, 2005), very often presenting with a leg-length inequality.

Leg-length inequality (of 1cm or more) and its effects on the pelvis are considered clinically significant factors in LBP presentations (Klingensmith and Blum, 2003 and Giles, 2005). In a patient where a leg-length inequality of 1cm or more is present with pelvic obliquity, a postural scoliosis may be present (Giles, 2005). Factors such as trauma, long-standing ergonomic factors or repetitive micro-trauma may be the stimulus for creating this asymmetry. Pelvic wedges placed at specific locations under the pelvis should induce a counter force within the pelvis. The relationship between pelvic block placement and radiographic pelvic analysis was investigated by Klingensmith and Blum (2003); they observed a change in leg-length when the blocks were placed under the patient's pelvis, yet it appeared to be inconsistent when compared with the radiographic findings. They were not able to demonstrate that any radiographic changes took place by

the insertion of pelvic wedges even though they observed the leveling of the leg-length inequality with the wedges in place. According to Hochman (2005), pelvic blocking improved lumbar ranges of motion significantly and, small improvements in the cervical spine were also noted. Abnormal segmental motion whether it be hypomobile or hypermobile joints or changes of mechanics in these joints, does not necessarily formulate the exclusive cause of general low back pain (Enebo and Gatterman, 2005). Further investigation is required into the actual effects of this light force conservative treatment approach to LBP.

2.3.4.3 NON STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDs)

There is much debate over the use of over the counter pharmacological interventions in chiropractic practice and, although integration of pharmacology is part of the curriculum for most chiropractic courses, the training according to McCarthy (2008) is insufficient to allow incorporation without further education. However, the alleviation or suppression of perpetuating factors through the administration of medications may increase the efficacy of other modalities, such as spinal manipulation, and speed of the recovery process (Raj and Paradise, 2004).

NSAIDs are the most regularly prescribed medications worldwide and are commonly used for both chronic and acute LBP (Roelofs *et al*., 2008). NSAIDs have a mild short-term symptomatic relief in patients with acute and chronic LBP and, compared with placebo treatments the results were in favour of NSAIDs, but at the “fee” of statistically significant side effects (Roelofs *et al.*, 2008). Paracetamol has evidently been more effective for acute LPB, with the added benefit of fewer side effects (van Tulder *et al*., 2005 and Roelofs *et al*., 2008). New medications such as cyclooxygenase-2 (Cox-2) inhibitors have similar efficacies to NSAIDs, but with less effect on gastric prostaglandins. However

Cox-2 inhibitors may be associated with increased risk of transient ischemic attacks, myocardial infarction, and unstable anginas (Bougie, 2005).

Spinal manipulative therapy has been shown to decrease inflammatory cytokines, reducing the inflammatory-type responses via a central yet unknown mechanism, which intimates that manipulative therapy is an effective and noninvasive alternative to certain pharmacological therapies (Teodorczyk-Injeyan *et al*., 2006).

According to the European Guidelines, management of acute LBP includes medication that must be prescribed, if necessary, for pain relief, first choice being Paracetamol, the second choice NSAIDs (van Tulder *et al*., 2005). The European Guidelines for chronic LBP mention evidence is strong that NSAIDs are effective for the relief of chronic low back pain, but should only be used for exacerbations or short-term periods of up to three months (Airaksinen *et al*., 2004).

2.3.4.4 INTRA MUSCULAR ANTI INFLAMMATORY INJECTION

Patients presenting with possible contra-indications to manipulation or high severity of symptoms may benefit by referral for co-management of symptoms with medication (Lawrence *et al*., 2008). With recent courses being made available for chiropractors for the administration of intra-muscular anti-inflammatory injections (Engelbrecht, 2008); it has opened up another dimension to treatment protocols. Although integration of pharmacology is part of the curriculum for most chiropractic courses, the training according to McCarthy (2008) is insufficient to allow incorporation without further education.

A randomized control trial involving a comparative study of diclofenac or manipulative therapy or both for acute LBP was conducted by Hancock *et al.* (2007). Neither diclofenac, (which appears to be as effective as other NSAIDs)

nor spinal manipulative therapy, by physiotherapists (mainly being low-velocity mobilization), gave clinically useful effects on the primary outcome of time to recover from acute LBP.

The World Federation of Chiropractic resolved that for reasons of chiropractic principle, patient welfare and interdisciplinary cooperation the practice of chiropractic should not include the use of prescription medicines. But chiropractic patients who may benefit from prescription drugs should be referred to a medical practitioner (WFC: Use of Prescription Drugs, 2003).

2.3.4.5 REFERRING TO ANOTHER HEALTHCARE PRACTITIONER

Various health care providers may be involved in the treatment of LBP in a primary setting. Patients presenting with contra-indications to manipulations and cases with high severity of symptoms may benefit more by referral for co-management of symptoms with medication (Lawrence *et al*., 2008). There is evidence that spinal manipulation in addition to general practitioner (GP) care is more effective than GP care alone in the treatment of chronic LBP (Airaksinen *et al.*, 2004).

Evidence from trials based on multidisciplinary programs targeting acute LBP includes a variety of interventions such as exercises, education, workplace visits, ergonomic advice and behavioral treatment (van Tulder *et al*., 2004). It is unclear what the effectiveness of the various components of these programs are, but they are generally associated with a treatment protocol for a more chronic presentation of LBP (van Tulder *et al*., 2004). A multidisciplinary, bio-psychosocial rehabilitation with functional restoration for patients with chronic LBP should be considered for patients who have failed mono-disciplinary treatment approaches (Airaksinen *et al*., 2004).

2.3.5 TREATMENT VARIATIONS ACCORDING TO ACUTE OR CHRONIC PRESENTATIONS

Most cases of LBP resolve regardless of the course of therapy within two to four weeks (Hills, 2005) but some do not improve (Shekelle and Delitto, 2005). Spinal manipulative therapy appears to reduce symptoms and improve function in patients with acute or chronic LBP (Lawrence *et al.*, 2008), with outcomes either similar or better in the short or long term when compared with placebo and with other treatments (Bronfort *et al*., 2004).

With presentations of high severity of acute or chronic LBP symptoms, benefit for the patient by referral for co-management of symptoms with medication is advised (Lawrence *et al*., 2008).

2.3.5.1 ACUTE LOW BACK PAIN

Most non-traumatic, presentations of acute LBP are exacerbations of a chronic condition (Plaugher, 1993). Acute conditions include recent trauma, aggravation of a chronic condition or inflammation (Souza, 2005) with symptoms that have been present four to six weeks or less (Hills, 2006). Evidence is present for manipulation of an acute presentation of LBP, with resulting improvements in range of motion and joint mobility, with a supplementary focus on decreasing pain and inflammation (Souza, 2005 and Hills, 2006). Interestingly van Tulder *et al*. (2004) recommended that passive treatment modalities such as bed rest, massage, ultrasound, electrotherapy and traction should be avoided as they may increase the risk of chronicity. Most guidelines are in agreement that psychological and social factors need to be considered, even in the acute stages of LBP, yet especially when the patient is not recovering (Moffett and Mannion, 2005).

The main objective according to Moffett and Mannion, (2005) is that any treatment approach that encourages and enables the individual with acute LBP to resume his or her normal activities, is the one to be recommended.

2.3.5.2 CHRONIC LOW BACK PAIN

Low back pain symptoms that have been present for greater than a 12 week period are considered to be chronic (Hills, 2005). There is evidence that manipulation is more effective than a placebo treatment for chronic LBP, especially with regard to the short-term effects (van Tulder *et al*., 1997). Shekelle and Delitto (2005) believe that most patients greatly value treatments that result even in short-term improvements in pain, even if long term outcomes are no different.

According to Haas *et al.* (2004) a concentrated course of chiropractic care of up to 12 visits in a three week period appears to be appropriate for the treatment of chronic LBP and interestingly, the inclusion or exclusion of physical modalities at each visit apparently has no meaningful effect on pain improvement. For most therapeutic procedures, the effects are somewhat modest; furthermore there appears to be no single intervention which is likely to be effective in treating the overall problem of chronic LBP of longer duration and more substantial disability, due to its multidimensional nature (Airaksinen *et al.,* 2004).

2.3.6 MYOFASCIAL TREATMENTS

Myofascial pain syndrome (MPS) is defined as a musculoskeletal pain disorder caused by one or more myofascial trigger points (TPs) and their associated reflexes (Simons *et al*., 1999). MPS may be one of the most common causes of persistent musculoskeletal pain including chronic LBP (Raj and Paradise, 2004).

Eleven muscles have been shown to have a myofascial involvement with pain in the low back, with the quadratus lumborum being the most common in LBP complaints (Raj and Paradise, 2004). Gatterman *et al.* (2001) noted the significance of the myofascial component in LBP and said it was within the scope of chiropractic practice to address these conditions.

In general, according to Cummings and Baldry (2006) myofascial pain syndromes that have been present for six months or less appear to be curable, whereas those that have been present for longer may have a tendency to relapse and have to be treated with more of a symptomatic approach.

2.3.6.1 ISCHEMIC COMPRESSION (TRIGGER POINT PRESSURE RELEASE)

Ischemic compression has been found to be more effective than numerous other modalities in the treatment of myofascial TPs (Hong *et al*.,1993). Ischemic compression involves palpatory pressure on myofascial TPs until a state of tension relief inactivates the TP (Raj and Paradise, 2004). Ischemic compression can provide effective pain relief, but it appears to work best in conjunction with other modalities to effectively deactivate the myofascial TP (Raj and Paradise, 2004).

Hong *et al*. (1993) compared the effectiveness of ischemic compression, spray and stretch, moist heat and ultrasound for the treatment of upper trapezius muscle myofascial TPs. Ischemic compression was found to be significantly more effective than the other three treatment approaches.

A study to determine the relative effectiveness of myofascial manipulation versus ischemic compression in the treatment of myofascial trigger points was undertaken by Shacksnovis (2005). He concluded that both treatments showed statistical improvements in terms of subjective and objective clinical findings with no statistical differences being evident between the two treatments. Furthermore,

Webb (2003) established that a home program of self ischemic compression using a Thera-Cane device was an effective treatment for patients suffering with active TPs, with results being comparable to clinically administered ischemic compression in terms of subjective and objective clinical findings.

Vernon and Schneider (2009) concluded that there was moderately strong evidence that ischemic compression provided immediate relief from myofascial TP pain, but there was little or no evidence of the long term effectiveness thereof.

2.3.6.2 MASSAGE

Massage is any mechanical stimulation of tissues by means of rhythmically applied pressure and stretching (Prentice, 1994). There is a wide range of physiological and psychological therapeutic benefits that can be induced by massage (Prentice, 1994). Similar to stretching, massage therapy can release tension within the muscle fibers and break down taut bands or knots associated with myofascial TPs (Raj and Paradise, 2004).

According to a review by Furlan, *et al*. (2002) massage is beneficial for patients with subacute and chronic nonspecific LBP, in terms of improving symptoms and function. In the review one high-quality study showed that patients who received massage combined with exercises and education were significantly better than those who received exercises only. The assessment included measurements of function and pain intensity on both short and long-term measurements.

Massage improves TP sensitivity significantly compared to control groups but a specific effect has not been concluded (Cummings and Baldry, 2006). Unexpectedly it was not recognized as an effective treatment for acute (van Tulder *et al*., 2005) and chronic LBP (Airaksinen *et al.*, 2004) by the European Guidelines for management of LBP. Its use before manipulation can be

recommended and not as a treatment in itself but to support the pursuit of continued activity by temporarily relieving myofascial pain (Moffett and Mannion, 2005).

2.3.6.3 ELECTRICAL MODALITIES

In the last 20 years there has been considerable development of therapeutic electrical devices. A wide-range of wave shapes, amplitudes and frequencies can now be used in many combinations to have a number of desired effects. Effects can target various physiological functions from a cellular to systemic levels (Prentice, 1994).

2.3.6.3a INTERFERENTIAL CURRENT (IFC)

Interferential current is an alternating current (AC) stimulator that uses two biphasic medium frequency sinusoidal AC currents that are designed to interfere with each other (Hooper, 2005). Benefits are related to the depth of muscular penetration, a wide area of effect and it is often considered to be the most comfortable form of electrical stimulation (Hooper, 2005). According to Vernon and Schneider (2009), most trials of IFC involved either immediate or short-term relief of myofascial TPs and that more research, especially on the longer-term effects was needed. There appears to be a general lack of evidence for the effectiveness of IFC in most research trials (Vernon and Schneider, 2009) making it a modality which is not recommended for use as a sole therapy for both acute and chronic LBP or the myofascial components thereof (Moffett and Mannion, 2005).

2.3.6.3b TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION (TENS)

TENS units are usually small pocket sized battery operated devices with electrodes which are placed on the skin. Due to the large range of frequencies available in modern TENS units, multiple effects are assumed to be elicited, influencing sensory, motor and noxious level stimulation (Hooper, 2005). Three modes of action are theorized, including the gate control theory, endogenous opiate release and central biasing involving the activation of pain fibers near the site of stimulation (Dutton, 2002).

Hutchings (1998) conducted a clinical trial investigating the effect of TENS with respect to electrode placement. Treatments were concluded to be effective with both direct placement of the electrode over the TP and also placement within the pain referral zone of the targeted muscle.

TENS has been shown to increase pain threshold readings over treated myofascial TPs (Cummings and Baldry, 2006). Yet, unsatisfactory results of the use of TENS in recent years have limited its range of application (Dutton, 2002). There is evidence however, that TENS may be effective in providing immediate relief of TPs (Vernon and Schneider, 2009) when used solely in the treatment of acute LBP, which appeared to have no benefit over a placebo (Bogduk, 2006). TENS appears only to be effective in some patients, but comprehensive and satisfactory explanations have not been provided for so far (Dutton 2002). According to van Tulder *et al.* (1997) TENS is ineffective in the treatment of LBP. The high velocity low amplitude chiropractic manipulation has been demonstrated to have better outcomes than TENS when on its own (Lawrence *et al.*, 2008) and has not been recommended as a treatment for chronic (Airaksinen *et al.*, 2004) and/or acute LBP (van Tulder *et al*., 2005) or the myofascial components thereof (Moffett and Mannion, 2005).

2.3.6.3c ULTRASOUND

The use of ultrasound as part of a treatment protocol is common in chiropractic practice, yet it is probably the least understood of all the electrotherapies (Hooper, 2005). Ultrasound produces an acoustic vibratory energy which is produced by passing electrical energy through a piezo-electric crystal contained in a transducer (Hooper, 2005).

There is conflicting evidence as to whether ultrasound is more effective than a placebo or is to some extent more effective than other therapies in the treatment of TPs (Vernon and Schneider, 2009). Ultrasound was shown to be ineffective according to a review for the management of myofascial pain by Cummings and Baldry (2006). They mentioned that the higher intensity ultrasound treatment (referred to as high-power, pain-threshold, static ultrasound) has subsequently demonstrated to be more effective than conventional ultrasound when targeted at myofascial TPs. There is limited evidence which states the effectiveness of ultrasound, which has consequently resulted in not even partial mention in the management for acute or chronic LBP by European Guidelines and Moffett and Mannion (2005).

2.3.6.4 DRY NEEDLING

Dry needling involves the precise insertion of a fine needle (usually acupuncture needles) into myofascial TPs, leading to sensory stimulation as well as mechanical disruption in the tissues (Raj and Paradise, 2004 and Cummings and Baldry, 2006) and with proper insertion, immediate anesthesia can be elicited (Raj and Paradise, 2004).

Jones (1994) investigated the efficacy of dry needling in the treatment of myofascial pain and concluded dry needling combined with a home program of stretching exercises was more effective than placebo ultrasound.

Hong (1994) conducted a double-blinded controlled comparative study of the therapeutic efficacy of active TP injection with and without local anaesthetic agent. The 15 patients that received dry needing experienced post-needle tenderness. More needle insertions were required in order to inactivate the trigger points in comparison to the 26 patients receiving the 0.5% Lidocaine injections. Furthermore, the Lidocaine group experienced less post-needle tenderness. Hong (1994) also demonstrated that it was essential to elicit a local twitch response during TP injection or dry needling in order to achieve full relief.

A review commented on by Cummings and Baldry (2006) demonstrated the effectiveness of treating myofascial pain with varied methods of trigger point injections. Conclusively the results showed that the nature of the injected substance made no difference to the outcome and strangely there was no therapeutic benefit in wet (injection of substances) over dry needling. All groups in the review in whose trigger points were needled showed marked improvement in their symptoms. Broome (1996) confirmed the findings above, with no additional therapeutic benefits of a saline injection over dry needling, and also confirmed the significant improvements of both therapies to subjective and objective findings.

Recent reviews of clinical trial evaluations of chiropractic management of myofascial TPs by Vernon and Schneider (2009) have revealed dry needling techniques alone did not appear to be superior to other treatments in the treatment of myofascial TPs. They were unable to find evidence for a specific efficacy of these techniques beyond placebo and remarked that more placebo-controlled trials were necessary. Furlan *et al*. (2005) suggested that dry-needling may be a useful adjunct to other therapies for chronic LBP. Further investigations

appear necessary to establish the specific effect of TP needling (Cummings and Baldry, 2006).

2.3.6.5 DRY NEEDLING IN CONJUNCTION WITH TENS

Electrode placement in TENS is of particular importance to a successful treatment (Hooper, 2005) and with the use of acupuncture needles (dry needling), inserted as electrodes into TPs, a very specific placement can be utilized. However, just by proper insertion of the needle an immediate reflex anesthetic effect can be elicited, known as the “needle effect” (Raj and Paradise, 2004).

A comparison between dry needling and electro-dry needling was conducted by Cumming, (2003) which revealed no significant differences with regards to the response to treatment in terms of pain rating scales. Very little literature is available on the combination of these two modalities.

2.3.6.6 ACUPUNCTURE

Traditional acupuncture is based on a number of philosophical concepts, one of which postulates that the manifestation of disease is a sign of imbalance between the male and female (Yin and Yang) energies within the body (Furlan et al., 2005). These energies circulate throughout the body along “meridians,” which are either feminine or masculine in character. Specific points, either on the skin surface or just below it, are believed to reflect all disorders. With the appropriate insertion of acupuncture needles into points along meridians, it is thought to restore the balance in the male and female energies. In a survey of traditional acupuncturists in the state of Washington, USA, the most often selected points

for the acupuncture treatment of LBP were from the Urinary Bladder, Kidney, Du, and Gall Bladder meridians (Sherman *et al.,* 2001).

Deep acupuncture to TPs has evidently been effective in the treatment of myofascial pain for up to three months according to Vernon and Schneider (2009). However, its use in the treatment of chronic LBP was not recommended by European Guidelines for its management, due to conflicting evidence and lack of conclusive efficacy (Airaksinen *et al.,* 2004). According to Furlan *et al*. (2005), acupuncture for chronic LBP is more effective for pain relief and functional improvement than no treatment in the short-term. Furthermore, Furlan *et al*. (2005) concluded that there was inconclusive data regarding the effectiveness of acupuncture for acute LBP and saw it as being no more effective than other conventional and “alternative” treatments.

2.3.6.7 PROPRIOCEPTIVE NEUROMUSCULAR FACILLITATION (PNF)

With spinal joint injury, proprioceptive activity may be disturbed (Saliba *et al.,* 1993). PNF is the application of a manual stimulus which stimulates proprioception activation within tissues within the body. Through stimulation of proprioceptors, spinal movement control and motion segment stability can be improved (Saliba *et al.,* 1993). A randomized clinical trial by Mac Dougall (1999) to evaluate the effectiveness of PNF as opposed to static stretching revealed both were effective forms of manual therapy, but results were not maintained for both interventions on a one month follow-up period.

2.3.6.8 STATIC STRETCHING

Any abnormal functioning of the lower extremity supporting structures including muscles, ligaments, tendons, and fascia may cause altered pelvic biomechanics and result in sacroiliac joint restrictions and LBP (Kasunich, 2003). Myofascial stretching exercises are a vital element of any multidisciplinary, pain management regimen (Raj and Paradise, 2004). McClure (1993) concluded that passive static stretching was a simple and safe method of regaining range of motion. Regular stretching appears to reduce pain by normalizing muscle physiology and reducing chemical imbalances that may irritate sensory and motor nerve endings, thereby reducing myofascial TPs (Potgieter, 2006).

A case study was carried out by Kasunich (2003) on a long distance runner who presented with LBP, sacroiliac pain and iliotibial band tightness. Iliotibial band syndrome, like many other overuse conditions, should be considered as a possible cause of LBP in runners and cyclists (Kasunich, 2003). In Kasunich's case study an unsuccessful treatment protocol of just manipulation, later resulted in an approach including static stretching, manipulation of the sacroiliac joints and lumbar spine in conjunction with cross-frictional massage of the iliotibial band. The results were successful, reducing symptoms of LBP, iliotibial band pain and sacroiliac pain, with the accompaniment of a gradual increase in exercises. However, with the adjunctive treatments involving both cross friction and regular stretching, it was not possible to see exactly which intervention was more effective.

2.3.6.9 REFERRING TO ANOTHER THERAPIST FOR MYOFASCIAL COMPONENT

No single treatment intervention is likely to be effective in treating the overall problem of chronic LBP of longer duration and more substantial disability, due to

its multidimensional nature (Airaksinen *et al*., 2004). Interventions such as massage have been recommended before manipulation to support the pursuit of continued activity by temporarily relieving pain within the musculature (Moffett and Mannion, 2005).

For patients who have had poor responses to mono-disciplinary treatment approaches for chronic LBP, they should consider multidisciplinary rehabilitation aimed at functional restoration (Airaksinen *et al*., 2004). Each treatment or therapy has a potential role in recovery (Menke, 2003).

Current trends, clinical communication and patient management skills in an interdisciplinary environment are vital to chiropractors in keeping pace with the future of health care and patient's needs (Menke, 2003). The responsibility rests on each chiropractor to make certain that the care and advice they provide is of benefit to their patients (Haneline, 2007). The referral of patients to external therapists or exercise instructors for the treatment of the myofascial components of a condition is common (Opperman, 1997 and Furlan, 2002). There appears to be limited information available regarding the referral of patients for specifically the myofascial component of LBP.

2.3.6.10 INJECTION OF ANESTHETIC

The injection of varied substances directly into trigger points is a common practice for treatment of myofascial TPs, often referred to as wet needling (Hong, 1994 and Raj and Paradise, 2004). Twenty three randomized controlled trials were reviewed by Cummings and Baldry (2006) which conclusively showed that when treating myofascial pain with trigger point injection the nature of the injected substance makes no difference to the outcome. Furthermore, there appears to be no improved therapeutic benefit in injection of substances over dry needling (Broome, 1996, Raj and Paradise, 2004 and Cummings and Baldry,

2006). Hong (1994) however revealed that injections with 0.5% lidocaine into myofascial TPs, reduced post injection soreness of greater intensity and duration in comparison to dry needling. Hong (1994) recommended the use of lidocaine over dry needling to reduce the intensity and duration of post injection soreness.

Results, in comparison to other less invasive needling therapies, have been demonstrated to be as effective to injections of anesthetics. This has resulted in guidelines for the treatment of LBP not recommending the use of trigger point injections. (Airaksinen *et al*., 2004).

2.3.6.11 STRETCH AND SPRAY TECHNIQUES

Stretch and spray techniques involve stretching of a muscle or group of muscles proceeded by spraying of a coolant over the skin of the stretched part (McClure, 1993 and Raj and Paradise, 2004). This process can be repeated two to three times until the skin becomes cold (Raj and Paradise, 2004). According to McClure (1993) spray and stretch techniques are sometimes successful when other methods of stretching have demonstrated to be unsuccessful. Hou *et al.* (2002) found that ischemic compression with spray and stretch provided immediate benefit in reducing TP sensitivity.

Kostopoulos and Rizopoulos (2008) studied the effects on range of motion of stretch and spray in comparison to just stretching of the hip musculature. The findings of the study supported the use of vapocoolants in therapeutic treatments of the hip, and it was thought that it may be a viable approach to the treatment of other joints for increasing range of motion.

Stretch and spray techniques are often cited by clinical experts as a valuable treatment of TPs (Raj and Paradise, 2004), but there are very few published

clinical trials of spray and stretch therapy for management of pain from TPs (Hou *et al.,* 2002), especially in the treatment of quadratus lumborum TPs.

2.3.6.12 CRYOTHERAPY

The traditional rule of an acute injury is in the application of ice to reduce the accumulation of tissue fluid in the injured area (Hooper, 2005). The body responds to the application of ice by an initial period of vasoconstriction, reducing the blood flow to the area, followed by vasodilation (Hooper, 2005). According to Hooper (2005), approximately every four to six minutes of ice application there is a cyclical vasoconstriction followed by vasodilatory effect. This effect minimizes any damage that might occur from a drastic reduction in blood flow. Pain treatment should be initiated early with the application of ice to gain efficient control over the inflammatory process of an acute injury (Hills, 2005).

Cryotherapy is perhaps the most widely used of all physical therapies (Hooper 2005). But in a recent review by French *et al*. (2006) in the application of heat and cryotherapy for low back pain, limited and poor quality studies were found. There also appears to be conflicting evidence in determining the different uses of cryotherapy for both chronic and acute phases of low back pain. This led to French *et al*. (2006) finding no definitive conclusions in their review about the use of cryotherapy, even though it is extensively used.

2.3.6.13 HEAT PACK

Physiologically, superficial topical application of heat increases local temperature and metabolism of local tissues and increases muscle relaxation, tissue extensibility, capillary permeability and vasodilation (Airaksinen *et al*., 2004). Travell, Simons and Simons (1999) said that moist heat appears to be more effective than dry heat, possibly due to a more effective absorption of heat. They

assume that moist heat relaxes the underlying muscles thereby diminishing the tension on the trigger points and reducing referred pain.
Evidence of heat therapy for LBP is limited and it appears that its effects are also limited (Airaksinen *et al.,* 2004 and French *et al.,* 2006).

There is moderate evidence that continuous heat wrap therapy reduces pain and disability in the short term with acute and sub-acute low back pain (up to 3 months) and that the addition of exercise to heat wrap therapy further reduces pain and improves function (French *et al*., 2006). However, there is no evidence in the effectiveness of heat therapy compared with placebo, or other treatments as the sole management in the treatment of chronic LBP (Airaksinen *et al*., 2004).

2.3.6.14 HYDROTHERAPY

Hydrotherapy is a form of exercise that is cost-effective and appears to be an effective part of a physiotherapeutic management protocol for chronic LBP.

Of the few published studies, the findings by McIlveen and Robertson (1998) on hydrotherapy suggested that hydrotherapy can contribute to the management of patients with chronic LBP due to an improvement in levels of function. Their study involved 20 exercises in warm water, with ten repetitions of each exercise, during a 60-minute group session, twice weekly for four weeks. Subjects had a significant improvement of function of the low back, but pain rating indices appeared to be consistent with the control group. Conclusively, McIlveen and Robertson (1998) found that hydrotherapy may have a possible beneficial role for subjects with chronic LBP.

2.3.6.15 SPINAL MANIPULATIONS

According to Lopes (1993) muscle changes occur secondary to joint restrictions and the removal of a subluxation or spinal restriction can often reverse the effect of its immobilization. Apparently some methods of chiropractic manipulations have a direct effect on the soft tissues of the body through reflex homeostasis mechanisms (Bergmann, 2005). The efficacy of Myofascial Adhesion Manipulation, commonly known as rip and grip, was investigated by Walker (2002). She concluded that in terms of subjective and objective findings Myofascial Adhesion Manipulation was an effective treatment for active myofascial TPs.

Pooke (2000) investigated individually the effects of both dry needling and manipulation to the main segmental nerve supply of the muscles with myofascial trigger points and concluded both as being effective for the treatment of myofascial TPs. Unfortunately Pooke's study failed to show which of the two treatments were more effective in the treatment of myofascial TPs. Maigne and Vautravers (2003), in a review of the mechanisms of action of spinal manipulative therapy, said the muscle effects of manipulation lasted less than a minute, which may indicate that the disruption of a pain–spasm–pain cycle is involved in the long-term effects of manipulation.

2.4 PATIENT MANAGEMENT WITH ADVICE AND EDUCATION

It is difficult to ascertain if follow-up advice plays a role in the maintenance of positive outcomes (Liddle *et al*., 2007). Most guidelines for both acute and chronic LBP advise on reassuring the patient by acknowledging the pain of the patient, being supportive and avoiding negative statements (van Tulder *et al*., 2004). Consistency across the profession is very important with taking the time to explain the diagnosis, treatment plan and in addition the reassurance of the

patient with information. This information could include comments such as; back pain is very common, is often recurrent, but usually the outlook is very good (van Tulder *et al*., 2004).

2.4.1 TREATMENT FREQUENCY AND DURATION OF TREATMENTS OF AN ACUTE PRESENTATION OF LBP

According to Bogduk (2006), who attempted to provide an evidence-based algorithm for LBP management, treatment interventions vary according to the presentation of an acute, sub-acute or chronic presentation of pain. Applying the algorithm that he formulated, nearly 80% of his patients could expect to be fully recovered by three months and the remainder in 12 months. Fortunately, acute LBP usually resolves within two to four weeks in the vast majority of patients (Hills 2006).

Souza, (2005) outlined the Mercy Guidelines for recommendations on frequency of treatments. In acute (less than 6 weeks) conditions, with no contra-indications to manipulations, there may be an initial treatment phase of two weeks at a frequency of three to five times per week. Re-evaluation, unless there was progressive worsening of the condition, it was usually done after two weeks, with treatments continuing for up to eight weeks depending on the patient's progress. Prolonged recovery, according to the Mercy Guidelines, generally included conditions that had symptoms that lasted more than 8 days, severe pain involvement, more than four previous episodes, or pre-existing structural or pathological conditions.

2.4.2 TREATMENT FREQUENCY AND DURATION OF TREATMENTS FOR CHRONIC PRESENTATION OF LBP

A study of patient reactions to their first chiropractic treatment to predict early treatment outcomes in persistent low back pain has provided useful information in an area that is characterized by almost complete ignorance (Axen *et al.,* 2002). According to their study, three distinct subgroups of chiropractic patients with persistent LBP were identified:

1. 77% to 91% of patients reported considerable improvement by their fourth visit and were patients who reacted positively and directly to treatment and who reported no unpleasant reactions to the treatment.
2. 22% to 38% of patients reported considerable improvement by their fourth visit reporting no earlier improvements and unpleasant reactions to the treatment.
3. 58% to 68% reported improvements by the fourth visit were those patients with a combined presentation of 1 and 2 above

These profiles can be used to define indications for spinal manipulation and when treatment protocols should be changed or referred. A clinical study on pain intensity and disability substantiated the clinically important effect of the number of chiropractic treatments for chronic LBP (Haas *et al*., 2004). Recommendations advised on a frequency of three to four treatments per week for up to three weeks for chronic LBP. Mathews (1995) however, in an investigation into frequent versus infrequent application of chiropractic treatments for mechanical LBP measured outcomes using the pain rating scale: Oswestry back disability index; orthopaedic test scores and lumbar spine range of motion. He concluded that a lower treatment frequency of once a week for three weeks seemed as effective as three treatments per week for a three week period.

According to Stig *et al*. (2001), there seems to be a distinct recovery pattern among chiropractic patients with chronic LBP. They conducted a questionnaire-

based study on when these patients first started improving from chiropractic treatment. In their study at the fourth visit, within a two week period, more than 50% of patients had reported improvements. Within a maximum of 12 visits, approximately 75% of the patients had reported improvement, but there were no reports concerning the other 25% of the sample population.

According to Mathews (1995), Stig *et al.* (2001); Axen *et al.* (2002); Haas *et al*. (2004) and Airaksinen *et al.* (2004) only recommendations concerning frequency and duration of chiropractic treatment can be followed. There appears to be no consensus on a fixed methodology to achieve absolute patient success for chronic LBP. However the European Guidelines for chronic LBP advised a "short course" of spinal manipulation (Airaksinen *et al.*, 2004).

2.4.3 PAIN FREE CHIROPRACTIC TREATMENT

There appears to be a paucity of supporting evidence of maintenance care in chiropractic for the asymptomatic patient (Rupert, 2000), but this was advocated by Wenban and Nielsen (2005). In a case study of one patient, Wenban and Nielsen, (2005) attempted to conceptualize and describe the ongoing chiropractic care of non-condition-specific, quality-of- life perspective. This was in contrast to describing the experiences of a person with pain while under chiropractic care. The subject appeared to have experienced an improvement in quality-of-life, as measured by two different quality-of-life instruments, while simultaneously experiencing an improvement in spinal function. Functional spinal improvement, as opposed to reported reduction in pain levels, could be clinically meaningful for monitoring responses to care (Lawrence *et al*., 2008).

According to Seaman, (2007) there seems to be no current evidence that lifetime preventive-care adjusting programs are appropriate. Hypomobility or restrictions within a joint can lead to "stagnation" of the joint's nutritional requirements, as joint motion is required for both exchange of nutrients and removal of waste

products, and without this movement, early degenerative changes can be expected (Enebo and Gatterman, 2005). Descarreaux *et al*. (2004) in a study of the efficacy of preventive spinal manipulation for chronic LBP and related disorders concluded the positive effects of preventive chiropractic treatment included maintaining functional capacities of the spine and reducing the number and intensity of pain episodes after an acute phase of treatment.

Based on a survey of 701 respondents in the USA on chiropractic maintenance care, it was recommended that 78% of chiropractic patients were suggested a maintenance care program however, only 34% of those chose to receive these services (Rupert, 2000). These patients averaged 14 visits on an annual basis for maintenance care. Chiropractors involved in this study agreed that maintenance care was of value to all ages, with the value increasing slightly with an increase in a patient's age. The maintenance care offered by these chiropractors involved a combination of interventions that relied heavily on patient education with regards to exercise, nutrition, and lifestyle changes. Some of the major reasons for the responding chiropractors advocating maintenance care were to minimize recurrence or exacerbations of the patients' condition, as well as to maintain or optimize state of health, to prevent conditions from developing, to provide palliative care for "incurable" problems, and to determine and treat subluxations.

There is a tremendous variance in opinions with regards to this type of care although it is advocated by a large number of chiropractors that more research in this field is still required (Rupert 2000).

2.4.4 ADVICE AND EDUCATION OF PATIENTS

A large percentage of chiropractic care given around the world appears to be directed at prevention and health promotion (Rupert, 2000). Liddle *et al.* (2006) noted the relevance of symptom chronicity to the type of advice offered.

Additional encouragement along with positive support may be needed for improving outcomes for people with a chronic LBP condition (Schenk, 2005). Chiropractors are encouraged to focus on the patient's compliance, the recommended treatment plan and advice on home exercise programs with chronic conditions (Schenk, 2005). On the whole, chiropractors are advised to give adequate information and to reassure the patient that in most cases LBP is treatable (van Tulder *et al*., 2005).

2.4.4.1 HOME STRETCHING EXERCISES

Self-stretching exercises play a major role in the recovery of patients with spinal dysfunctions (McClure, 1993 and Raj and Paradise, 2004). An effective stretch can reduce arterial compression due to abnormal muscle tone and normalize blood flow (Potgieter, 2006). There are several techniques that can be used to treat LBP, each designed to increase the range of motion and reduce muscle shortening in the affected muscle groups (Raj and Paradise, 2004). Length-tension changes in muscles can develop due to biomechanical changes or stresses (McClure, 1993). Stretching can result in reduction or complete relief of myofascial pain syndromes (McClure, 1993).

Home stretches as an adjunct to dry needling techniques have evidently been effective in comparison to placebo ultrasound in the treatment of myofascial pain (Jones, 1995); however, stretching as an adjunctive therapy to manipulation appears to lack scientific based evidence.

2.4.4.2 HOME STRENGTHENING EXERCISES FOCUSED ON CORE STABILITY

Individually designed strengthening or stabilizing programs appear to be effective in the management of LBP (Lawrence *et al.,* 2008). Core stability exercise training can begin after the patient has passed through the acute pain control phase (Hills, 2006). The only contra-indications to core stability exercises include spinal or medical conditions that exclude exercise involving the musculature of the trunk, such as acutely unstable spinal injuries, significant acute neurological compromise, or an unstable medical presentation.

Research investigating the abdominal draw-in or hollowing maneuver using the transversus abdominis muscle (drawing the navel upwards in a cranial direction and in towards the spine) demonstrated that an inability to perform this maneuver in the supine position differentiated chronic LBP from pain-free subjects (Dutton, 2002). The muscles involved are the internal obliques and the transversus abdominis and they are accompanied with a coactivation of the multifidus muscle, the diaphragm and pelvic floor musculature. According to Standaert *et al.* (2008), in individuals without low back pain, the transversus abdominis muscle was the first muscle activated on limb movement, whereas it was significantly delayed following limb movement in chronic LBP individuals. This indicates a potential for decreased spinal stability and fundamental problems with motor control (Standaert *et al.,* 2008). The multifidus muscle is well known for its dynamic motion segment control, together with the transversus abdominis, which enhances dynamic stability of the spine (Dutton, 2002).

Di'ez, (2004) conducted a study on the conservative management approaches to adult patients with chronic LBP and bilateral congenital hip dislocations without acetabular formation. His conservative chiropractic approach included chiropractic manipulation and spinal stabilization exercises using gym exercise

balls to focus on core stability. His treatment approaches appeared to be successful on various indexes of pain, disability and function.

Wilson (2006) evaluated the effectiveness of spinal manipulation in conjunction with core stability exercises as opposed to spinal manipulation alone in the treatment of post natal mechanical LBP for a treatment period of three weeks involving six treatments. Both subjective and objective findings of the trial were in slight favor of the manipulation and exercise group. However, there was too little evidence to validate it as being more effective than manipulation alone.

A recent review of the available evidence by Standaert *et al*. (2008) on lumbar stabilization exercises suggested that they are effective at decreasing pain and function in patients with chronic LBP, but that this treatment is no more effective than a less specific, general exercise program. Recommendations included finding more information on the types of patients to whom it may be best suited, the most effective exercises, and the optimal dose, duration, frequency and progression of spinal stabilization exercises.

2.4.4.3 HOME STRENGTHENING EXERCISES FOCUSED ON GLOBAL MUSCLES

The key, according to Hills (2006), to LBP management is to attain adequate musculoligamentous control of lumbar spine forces to minimize the risk of repetitive injury to the intervertebral discs, facet joints and surrounding structures. The spine should be stabilized using strengthening of segmental core stability muscles before global muscles of the spine are targeted including the latissimus dorsi, abdominals and erector spinae muscles.

Standaert *et al*. (2008) in a review of lumbar stabilization exercises suggested that exercises focused on core stability were effective at improving pain and

function of patients with chronic LBP. However, these methods were no more effective on various pain and functional rating indices than a less specific, general exercise program. One must thus consider that global muscles may work closely with the core stabilizer muscles and only exercise in general should be the advice for chronic LBP, similarly the European guidelines for chronic LBP reported similar findings (Airaksinen *et al*., 2004).

2.4.4.4 ADJUNCTIVE NUTRITIONAL THERAPY OR ADVICE

Chiropractors are in an excellent position to provide nutritional advice and education to the public, very often being the primary care giver to a large number of LBP sufferers (Andersen, 2005). According to the 2005 Job Analysis of Chiropractic in the USA, 98% of chiropractors talk to patients about nutrition contributing to the promotion of health and prevention of disease (Johnson *et al*., 2008). In survey of chiropractic maintenance care in the USA, 92.8% of 701 respondents agreed that an important therapeutic component within their practices included proper eating habits. Only 67% agreed on the use of vitamins and supplements (Rupert, 2000).

There is little empirical evidence to suggest that the modification of risk factors such as obesity or smoking prevents occurrence or recurrent LBP episodes (Hurwitz and Shekelle, 2006). That said, nutrition and dietary advice should be incorporated into treatment plans offered by chiropractors due to the varied health concerns which are related to poor nutrition and unhealthy dietary habits (Andersen, 2005).

2.4.4.5 ADVICE ON AN EXERCISE PROGRAM

One of the most common experimental interventions resulting in a positive outcome in chronic LBP trials has been advice to exercise (Liddle *et al*., 2007). European guidelines for chronic LBP recommend supervised exercise therapy as a first-line treatment in the management of chronic low back pain (Airaksinen *et al.*, 2004). According to a 2005 Job Analysis of Chiropractic in the USA, 98% of chiropractors talked to their patients about exercise (Johnson *et al*., 2008). Besides the increase in endorphin levels promoting a sense of well-being, there are also improvements of general cardiovascular condition and in conjunction with manipulation, exercise is likely to speed and improve outcomes as well as minimize intermittent recurrence of LBP conditions (Lawrence *et al*., 2008). Although the high velocity low amplitude chiropractic manipulation has better outcomes than home exercise alone (Lawrence *et al*., 2008), exercise appears to be most effective as an adjunctive treatment for improving pain, back-specific function and work disability in chronic LBP (Liddle *et al.,* 2006). Exercise in general allows the patient to perform at a higher level of function (Hills, 2006).

Current guidelines for acute LBP patients do not recommend the prescription of specific exercise programs, but rather more simple advice to remain active (van Tulder *et al.*, 2005 and Liddle *et al.,* 2007). But, in cases of chronic low back pain, the advice given appears to be quite the opposite, with positive outcomes from specific exercise programs (Liddle *et al.,* 2006). Preventative care with physical exercise has been said to have a positive effect in the prevention of back pain, further episodes of back pain and work absence due to back pain (Burton, 2005).

2.4.4.6 POSTURAL OR ERGONOMIC ADVICE

Chiropractors should do everything they can to get patients actively involved early in their rehabilitation by making postural and ergonomic changes and doing exercises (Ross, 1997). Prevention of most cases of mechanical LBP can be achieved by using good ergonomic principles when performing heavy manual labor, which is largely dependant on education and raising the awareness of individuals at risk (Hills, 2006).

The goal of ergonomics, in particular, is to maximize compatibility between the individual and the task and environment to promote performance and health (Ortiz and Smith, 1993). There are so many areas which can be targeted with ergonomic consideration, but the activities that are mostly performed have the biggest impact (Ortiz and Smith, 1993). There appears to be evidence to suggest that existing persistent symptoms of LBP might be reduced with a medium to firm instead of a hard mattress. However, there is insufficient evidence to recommend for or against any specific chairs for the prevention of LBP (Burton, 2005) even though the forces during sitting have been considered a cause of LBP (Ortiz and Smith, 1993).

2.4.4.7 PROPRIOCEPTIVE EXERCISES

Spinal position sense is said to be altered in patients with chronic LBP (Polus, 2005). Proprioceptive training involves various balance devices, such as wobble boards, exercise balls and mini trampolines. The intention is to have the body react to rapid changes in balance and to support these changes by integrating the rest of the body (Souza, 2005). Dynamic exercise training programs develop coordination of muscle group activities that leads to improvement in proprioception and the fusion of muscle control with spinal stability. This type of training according to Hills (2006) should be advised as part of a management

protocol for LBP. The avoidance of muscle fatigue is recommended as it can lead to impaired proprioceptive acuity (Polus, 2005).

2.4.4.8 POWER-PLATE REHABILITATION

There is a wealth of literature that supports the hypothesis that whole body vibration contributes to the development of LBP (Hurwitz and Shekelle 2006). However, whole body vibration training has evidently been demonstrated to increase the production of regenerative and repairing hormones which improve blood circulation in the skin and muscles, strengthen bone tissue (Vella, 2005), improves lymphatic drainage and increase the basal metabolic rate (Rittweger, *et al*., 2002).

Whole body vibration works by stimulating the body's natural stretch reflexes and causes reflex muscle contractions. These reflex actions are continually stimulated, so a muscle continues to contract and relax until the vibration stops (Vella, 2005).

In an investigation into the short term efficacy of vibration training on the Power-plate in low back pain sufferers, van der Merwe (2008) evidently showed an improvement in both the objective and subjective clinical findings. However, when van der Merwe (2008) compared the relative effectiveness of the vibration training to core stability exercises the vibration training group did not significantly outperform the core muscle exercise group in terms of decrease in pain rating scales and core muscle endurance.

2.4.4.9 FOOT ORTHOTICS

In cases where a leg-length inequality of 1cm or more is present with pelvic obliquity, a marked postural scoliosis and LBP may be present (Giles, 2005). According to Gurney (2002), the breakpoint of 2cm, for intervention with foot orthoses, is often used. This deviation could be considerably higher for younger persons who are inactive and have had leg-length inequalities their entire life and considerably lower for older persons who are active and have acquired leg-length inequalities later in life.

Ferrari (2007) conducted a study whereby thirty patients presenting with chronic, nonspecific, low back pain and/or soft tissue lower limb disorders completed the SF-36 (short-form health survey with only 36 questions) and Oswestry Disability Questionnaire before and 6 weeks after prescription of customized foot orthotics. With the use of customized foot orthotics, a high rate of pain reduction was reported (Ferrari, 2007). However this was not a randomized controlled trial and did not involve a control group, which resulted in the size of the effect not being quantifiable.

Foot orthotics, when used in conjunction with chiropractic care, may play an important role in maintaining the outcome of chiropractic care by supporting appropriate biomechanics of the body (Zhang, 2005). However, according to both van Tulder *et al*. (1997) and Burton, (2005) there is no legitimate evidence for the effectiveness of orthoses in the treatment or prevention of chronic LBP, and they concluded that there was insufficient evidence for or against their use.

2.4.4.10 STRESS MANAGEMENT TECHNIQUES

Psychosocial stress is a characteristic of modern life, and there is growing evidence that stress has an impact on health (Jamison, 1999). A psychological

evaluation is recognized as a component of a comprehensive diagnostic work-up of chronic LBP patients (Jamison, 1999).

Stress-reduction recommendations, according to Johnson *et al*. (2008), are offered by 96% of chiropractors in the USA. This related directly to a descriptive study undertaken by Jamison (1999) to ascertain the stress perceptions of chiropractic patients. More than 30% of the patient subjects regarded themselves as moderately to severely stressed and over 50% felt that stress had a moderate or greater effect on their current problem (Jamison, 1999). Some 71% of the patients felt it would be helpful if their chiropractor included stress management strategies to help them cope (Jamison, 1999). A survey relating to chiropractic maintenance care, reported 91% of chiropractors believe that chiropractic maintenance care could reduce stress levels (Rupert, 2000). Jamison (1999) recommended that chiropractors actively include stress management routinely as part of a holistic protocol to improving both pain management and general health but it is uncertain if this is being done.

2.4.5 MANAGEMENT OF A PATIENT THAT IS NOT RESPONDING TO TREATMENT

Failure of a patient to recover should result in a more thorough and extensive search into the cause of the back pain, including the possibility of recurrent back injuries (Hills, 2006). According to Bogduk (2006), reviewing patients to confirm recovery or failure to improve at each follow-up should be repeated. The purpose for a reevaluation is both to assure the patient that there is no serious disease causing their pain and that something has not been missed (Liebenson and Skaggs, 2005). If recovery appears to be slow, assess previous treatment interventions and appropriateness of these (Bogduk, 2006).

Chiropractors are trained in diagnosing and reinforcing life-style and medical compliance with respect to numerous diseases (Menke, 2003). Chiropractors

referring to the medical system are acknowledging the medical physician by what they do best (Menke, 2003). Cases treated by chiropractors can be co-treated with pharmaceutical prescriptions to enhance recovery, if indicated (Menke, 2003).

Mercy Guidelines outlined by Souza (2005) suggested that for acute conditions, with no signs indicating referral, an initial treatment period of two weeks, with three to five treatments per week should be initiated, followed by a further two weeks with a different treatment plan, if the patient is not improving. Thereafter if symptoms persist, referral for further investigations or referral to the appropriate professional is required. On the other hand, some cases up to eight weeks of treatments for an acute presentation of LBP were recommended by the Mercy Guidelines (Souza, 2005).

In healthcare, having multiple providers can impact negatively on patients, especially when contradictory advice has been given (Mootz *et al*., 2005). However, getting patients on the right path to recovery with appropriate advice, referrals and management, at the earliest time, has the potential to enhance outcomes and lower costs (Menke, 2003).

2.5 CONCLUSION

The future role of chiropractic in the management of LBP will probably be determined by its commitment to interdisciplinary co-operation and evidence-based practice (Meeker and Haldeman, 2002). The goal of the chiropractor should not be to abandon their philosophies but to allow science to remove the restraints of previously narrow-minded limitations and to seek and incorporate new discoveries which have results that are consistently reproducible (Flanagan and Giordano, 2002).

Although risk of serious complication after spinal manipulation is low, it should be provided by professionals with competent skills (Van Tulder *et al.,* 2005). For the sake of quality patient care and for the protection against third party payers and malpractice suits, chiropractic needs to define for itself what the parameters of the profession are, and how to justify and validate these knowledge claims (Villanueva-Russell, 2004). It seems that nearly all the proposed theories to explain the effects and mechanisms of action of spinal manipulation have not been fully tested and much more basic science research in these fields needs to be accomplished (Cramer *et al*., 2006).

CHAPTER 3

3.0 RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

This chapter includes data regarding study design, the research tool, the sampling procedure, inclusion and exclusion criteria, confidentiality and the interventions utilized for statistical evaluation.

3.2 STUDY DESIGN

This study involved a quantitative descriptive design utilizing a questionnaire that was developed and validated by the researcher.

3.3 RESEARCH TOOL

In research situations, it is preferable to use previously validated questionnaires, (Mouton, 2001). However, in this study it was not possible due to it being the first of its kind. The questionnaire was formulated by the researcher, which was amended by a Focus Group. Only an English questionnaire was formulated. This was because the medium of instruction for chiropractic education in South Africa, is in English. Only one questionnaire was handed out to each participant. The questionnaire included sections on demographics, treatment protocols and patient management and education.

The focus group consisted of 7 participants who were recruited on the basis of characteristics common to the research participants to enhance reliability

(Greenbaum, 2000). Before commencing, the participants in the Focus Group were supplied with a Letter of Information (Appendix C). Each participant was required to sign an Informed Consent (Appendix D), Code of Conduct Form (Appendix E) and Confidentiality Statement Form (Appendix F). The initial questionnaire or Pre-focus Group questionnaire was then given to the participants who were asked to review and discuss the questions and to give recommendations as to how the questionnaire could be modified in order to accurately record the relevant information within the study group and in the South African context. Participants of the Focus Group were also required to complete a pilot test evaluation form (Appendix G).

A pilot sample was carried out on 3 chiropractors outside of the greater Durban area to ensure that there were no complications with administration of the questionnaire. All comments, criticisms and recommendations received from the participants of the Focus Group and pilot sample were considered before the questionnaire was finalized.

3.4 SAMPLING PROCEDURE

The Allied Health Professions Council of South Africa is responsible for managing the government register of practicing chiropractors from which contact details of all the chiropractors in the Durban metropolitan area were obtained. Of the 477 chiropractors registered with the Allied Health Professions Council of South Africa, it was found that only 80 were practicing in the greater Durban metropolitan area. Due to the relatively small sample size of 80 chiropractors, a large response rate was required. A minimum return rate of 70% was deemed sufficient in order to obtain statistical significance of the group being studied (Esterhuizen, 2008). A response rate of 70% was obtained.

In order to maximize the response, a more personal approach to data collection was used. Each participant was to be telephoned to make an appointment with

the prospective participants. However early on in the study, due to lack of time to coordinate appointments in busy practices, the researcher decided to drop off the relevant documentation by hand at the prospective participants' practices. The researcher informed the prospective participants of the relevant information regarding the research. The researcher requested confirmation that participation was intended and a date was proposed by the researcher for the collection of the relevant documentation, usually two to three days later. This avoided the possibly of consuming patient-intended time by making appointments. Due to a more personal approach to initial communications regarding participation, a high return rate was obtained.

At the same time the research Questionnaire was dropped off and collected, the participants were able to ask any questions related to the Questionnaire. Each participant received a Questionnaire (Appendix A) a Letter of Information and Informed Consent Form (Appendix B). The Questionnaires that were not completed in their entirety were still used for the data analysis. The participants had the option to withdraw from the study at any time during this process. The Informed Consent Form was required to be signed and returned with the completed questionnaire. The Questionnaire had no requirements for personal information regarding name, street address or contact details. The completed Questionnaires were posted into a sealed box with a postage slot, which was opened only once all questionnaires had been returned, to ensure confidentiality. The Questionnaires were then processed and coded for the results.

3.5 INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria for the chiropractor's participation were as follows:

- All participants were chiropractors registered with the AHPCSA.
- All participants were residents of the Republic of South Africa and practiced in the greater Durban metropolitan area with a dialling code of (031).
- Each participant's full contact details were required, so that each subject could be contacted and informed of the study so they could be asked if they would be willing to participate (Mouton, 2001).
- Each participant signed an Informed Consent Form (Appendix B)

Exclusion criteria for the chiropractor's participation were as follows:

- Members of the focus group and pilot study were not permitted to participate in the study.
- Any chiropractor who did not meet the inclusion criteria was excluded.

3.6 CONFIDENTIALITY

All participants' information and questionnaires were kept anonymous by using a coding system for each questionnaire; no names were revealed in the publication of the results. Participants were informed of all aspects of the study with the information sheet and a brief outline of the study by the researcher. Participants were able to withdraw from the study at any point during the questionnaire answering process until the Informed Consent Form and Questionnaire were posted into the sealed box. The Questionnaire had no requirements for personal information regarding name, street address or contact details. The Informed Consent Form was kept separate from the questionnaire.

3.7 STATISTICAL METHODS

SPSS version 15.0 was used for data analysis (SPSS Inc., Chicago, Illinois, USA). Descriptive objectives were analysed with frequency tables and cross-tabulation tables (Esterhuizen, 2008). Demographic variables and practice variables were assessed for association with responses to the questionnaire using Pearson's chi square tests in the case of categorical demographics and responses (Esterhuizen, 2008). Bar graphs were included to reflect the treatments that were always or frequently used by respondents (Esterhuizen, 2008). Statistics were confirmed by a qualified statistician once the required sample size of completed questionnaires had been returned.

CHAPTER 4

4.0 RESULTS

4.1 INTRODUCTION

This chapter aims to statistically analyze the primary data which was extracted from the answered questionnaires. The data utilized was collected exclusively from subjects that adhered to the inclusion and exclusion criteria of the study, from a sample population of 80 chiropractors in the greater Durban metropolitan area. The response rate required for statistical significance was 70% (*n* = 56) of the population (Esterhuizen, 2008) which was achieved.

4.2. DEMOGRAPHIC INFORMATION

The tables that follow reflect the number of respondents (cnt) and percentages in each category of the demographic variables.

The largest proportion of respondents was between 30 and 34 years old, with a range from 25 to 74 years of age. It was not possible to determine the age of the total sample of chiropractors in Durban, as their age was not specified on the Allied Health professions register. This is displayed in Table 1.

Table 1: Summary of age groups (in years) of participants

Ages (in years)	Cnt	%
25-29	18	32.14
30-34	25	44.64
35-39	8	14.3
40 and over	5	8.9
Total	**56**	**100.0**

A total of 60.7% of the respondents were male, while 39.3% were female. It was not possible to determine the male to female ratio of the total sample of chiropractors in Durban, as their gender was not specified on the Allied Health professions register. This is displayed in Table 2.

Table 2: Gender of participants

	Cnt	%
Male	34	60.7
Female	22	39.3
Total	**56**	**100.0**

The majority of the respondents (87.5%) were White; the balance consisted of Indians (12.5%) and there were no Black or other ethnic group respondents. This is displayed in Table 3.

Table 3: Ethnicity of participants

	Cnt	%
Indian	7	12.5
White	49	87.5
Total	**56**	**100.0**

A total of 85.7% of respondents were Durban University of Technology graduates. There were four other institutes from which the sample population had qualifications. This is displayed in Table 4.

Table 4: Summary of institution of qualification

	Cnt	%
AECC	1	1.8
DUT	48	85.7
National C.C.	1	1.8
Palmer	3	5.4
WITS	3	5.4
Total	**56**	**100.0**

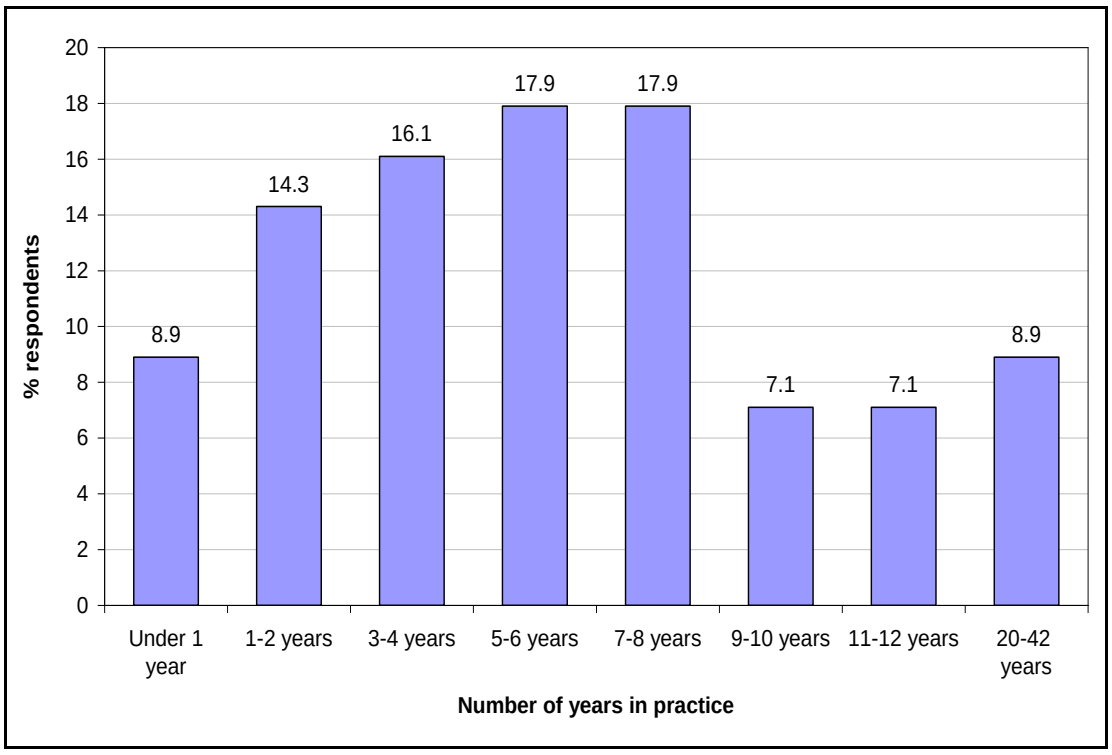
The majority (91.1%) of practitioners had an M.Tech qualification. This was expected as the two institutions in South Africa both award a Masters Degree in Chiropractic. This is displayed in Table 5.

Table 5: Summary of qualification obtained by the participants

	Cnt	%
D.C C.P. Chiro Rad	1	1.8
Doctor of Chiropractic	4	7.1
M.Tech	51	91.1
Total	**56**	**100.0**

The number of months or years of practice of the participating subjects, ranged from one month to 47 years. The majority of the subjects had less than 12 years of experience, with only 8.9% having over 20 years of experience. This is displayed in Figure 1 below.

Figure 1: Summary statistics for number of years in practice



The majority (91%) of the participants had attended at least one health related conference since they qualified. The majority (73.2%) had attended the annual Chiropractic Association of South Africa conferences. This is displayed in Tables 6 and 7 below.

Table 6: Summary of participant's attendance to any health related conferences since they qualified?

	Cnt	%
Yes	51	91.1
No	5	8.9
Total	**56**	**100.0**

Table 7: CASA conferences

	Cnt	%
CASA	41	73.2%

The majority (71.4%) of the respondents have attended at least one health related short course since they qualified. Of these the most popular were on Non Steroidal Anti Inflammatory Drugs, (NSAIDS) (19.6%), Biopuncture (12.5%) and Neural Impulse protocol (NIP) (10.7%). This is displayed in Tables 8 and 9 below.

Table 8: Summary of participant's attendance to any health related short courses since they qualified

	Cnt	%
Yes	40	71.4
No	16	28.6
Total	**56**	**100.0**

Table 9: NSAIDS, Biopuncture, NIPP courses

	Cnt	%
Biopuncture	7	12.5%
NIP	6	10.7%
NSAIDS	11	19.6%

A minority (23.2%) of the participant population subscribe to a chiropractic specific journal publication or magazine. The most popular (10.7%) of the subscriptions was with *The Chiropractic Report*. This is displayed in Tables 10 and 11 below.

Table 10: Summary of subscriptions to any chiropractic specific journal publications or magazines

	Cnt	%
Yes	13	23.2
No	42	75.0
Total answered	**55**	**98.2**
Not answered	1	1.8
Total	**56**	**100.0**

Table 11: Specific journal publications or magazines subscribed to

	Cnt	%
Not specified	44	78.6
Chiropractic Report	5	8.9
Chiropractic Report, Spine	1	1.8
Journal of Manipulative Physiologic therapeutics	1	1.8
Journal Bodywork and Movement Therapy	1	1.8
Newswire	1	1.8
Online Journals – Elsevier	1	1.8
Online Journals	1	1.8
Research Review Service	1	1.8
Total	**56**	**100.0**

A total of 75% of the study sample say that their practices have been influenced by health related short courses, journals, articles or conferences. This is displayed in Table 12. These influences have been specified in Table 13 below.

Table 12: Summary of statistics of the influences of any health related short courses, journals, articles or conferences on practice.

	Cnt	%
Yes	42	75.0
No	14	25.0
Total	**56**	**100.0**

Table 13: Summary of practice influences from health related short courses, journals, articles or conferences.

	Cnt	%
Not specified	16	28.6
2 Day Sport Medicine course	1	1.8
Applied Kinesiology	1	1.8
CASA conferences, KZN branch meetings - Practical demonstrations and lectures	1	1.8
CCEP- Examinations and Treatments daily. Started use of Orthotics since CCEP	1	1.8
Craniosacral Therapy	1	1.8
Either updated or new technology or information - refine treatment regime	1	1.8
Given direction of treatment for certain viceral conditions & practice ideas	1	1.8
Grasten, NIP	1	1.8
Helped me with psychological state of patients	1	1.8
Improved diagnostic of Subluxation	1	1.8
Improved knowledge and understanding of certain conditions; helped ecplain things to patients	1	1.8
Incorporation of Techniques	1	1.8
Influenced by evidence - based neural theory	1	1.8
Injectables	1	1.8
Journals and Articles, especially paediatric	1	1.8
Kinesio taping, Biopuncture	1	1.8
Learn something from every course you do that you can integrate into your practice	1	1.8
Learnt from experiences of others	1	1.8
New Techniques and up to date research	1	1.8
New Techniques etc	1	1.8
NIP	5	8.9
No response	4	7.1
NSAIDS	1	1.8
NSAIDS, Different Diagnostic procedures	1	1.8
Online journals	1	1.8
Online research - Change constantly both diagnostic & treatment methods	1	1.8
Online research	1	1.8
Polyclinic at World Student Games	1	1.8
Receptor Tonus Technique, Sports Nutrition, NSAIDS	1	1.8
Seminars and Quantum Energetix	1	1.8
Update knowledge base ***	1	1.8
Use of Diclofenac	1	1.8
WCCS	1	1.8
Total	**56**	**100.0**

A total of 26.8% of the sample population have practiced chiropractic outside of South Africa. This is displayed in Table 14. A summary of the countries that chiropractors have practiced in is displayed in Table 15.

Table 14: Summary of statistics for chiropractic experience outside of South Africa

	Cnt	%
Yes	15	26.8
No	41	73.2
Total	**56**	**100.0**

Table 15: Summary of the countries where sample participants have practiced

	Cnt	**%**
UK	**4**	**7.2**
Ireland	**3**	**5.4**
Kenya	**1**	**1.8**
Saudi Arabia	**1**	**1.8**
Turkey	**1**	**1.8**
Namibia	**1**	**1.8**
Malaysia	**2**	**3.6**
Thailand	**1**	**1.8**
Peru	**1**	**1.8**
Tanzania	**1**	**1.8**
El Salvador	**1**	**1.8**

4.3. TREATMENT PROTOCOLS

The data in Table 16a reflect the comparison between using the "straight" chiropractic philosophy and age group. A total of 17.9% use the "straight" philosophy and of these, 3.6% are under 30, while 7.1% are between 30 and 34 years and 7.1% are 40 years and over. The results of the chi-square test are significant (p = 0.001); however, these differences must be accepted with caution because of small cell sizes.

Table 16a: A Comparison between "Straight" philosophy and Age group

		Under 30		30-34		35-39		40 and over		Total	
		Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
"Straight" (to remove vertebral subluxations to facilitate healing)	Yes	2	3.6%	4	7.1%	0	.0%	4	7.1%	10	17.9%
	No	19	33.9%	18	32.1%	8	14.3%	1	1.8%	46	82.1%
Total		**21**	**37.5%**	**22**	**39.3%**	**8**	**14.3%**	**5**	**8.9%**	**56**	**100.0%**
Pearson Chi-Square value = 15.898, df = 3, p = 0.001 5 cells (62.5%) have expected count less than 5. The minimum expected count is .89.											

The data in Table 16b demonstrate the comparison between using a "straight" chiropractic philosophy and gender. Of the 17.9% using a "straight" philosophy, 14.3% are male while 3.6% are female. The results of the chi-square test were not significant (p = 0.168).

Table 16b: Comparison between "Straight" philosophy and Gender

		Male		Female		Total	
		Cnt	%	Cnt	%	Cnt	%
"Straight" (to remove vertebral subluxations to facilitate healing)	Yes	8	14.3%	2	3.6%	10	17.9%
	No	26	46.4%	20	35.7%	46	82.1%
Total		**34**	**60.7%**	**22**	**39.3%**	**56**	**100.0%**
Pearson Chi-Square value =1.898, df = 1, p = 0.168 1 cell (25.0%) has expected count less than 5. The minimum expected count is 3.93.							

The data in Table 16c reflect the comparison between using the "straight" philosophy and ethnicity. Of the 17.9% using a "straight" philosophy, only 1.8% are Indian while 16.1% are White. The results of the chi-square test were not significant (p = 0.792).

Table 16c: Comparison between "Straight" philosophy and Ethnicity

		Indian		White		Total	
		Cnt	%	Cnt	%	Cnt	%
"Straight" (to remove vertebral subluxations to facilitate healing)	Yes	1	1.8%	9	16.1%	10	17.9%
	No	6	10.7%	40	71.4%	46	82.1%
Total		**7**	**12.5%**	**49**	**87.5%**	**56**	**100.0%**
Pearson Chi-Square value = 0.070, df = 1, p = 0.792 1 cell (25.0%) has expected count less than 5. The minimum expected count is 1.25.							

The data in Table 17a reflect the comparison between using the "mixer" philosophy and age group. A total of 73.9% use this "mixer" philosophy and of these 31.1% are under 30, while 28.6% are between 30 and 34 years , 3.6% are between 35 and 39 years and 8.9% are 40 years and over. The results of the chi-square test are significant (p = 0.005). Again these differences must be accepted with caution because of small sample size.

Table 17a: Comparison between "Mixer" philosophy and Age group

		Under 30		30-34		35-39		40 and over		Total	
		Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
"Mixer" (to remove vertebral subluxations to restore functionality)	Yes	18	32.1%	16	28.6%	2	3.6%	5	8.9%	41	73.2%
	No	3	5.4%	6	10.7%	6	10.7%	0	.0%	15	26.8%
Total		**21**	**37.5%**	**22**	**39.3%**	**8**	**14.3%**	**5**	**8.9%**	**56**	**100.0%**
Pearson Chi-Square value = 12.988, df = 3, p = 0.005 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.34.											

The data in Table 17b reflect the comparison between using the "mixer" philosophy and gender. Of the 73.2% using this method, 48.2% are male while 25% are female. The results of the chi-square test are not significant (p = 0.193).

Table 17b: Comparison between "Mixer" philosophy and Gender

		Male		Female		Total	
		Cnt	%	Cnt	%	Cnt	%
"Mixer" (to remove vertebral subluxations to restore functionality)	Yes	27	**48.2%**	14	**25.0%**	**41**	**73.2%**
	No	7	**12.5%**	8	**14.3%**	**15**	**26.8%**
Total		**34**	**60.7%**	**22**	**39.3%**	**56**	**100.0%**
Pearson Chi-Square value = 1.695, df = 1, p = 0.193 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.89.							

The data in Table 17c reflect the comparison between using the "mixer" philosophy and ethnicity. Of the 73.2% using the "mixer" philosophy, 8.9% are Indian while 64.3% are White. The results of the chi-square test are not significant (p = 0.909).

Table 17c: Comparison between "Mixer" philosophy and Ethnicity

		Indian		White		Total	
		Cnt	%	Cnt	%	Cnt	%
"Mixer" (to remove vertebral subluxations to restore functionality)	Yes	5	**8.9%**	36	**64.3%**	**41**	**73.2%**
	No	2	**3.6%**	13	**23.2%**	**15**	**26.8%**
Total		**7**	**12.5%**	**49**	**87.5%**	**56**	**100.0%**
Pearson Chi-Square value = 0.013, df = 1,p = 0.909 1 cell (25.0%) has expected count less than 5. The minimum expected count is 1.88.							

The data in Table 18a reflect the comparison between using the evidence-based philosophy and age group. A total of 66.1% use evidence-based philosophy. Of these, 25% are under 30, while 25% are between 30 and 34 years, 12.5% are between 35 and 39 years and 3.6% are 40 years and over. The results of the chi-square test are significant (p = 0.359). Again these differences must be accepted with caution because of small cell sizes.

Table 18a: Comparison between Evidence-based philosophy and age group

		Under 30		30-34		35-39		40 and over		Total	
		Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
Evidence based (treatment based on scientific literature)	Yes	14	**25.0%**	14	**25.0%**	7	**12.5%**	2	**3.6%**	**37**	**66.1%**
	No	7	**12.5%**	8	**14.3%**	1	**1.8%**	3	**5.4%**	**19**	**33.9%**
Total		**21**	**37.5%**	**22**	**39.3%**	**8**	**14.3%**	**5**	**8.9%**	**56**	**100.0%**
Pearson Chi-Square value = 3.216, df = 3,p = 0.359 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.70.											

The data in Table 18b reflect the comparison between using the evidence-based philosophy and gender. Of the 66.1% using this method, 42.9% are male, while 23.2% are female. The results of the chi-square test are not significant (p = 0.788).

Table 18b: Comparison between Evidence-based philosophy and gender

		Male		Female		Total	
		Cnt	%	Cnt	%	Cnt	%
Evidence-based (treatment based on scientific literature)	Yes	24	**42.9%**	13	**23.2%**	**37**	**66.1%**
	No	10	**17.9%**	9	**16.1%**	**19**	**33.9%**
Total		**34**	**60.7%**	**22**	**39.3%**	**56**	**100.0%**
Pearson Chi-Square value = 0.788, df = 1,p = 0.375 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.46.							

The data in Table 18c reflect the comparison between using Evidence-based philosophy and ethnicity. Of the 66.1% using this method, 7.1% are Indian and 58.9% are White. The results of the chi-square test are not significant (p = 0.594).

Table 18c: Comparison between Evidence-based philosophy and Ethnicity

		Indian		White		Total	
		Cnt	%	Cnt	%	Cnt	%
Evidence based (treatment based on scientific literature)	Yes	4	**7.1%**	33	**58.9%**	**37**	**66.1%**
	No	3	**5.4%**	16	**28.6%**	**19**	**33.9%**
Total		**7**	**12.5%**	**49**	**87.5%**	**56**	**100.0%**
Pearson Chi-Square value = 0.284, df = 1, p = 0.594 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.38.							

The data in Table 19 reflect that 55.4% of respondents indicated that they always attempt to adjust specific segments only and 71.4% frequently adjust the Sacroiliac joints for management of non specific low back pain. A total of 42.9% occasionally use drop pieces. Table 20 reflects the other manipulations used. Table 19 is graphically presented in Figure 2.

Table 19: Manipulation/s most commonly used in treatment of low back pain

	Never		Rarely		Occasionally		Frequently		Always	
	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
Q2.1bA Attempt to adjust specific segments only.	1	1.8%	5	8.9%	2	3.6%	17	30.4%	31	55.4%
Q2.1bB Adjust the segment on both sides	7	12.5%	6	10.7%	18	32.1%	20	35.7%	5	8.9%
Q2.1bC Adjust multiple segments within the lumbar spine	14	25.0%	15	26.8%	15	26.8%	8	14.3%	4	7.1%
Q2.1bD Adjust multiple segments throughout the spine and sacroiliac joints	8	14.3%	13	23.2%	11	19.6%	20	35.7%	4	7.1%
Q2.1bE Adjust Sacroiliac joints	3	5.4%	0	.0%	7	12.5%	40	71.4%	6	10.7%
Q2.1bF Use Instrument adjustment methods (Activator)	42	75.0%	2	3.6%	8	14.3%	2	3.6%	2	3.6%
Q2.1bG Mobilizations	5	8.9%	9	16.1%	23	41.1%	16	28.6%	3	5.4%
Q2.1bH Toggle recoil	35	62.5%	6	10.7%	10	17.9%	4	7.1%	1	1.8%
Q2.1bI Drop piece	14	25.0%	3	5.4%	24	42.9%	14	25.0%	1	1.8%

Table 20: Other manipulations used

	Cnt	%
Always adjust fixated segments no matter where locate	1	1.8
Blocking Techniques	1	1.8
Depends on history	1	1.8
Gonstead Technique	1	1.8
NIP	2	3.6

Figure 2: Manipulation/s most commonly used in treatment of low back pain

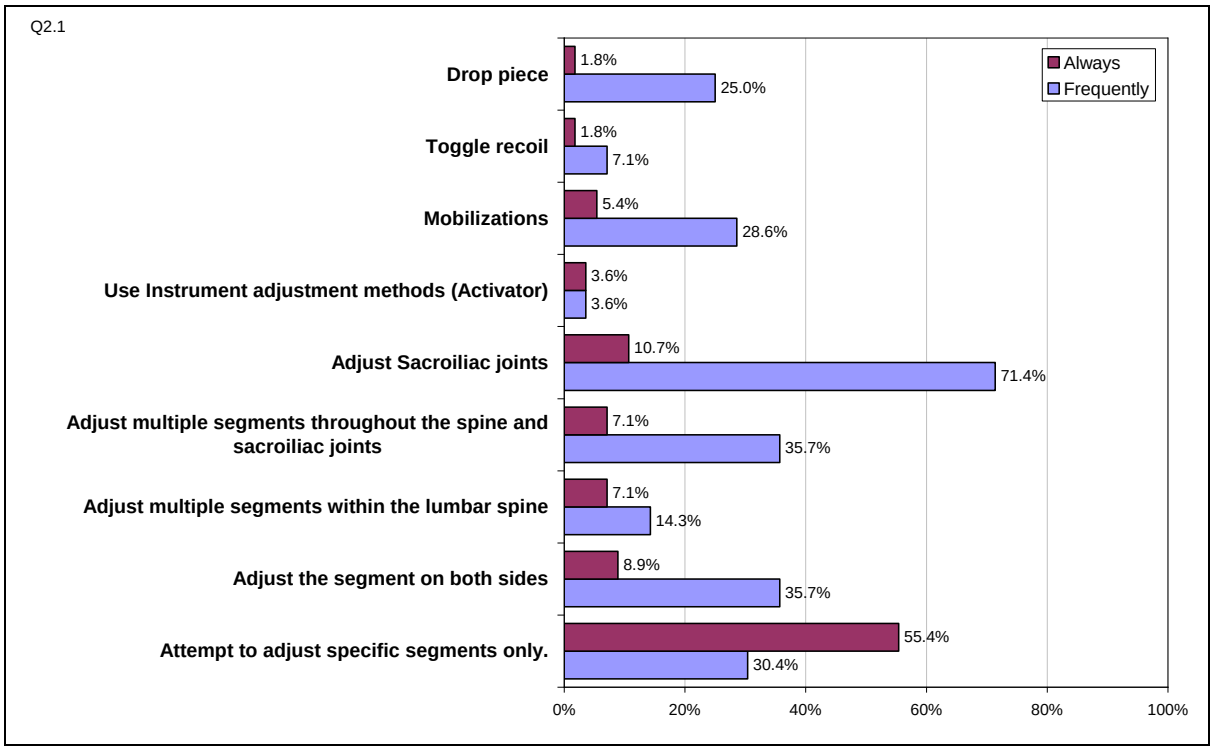


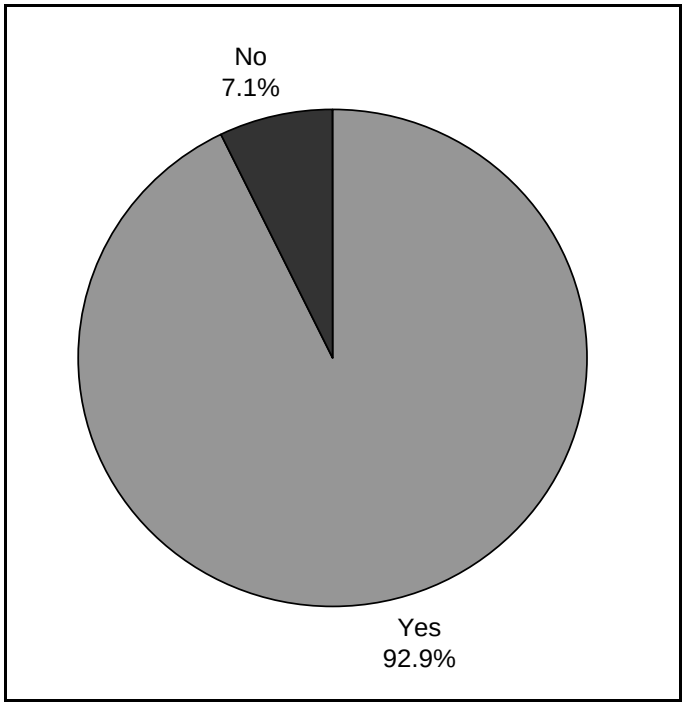
Table 21: Would you regard manual articular manipulation the primary focus of your treatment protocols, for mechanical lower back pain?

	Cnt	%
Yes	52	92.9
No	4	7.1
Total	**56**	**100.0**

Table 22: Reasons for not regarding manual articular manipulation as your primary focus for mechanical low back pain treatment protocols

	Cnt	%
Personal interpretations of current literature	1	1.79%
Focus on soft tissue as the primary focus	1	1.79%
Prefer the use of other therapeutic approaches	1	1.79%
Depends on each patient, history and presentation	1	1.79%
Incorporate soft tissue as well as manipulation	1	1.79%
Use manual articular manipulation as primary focus to treatment	51	91.07%
Total	56	100.0%

Figure 3: Is manual articular manipulation the primary focus of the treatment protocols, for mechanical lower back pain?



The data in Table 23 reflect treatment methods used when manual articular manipulations were contra-indicated. A total of 21.4% “always” used mobilizations, while 42.9% used it “frequently”. A total of 17.9% used cryotherapy “always”, while 42.9% use it “frequently”. This is graphically presented in Figure 4.

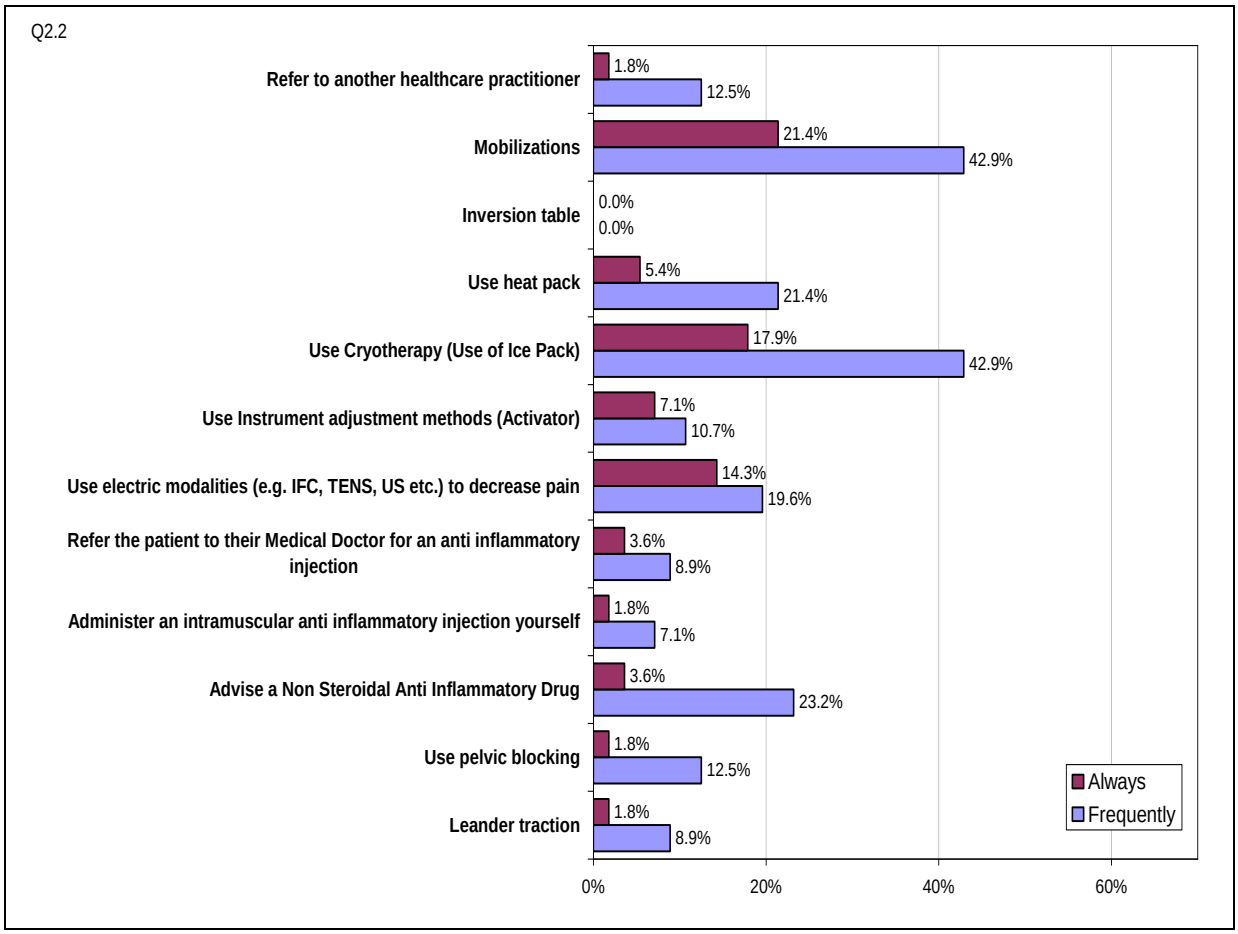
Table 23: Treatment used if manual manipulation is contra-indicated

	Never		Rarely		Occasionally		Frequently		Always	
	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
Q2.2A Leander traction	38	67.9%	6	10.7%	6	10.7%	5	8.9%	1	1.8%
Q2.2B Use pelvic blocking	31	55.4%	5	8.9%	12	21.4%	7	12.5%	1	1.8%
Q2.2C Advise a Non Steroidal Anti Inflammatory Drug	8	14.3%	5	8.9%	28	50.0%	13	23.2%	2	3.6%
Q2.2D Administer an intramuscular anti inflammatory injection yourself	38	67.9%	1	1.8%	12	21.4%	4	7.1%	1	1.8%
Q2.2E Refer the patient to their Medical Doctor for an anti inflammatory injection	17	30.4%	10	17.9%	22	39.3%	5	8.9%	2	3.6%
Q2.2F Use electric modalities (e.g. IFC, TENS, US etc.) to decrease pain	23	41.1%	6	10.7%	8	14.3%	11	19.6%	8	14.3%
Q2.2G Use Instrument adjustment methods (Activator)	39	69.6%	2	3.6%	5	8.9%	6	10.7%	4	7.1%
Q2.2H Use Cryotherapy (Use of Ice Pack)	3	5.4%	7	12.5%	12	21.4%	24	42.9%	10	17.9%
Q2.2I Use heat pack	16	28.6%	11	19.6%	14	25.0%	12	21.4%	3	5.4%
Q2.2J Inversion table	52	92.9%	1	1.8%	3	5.4%	0	.0%	0	.0%
Q2.2K Mobilizations	3	5.4%	3	5.4%	14	25.0%	24	42.9%	12	21.4%
Q2.2L Refer to another healthcare practitioner	9	16.1%	2	3.6%	37	66.1%	7	12.5%	1	1.8%

Table 24: Other methods used if manual manipulation is contra-indicated

	Cnt	%
Craniosacral Techniques	1	1.8
Homeopathy - Qualified	1	1.8
Logan Basic	1	1.8
Start patient on lumbar stabilization program	1	1.8

Figure 4: Most common Treatments used if manual manipulation is contra-indicated



The data in Table 25 reflected that 42.9% “always” attempted to adjust restrictions or subluxations found throughout the spine, 21.4% used mobilizations “always”, 39.3% used them “frequently” and 30.4% used cryotherapy “always”, with 41.1% using it “frequently”. This is graphically presented in Figure 5.

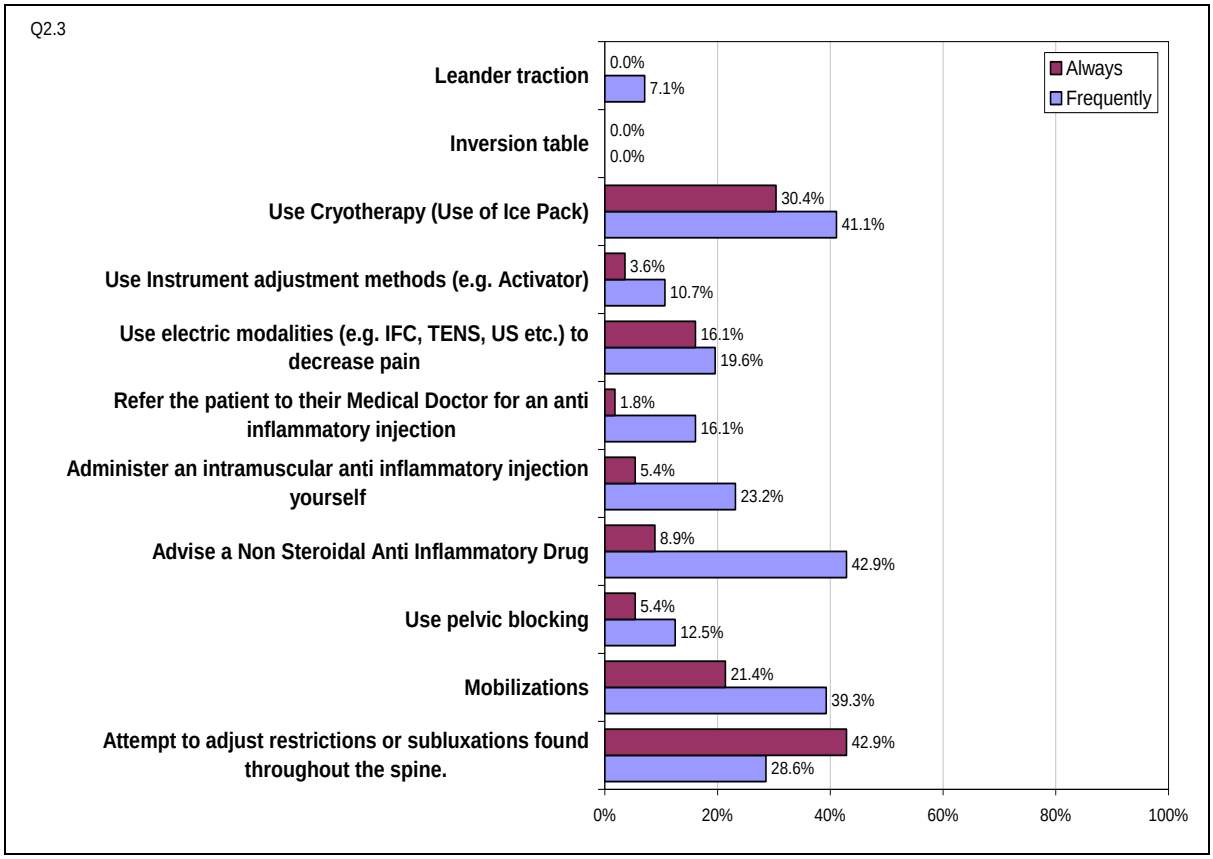
Table 25: Treatment of a patient who has a severe, acute lower back pain

	Never		Rarely		Occasionally		Frequently		Always	
	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
Q2.3A Attempt to adjust restrictions or subluxations found throughout the spine.	4	7.1%	4	7.1%	8	14.3%	16	28.6%	24	42.9%
Q2.3B Mobilizations	5	8.9%	3	5.4%	14	25.0%	22	39.3%	12	21.4%
Q2.3C Use pelvic blocking	32	57.1%	7	12.5%	7	12.5%	7	12.5%	3	5.4%
Q2.3D Advise a Non Steroidal Anti Inflammatory Drug	7	12.5%	2	3.6%	18	32.1%	24	42.9%	5	8.9%
Q2.3E Administer an intramuscular anti inflammatory injection yourself	37	66.1%	0	.0%	3	5.4%	13	23.2%	3	5.4%
Q2.3F Refer the patient to their Medical Doctor for an anti inflammatory injection	14	25.0%	11	19.6%	21	37.5%	9	16.1%	1	1.8%
Q2.3G Use electric modalities (e.g. IFC, TENS, US etc.) to decrease pain	26	46.4%	6	10.7%	4	7.1%	11	19.6%	9	16.1%
Q2.3H Use Instrument adjustment methods (e.g. Activator)	40	71.4%	2	3.6%	6	10.7%	6	10.7%	2	3.6%
Q2.3I Use Cryotherapy (Use of Ice Pack)	5	8.9%	1	1.8%	10	17.9%	23	41.1%	17	30.4%
Q2.3J Inversion table	53	94.6%	2	3.6%	1	1.8%	0	.0%	0	.0%
Q2.3K Leander traction	40	71.4%	4	7.1%	8	14.3%	4	7.1%	0	.0%

Table 26: Other Treatments for a patient who has a severe, acute lower back pain

	Cnt	%
Adjust only primary vertebral subluxation complex, site of neuropathology, pain findings and source of compensation	1	1.8
Craniosacral Techniques	1	1.8

Figure 5: Most common Treatments of a patient who has a severe, acute lower back pain



The data in Table 27 reflected 60.7% “always” attempted to adjust restrictions or subluxations found throughout the spine. A total of 17.9% “always” used mobilizations and 48.2% used it “frequently”. This is graphically presented in Figure 6.

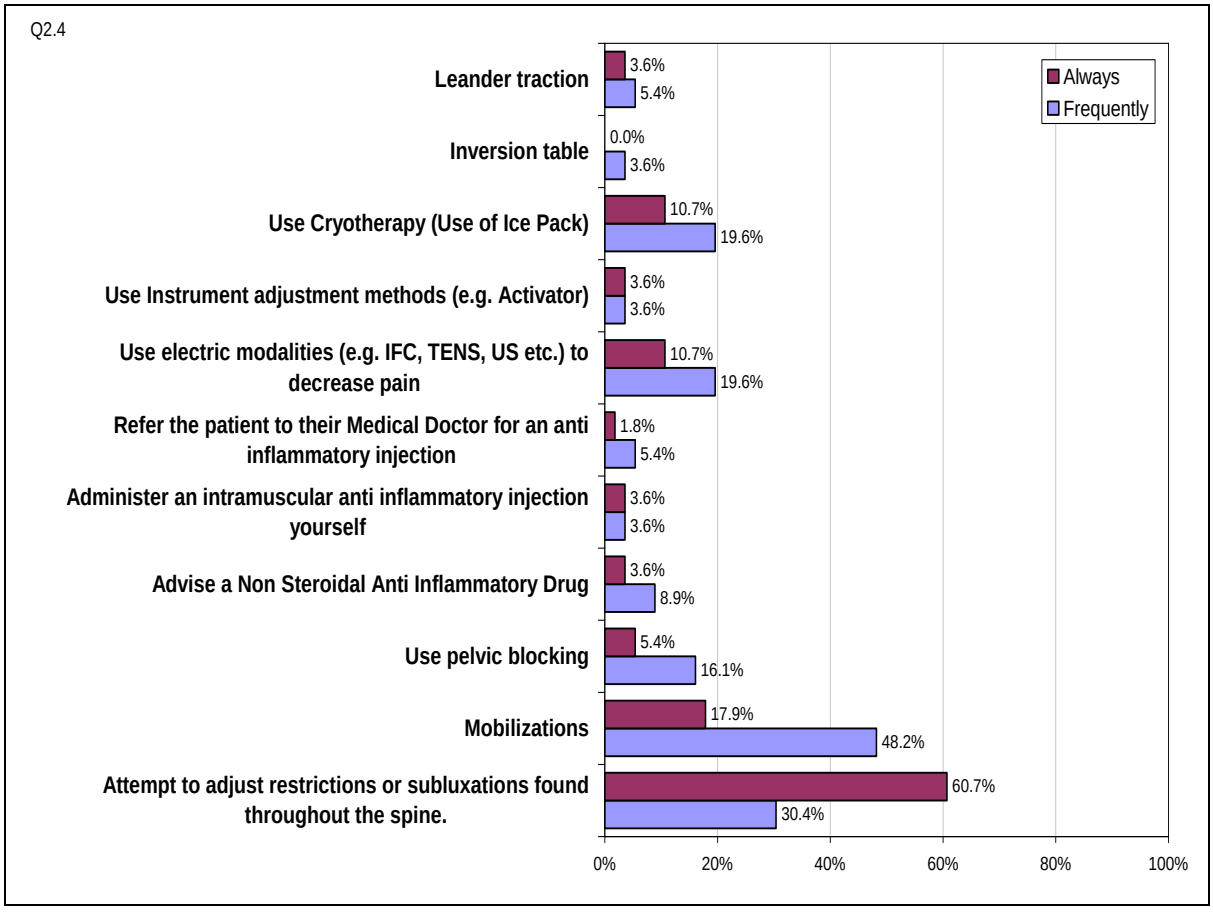
Table 27: Treatment of a patient who has a severe, chronic lower back pain

	Never		Rarely		Occasionally		Frequently		Always	
	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
Q2.4A Attempt to adjust restrictions or subluxations found throughout the spine.	2	3.6%	1	1.8%	2	3.6%	17	30.4%	34	60.7%
Q2.4B Mobilizations	3	5.4%	4	7.1%	12	21.4%	27	48.2%	10	17.9%
Q2.4C Use pelvic blocking	33	58.9%	6	10.7%	5	8.9%	9	16.1%	3	5.4%
Q2.4D Advise a Non Steroidal Anti Inflammatory Drug	8	14.3%	22	39.3%	19	33.9%	5	8.9%	2	3.6%
Q2.4E Administer an intramuscular anti inflammatory injection yourself	40	71.4%	9	16.1%	3	5.4%	2	3.6%	2	3.6%
Q2.4F Refer the patient to their Medical Doctor for an anti inflammatory injection	25	44.6%	16	28.6%	11	19.6%	3	5.4%	1	1.8%
Q2.4G Use electric modalities (e.g. IFC, TENS, US etc.) to decrease pain	27	48.2%	3	5.4%	9	16.1%	11	19.6%	6	10.7%
Q2.4H Use Instrument adjustment methods (e.g. Activator)	41	73.2%	2	3.6%	9	16.1%	2	3.6%	2	3.6%
Q2.4I Use Cryotherapy (Use of Ice Pack)	14	25.0%	12	21.4%	13	23.2%	11	19.6%	6	10.7%
Q2.4J Inversion table	52	92.9%	1	1.8%	1	1.8%	2	3.6%	0	.0%
Q2.4K Leander traction	42	75.0%	1	1.8%	8	14.3%	3	5.4%	2	3.6%

Table 28: Other Treatment of a patient who has a severe, chronic lower back pain

	Cnt	%
Adjust only primary vertebral subluxation complex, site of neuropathology, pain findings and source of compensation	1	1.8
Spinal Rehab is essential	1	1.8

Figure 6: Most common treatments of a patient who has a severe, chronic lower back pain



The data in Table 29 reflected myofascial treatments for the Quadratus Lumborum muscle. A total of 60.7% always used spinal manipulations, 30.4% always used Ischemic compression while 32.1% “always” used massage. This is graphically presented in Figure 7.

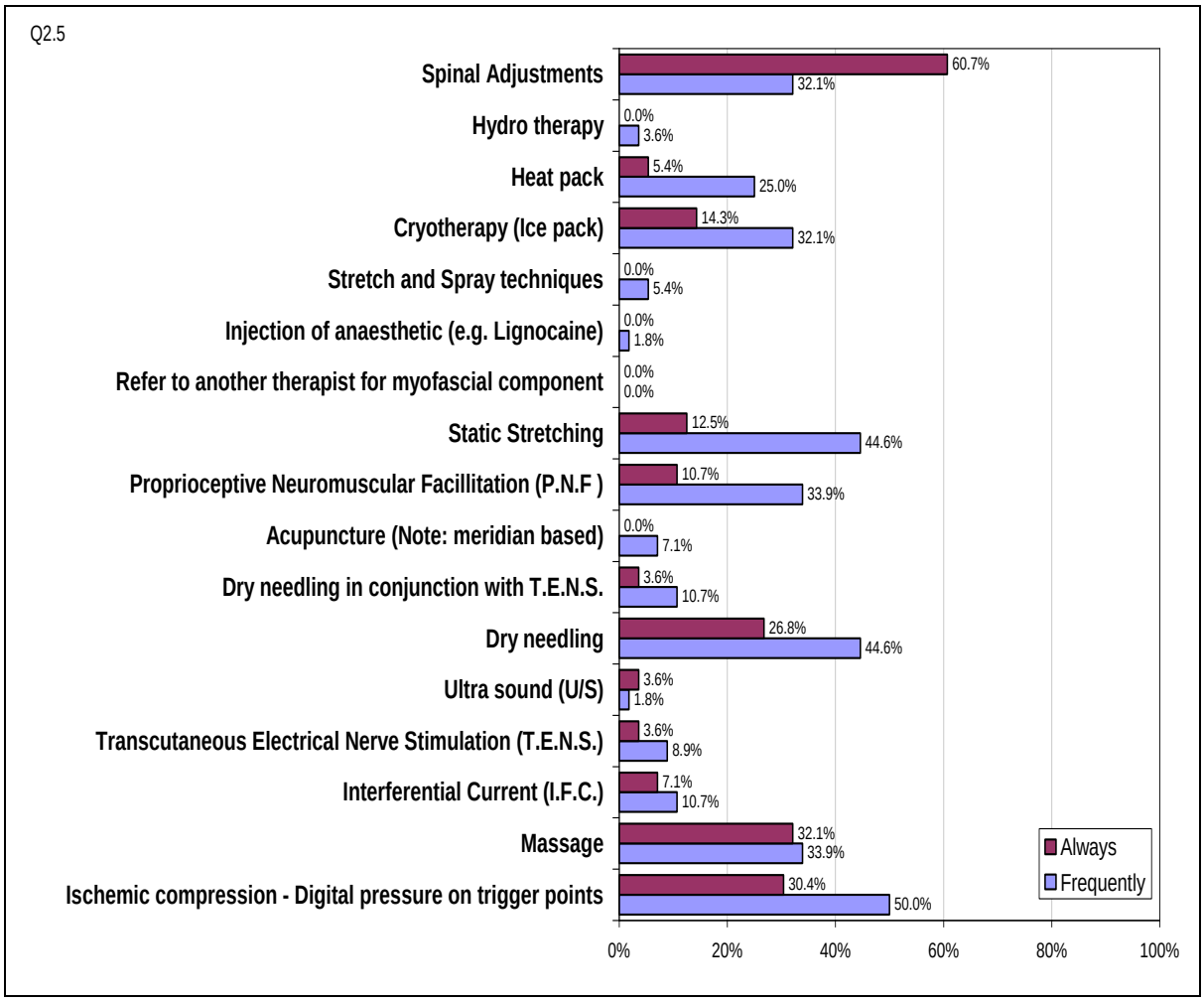
Table 29: Myofascial treatment used for myofasciitis of the Quadratus Lumborum muscle

	Never		Rarely		Occasionally		Frequently		Always	
	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
Q2.5A Ischemic compression - Digital pressure on trigger points	3	5.4%	4	7.1%	4	7.1%	28	50.0%	17	30.4%
Q2.5B Massage	4	7.1%	7	12.5%	8	14.3%	19	33.9%	18	32.1%
Q2.5C Interferential Current (I.F.C.)	39	69.6%	3	5.4%	4	7.1%	6	10.7%	4	7.1%
Q2.5D Transcutaneous Electrical Nerve Stimulation (T.E.N.S.)	34	60.7%	7	12.5%	8	14.3%	5	8.9%	2	3.6%
Q2.5E Ultra sound (U/S)	37	66.1%	8	14.3%	8	14.3%	1	1.8%	2	3.6%
Q2.5F Dry needling	6	10.7%	3	5.4%	7	12.5%	25	44.6%	15	26.8%
Q2.5G Dry needling in conjunction with T.E.N.S.	40	71.4%	4	7.1%	4	7.1%	6	10.7%	2	3.6%
Q2.5H Acupuncture (Note: meridian based)	45	80.4%	5	8.9%	2	3.6%	4	7.1%	0	.0%
Q2.5I Proprioceptive Neuromuscular Facillitation (P.N.F)	6	10.7%	7	12.5%	18	32.1%	19	33.9%	6	10.7%
Q2.5J Static Stretching	8	14.3%	3	5.4%	13	23.2%	25	44.6%	7	12.5%
Q2.5K Refer to another therapist for myofascial component	38	67.9%	10	17.9%	8	14.3%	0	.0%	0	.0%
Q2.5L Injection of anaesthetic (e.g. Lignocaine)	53	94.6%	1	1.8%	1	1.8%	1	1.8%	0	.0%
Q2.5M Stretch and Spray techniques	47	83.9%	5	8.9%	1	1.8%	3	5.4%	0	.0%
Q2.5N Cryotherapy (Ice pack)	9	16.1%	4	7.1%	17	30.4%	18	32.1%	8	14.3%
Q2.5O Heat pack	18	32.1%	8	14.3%	13	23.2%	14	25.0%	3	5.4%
Q2.5P Hydro therapy	47	83.9%	6	10.7%	1	1.8%	2	3.6%	0	.0%
Q2.5Q Spinal Manipulations	1	1.8%	0	.0%	3	5.4%	18	32.1%	34	60.7%

Table 30: Other Myofascial treatments used

	Cnt	%
Active Release techniques – Frequently	1	1.8
Acupressure	1	1.8
Adjust primary vertebral subluxation complex	1	1.8
Biopuncture in conjunction with above	1	1.8

Figure 7: Myofascial treatments used for myofasciitis of the Quadratus Lumborum muscle



4.4 PATIENT MANAGEMENT WITH ADVICE AND EDUCATION

Tables 31 and 32 reflect that the treatment plan and working diagnosis are presented by all respondents to their patients.

Table 31: Do you explain your treatment plan to your patients?

	Cnt	%
Yes	56	100.0

Table 32: Do you explain your working diagnosis to your patient?

	Cnt	%
Yes	56	100.0

Table 33: Number of days requested between first treatment and first follow up for acute lower back pain

No. of days	Cnt	%
1	31	55.4
1-2	5	8.9
2	18	32.1
3	1	1.8
7	1	1.8
Total	**56**	**100.0**

Table 34: After how many treatments with no relief on acute lower back pain would you consider further investigations necessary?

No. of treatments	Cnt	%
0	1	1.8
1	1	1.8
1-2	1	1.8
2	10	17.9
3	21	37.5
3-4	2	3.6
4	7	12.5
5	6	10.7
6	4	7.1
7	2	3.6
9	1	1.8
Total	**56**	**100.0**

Table 35: Number of days requested between first treatment and follow up for chronic low back pain

No. of days	Cnt	%
1	5	8.9
1-2	1	1.8
2	23	41.1
2-3	3	5.4
3	16	28.6
4	3	5.4
5	2	3.6
7	2	3.6
12+	1	1.8
Total	**56**	**100.0**

Table 36: After how many treatments with no relief on chronic lower back pain would you consider further investigations necessary?

No of Treatments	Cnt	%
2	2	3.6
2-3	1	1.8
3	9	16.1
3-4	1	1.8
4	14	25.0
5	3	5.4
6	9	16.1
7	6	10.7
8	3	5.4
10	4	7.1
12+	4	7.1
Total	**56**	**100.0**

Table 37: Advice on follow ups once patient has become pain free

	Cnt	%
Yes	48	85.7
No	8	14.3
Total	**56**	**100.0**

Table 38: Number of pain free follow ups suggested

No. of Pain free follow ups	Cnt	%
No F/ups	8	14.3
1	23	41.1
1-2	1	1.8
2	8	14.3
3	4	7.1
4	3	5.4
12+	6	10.7
Depends on ROM	1	1.8
Relates to function not pain	1	1.8
Until functioning is restored	1	1.8
Total	**56**	**100.0**

Table 39: Period between treatment/s followed if a patient has become pain-free

No. of Weeks	Cnt	%
1	5	8.9
2	9	16.1
3	4	7.1
4	19	33.9
5	2	3.6
6	5	8.9
8+	3	5.4
Total answered	**47**	**83.9**
Not answered	9	16.1
Total	**56**	**100.0**

Table 40: Suggest a pain free check up, for people without a history of back pain?

	Cnt	%
Yes	32	57.1
No	24	42.9
Total	**56**	**100.0**

Table 41: If a person presents with no pain and no history of back pain, but subluxations or restrictions were located, would you manipulate them?

	Cnt	%
Yes	44	78.6
No	12	21.4
Total	**56**	**100.0**

Table 42: Period between treatment/s followed in a patient that is pain free and has no history of lower back pain, but subluxations or restrictions were located and manipulated

No. of Weeks	Cnt	%
	13	23.2
1	12	21.4
2	4	7.1
2-3	1	1.8
3	1	1.8
4	8	14.3
5	2	3.6
6	2	3.6
8+	12	21.4
Not answered	1	1.8
Total	**56**	**100.0**

The data in Table 43 reflect that 64.3% of respondents always advise on home stretches, 60.7% advised on postural or ergonomic advice (sleeping, seated and standing) while 44.6% advised home strengthening exercises focused on core stability.

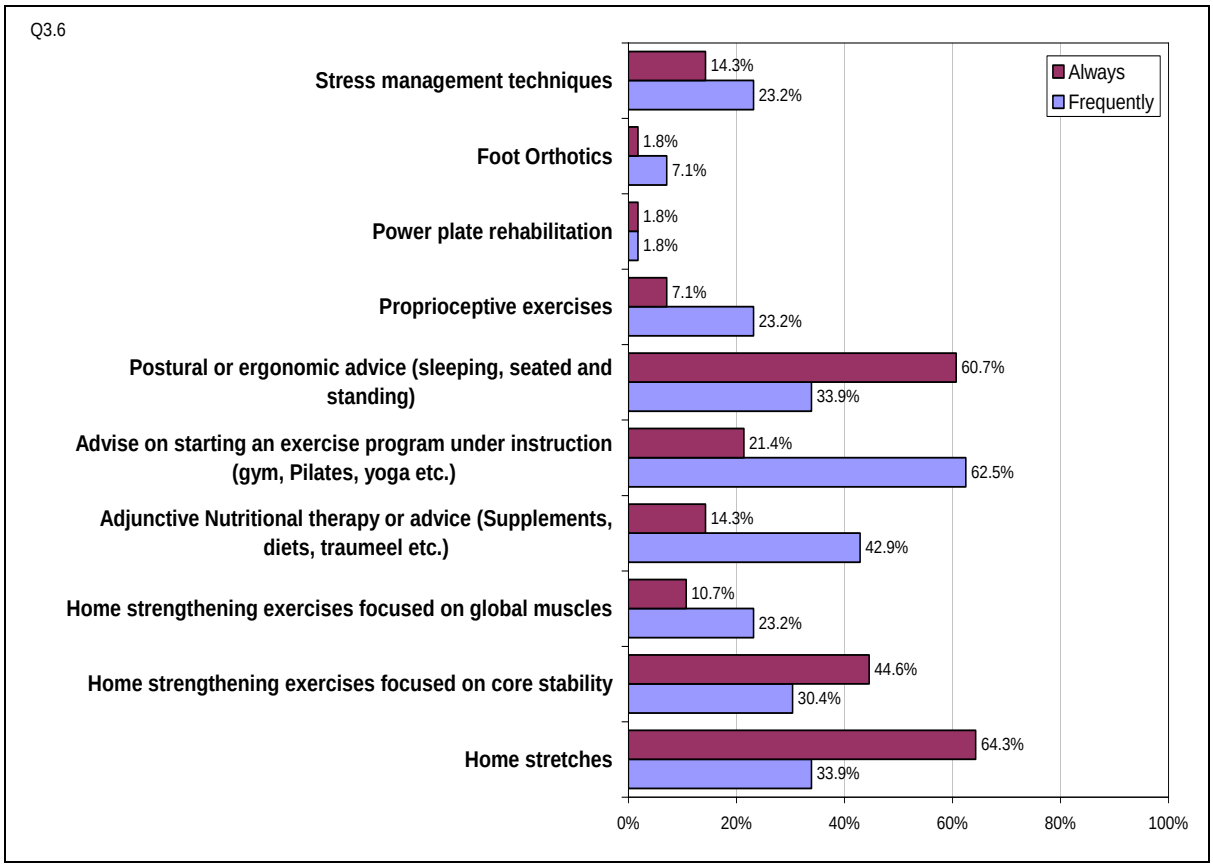
Table 43: Advice or education given for lower back pain conditions

	Never		Rarely		Occassionally		Frequently		Always	
	Cnt	%	Cnt	%	Cnt	%	Cnt	%	Cnt	%
Q3.6A Home stretches	0	.0%	0	.0%	1	1.8%	19	33.9%	36	64.3%
Q3.6B Home strengthening exercises focused on core stability	1	1.8%	2	3.6%	11	19.6%	17	30.4%	25	44.6%
Q3.6C Home strengthening exercises focused on global muscles	7	12.5%	7	12.5%	23	41.1%	13	23.2%	6	10.7%
Q3.6D Adjunctive Nutritional therapy or advice (Supplements, diets, traumeel etc.)	0	.0%	9	16.1%	15	26.8%	24	42.9%	8	14.3%
Q3.6E Advise on starting an exercise program under instruction (gym, Pilates, yoga etc.)	0	.0%	3	5.4%	6	10.7%	35	62.5%	12	21.4%
Q3.6F Postural or ergonomic advice (sleeping, seated and standing)	0	.0%	0	.0%	3	5.4%	19	33.9%	34	60.7%
Q3.6G Proprioceptive exercises	2	3.6%	10	17.9%	27	48.2%	13	23.2%	4	7.1%
Q3.6H Power plate rehabilitation	34	60.7%	9	16.1%	11	19.6%	1	1.8%	1	1.8%
Q3.6I Foot Orthotics	11	19.6%	17	30.4%	23	41.1%	4	7.1%	1	1.8%
Q3.6J Stress management techniques	5	8.9%	8	14.3%	22	39.3%	13	23.2%	8	14.3%

Table 44: Other advice or education given for lower back pain conditions

	Cnt	%
Swimming	1	1.8

Figure 8: Advice or education given for lower back pain conditions



The data in Table 45 reflected patient management once the proposed prognostic period had been exceeded or treatment outcomes had not been met. A total of 46.4% “always” reassessed all previous positive findings while 26.8% sent for further investigations, e.g. blood work, radiographs, C.T. or M.R.I. A total of 21.4% “always” assessed the patient as a new patient and 21.4% change treatment methods.

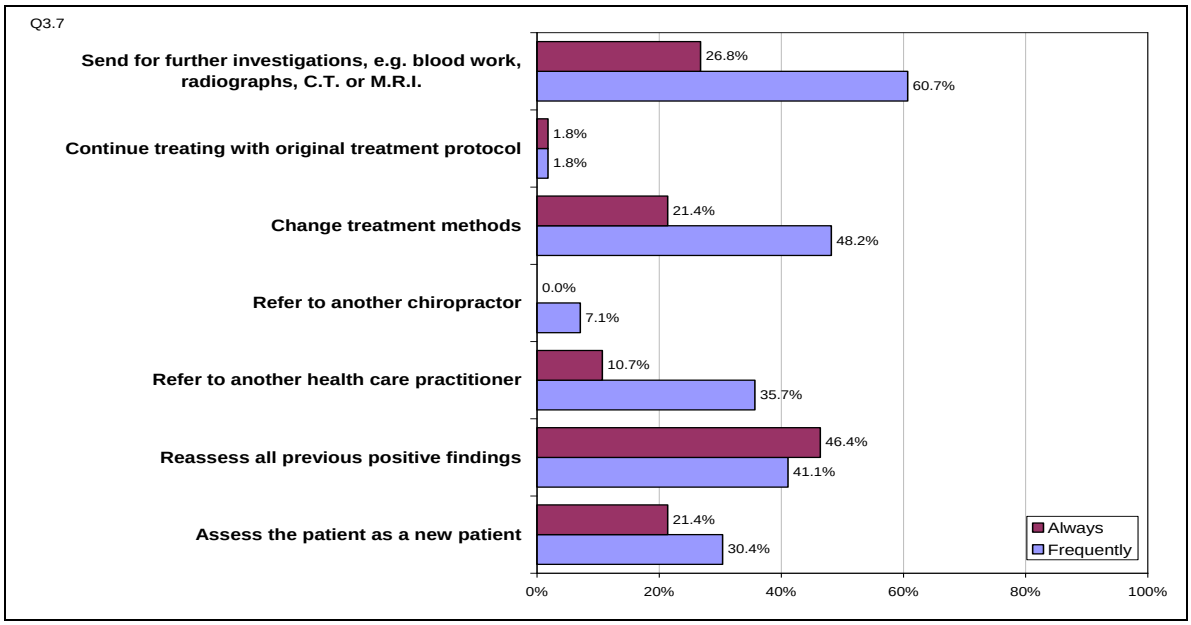
Table 45: Steps taken if the aims of your treatment protocol, after your proposed prognostic period has been exceeded, are not met

	Never		Rarely		Occassionally		Frequently		Always	
	Count	%	Count	%	Count	%	Count	%	Count	%
Q3.7A Assess the patient as a new patient	6	10.7%	5	8.9%	16	28.6%	17	30.4%	12	21.4%
Q3.7B Reassess all previous positive findings	2	3.6%	1	1.8%	4	7.1%	23	41.1%	26	46.4%
Q3.7C Refer to another health care practitioner	1	1.8%	2	3.6%	27	48.2%	20	35.7%	6	10.7%
Q3.7D Refer to another chiropractor	9	16.1%	28	50.0%	15	26.8%	4	7.1%	0	.0%
Q3.7E Change treatment methods	3	5.4%	1	1.8%	13	23.2%	27	48.2%	12	21.4%
Q3.7F Continue treating with original treatment protocol	15	26.8%	31	55.4%	8	14.3%	1	1.8%	1	1.8%
Q3.7G Send for further investigations, e.g. blood work, radiographs, C.T. or M.R.I.	0	.0%	0	.0%	7	12.5%	34	60.7%	15	26.8%

Table 46: Other steps taken

	Cnt	%
Be realistic and check that patient is sticking to protocol	1	1.8

Figure 9: Steps taken if the aims of treatment protocols after proposed prognostic period has been exceeded or are not met



CHAPTER 5

5.0 DISCUSSION

5.1 INTRODUCTION

This chapter aims to discuss the data found in chapter four regarding patient management protocols. The discussion will be accompanied by limitations of the study.

Please refer to chapter four according to the Tables referred to in this chapter.

5.2 DEMOGRAPHIC DATA OF RESPONDING CHIROPRACTORS

The total number of respondents was fifty six, which represented 70% of the chiropractors in the greater Durban metropolitan area. A total of 60.7% of the respondents were male while 39.3% were female (Table 2). The largest proportion of respondents was between 30 and 34 years old (Table 1).

5.2.1 ETHNICITY OF RESPONDING CHIROPRACTORS

The majority of the respondents (87.5%) were White, the balance were Indians (12.5%). There were no Black or other ethnic respondents (Table 3). The value of chiropractic among Black South Africans appears to be underappreciated according to Myburgh and Mouton, (2007) which has a direct impact on the ethnic group ratio of the numbers of Black South African chiropractors in accordance to the population.

5.2.2 INSTITUTE OF QUALIFICATION OF RESPONDENTS

A total of 85.7% of the respondents were Durban University of Technology (DUT) graduates, and the majority (91.1%) of practitioners had a Masters of Technology qualification (Tables 4 and 5). Having an institute within an area may have implications on patient management protocols adhered to within that area. The results of this study revealed that most of the graduates in the greater Durban area were from the DUT. Collegial pressures, local institution teachings or governing body requirements are some of the factors that may relate to chosen practice management protocols.

The tertiary institutions hosting a qualification in Chiropractic in South Africa both award a Masters Degree in Chiropractic after six years of education and training (Van Den Bos, n.d.). The curriculum adheres to the norms and standards of chiropractic education set by such bodies as the Council on Chiropractic Education, which is applied by various chiropractic universities and institutes around the world (Van Den Bos, n.d.). Chiropractic in South Africa is a Legislated Profession (Amended Act 63 of 1982) and is controlled by the Allied Health Professions Council of South Africa (AHPCSA) and to a lesser degree by the World Federation of Chiropractic (Chapman-Smith and Cleveland, 2005). Although reported treatment techniques in this study differ, the difference seems more on the basis of philosophy and training than on the application of evidence-based guidelines (Wickes, 2002).

Chiropractic education in South Africa was only available from 1989 (Van Den Bos, n.d.). Five respondents (8.9%) in the group with over 15 years of experience were graduates from other countries, from three institutes, which may have had varied philosophies and patient management protocols. There has been little or no research done on the specificities relating number of years of experience or institute of qualification to general management protocols for LBP. The

chiropractic profession is evolving rapidly and problems are sometimes encountered by new graduates who become associates in well established, “old school” practices where variances in interpretation between the educational institution and experienced practitioner often become apparent (McCarthy, 2008). Being exposed to new techniques, skills, treatment protocols and philosophies, may influence new graduates, with the possibility of impairing the consolidation of knowledge promoted by training institution (McCarthy, 2008). It is important to remember that each individual develops his or her own philosophy and habits through experience in practice and this will affect each individuals preferred method of treatment.

5.2.3 ADDITIONAL EDUCATIONAL RESOURCES

Of the respondents, 91.1% have attended health related conferences since they qualified (Table 6). Chiropractic Association of South Africa (CASA) conferences were most regularly attended (Table 7) with 73.2% of the study population attending at least one of these annual conferences since qualifying. The data also reflects 71.4% of the respondents have taken at least one short course since qualifying (Table 8). This study however did not cover the quantity, quality or at what date conferences or short courses had been attended. Respondents may have been practicing for several years without continuing their education or updating themselves with recent literature or practice methods. To evaluate the effectiveness of conferences and short courses on practice protocols, it would be essential to review and compare findings regularly in order to see if changes do occur after specific conferences or short courses.

In a survey of chiropractors' opinions of continued education, greater than 95% of responding chiropractors felt that continued education was important (Stuber *et al*., 2005). Chiropractors in general appear to have a positive attitude towards Continued Professional Development (CPD) and are aware of the importance to

keep up to date with new practices and available technology (Bolton, 2003). The attitudes towards CPD and attendance records with regards to short courses and congresses are not yet known for chiropractors specifically in the greater Durban metropolitan area.

The findings in this study show that attendance of respondents, to short courses and congresses, seemed to be relatively low in accordance to the importance of CPD to chiropractors, as stipulated by Stuber *et al*. (2005). The requirements for South African CPD points by the AHPCSA have not yet been finalized (Engelbrecht, 2009). There have however been repeated communications by the Chiropractic Association of South Africa (CASA) to the AHPCSA regarding this issue (Engelbrecht, 2009). Currently to retain membership status with CASA, the minimum compulsory CPD requirement is 18 hours per annum (Engelbrecht, 2009).

Short courses (Table 9) are offered by various institutions and organizations of which the most popular appear to be Biopuncture (12.5%), Neural Impulse protocol, (NIP) (10.7%) and prescription of Non-Steroidal Anti-Inflammatory Drugs (NSAIDS) (19.6%). Ideally these programs of study should be validated by an established educational institution (Parkin-Smith, 2005) and by the AHPCSA (Amended Act of 1982). Biopuncture however, is not currently accepted as part of chiropractic practice, although it may become a post-graduate elective in the future (Engelbrecht, 2009). The NSAIDs injection courses, which were sanctioned by the AHPCSA, remain a controversial issue as persons who have done the course can legally not obtain diclofenac, as this requires a "dispensing license," which no chiropractors have been able to obtain (Engelbrecht, 2009).
The development, nature and structure of chiropractic specialities have received little attention, and there is little or no published evidence demonstrating a relationship between these programs and actual practice (Parkin-Smith, 2005).

Chiropractic specific journal publications or magazines are subscribed to by only 23.2% of the study population (Table 10). The most popular (10.7%) subscription was “The Chiropractic Report” (Table 11). It is a worldwide publication on chiropractic, endorsed by the World Federation of Chiropractic, which reviews international professional research issues (http://chiropracticreport.com, n.d.). There is a need to encourage more chiropractors in the greater Durban area to subscribe to a chiropractic journal publication. Surprisingly none of the respondents appeared to subscribe to more that one chiropractic journal publication or magazine. Over ninety percent of respondents of an online survey who had completed online or distance continued education into chiropractic courses found them to be somewhat or extremely satisfactory (Stuber *et al.,* 2005). The Internet has evolved chiropractic research extensively, especially in the last decade (Haas *et al.*, 2006). The work of chiropractic researchers has contributed substantially to the amount and quality of the evidence on spinal manipulation in the management of LBP (Haas *et al.*, 2006); which is readily available on the World Wide Web. Future studies should endeavor to assess the type and medium of conveyance of knowledge preferred by chiropractors for CPD. With this knowledge, tailor made CPD courses and congresses could become more popular and attendance levels may be improved.

It would be complex to assess all the variables within practice and to account for the influences which have led to each individual’s chosen management protocols. Of the respondents however; 75% said they had been influenced in the way they practice by one or more varied health-related short course, journal, article or conference they had attended or read (Table 12). The influences on management protocols were considerably varied (Table 13) in the sample group, which was expected. Six (10.7%) subjects who had done a Neural Impulse Protocol (NIP) course and four (7.1%) a NSAIDs injection course reported significant influences on the way they practiced in general. The degree of influence however, was not investigated and this may have determined a greater understanding of the level of influence from various short courses.

Of the respondents, 26.8% have practiced outside of South Africa, of which almost half (12.6%) practiced in the United Kingdom (UK) and Ireland (Tables 14 and 15). The data indicated some courses, such as Basic Veterinary Chiropractic (International Academy of Veterinary Chiropractic) and Certified Chiropractic Extremity Practitioner (CCEP) completed by chiropractors who practiced abroad had not been studied by those who had practiced solely in South Africa. At any level of experience, the learning of new manual diagnostic or therapeutic skills are very useful and can broaden the scope of conditions that a practitioner might consider treatable (McCarthy 2008). The length of stay and experience obtained from the respondents who had practiced abroad was not stipulated within the questionnaire and should be considered in future investigations of this type.

5.3 TREATMENT PROTOCOLS

The focus of this study is limited to general or non-specific LBP, which is back pain exclusively in the lumbar and sacroiliac joint regions (Gatterman *et al*., 2001). Patients with LBP with radiating leg pain, sciatica, or radiculopathy were excluded from the study with the exception of a short section which assessed management of patients with contra-indications to manipulation, which may include the above. Patient outcomes from specific management methods were not incorporated in this study. However, a study relating the various treatment methods to patient-based outcomes would be useful.

5.3.1 CHIROPRACTIC PHILOSOPHY

In the questionnaire regarding philosophical orientations (Tables 16a to 18c) of practice, respondents were able to choose between three general chiropractic philosophies: “straight”, “mixer” or evidence-based. Some respondents chose more than one option, which was not acceptable when a combination of “straight” and evidence-based were selected as these are contradicting philosophies.

However, the practitioners following the “straight” philosophy may have felt their approach is evidence-based. Some of the respondents chose all three options, which is unlikely to occur in practice, as the philosophies contradict one another. This may reflect a misunderstanding of the question or the distinguishing features of each philosophical orientation. However, all three philosophies may have been present in some way. In order to evaluate the data, it was necessary to negate the impossibility of incorporating all three philosophies into one practice. This may have led to an inaccurate representation of the philosophical approaches followed by the respondents.

In the comparison between philosophical orientation and age group of the sample population, the results of the Chi-square tests were significant, revealing age as a possible influence on choice of philosophical orientation (Tables 16a, 17a and 18a). These differences were accepted with caution because of low numbers in the over forty year age group. In future studies, larger sample sizes should be used to evaluate this comparison adequately.

A total of 17.9% of the sample base their practice on the “straight” philosophical methods, of these, 14.2% were over the age of 30 years and of these half (7.1%) were 40 years and over.

A total of 73.9% of the respondents said they used a “mixer” philosophical approach and of these 61.1% were under the age of 35. The balance of this group consisted of the foreign graduates, of which all 5 responded in favour of this approach. Four of these respondents appear to blend “mixed” with “straight” philosophies.

A total of 66.1% of respondents used evidence-based philosophical approaches in practice and of these 50% were under the age of 35, 12.5% were between 35 and 39 years and only 3.6% were 40 years and over.

In the comparison between philosophical orientation and gender the results of the Chi-square test were not significant. In the comparison between philosophical orientation and ethnicity, the results of the Chi-square tests were also not

significant. However, due to small sample groups these results should be accepted with caution.

It appears that the majority (7.1% of a total of 8.9%) of chiropractors over the age of 40 follow philosophies that are less evidence-based and more focused on the innate ability of the body to heal itself. Interestingly, this population of chiropractors also had the most number of years in practice and half of them were educated outside of the greater Durban area. The balance of this “straight” philosophy group had had overseas education and/or work experience, but had qualified locally. This may indicate respondents could either be geographically or educationally influenced. There were no other definite variables which appeared to link the respondents to choice of philosophical orientation.

The methodology of chiropractic to validate its techniques in the past was pursued from a historical approach, where the results were largely based on anecdotal case studies or testimonials (Villanueva-Russell, 2005). In the past two decades, there has been a marked change in the manner in which chiropractic is viewed, even by the members of the profession itself (Meeker and Haldeman, 2002). According to the results of this study, 73.9% of the respondents chose mixed and 66.1% chose evidence-based philosophies, indicating a possible local or institutional abandonment of the classic mono-causal theory proposed in “straight” chiropractic philosophy.

5.3.2 LOW BACK PAIN MANIPULATION PROTOCOLS

The data in Figure 2 reflect that 55.4% of the respondents always and 30.4% frequently attempt to adjust specific segments only. The force and amplitude of a short-lever specific thrust required to move one segment is less than with a non-specific contact (Bergmann, 2005), resulting in less trauma to related joints and soft tissues. Specific contact points may be difficult to locate and it may be

necessary to sacrifice specificity and patient comfort during the manipulation (Bergmann, 2005). In contrast Bronfort *et al*. (2004) mentioned there was little agreement regarding manipulation of specific segments only, which was supported by only 7.1% of the respondents who prefer manipulation of multiple segments with less specificity throughout the spine. The results from this study highlighted that the majority of respondents do prefer a more specific "conservative" approach to manipulation protocols. Although there are various interpretations available in the literature, there appears to be no need to be less specific with manipulations. With the possibility of causing less trauma and discomfort to the patient, specificity appears to be the more accepted option.

Of the sample respondents, 71.4% frequently adjust the Sacroiliac joints for management of non-specific LBP. There is controversy and debate regarding Sacroiliac joint dysfunctions, effects on axes of rotation and translation, unilateral joint dysfunction, short leg syndrome, patterns of pain, role of muscles spanning the joint and biomechanical involvement of the Sacroiliac joints in LBP (Mierau, 2005). The theory, as proposed by Walters (1993), of a coupled biomechanical approach attributing LBP to SI joint dysfunctions appears to be strongly supported in this study.

Plaugher (1993) suggested that management related to symptomatology only may lead to inappropriate treatments, where the secondary reaction to a restricted joint may present as the primary source of symptomatology. There is a need for further investigation regarding specific manipulation protocols, as there appears to be little evidence regarding a primary lesion, and the biomechanical compensations related to pain. Technique procedures regarding the manipulation may be similar, but there are many variables within each chiropractor's lifestyle that may influence the experiences obtained through the years of practice, and the refinement of techniques of both manual and interpersonal skills. With the data collected, it appears that most chiropractors in the greater Durban area are more conservative with their approach to manipulation, aiming to manipulate

specific segments, while also appreciating the involvement of the SI joints as a component in the treatment of LBP.

5.3.3 REASONS FOR NOT REGARDING MANUAL ARTICULAR MANIPULATION AS THE PRIMARY FOCUS FOR MECHANICAL LOW BACK PAIN TREATMENT PROTOCOL.

The embracing of adjunctive techniques is not universal within the profession and some practitioners consider that these dilute chiropractic and what it has to offer (McCarthy 2008). Manual articular manipulation was regarded by 91.07% of respondents as their primary focus for treatment of mechanical LBP (Table 21 and Figure 3). 8.03% that did not regard manual articular manipulation as their primary focus for the treatment of LBP. Their reasons included personal interpretation of current literature; a primary focus on soft tissue; the preference of other therapeutic approaches and other dependants related to patient presentations (Table 22). There are tangible benefits to using hybridised treatment approaches. However, these require ethical validation in the interest of patient wellbeing (McCarthy, 2008).

5.3.4 MANAGEMENT OF PATIENTS WITH CONTRA-INDICATIONS TO MANUAL ARTICULAR MANIPULATION

In evaluating any therapy, considering potential risks and benefits is crucial (Bronfort *et al*., 2004). Modifications are necessary for certain high risk or contra-indicated patients (Souza, 2005). The data revealed that 21.4% of respondents always use mobilizations, while 42.9% use it frequently when contra-indications to manipulations are evident (Table 23). From these results, mobilizations appear to be used more frequently than a number of other treatment methods. This method of treatment is supported for the treatment of chronic and acute LBP (Airaksinen *et al.,* 2004 and Bronfort *et al*., 2004). This study, however, did not

evaluate the frequency or the method of mobilizations used most commonly in the treatment of patients with contra-indications to manipulation.

17.9% of respondents used cryotherapy “always” in patients with contra-indications to spinal manipulation, while 42.9% used it “frequently” (Table 23). These results are relatively small in accordance to what Hooper (2005) believed is the most widely used of all physical therapies. In the recent Cochrane review by French *et al*. (2006) on the application of heat and cryotherapy for LBP, limited and poor quality studies were found. This resulted in no definite conclusions on the use of cryotherapy for LBP (French *et al.,* 2006). There is however substantial recent literature (Hooper, 2005, Souza, 2005 and Hills, 2006) that condones the use of cryotherapy. Its use throughout the ages suggests it has some properties of reducing pain and restoring function even if only temporarily.

Other methods used by respondents for patients contra-indicated to manipulation include: Homeopathy, by a qualified Homeopath; Craniosacral techniques, by one respondent, and Logan Basic methods, by another.

5.3.5 ACUTE LOW BACK PAIN TREATMENTS

Acute conditions include recent trauma, acute on chronic flare-ups or inflammation (Souza, 2005). These are symptoms that are present for four to six weeks or less (Hills, 2005). The results of this study reflected that 42.9% of respondents “always” aim to adjust identified restrictions or subluxations throughout the spine, 21.4% “always” use mobilizations and 30.4% “always” use cryotherapy (Table 25 and Figure 5). Evidence is strong that manipulation of acute LBP improves range of motion and joint mobility (Souza, 2005 and Hills, 2005). Of the total respondents, 42.9% “frequently” recommended a Non Steroidal Anti Inflammatory Drug for severe acute LBP. When these figures were

compared to spinal manipulations, 71.5% of respondents “always” or “frequently” administered NSAIDs whereas 8.9% of respondents “always” or 42.9% “frequently” promoted NSAIDs as an adjunctive treatment. There did not appear to be any indications that less experienced practitioners or practitioners from other universities preferred the use of NSAIDs to control pain. Paracetamol has been proposed to be an effective medication for acute LBP, with the added benefit of fewer side effects (van Tulder *et al.*, 2005 and Roelofs *et al.*, 2008). However in this study it was not investigated as an option and in retrospect, should have been offered as a treatment option in the questionnaire.

Craniosacral therapy was used by one respondent as a treatment option for acute LBP (Table 26). Another respondent used manipulation of a primary vertebral subluxation complex directed at the site of neuropathology, pain findings or source of compensation (Table 26). These respondents required patient specific evaluations and the exact methods of evaluation and treatment were not examined in this study.

5.3.6 CHRONIC LOW BACK PAIN TREATMENTS

Low back pain symptoms for more than 12 weeks are considered to be chronic (Hills, 2005). The results reflect that 60.7% of respondents “always” and 30.4% “frequently” aim to manipulate identified restrictions or subluxations throughout the spine for chronic LBP (Table 27 and Figure 6). Strong evidence supports efficacy of manipulation over placebo for chronic LBP, especially with regard to short-term benefits (van Tulder *et al.*, 1997). A total of 17.9% of respondents “always” use mobilizations and 48.2% use them “frequently”.

5.3.7 MYOFASCIAL TREATMENTS

Gatterman *et al.* (2001) noted the significance of the myofascial component in LBP and regarded it as being within the scope of chiropractic practice. All respondents reported at least one intervention other than spinal manipulation as a treatment of the myofascial component of LBP. The results reflect that 60.7% of respondents “always” use spinal manipulation for the treatment of Quadratus Lumborum myofascial trigger points (Table 29 and Figure 7). Pooke (2000) confirmed that manipulation of the main segmental nerve supply of paraspinal muscles was an effective treatment for myofascial TPs. According to Lopes (1993) if muscle changes occur secondary to joint restrictions, then removal of the restriction should reverse the muscular effects.

Ischemic compression was used “always” by 30.4% and “frequently” by 50% of respondents (Table 29). According to a review by Vernon and Schneider (2009) on the chiropractic management of myofascial trigger points and pain syndromes, there is moderately strong evidence that ischemic compression provides immediate relief from myofascial TP pain.

Massage is “always” used by 32.1% and “frequently” by 33.9% of respondents (Table 29). Massage has been demonstrated to be beneficial for patients with subacute and chronic non-specific LBP, in terms of improved symptoms (Furlan, *et al*., 2002). Moffett and Mannion (2005) recommended massage as an adjunct to manipulation but not as a treatment in itself for LBP. It appears that the majority of respondents that use ischemic compression use it in conjunction with massage. Independently these therapies have been demonstrated to be effective, however there appears to be little or no recent literature which evaluates a combination of these two therapies.

Dry needling was “frequently” (44.6%) used by some respondents (Table 29). The specific efficacy of dry needling has yet to be confirmed (Cummings and

Baldry, 2006). However, it appears to be an effective treatment for myofascial trigger points (Jones, 1995 and Broome, 1996). The risks of dry needling are low and remains within the scope of the curriculum in the South African chiropractic learning institutes (Engelbrecht, 2009). Four of the five foreign qualified respondents never use dry needling in the treatment of Quadratus Lumborum trigger points. This may be due to their training, age or time of qualifying, as these respondents are all over the age of 40 and have had more than 25 years of experience. There were only two DUT graduates who chose never to use dry needling in their practice, the reasons of which were not investigated in this study.

Myofascial stretching exercises according to Raj and Paradise (2004) are a vital component of any multidisciplinary, pain management protocol in chiropractic. However in this study, static stretching was frequently used by only 44.6% of respondents (Table 29). The low response to this question may be related to self stretching programs as post treatment advice.

An additional suggested therapy of one respondent included Biopuncture using intramuscular Traumeel injection for the treatment of myofascial trigger points in the Quadratus Lumborum muscle (Table 30). This individual however; did not appear to have completed any additional qualifications or courses which would have allowed this intervention to be utilized in practice.

5.4 PATIENT MANAGEMENT AND EDUCATION

Patient education is vital in any holistic management protocol. It incorporates condition-specific patient information, precautionary measures and follow-up treatment advice. It supports patients in taking responsibility for their self-care rehabilitation and strengthens the therapeutic relationship.

5.4.1 EXPLAINING WORKING DIAGNOSIS AND TREATMENT PLANS

All respondents openly explain to their patients both working diagnoses and treatment plans. The research questionnaire did not address the extent of this information and this would require further research to evaluate adequately.

5.4.2 TREATMENT FREQUENCY AND DURATION OF TREATMENTS OF AN ACUTE PRESENTATION OF LBP

The first follow-up after the initial treatment for an acute presentation of LBP ranged from one to seven days (Table 33). The majority (55.4%) of respondents recommended the first follow-up one day after the initial consultation, while 32.1% preferred a follow-up after two days. There was relative conformity in the number of days before the first follow-up treatment where 96.42% of respondents recommended follow-up at day one or two. These results may vary according to severity of symptoms. However, this study did not address case specific variables.

Just over half of the respondents (57.14%) required more than three treatments for acute LBP. 5.4% of the respondents recommended to undergo further investigations after seven unsuccessful treatments (Table 34).

Souza (2005) outlined the Mercy Guidelines for recommendations on frequency of treatment of acute LBP. In acute uncomplicated conditions with no contra-indications to manipulation there may be an initial treatment phase of two weeks at a frequency of three to five times per week. This is congruent with the majority of respondents from the greater Durban area. Mathews (1995) however concluded that one treatment per week for three weeks was as effective as three treatments per week for three weeks, which suggests that a lower treatment

frequency may be as effective. Furthermore, re-evaluation according to Souza (2005) should be after two weeks unless there is progressive deterioration of symptoms within this period.

5.4.3 TREATMENT FREQUENCY AND DURATION OF TREATMENTS OF A CHRONIC PRESENTATION OF LBP

The recommended first follow-up after an initial treatment for a presentation of chronic LBP ranged from one to 12+ days amongst respondents (Table 35). The majority (41.1%) of respondents recommended the first follow-up treatment two days after the initial treatment, while 28.6% recommended follow-up treatments at three days and 8.9% after one day. There appears to be a larger range in these figures when compared with number of days after initial treatment for acute LBP. This may be due to the complexity of chronic LBP, and greater responsibility placed on the patient to perform exercises or other rehabilitative measures.

The range in number of treatments for patients with chronic LBP not responding to treatments varied between respondents (Table 36). Of the total respondents 25% considered four treatments as adequate before further investigations, 16.1% three treatments, and 14.2% ten or more treatments. Seven of the eight respondents choosing 10 or more treatments were graduates from DUT. There were no other common variables evident to distinguish these respondents from others. In a questionnaire based study, Stig *et al*. (2001) reported initial improvement in 50% of patients with chronic LBP at the fourth chiropractic visit within a two week period and by the 12th visit a further 25% of subjects had reported improvements. Of the respondents in the current study more than half considered further investigations were deemed necessary if the patient had not improved after five treatments.

Recommendations for treatment frequency for chronic LBP varied considerably. This question was not addressed in the questionnaire. However, retrospectively this would have been useful. Haas *et al*. (2004) recommended a frequency of 3 to 4 treatments per week for up to 3 weeks in treatment of non-specific LBP, whereas Mathews (1995) suggested one treatment per week was adequate. Non-specific chronic LBP is a challenging condition to treat due to its multidimensional nature (Airaksinen *et al*., 2004). Further investigation of treatment frequency specifically with regard to chronic LBP would benefit the profession.

5.4.4 PAIN-FREE FOLLOW-UPS IN CHIROPRACTIC PRACTICE.

Pain-free follow-up treatments are controversial in chiropractic practice guidelines, especially when extended period of maintenance treatments are recommended in the absence of pain. The majority (85.7%) of respondents advise one or more follow-up/s once their patient has become pain-free (Table 37). The number of recommended pain-free follow-up treatments varies considerably from one to twelve or more treatments (Table 38).

A third of respondents recommended a period of four weeks between pain free treatments (Table 39). The majority (41.1%) recommended one pain-free follow-up treatment whereas up to 10.7% suggested 12 or more pain-free follow-ups. The three respondents from Palmer College and the respondent from the Anglo European College of Chiropractic (AECC) all recommended 12 or more pain free follow-ups. These respondents had more than 25 years of experience and were therefore the most experienced sub-group of respondents. There were only two DUT respondents who recommended 12 or more pain free follow-up treatments. Some of the reasoning behind such high numbers of follow-up treatments in the absence of pain may be related to maintenance of function and range of motion, as opposed to managing pain levels alone. Also to be considered are followers of

the “straight” chiropractic philosophy, where disease states are supposedly related to subluxations within the spine.

57.1% recommended check-ups for people without pain or even a history of back pain (Table 40). 78.6% of respondents reported they would manipulate a pain-free person, with no history of back pain if a restriction or subluxations were identified. This suggested that 78.6% of respondents manipulate according to range of motion and function within the spine and believe it is necessary to have normal unrestricted function. People without pain or a history of back pain, may have functional or range of motion dysfunction within the spine. Lawrence *et al*, (2008) suggested functional spinal improvement, as opposed to reported reduction in pain levels, may be clinically more relevant in monitoring responses to chiropractic care.

Based on Rupert’s (2000) USA survey, 78% of chiropractic patients were recommended to continue with a maintenance care program and approximately 34% of those chose to receive this service. In the greater Durban area, 85.7% of chiropractors advised on pain free follow-up/s, with 41.1% advising on only one pain free follow-up treatment, not indicating the need for a maintenance program as such (Tables 37 and 38). Joint motion is required for both exchange of nutrients and removal of waste products within the joint (Enebo and Gatterman, 2005), which supports the theory that preventative chiropractic care may benefit all individuals with spinal joint restrictions. Cost-benefit factors may influence these recommendations.

5.4.5 ADVICE AND EDUCATION GIVEN TO PATIENTS WITH LOW BACK PAIN CONDITIONS

Chiropractors offer more public health education, advice and recommendations than many other types of health care providers (Johnson *et al.*, 2008). Education varies according to the condition and its chronicity (Liddle *et al.,* 2006). It is an

integral part of the treatment protocol and should be conveyed to the patient as such. A large proportion of respondents always advise on home stretches (64.3%) and offer postural or ergonomic advice (60.7%) and 62.5% frequently advise on starting an exercise program under supervision (Table 43 and Figure 8).

A significant number of Durban chiropractors appear to advocate stretching and ergonomic advice more often than exercise or other self-help advice (Table 43). Recommendations on exercise appear to be the most common experimental intervention resulting in a positive outcome in chronic LBP trials (Liddle *et al.*, 2007), although chiropractic manipulation has better outcomes than home exercise alone in management of chronic LBP (Lawrence *et al.*, 2008).

5.4.6 MANAGEMENT OF PATIENTS NOT RESPONDING TO TREATMENT FOR LBP

Failure of a patient to respond to treatment indicates further investigations as to the aetiology of their back pain (Hills, 2006). Of the 87.5% of respondents, 46.4% “always” and 41.1% “frequently” review all previous positive findings (Table 45 and Figure 9). Of 87.5% of respondents, 26.8% “always” and 60.7% “frequently” send patients for further investigations which may include blood work, radiographs, Computed Tomography or Magnetic Resonance Imaging (MRI) scans. Of 69.6% of respondents, 21.4% “always” and 48.2% “frequently” change treatment methods when a patient is not responding. This response appears to be relatively low and may indicate possible stagnating treatment protocols or limited knowledge of variances in treatment methods or availability to treatment tools. Threshold for a second opinion or referral of non-responding patients was not investigated in this questionnaire and retrospectively may have added further value to this study.

CHAPTER 6

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The purpose of this study was to determine the patient management protocols used by chiropractors for the treatment of LBP, in the greater Durban metropolitan area.

The number of respondents was 56, which represented 70% of the chiropractors in the greater Durban metropolitan area. Of the respondents 60.7% were male and 39.3% were female. The majority of respondents (87.5%) were White 12.5% were Indians. There were no Black or other ethnic groups represented. The respondent's age ranged from 25 to 74 years old. The majority of respondents were between 30 and 34 years of age.

From this study there appeared to be a wide range of influences on practice philosophy and management protocols, independent of demographics and training institute. The number of short courses and congresses available and increasing accessibility to online chiropractic resources and journals may have a significant influence on practitioner approaches to patient management.

This study suggested that a chiropractor's age significantly affects his or her philosophical orientation. This may in part be due to the institute of qualification but may also reflect a changing trend in chiropractic philosophy in recent years. The majority of chiropractors in the greater Durban area over the age of 40 obtained their qualifications from foreign colleges. This group represented the majority of respondents following a "straight" philosophy, whereas other

respondents favored “mixed” and evidence-based philosophical orientations. This may have represented a shift towards a more scientific model of chiropractic.

Under the conditions of contra-indications to manipulation it appears that numerous therapeutic approaches were being utilized by respondents. The most common however, appear to be mobilizations (64.3%) and cryotherapy (60.8%) when these conditions were evident.

The myofascial component of LBP appears to be satisfactorily addressed by the majority of respondents. Spinal manipulation directed at myofascial trigger points in the Quadratus Lumborum, the muscle most commonly associated with LBP, is strongly advocated by 92.8% of respondents. Ischemic compression (80.4%), dry needling (71.4%) and massage (66%) are also used “always” or “frequently” in the treatment of Quadratus Lumborum myofascial trigger points.

Regarding manipulation protocols for LBP, the majority (85.8%) of respondents seemed to prefer specific short-lever manipulations. Sacroiliac joint manipulation was also considered important by a significant proportion (82.1%) of respondents for the treatment of LBP.

Amongst respondents, the first follow-up treatment after initial treatment in an acute presentation of LBP ranged from one to seven days. There was relative agreement (96.42%) that first follow-up treatment should be after one or two days. In contrast, the recommended first follow-up treatment after an initial treatment of chronic LBP ranged from one to 12+ days, where the majority (41.1%) of respondents recommended first follow-up treatment after two days, 28.6% after three days and 8.9% after one day. This variance may in part be due to the complexity of chronic LBP, although it may also have represented greater responsibility was placed on the patient to perform prescriptive exercises between treatments.

In the treatment of acute LBP, further investigations were considered necessary by more than half (57.14%) of respondents after two to three treatments where no relief had been obtained. A small number of respondents recommended up to seven (3.6%) and nine (1.8%) treatments before further investigation. In contrast, in patients with chronic LBP not responding to treatment, the threshold for further investigations varied more widely between practitioners. Of respondents, 25% considered four, 16.1% three, and 14.2% ten or more treatments before further investigations were necessary.

Management protocols for acute LBP appeared to be more uniform when compared to management of chronic LBP. This highlights the complexity and varied approaches in managing chronic LBP. There is wide inter-practitioner variation in the application of various modalities and protocols. There appear however, to be common underlying trends between different chiropractic patient management protocols, such as reduction of inflammation and improved range of motion and joint function.

There appear to be shifts within the chiropractic profession to model itself on current science and philosophies promoted by other healthcare models (Parkin-Smith 2005). Despite the variances in philosophy amongst respondents, there remains consensus that manual articular manipulation remains the mainstay in chiropractic treatment protocols for both acute and chronic LBP.

6.2 LIMITATIONS AND RECOMMENDATIONS

A generalized or non-specific approach to management of LBP presentations was assessed in this study. A more specific, case-based study of LBP management may demonstrate to be more accurate for assessment purposes and should be considered in future investigations of this type.

In this study, pain was assessed as the primary variable affecting management protocols. In future studies, range of motion and joint function should also be incorporated as variables within LBP management protocols.

A larger sample size may yield more accurate results and highlight statistical differences where present, which a small sample size, as in this study of 56 respondents, may not be able to reveal accurately. This could include a national study of this type.

In this study, the questionnaire was formulated by the researcher and amended by a Focus Group; however there is a lack of global verification that the questionnaire is valid and reliable to investigate the given topic.

In this study, the focus was on management protocols for non-specific LBP. A future study could investigate how the results of a diagnostic tools used in chiropractic affect choice of management protocols where an aetiology has been determined.

Recommendations for the treatment frequency for LBP after the first follow-up treatment were not assessed in this study although retrospectively, it may have provided useful data.

Long-term follow-up studies of this type should endeavor to determine new trends or developments in management protocols for LBP. This would be helpful in evaluating change within the profession over time and may influence curriculum developments in learning institutions.

Results of this study show an under-representation of Black South African chiropractors in the greater Durban metropolitan area. Strategies to promote chiropractic in this population group, both as practitioners and patients may be invaluable to the profession and its future in South Africa.

Threshold for a second opinion or referral of non-responding patients was not investigated in this questionnaire and retrospectively may have added further value to this study.

This study did not cover the number or date at which conferences or short courses had been attended. Practitioners may have been practicing for several years without continuing their education or updating themselves with recent findings. In order to gauge the effectiveness of CPD on practice management protocols, a study to review and compare findings repeatedly would be required in order to see if changes do occur after conferences or short courses. This information would be invaluable to the profession in order to see the impact of CPD on practice management protocols.

Repeated use of Chi-Squared test could result in spurious results and may be a limitation in this study.

Future studies should endeavor to assess the medium of conveyance and type of knowledge which is preferred by chiropractors partaking in CPD. With this knowledge, tailor made CPD courses could become more popular and attendance levels may be improved.

This study did not evaluate the frequency or the method of mobilizations used. There are a wide range of mobilization grades and techniques available for the treatment of LBP. A study of the method and frequency of application of mobilizations within chiropractic practice would clarify its use as a treatment for LBP.

Paracetamol has been demonstrated to be more effective than NSAIDs for acute LBP, with the added benefit of fewer side effects. In this study however, it was not investigated as part of a treatment for acute LBP and in retrospect, should have been offered as a treatment option in the questionnaire.

This study was unable to determine the use of combination treatments. This should be investigated in order to evaluate what methods are used with success in conjunction with each other.

The attitudes and attendance records of chiropractors regarding CPD is not known for chiropractors in the greater Durban metropolitan area, or in South Africa in general. Research available on this topic was only available from other countries and would be valuable in the South African context.

REFERENCES

Airaksinen, O., Brox J.I., Cedraschi, C., Hildebrandt, J., Klaber-Moffett, J., Kovacs, F., Mannion, A.F., Reis, S., Staal, J.B., Ursin, H. and Zanoli, G. 2004. European Guidelines for the Management of Chronic Non-Specific Low Back Pain. Available: http://www.backpaineurope.org/web/files/WG2_Guidelines.pdf [Accessed 09/12/08]

Andersen, G.D. 2005. Clinical Nutrition. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies. Pp1099-1135

Axen, I., Rosenbaum, A., Robech, R., Wren, T. and Leboeuf-Yde, C. 2002. Can patient reactions to the first chiropractic treatment predict early favorable treatment outcome in persistent low back pain? Journal of Manipulative Physiological Therapeutics. Volume 25, Number 7. Pp 450-454.

Bergmann, T.F. 2005. High-Velocity Low-Amplitude Manipulative Techniques. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies, Inc. pp755-766.

Bergmann, T.F. 2005. Chiropractic Technique. In Gatterman M.I. Foundations of Chiropractic: Subluxation, 2nd Ed. Missouri, USA. Mosby Inc. pp 133-167.

Bogduk, N. 2006. Evidence-based treatment of back pain. In Low Back Syndromes: Integrated Clinical Management. Morris C.E. U.S.A. McGraw-Hill Companies, Inc. pp 821-837.

Bolton, J.E. 2003. Chiropractors' attitudes to, experiences of and future needs regarding continuing professional development. European Journal of Chiropractic 2003, Volume 48, pg 69.

Bougie, J.D. 2005. Geriatric Practice-Specific issues. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies. Pp 1079-1098

Bronfort, G., Haas, M., Evans, R.L. and Bouter, L.M. 2004. Efficacy of spinal manipulation and mobilization for low back pain and neck pain: a systematic review and best evidence synthesis. The Spine Journal 4. Northwestern Health Sciences University. USA. pp335–356.

Broome, R.J. 1996. The Therapeutic Efficacy of Invasive Needling Techniques in the Management of Myofascial Pain and Dysfunction Syndrome. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Burton, A.K. 2005. How to prevent low back pain. Best Practice & Research Clinical Rheumatology. Volume 19. Issue 4. Pp 541-555.

Carey, P., Clum, G. and Dixon, P. 2005. Final Report of the Identity Consultation task force. World Federation of Chiropractic. Available: http://www.wfc.org/Website/WFC/Library.nsf/CatalogByTitleLive/Aa-TF%20Final%20Rept-Am%2004-29-05/$FILE/Aa-TF%20Final%20Rept-Am%2004-29-05.pdf
[Accessed 12/10/08]

Chapman-Smith, D.A. and Cleveland, C.S. 2005. International Status, Standards and Education of the Chiropractic Profession. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies.pp 111-134.

Cooperstein, R., Perle, S.M., Gatterman, M.I., Lantz, C. and Schneider, M.J. 2001. Chiropractic Technique Procedures for Specific Low Back Conditions: Characterizing the Literature. Journal of Manipulative and Physiological Therapeutics. Volume 24. Number 6. Pp 407-424.

Cox, J.M. and Gudavalli, M.R. 2005. Traction and Distraction Techniques. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies. Pp 821-840

Cramer, G.D. Gregerson, D.M., Knudsen, J.T., Hubbard, B.B., Ustas, L.M. and Cantu, J.A. 2002. The Effects of Side-Posture Positioning and Spinal Adjusting on the Lumbar Z Joints. SPINE, Volume 27, Number 22. Pp 2459–2466

Cramer, G., Budgell, B., Henderson, C., Khalsa, P. and Pickar, J. 2006. Basic Science Research Related to Chiropractic Spinal Adjusting: The State of the Art and Recommendations Revisited. Journal of Manipulative and Physiological Therapeutics. Volume 29, Number 9. Pp 726-757.

Cumming, L.M. 2003. The relative effectiveness of Electroacupuncture as compared to single dry needle insertion in treatment of Trapezius myofasciitis. Masters Degree in Technology: Chiropractic.Dissertation. Durban Institute of Technology, South Africa. Pp 85-89

Cummings, M. and Baldry, P. 2006. Regional myofascial pain: diagnosis and management. Best Practice & Research Clinical Rheumatology. Volume 21, Number 2. Pp 367-387.

Davis, M.A. and Bove, G.M. 2008. The Chiropractic Healer. Journal of Manipulative and Physiological Therapeutics. Volume 31, Number 4. Pp 323-327

Descarreaux, M., Blouin, J., Drolet, M., Papadimitriou, S. and Teasdale, N. 2004. Efficacy of preventative spinal manipulation for chronic low –back pain and related disabilities: A Preliminary Study. Journal of Manipulative and Physiological Therapeutics. Volume 27, Number 8. Pp 509-514.

Dı´ez, F. 2004. Chiropractic Management of patients with bilateral congenital hip dislocation with chronic low back and leg pain. Journal of Manipulative and Physiological Therapeutics, Volume 27, Number 4. Pp 280e1 -280e8.

DiFabio R.P. 1992. The efficacy of manual therapy. American Physical Therapy Association. Volume 72. Pp 853–864.

Docrat, A., 1999. A comparison of the epidemiology of low back pain in Indian and Coloured communities in South Africa. Masters Degree in Technology: Chiropractic.Dissertation. Durban Institute of Technology, South Africa.

Dutton, M. 2002. Manual Therapy of the Spine: An integrated approach. USA. McGraw-Hill Companies, Inc.

Enebo, B.A. and Gatterman, M.I. 2005. In Gatterman M.I. Foundations of Chiropractic Subluxation 2nd Ed. St. Louis Missouri. USA. Mosby, Inc. pp245-282

Engelbrecht, R. 2008. Chiropractic Association of South Africa (C.A.S.A.): Online: http://www.chiropractic.co.za/index.html?lf=1;pg=7 [Accessed 10/10/08]

Engelbrecht, R. 2009. To robpalm123@hotmail.com

Esterhuizen, T. 2008 (esterhuizent@ukzn.ac.za) Emailed to R. H. Palmer (robpalm123@hotmail.com) [Accessed

Evans M.W. and Rupert R. 2006. The Council on Chiropractic Education's New Wellness Standard: A call to action for the chiropractic profession. BioMed Central Ltd. Chiropractic & Osteopathy. Volume 14. Number 23. Pp 1-6

Ferrari, R. 2007. Responsiveness of the Short-Form 36 and Oswestry Disability Questionnaire in Chronic Nonspecific Low Back Pain and Lower Limb Pain Treated with Customized Foot Orthotics. Journal of Manipulative and Physiological Therapeutics. Volume 30, Number 6. pp 456-458.

Flanagan, J. and Giordano, J. 2002. The Role of the Institution in Developing the next Generation Chiropractor: Clinician and Researcher. Journal of Manipulative and Physiological Therapeutics: Commentary. Volume 25, Number 3. Pp 193-196.

Forand, D., Drover, J., Suleman, Z. and Herzog, W. 2004. The Forces Applied by Female and Male Chiropractors During Thoracic Spinal Manipulation. In Morris C.E. Low back Syndromes: An integrated clinical management. USA. McGraw-Hill Companies, Inc. pp 49-56

Forst, S.L., Wheeler, M.T., Fortin, J.D. and Vilensky, J.A. 2006. The Sacroiliac Joint: Anatomy, Physiology and Clinical Significance. Pain Physician Volume 9, Number 1. Pp 61-68.

Foster, I.E. and Bagust, J. 2004.Cutaneous Two-Point Discrimination Thresholds and Palpatory Sensibility in Chiropractic Students and Field Chiropractors. Journal of Manipulative and Physiological Therapeutics. Volume 27, Number 7. Pp 466-471.

French, S.D., Cameron, M., Walker, B.F., Reggars, J.W. and Esterman, A.J. 2006.A Cochrane Review of Superficial Heat or Cold for Low Back Pain. SPINE Volume 31, Number 9, Lippincott Williams & Wilkins, Inc. pp998–1006

Furlan, A.D., Brosseau, L., Imamura, M. and Irvin, E. 2002. Massage for Low-back Pain: A Systematic Review within the Framework of the Cochrane Collaboration Back Review Group. SPINE. Volume 27, Number 17. Pp 1896–1910.

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. Volume 30, Number 8. Pp 944–963.

Gatterman, M.I. 1990. Chiropractic Management of Spinal Related Disorders. Baltimore: Williams and Wilkens. Pp 437.

Gatterman, M.I., Cooperstein, R., Lantz, C., Perle, S.M. and Schneider, M.J. 2001. Rating Specific Chiropractic Technique Procedures for Common Low Back Conditions. Journal of Manipulative and Physiological Therapeutics, Volume 24, Number 7. pp449-456

Gay, R.E., Bronfort, G. and Evans R.L. 2005. Distraction Manipulation of the Lumbar Spine: A Review of the Literature. Journal of Manipulative and Physiological Therapeutics. Volume 28. Issue 4. Pp 266-273.

Gay, R.E. Brault, J.S. 2008. Evidence-informed management of chronic low back pain with traction therapy. The Spine Journal. Volume 8. Pp 234–242.

Giles, L.G.F. and Muller, R. 1999. Chronic Spinal pain syndromes: A clinical pilot trial comparing acupuncture, a nonsteroidal anti-inflammatory drug and spinal manipulation. Journal of Manipulative and Physiological Therapeutics. Volume 22. Pp 376-381.

Giles, L.G. 2005. Pathophysiology of the Posterior Zygapophysial (Facet) Joints. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies. Pp 401-417

Gillespie D.M. 2004. The Effectiveness of Manual Manipulation Versus The Activator Adjusting Instrument in the Management of Acute Facet Syndrome of the Lumbar Spine. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Greenbaum, T.L. 2000. Moderating focus groups: A practical guide for group facilitation. USA. Sage.

Haas, M., Groupp, E. and Kraemer, D.F. 2004. Dose-response for chiropractic care of chronic low back pain. The Spine Journal 4. pp574-583.

Hancock, M.J., Maher, C.G., Latimer, J., McLachlan, A.J., Cooper, C.W., Day, R.O., Spindler, M.F. and McAuley, J.H. 2007. Assessment of diclofenac or spinal manipulative therapy, or both, in addition to recommended fi rst-line treatment for acute low back pain: a randomised controlled trial. The Lancet. Volume 370. Pp 1638–1643.

Haneline, M.T. 2007. Evidence – based Chiropractic Practice. Jones and Bartlett Publishers, Inc. Pp 3-22

Hills, E.C. 2005. Mechanical low back pain. Available: http://emedicine.medscape.com/article/310353-overview [Accessed 04/03/2008]

Hochman J.I. 2005. The Effect of Sacro Occipital Technique Category II Blocking on Spinal Ranges of Motion: A Case Series. Journal of Manipulative and Physiological Therapeutics. Volume 28, Number 9. Pp719-723.

Hong, C.Z., Chen, Y.C., Pon, C.H., Yu, J. 1993. Immediate effects of various physical medicine modalities on Pain Threshold of an Active Myofascial Trigger Point. Journal of Musculoskeletal Pain. Volume 1. Pp37-53.

Hong, C.Z. 1994. Lidocaine injection versus dry needling to myofascial trigger point: the importance of the local twitch response. American Journal of Physical Medicine and Rehabilitation. Volume 73, Number 4. Pp 256-263.

Hooper, P.D. 2005. The Use of Physical Modalities. In Haldeman S. 3rd Ed. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies, Inc. Pp 861-874

Hou, C.R., Tsai, L.C., Cheng, K.F., Chung, K.C. and Hong, C.Z. 2002. Immediate effects of various physical therapy modalities on cervical myofascial pain and trigger point sensitivity. Arch Phys Med Rehabil. Pp 1406-1414

Hurwitz E.L., Coulter I.D., Adams A.H., Genovese B.J. and Shekelle P.G., 1998. Utilization of chiropractic services in the United States and Canada. American Journal of Public Health. Pp 1985-1991.

Hurwitz, E.L. and Shekelle, P.G. 2006. Epidemiology of low back syndromes. In Morris C.E. Low Back Syndromes: Integrated Clinical Management. U.S.A.: McGraw-Hill Companies, Inc. Pp 83-106

Hutchings, T.A. 1998. The treatment of Myofascial Pain Syndrome using Trancutaneous Electrical Nerve Stimulation: a comparison of two types of electrode placements. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Ibrahim, T., Burhan, A., Mehmet, B. and Nazim, G. 1998. Distraction of Lumbar Vertebrae in Gravitational Traction. Spine. Volume 23, Number 9. Pp1061-1063.

Jacobs, R. 2005. The efficacy of a toggle recoil drop piece adjustment technique in the treatment of sacroiliac dysfunction. Chiropractic.Dissertation. Durban Institute of Technology, South Africa.

Jamison, J.1999. Stress: The Chiropractic Patients' Self-Perceptions. Journal of Manipulative and Physiological Therapeutics. Volume 22, Number 6.

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

Jones, A.D. 1994. The effectiveness of Myofascial Trigger Point Therapy on Myofascial Pain Syndrome Trigger Points. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Kasunich, N.J. 2003. Changes in low back pain in a long distance runner after stretching the iliotibial band. Journal of Chiropractic Medicine. Volume 2, Number 1. Pp 37-40.

Kawchuk, G.N., Prasad, N.G., McLeod, R.C., Liddle, T., Li, T. and Zhu, Q. 2006. Variability of Force Magnitude and Force Duration in Manual and Instrument-Based Manipulation Techniques. Journal of Manipulative and Physiological Therapeutics, Volume 29, Issue 8, Pp 611-618.

Keating, J.C. 2005. Phiosophy in Chiropractic. In Haldeman, S. Principles and Practice of Chiropractic. 3rd Edition. U.S.A: McGraw Hill.

Klingensmith, R.D. and Blum, C.L. 2003. The relationship between pelvic block placement and radiographic pelvic analysis. Journal of Chiropractic Medicine. Volume 2. Number 3. Pp 102-106.

Kostopoulos, D. and Rizopoulos, K. 2008. Effect of topical aerosol skin refrigerant (Spray and Stretch technique) on passive and active stretching. Journal of Bodywork and Movement Therapies. Volume 12. Pp 96–104.

Kretzmann, H. M. 1995. A Study of the Relative Effectiveness of McManis Traction used as an Adjunct to Spinal Manipulative Therapy. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Lancourt, J.E. 1998. Point of View: Distraction of Lumbar Vertebrae in Gravitational Traction. Spine. Volume 23 Number 9. Pp 1064.

Lawrence, D.J., Meeker, W., Branson, R., Bronfort, G., Cates, J.R. Haas, M. Haneline, M., Micozzi, M., Updyke, W., Mootz, R., Triano, J.J., and Hawk, C. 2008. Chiropractic management of low back pain and low back related leg complaints: A Literature synthesis. Journal of Manipulative and Physiological Therapeutics, Volume 31, Number 9. Pp 659-674.

Liddle, S.D., Gracey, J.H. and Baxter, G.D. 2007. Advice for the management of low back pain: A systematic review of randomised controlled trials. Manual Therapy 12. Pp 310–327.

Liebenson, C. and Skaggs, C. 2005. The Roles of Rehabilitation and Exercise in Chiropractic Practice. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies. Pp 887-905

Lopes, M.A. 1993. Vertebral Subluxation Complex. In Plaugher G. Textbook of Clinical Chiropractic – A specific biomechanical approach. Baltimore, USA. Williams and Wilkins. Pp 52-72

Mac Dougall T.C. 1999. The Relative Effectiveness of Proprioceptive Neuromuscular Facilitative Stretching as compared to Static Stretching in the treatment of Active Myofascial Trigger Points. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Manga, P., Angus, D.E., Papadopoulos, C. and Swan W.R. 1993. The Effectiveness and Cost-Effectiveness of Chiropractic Management of Low-Back Paini, Kenilworth Publishers. Toronto. Available: http://www.chiropractic.on.ca/ecms.ashx/cc525f63-98f9-43ce-b9c0-2dc8186b750c/ResearchandReportsDocument/MangaReport1993-ExecutiveSummary.pdf
Accessed 24/06/08

Maigne, J. and Vautravers, P. 2003. Mechanism of action of spinal manipulative therapy. Joint Bone Spine. Volume 70. Pp 336–341.

Marszalek, N.M. 2002. The Effectiveness of manipulation of the Symptomatic Sacroiliac Joint compared to manipulation of both the asymptomatic and Symptomatic Sacroiliac joints in the treatment of Unilateral Sacroiliac Syndrome. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Mathews, R. 1995. The Approaches of Frequent and Infrequent Application of Chiropractic Treatment: A Study of their relative efficacy in the management of mechanical low back pain. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

McCarthy, P.W. 2008. Scope of practice: What should be included and what not? Clinical Chiropractic. Volume 11. Pp 115-119.

McClure, M. 1993. Flexibility Training. In Basmajian J.V. and Nyberg R. Rational Manual Therapies. USA. Williams and Wilkins. Pp 359-370

Mcllveen, B. and Robertson, V.J. 1998. A Randomized Controlled Study of the Outcome of Hydrotherapy for Subjects with Low Back or Back and Leg Pain Physiotherapy, January 1998, Volume 84, Number 1. pp 17-26.

Meeker, W.C. and Haldeman, S. 2002. Chiropractic: A Profession at the Crossroads of Mainstream and Alternative Medicine. Annals of Intern Medicine. Academia and Clinic. Volume 136, Number 3. Pp 216-227.

Menke, J.M. 2003. Principles in Integrative Chiropractic. Journal of Manipulative and Physiological Therapeutics. Volume 26, Number 4. Pp 254-272.

Mierau, D. 2005. Biomechanics and Pathophysiology of the Sacroiliac Joint. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies, Inc. Pp 433-446.

Moffett, J.K. and Mannion, A. F. 2005. What is the value of physical therapies for back pain? Best Practice & Research Clinical Rheumatology. Volume 19, Number 4. Pp 623–638.

Mootz R.D. and Shekella P.G, 2005. Chiropractic in the United States: Training, practice and research. Journal of Manipulative and Physiological therapeutics. http://www.ncschiropractic.com/ahcpr/part8.htm [Accessed 23/08/2008]

Mootz, R.D., Coulter, I. and Schultz, G.D. 2005. Professionalism and Ethics in Chiropractic. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies. Pp 201-219

Mouton, J. 2001. How to succeed in your Masters and Doctoral Studies – A South African Guide and Resource book. South Africa. Van Schaik Publishers.

Myburgh, C. and Mouton, J. 2007. Development Issues in Chiropractic: A South African Practitioner and Patient Perspective. Journal of Manipulative and Physiological Therapeutics. Volume 30, Number 3. Pp 206-214.

Nyberg, R. and Basmajian, J.V. 2005. Rationale for the Use of Spinal Manipulation. In Gatterman M.I. Foundations of Chiropractic: Subluxation, 2nd Ed. Missouri, USA. Mosby Inc. Pp 451-467

Nyiendo, J., Haas, M. and Goodwin, P. 2000. Patient characteristics, practice activities and one-month outcomes from chronic, recurrent low back pain treated by chiropractors and family physicians: a practice-based feasibility study. Journal of Manipulative and Physiological Therapeutics. Volume 23 Number 4. Pp 239-245.

Opperman, E. 1997. Chiropractic care in Association with a wellness approach for the treatment of mechanical low back pain. Masters Degree in Technology: Chiropractic.Dissertation. Durban Institute of Technology, South Africa.

Ortiz, D. and Smith, R. 1993. Ergonomic Considerations. In Basmajian J.V. and Nybery R. Rational Manual Therapies. Williams and Wilkins. USA. Pp 441-450

Parkin-Smith, G.F. 2005. Advanced chiropractic practice—–Requirement or just a desire? Clinical Chiropractic. Volume 8. Pp49-56.

Plaugher, G. and Lopes, M.A. 1993. Clinical Anatomy and Biomechanics of the Spine. In Plaugher, G. Textbook of Clinical Chiropractic – A specific biomechanical approach. Baltimore, USA. Williams and Wilkins. Pp 12-51

Plaugher, G. 1993. Lumbar Spine. In Plaugher, G. Textbook of Clinical Chiropractic – A specific biomechanical approach. Baltimore, USA. Williams and Wilkins. Pp 190-242

Polus, B.I. 2005. Muscle Spindles and Spinal Proprioception. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies. Pp 249-268

Pooke, H. C. 2000. The Relative Effectiveness of Chiropractic Manipulation to the Level of Main Segmental Nerve supply as Opposed to Dry Needling in the Treatment of Muscles with Myofascial Trigger Points. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Potgieter, R. 2006. Etiology of myofascial pain and dysfunction syndrome leading to active trigger-points with Traumeel's treatment intersection. Journal of Biomedical therapy. Pp 13-15

Prentice, W.E. 1994. Therapeutic Modalities in sports Medicine, 3rd Ed. USA, Mosby-Year Book, Inc.

Raj, P.P. and Paradise, L.A. 2004. Myofascial Pain Syndrome and Its Treatment in Low Back Pain. Seminars in Pain Medicine, Volume 2. Pp 167-174.

Redwood, D. 2003. Spinal Adjustment for Low Back Pain. Seminars in Integrative Medicine, Volume 1, Number 1. Pp 42-52.

Rittweger J, Ehrig J, Just K, et al. 2002.Oxygen-uptake in whole-body vibration exercise: Influence of vibration frequency, amplitude, and external load. International Journal of Sports Medicine. Volume 23. Pp 428-432.

Roelofs, P.D., Deyo, R.A., Koes, B.W., Scholten, R.J. and van Tulder, M.W. 2008. Nonsteroidal Anti-Inflammatory Drugs for Low Back Pain: An Updated Cochrane Review. The Spine Journal. Volume 33, Number 16. Pp 1766–1774.

Ross J.K., Bereznick, D.E. and McGill, S.M. 2004. Determining Cavitation Location During Lumbar and Thoracic Spinal Manipulation. Is Spinal Manipulation Accurate and Specific? The Spine Journal, Volume 29, Number 13. Pp 1452–1457.

Ross, M. 1997. Manipulation and Back School in the Treatment of Low Back Pain. Journal of Physiotherapy - Focus. Volume 83, Number 4. Pp 181-183.

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. Volume 23, Number I. Pp 1-9.

Saliba, V.L., Johnson, G.S. and Wardlaw, C. 1993. Proprioceptive Neuromuscular Facilitation. In Basmajian J.V. and Nyberg R. Rational Manual Therapies. USA. Williams and Wilkins. Pp 243-284

Scaringe, J. and Kawaoka, C. 2005. Mobilization Techniques. In Haldeman S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies. Pp 767-785

Schenk, K.W. 2005. Chiropractic management of chronic low back pain:A report of positive outcomes with patient compliance. Journal of Chiropractic Medicine. Volume 4. Number 1. Pp 39-42.

Seaman, D. 2007. A cure for the curse of chiropractic, part two. Dynamic chiropractic. Available: www.chiroweb.com/archives/25/04/14.html [Accessed 6/12/08]

Shacksnovis, R. The Relative Effectiveness of Myofascial Manipulation versus Ischemic Compression in the treatment of Myofascial Trigger Points of the Upper Trapezius Muscle. M.Tech: Chiropractic dissertation, Durban Institute of Technology.

Shekelle, P.G. and Delitto, A.M. 2005. Treating low back pain. The Lancet. Volume 365. Pp 1987-1989.

Sherman, K. J., Hogeboom, C. J. and Cherkin, D. C. 2001. How traditional Chinese medicine acupuncturists would diagnose and treat chronic low back pain: results of a survey of licensed acupuncturists in Washington State. Complementary Therapies in Medicine. Harcourt Publishers Ltd. Volume 9. Pp 146–153.

Simons, D.G., Travell, J.G. and Simons, L.S. 1999. Myofascial Pain and Dysfunction: The Trigger Point Manual. Volume 1. 2nd Ed. US. Williams & Wilkins.

Souza, T.A. 2005. Differential Diagnosis and Management for the Chiropractor: Protocols and Algorithms 3rd Ed. Jones and Bartlett Publishers Inc. Sudbury.

Standaert, C.J.,Weinstein, S.M. and Rumpeltes, J.(2008) Evidence-informed management of chronic low back pain with lumbar stabilization exercises. The Spine Journal. Volume 8. Pp 114–120.

Stig, L.C., Nilsson, O. and Leboeuf-Yde, C. 2001. Recovery Pattern of Patients Treated With Chiropractic Spinal Manipulative Therapy for Longlasting or Recurrent Low Back Pain. Journal of Manipulative and Physiological Therapeutics. Volume 24, Number 4. Pp 288-291.

Stuber K.J., Grod, J.P., Smith, D.L. and Powers, P. 2005. An online survey of chiropractors' opinions of continuing education. Chiropractic & Osteopathy Volume 13, Number 22. Pp 1-11.

Tardif, G.S. 1994. Is the Chiropractic management of Low-back pain the solution? What can physicians learn from the Magna report. Canadian Medical Association Journal. Volume 151, Number 9. Pp 1247-1249.

Teodorczyk-Injeyan, J.A., Injeyan, H.S. and Ruegg, R. 2006. Spinal Manipulative Therapy reduces Inflammatory Cytokines But Not Substance-P production in Normal Subjects. Journal of Manipulative and Physiological Therapeutics. Volume 29, Number 1. Pp 14-21.

Terrett, A.G.J. 2005. Neurological Complications of Spinal Manipulation Therapy. In Haldeman, S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies. Pp 1149-1164.

The Chiropractic Report. Available: http://chiropracticreport.com/portal/index.php?option=com_frontpage&Itemid=1 [Accessed 19/03/09]

Triano, J. 2005. The Theoretical basis for spinal manipulation. In Haldeman, S. Principles and Practice of Chiropractic. USA. McGraw-Hill Companies, Inc. Pp 361-381

Van Den Bos, M. President of Chiropractic Association of South Africa. Available: http://www.chiropractic.co.za/index.html?lf=1;pg=7
[Accessed 19/03/09]
Van der Merwe, N.T. 2008. An investigation the short term efficacy of vibration training on the Power-plate in low back pain sufferers with regards to core muscle strength. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Van der Meulen, A. G. 1997. An Epidemiological Investigation of Low Back Pain in a Formal Black South African Township. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Van Tulder, M.W., Koes, B.W. and Bouter, L.M. 1997. Conservative Treatment of Acute and Chronic Nonspecific Low Back Pain: A Systematic Review of Randomized Controlled Trials of the Most Common Interventions. Spine: Volume 22. Number 18. Pp 2128-2156.

Van Tulder, M., Becker, A., Bekkering, T., Breen, A., Gil del Real, M.T., Hutchinson, A., Koes, B., Laerum, E. and Malmivaara, A. 2004. European Guidelines for the Management of Acute Nonspecific Low Back Pain in Primary Care. On behalf of the COST B13 Working Group. Available: http://www.backpaineurope.org/web/files/WG1_Guidelines.pdf
[Accessed 26/02/09]

Vella, C.A. 2005. Whole Body Vibration Training. IDEA Fitness Journal. January 2005.

Vernon, H. and Schneider, M. 2009. Chiropractic management of myofascial trigger points and myofascial pain syndrome: A Systematic review of the literature. Journal of Manipulative and Physiological Therapeutics, Volume 32, Issue 1, January 2009, Pp 14-24.

Villanueva-Russell, Y. 2005. Evidence-based medicine and its implications for the profession of chiropractic. Social Science & Medicine. Volume 60, Issue 3. Pp 545-561.

Walker, C. 2002. The Efficacy of Myofascial Adhesion Manipulation in the Treatment of Myofascial Pain Syndrome. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Walters, P.J. 1993. Pelvis. In Plaugher G. Textbook of Clinical Chiropractic – A specific biomechanical approach. Baltimore, USA. Williams and Wilkins. Pp 150 – 189.

Webb, Q. 2003. The Effectiveness of a Home Programme of Ischemic Compression Compared with Self Applied Ischemic Compression Under Clinical Observation for the treatment of Myofascial Pain Syndrome of the Levator Scapulae Muscle. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

Wenban, A.B. and Nielsen, M.K. 2005. Chiropractic maintenance care and quality of life of a patient presenting with chronic low back pain. Journal of Manipulative and Physiological Therapeutics. Volume 28. Number 2. Pp136-142

Wickes, D. 2002. Educating primary care chiropractic physicians. Journal of Chiropractic Medicine. Volume 1. Number 4. Pp175-179.

Wilson, D.P.C. 2006. The Relative Effectiveness of Spinal Manipulation in conjunction with Core-Stability Exercises as opposed to Spinal Manipulation Alone in the Treatment of Post-Natal Mechanical Low Back Pain. M.Tech: Chiropractic dissertation, Technikon Natal, Durban.

World Federation of Chiropractic. 2003. WFC Policy Statement: Use of Prescription Drugs. Available: http://www.wfc.org/website/WFC/Library.nsf/CatalogByTitleLive/Use%20of%20Prescription%20Drugs%20(1999)/$FILE/992003143539.PDF
[Accessed 01/04/09]

World Federation of Chiropractic. 2003. WFC Policy Statement: Use of the Title Chiropractor. Available: http://www.wfc.org/website/WFC/Library.nsf/CatalogByTitleLive/Use%20of%20the%20Title%20Chiropractor%20(2001,%20amended%202003)/$FILE/992003143112.PDF
[Accessed 01/04/09]

Zhang, J. 2005. Chiropractic adjustments and orthotics reduced symptoms for standing workers. Journal of Chiropractic Medicine. Volume 4. Number 4. Pp 177-181.

APPENDIX

Appendix A

Questionnaire

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 B

Letter of Information and Consent

Title of the Research Study: An investigation into patient management protocols of low back pain by chiropractors in the greater Durban area.

Principle Investigator/s: Robert Hilton Palmer

Co-Investigator/s: Supervisor: Dr Grant Steven Webb
Co-Supervisor: Dr Andrew Jones

Brief Introduction and Purpose of the Study: No current consensus or proven algorithm exists among physicians, physical therapists, or chiropractors concerning the most appropriate treatment and management of lower back pain. The scope of chiropractic is wide within the treatment of low back pain. It is important to keep up to date with developments within the chiropractic profession to notice any trends which may be developing. The purpose of the study is to determine patient management protocols of practicing chiropractors within the greater Durban area and associate them to demographic factors and available literature on the subject.

Outline of the Procedures: Please would you take 10-15 minutes of your time to fill in this questionnaire. All answers are strictly confidential, and you are therefore requested to be honest and answer all questions to the best of your knowledge. Once you have completed the questionnaire in full, post it into the sealed box provided by the researcher. The questionnaires will be received by a neutral party to ensure anonymity of each participant. The data will be analysed by an independent statistician and results will be reported in aggregate. You shall be required to complete and sign the consent form below.

Risks/Discomforts to the Subject: There will be no risks to the respondents as all personal data is confidential and the results will be used for research purposes only.

Benefits: Benefits to the subject: To keep up to date with what patient management protocols are being adhered to by fellow colleagues in the greater Durban area. To gain a greater knowledge of other possibilities within the scope of chiropractic treatment for low back pain management. Benefits to the researcher: The accolade of a masters' degree in Chiropractic.

Reason/s why the Subject May Withdrawn from the Study: At anytime during the research process you may withdraw from the study, however once your questionnaire is posted into the sealed container it may not be removed to protect the confidentiality of the other respondents.

Remuneration: Participation is voluntary and there is no direct remuneration for your participation in this study.

Costs of the Study: There are no costs involved for your participation in this study.

Confidentiality: All information will be confidential and the results will be used for research purposes only.

Research-related Injury: This is not applicable to this study, as there will be no physical interventions.

Persons to Contact in the Event of Any Problems or Queries:
Supervisor: Dr Grant Steven Webb Tel: (032)9460113
Head of Department – Chiropractic: Dr Charmaine Maria Korporaal Tel: 0832463562
Principle Investigator: Robert Hilton Palmer Tel: 0828281118
Faculty of Health Sciences Research and Ethics Committee: Mr. Vikesh Singh Tel: (031)3732701

Statement of Agreement to Participate in the Research Study: (I,…… (Subject's full name)…….. (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.

Subject's name (print) …….. Subject's signature:…….. Date:…….
Researcher's name (print) signature: ……... Researcher's signature:……..Date:.....
Witness name (print) signature: ……... Witness signature: …….....Date:……

Appendix C

LETTER OF INFORMATION – FOCUS GROUP

Dear Participant,

I would like to welcome you and thank you for participating in the focus group of my study.

The title of my research project is:

An investigation into patient management and treatment protocols of lower back pain by Chiropractors in the Greater Durban area.

Name of Supervisor: **Dr Grant Webb; M.Tech Chiropractic (TN).**
Name of Assistant Supervisor: **Dr Andrew Jones; M.Tech Chiropractic (TN)**
Name of Researcher: **Robert Hilton Palmer (0828281118)**
Name of Institution: **Durban University of Technology (031 204 2205)**

In order to understand the outcomes required for the focus group it is important to understand the objectives set out for this study:

- To establish what norms are associated with the use of diagnostic tools or methods to formulate adequate treatment protocols and patient management.
- To establish knowledge of what physical therapies are being used as part of a treatment protocol.
  Objectives: a) Gain an understanding of what therapies are being incorporated into treatment protocols within private practice.
  b) Gain an understanding of variations of treatments with regards to chronic and acute conditions
- To establish an understanding of manipulation methods and protocols followed
  Objectives: a) Gain insight into what manipulation strategies are most often used.
  b) Gain an insight into what treatment techniques or patient management is used when manipulation is contra indicated.
- To establish a knowledge of what else is being done on the level of patient education and management.
  Objectives: a) Gain an understanding of what post treatment advice is given.
  b) Advise on follow up strategies for best results with desired treatment protocol.
  c) Gain an understanding of patient management once pain free.

Focus group:

The purpose of the focus group is to validate the research tool. As members of the focus group, who have a practical perspective from experience in the field of chiropractic, you will be required to review and discuss the questionnaire. The discussions will focus on the changes necessary in order to alter the questionnaire into a chiropractic specific context. By identifying any inconsistencies with practice or areas that are not covered in the questionnaire which need to be further developed; especially in terms of other treatment protocols and patient management techniques for low back pain, ensuring validity of the questionnaire will.

Your participation in this study is much appreciated. Your comments and contributions will be kept confidential. The results of this focus group will be used for research purposes only.

If you have any further questions please contact me.

Yours sincerely,
Robert H. Palmer (0828281118)

Appendix D

INFORMED CONSENT FORM

(TO BE COMPLETED BY THE PARTICIPANTS OF THE FOCUS GROUP)

DATE:

TITLE OF RESEARCH PROJECT:

An investigation into patient management and treatment protocols of lower back pain by Chiropractors in the Greater Durban area.

NAME OF SUPERVISOR:

Dr Grant Webb; M.Tech Chiropractic (TN)

NAME OF RESEARCH STUDENT:

Robert Hilton Palmer

Please circle the appropriate answer	**YES /NO**	
1. Have you read the research information sheet?	Yes	No
2. Have you had an opportunity to ask questions regarding this study?	Yes	No
3. Have you received satisfactory answers to your questions?	Yes	No
4. Have you had an opportunity to discuss this study?	Yes	No
5. Have you received enough information about this study?	Yes	No
6. Do you understand the implications of your involvement in this study?	Yes	No
7. Do you understand that you are free to:		
a) Withdraw from this study at any time?	Yes	No
b) Withdraw from the study at any time, without reasons given.	Yes	No
c) Withdraw from the study at any time without affecting your future health care or relationship with the Chiropractic day clinic at the Durban University of Technology.	Yes	No
8. Do you agree to voluntarily participate in this study?	Yes	No
9. Who have you spoken to regarding this study?		

If you have answered NO to any of the above, please obtain the necessary information from the researcher and / or supervisor before signing. Thank You.

Please print in block letters:

Focus Group Member: _____ Signature: _____

Witness Name: _____ Signature:_____

Researcher's Name: _____ Signature:_____

Supervisor's Name: _____ Signature: _____

Co-Supervisor's Name:_____ Signature:_____

Appendix E

CODE OF CONDUCT

This form needs to be completed by every member of the Focus Group prior to the commencement of the focus 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 focus 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. Due respect to be given to every suggestion and comment by any member of the focus group and be debated with reference to the outcomes of the research.

3. The information gathered from this focus group by the researcher will be made public in terms of a mini dissertation and journal publication. The researcher will ensure that any participants in the focus group and research remain anonymous and confidential.

Member represents	Member's Name	Signature	Contact Details

Appendix F

CONFIDENTIALITY STATEMENT – FOCUS GROUP DECLARATION

IMPORTANT NOTICE:
THIS FORM IS TO BE READ AND FILLED IN BY EVERY MEMBER PARTICIPATING IN THE FOCUS GROUP, BEFORE THE FOCUS GROUP MEETING CONVENES.

1. All information contained in the research documents and any information discussed during the focus 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. The returned questionnaires will be coded and kept anonymous in the research process.
3. None of the information shall be communicated to any other individual or organisation outside of this specific focus group as to the decisions of this focus group.
4. The information from this focus group will be made public in terms of a journal publication, which will in no way identify any participants of this research.
5. Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Member represents	Member's Name	Signature	Contact Details

Appendix G:

Pilot test evaluation form

1 What is your opinion of the subject presented in this questionnaire?
(Please mark the most appropriate box)

- 1.1 Extremely interesting ☐
- 1.2 Interesting ☐
- 1.3 Average ☐
- 1.4 Boring ☐
- 1.5 Very boring ☐

2 Do you think the topics raised in this questionnaire were adequately covered?

- 2.1 Yes ☐
- 2.2 No ☐

3 What is your opinion about the covering letter?
(Please mark one box only)

- 3.1 Very clear ☐
- 3.2 Clear ☐
- 3.3 Adequate ☐
- 3.4 Unclear ☐
- 3.5 Needs revising ☐

4 How would you describe the instructions accompanying each of the questions?
(Please mark one box only)

- 4.1 Very clear ☐
- 4.2 Clear ☐
- 4.3 Adequate ☐
- 4.4 Unclear ☐
- 4.5 Needs revising ☐

5 Do you think the questionnaire is too long?

- 5.1 Yes ☐
- 5.2 No ☐

6 What is your opinion of the wording of the questionnaire?
(Please mark the appropriate box/es)

- 6.1 The meaning of **all questions** is absolutely clear ☐
- 6.2 The meaning of **most** questions is clear ☐
- 6.3 There is too much chiropractic/ medical jargon ☐
- 6.4 The questions will not be understood by

lay persons ☐

6.5 The questionnaire needs to be revised because it is unclear ☐

If you had any difficulty answering any question/s, please write the number/s of the question/s in the space below with a suggestion on how the question/s can be improved?

_____
_____
_____
_____
_____

Thank you for your most valuable time in helping me with my research project.
Please be reminded that the topics discussed above are strictly confidential.

Appendix H

Focus Group DVD
(For examination purposes only)