

THE EFFECTIVENESS OF MANUAL MANIPULATION VERSUS THE ACTIVATOR ADJUSTING INSTRUMENT IN THE MANAGEMENT OF ACUTE FACET SYNDROME OF THE LUMBAR SPINE.

By

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A dissertation submitted to the Faculty of Health in partial compliance with the requirements for a Masters Degree in Technology: Chiropractic at Durban Institute of Technology.

I, David McKenzie Gillespie, do hereby declare that this dissertation represents my own work both in conception and execution.

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12/11/03

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DEDICATION

To my Mom whose unwavering belief in me has allowed me to complete this course. I thank you with all my heart.

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Dr H.L. White

Horace thank you for your support, guidance, understanding, patients and most of all for being a friend, without you this probably would never have happened and for that I will always be grateful.

The staff at the DIT Chiropractic Day Clinic

Dear Pat, Linda and Inez, thank you for all the time and support you gave me without the three of you the adventure would not have been nearly as much fun.

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ABSTRACT

The purpose of this study was to compare the relative effectiveness of manual manipulation versus the Activator Adjusting Instrument in the management of acute facet syndrome of the lumbar spine.

The study was a randomized prospective study. Sixty patients, between the ages of 18-59, from the greater Durban Area participated in the study. They underwent a case history, relevant physical examination and a lumbar spine examination. The sixty subjects were randomly allocated into two groups of thirty. Group one received manually administered chiropractic adjustments while group two was treated by means of the Activator adjusting instrument, after being diagnosed with acute facet syndrome of the lumbar spine.

Each patient received five treatments over a two week period. Subjective and objective studies were recorded at the first and final visit. Subjective data was recorded using the Numerical pain Rating Scale 101 and the McGill Short Form Pain Questionnaire. Objective results were recorded by means of The Digital Inclinator and the Digital algometer.

The recorded data was used to perform statistical analysis parametric paired and unpaired t-tests to compare inter and intra-group data respectively, at a 95% level of confidence.

After analysis of the collected data it was found that there was no statistical difference between the two groups as both groups responded favorably to treatment.

From the results it appears that both groups responded equally well to their respective treatment protocols in the treatment of acute facet syndrome of the lumbar spine. It can thus be concluded that both manual manipulation and manipulation administered via the Activator Adjusting Instrument are beneficial in the treatment of acute facet syndrome of the lumbar spine.

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CHAPTER ONE

1.1 INTRODUCTION

Back pain has a world wide prevalence, but in many industrialized societies, disability due to back pain has reached epidemic proportions.(Frank; De Souza, 2001). De Girolamo(1991) states that lower back pain represents a major public health problem in developing countries. The prevalence of lower back pain is second only to the common cold (Weiner et al. 2000:451) and is the second most common cause of work absenteeism in the United States. Van der Meulen (1997) undertook an epidemiological investigation of low back pain in a formal black South African township. It was found that the lifetime incidence of low back pain amongst Black South Africans within the greater Durban area was 57.6%. Docrat (1999) Undertook a similar study amongst Indian and Colored communities in the greater Durban area, findings were that the lifetime incidence of lower back pain amongst Indians was 78.2% and Coloreds 76.6%.

Although a model describing the patho-anatomy and patho-physiology is in existence (Kirkaldy-Willis, 1988:134) , a standard plan of management has not been agreed on to treat even the simplest forms of low back pain(Van Tulder et al. 1997)

Studies have proven chiropractic to be an effective form of treatment in the management of lower back pain(Meade et al. 1995; Koes et al. 1996; Carey et al. 1995).

Mechanical low back pain is the result of the lumbar spines' inherent susceptibility to static loads. These loads are due to muscle action, the forces of gravity and abnormal kinematics. A large percentage of lumbar spine dysfunction responds well to chiropractic management (Gatterman, 1990:129).

After systematically reviewing clinical trials assessing the efficacy of spinal manipulation in the management of low back pain(Koes et al. 1996:2869) concluded that the efficacy of spinal manipulation for patients with acute or chronic back pain has not been proven with well structured randomized controlled trials.

The use of instruments to adjust the spine dates back to the origins of the profession (Fuhr et al. 1997). Little research has been done regarding the Activator Adjusting Instrument. It was found that the Activator Adjusting Instrument compared favorably with manual adjusting techniques in the management of cervical facet syndrome (Wood et al. 2001)

1.2 STUDY OBJECTIVES

The objective of this study is to evaluate the relative effectiveness of the Activator Adjusting Instrument versus a manual adjustment in the treatment of acute facet syndrome of the lumbar spine.

The first objective was to evaluate the relative effectiveness of manual and activator adjusting in the treatment of acute lumbar facet syndrome in terms of objective measures.

The second objective was to evaluate the relative effectiveness of manual and activator adjusting in the treatment of acute lumbar facet syndrome in terms of subjective measures.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

2 INTRODUCTION

2.1 INCIDENCE OF LOW BACK PAIN

LBP according to Burton and Cassidy (1992: 20), has a lifetime prevalence of between 60%and 90% for any given population. Although back pain is prevalent world wide it has now reached epidemic proportions in many industrialized societies (Frank. A.O. ; De Souza. L. H. 2001)

After retrospective studies an authority on low back pain stated "it is the second most common cause of physical disability after cardiovascular disease. Moreover it is increasing faster than any form of chronic disability.... we are now facing an epidemic of lower back disability in all Western societies" (Waddell 1993,317-8).

In a review of clinical management and health care, Waddell (1995) states that at some time during their life 60% of the population will experience lower back pain, of these 70% will experience three or more episodes during their lives and a further 20% will experience some degree of pain throughout their lives.

It was suggested by Schaefer and Faye (1990:195) that the three most commonly found diagnoses regarding low back pain are: lumbar facet syndrome, sacroiliac syndrome and lumbar radicular syndrome which may be either discogenic or biomechanical in origin.

The literature regarding the epidemiology of low back pain mainly deals with high-income countries which make up less than 15% of the world population (Volinn 1997).

Epidemiological studies carried out in South Africa shows the incidence of low back pain amongst black South Africans is 57.6% (Van der Meulen, 1997) and amongst Indians and Coloreds the incidence was between 70% and 80% (Docrat, 1999).

2.2 EFFICACY OF SPINAL MANIPULATIVE THERAPY

Back pain has been manually treated by the application of forces to the spine for hundreds of years. Spinal manipulation is one commonly used method of treatment. It involves the use of sudden, low amplitude, high velocity thrusts to segments of the spine (Lee *et al.* 1993:302).

Chiropractic adjustments are, " a passive manual manoeuvre in which specifically directed manual forces are applied to vertebral and extra-vertebral articulations of the body, with the object of restoring mobility to restricted areas." (Gatterman 1990: 410).

After reviewing relevant studies it was suggested that spinal manipulative therapy is a more effective treatment than bedrest and analgesia, analgesia alone, heat, exercise and massage, or mobilization, in the treatment of low back pain (Haldeman and Phillips 1991:2: 1582-1583).

Meade et al. (1990) conducted a randomized clinical trial to compare chiropractic and outpatient treatment of low back pain. This trial compared chiropractic treatment to numerous accepted conservative treatments. 741 patients were included in the trial all between the ages of 18 and 65 and no patients with contraindications to spinal manipulative therapy were included. The trial showed chiropractic treatment to be more beneficial. Using the Oswestry Low Back Pain Disability Index a two-year follow up showed a 7% benefit for the chiropractically treated group. A second study to compare chiropractic and hospital outpatient management for low back pain over a three year period was carried out. At three years the Oswestry scores showed a 29% higher rate of improvement for the chiropractically treated group as compared to the hospital outpatient group. The conclusion was that chiropractically managed patients showed greater long term benefit and satisfaction than those patients managed as hospital outpatients. (Meade et al. 1995).

Koes et al. (1996) undertook a systematic review of randomized clinical trials in order to asses the efficacy of spinal manipulation for patients with low back pain. Thirty six randomized clinical trials comparing spinal manipulation with other treatments were identified. Of these studies, 53% showed favorable results for manipulation. Most of the

studies were however of a poor quality. This is due to the fact that out of a possible score of 100 none of the studies scored more than 60 when assessed for their methodological quality. The authors state that the efficacy of spinal manipulation has not been demonstrated with sound randomized clinical trials and additional research is justified.

After a systemic review of randomized controlled trials to assess the effectiveness of the most common conservative types of treatments for patients with acute and chronic nonspecific low back pain, strong evidence was found in favor of spinal manipulation along with back school and exercise therapy. (van Tulder *et al.* 1997). However the highest score out of 100 was only 79 which again questions the quality of the methodology used in this research.

2.3 STUDIES INVOLVING THE ACTIVATOR ADJUSTING INSTRUMENT.

Osterbauer *et al.* (1993) undertook a study to correlate diagnostic and biomechanical treatment outcomes of manipulative/adjustive care in patients specifically selected for sacroiliac syndrome. Ten out of 153 consecutive new patients with "primary," chronic, uncomplicated SIJS were selected over an 11 month period on the basis of painful SIJ and provocation tests. A six week intensive regimen of, manually assisted short lever adjustments were administered via The Activator Adjusting Instrument. The results showed a significant decrease from a mean baseline value of 25 to 12($t=2.28$; $p<0.5$). Also the average disability scores diminished from 28 to 13%($t=2.3$; $p<0.5$) and a reduction in the number of provocation tests was also noted.

Gemell and Jacobson (1995) compared the immediate effects on pain of Meric and Activator adjustments with patients with acute low back pain. A randomized, controlled clinical trial was used to compare adjustments. Thirty consecutive established patients were used. Sixteen patients were randomly assigned to the Meric group and fourteen to the Activator group. The patients received a single adjustment to the posterior joints involved. Patients recorded their pain on a visual analogue scale before and immediately after the adjustment. The mean reduction in pain for the activator group was=22.2, SD=21.7 for the Meric group=21.8, SD=21.5. The study demonstrated that neither technique was superior to the other.

Wood et al (2001) undertook a study to compare the relative effect of an instrumentally delivered thrust to traditional manually-delivered thrusts in the treatment of cervical spine dysfunction. The study was a prospective, randomized, comparative clinical trial. Patients were randomly placed into two groups A and B. Group A received mechanical force, manually-assisted (MFMA) manipulation to the cervical spine via the Activator Adjusting Instrument. Group B received standard diversified adjustments. Results showed that that both treatment methods were beneficial in the treatment of cervical spine dysfunction.

2.4 CLASSIFICATION OF LOW BACK PAIN

The classification system to be used in this study is laid out by Kirkaldy-Willis (1992: 105). This system utilizes a three-phase degenerative classification of low back pain. The three phases are as follows:

2.4.1 STAGE 1: Dysfunction stage

This phase presents as a result of rotational or compressive injury. It is most commonly associated with minor trauma although major trauma may also be a cause.

Pathophysiological mechanisms involved are: due to capsular and annular tearing a small amount of joint dysfunction occurs. In order to protect the joint the posterior muscle segments go into hypertonic contraction. The resulting ischaemia and collection of metabolites lead to more pain. The posterior facet joints remain splinted thereby maintaining joint dysfunction. These changes later lead to fibrosis.

Symptoms experienced during stage 1

Pain is very often localized to one area unilaterally. Pain may be felt in the groin, greater trochanter and posterior thigh as far as the knee, rarely does it move past the knee.

Movement exacerbates the pain and rest relieves it.

Signs presenting during stage 1

There is normally unilateral tenderness over sacrospinalis and multifidus muscles at one level. Due to the hypertonic state of the muscle there is abnormal lateral bending. All movements are restricted especially extension. Some degree of functional scoliosis may be present.

2.4.2 STAGE 2: Unstable phase.

This stage may present in two possible ways. The first is similar to the previous stage, the second may be chronic or insidious with no history (Kirkaldy-Willis: 1992 : 110).

Pathological changes are as follows:

- 1)The cartilage of the posterior facet joints continue to degenerate
- 2)Stretching of the facet joint capsule occurs
- 3)Capsule hyperlaxity occurs leading to further degeneration, excessive segmental motion resulting in subluxation and entrapment.

Pathological changes result in the following disc changes;

- 1)Micro tears both radial and circumferential coalesce leading to
- 2)Exit of nucleus substance from the disc with internal disruption.
- 3)Disc bulge due to bulging of the annulus around the disc circumference.
- 4) Increased abnormal movement in the three joint complex.

Symptoms experienced during stage 2

Symptoms experienced may be no worse than those experienced in stage one. There may however be complaints of weakness or feelings of the lower back giving way. Certain movements ie: extending after forward flexing may cause a catching sensation.

Signs presenting during stage 2

Palpation shows increased movement between one vertebrae and the next when the patient lies on one side. A catch may at one level may be observed as the patient returns to standing after bending forward. The patient may need to support themselves by placing both hands on their hips when standing upright from being bent forward.

2.4.3 STAGE 3: Stabilization phase

This stage presents in two ways. Older patients usually have a long standing history of low back pain. Back pain is commonly associated with a degenerative scoliosis as well as abnormalities in muscle action. The predominant feature is generally leg pain This stage is more rare in younger patients and while there is low back pain, as the lower back pain subsides leg pain is the more pronounced feature.

The mechanisms at work during this stage are threefold. The posterior joint becomes more stiff due to: destruction of articular cartilage, fibrosis within the joint, enlargement and locking of the facets and periarticular fibrosis.

The disc undergoes similar changes with loss of nuclear material, approximation of vertebral bodies, destruction of vertebral end plates, fibrosis within the disk and osteophyte formation around the disc periphery. Two vertebrae may become ankylosed occasionally.

Symptoms experienced during stage 3

The frequency of lower back pain that was previously severe becomes less incapacitating.

Painful episodes may occur but are often muscular in nature.

Signs experienced during stage 3

Tenderness to pressure over several areas is common, marked stiffness of the spine within a reduction in all ranges of motion and scoliosis with a rotational component.

Signs indicating neurological entrapment are sometimes elicited.

2.5 CLINICAL CONSIDERATIONS OF LOW BACK PAIN

Kirkaldy-Willis has also categorized clinical lesions into a framework which enables the examiner to group lesions into one of the three phases. This allows for better understanding of the pathophysiological process taking place.

Dysfunction includes

Posterior facet syndrome

Sacroiliac syndrome

Maignes syndrome

Myofascial Pain Syndrome (Gluteus maximus/medius/minimus, Quadratus lumborum, Piriformis, Tensor fascia latae, Hamstrings)

Disc Herniation

Instability includes

Facet and disc degeneration

Lateral stenosis

Central stenosis

Disc Herniation

Stabilization includes

Lateral stenosis

Central stenosis

Multilevel stenosis

Disc Herniation

2.6 DIAGNOSTIC CRITERIA FOR POSTERIOR FACET SYNDROME OF THE LUMBAR SPINE

This study deals with the dysfunction phase specifically posterior facet syndrome.

Posterior facet syndrome presents with localized tenderness, usually unilaterally over the involved spinal segment accompanied by hypertonic muscles (Kirkaldy-Willis 1992: 106).

Referral pain involving the buttock, posterolateral thigh, and rarely below the knee is experienced. Hyperextension exacerbates the pain while flexion reduces it. The pain is sclerotogenous in nature. Aggravating factors include sleeping on ones stomach, picking heavy object above the waistline or anterior to the body. Sneezing and coughing may exacerbate the pain in the acute phase (Gatterman 1995: 162).

Kemps test and facet joint challenge are tests specific for this condition (Schaefer and Faye 1990: 217; Magee 1992: 274).

2.7 CONTRAINDICATIONS TO SPINAL MANIPULATION

As for all forms of treatment certain conditions are contraindications to the treatment. In ominous conditions where the incorrect use of dynamic thrust may lead to adverse reactions to the patient, spinal manipulative therapy is contraindicated (Haldeman et al. 1993: 170-172)

According to Gatterman(1990: 67) the contraindications to spinal manipulative therapy are:

Athero-sclerosis of major blood vessels

Abdominal aneurysms

Prostate and bone tumours

Arthritis(e.g. T.B., osteomyelitis)

Psychological disorders(e.g. malingering)

Metabolic disorders(e.g. clotting disorders)

Neurological disorders(e.g. space occupying lesions)

2.8 ACTION OF SPINAL MANIPULATIVE THERAPY

The result of the spinal manipulation is to carry the joint deep into it's parapsychological range for a brief moment, identified by an auditory crack within the involved joint (Sandoz 1976). The result is increased passive range of joint motion in all directions.

According to Shekelle (1994) spinal manipulation is a form of manual therapy involving joint movement through its normal physiological range past its end stage. The joint does not however move past its anatomical range into the parapsychological zone. Active and passive movements are within the physiological ranges of motion.

The possible effects of spinal manipulation according to Calliet (1981: 129-130) are as follows.

1. A facet joint is immobilized by an acute synovial reaction and adherence of the joint surfaces of the facets takes place. A passive movement which involves the mobilization of the spinal motion segment back and forth through its passive range of motion, separates these surfaces.

2. The mechano-receptors of the joint are desensitized by the abrupt movement of the joint (manipulation), and reflex protective spasm is eliminated allowing the joint to move again.
3. The manipulation allows the entrapped meniscus to exit the facet joint in which it became entrapped.
4. The capsule of the facet joint becomes lodged between two adjacent articular surfaces and the manipulative process allows this capsule to be freed.
5. The spindle systems of the adjacent muscles are reflexly stimulated by the dynamic thrust of the manipulation and reciprocally relax the extrafusal muscle fibers.
6. The mal-aligned spinal segments are aligned to conform to the center of gravity.

CHAPTER 3

MATERIALS AND METHODS

3 INTRODUCTION

This chapter outlines the general that will be used in this study. Included are study design, patient selection, intervention as well as measurements and observations obtained.

Discussion of statistical procedures will also be discussed.

The object of the study was to compare manual adjusting techniques and instrumental adjusting technique in terms of objective and subjective findings, in order to determine the more effective management of low back pain.

3.1 THE DATA

The data was primarily of two types: primary and secondary. The nature of the data is discussed below.

3.1.1 The Primary Data

Primary data was collected directly from the patient using the following:

- 1) To measure the patients perception of pain and changes therein the McGill Pain Questionnaire and the Numerical Pain Rating Scale-101 was used (Jensen et al. 1986).
- 2) Pain sensitivity was measured by means of a digital algometer.
- 3) The patients range of motion was measured by means of a digital inclinometer.
- 4) Orthopaedic tests used to diagnose lumbar facet syndrome were: Facet joint challenge, Kemps test and prone Hyperextension.

3.1.2 The Secondary Data

The secondary data was obtained from scientific journal articles, published reports and text books containing relevant information.

3.2 CRITERIA GOVERNING THE ADMISSIBILITY OF THE DATA

The only subjective data admissible was obtained from the McGill Pain Questionnaire and the Numerical Pain Rating Scale-101 which were completed by the patients under supervision of the researcher.

The only objective data admissible was obtained from the algometer, inclinometer and Orthopaedic Pain Scale Ratings. All findings were documented by the researcher.

3.3 RESEARCH METHODOLOGY

3.3.1 SUBJECT SELECTION

Patients were obtained by means of convenience sampling. Adverts were placed in the press, local universities, local gymnasiums, local clubs and by word of mouth. It was advertised that free treatment would be available to any members of the public between the ages of 18 to 59 suffering from low back pain of a duration of four weeks or less (Kirkaldy-Willis 1988: 8).

Each potential patient was telephonically interviewed in order to ascertain thier suitability for the study. Inclusion criteria for this study:

- 1) Patients had to fall between the ages of 18-59
- 2)The patients low back pain must be of four weeks duration or less
- 3) If undergoing other drug interventions the patient was required to undergo a forty eight hour washout period.
- 4) Patients suffering from posterior facet syndrome of the lumbar spine were included

Exclusion criteria for spinal manipulation according to Kirkaldy-Willis (1992: 291) are:

- 1)Osteopaenia
- 2)Spondyloarthropathies

- 3) Patients being treated with anticoagulants
- 4) Bleeding disorders
- 5) Psychological overlay
- 6) Destructive lesions involving the: spine, ribs and pelvis
- 7) Fractures and dislocations which have not completely resolved
- 8) Gross instability
- 9) Cauda equina syndrome
- 10) Large abdominal aneurysms
- 11) Visceral referred pain

On being deemed suitable for this study the patient was invited to an initial consultation where they were further examined for posterior facet syndrome of the lumbar spine. Examination included a full case history(Appendix A), physical exam(Appendix B) and a lumbar spine regional exam(Appendix C).

Patients with involved myofascial pain dysfunction syndrome (Travell and Simon 1983: 1:1) were not excluded from this study the myofascial component was however not treated.

The Orthopaedic Pain Rating Scale(Appendix D) was utilized to gain a score rating in order to diagnose posterior facet syndrome of the lumbar spine. The following tests were used for the purpose of this study: Kemps test, facet joint challenge and prone hyper extension.

Kemps test is carried out with the patient initially seated upright and the examiner positions themselves behind the patient. In order to support and control the patient the examiner reaches around the chest and shoulder of the patient from the posterior side. The examiner then requests that the patient flexes forward and to one side. They then bend obliquely backwards as far as they can. Axial pressure is then applied. A positive test is pain and tenderness over the involved vertebral segment. This test scores a maximum of 4 on the Orthopaedic Pain Rating Scale.

Lumbar facet joint challenge according to Gatterman (1990:84) is carried out with the patient lying prone. The examiner then contacts the spinous process above with the thumb of one hand and the spinous process below with the thumb of the other hand. The examiner then applies lateral forces in opposite directions. If initially no pain is noted the examiner may apply a slightly greater force thereby bouncing the joints. The aim of this test is to note "springiness" or joint play. In a normally functioning joint this joint play should never have a hard end feel. This test scores a maximum of 4 on the Orthopaedic Pain Rating Scale.

Prone Hyperextension involves the patient lying prone. They are then requested to extend their back. Increased pain is indicative of a positive test (Gatterman 1990: 141). This test scores a maximum of 2 on the Orthopaedic rating scale.

A minimum score of four out of a possible eight was required to confirm posterior facet syndrome of the lumbar spine. Once it was ascertained that the patient was indeed suffering from posterior facet syndrome of the lumbar spine they were invited into the study.

3.3.2 PATIENT ALLOCATION

On agreeing to participate in the study the patient was required to read a letter of information(Appendix E) which gave a detailed out line of the study and once this was completed they were required to sign an informed consent form(Appendix F).

In order to fairly allocate patients into one of two groups a system of consecutive randomized allocation was used. Sixty consecutively numbered pieces of paper were placed in an envelope and patients were asked to draw numbers. Patients drawing even numbers were placed into group one which was treated with manual manipulation (Shiraz 1990: 137-160). The techniques to be used included the lumbar roll, sitting lumbar and spinous hook or pull. Those patients drawing odd numbers were placed into group two which received adjustments administered by means of the Activator Adjusting Instrument.

A treatment protocol was drawn up whereby the patient was required to receive five treatments over a two week period, if the low back pain resolved before five treatments were completed measurements would be taken after the patient became asymptotic.

3.3.3 INTERVENTION

Group 1: Manual manipulation

Patients in group one received manual manipulation according to Sharaz (1990: 137-160).

Adjusting techniques included: lumbar roll and seated lumbar techniques. Dysfunctional spinal segments were identified by means of motion palpation and recorded on the patients data sheet.

Group 2: Activator Adjusting Instrument

Patients in group two received adjustments instrumentally by means of The Activator Adjusting Instruments. Dysfunctional spinal segments were identified by means of motion palpation and recorded on the patients data sheet. Once this was completed the patient was asked to lie prone on the adjusting table. The examiner, in order to maintain continuity throughout all the patients set the Activator Adjusting Instrument onto the maximum setting. The rubber tip was then placed perpendicularly over the involved facet joint and the adjustment was administered.

3.4 METHOD OF MEASUREMENTS

3.4.1 SUBJECTIVE MEASUREMENTS

Subjective measurements were obtained using the McGill Short-Form Pain Questionnaire(Appendix G) and the Numerical Pain Rating Scale-101(Appendix H).

3.3.1.1 MCGILL SHORT-FORM PAIN QUESTIONNAIRE

According to Melzack (1987: 197) "It is the most widely used measuring test for pain providing valuable information on the sensory, affective and evaluative dimension of pain experience." This form a measurement of the patients perception of their pain intensity and quality. This allows for a sensory dimension of pain (Melzack, 1987: 197). The form is made up of fifteen descriptive words which are rated on an intensity scale: 0=none, 1=mild, 2=moderate and 3=severe. The sheet once completed is scored and then converted into a percentage (Melzack, 1987: 197)

3.4.1.2 NUMERICAL PAIN RATING SCALE 101

A study to compare the responsiveness of three different pain scales recommended the use of the NRS (Bolton and Wilkinson 1998).

It is suggested that the Numerical Pain Rating scale is a reliable measurement method and should be the questionnaire of choice (Jenson et al. (1986). Patients are instructed to record their pain when it is at it's worst and least on a scale of 0-100. Zero was pain free and one hundred was pain at its worst. By averaging the two scores an accurate assessment of the pain could be obtained (Jensen et al. 1986). This is a measurement of the patients pain intensity. Measurements were taken after the first and final treatment.

3.4.2 OBJECTIVE MEASUREMENTS

3.4.2.1 DIGITAL ALGOMETER

The algometer or "pressure gauge" as it is also known has been used to measure both general and local pain sensitivity. It has been used in a variety of conditions including: arthritis, fibrositis, abdominal pain and even in psychological research (Fischer, 1986: 836).

A digital algometer was used in order to determine the pressure threshold of the patients. Fischer (1987) defines the pressure threshold as the minimum amount of pressure required to cause pain.

The use of a more sensitive digital algometer as opposed to the use of the manual algometer to measure pain threshold has been recommended (Pillay 2001).

In order to measure the patients pain threshold the area of joint dysfunction was identified via palpation. This point was then marked with a non permanent marker. The digital algometer was then placed over this point ensuring that it was at 90 to the skin surface which would prevent the instrument slipping. Pressure was then applied to the point until the patient responded after which the instrument was removed. This process was repeated 3 times in order to obtain a mean. The average was then recorded as the patients pain threshold. This process was performed prior to the first treatment and after the last(Appendix I).

The instrument which was used for the purpose of this research was: The Algometer Commander: Pain Threshold Meter, PTH-AFT. Manufacturer: JTech Medical industries, 357 West 910 South, Herber City, Utah, USA.

3.4.2.2 THE DIGITAL INCLINOMETER

A study involving 54 patients was undertaken in order to ascertain the inclinometer's reliability and validity as a tool for measuring the range of motion of the lumbar spine (Sauer et al. 1996). The inclinometer was shown to be a highly reliable and useful clinical tool for measuring range of motion.

After explaining the procedure to them patients were asked to stand erect in front of the researcher dressed appropriately. The procedures listed in the users manual were then followed in order to measure: flexion, extension, lateral flexion bilaterally and rotation. Degrees of motion were noted and then recorded in the patients data sheets(Appendix J).

The instrument used in this study was: The Dualer Lite. Manufacturer: JTech Medical Industries, 357 West 910 South, Herber City, Utah, USA.

3.5 STATISTICAL ANALYSIS

3.5.1 Treatment of the Data

3.5.1.1 Subjective Data

The subjective data was treated as follows:

Questionnaires that the patients filled out were screened to ensure that they had been filled out correctly.

Raw data from the questionnaires were converted into percentages where necessary and recorded separately for each group.

The data was analyzed using a 5% significance level.

3.5.1.2 Objective data

The objective data was treated as follows:

The algometer readings were recorded separately for each group.

The results of orthopaedic tests were recorded separately for each group

The data was analyzed using a 5% significant level

3.6 Statistical Procedure

After consulting the Durban Institute of Technology research statistician, statistical analysis was conducted on the subjective and objective data using the SPSS Version 9.0 statistical software program (manufactured by SPSS Inc., 444N. Michigan Ave, Chicago, Illinois, 60611, USA). The results were presented in the form of graphs and tables. The statistical evaluation was aimed at measuring any significant changes occurring between the first and the final treatment between the two groups.

Both parametric and non-parametric testing was used in order to analyze the data obtained. Parametric testing was used to analyze the algometer readings, Inclinator readings, NRS and SFMPQ readings. Statistical tests included Mann-Whitney Unpaired-T

test(for inter-group analysis), and Wilcoxon Signed test (for intra-group analysis). This analysis would determine any significant changes between the first and final treatment within each study group.

3.6.1 Procedure 1: Mann Whitney U-Test (Inter-group)

The unpaired t-test was used for the inter-group comparison of each of the continuous variables. In each test the null hypothesis (H_0) states there is no difference between the two independent samples being compared, with respect to the variable being tested, at the $\alpha=0.05$ level of significance. The alternative hypothesis (H_i) states that there is a difference.

H_0 : There is no difference between treatment groups.

H_i : There is a difference between treatment groups.

$\alpha=0.05$

Decision rule- If $p < \alpha$, reject H_0

If $p \geq \alpha$, accept H_0

Where p is the observed significance level or P-value.

3.6.2 Procedure 2: Wilcoxon Signed Rank Test (Intra-group)

The Wilcoxon Signed Rank test was used at the 5% level of significance. It was used to determine whether any statistically significant improvement occurred within group 1, and group 2 between the first and final visit.

The null hypothesis (H_0) stated that there would be no significant improvement between each of these consultations. Therefore the null hypothesis is either accepted or rejected depending on the p-value being greater or less than α .

The alternative hypothesis (H_1) states that there was significant improvement between the first and final visit. (Fischer and Van Belle 1993: 315-319).

One-tailed test.

H_0 : There is no improvement between the consultations.

H_1 : There is an improvement between visits.

$\alpha = 0,05$

Decision rule:

If $p < \alpha$, reject H_0

If $p \geq \alpha$ accept H_0 .

Where $p = \text{reported P-value}/2$ if (H_0 is of form $<$ and z is negative)

(H_0 is of form $<$ and z is positive)

or

$P = 1 - (\text{reported P-value}/2)$ if (H_0 is of form $<$ and z is negative)

(H_0 is of form $<$ and z is positive)

CHAPTER4

4.0 INTRODUCTION

This study was made up of 60 patients who were then equally divided into 2 groups of 30.

The first group was treated by means of manual manipulation and the second by the use of The Activator Adjusting Instrument.

4.1 General Hypothesis

The null hypothesis is the same for both treatment groups.

Ho: There would be no statistical difference in the subjective and objective findings on evaluation of the intra-group data indicating that the treatment was statistically insignificant

The alternative hypothesis for the 2 groups is once again the same for both groups.

Ha: There would be no statistical difference in the subjective and objective findings on evaluation of the intra group data indicating that the treatment was statistically insignificant.

To integrate data obtained from both groups a third hypothesis is required.

Ho: There would be no statistical difference in the subjective and objective findings on analysis of the inter-group data, showing the 2 treatment groups were equally effective.

Ha: There would be a statistical difference in the subjective and objective findings on analysis of the inter-group data, showing that the 2 treatment groups were not equally as effective.

4.2 THE ANALYSED DATA

4.2.1 P-VALUE

The data was analyzed at the $\alpha = 0.05$ level.

The decision rule for a two tailed test states:

Reject the null hypothesis (H_0) if, $p < \alpha/2$.

Accepted the null hypothesis (H_0) if, $p > \alpha/2$.

Now, $\alpha = 0.05$

Therefore, $\alpha/2 = 0.025$

Therefore the p-value would have to be below or equal to 0.025 to reject the null hypothesis and conclude that there is a significant improvement at the $\alpha = 5\%$ level.

4.2.2 POWER

The probability of Type II error

The power of statistical test is $(1-\beta)$

This is the probability of detecting a difference between the groups.

Therefore, power value should be as close to one as possible.

If a test has low power of 0.20, it would mean that the probability of detecting a result could be purely a chance of 20 out of 100.

4.3 DEMOGRAPHIC DATA

The study is designed to include sixty patients who are then subdivided into two groups of thirty each. Six patients were excluded from this study due to non-compliance.

TABLE 4.1 AGE DISTRIBUTION

AGE	GROUP 1	GROUP2	TOTAL
16-25	7	4	11
26-35	14	10	24
36-45	3	9	12
46-55	2	4	6
56-59	4	3	7

TABLE 4.2 GENDER DISTRIBUTION

	GROUP 1	GROUP 2	TOTAL
MALE	18	18	36
FEMALE	12	12	24

The Non-Parametric: MANN-WHITNEY U- TESTS

TABLE 4.3 STATISTICAL RESULTS OF THE MANN-WHITNEY U-

TEST:NUMERICAL: PAIN RATING SCALE 101

GROUP		MEAN	SD	MEAN RANK	P
NRS101 TX 1	G1	48.917	12.382	29.62	0.693
	G2	52.483	16.313	31.38	
NRS101 TX N	G1	17.583	15.249	22.47	0.000
	G2	32.917	14.682	38.53	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

MANN-WHITNEY U- TESTS

**TABLE 4.4 STATISTICAL RESULTS OF THE MANN-WHITNEY TEST
:McGILL SHORT FORM PAIN QUESTIONNAIRE**

GROUP		MEAN	SD	MEAN RANK	P
MSRPQ TXI	G1	15.7857	7.6472	32.03	0.496
	G2	16.4547	11.5790	28.97	
MSRPQ TX N	G1	4.7170	7.0046	24.57	0.008
	G2	8.3130	7.2309	36.43	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

MANN-WHITNEY U- TESTS

**TABLE 4.5 STATISTICAL RESULTS OF THE MANN-WHITNEY TEST FOR
THE ALGOMETER READINGS INVOLVED SIDE FIRST LEVEL**

GROUP		MEAN	SD	MEAN RANK	P
ALGOMETER TXI	G1	50.863	11.386	30.80	0.894
	G2	50.113	11.812	30.20	
ALGOMETER TX N	G1	62.310	12.716	34.48	0.077
	G2	56.260	14.233	26.52	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was accepted due to the level of the P-value.

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MANN-WHITNEY U- TESTS

**TABLE 4.6 STATISTICAL RESULTS OF THE MANN-WHITNEY TEST FOR
THE ALGOMETER READINGS INVOLVED SIDE 2ND LEVEL**

GROUP		MEAN	SD	MEAN RANK	P
ALGOMETER TXI	G1	52.120	11.610	24.13	0.301
	G2	49.222	12.799	20.15	
ALGOMETER TX N	G1	63.315	14.417	25.90	0.058
	G2	54.478	14.221	18.61	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was accepted due to the level of the P-value.

MANN-WHITNEY U- TESTS

**TABLE 4.7 STATISTICAL RESULTS OF THE MANN-WHITNEY TEST FOR :
FOREWARD FLEXION**

GROUP		MEAN	SD	MEAN RANK	P
FF TX 1	G1	90.33	12.66	26.18	0.055
	G2	95.13	24.28	34.82	
FF TX N	G1	94.97	11.70	28.07	0.279
	G2	95.23	15.26	32.93	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was accepted due to the level of the P-value.

MANN-WHITNEY U- TESTS

**TABLE 4.8 STATISTICAL RESULTS OF THE MANN-WHITNEY TEST FOR :
EXTENTION**

GROUP		MEAN	SD	MEANRANK	P
Ext TX 1	G1	30.37	8.24	35.58	0.024
	G2	27.60	14.92	25.42	
Ext TX N	G1	33.63	8.32	36.70	0.006
	G2	29.43	14.51	24.30	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

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MANN-WHITNEY U-TESTS

**TABLE 4.9 STATISTICAL RESULTS OF THE MANN-WHITNEY TEST FOR
LEFT LATERAL FLEXION**

GROUP		MEAN	SD	MEAN RANK	P
LL TX I	G1	26.10	6.87	33.30	0.213
	G2	23.90	5.94	27.70	
LL TX N	G1	27.57	6.77	33.03	0.260
	G2	25.60	5.46	27.97	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group two showed more improvement than group one overall and the null hypothesis was accepted due to the level of the P-value.

MANN-WHITNEY U-TESTS

**TABLE 4.10 STATISTICAL RESULTS OF THE MANN-WHITNEY TEST FOR:
RIGHT LATERAL FLEXION**

GROUP		MEAN	SD	MEAN RANK	P
RL TX 1	G1	26.13	6.46	32.58	0.354
	G2	25.07	6.97	28.42	
	TOTAL				
RL TX N	G1	27.60	6.46	31.62	0.620
	G2	26.93	7.06	29.38	

According to the above table there was improvement within both groups. Both groups showed similar levels of improvement. The null hypothesis was accepted due to the level of the P-value.

MANN-WHITNEY U-TESTS

**TABLE 4.11 STATISTICAL RESULTS OF THE MANN-WHITNEY TEST FOR
LEFT ROTATION**

GROUP		MEAN	SD	MEAN	P
LR TX 1	G1	8.00	3.19	31.67	0.601
	G2	8.30	5.27	29.33	
	TOTAL				
LR TX N	G1	10.20	2.95	34.20	0.099
	G2	9.60	4.95	26.80	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was accepted due to the level of the P-value.

MANN-WHITNEY U-TESTS

**TABLE 4.12 STATISTICAL RESULTS OF THE MANN-WHITNEY TEST FOR:
RIGHT ROTATION**

GROUP		MEAN	SD	MEAN	P
RR TX 1	G1	8.33	3.30	32.20	0.448
	G2	8.27	5.29	28.80	
	TOTAL				
RR TX N	G1	10.77	3.02	35.90	0.016
	G2	9.27	4.78	25.10	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

**TABLE 4.13 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK
TEST: NUMERICAL PAIN RATING SCALE 101**

GROUP		MEAN	SD	MEAN RANK	P
NRS101 TX 1	G1	48.917	12.382	.00	0.000
	G2	52.483	16.313	.00	
NRS101 TX N	G1	17.583	15.249	15.50	0.000
	G2	32.917	14.682	15.50	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

**TABLE 4.14 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK
TEST FOR THE: MCGILL SHORT FORM PAIN QUESTIONNAIRE**

GROUP		MEAN	SD	MEAN RANK	P
MSRPQ TX I	G1	15.7857	7.6472	.00	0.000
	G2	16.4547	11.5790	.00	
MSRPQ TX N	G1	4.7170	7.0046	.15.50	0.000
	G2	8.3130	7.2309	14.50	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

TABLE 4.15 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK TEST FOR THE: ALGOMETER READINGS FOR THE INVOLVED SIDE OF THE FIRST FIXATION

GROUP		MEAN	SD	MEAN RANK	P
ALGOMETER TX 1	G1	50.863	11.386	15.50	.000
	G2	50.113	11.812	15.50	
ALGOMETER TX N	G1	62.310	12.716	.00	.000
	G2	56.260	14.233	.00	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

TABLE 4.16 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK TEST FOR THE: ALGOMETER READINGS FOR THE INVOLVED SIDE OF THE SECOND FIXATION

GROUP		MEAN	SD	MEAN RANK	P
ALGOMETER TXI	G1	52.120	11.610	10.50	.000
	G2	49.222	12.716	12.86	
ALGOMETER TX N	G1	63.315	14.417	.00	.000
	G2	54.478	14.221	3.00	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

**TABLE 4.17 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK
TEST FOR: FOREWARD FLEXION**

GROUP		MEAN	SD	MEAN RANK	P
FF TX I	G1	90.33	12.66	15.90	0.00
	G2	95.13	24.28	16.79	
FF TX N	G1	94.97	11.70	4.00	0.000
	G2	95.23	15.26	10.33	

According to the above table there is improvement within group one between the first and final treatment. Group two showed no change. The null hypothesis is rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

**TABLE 4.18 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK
TEST FOR: EXTENTION**

GROUP		MEAN	SD	MEANRANK	P
Ext TX I	G1	30.37	8.24	15.43	0.000
	G2	27.60	14.92	16.92	
Ext TX N	G1	33.63	8.32	3.00	0.000
	G2	29.43	14.51	8.40	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

**TABLE 4.19 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK
TEST FOR: LEFT LATERAL FLEXION**

GROUP		MEAN	SD	MEAN RANK	P
LL TX I	G1	26.10	6.87	15.50	0.05
	G1	23.90	5.94	12.57	
LL TX N	G1	27.57	6.77	11.50	0.000
	G2	25.60	5.46	6.00	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group two showed more improvement than group one overall and the null hypothesis was rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

**TABLE 4.20 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK
TEST FOR: RIGHT LATERAL FLEXION**

GROUP		MEAN	SD	MEAN RANK	P
RL TX I	G1	26.13	6.46	16.13	0.004
	G2	25.07	6.97	17.05	
	TOTAL				
RL TX N	G1	27.60	6.46	8.94	0.005
	G2	26.93	7.06	9.11	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

**TABLE 4.21 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK
TEST FOR: LEFT ROTATION**

GROUP		MEAN	SD	MEAN	P
LR TX I	G1	8.00	3.19	14.25	0.000
	G2	8.30	5.27	14.17	
	TOTAL				
LR TX N	G1	10.20	2.95	4.50	0.000
	G2	9.60	4.95	9.50	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

WILCOXON SIGNED RANK TESTS

**TABLE 4.22 STATISTICAL RESULTS OF THE WILCOXON SIGNED RANK
TEST FOR: RIGHT ROTATION**

GROUP		MEAN	SD	MEAN	P
RR TX 1	G1	8.33	3.30	14.80	0.000
	G2	8.27	5.29	14.16	
	TOTAL				
RR TX N	G1	10.77	3.02	4.00	0.004
	G2	9.27	4.78	9.33	

According to the table of results above there was an improvement within both groups between the first and final treatment. Group one showed more improvement than group two overall and the null hypothesis was rejected due to the level of the P-value.

GRAPHICAL REPRESENTATION OF STATISTICAL DATA

The following figures show the: mean values, standard deviations and mean ranks recorded at the first and final treatment comparing the manually adjusted and instrumentally adjusted groups.

Abbreviations: **M**= Mean

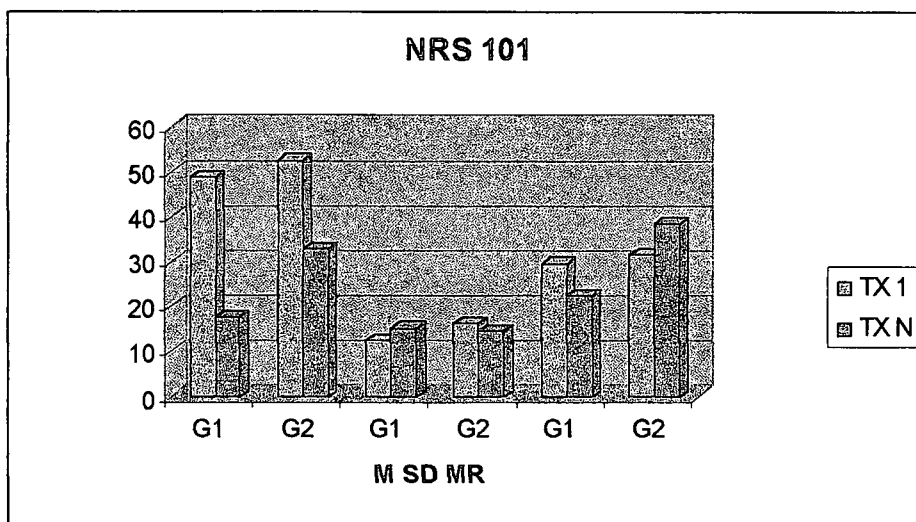
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.23: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: NUMERICAL PAIN RATING SCALE-101



Abbreviations: **M**= Mean

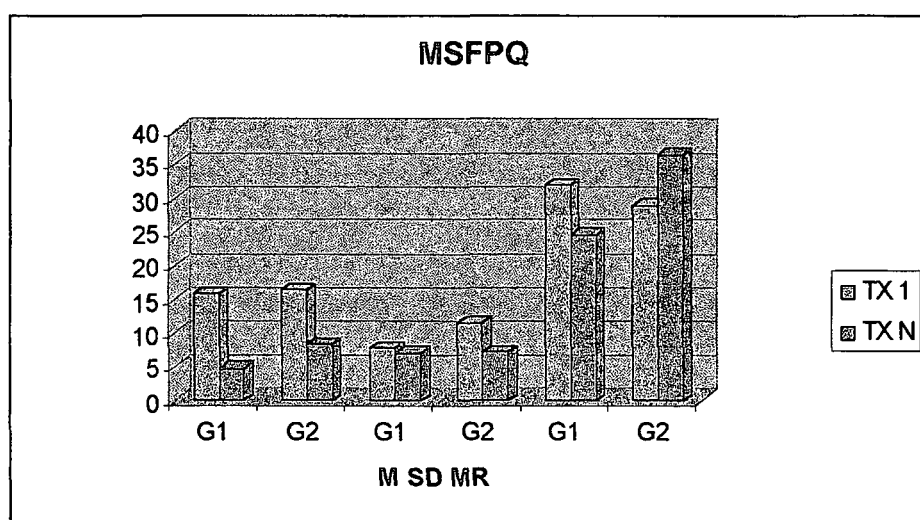
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.24: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: MCGILL SHORT FORM PAIN QUESTIONNAIRE



Abbreviations: M= Mean

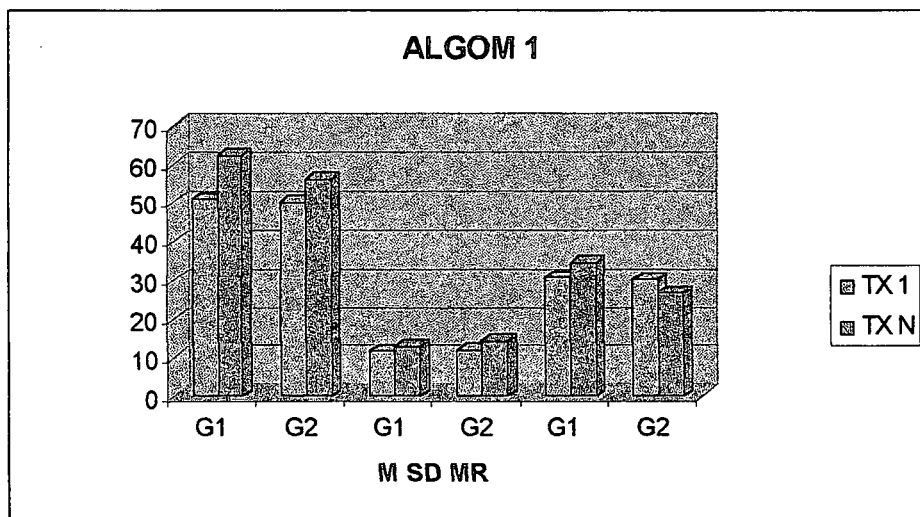
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.25: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: ALGOMETER READINGS FIRST LEVEL



Abbreviations: **M**= Mean

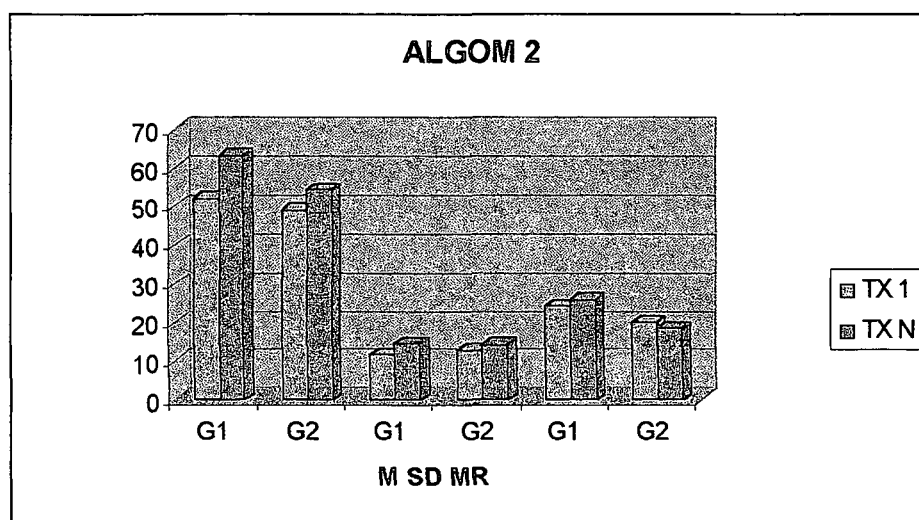
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.26: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: ALGOMETER READINGS 2ND LEVEL



Abbreviations: **M**= Mean

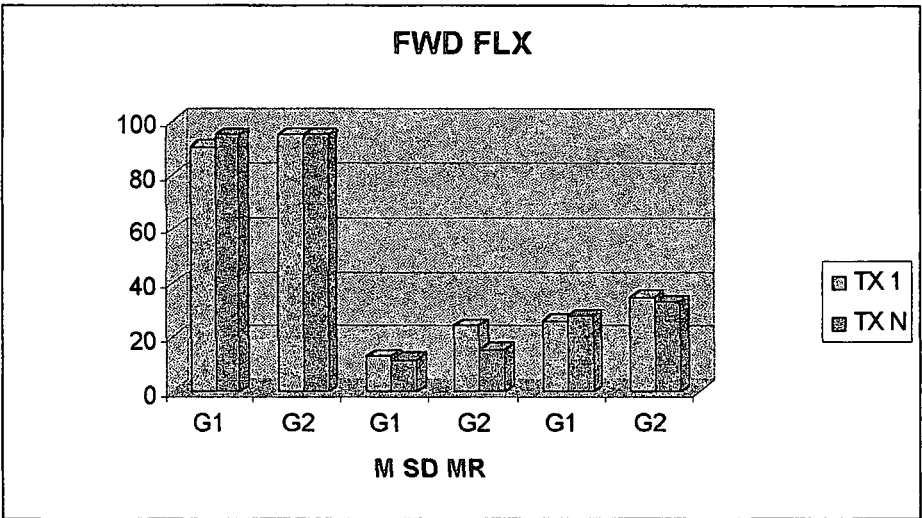
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.27: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: FORWARD FLEXION



Abbreviations: **M**= Mean

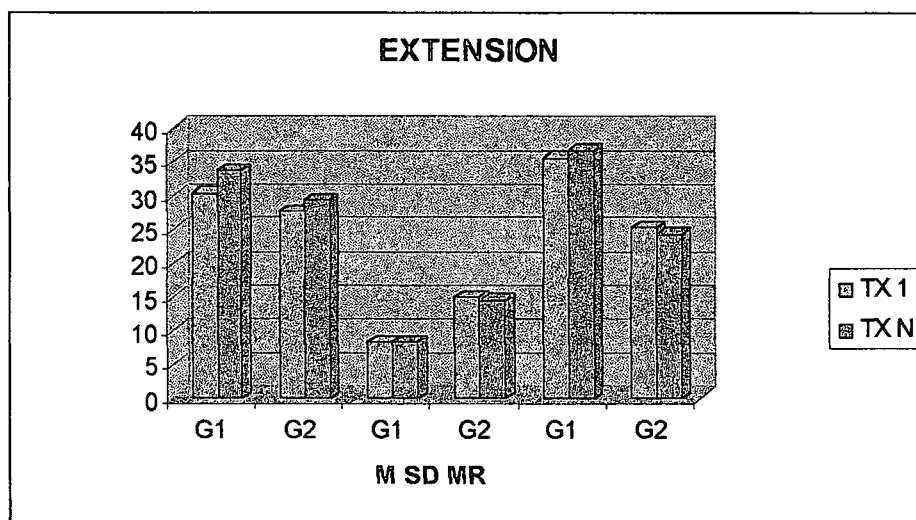
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.28: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: EXTENTION



Abbreviations: M= Mean

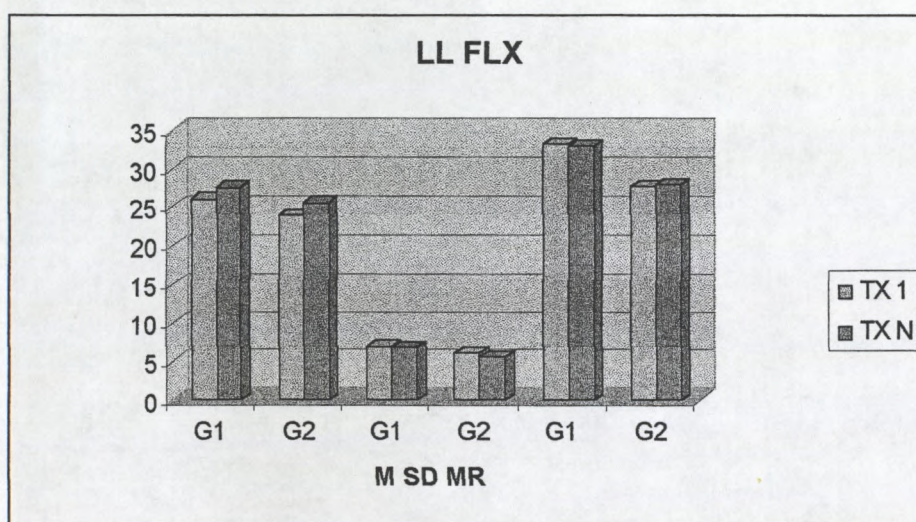
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.29: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: LEFT LATERAL FLEXION



Abbreviations: **M**= Mean

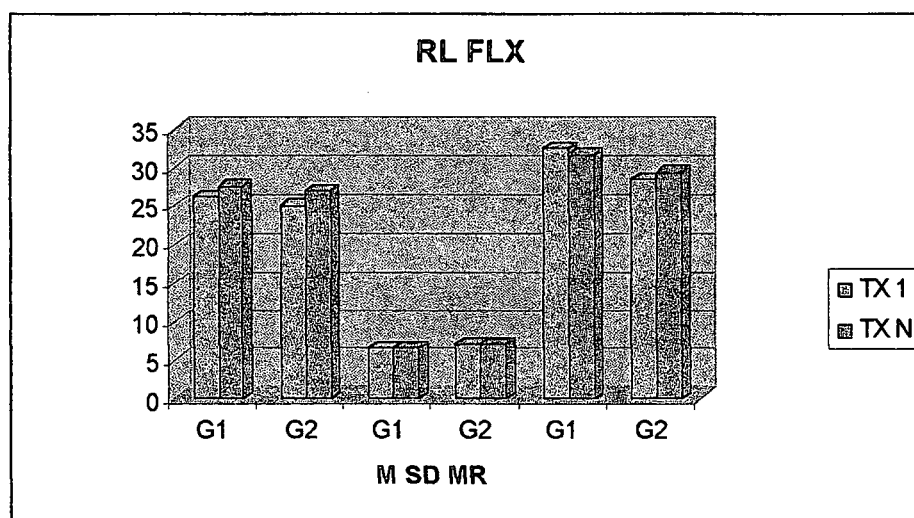
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.30: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: RIGHT LATERAL RLEXION



Abbreviations: M= Mean

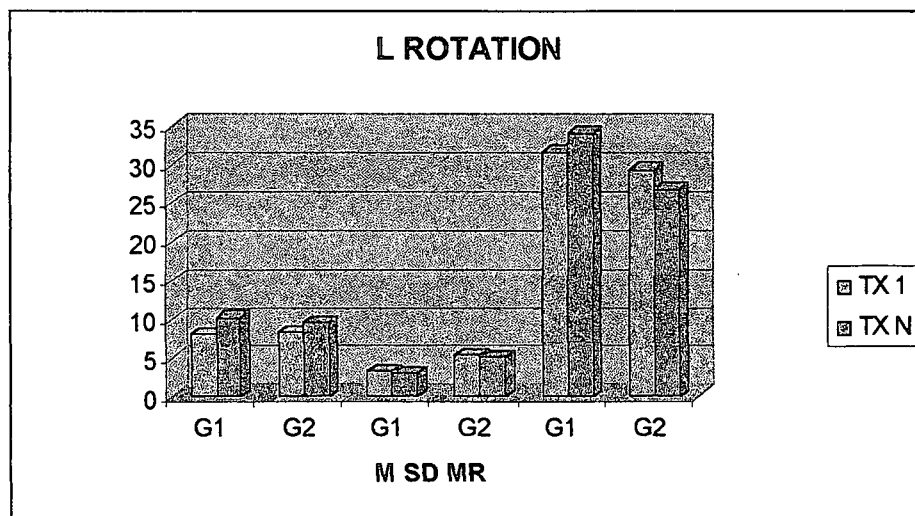
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.31: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: LEFT ROTATION



Abbreviations: **M**= Mean

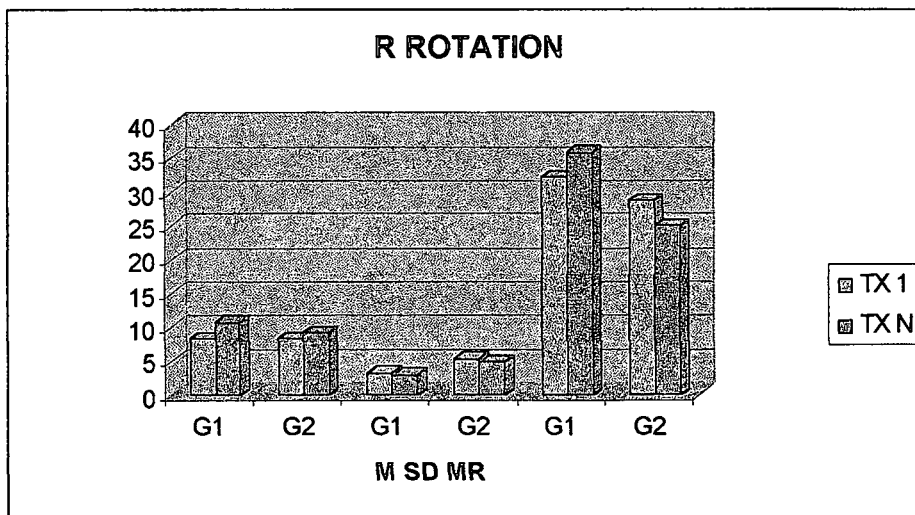
SD= Standard Deviation

MR =Mean Rank

MANN-WHITNEY U- TESTS

Table 4.32: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

MAN-WHITNEY UNPAIRED TEST: RIGHT ROTATION



Abbreviations: **M**= Mean

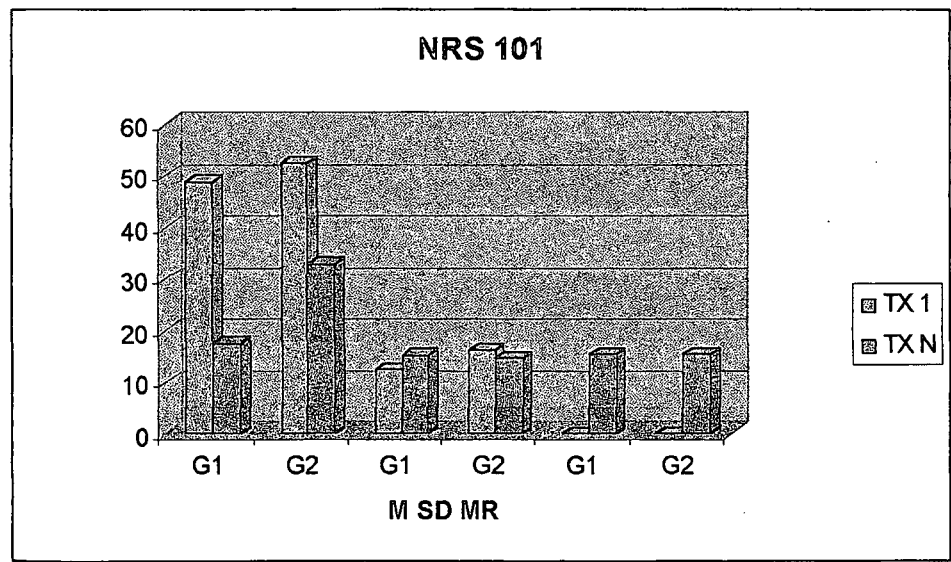
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.33: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: NUMERICAL PAIN RATING SCALE 101



Abreviations: **M**= Mean

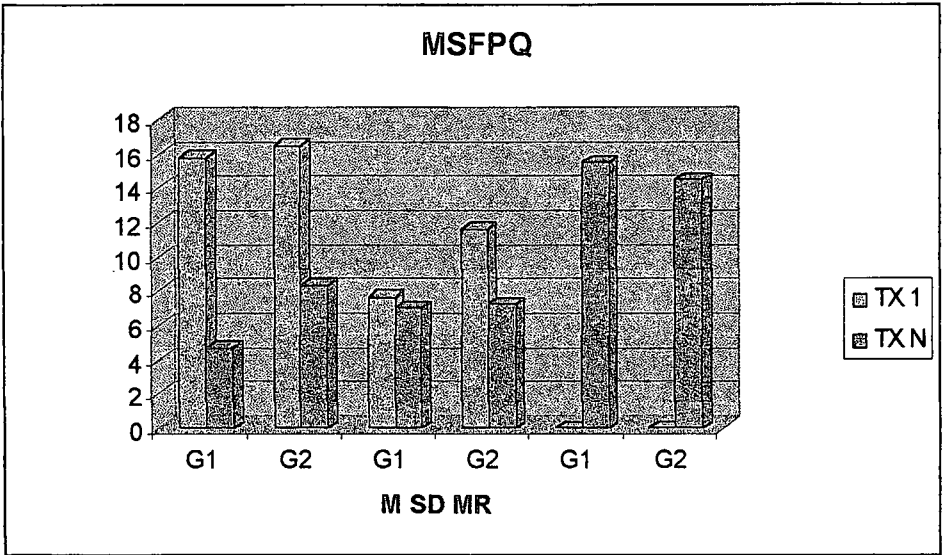
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.34: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: MCGILL SHORT FORM PAIN QUESTIONNAIRE



Abbreviations: M= Mean

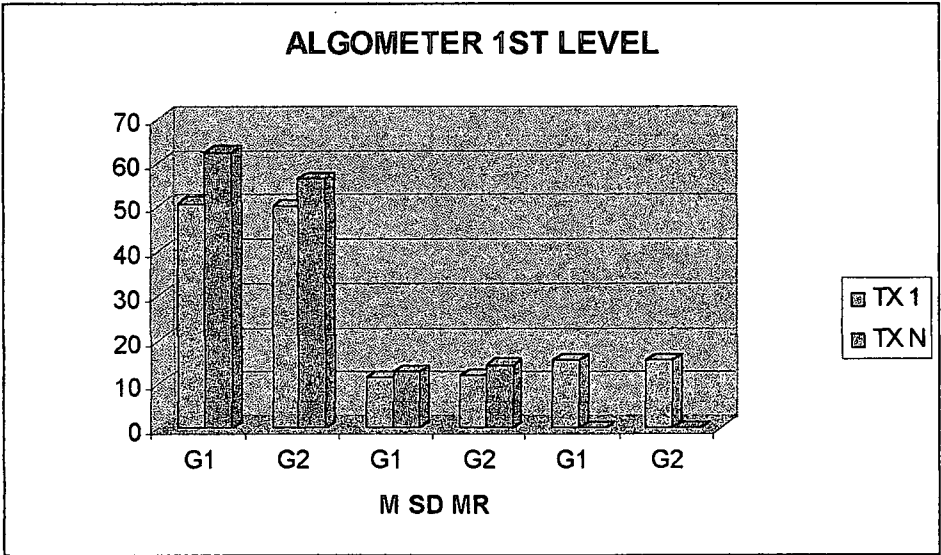
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.35: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: ALGOMETER READINGS 1ST LEVEL



Abbreviations: **M**= Mean

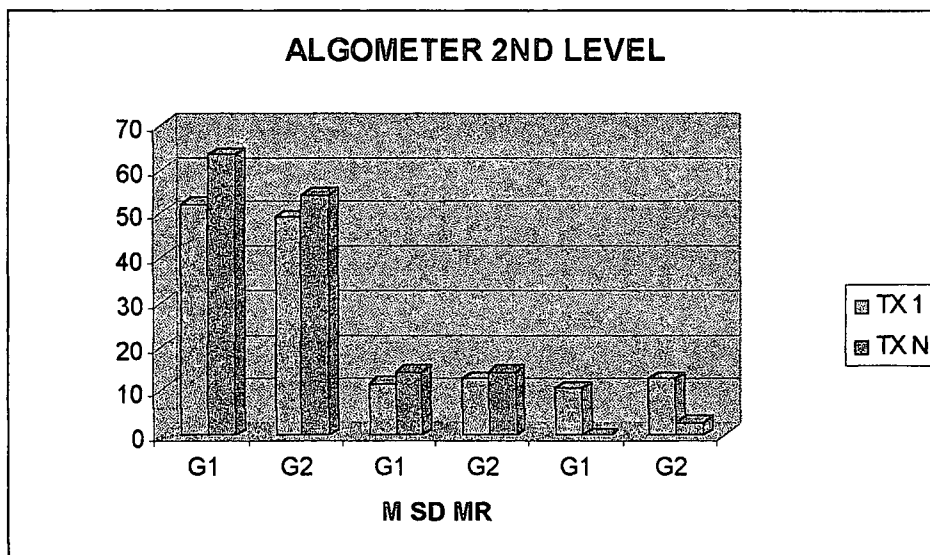
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.36: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: ALGOMETER READINGS 2ND LEVEL



Abbreviations: **M**= Mean

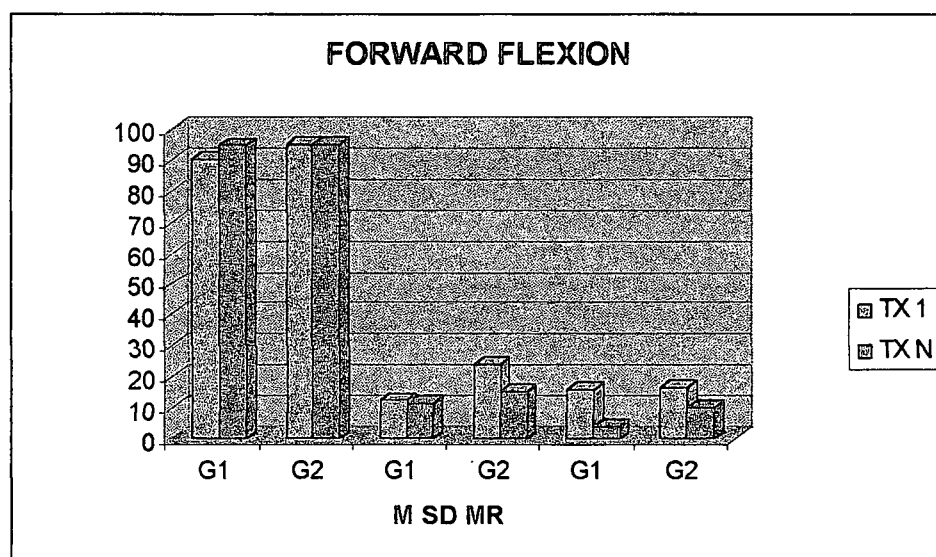
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.37: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: FORWARD FLEXION



Abbreviations: **M**= Mean

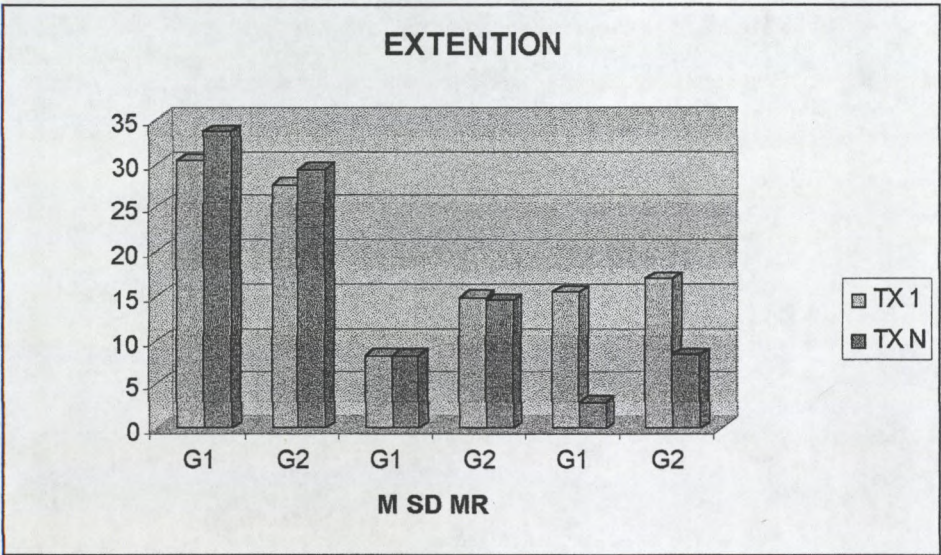
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.38: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: EXTENTION



Abbreviations: **M**= Mean

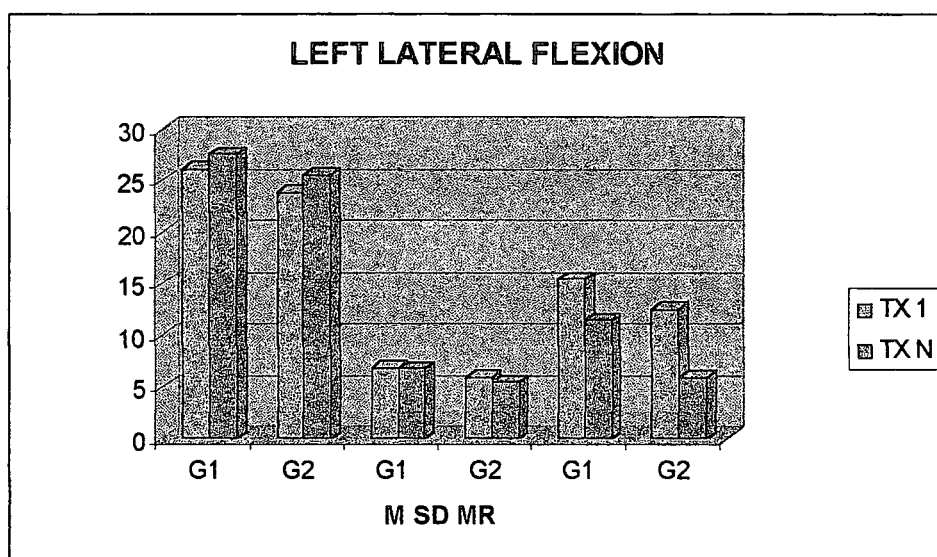
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.39: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: LEFT LATERAL FLEXION



Abbreviations: **M**= Mean

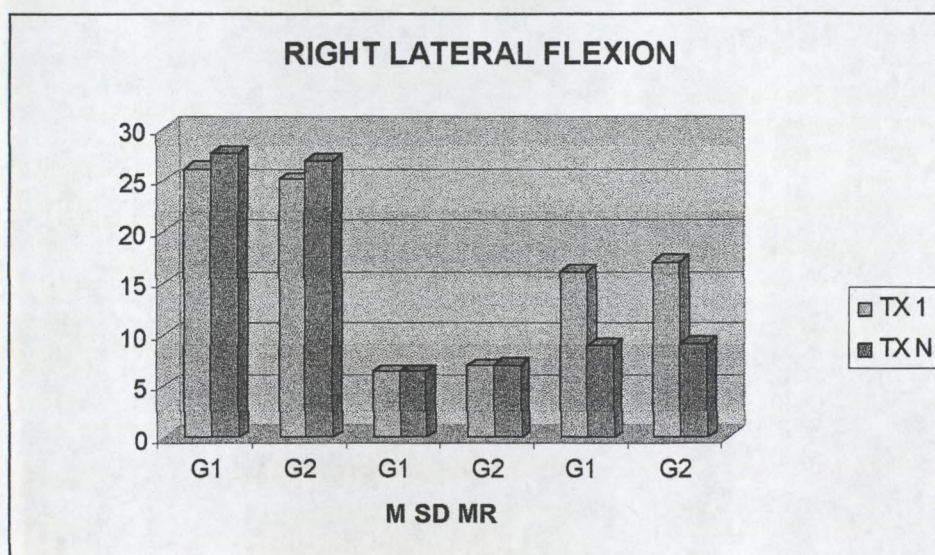
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.40: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: RIGHT LATERAL FLEXION



Abbreviations: **M**= Mean

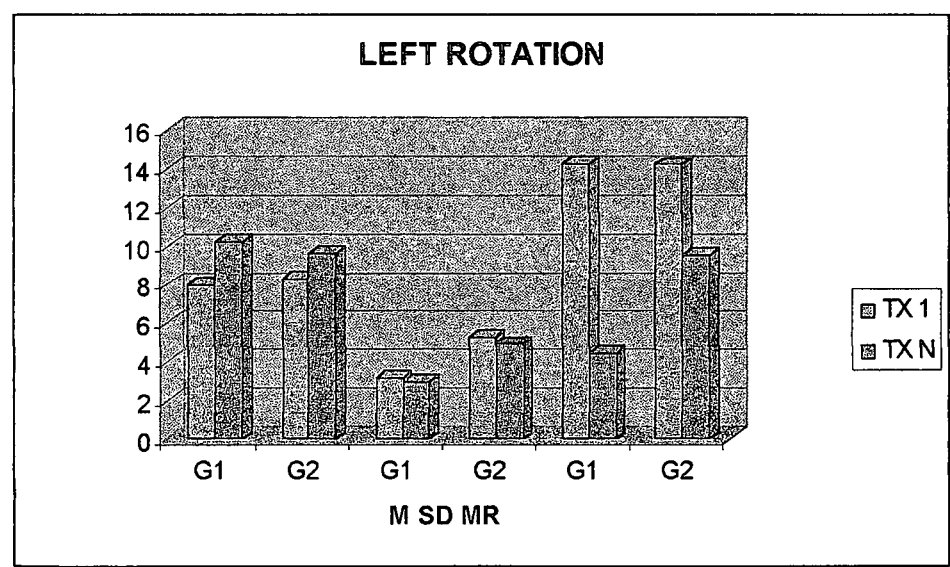
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.41: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: LEFT ROTATION



Abbreviations: M= Mean

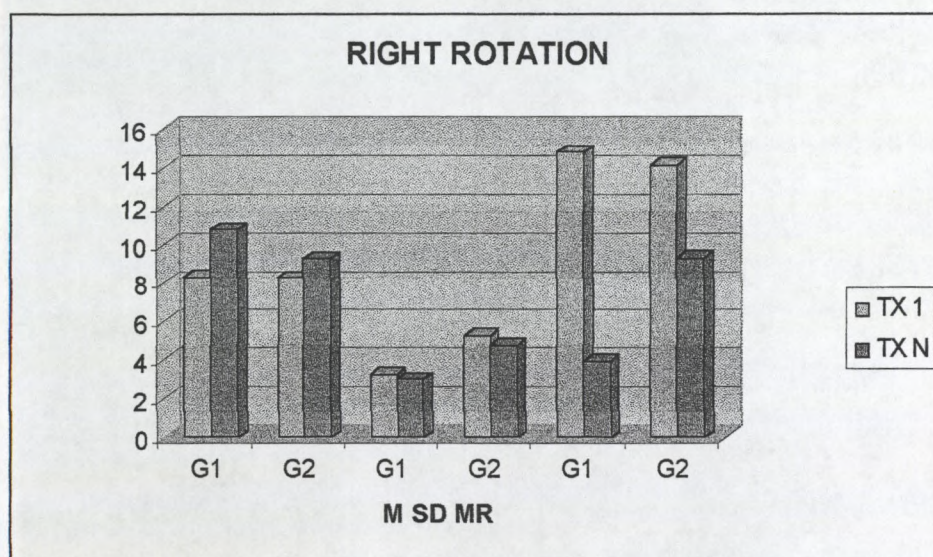
SD= Standard Deviation

MR =Mean Rank

WILCOXON SIGNED RANK TESTS

Table 4.42: Mean values, standard deviation and mean ranks recorded at the first and final consult comparing the manually adjusted group to the instrumentally adjusted group.

WILCOXON SIGNED RANK TEST: RIGHT ROTATION



Abbreviations: **M**= Mean

SD= Standard Deviation

MR =Mean Rank

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

The aim of this chapter is to discuss the subjective and objective findings in a simple and clear manner.

The data was gathered at the first and final treatment. The subjective data consisted of the Numerical Pain Rating Scale-101 and the McGill Short Form Pain Questionnaire. The objective data consisted of algometer and digital inclinometer readings.

The results are divided into two major categories, namely: Intra-group analysis, and inter-group analysis.

5.2 Intra-group results

5.2.1 Subjective data

5.2.1.1 The Numerical Pain Rating Scale-101

The NRS scores were statistically analyzed using the Mann Whitney U-Test.

Within group one there was an improvement between the first and final treatment ($p=0.000$). Table 4.3, Graph 4.23 shows this improvement. The null hypothesis is rejected due to the level of the p-value.

Within group two there was improvement between the first and final treatment ($p=0.000$). Table 4.3, Graph 4.23 shows this improvement. The null hypothesis is rejected due to the level of the p-value.

5.2.1.2 The McGill Short Form Pain Questionnaire

The MSFPQ scores were statistically analyzed using The Mann Whitney U-Test.

Within group one there was an improvement between the first and final treatment ($p=0.008$). Table 4.4, Graph 4.24 shows this improvement. The null hypothesis is rejected due to the level of the p-value.

Within group two there is an improvement between the first and final treatment ($p=0.008$). Table 4.4, Graph 4.24 shows this improvement. The null hypothesis is rejected due to the level of the p-value.

5.2.2 The Digital Algometer

The algometer readings were analyzed using the Mann Whitney U-Test

The readings were taken on the involved (symptomatic) side only.

Within group one there was no significant improvement between the first and final treatment ($p=0.077$). Table 4.5, 4/6, Graph 4.25,26 indicates this . The null hypothesis is accepted due to the level of the p-value.

Within group two there was no significant difference between the first and final treatment ($p=0.077$). Table 4.5/6, Graph 4.25,26 indicates this. The null hypothesis is accepted due to the level of the p-value.

5.2.3 The digital inclinometer

The readings of the digital algometer (ranges of motion) were statistically analyzed using The Mann Whitney U-Test.

5.2.3.1 Forward flexion

Within group one there was no significant improvement between the first and final visit ($p=0.279$). Table 4.7, Graph 4.27 indicate these changes. The null hypothesis was accepted due to the P-value falling above the 0.05 level.

Within group two there was no significant difference between the first and final treatments. Table 4.7, Graph 4.27 indicate these changes. The null hypothesis is accepted due to the level of the p-value.

5.2.3.2 Extension

Within group one there was an improvement between the first and final treatment ($p=0.006$). Table 4.8, Graph 4.28 indicate these changes. The null hypothesis is rejected as the p-value falls below 0.05.

Within group two there was an improvement between the first and final treatment ($p=0.006$). Table 4.8, Graph 4.28 indicate these changes. The null hypothesis is rejected as the p-value falls below 0.05.

5.2.3.3 Left lateral flexion

Within group one there was no significant improvement between the first and final treatment ($p=0.260$) Table 4.9, Graph 4.29 indicate these changes. The null hypothesis is accepted due to the level of the p-value.

Within group two there was no significant improvement between the first and final treatment ($p=0.260$). Table 4.9, Graph 4.29 indicate these changes. The null hypothesis is accepted due to the level of the p-value.

5.2.3.4 Right lateral flexion

Within group one there was an improvement between the fist and final treatment ($p=0.620$). Table 4.10, Graph 4.30 indicate these changes. The null hypothesis is accepted due to the level of the p-value.

Within group two there was an improvement between the fist and final treatment ($p=0.620$). Table 4.10, Graph 4.30 indicate these changes. The null hypothesis is accepted due to the level of the p-value.

5.2.3.5 Left rotation

Within group one there was no significant improvement between the fist and final treatment ($p=0.099$). Table 4.11, Graph 4.31 indicate these changes. The null hypothesis is accepted due to the level of the p-value

Within group two there was no significant improvement between the fist and final treatment ($p=0.099$). Table 4.11, Graph 4.31 indicate these changes. The null hypothesis is accepted due to the level of the p-value.

5.2.3.6 Right rotation

Within group one there was an improvement between the first and final treatment ($p=0.016$) Table 4.12, Graph 4.32 indicates these changes. The null hypothesis is rejected due to the level of the p-value.

Within group two there was an improvement between the first and final treatment ($p=0.016$). Table 4.12, Graph 4.32 indicates these changes. The null hypothesis is rejected due to the level of the p-value.

5.3 Intra group analysis

5.3.1 Subjective data

5.3.1.1 The Numerical Pain Rating Scale 101

The NRS-101 was analyzed using the Wilcoxon Signed Rank test.

When the two groups were statistically compared (Table 4.13, Graph 4.33) it was found that there was a significant improvement between the first and final treatment for both groups. Group one shows a greater level of improvement overall. The null hypothesis is rejected.

5.3.1.2 The McGill Short Form Pain Questionnaire

The MSFPQ scores were analyzed using the Wilcoxon Signed Rank Test.

When the two groups were statistically compared (Table 4.14, Graph 4.34) it was found that there was a significant improvement between the first and final treatment for both groups. Group one shows a greater level of improvement overall. The null hypothesis is rejected.

5.3.2 Objective data

5.3.2.1 Algometer readings

The readings of the digital algometer (ranges of motion) were statistically analyzed using The Wilcoxon Signed Rank Test.

When the two groups were statistically compared (Table 4.15,16 Graph 4.35,36) it was found that there was a significant improvement between the first and final treatment for both groups. Group one shows a greater level of improvement overall. The null hypothesis is rejected.

5.3.2.2 The Digital Inclinometer

The readings of the digital inclinometer (ranges of motion) were statistically analyzed using The Wilcoxon Signed Rank Test.

5.3.2.2.1 Forward flexion

When the two groups were statistically compared (Table 4.17 Graph 4.37) it was found that there was a significant improvement between the first and final treatment for both groups. Group one shows a greater level of improvement overall. The null hypothesis is rejected.

5.3.2.2.2 Extension

When the two groups were statistically compared (Table 4.18 Graph 4.38) it was found that there was a significant improvement between the first and final treatment for both groups. Group one shows a slightly greater level of improvement overall. The null hypothesis is rejected.

5.3.2.2.3 Left lateral flexion

When the two groups were statistically compared (Table 4.19 Graph 4.39) it was found that there was a significant improvement between the first and final treatment for both groups. Group one shows a slightly greater level of improvement overall. The null hypothesis is rejected.

5.3.2.2.4 Right lateral flexion

When the two groups were statistically compared (Table 4.20 Graph 4.40) it was found that there was a significant improvement between the first and final treatment for both groups. Group one shows a slightly greater level of improvement overall. The null hypothesis is rejected.

5.3.2.2.5 Left rotation

When the two groups were statistically compared (Table 4.21 Graph 4.41) it was found that there was a significant improvement between the first and final treatment for both groups. Both groups showed similar levels of improvement. The null hypothesis was rejected.

5.3.2.2.6 Right rotation

When the two groups were statistically compared (Table 4.22 Graph 4.42) it was found that there was a significant improvement between the first and final treatment for both groups. Group one shows a greater level of improvement overall. The null hypothesis is rejected.

Comparison of results

Many studies are to be found supporting the use of manually administered chiropractic adjustments in the management of lower back pain (Meade et al. 1995; Koes et al. 1996; Carey et al. 1995).

In terms of both inter and intra group analysis both groups showed significant improvement in both subjective and objective measurements. Overall group one (manually manipulated) showed more improvement than group two (instrumentally manipulated). Both treatment protocols however provided relief from lower back pain and are comparable to one another.

No studies can be found comparing manual manipulation with instrumental manipulation for the management of lower back pain. This study would therefore act as a base-line study for further research in this field.

Summary

After statistical analysis and it's interpretation regarding the use of instrumentation as opposed to manipulation using the Diversified Technique it was found that some differences did occur, favoring manual manipulation in most cases. However, these Differences where not sufficient to conclude that one treatment was more effective than the other.

CHAPTER SIX

6 RECOMMENDATIONS AND CONCLUSIONS

6.1 Recommendations

6.1.1 Homogeneity

With respect to age, gender race occupation and the extent of pain and disability, the use of more closely defined parameters would greatly enhance study strength. Stratification in future research studies is recommended in order to ensure homogeneity within two groups. This would improve comparability of baseline characteristics.

6.1.2 Epidemiological studies

Studies involving point prevalence and lifetime incidence around the greater Durban area would improve the reporting of lumbar facet syndrome and allow for stratification of subjects presenting with this condition at the Durban Institute of Technology Chiropractic Clinic.

6.1.3 Blinding

To remove the possibility of observer bias the examiner could be prevented from knowing which group is being assessed, as well as by not allowing the examiner to view the previous treatment readings.

6.1.4 Sample size

To avoid the possibility of Type II error, which is incorrectly accepting the null hypothesis, the use of larger sample sizes is recommended which would also increase the validity of the study.

6.1.5 Treatment schedules

Treatments should be uniformly set out so that consistency and validity of the treatments can be ensured. Treatment should be concluded within set time parameters to allow direct and accurate comparison of the effect of each treatment and overall efficacy.

6.1.6 Use of instrumentation

Without the use of a permanent form of marking it is almost impossible to correctly place instrumentation on exactly the same points for each measurement required. This allows for questioning instrumentation validity in this research for obtaining objective measures.

6.1.7 Placebo group

The incorporation of a third placebo group would greatly increase the validity of this research. This would also allow for the observation of the natural progression of lumbar facet syndrome.

6.1.8 Conclusion

The results of this study showed that both groups displayed statistically significant improvement. Group one did however show a greater overall improvement as compared to group two. This shows that both forms of intervention are beneficial in the management of lower back pain and can be used with confidence when managing lower back pain.

The lack of a long term follow up period prevents any comment on the long term effect of either treatment protocols.

It is the authors contention that further research into lower back pain should concentrate on the ergonomic implications of the Diversified Technique of manipulation, and aim to establish the use of more conservative treatment protocols for lower back pain. Thus, further investigation into this condition and alternative treatment protocols, combined with a better study design would greatly enhance the chiropractic approach to lower back pain.

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APPENDIX A

DURBAN INSTITUTE OF TECHNOLOGY
CHIROPRACTIC DAY CLINIC
CASE HISTORY

Patient: Date:

File # : Age :

Sex : Occupation:

Intern :Signature:

FOR CLINICIANS USE ONLY:

Initial visit

Clinician:Signature :

Case History:

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Examination:

Previous:

Current:

X-Ray Studies:

Previous:

Current:

Clinical Path. lab:

Previous:

Current:

Case Status:

PTT:	Signature:	Date:
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CONDITIONAL:

Reason for Conditional:

Signature:	Date:
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Conditions met in Visit No:	Signed into PTT:	Date:
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Signed off:	Date:
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6. Current health status and life-style:

- ▶ Allergies
- ▶ Immunizations
- ▶ Screening Tests incl. xrays

- ▶ Environmental Hazards (Home, School, Work)
- ▶ Exercise and Leisure
- ▶ Sleep Patterns
- ▶ Diet
- ▶ Current Medication
Analgesics/week:
- ▶ Tobacco
- ▶ Alcohol
- ▶ Social Drugs

7. Immediate Family Medical History:

- ▶ Age
- ▶ Health
- ▶ Cause of Death
- ▶ DM
- ▶ Heart Disease
- ▶ TB
- ▶ Stroke
- ▶ Kidney Disease
- ▶ CA
- ▶ Arthritis
- ▶ Anaemia
- ▶ Headaches
- ▶ Thyroid Disease
- ▶ Epilepsy
- ▶ Mental Illness
- ▶ Alcoholism
- ▶ Drug Addiction
- ▶ Other

8. Psychosocial history:

- ▶ Home Situation and daily life
- ▶ Important experiences
- ▶ Religious Beliefs

APPENDIX B

CHIROPRACTIC DAY CLINIC PHYSICAL EXAMINATION

Patient: _____ File#: _____ Date: _____

Clinician: _____ Signature: _____

Student: _____ Signature: _____

1. VITALS

Pulse rate:

Respiratory rate:

Blood pressure: R L Medication if hypertensive:

Temperature:

Height:

Weight: Any change Y/N If Yes : how much gain/loss _____
Over what period _____

2. GENERAL EXAMINATION

General Impression:

Skin:

Jaundice:

Pallor:

Clubbing:

Cyanosis (Central/Peripheral):

Oedema:

Lymph nodes - Head and neck:

- Axillary:

- Epitrochlear:

- Inguinal:

Urinalysis:

3. CARDIOVASCULAR EXAMINATION

- 1) Is this patient in **Cardiac Failure** ?
- 2) Does this patient have signs of **Infective Endocarditis** ?
- 3) Does this patient have **Rheumatic Heart Disease** ?

Inspection

- Scars
- Chest deformity:
- Precordial bulge:
- Neck -JVP:

Palpation:

- Apex Beat (character + location):
- Right or left ventricular heave:
- Epigastric Pulsations:
- Palpable P2:
- Palpable A2:

Rectal Examination

- Perianal skin:
- Sphincter tone & S4 Dermatome:
- Obvious masses:
- Prostate:
- Appendix:

6. G.U.T EXAMINATION

External genitalia:

Hernias:

Masses:

Discharges:

7. NEUROLOGICAL EXAMINATION**Gait and Posture**

- Abnormalities in gait:
- Walking on heels (L4-L5):
- Walking on toes (S1-S2):
- Rombergs test (Pronator Drift):

Higher Mental Function

- Information and Vocabulary:
- Calculating ability:
- Abstract Thinking:

G.C.S.:

- Eyes:
- Motor:
- Verbal:

Evidence of head trauma:**Evidence of Meningism:**

- Neck mobility and Brudzinski's sign:
- Kernigs sign:

Cranial Nerves:**I** Any loss of smell/taste:

Nose examination:

II External examination of eye: - Visual Acuity:

- Visual fields by confrontation:

- Pupillary light reflexes = Direct:

= Consensual:

- Fundoscopy findings:

III Ocular Muscles:

Eye opening strength:

IV Inferior and Medial movement of eye:**V** a. Sensory - Ophthalmic:

- Maxillary:

- Mandibular:

b. Motor - Masseter:

- Jaw lateral movement:

c. Reflexes - Corneal reflex

- Jaw jerk

VI Lateral movement of eyes

Sensory System:

- a. Dermatomes
 - Light touch:
 - Crude touch:
 - Pain:
 - Temperature:
 - Two point discrimination:
- b. Joint position sense
 - Finger:
 - Toe:
- c. Vibration:
 - Big toe:
 - Tibial tuberosity:
 - ASIS:
 - Interphalangeal Joint:
 - Sternum:

Cerebellar function:

Obvious signs of cerebellar dysfunction:

- = Intention Tremor:
- = Nystagmus:
- = Truncal Ataxia:

Finger-nose test (Dysmetria):

Rapid alternating movements (Dysdiadochokinesia):

Heel-shin test:

Heel-toe gait:

Reflexes:

Signs of Parkinsons:

8. SPINAL EXAMINATION:(See Regional examination)

Obvious Abnormalities:

Spinous Percussion:

R.O.M:

Other:

9. BREAST EXAMINATION:

Summon female chaperon.

Inspection

- Hands rested in lap:
- Hands pressed on hips:
- Arms above head:
- Leaning forward:

Palpation

- masses:
- tenderness:
- axillary tail:
- nipple:
- regional lymph nodes:

APPENDIX C

TECHNIKON NATAL CHIROPRACTIC DAY CLINIC
REGIONAL EXAMINATION - LUMBAR SPINE AND PELVIS.

PATIENT: _____

FILE #: _____

DATE: _____

INTERN/RESIDENT: _____

SUPERVISING CLINICIAN: _____

STANDING:

Posture
Minor's Sign
Skin
Scars
Discoloration
Muscle Tone
Bony & Soft Tissue Contours

Spinous Percussion
Schober's Test (6cm)
Treadmill
Body Type
Attitude

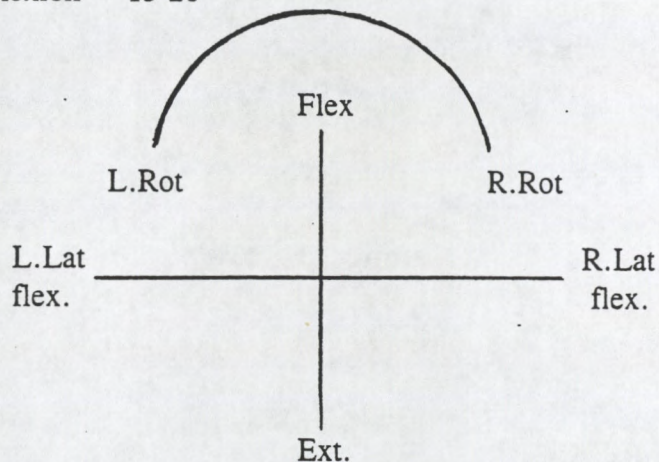
RANGE OF MOTION

Forward Flexion = $40-60^{\circ}$ (15cm from floor)

Extension = $20-35^{\circ}$

L/R Rotation = $3-18^{\circ}$

L/R Lateral Flexion = $15-20^{\circ}$



SUPINE:

Skin
Hair
Nails
Palpate Abdomen/groin
Pulses (abdomen)

Observe abdomen
Fasciculations
Abdominal Reflexes

NEUROLOGICAL EXAMINATION

DERMATOMES			MYOTOMES			REFLEXES		
	L	R		L	R		L	R
T12			Hip Flex			Pat.		
L1			Hip int rot			Achil		
L2			Hip ext rot			H/S		
L3			Hip abd					
L4			Hip add					
L5			Knee flex					
S1			Knee ext					
S2			Dorsiflex					
S3			Plantarflex					
			Eversion					
			Ext.hal.long					

Tripod

Kemp's Test

MOTION PALPATION and JOINT PLAY:

LEFT: Upper Thoracics:
Lumbar Spine:
Sacroiliac Joint:

RIGHT: Upper Thoracics:
Lumbar Spine:
Sacroiliac Joint:

Basic Exam: Hip

Case History:

ROM: Active:

Passive:

RIM:

Orthopaedic/Neuro/

Vascular:

Observ/Palpation:

Basic Exam: Thoracic Spine

Case History:

ROM: Motion Palp:

Active:

Passive:

Orthopaedic/Neuro/

Vascular:

Observ/Palpation:

APPENDIX D

ORTHOPAEDIC ASSESSMENT RATING

TEST	SCORE
KEMPS(4)	
FACET JOINT CHALLENGE (4)	
PRONE HYPEREXTENTION (2)	

APPENDIX E

Letter To patient

Re: Prospective, randomized, comparative clinical trial.

Title: The effectiveness of manual manipulation versus the Activator Adjusting Instrument in the management of acute facet syndrome of the lumbar spine.

Supervisor: Dr HL White

Dear participant

Welcome to this research study. You have been selected to participate in a clinical trial comparing two treatment forms for lower back pain.

The condition you have and which is to be treated is known as lumbar facet syndrome. The aim of the study is to compare two different forms of spinal adjustments in the treatment of lumbar facet syndrome. Both forms of spinal adjustments are recognized Chiropractic techniques. Patients may be expected to obtain some measure of relief from lower back pain during the course of and after this study.

There are two treatment groups each consisting of 30 patients. One group will receive treatment using Diversified technique which uses the hands to adjust, while the second group will be adjusted by means of an Activator Adjusting Instrument which involves adjusting by means of an instrument. Patients will be randomly allocated to either group A or B. The research will entail 5 treatments spread over a ten-day period.

During the treatment period patients will be required to refrain from lifestyle changes including new exercise programs and any changes in normal physical activity as well as any other forms of treatment.

Treatment during this study will be free of charge and no levies will be imposed or compensations afforded the participant at any stage of this research.

Participation in this study is entirely voluntary and if a patient is unable to complete the study they may withdraw at any stage.

If during the course of the study a patient develops any adverse responses to the treatment they will be deemed non eligible for the study.

Patient confidentiality will be maintained. Patient complaints may be submitted to myself or Dr HL White at The Technikon Natal Day Clinic(2042205).

This study will be carried out under the supervision of The Technikon Natal Day Clinic.

Any additional enquiries can be directed to the afore mentioned clinic.

Results of the research will be forwarded to the participants in writing

Yours sincerely
Dave Gillespie

Incwadi yesiguli

Umyalezo: Imizamo yokuhlolisisa okubhekiwe, okwenziwe ngokungenhloso, nokuqhathanisiwe

Isihloko : Okungaba imiphumela yokuhlikihla ngesandla kanye nomshini oyithuluzi osebenza ekuqashweni kobuhlungu bamathambo omgogodla ongemuva eqolo.

Umpathi : Dkt. H.L. White

Mhlanganyeli othandekayo

Siyakwamukela kulesisifundo socwaningo. Ukhethiwe ukuba uhlanganyele kulemizamo yokuhlolisisa kuqhathaniswa izindlela ezimbili zokwelapha ubuhlungu beqolo.

Isimo okusona futhi esizobe selashwa saziwa ngokuthi amathambo eqolo elingezansi. Injongo yalesisifundo ukuqhathanisa izindlela ezimbili zokwelapha iqolo uma kwelashwa amathambo eqolo elingezansi. Zombili lezizindlela zokwelapha iqolo zibizwa ngokuthi i-Chiropractic techniques. Iziguli zingase zilindelwe ukuba zithole isikalo sobuncono bezinhlungu zeqolo elingezansi ngesikhathi kusaqhutshekwa nalesisifundo, nangesikhathi sekuqedliwe ngalesisifundo.

Mabili amaqembu alashwayo lilinye liqukethe iziguli ezingu-30. Elilodwa iqembu lizothola ukwelashwa lisebenzisa iDiversified techniques lena esebenzisa izandla ukuba zihlele, kuthi elesibili iqembu lizohleleka ngokuba lisebenzise i Activator Adjusting Instrument embandakanya ukuhlela kusetshenziswa ithuluzi elithile. Iziguli zizobekwa nje ngokungenhloso zibekwe eqenjini A noma B. Ucwanningo luzobeka ukwelashwa okungu-5 olungasetshenziswa isikhathi esingaphezu kwezinsuku eziyishumi.

Ngesikhathi sokwelashwa iziguli kuzodingeka ukuba zisuke ekushintsheni kwempilo okungaba izinhlelo zokuzivocavoca okusha nanoma yiluphi ushintsho ekunyakaziseni umzimba okwejoywayelekile kanye nokuyeka noma iziphi ezinye izindlela zokwelashwa.

Ukwelashwa ngesikhathi salesisifundo kuzoba mahhala futhi akukho nhlawulo ezokhokhwa noma isinxephezelo esizonikwa isiguli kunoma isiphi isigaba salolucwaningo.

Ukuhlanganyela kulesisifundo akuyona impoqo kanti uma isiguli singakwazanga ukuqedela lesisifundo singakwazi ukuhoxa noma yinini.

Uma ngesikhathi sesifundo isiguli singazwani kahle nemithi esiyisebenzisayo sizothathwa njengomuntu obekungafanelekile ukuba abe kulesisifundo.

Imfihlo yesiguli izogcinwa iphephile. Isikhalazo seziguli sizolethwa kimini noma ku Dkt. H. L. White oseMtholampilo wase Technikon Natal (204 2205)

Lesisifundo sizobe senziwa siphethwe uMtholampilo wase Technikon Natal.

Noma yimiphi imibuzo etholakalayo ayibhekiswe kuloMtholampilo osekukhulunywe ngawo ngenhla.

Imiphumela yalolucwaningo izonikezwa abahlanganyeli ngokwemibhalo.

Owakho ozithobayo

Dave Gillespie

APPENDIX F

INFORMED CONSENT FORM

(To be completed by patient / subject)

Date :

Title of research project : THE EFFECTIVENESS OF MANUAL
MANIPULATION VERSUS THE ACTIVATOR
ADJUSTING INSTRUMENT IN THE
MANAGEMENT OF ACUTE FACET
SYNDROME OF THE LUMBAR SPINE.

Name of supervisor : Dr HL White

Name of research student : Mr DM Gillespie

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 withdraw from this study? | Yes | No |
| | a) at any time | | |
| | b) without having to give any a reason for withdrawing, and | | |
| | c) without affecting your future health care. | | |
| 8. | Do you agree to voluntarily participate in this study | Yes | No |
| 9. | Who have you spoken to?..... | | |

If you have answered NO to any of the above, please obtain the necessary information before signing

Please Print in block letters:

Patient /Subject Name:..... Signature:..... 

Parent/ Guardian:..... Signature:.....

Witness Name:..... Signature:.....

Research Student Name:..... Signature:.....

APPENDIX G

Short-form McGill Pain Questionnaire (SF-MPQ)

Ronald Melzack (1984)

Date: _____ File no.: _____ Visit no: _____

Patient name: _____

	NONE 0	MILD 1	MODERATE 2	SEVERE 3
THROBBING				
SHOOTING				
STABBING				
SHARP				
CRAMPING				
GNAWING				
HOT-BURNING				
ACHING				
HEAVY				
TENDER				
SPLITTING				
TIRING-EXHAUSTING				
SICKENING				
FEARFUL				
PUNISHING-CRUEL				

APPENDIX H

Numerical Rating Scale - 101 Questionnaire

Date:_____ File no:_____ Visit no:_____

Patient name:_____

Please indicate on the line below, the number between 0 and 100 that best describes the pain you experience when it is at its worst. A zero (0) would mean "no pain at all", and one hundred (100) would mean "pain as bad as it could be".

Please write only one number.

Please indicate on the line below, the number between 0 and 100 that best describes the pain you experience when it is at its least. A zero (0) would mean "no pain at all" and one hundred (100) would mean "pain as bad as it could be".

Please write only one number.

APPENDIX I

DIGITAL ALGOMETER READING

PRE TREATMENT

LEVEL	LISTING	READING L	READING R
L1			
L2			
L3			
L4			
L5			

DIGITAL ALGOMETER READING

POST TREATMENT

LEVEL	LISTING	READING L	READING R
L1			
L2			
L3			
L4			
L5			

APPENDIX J

INCLINOMETER READINGS

PRE TX 1

POST TX 5

INCLINOMETER	DEGREES	INCLINOMETER	DEGREES
FWD FLX		FWD FLX	
EXT		EXT	
L.LAT.FLEX		L.LAT.FLEX	
R.LAT.FLEX		R.LAT.FLEX	
L.ROT		L.ROT	
R.ROT		R.ROT	