THE RELATIVE EFFECTIVENESS OF MYOFASCIAL MANIPULATION VERSUS ISCHAEMIC COMPRESSION IN THE TREATMENT OF MYOFASCIAL TRIGGER POINTS OF THE UPPER TRAPEZIUS MUSCLE.

By

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Dissertation submitted in partial compliance with the requirements for the Master's Degree in Technology: Chiropractic in the Department of Chiropractic at the Durban Institute of Technology.

I, Richard Shacksnovis, do hereby declare that this dissertation represents my own work in both concept and execution.

Richard Shacksnovis Date

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Date

Dedication

THIS DEDICATION IS IN HONOUR OF MY MOTHER WHO HAS ALWAYS BEEN THERE FOR ME AND SUPPORTED ME THROUGH THICK AND THIN.

ACKNOWLEDGEMENTS

I would like to acknowledge the following people who helped me to reach my goal.

Dr. Charmaine Korporaal who helped me throughout my research, a special thanks is much needed.

To Netta Kruger who acted as my receptionist / work driver.

To Tanya Esterhuizen who did my statistics so well and in record time.

To Mrs Ireland, who gave many helpful hints as well as information.

To my friends, who gave encouragement from the verandas of Tuscany.

Abstract

Myofascial pain syndrome is defined as the sensory, motor and autonomic symptoms caused by myofascial trigger points (MFTPs), or hyperirritable spots within skeletal muscles that are associated with palpable nodules in a taut band (Travell, Simons and Simons, 1999 1:5).

Treatments for this syndrome include, but are not limited to is haemic compression, heat pack therapy, active range of motion, spray and stretch, tens therapy, interferential current therapy and myofascial release technique (Hou et al. 2002).

Despite this array of treatments available to a clinician, authors agree that more studies are required to determine the efficacy of these treatments (Han and Harrison, 1997:98). Thus an effective treatment is needed for myofascial pain syndrome as according to Schneider (1995); myofascial pain syndrome has become one of the most predominant soft tissue syndromes seen in the clinical practice today.

The purpose of this study is to determine the relative effectiveness of myofascial manipulation versus the ischaemic compression in the treatment of myofascial trigger points of the upper trapezius muscle in terms of objective and subjective clinical findings.

This study consisted of 60 patients, divided into 2 groups of 30 each. Every patient underwent a full case history, physical, and cervical regional examination in order to determine that they fitted the inclusion and exclusion criteria with respect to active subacute MFTP's.

Thereafter each patient was placed randomly into either the myofascial manipulation or ischaemic compression groups at random. Those patients that were in group A were in the myofascial manipulation group and those in

group B were in the ischaemic compression group. All patients then received 3 treatments and had 1 follow up consultation in a 3 week period.

At set intervals (prior to treatments 1, 2, 3 and at the follow up consultation) measurements where taken with the NRS, McGill pain questionnaire (subjective readings), CROM and algometer (objective readings).

Data were captured in MS Excel and exported into SPSS version 12 (SPSS inc. Chicago, Ill) for analysis.

Quantitative variables were checked for departure from normality using the skewness statistic. Repeated measures ANOVA was used to test three hypotheses simultaneously on each outcome measurement between the within-patients effects of time and the between-patients effects of treatment group:

1. The effect of time
2. The effect of group and

3. The time by group interaction (the treatment effect).

Profile plots of estimated marginal means were done for each outcome showing group by time to assist in interpretation of the ANOVA results.

Hypothesis testing decision rule: a two tailed p value of <0.05 was considered statistically significant.

The evaluation of these recordings showed that both treatments showed a statistical improvement in terms of subjective and objective clinical findings to a value of p=<0.001. There was no statistical difference between the 2 groups in the subjective data or the CROM readings of the objective data. There was however a statistical difference between the two groups in the algometer readings of the left upper trapezius (p=0.026) but not the right (p=0.3.45). As a mean average there was not a statistical difference (p=0.080) where a p value of less than 0.05 is significant.

It is therefore the researcher's conclusion that there is no statistical difference between the myofascial manipulation and the ischaemic compression groups in terms of subjective and objective findings for 3 treatments over a 3 week period for subacute trigger points of the Upper Trapezius muscle numbers 1 and 2.

In light of these findings the chiropractor might find it better to use myofascial manipulation as an effective treatment to the benefit of the patient as the treatment is faster in application and subjects the patient to less overall pain over a shorter period of time.

Furthermore that application of myofascial manipulation as a treatment places less stress on the practitioner for a shorter period of time allowing the practitioner to affect more treatments within one treatment session than could be applied with the utilisation of IC

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KEY

MM	- MYOFASCIAL MANIPULATION
IC	-ISCHAEMIC COMPRESSION
MFTP	- MYOFASCIAL TRIGGER POINT
CROM	- CERVICAL RANGE OF MOTION DEVISE
NRS	- NUMERICAL PAIN RATING SCALE

Abstract

Introduction

“Myofascial pain syndrome may be defined as the sensory, motor and autonomic symptoms caused by myofascial trigger points (MFTP), or the hyperirritable spots within skeletal muscles that are associated with palpable nodules in a taut band. These MFTP are extremely common and become a distressing part of nearly everyone’s life at one time or another.” (1)

Although a number of treatments have been proved to be effective in the treatment of MFTP including IC, MM has yet to be proved against any form of treatment that has been researched.

The purpose of this study was to investigate the relative effectiveness of IC and MM as two individual treatments for MFTP’s of the upper trapezius muscle in terms of subjective and objective clinical findings (and to find out if there is any difference between MM and IC).

Objective

Objective One:

The first objective of the study was to determine the effectiveness myofascial manipulation versus ischaemic compression in terms of objective clinical findings, for the treatment of myofascial pain syndrome.

The first hypothesis is that MM is more effective than IC in terms of objective clinical findings.

Objective Two:

The second objective of the study was to determine the effectiveness of MM and MM in terms of subjective clinical findings, for the treatment of myofascial pain syndrome.

The second hypothesis is that MM is more effective than IC in terms of subjective clinical findings.

Objective Three

The third objective was to determine patient responses to the two different forms of care (viz. myofascial manipulation and ischaemic compression).

The third hypothesis is that patients' responses are found to be more favourable with MM than with IC.

Study Design

This study was a comparative, randomised, clinical trial.

The purpose was to compare and evaluate the efficacy of myofascial manipulation to Ischaemic Compression, in terms of subjective and objective clinical findings, for the treatment of myofascial pain syndrome.

Methods

This study involved 60 patients divided into 2 groups of 30. Once accepted into the study, each patient was randomly assigned to a treatment group (A of

30 for the MM, or B of 30 for IC). This included selection by assigning consecutive patients who presented to the clinic into either Group A, Group B by means of drawing out of a hat.

With 4 consultations taking place, the first 3 consultations involved taking the readings (taken first), followed by the intervention. At the 4th consultation a final set of readings were taken for subjective and objective clinical findings. Then the patient was asked to complete a small questionnaire as to their impression of the study and their response to it.

Results

For NRS, Short Form Mcgill Pain Questionnaire and the CROM there was an overall significant decrease in scores over the 4 visits although there was no statistical difference between the groups, however the trends support greater improvement treatment effect.

Algometer readings on the left side showed a significant treatment effect in favour of the MM group since the IC group means started to decrease after visit 3. This was not significant on the right side, as well as when the average of the left and right sides was used, although the same trend was visible as the left side (and significant).

Conclusion

The results of this study show that there is no statistical difference between the MM and the IC groups in terms of subjective and objective findings for 3 treatments over a 3 week period for subacute trigger points of the Upper Trapezius muscle numbers 1 and 2.

Introduction

Myofascial pain syndrome may be defined as the sensory, motor and autonomic symptoms caused by myofascial trigger points (MFTP), or the hyperirritable spots within skeletal muscles that are associated with palpable nodules in a taut band. These MFTP's are extremely common and become a distressing part of nearly everyone's life at one time or another." (1)

In a comparative study between four treatment modalities: spray and stretch, moist heat packs, ultrasound and ischaemic compression. All four where found to be effective, but IC was found to be more effective than any other modality (2, 3). MM has yet to be proved against any form of treatment that has been researched.

In a study of 60 patients, it was found that myofascial manipulation was an effective treatment for MFTP's by reducing MFTP intensity and sensitivity in individuals with pain in the upper fibres of the trapezius and levator scapulae when compared to a placebo with a statistically significant p-value of 0.049. (4)

The differences in mechanism of action may be attributed to the two different mechanisms of stretch employed by the respective techniques:

- The static stretch by ischaemic compression would literally deform the muscle fibre, pulling apart the actin / myosin cross bridges restoring the muscle fibre to full length (5, 6).
- The dynamic stretch by myofascial manipulation will not only incorporate the stretch separating the actin / myosin filaments in the muscle fibre but it will also give a sudden barrage of nerve impulses to CNS (central nervous system) that will force the muscle to relax by toning down the impulses by the gamma nerves (7). This is supported by the definition of myofascial manipulation as a forceful passive movement of the musculo-

> fascial elements through their restrictive directions; in order to elicit a stretch reflex that will cause the active MFTP to release (8). Soft tissue manipulations (including myofascial manipulations and stretching and release methods) may therefore be used to restore mechanical function of the soft tissue, especially its elasticity and mobility relative to other tissue or tissue layers as well as restore neurological input. (9),

The purpose of this study was to investigate the relative effectiveness of ischaemic compression and myofascial manipulation as two individual treatments for MFTP's of the upper trapezius muscle in terms of subjective and objective clinical findings.

Methods

Sixty symptomatic female office workers gave written informed consent to participate in this study. All patients had MFTPs of the upper trapezius muscles. (see Appendix A for Demographic Data)

Study Protocol

Patients were assigned in a balanced randomised manner to either the MM or the IC group. All patients under went a full case history, physical examination, cervical regional in order to ensure that all patients met the required inclusion criteria.

The diagnosis of subacute MFTP's, were established by reproducing the pain referral patterns by manual palpation. Further evaluations were performed, and treatments were carried out post evaluation by the researcher.

There were 4 consultations over a period of a maximum of 3 weeks, with the intervention taking place in the first three consultations (1).

At the first 3 consultations (including the initial consultation) the readings were

taken first, followed by the intervention. At the 4th consultation a final set of readings were taken for subjective and objective clinical findings. Then the patient was asked to complete a small questionnaire as to their impression of the study and their response to it.

Measurement technique

a. Subjective measurements:

1. Short form McGill pain questionnaire (S-FMPQ), as this is easy to understand and quick to use and it provides information on the sensory, affective and overall intensity of pain. The S-FMPQ is an easy to understand and quick to use measurement of pain. It consists of 15 descriptors of pain, rated on an intensity scale as 0=none, 1=mild, 2=moderate or 3=severe, and it provides information on the sensory affective and overall intensity of pain. The S-FMPQ was chosen as a measurement for this study as it is sensitive, quick to administer and easy to understand by patients. On completion of the questionnaire, the points are added up to form a final maximum points out of 45 for each consultation. (10)

2. A Numerical pain rating scale was also used which asks the patient to rate their pain intensity on a numerical scale of 0 – 100. In a study comparing 6 methods on 75 chronic pain patients, the NRS was deemed the most practical index to use for its simplicity and easy to administer. The two scores were then added together and a mean average was to be obtained. The NRS is a scale that asks the patient to rate their pain intensity out of 100 where 0= the least amount of pain and 100= the most amount of pain. This is a practical index to use, as it is easy to administer and score. On completion of the scale, the mean score of the least and the worst was found by adding them together. (11, 12).

b. Objective measurements

1. Algometer readings were taken to measure changes in pressure pain threshold for each patient over the course of each of the research treatments. This form of measurement has been proven to be useful for the assessment of treatment results (13).

   The procedure was as follows

   - The dial on the gauge was set to zero.
   - The disc was placed on the point of maximum sensitivity
   - Pressure was increased at 1kg/cm2/sec
   - The patient was asked to indicate by saying “yes” at the point where the pain was first perceived.
   - The pressure was stopped at this point and a reading was taken.

2. CROM device, a cervical range of motion device with a magnetic yoke and gravity goniometers which measure the cervical range of motion in the frontal and sagittal planes. Previous research has concluded that inter tester and intra tester reliability using the CROM device were accurate to an intra class coefficient of greater than .80. In this research, due to the nature of the muscle to be tested, the upper trapezius (a lateral flexor of the cervical spine), only values for active range of motion were recorded before the start of each of the 3 treatments given and then a fourth recording was taken at the 4^{th} consultation. (14)

Qualitative data was collected at the final / follow – up visit

All patients will be asked the following questions on completion of the study:

- Pain experienced at each treatment.
- Apprehension before each treatment.
- Type of response to care.
- Overall experience of care.

Myofascial Trigger Point Palpation

MFTP 1 is located by pincer palpation of the free margin of the upper trapezius muscle, approximately midway between the spinous processes and the acromion, in the anterior fibres.

MFTP 2 is located close to MFTP1, but is slightly posterior and inferior, just caudal to the free border of the upper trapezius.

Group A received treatment in the form of MM

> The patient was placed in the side-lying position with the involved MFTP side up or in the seated position, with the involved side exposed appropriately. The choice was made according to where the restriction was presented at its highest level of pain and restriction in terms of subjective and objective clinical findings. Once located, the researcher used a firm reinforced index contact over the MFTP. Tissue slack was removed from the muscle by exerting pressure to the MFTP in the long axis direction of the muscle fibres. Once this was done, a high velocity, low amplitude thrust was given to the MFTP in the same direction. The same treatment was given at each treatment. (1)

Group B received treatment in the form of IC.

> The patient was placed in the side-lying position with the involved MFTP side up or in the seated position, with the involved side exposed appropriately. A steady even pressure using the thumb over a period of 7-10 seconds was applied to the MFTP. This was repeated two to three times. (15).

STATISTICS

Data were captured in MS Excel and exported into SPSS version 12 (SPSS inc. Chicago, Ill) for analysis.

Quantitative variables were checked for departure from normality using the skewness statistic. Repeated measures ANOVA was used to test three hypotheses simultaneously on each outcome measurement between the within-patients effects of time and the between-patients effects of treatment group:

1. The effect of time
2. The effect of group and
3. The time by group interaction (the treatment effect).

Profile plots of estimated marginal means were done for each outcome showing group by time to assist in interpretation of the ANOVA results.

Hypothesis testing decision rule: a two tailed p value of <0.05 was considered statistically significant.

RESULTS

(See appendix B for graphs and tables)

The evaluation of these recordings showed that both treatment groups improved in terms of subjective and objective clinical findings to a value of p=<0.001. There was no statistical difference between the 2 groups in the subjective data or the CROM readings of the objective data. There was however a statistical difference between the two groups in the algometer readings of the left upper trapezius (p=0.026) but not the right (p=0.3.45). As a mean average there was not a statistical difference (p=0.080) where a p value of less than 0.05 is significant.

It is therefore the researcher's conclusion that there is no statistical difference between the myofascial manipulation and the ischaemic compression groups in terms of subjective and objective findings for 3 treatments over a 3 week period for subacute trigger points of the Upper Trapezius muscle numbers 1 and 2.

Discussion

For the subjective measurements of NRS, McGill pain score and CROM, there was an overall significant improvement in scores over the 4 visits. There was however no statistical difference in treatment effect and both groups improved at the same rate statistically. However the trend was visible from the profile plots, that the IC group improved at a faster rate than the MM group due to a slow decrease in scores in the MM group between visits 2 and 3.

Algometer readings on the left side showed a significant treatment effect in favour of the MM group compared to the IC group. This was not significant on the right side, as well as when the average of the left and right sides was used, although the same trend was visible as the left side (and statistically significant).

Thus the MM treatment was not statistically superior or inferior to the IC treatment in terms of NRS and McGill pain rating scales and CROM, however the trends associated with these measures tend to indicate that there is a slant towards the support of the IC group faring better than the MM group. This could be related to the hypotheses based on the inflammatory reactions created by the MM through the course or treatment, as adhesions are broken.

However it must be noted that MM was significantly superior to IC for algometer measurements on the left side, but not significantly different on the right side or on the average of left and right sides. This could be related to the hypothesis that MM has a greater ability to decrease the effects of MFTP's through the dynamic stretch applied to the muscle, whereas the IC imparts a slow sustained stretch that has the ability to irritate MFTP's before resolution is affected.

Conclusion

It is therefore the researcher's conclusion that there is no statistical difference between the MM and the IC groups in terms of subjective and objective findings for 3 treatments over a 3 week period for subacute trigger points of the Upper Trapezius muscle numbers 1 and 2.

In light of these findings the chiropractor might find it better to use MM as an effective treatment to the benefit of the patient as the treatment is faster in application and subjects the patient to less overall pain over a shorter period of time.

Furthermore that application of MM as a treatment places less stress on the practitioner for a shorter period of time allowing the practitioner to affect more treatments within one treatment session than could be applied with the utilisation of IC.

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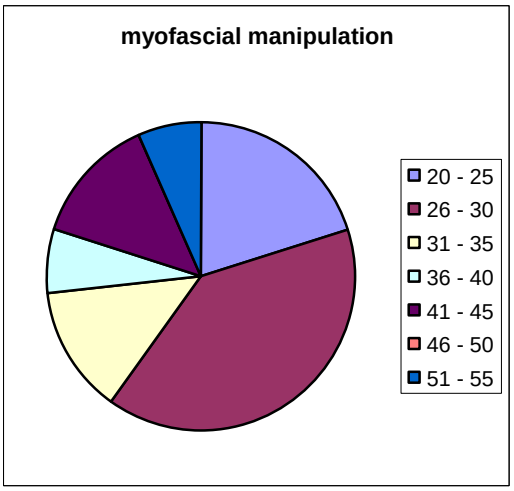
Tables and figures

Appendix A

TABLE 1: Age distribution

Age group	Group 1 Myofascial manipulation	Group 2 Ischaemic compression	Total % of patients
20 - 25	6	7	22
26 - 30	12	11	38
31 - 35	4	2	10
36 - 40	2	2	7
41 - 45	4	6	17
46 - 50	0	1	2
51 - 55	2	1	5



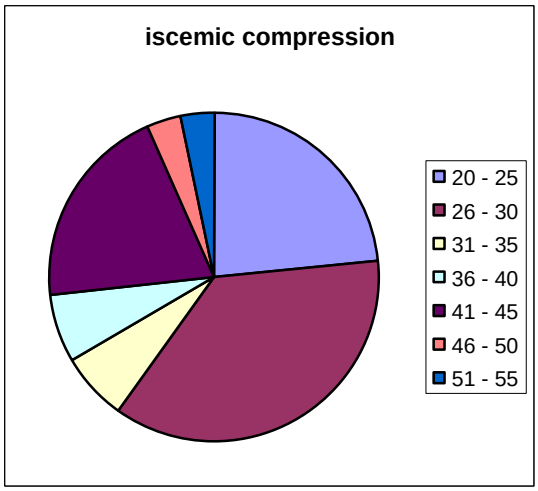


Figure 1.1. myofascial manipulation Age demographics

Figure 1.2 ischaemic compression. Age demographics

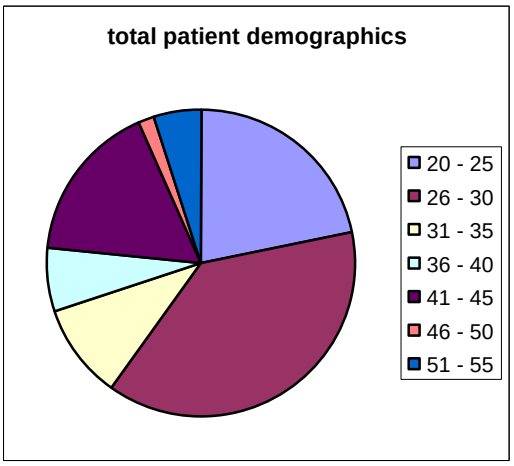
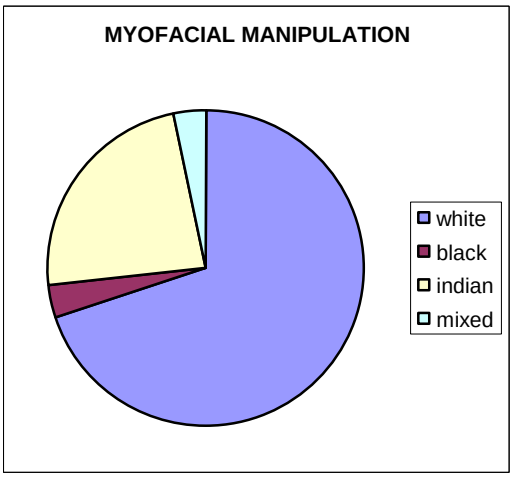


Figure 1.3. Total age demographics

TABLE 2: RACE DISTRIBUTION

RACE	Group 1 Myofascial manipulation	Group 2 ischaemic compression	Total % of patients
WHITE	21	14	58.3
BLACK	1	3	6.6
INDIAN	7	12	31.6
MIXED RACE	1	1	3.3



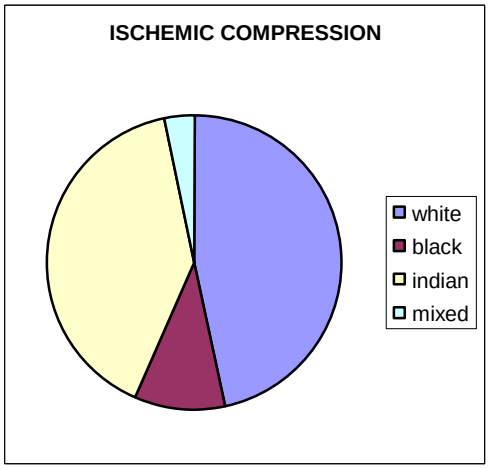


Figure 2.1

Figure 2.2

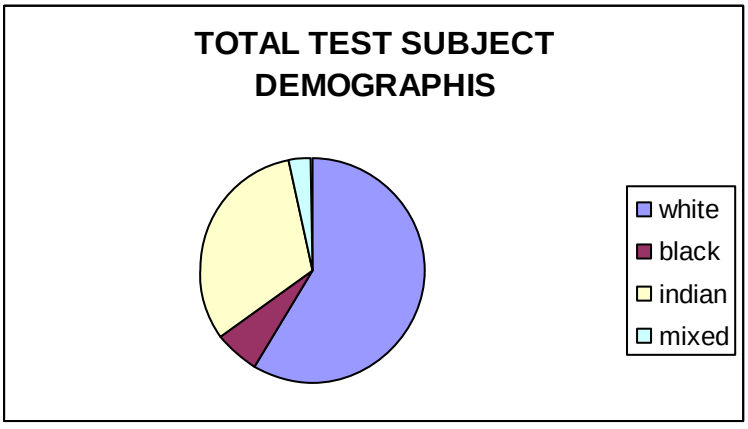


Figure 2.3

Appendix B

Table 1: Hypothesis tests for repeated measures ANOVA for NRS

Effect	Statistic	P value
Time	Wilks' lambda = 0.267	<0.001
Group	F= 0.098	0.755
Time*group	Wilks' lambda = 0.890	0.087

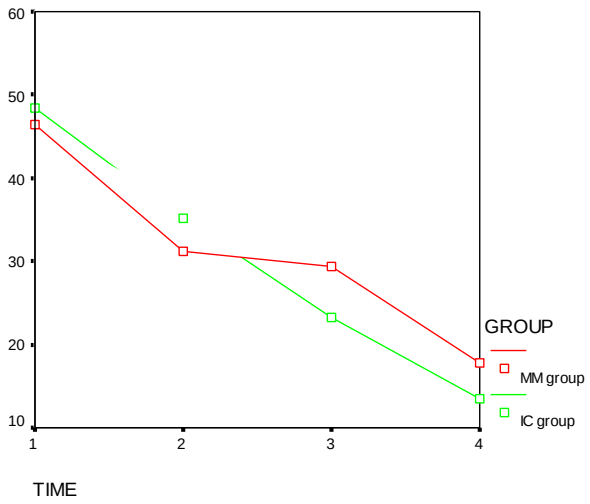


Figure 3: Profile plot of mean NRS by group over time

Table 2: Hypothesis tests for repeated measures ANOVA for McGill pain score

Effect	Statistic	P value
Time	Wilks' lambda = 0.275	<0.001
Group	F= 0.065	0.799
Time*group	Wilks' lambda = 0.915	0.170

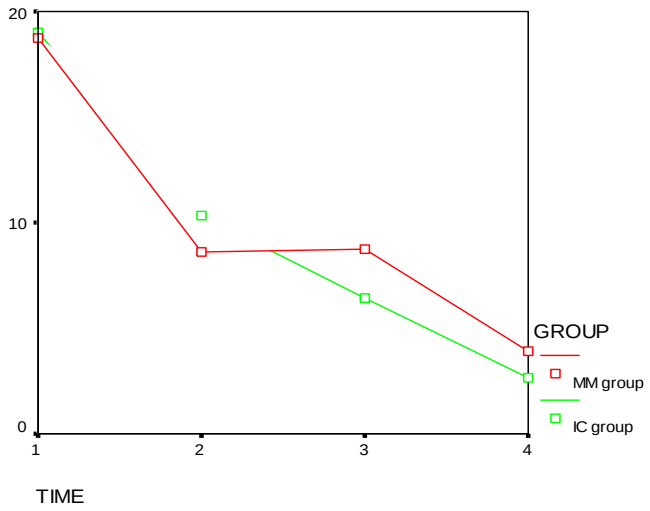


Figure 4: Profile plot of mean McGill score over time by group

Table 3: Hypothesis tests for repeated measures ANOVA for CROM left side

Effect	Statistic	P value
Time	Wilks' lambda = 0.405	<0.001
Group	F= 0.727	0.397
Time*group	Wilks' lambda = 0.947	0.377

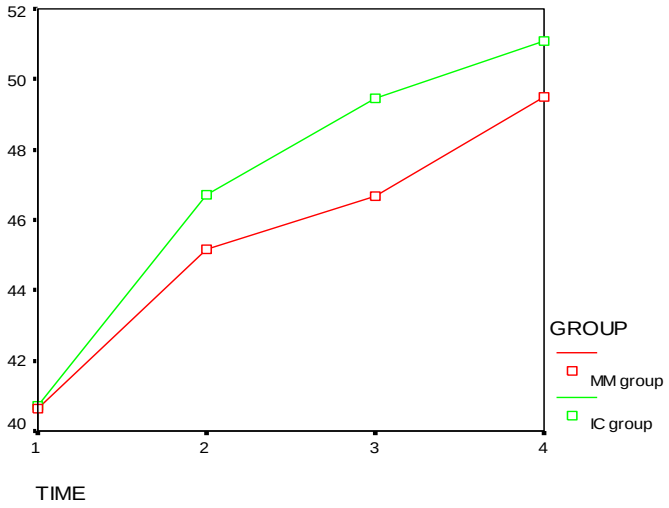


Figure 5.1: Profile plot of mean CROM left side by group over time

Table 4: Hypothesis tests for repeated measures ANOVA for CROM right side

Effect	Statistic	P value
Time	Wilks' lambda = 0.305	<0.001
Group	F= 0.700	0.406
Time*group	Wilks' lambda = 0.966	0.587

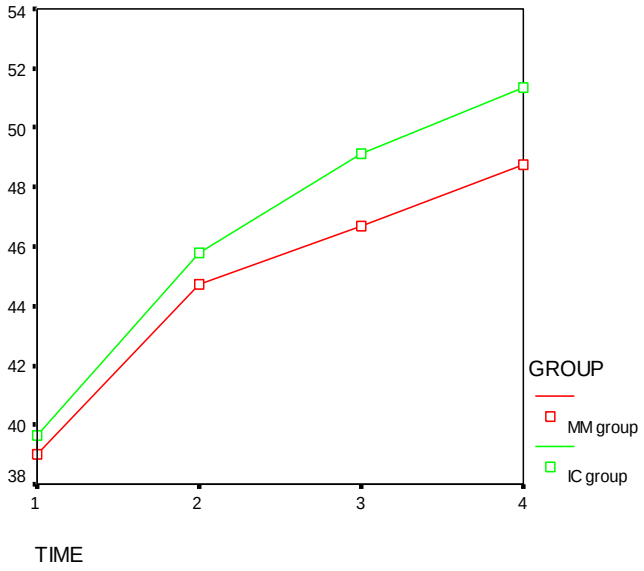


Figure 5.2: Profile plot of mean CROM right side by group over time

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Table 5: Hypothesis tests for repeated measures ANOVA for CROM (average of left and right sides)

Effect	Statistic	P value
Time	Wilks' lambda = 0.321	<0.001
Group	F= 0.783	0.380
Time*group	Wilks' lambda = 0.956	0.464

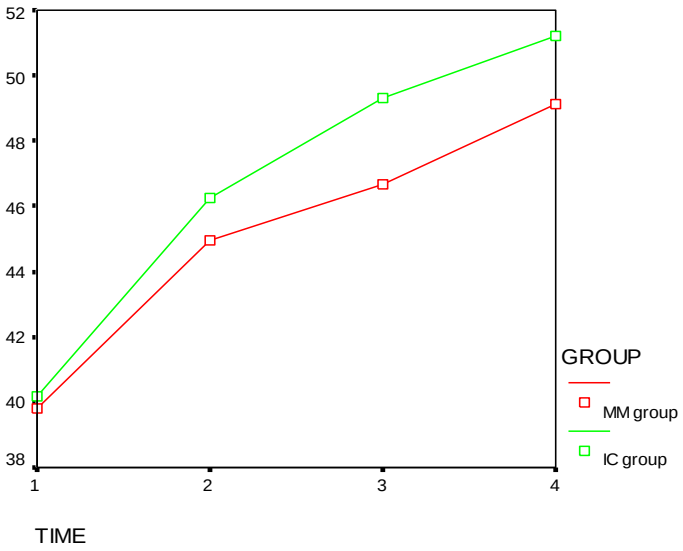


Figure 5.3: Profile plot of mean CROM (average of left and right sides) by group over time

Table 6: Hypothesis tests for repeated measures ANOVA for Algometer left side

Effect	Statistic	P value
Time	Wilks' lambda = 0.558	<0.001
Group	F= 0.538	0.466
Time*group	Wilks' lambda = 0.848	0.026

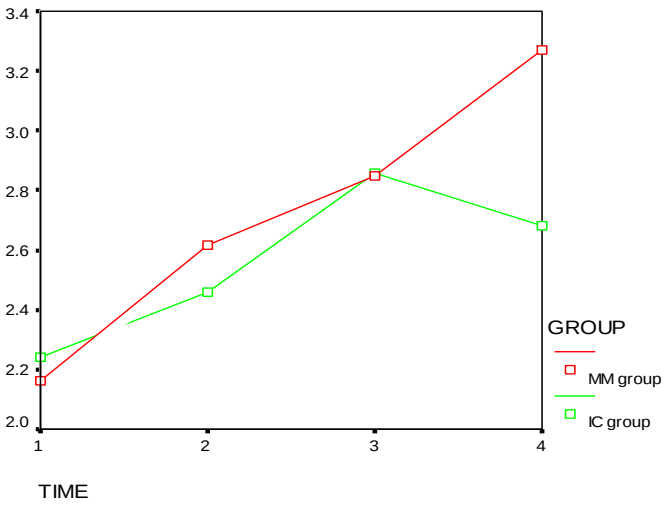


Figure 6.1: Profile plot of mean Algometer reading (left side) by group over time

Table 7: Hypothesis tests for repeated measures ANOVA for Algometer right side

Effect	Statistic	P value
Time	Wilks' lambda = 0.670	<0.001
Group	F= 0.072	0.789
Time*group	Wilks' lambda = 0.943	0.345

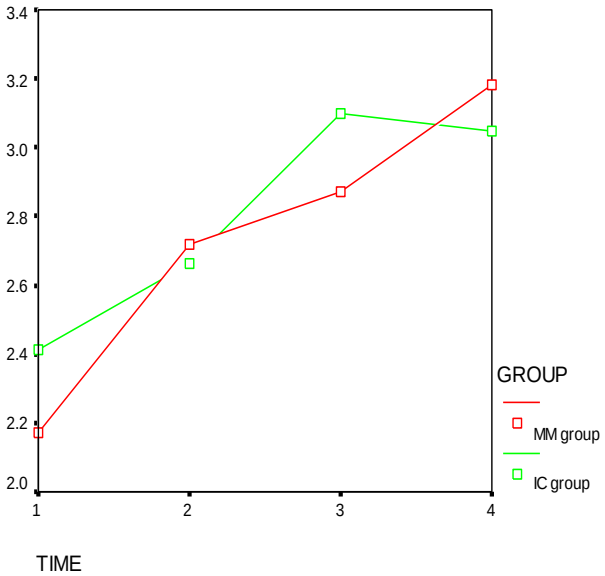


Figure 6.2: Profile plot of mean algometer readings (right side) by group over time

Table 8: Hypothesis tests for repeated measures ANOVA for Algometer (average of left and right sides)

Effect	Statistic	P value
Time	Wilks' lambda = 0.585	<0.001
Group	F= 0.039	0.843
Time*group	Wilks' lambda = 0.887	0.080

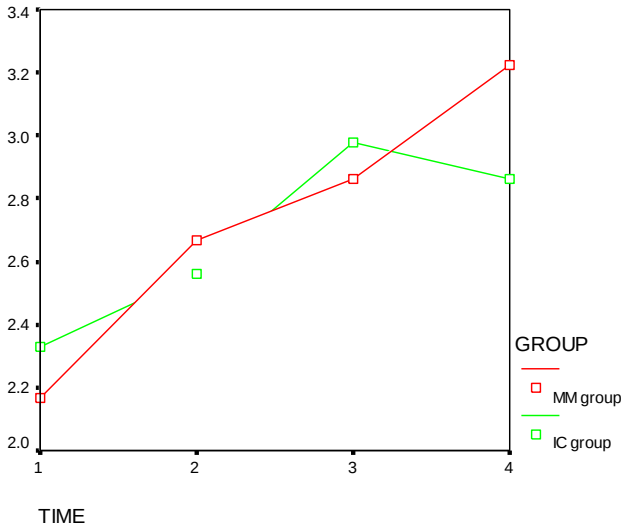


Figure 6.3: Profile plot of mean algometer reading (averaged right and left side) by group over time

Glossary

Myofascial trigger point (MFTP) is a discrete focal tenderness / highly localized and hyperirritable spot located in a palpable taut band of skeletal muscle, which produces a local twitch in response to snapping or palpation of the band, they are associated with regional referred pain, which is reproducible if manually compressed. MFTPs can be active or latent, depending on clinical characteristics (Hong and Simons 1998 and (Travell, Simons and Simons, 1999 1:19). Both active and latent MFTP develop as a result of the same factors, but at varying degrees (Travell, Simons and Simons, 1999 1:19) however the distinguishing characteristics of a myofascial trigger point is related degree of activity and its location within a taut band of muscle fibre or fascia (Kruse 1998).

Active MFTP has an area of tenderness at rest or on palpation, a taut band of muscle, a local twitch response and referred pain. A latent MFTP, which occurs more commonly, may display hypersensitivity and display all the characteristics of an active MFTP except that it is not associated with spontaneous pain. (Han and Harrison 1997)

Myofascial pain syndrome may be defined as the sensory, motor and autonomic symptoms caused by myofascial trigger points (MFTP), or the hyperirritable spots within skeletal muscles that are associated with palpable nodules in a taut band. MFTP are extremely common and become a distressing part of nearly everyone's life at one time or another (Travel Simons and Simons 1999 1:5, 12).

Chapter 1
Introduction

1.1 The problem and its setting

Myofascial pain syndrome is defined as the sensory, motor and autonomic symptoms caused by myofascial trigger points (MFTP's), or hyperirritable spots within skeletal muscles that are associated with palpable nodules in a taut band (Travell, Simons and Simons, 1999 1:5).

Treatments for this syndrome include, but are not limited to ischaemic compression, heat pack therapy, active range of motion, spray and stretch, tens therapy, interferential current therapy and myofascial release technique (Hou et al. 2002).

Despite this array of treatments available to a clinician, authors agree that more studies are required to determine the efficacy of these treatments (Han and Harrison, 1997:98). Thus an effective treatment is needed for myofascial pain syndrome as according to Schneider (1995); myofascial pain syndrome has become one of the most predominant soft tissue syndromes seen in the clinical practice today.

Therefore this study was formulated to assess the relative effectiveness of myofascial manipulation versus ischaemic compression in the treatment of myofascial trigger points of the upper trapezius muscles.

1.2 Aim of the study

The purpose of this study was to determine the relative effectiveness of myofascial

manipulation versus the ischaemic compression in the treatment of MFTP's of the upper trapezius muscle in terms of objective and subjective clinical findings.

Objective One:

The first objective of the study was to determine the effectiveness of myofascial manipulation versus ischaemic compression in terms of objective clinical findings, for the treatment of myofascial pain syndrome.

> The first hypothesis was that myofascial manipulation was more effective than ischaemic compression in terms of objective clinical findings.

Objective Two:

The second objective of the study was to determine the effectiveness of myofascial manipulation and ischaemic compression in terms of subjective clinical findings, for the treatment of myofascial pain syndrome.

> The second hypothesis was that myofascial manipulation was more effective than ischaemic compression in terms of subjective clinical findings.

Objective Three

The third objective was to determine patient responses to the two different forms of care (viz. myofascial manipulation and ischaemic compression).

> The third hypothesis was that patients' responses are found to be more favourable with myofascial manipulation than with ischaemic compression.

1.3 Need for a solution to the problem

In a comparative study by Hong (1993) between four treatment modalities: spray and stretch, moist heat packs, ultrasound and ischaemic compression. All four where found to be effective, but ischaemic compression was found to be more effective

than any other modality. However myofascial manipulation has only been researched against placebo (Walker 2002), and as a result there has been no research to evaluate myofascial manipulation against any another myofascial techniques, especially one that has been found to work well (Hains 2002).

1.4 Benefits of the study

It is hoped that this study will provide important information with regard to the efficacy of myofascial manipulation compared to ischaemic compression, as it would provide the chiropractor with a simple, effective, non-invasive and time saving treatment that is cost effective, for MFTP's in terms of pain relief and an increase in muscle range of motion.

In view of the fact that there is little information on myofascial manipulation, it is hoped that further studies will be conducted into the use of myofascial manipulation on other muscular and soft tissue conditions.

Chapter 2
Literature Review

2.1 Introduction

Myofascial Pain Syndrome is an extremely common condition presenting to primary health care practice (Hubbard, 1998:16) as patients often suffer significant levels of pain, which drives them to seek care (Schneider, 1996). Muscular pain is the most common work-related injury and the second most common cause of visits by patients to physicians (Hubbard, 1998:16).

2.2 Prevalence

In a review article written by Han and Harrison (1997:90) the incidence of myofascial pain syndrome is reported as high as 85% at certain American pain clinics. Han and Harrison (1997:90) also claim that American studies done at pain clinics indicate that the incidence of myofascial pain syndrome varies between 30% and 85%. Chaiamnuay et al (1998:1382) support this as they have found similar results in their study conducted in villages from rural Thailand where 2463 subjects were examined of which 36.2% had musculoskeletal pain with myofascial pain syndrome being the most common diagnosis. In a similar manner, Fishbain et al (1986:197) reported that of 283 consecutive admissions to a pain centre programme, myofascial trigger points (components of myofascial pain syndrome) were the primary cause of pain in 85% of cases.

2.3 Aetiology

According to Alvarez (2002) a lack of exercise, prolonged poor posture, vitamin deficiencies, sleep disturbances and joint problems may all predispose to the development of micro-trauma. Based on studies utilising spontaneous electrical activity (SEA) as a mechanism of recording activity within a MFTP region, Hong and Simons (1998) proposed an updated hypothetical mechanism of taut band formation. They proposed that intracellular calcium in certain muscle fibres may be excessively

released in response to trauma or abnormal stress. This would lead to an increase in metabolism and uncontrolled shortening of the muscle fibres. As a result of this there is an impairment of local blood perfusion, decreasing the amount of oxygen and nutrients to the area.

These two aspects:

-Release of calcium

-Reduced blood flow

Are thought to be responsible for creating a vicious cycle, which results in a local energy crisis and the formation of taut bands (Hong and Simons, 1998).

Furthermore, in the phase of excessive calcium release, it is thought that the transient contraction of this band of muscle fibres on compression or stimulation; is a local twitch response (Kruse, 1992).

Factors that are linked to the development of the myofascial pain syndrome are occupational or recreational activities that produce repetitive stress on a specific muscle or muscle group. One such example is that of chronic stress, activating the hypothesised cycle described above, leading to trigger points.

Rachlin (1994), as quoted by Alvarez (2002) adds the following to the above: holding a telephone receiver between shoulder and ear, prolonged bending over a table, sitting with poor back support, improper height of arm rest supports and moving heavy boxes. According to Sauter et al. (1991), Bergqvist et al. (1995) the following workstation component variables have been isolated as potential contributors to disorders:

-Screen distance, horizontal and vertical position.

-Keyboard and mouse vertical position and distance.

-Seat height and depth.

-Relative size of back support.

-Backrest inclination.

-Resting of the wrists whilst typing.

Where Hsieh (2000) classified the causes of myofascial pain syndrome as, or associated with acute or chronic repetitive trauma, (such as strain, sprain, contusion, poor posture, muscle overloading), lesions involving various structures, (such as tendonitis, bursitis synovitis, arthritis, intervertebral disc lesions), or emotional stress such as anxiety depression and somatization. Conditions believed to perpetuate or exacerbate the severity of myofascial pain syndrome, including biomechanical stress, nutritional inadequacies pharmaceutical tactics, metabolic and endocrine imbalance, chronic infections and psychological factors. (Chaitow and DeLany, 2002 1:45)

2.4 Clinical features

2.4.1 Symptoms

Patients with myofascial pain syndrome complain of regional persistent pain, most frequently located in the head, neck, shoulders, upper and the lower extremities and the back. The pain ranging from a mild ache to an excruciating pain, is either sharp or dull, and is often associated with general fatigue and a decreased range of motion and loss of muscle strength (Han and Harrison 1997).

Myofascial pain is often referred to a distant site from the MFTP, in a characteristic pattern for that muscle and sometimes patients are even aware of a numbness or paraesthesia rather than pain (Travell, Simons and Simons, 1999 1:20).

> In respect of this research the following referred pain patterns are applicable to the MFTP's located in the upper fibres of the trapezius muscle (Travell Simons and Simons, 1999 1:278).

Referred pain from MFTP 1 is ipsilateral to the MFTP and unilateral, along the posterior aspect of the neck to the mastoid process. When severe, this pain may extend to the side of the head and temple as well as the back of the orbit, it may include the angle of the jaw (Travell, Simons and Simons, 1999 1:278).

Whereas the referred pain from MFTP 2 lies in the same distribution as that of MFTP1, blending with and limited to its distribution behind the ear (Travell, Simons and Simons 1999 1:278).

In addition patients often complain of disturbed sleep as a result of myofascial pain syndrome, which can lead to a vicious cycle of increased pain sensitivity the following day (Travell, Simons and Simons 1999 1:21).

2.4.2 Signs

There are certain characteristics as recognised by Gerwin (1997), Travell, Simons and Simons (1999) and Hanten et al. (2000), which aid the clinician with evaluating the patient suffering with myofascial pain syndrome. These form part of a set of diagnostic criteria for myofascial pain syndrome, which is most suitably outlined by Schneider (1995):

To diagnose myofascial pain syndrome, all 5 major criteria should be present and at least 1 of the minor criteria.

Major criteria:

1. Regional pain complaint
2. Pain pattern follows a known distribution of muscular referred pain.
3. Palpable taut band (in accessible muscles).
4. Exquisite focal tenderness at one point or nodule within a taut band.
5. Some restricted range of motion or muscle weakness (when measurable).

Minor criteria:

1. Manual pressure on the MFTP nodule reproduces the chief pain complaint.
2. Snapping palpation of the taut band at the MFTP elicits a local twitch response.
3. Pain is diminished or eliminated by muscular treatment, e.g. therapeautic stretch, ischaemic compression or needle injection of the MFTP.

These criteria are principally assessed by palpation of the affected muscles. The application of a sustained deep pressure is the method used most frequently in the diagnosis of MFTP's. When MFTP's are palpated, the pain is either concentrated in the trigger point area or along that muscles distinct referral pattern, which is constant, reproducible, and does not follow a dermatomal or nerve distribution (Han and Harrison 1997)

2.5 Confirmatory diagnosis

The reliability and validity of the palpatory diagnosis has been confirmed by various techniques and according to Han and Harrison (1997) there has been confirmation with the technique of thermography. This is a non-invasive imaging technique, which detects the temperature distribution of the bodies' surface. Heat is detected and converted into a visual image. In myofascial pain syndrome it has been used to objectively detect active and latent trigger points, which appear as discoid shapes, 1.5 degrees Celsius higher in active, and 1 degree Celsius higher in latent trigger points compared to the corresponding areas on the opposite side of the body.

Another useful technique also used in identifying and confirming the presence of a MFTP is electromyography (EMG) which identifies trigger points by recording the continuous low amplitude action potentials, interrupted by high voltage spikes of electromyographic activity of trigger points within the muscles which are not found at other non-tender sites (Hong and Simons 1998:865)

Thus for the purposes of this research, the palpatory diagnosis had been utilised as the above techniques have validated the palpatory diagnosis as a reliable and valid method of patient assessment in respect of myofascial pain syndrome (Hsieh et al. 2000). Furthermore the application of the thermography and electromyography in this study was not possible based on the fact that this study was conceptualised in order to find a time effective, cheaper, more effective treatment for MFTP's for chiropractors in the field, which would not be complemented by the use of assessment modalities that do not conform to the same criteria.

2.6 Treatment

As a result of a vast amount of research, a large number of different treatments have been shown to be clinically effective in the treatment of MFTP. These treatments include amongst others

- Ischaemic compression (Mance, 1986 and Hanten, 2000),
- Myofascial manipulation (Nook, 2000 and Walker, 2002),
- Spray and stretch (Han and Harrison, 1997: 97),
- Ultrasound (Gam et al, 1998:73),
- Transcutaneous electrical nerve stimulation (Han and Harrison, 1997:97) and
- Dry needling (Lewit, 1979:90; Hong, 1994:256 and Alvarez, 2002:657).

Each of these treatment modalities have thus been classified according to their invasive or non-invasive nature.

Invasive

Invasive techniques are those that either penetrate the skin or body cavities which require and depend on a high level of skill from the practitioner:

- Dry needling (Lewit, 1979:90, Hong, 1994:256, Alvarez, 2002:657).
- Injection with anaesthetic (Travell, Simons and Simons, 1999)
- Injection with non-steroidal anti-inflammatory (Travell, Simons and Simons, 1999)
- Injection with steroidal anti-inflammatory (Travell, Simons and Simons, 1999)

Non invasive

In this category one finds

- Ischaemic compression (Mance, 1986 and Hanten, 2000),
- Myofascial manipulation (Nook, 2000 and Walker, 2002),
- Spray and stretch (Han and Harrison, 1997: 97),
- Ultrasound (Gam et al, 1998:73),
- Transcutaneous electrical nerve stimulation (Han and Harrison, 1997:97)

Manual methods are non-invasive and available to the patient to use at home with self-treatment; they may also be used to treat multiple MFTP's or more than one muscle group at a time. (Travell, Simons and Simons, 1999 1: 151).

Both invasive and non-invasive techniques should be available to the patient. Thus it can be seen that ischaemic compression and myofascial manipulation are therefore both classified as conservative forms of therapy, which are non-invasive therapies.

However even though they have been classed into the non-invasive category, there are differences in respect of the two interventions, which include (Schneider, 1996, Chaitow and Delany 2002, Walker 2002):

- The mechanism of application (viz. Duration of treatment application and manner).
- Pain and discomfort felt by the patient during the treatment application.
- The proposed changes at the muscular level with respect to how the intervention is applied.

These differences in mechanism of action may be attributed to the two different mechanisms of stretch employed by the respective techniques:

- The static stretch by ischaemic compression would literally deform the muscle fibre, pulling apart the actin / myosin cross bridges restoring the muscle fibre to full length (Manse et al, 1986 and Schneider, 1996).
- The dynamic stretch by myofascial manipulation will not only incorporate the stretch separating the actin / myosin filaments in the muscle fibre but it will also give a sudden barrage of nerve impulses to CNS (central nervous system) that will force the muscle to relax by toning down the impulses by the gamma nerves (Korr, 1975 as cited in Leach, 1994). This is supported by the definition of myofascial manipulation as a forceful passive movement of the musculo-fascial elements through their restrictive directions; in order to elicit a stretch reflex that will cause the active MFTP to release (Hertling and Kessler 1996). According to Cantu et al. (1996), soft tissue manipulations

(including myofascial manipulations and stretching and release methods) may therefore be used to restore mechanical function of the soft tissue, especially its elasticity and mobility relative to other tissue or tissue layers as well as restore neurological input.

However these two mechanisms are still hypotheses of action and may not necessarily be linked to clinical improvement, yet lends credence to the hypothesis that myofascial manipulation could be more effective than ischaemic compression, principally due to the decreased time period of discomfort felt by the patient and the two-pronged mechanism of action, which are thought to achieve improved clinical effectiveness.

This hypothesis is supported by a recent study by Walker (2000:90) on the effectiveness of myofascial manipulation, where a group of 60 patients, all of whom were diagnosed with active MFTP, were randomly split into 2 equal groups with 1 group receiving treatment (myofascial manipulation) and the other group a placebo treatment (detuned ultrasound). Each patient received 4 treatments over a maximum of 3 weeks. Evaluation of the statistical results ($p=0.049$) showed that the treatment group responded favourably (although not highly significantly) in terms of subjective and objective clinical findings and that myofascial manipulation was an effective treatment of active MFTP of myofascial pain syndrome.

Therefore this study aims to determine which of the two treatment protocols, myofascial manipulation and ischaemic compression is more effective than the other in terms of objective and subjective clinical findings.

Chapter3

Research Design and Methods

3.1 Study Design:

This study was a comparative, randomised, clinical trial.

The purpose was to compare and evaluate the efficacy of myofascial manipulation, in terms of subjective and objective clinical findings, for the treatment of myofascial pain syndrome.

3.2 Advertising:

Patients were obtained via advertising in the form of pamphlets and posters (see Appendix A), which were placed in public places such as gyms and public libraries, or by referrals.

3.3 Sample selection;

As a result of the advertising process, a non-probability convenience sampling technique is applied to this study.

3.4 Sample size:

This study involved 60 patients divided into 2 groups. There were 30 patients in group A and 30 patients in group B.

3.5 Sample allocation:

Once accepted into the study, each patient was randomly assigned to a treatment

group (either group A for the myofascial manipulation, or group B for ischaemic compression). This included selection by assigning consecutive patients who presented to the clinic into either Group A or Group B by means of drawing out of a hat.

3.6 Research - Patient procedure

- **Telephonic interview:**

Patients were required to initially contact the chiropractic department telephonically in order to find out if they met the study requirements.

Telephonically they were asked:

- Their age.
- Gender.
- What their daily activities in work and social environments were.
- How they came to have their neck pain.
- How long they have had their pain for.
- Questions pertaining to the exclusion criteria.

If they meet the inclusion criteria they were told briefly what the study is about and what was required of them. They were also told that should they enter the program there was also an incentive of 2 free follow up treatments after the conclusion of the study.

- **Patient assessment:**

Once patients met the telephonic requirements, the prospective patients were invited to attend a consultation at the Chiropractic Clinic, where they were screened to determine if they met the studies inclusion criteria. This was achieved if a positive diagnosis of myofascial pain syndrome of the upper trapezius muscles was made by the researcher based a case history (APPENDIX A), physical examination (APPENDIX B) and regional examination (APPENDIX C) of the upper back and neck musculature in order to determine if they were eligible for the study. The patients then had to read the letter of information and

then sign the letter of consent before they were allowed to participate.

The assessment ensured that the patient was accepted into the study on the basis of the following criteria:

3.7 Inclusion and exclusion criteria

A. Inclusion Criteria:

- Female secretaries, Personal Assistants and receptionists between the ages of 20 and 55 years,

  In respect of age:

  In a group of 60 patients treated for myofascial pain, Chettier (2001), found that 52% were aged 32-55 and 43% were aged 20-31 showing that the ages 20-55 have the greatest numbers of the population that suffer from MFTP. According to Travell, Simons and Simons (1999 1:12) patients in their mature years (up to 55 years) are most likely to suffer from the pain syndromes of active MFTP. These statistics would support the current age group limits set for this study.

  In respect of occupation:

  Rachlin (1994), as quoted by Alvarez (2002) add the following to the above: holding a telephone receiver between shoulder and ear, prolonged bending over a table, sitting with poor back support, improper height of arm rest supports and moving heavy boxes. This is supported by Travell, Simons and Simons (1999) and lends support to the selection of secretaries, personal assistants and receptionists for this study, as the factors mentioned above are similar in all the occupational groupings. Furthermore this improves the sample homogeneity (Mouton, 1996).

  In respect of gender:

  According to Han and Harrison (1997), the incidence of trigger points is higher in women than in men, which correlates well with the occupational groupings that where chosen for the study as most secretaries, personal assistants and

receptionists are females.

- A positive diagnosis of subacute myofascial pain syndrome of the upper trapezius.

  Myofascial pain syndrome from onset to 3-5 days is considered as acute and myofascial pain syndrome will be 2-3 months is considered as chronic, therefore this was the range for the treatment of neck pain (Schneider, 1996 and Vizniak, 2003). This time range was to avoid the potential co-existence of myofascial pain dysfunction and fibromyalgia, which is diagnosable after a 3-month period. Therefore any time between 1 week and 2-3 months is considered subacute for this research (Schneider, 1996).

- Patients that are willing to and sign the informed consent form for voluntary participation.

B. Exclusion Criteria:

- Patients exhibiting any of the following contra-indications to myofascial manipulation according to Walker (2002) and Nook (1998:43):
  - Vascular compromise
  - Anticoagulant use and Hemophiliacs
  - Severe diabetes (with peripheral neuropathy)
  - Sensory deficit

  Also to be excluded are patients who exhibit any of the contra indications to massage and massage type therapies which include (Basmajian, 1985: 284 - 285):
  - Infection due to bacterial action
  - Rheumatoid, infective or gouty arthritis
  - Bursitis and calcification in soft tissue structures
  - Patients on anti-coagulant therapy
  - Patients using analgesics and anti-inflammatory drugs
  - Fractures, dislocations or bone tumours

- Patients diagnosed with fibromyalgia as diagnosed by the criteria according to Schneider (1995):
  a) A history of widespread pain for at least 3 months (pain on both sides of the body and above and below the waist.)
  b) Pain in 11 of 18 tender point sites on digital palpation.

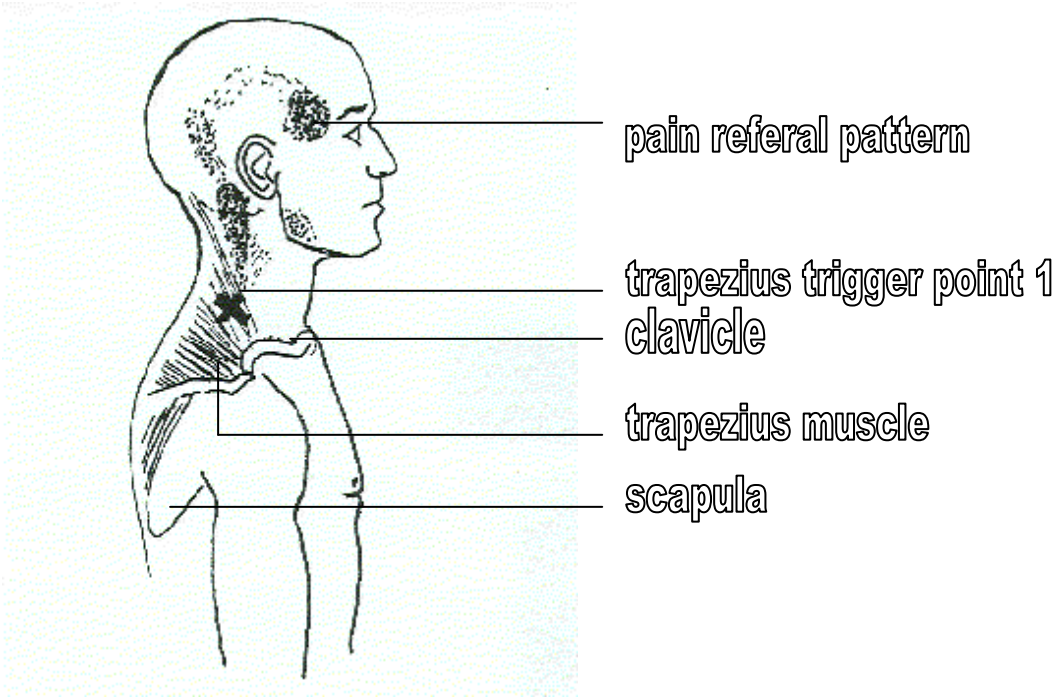
- Further exclusion criteria were patients who were already receiving medical, physical or other treatment pertaining to their neck pain, as well as patients who were unwilling to give informed consent. (APPENDIX I).

3.8 Location and diagnosis of the MFTP's of the Upper Trapezius Muscle

Travell, Simons and Simons (1999 1:278) discuss two main regions for the presence of MFTP's, as found in the upper trapezius muscle fibres, namely MFTP 1 and MFTP 2.

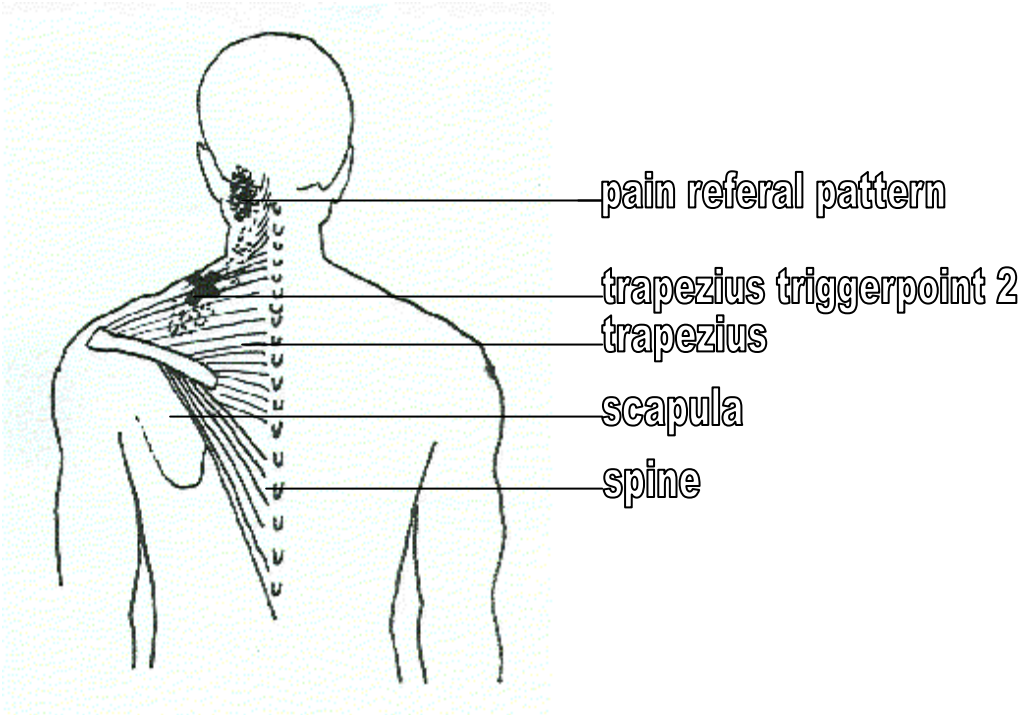
MFTP 1 is located by pincer palpation of the free margin of the upper trapezius muscle, approximately midway between the spinous processes and the acromion, in the anterior fibres.

Referred pain from this MFTP is unilateral, along the posterior aspect of the neck to the mastoid process. When severe, this pain may extend to the side of the head and temple as well as the back of the orbit, it may include the angle of the jaw. It is a common cause of tension neck ache and temporal headaches (Travell, Simons and Simons, 1999 1:278).



MFTP 2 is located close to MFTP1, but is slightly posterior and inferior, just caudal to the free border of the upper trapezius.

Palpation of this trigger point is performed in a similar manner as for MFTP1, but larger patients may require flat palpation. Referred pain from this MFTP also lies posterior to that of MFTP1, blending with its distribution behind the ear (Travell, Simons and Simons 1999 1:278).



In addition to the location and the referred pain pattern, the following criteria where utilised in order to determine the presence of the above MFTP's, with the requirement that the patient had all 5 of the major criteria and at least 1 of the minor criteria according to the classification by Schneider (1995):

Major criteria:

1. Regional pain complaint.
2. Pain pattern follows a known distribution of muscular referred pain.
3. Palpable taut band (in accessible muscles).
4. Exquisite focal tenderness at one point or nodule within a taut band.
5. Some restricted range of motion or muscle weakness (when measurable).

Minor criteria:

1. Manual pressure on the MFTP nodule reproduces the chief pain complaint.
2. Snapping palpation of the taut band at the MFTP elicits a local twitch response.
3. Pain is diminished or eliminated by muscular treatment, e.g. therapeutic stretch, ischaemic compression or needle injection of the MFTP.

3.9 Interventions:

Group A received treatment in the form of myofascial manipulation as prescribed by Walker (2002):

The patient was placed in the side-lying position with the involved MFTP side up or in the seated position, with the involved side exposed appropriately. The choice was made according to where the restriction was presented at its

highest level of pain and restriction in terms of subjective and objective clinical findings. The location of the MFTP was determined by flat or pincer palpation as described by Travell, Simons and Simons, (1999). Once located, the researcher used a firm reinforced index contact over the MFTP. Tissue slack was removed from the muscle by exerting pressure to the MFTP in the long axis direction of the muscle fibres. Once this was done, a high velocity, low amplitude thrust was given to the MFTP in the same direction. The same treatment was given at each treatment.

Group B received treatment in the form of ischaemic compression.

The patient was placed in the side-lying position with the involved MFTP side up or in the seated position, with the involved side exposed appropriately. The location of the MFTP was determined by flat or pincer palpation as described by Travell, Simons and Simons, (1999). Once located, treatment was given as prescribed by Hains (2002). A steady even pressure using the thumb over a period of 7-10 seconds was applied to the MFTP. This was repeated two to three times at successfully deeper levels (Schneider, 1996). According to Hains (2002), excessive pressure or holding pressure for long periods of time may cause the patient to become bruised.

3.10 Intervention frequency

There were 4 consultations over a period of a maximum of 3 weeks as outlined by Walker (2002:34) with the intervention taking place in the first three consultations.

At the first 3 consultations (including the initial consultation) the readings were taken first, followed by the intervention. At the 4th consultation a final set of readings were taken for subjective and objective clinical findings. Then the patient was asked to fill out a small questionnaire as to their impression of the study and their response to it.

3.11 Measurement tools:

Qualitative data:

a. Subjective measurements:

1. Short form McGill pain questionnaire (APPENDIX D), as this is easy to understand and quick to use and it provides information on the sensory, affective and overall intensity of pain according to Melzack (1987:191). The S-FMPQ is an easy to understand and quick to use measurement of pain (Melzack, 1987:191). It consists of 15 descriptors of pain, rated on an intensity scale as 0=none, 1=mild, 2=moderate or 3=severe, and it provides information on the sensory affective and overall intensity of pain (Melzack, 1987:191). The S-FMPQ was chosen as a measurement for this study as it is sensitive, quick to administer and easy to understand by patients. On completion of the questionnaire, the points are added up to form a final maximum points out of 45 for each consultation.

2. A Numerical pain rating scale (APPENDIX E) was also used which asks the patient to rate their pain intensity on a numerical scale of 0 – 100. In a study of by Jenson et al. (1986), comparing 6 methods on 75 chronic pain patients, the NRS was deemed the most practical index to use for its simplicity and easy to administer. The two scores were then added together and a mean average was to be obtained. The NRS is a scale that asks the patient to rate their pain intensity out of 100 where 0= the least amount of pain and 100= the most amount of pain. This is a practical index to use, as it is easy to administer and score (Jenson, Karoly and Braver, 1986). On completion of the scale, the mean score of the least and the worst was found by adding them together.

b. Objective measurements

1. Algometer readings (APPENDIX F) were taken to measure changes in pressure pain threshold for each patient over the course of each of the research treatments. This form of measurement has been proven to be

useful for the assessment of treatment results (Fischer, 1987:207).

The procedure according to Fischer (1986):

- The dial on the gauge was set to zero.
- The disc was placed on the point of maximum sensitivity.
- Pressure was increased at 1kg/cm2/sec.
- The patient was asked to indicate by saying “yes” at the point where the pain was first perceived.
- The pressure was stopped at this point and a reading was taken.

According to Reeves et al. (1986), as quoted by Han and Harrison (1997), pressure algometry is a diagnostic tool used to quantify the pressure pain threshold for each patient over the course of each treatment. This is the measurement of minimum pressure that induces pain, which is useful in the assessment of the results and is a reliable tool for quantifying MFTP sensitivity (Reeves et al. 1986, Fischer 1987 and Han and Harrison 1997).

Algometer readings were taken to measure changes in pressure pain threshold for each patient over the course of research treatments. This form of measurement has been proven to be useful for the assessment of treatment results (Fischer 1987:207)

2. CROM device (APPENDIX G), a cervical range of motion device with a magnetic yoke and gravity goniometers which measure the cervical range of motion in the frontal and sagittal planes. Research by Youdas et al. (1992), concluded that after testing 337 subjects that inter tester and intra tester reliability using the CROM device were accurate to an intra class coefficient of greater than .80. In this research, due to the nature of the muscle to be tested, the upper trapezius (a lateral flexor of the cervical spine), only values for active range of motion were recorded before the start of each of the 3 treatments given and then a fourth recording was taken at the 4th consultation.

3.12 Qualitative data was collected at the final / follow – up visit.

All patients will be asked the following questions on completion of the study:

- Pain experienced at each treatment.
- Apprehension before each treatment.
- Type of response to care.
- Overall experience of care.

3.13 Measurement frequency:

Measurements (both subjective and objective) of the patients were taken prior to each of the three treatments and at the fourth follow up.

3.14 Statistical analysis

Data were captured in MS Excel and exported into SPSS version 12 (SPSS inc. Chicago, Ill) for analysis.

Quantitative variables were checked for departure from normality using the skewness statistic. Repeated measures ANOVA was used to test three hypotheses simultaneously on each outcome measurement between the within-patients effects of time and the between-patients effects of treatment group:

1. The effect of time
2. The effect of group and
3. The time by group interaction. (The treatment effect).

Profile plots of estimated marginal means were done for each outcome showing group by time to assist in interpretation of the ANOVA results.

Hypothesis testing decision rule: a two tailed p value of <0.05 was considered statistically significant.

CHAPTER 4

STATISTICAL ANALYSIS

4.1 INTRODUCTION

This chapter tabulates the results obtained from the statistical analysis of the primary data collected over the duration of the research programme. The measurement criteria included:

- Numerical pain rating scale 101
- Short form McGill questionnaire
- Algometer readings
- Cervical range of motion device

Key

MM	- myofascial manipulation
IC	- ischaemic compression
CROM	- cervical range of motion
NRS	- numerical pain rating scale
SFMQ	- short form McGill pain questionnaire
MFTP	- Myofascial Trigger Point

4.2 CRITERIA FOR GOVERNING THE ADMISSABLITY OFTHE DATA

The data collected was only used from those patients that met the research criteria and who remained in the program for the full duration of the study. Only the objective data (algometer and CROM) that was recorded by the researcher was utilized. Only subjective data (NRS and SFMQ) that was completed by the patients under the supervision of the researcher was utilized.

4.3 DEMOGRAPHIC DATA

Only females between the ages of 20 and 55 who worked in an office as secretaries or their particular companies equivalent took part in this research.

TABLE 1: Age distribution

Age Group	Group 1 Myofascial manipulation	Group 2 Ischaemic compression	Total % of patients
20 - 25	6	7	22
26 - 30	12	11	38
31 - 35	4	2	10
36 - 40	2	2	7
41 - 45	4	6	17
46 - 50	0	1	2
51 - 55	2	1	5

Bland (1994) reports that working individuals between 25 and 29 years of age have a 25% to 30% incidence of one or more attacks of neck pain, this figure rising to 50% for those over 45 years of age.

Significant correlation between older age and neck and shoulder disorders has been established in previous studies (Bergqvist et al, 1995:a; Fredriksson et al, 2000 and Gerr et al, 2002).

According to the health based decision model; young staff may be more healthy than senior staff, they may therefore choose to stay at work even when neck pain is provoked, and will stop only when pain becomes intolerable. On the other hand older staff may be less healthy and more concerned about their health. They may stop work before or at the onset of pain. Therefore there may be more young staff with neck pain at work (Krause et al. 1997).

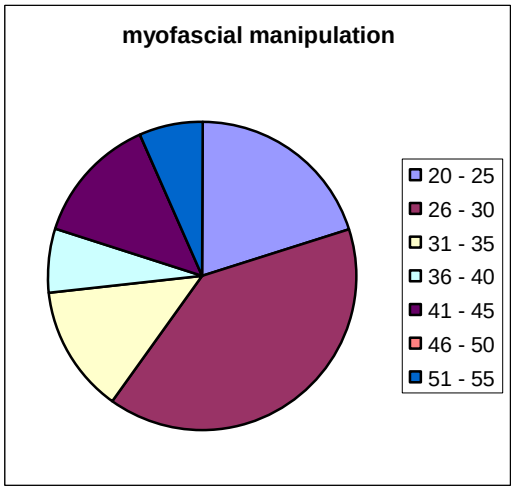


Figure 1.1. myofascial manipulation Age demographics

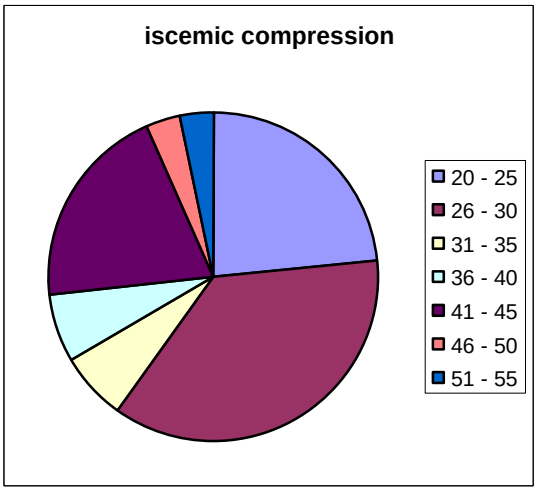


Figure 1.2. Ischaemic compression Age demographics

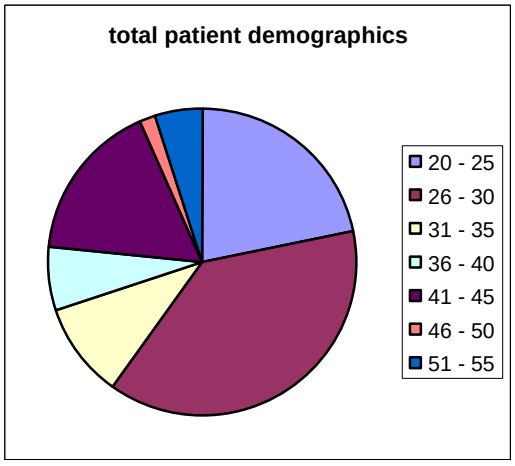


Figure 1.3. Total age demographics

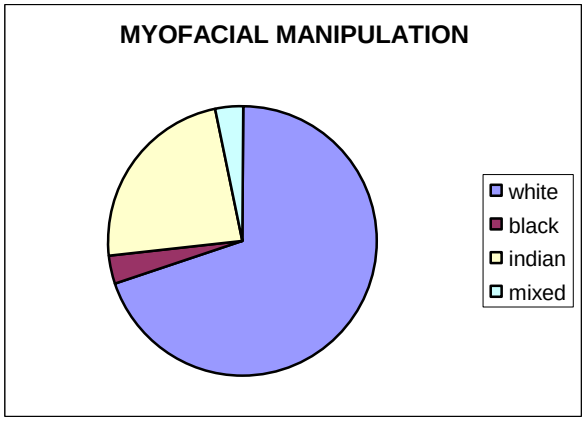
TABLE 2: ETHNIC DISTRIBUTION

RACE	Group 1 Myofascial manipulation	Group 2 ischaemic compression	Total % of patients
WHITE	21	14	58.3
BLACK	1	3	6.6
INDIAN	7	12	31.6
MIXED RACE	1	1	3.3

The research study was not a true reflection of the demographic representation of South Africa's population, as there where only four black patients who took part in the study who needed to have explained to them what chiropractic was. There is a need to educate parts of our society so that all may benefit in that part of health care that chiropractic provides.

Factors that could have affected the study based in the ethnic demographics were those patients that come from different cultures and first languages who's perception of pain was different to that of what was asked, which leads to a difference in their perception of the treatment given (Melzack, 1975).

Figures for the ethnic participation in this study:



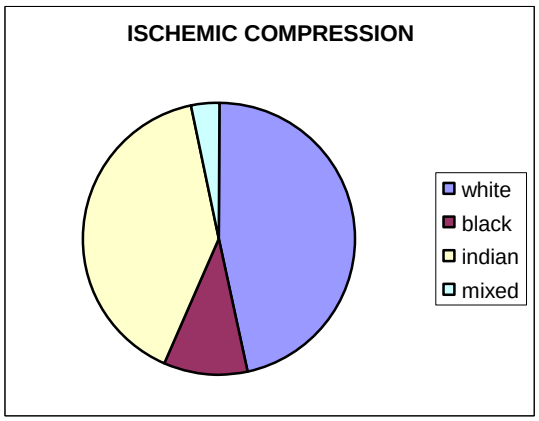


Figure 2.1 **Figure 2.2**

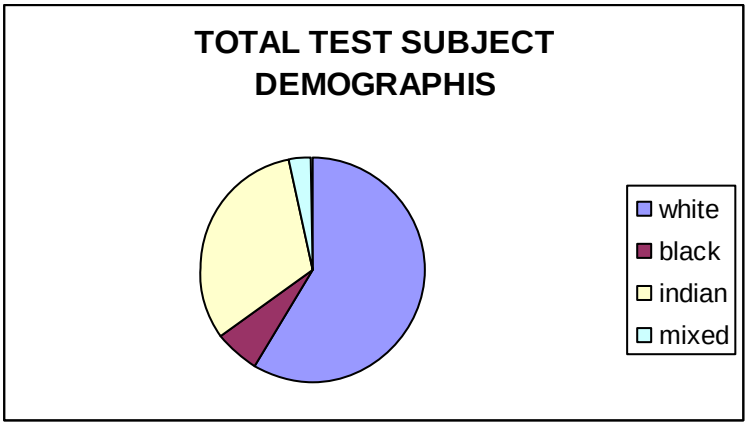


Figure 2.3

4.4 NRS

An average of the worst and least pain NRS at each time point was used as the outcome measure. The results of the repeated measures ANOVA is shown in Table 1. There was a significant effect of time overall in both groups ($p < 0.001$). This means that both groups mean NRS changed significantly over time. Examination of Figure 1 shows that this was a decrease in NRS score over time in both groups. The effect of group was not significant ($p = 0.755$). This means that at all time points the difference between the groups, means for NRS were not significant (i.e. the points were coincident). This can also be seen in Figure 3 since there was not a large difference between the group means at any time point. Finally, there was a non-

significant interaction between time and group (p = 0.087). This means that the groups did not change at different rates over time. If the interaction were significant, it would be an indication of a treatment effect. An interaction can usually be seen graphically by lines that cross over. In Figure 3 the lines of the 2 groups do cross over between visit 2 and 3, but not significantly (they are still going in the same direction). Thus both groups showed a significant decrease in NRS score over time, and there was no difference in this rate of decrease over time between the groups, although the rate appears steeper in the IC group than the MM group.

Table 1: Hypothesis tests for repeated measures ANOVA for NRS

Effect	Statistic	P value
Time	Wilks' lambda = 0.267	<0.001
Group	F= 0.098	0.755
Time*group	Wilks' lambda = 0.890	0.087

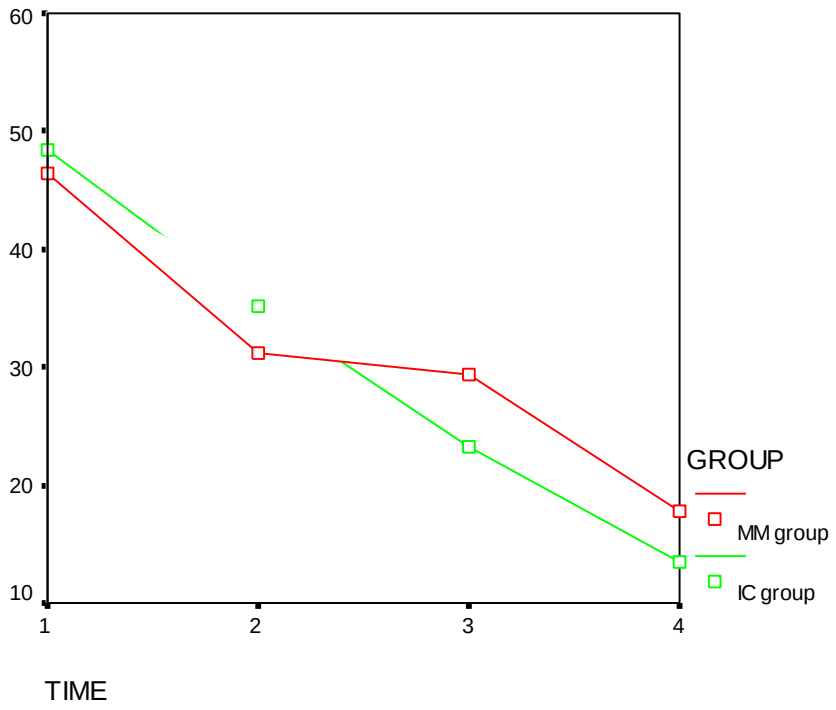


Figure 3: Profile plot of mean NRS by group over time

The above graph and significant readings indicate that one of the following hypotheses could be relevant:

1. That the treatment as applied over the respective muscles was the source of muscle tenderness / muscle soreness in both groups, yet this decreased over time as reported by the patients long before the following treatment (i.e. same day resolution), thus resulting in improvement in both groups before the next treatment. This however does not explain the differences between the 2 groups.

2. It was hypothesised in chapter 2 myofascial manipulation would involve a greater element of stretch (dynamic stretch) as opposed to the ischaemic compression (static stretch), (Korr, 1975 as cited in Leach, 1994). However this is not supported by the changes in the two groups as noted above, since the ischaemic compression group improves faster and more consistently than the myofascial manipulation group.

Thus it would seem that the treatment effects are not responsible for the differences seen in the two groups. Therefore an analysis supports a mechanism that is related either to the patient presentation, the mechanism of treatment delivery or factors that where not taken into account in this study.

In respect of the patient presentation, there seems to be very little difference in the age range between the two groups where the average age is fairly similar. The demographics, although not similar in some respects, do show a fairly consistent spread. Furthermore, the effects of the patient demographics, is limited in respect of the CROM readings where the subject is unable to influence the results.

In respect of the mechanism of treatment delivery, the researcher hypothesised that the following could have had an effect on the results obtained:

a. The ischaemic compression as applied to the patient followed a progression from light pressure to deep pressure over a period of 30 seconds at each treatment (Travell, Simons and Simons 1999 1:8), therefore allowing for the treatment of both more superficial muscle involvement as well as deep within the course of one visit.

b. On the reverse side the myofascial manipulation group seemed to have experienced the myofascial manipulation as follows:

1. Treatment one involved the application of a superficial force (as indicated in chapter 3) over the tender muscle. This force would only have been able to break superficial adhesions by virtue of the force applied.
2. At treatment two the patient would have had some pain and reactive inflammation as a residue from the previous treatment. This trauma would inevitably cause edema leading to the degranulation of mast cells and the release of heparin and histamine both of which encourage muccopolysaccharide deposits and fibrobastic activity respectively, (Chaitow and Delany, 2002 1:86), generally between 48 and 72 hours before. This would have hindered the depth by which the second myofascial manipulation could have been applied. In addition to this, the development of new adhesions from the induced swelling would have had to be addressed with this treatment as well. This would therefore account for the decreased in the rate of improvement between visits 2 and 3.
3. At treatment 3, due to the resolution of the initial swelling and the relatively decreased effect of treatment 2, treatment 3 would have been able to address deeper adhesions as the researcher was able to access the deeper adhesions within the same muscle. As a result of this the patient improvement would have reflected a similar pattern to treatment one.

This hypothesis would best have been supported by treatments and readings that continued into the following cycle (i.e. a treatment 4 and 5, with a follow up at 6), if the assumptions and hypotheses above were to have been conclusive.

4.5 McGill PAIN QUESTIONNAIRE

Similarly with McGill pain score, there was a significant effect of time overall (p<0.001) but no group effect (p =0.799), nor time by group interaction (p = 0.170). As with the NRS score, the lines of the 2 groups do cross between visit 2 and 3 but not significantly. The rate of decrease in McGill score was slightly steeper in the IC group than the MM group although the difference was not statistically significant.

Table 2: Hypothesis tests for repeated measures ANOVA for McGill pain score

Effect	Statistic	P value
Time	Wilks' lambda = 0.275	<0.001
Group	F= 0.065	0.799
Time*group	Wilks' lambda = 0.915	0.170

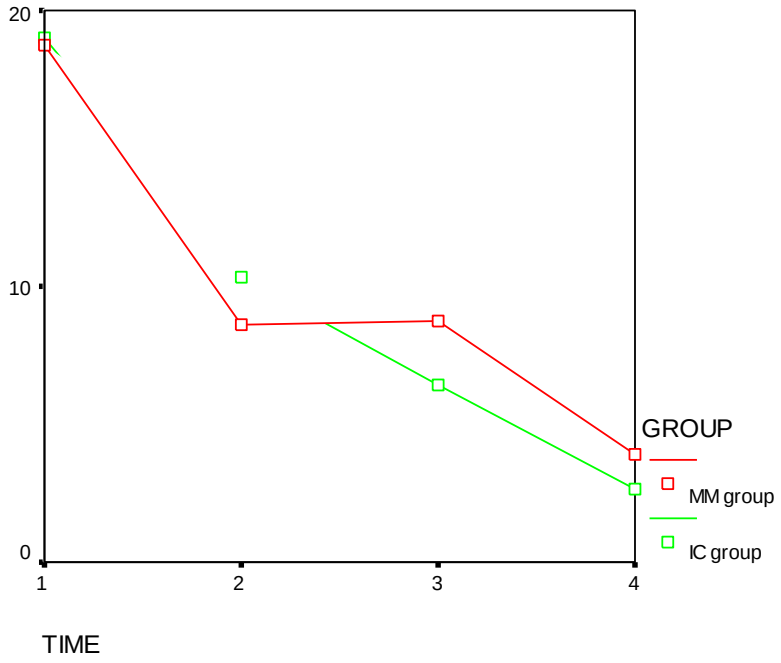


Figure 4: Profile plot of mean McGill score over time by group

With the McGill pain questionnaire, following on from the hypothesis given for the NRS above, indicates that in the IC group there is no breaking of adhesions so there is a decrease likelihood of inflammation as compared to the MM group.

However, the decrease in the reactivity of the trigger points with continued treatment reflects a decrease in pain, and this decrease is sustained. Yet it has been noted that initially 2 patients developed post treatment nausea, which could have been the result of trigger point irritation at the initial visit (Travell, Simons and Simons, 1999). Thus it would stand to reason that the rate of improvement in the IC group would be slower than that of the MM group.

With the MM group as compared to that of the IC group, due to the breaking of adhesions, reactive inflammation develops. With this initial inflammation there is still an improvement in the overall types of pain reported as functional activity improves between treatments 1 and 2.

At the second treatment, the depth attained by the researcher in terms of applying MM to the muscle and its adhesions is decreased due to the residual effects of the inflammation that has occurred post treatment 1. This therefore results in the researcher only being able to break the newly formed adhesions (inflammation as developed as a result of the previous treatment) and also some of the old adhesions, which shows flattening in the overall rate of improvement.

Therefore as expected, the readings taken prior to treatment 3 (reading for effect of treatment 2), the patient reports a negligible increase / stabilisation of the in pain descriptors, as the treatment penetration was less than the previous treatment given.

With the decreased depth of applied treatment at the treatment 2, there is a reduced development of inflammatory processes. This allowed the researcher to access the adhesions within the muscle more readily at treatment 3. Thus at the third treatment the researcher was able to access deeper into the muscle allowing for older adhesions to be removed and there is therefore a further rate of improvement (similar to the response as found at treatment 1), giving a greater response by the patient in terms of the pain descriptors noted on the McGill pain questionnaire (as measured at consultation 4).

4.6 CROM

CROM left lateral flexion

For CROM left side there was a significant change over time in both groups ($p<0.001$). Figure 5.1 shows that this was an increase in both groups. There was no interaction ($p = 0.377$) between time and group, and no group effect ($p = 0.397$). Thus the treatment received made no significant difference on this outcome over time. However, Figure 5.1 shows that the rate of increase was steeper in the IC group compared with the MM group, although this was not statistically significant.

Table 3: Hypothesis tests for repeated measures ANOVA for CROM left side

Effect	Statistic	P value
Time	Wilks' lambda = 0.405	<0.001
Group	F= 0.727	0.397
Time*group	Wilks' lambda = 0.947	0.377

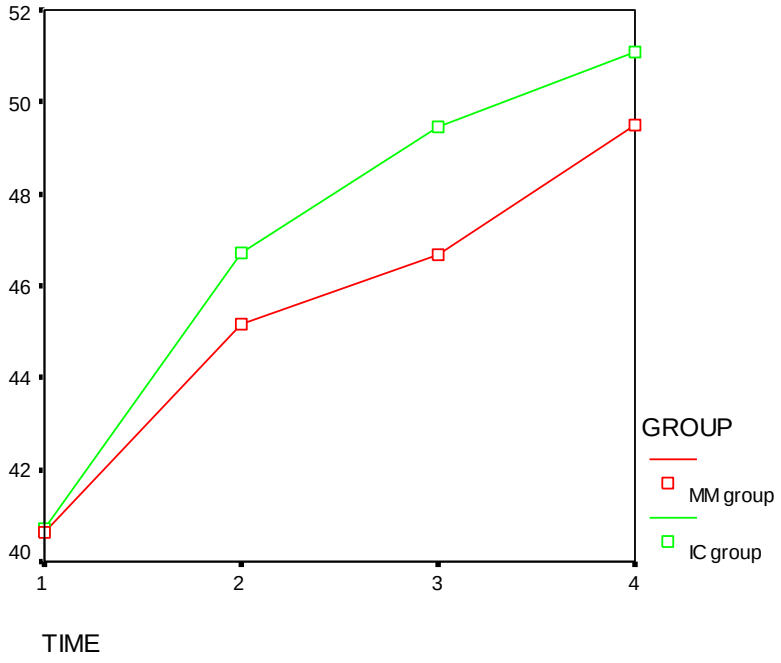


Figure 5.1: Profile plot of mean CROM left side by group over time

CROM right lateral flexion

As with the left side, the right side showed a significant increase in CROM readings over time in both groups (p <0.001). There was no group effect (p = 0.406), nor time by group interaction (p = 0.587). Thus both groups increased to the same extent over time. However, examination of Figure 5.2 shows that the IC group increased at a slightly faster rate than the MM group.

Table 4: Hypothesis tests for repeated measures ANOVA for CROM right side

Effect	Statistic	P value
Time	Wilks' lambda = 0.305	<0.001
Group	F= 0.700	0.406
Time*group	Wilks' lambda = 0.966	0.587

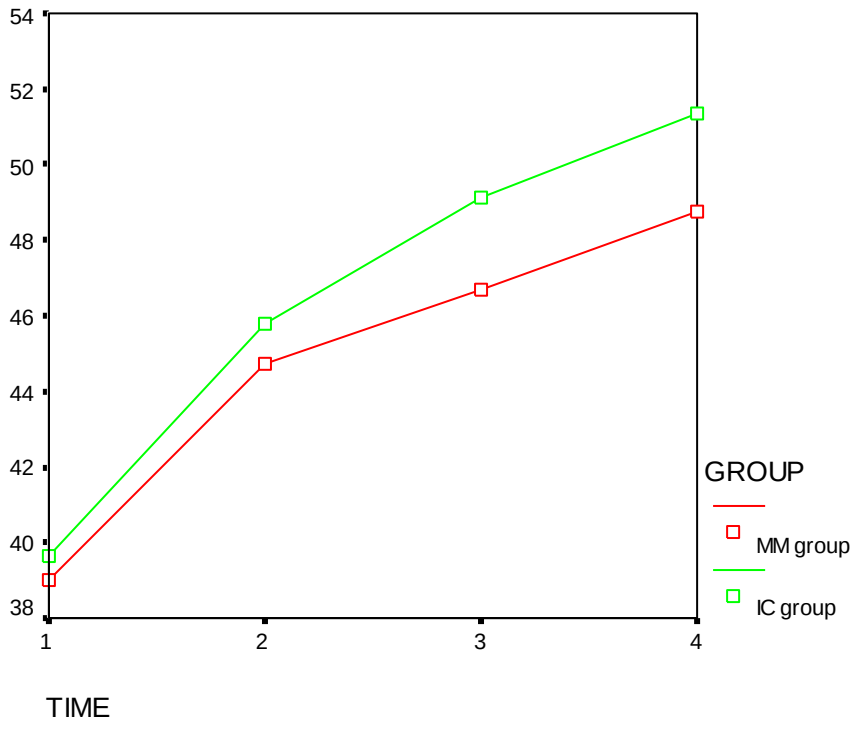


Figure 5.2: Profile plot of mean CROM right side by group over time

CROM (average of left and right sides)

When the average left and right sides for CROM was used, there was overall a significant time effect (p<0.001) but no interaction nor group effect. Figure 5.3 shows that although the interaction was not significant (p = 0.464) the IC group showed a slightly higher rate of increase than the MM group.

Table 5: Hypothesis tests for repeated measures ANOVA for CROM (average of left and right sides)

Effect	Statistic	P value
Time	Wilks' lambda = 0.321	<0.001
Group	F= 0.783	0.380
Time*group	Wilks' lambda = 0.956	0.464

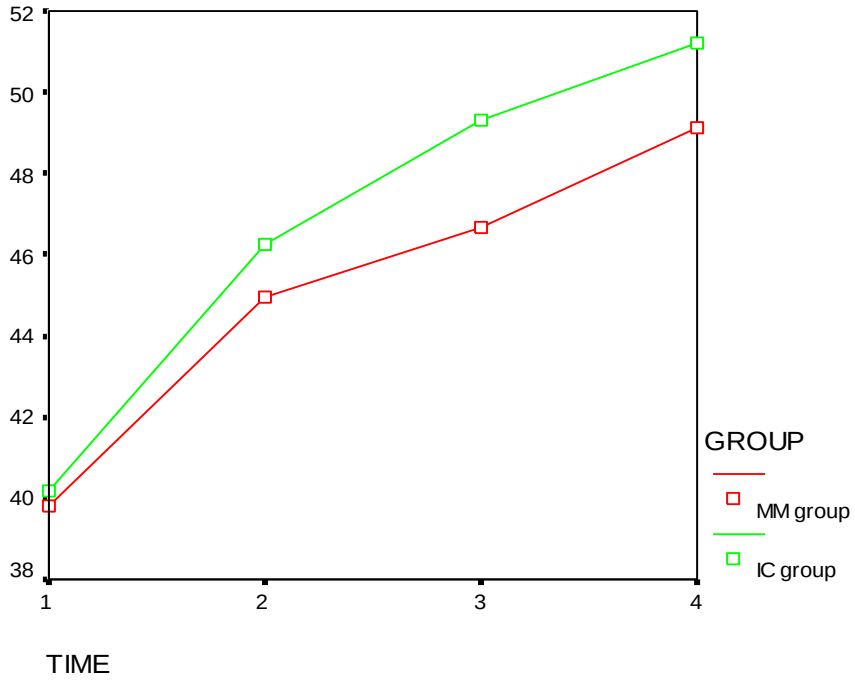


Figure 5.3: Profile plot of mean CROM (average of left and right sides) by group over time

In all patients, it has been noted that if the muscular pathology results from a prolonged posture (or required work related postures), these muscles adapt to the position of most congruency with the environment. This would imply that a prolonged period of muscle (agonist) shortening, could lead to an antagonist elongation and an agonist shortening in an adaptive manner (Panjabi and White, 1990). These prolonged positions have been though to be responsible for the formation of trigger points (Travell and Simons, 1999).

Therefore with the ischaemic compression group, the resultant sustained stretch, which was applied to the muscle (in its maximally lengthened position) for a period of 10 seconds before being applied twice more at consistently deeper levels for the defined 10 second period, there would be resultant

A. Muscle lengthening and,
B. A decrease in trigger point activity,

with a subsequent increase in the range of motion consistently over the three treatments.

With the MM group the first treatment leads to an inflammatory reaction with accompanying swelling. Although a decrease in spasm is noted by virtue of improved range of movement post the first treatment. This improvement is stunted post the second treatment due to the development of new swelling on a residual base was well as the breaking of fewer adhesions within the muscle due to decreased access to the examiner posed by the swelling post treatment 1.

After the third treatment, which was similar to treatment 1, with minimal swelling, effecting a deeper treatment resulting in the breaking down of older / deeper adhesions, allowing an increased rate of improvement before consultation 4.

4.7 TRP (left)

The interaction between time and group was significant (p =0.026). This means that the groups behaved differently over time, i.e. there was a treatment effect. Since the interaction is significant, one can no longer interpret the main effects of time and group. Figure 6.1 shows that the groups show approximately the same trajectory until visit 3, when the MM group continued to increase until visit 4, while the IC group started to decrease until visit 4. Thus the MM group improved over time at a faster rate than the IC group.

Table 6: Hypothesis tests for repeated measures ANOVA for Algometer left side

Effect	Statistic	P value
Time	Wilks' lambda = 0.558	<0.001
Group	F= 0.538	0.466
Time*group	Wilks' lambda = 0.848	0.026

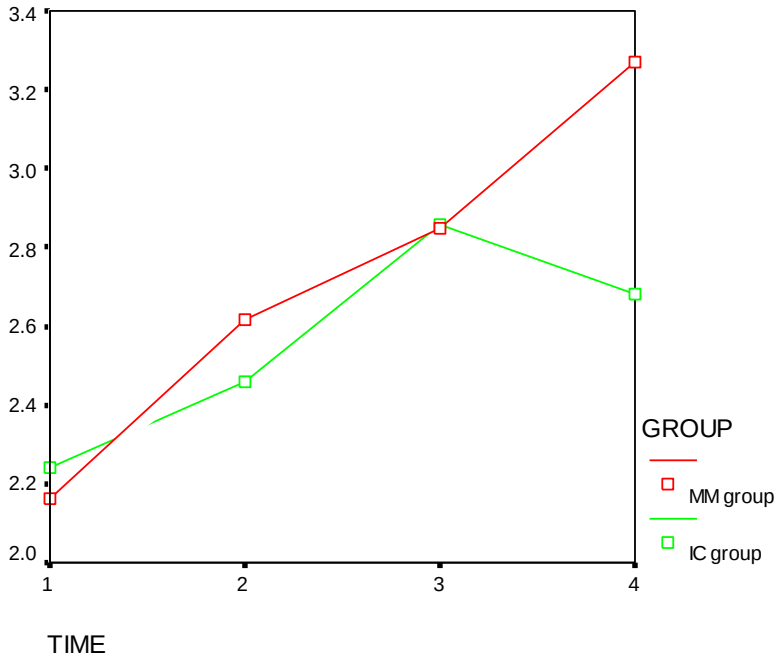


Figure 6.1: Profile plot of mean Algometer reading (left side) by group over time

TRP (right)

For right side algometer readings, there was a significant effect of time (p<0.001), i.e. the means of both groups increased significantly over time. There was however, no difference in the rate of increase in the two groups (p = 0.345) nor in the means of the two groups overall (p = 0.789). Figure 6.2 shows that both groups increased until visit 3, where the IC group decreased, while the MM group increased. This interaction was not statistically significant, but does show a trend consistent with the left side.

Table 7: Hypothesis tests for repeated measures ANOVA for Algometer right side

Effect	Statistic	P value
Time	Wilks' lambda = 0.670	<0.001
Group	F= 0.072	0.789
Time*group	Wilks' lambda = 0.943	0.345

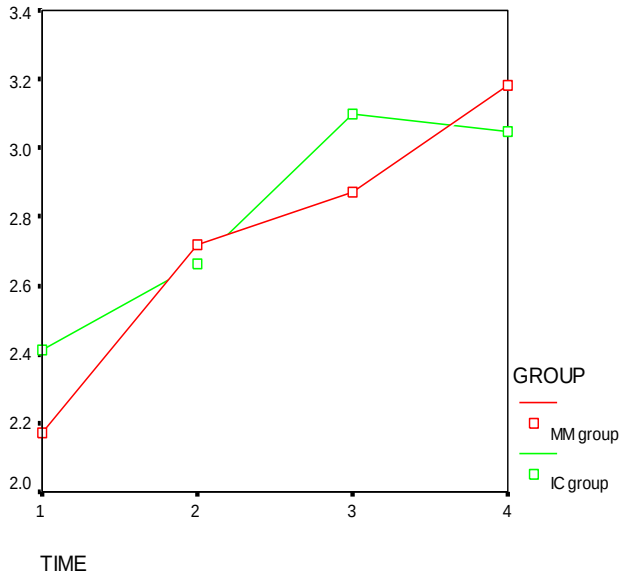


Figure 6.2: Profile plot of mean algometer readings (right side) by group over time

TRP (average of left and right sides)

When the average of the left and right sides algometer readings were taken, the interaction between time and group were not statistically significant (p =0.080). There was a significant time effect overall (p<0.001). Thus the values in both groups increased to the same extent over time. However, Figure 6.3 shows that at visit 4 the mean values in the MM group continued to improve, while those from the IC group decreased. Overall the treatment effect was not significant, but the trend was noticeable.

Table 8: Hypothesis tests for repeated measures ANOVA for Algometer (average of left and right sides)

Effect	Statistic	P value
Time	Wilks' lambda = 0.585	<0.001
Group	F= 0.039	0.843
Time*group	Wilks' lambda = 0.887	0.080

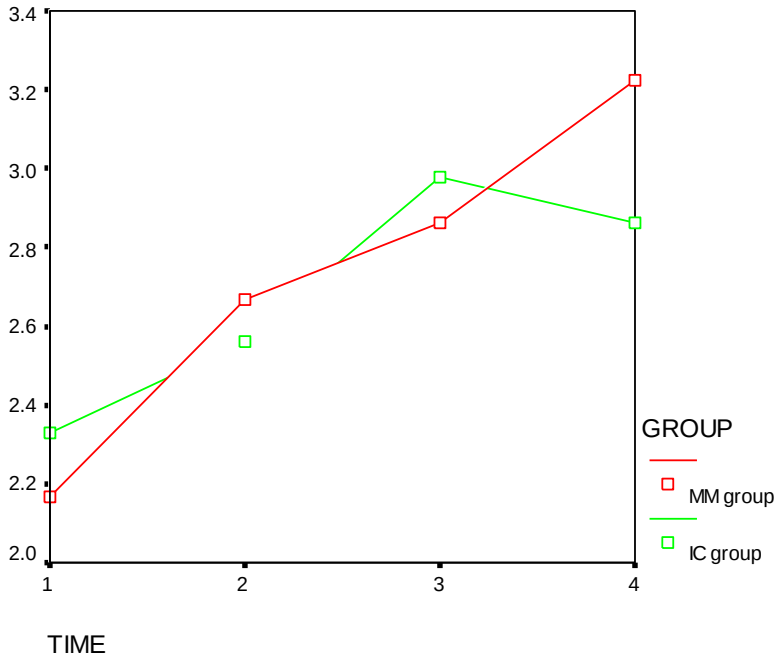


Figure 6.3: Profile plot of mean algometer reading (averaged right and left side) by group over time

It must be noted that most of the patients were right hand dominant, and given the nature of their occupation, all patients used the mouse control when operating computers, it has been deduced that the complaint of right-sided pain was more difficult to treat.

In terms of treatment using IC it is noted that it is an effective treatment, however, the treatment effect is slower. It is hypothesised that this is directly related to the static nature of the stretch reflex employed in this treatment. In relation to the static stretch reflex the degree of neurological stimulation when using a stretch reflex is less than that of a dynamic stretch reflex (Korr, 1975 as cited in Leach, 1994) and therefore it is expected that the IC is less effective than the MM over the time period of this study. This hypothesis is supported by the rate of improvement as noted on the graph (Figure 6.3) and the table (Table 8) above. Variations in the degree of improvement maybe related to the subtle differences in the treatment or the intervention delivery, as noted in the previous three discussions as related to the NRS, McGill pain questionnaire and CROM.

However in addition it must also be noted that the IC form of treatment may also have initially irritated or worsened the MFTP's in the muscles (i.e. the 2 patients who felt nausea post the initial treatment), therefore slowing initial improvement.

4.8 OBSERVATIONS:

As part of the study the patients were asked to fill in a mini questionnaire to aid the researcher in answering questions about the effectiveness of the treatments as perceived by the patients, which could add to the knowledge of the effectiveness of each of the treatments utilized.

All patients were requested to briefly answer the following questions on completion of the study:

1. Pain experienced during the consultation.
2. Apprehension before each treatment.

3. Type of response to care.
4. Overall experience to care.

4.8.1 MYOFASCIAL MANIPULATION

In this study, 21 patients from the myofascial manipulation group found that they experienced a short transient pain during the treatment itself and most felt tender that evening which later subsided. All pain / discomfort was short termed and left no lasting impression in respect of reported pain.

Two patients felt apprehension before or during any of the myofascial manipulation treatments, nonetheless 29 patients felt that they had an increase range of motion and decreased trapezius muscle pain with a decrease of any associated headaches, with only 1 patient feeling that they had had little improvement.

All 30 patients felt that they had benefited from this treatment in terms of being able to sleep better, improved performance at work, and improved concentration, even in the face of the noted negative reports.

Patients who received treatment on consecutive days showed a tendency to worsen or experience higher levels of tenderness, which is attributed to the fairly aggressive nature of the treatment.

4.8.2 ISCHAEMIC COMPRESSION

In this study, 18 patients from the ischaemic compression group found that they experienced a prolonged pain during the treatment itself.

Twelve patients mentioned uncomfortable and tender feelings during that same evening of the treatment and in addition to this 2 patients felt mild nausea. All pain / discomfort was short termed and left no lasting impression in respect of reported pain.

No patients felt any apprehension before or during any of the ischaemic compression group treatments, with 30 patients reporting that they felt they had an increase range of motion and decreased trapezius muscle pain with a decrease of associated headaches.

All the patients felt that they had benefited from this treatment in terms of being able to sleep better, improved performance at work, and improved concentration.

Patients who received treatment on consecutive days showed an initial tendency to worsen or experience higher levels of tenderness.

These observations did not form part of the quantitative data collected and analysed, but were merely observations made by the researcher and included reported findings from the patients during the course of the research.

4.9 SUMMARY OF THE RESULTS

For the subjective measurements of NRS and McGill pain score, there was an overall significant decrease in scores over the 4 visits. There was however no statistical treatment effect and both groups decreased at the same rate statistically. However the trend was visible from the profile plots that the IC group decreased at a faster rate than the MM group due to a slow decrease in scores in the MM group between visits 2 and 3.

CROM measurements increased significantly over time in both groups and there was no statistical treatment effect. However, the profile plots showed a trend of the IC group increasing at a faster rate than the MM group.

Algometer readings on the left side showed a significant treatment effect in favour of the MM group since the IC group means started to decrease after visit 3. This was not significant on the right side, as well as when the average of the left and right sides was used, although the same trend was visible as the left side (and significant).

Thus the MM treatment was not statistically superior or inferior to the IC treatment in terms of NRS and McGill pain rating scales and CROM, however the trends associated with these measures tend to indicate that there is a slant towards the support of the IC group faring better than the MM group. This could be related to the hypotheses based on the inflammatory reactions created by the MM through the course or treatment, as adhesions are broken.

However it must be noted that MM was significantly superior to IC for algometer measurements on the left side, but not significantly different on the right side or on the average of left and right sides. This could be related to the hypothesis that MM has a greater ability to decrease the effects of MFTP's through the dynamic stretch applied to the muscle, whereas the IC imparts a slow sustained stretch that has the ability to irritate MFTP's before resolution is affected.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 RECOMMENDATIONS

5.1.1 SUBJECTIVE DATA

There were no problems encountered with the NRS or the McGill pain questionnaire as the level of intelligence of the patients ensured understanding of what was being asked. Should this study have been directed to a larger portion of the population, translations of the McGill pain questionnaire may have been needed in Zulu so as to reach a more accurate collection of data.

5.1.2 OBJECTIVE DATA

No problems were encountered with the use of the CROM device as careful explanation of the device, and what was expected of the patient at each treatment, was given. The researcher found it to be a reliable tool.

The one confounding variable that occurred with collection of the objective data as related to the pressure from the algometer, that could be seen as a form of treatment in itself and Kruse (1992) supports this with a study on thermographic analysis of MFTP's. It was found that there was a dynamic reduction in the mean temperature of the MFTP's from immediately before to immediately after the use of the algometer, as it applied pressure to the MFTP's directly. This implies that the algometer could responsible for a treatment effect and may therefore have confounded the treatment specific results obtained for the IC and MM groups in this study. However these algometer recordings where taken on all patients and therefore the effect should have led to the same extent of improvement and thus trends are still analysable for purposes of this study.

It is advised in further studies to separate the treatments by at least two days to allow any mild inflammatory response to decrease and thus to allow for more accurate data to be collected in terms of improvement rather than related to inflammation or pain cycles related thereto.

5.1.3 PATIENT INFLUENCES

Due to the type of work being performed by the patients in their respective environment (including a relatively high amount of stress due to the nature of their work), there was a tendency for an increase in stress towards the end of the month. It is therefore advised that any further studies of patients within this environment be confined to the first three weeks of the month, in order to ensure that maximum levels of improvement are not counteracted by external factors (such as stress).

However the above recommendation would need to be based on further studies that assess pain intensity levels in the work place at the different times of the month, as the assumption is that pain / discomfort increase towards the end of the month.

Based on the results obtained in this study, it is recommended that future research look at the effect of patient age groups, ethnicity and chronicity of pain / discomfort, in order to establish the effect of these 2 variables on the outcomes of clinical trials such as this one.

5.2 OTHER RECOMMENDATIONS

In this study a sample pool of 60 patients were obtained. This sample size was large enough to use parametric statistical analysis, but a larger sample size is recommended and would have yielded more accurate results as well as more significant statistical differences if they where to become apparent.

In order to eliminate researcher bias towards a favoured treatment, it is recommended that two experienced practitioners be assigned to a treatment protocol each and the researcher takes note only of the readings, being blinded from the treatments being applied to the patients.

As conclusions were made only of the short term effects of these treatments, it is recommended that two week, one month and possibly two month follow up consultations would reveal further information on the long term effects of these treatments.

It is further recommended that studies using IC or MM treatments are done in conjunction with other treatment modalities (e.g. adjustments).

Finally, research is needed into the use of these techniques for the treatment of other soft tissue conditions where pain and restricted range of motion are the clinical signs and symptoms (for example fibromyalgia, tendonitis and capsulitis).

6.1 CONCLUSION

This study consisted of 60 patients, divided into 2 groups of 30 each. Every patient underwent a full case history, physical, and cervical regional examination in order to determine that the fitted the inclusion and exclusion criteria with respect to active subacute MFTP's.

Thereafter each patient was randomised into either the myofascial manipulation or ischaemic compression groups at random. Those patients that were in group A were in the myofascial manipulation group and those in group B were in the ischaemic compression group. All patients then received 3 treatments and had 1 follow up consultation in a 3 week period.

At set intervals (prior to treatments 1, 2, 3 and at the follow up consultation) measurements where taken with the NRS, McGill pain questionnaire (subjective readings), CROM and algometer (objective readings).

The evaluation of these recordings showed that both treatments showed a statistical improvement in terms of subjective and objective clinical findings to a value of $p=<0.001$. There was no statistical difference between the 2 groups in the subjective data or the CROM readings of the objective data. There was however a statistical

difference between the two groups in the algometer readings of the left upper trapezius (p=0.026) but not the right (p=0.3.45). As a mean average there was not a statistical difference (p=0.080) where a p value of less than 0.05 is significant.

It is therefore the researcher's conclusion that there is no statistical difference between the myofascial manipulation and the ischaemic compression groups in terms of subjective and objective findings for 3 treatments over a 3 week period for subacute trigger points of the Upper Trapezius muscle numbers 1 and 2.

In light of these findings the chiropractor might find it better to use myofascial manipulation as an effective treatment to the benefit of the patient as the treatment is faster in application and subjects the patient to less overall pain over a shorter period of time.

Furthermore that application of MM as a treatment places less stress on the practitioner for a shorter period of time allowing the practitioner to affect more treatments within one treatment session than could be applied with the utilisation of IC.

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APPENDIX

Appendix A

DURBAN INSTITUTE OF TECHNOLOGY
CHIROPRACTIC DAY CLINIC
CASE HISTORY

Patient: _____ _____

File # : _____ _____

Sex : _____ Occupation: _____

Intern : _____ _____ Signature ___

FOR CLINICIANS USE ONLY:
Initial visit
Clinician: Signature :

Case History:

Examination:

Previous:
Current:

X-Ray Studies:

Previous:
Current:

Clinical Path. lab:

Previous:
Current:

CASE STATUS:

PTT:	Signature:	Date:

CONDITIONAL:
Reason for Conditional:

Signature: Date:

Conditions met in Visit No:	Signed into PTT:	Date:
Case Summary signed off:		Date:

Intern's Case History:

1. **Source of History:**

2. **Chief Complaint : (patient's own words):**

3. **Present Illness:**

	Complaint 1	**Complaint 2**
▸ Location ▸ Onset : Initial: Recent: (1) Cause: ▸ Duration ▸ Frequency ▸ Pain (Character) ▸ Progression ▸ Aggravating Factors ▸ Relieving Factors ▸ Associated S & S ▸ Previous Occurrences ▸ Past Treatment (a) **Outcome:**		

4. **Other Complaints:**

5. **Past Medical History:**

- General Health Status
- Childhood Illnesses
- Adult Illnesses
- Psychiatric Illnesses
- Accidents/Injuries
- Surgery
- Hospitalizations

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

9. Review of Systems:

- General
- Skin
- Head
- Eyes
- Ears
- Nose/Sinuses
- Mouth/Throat
- Neck
- Breasts
- Respiratory
- Cardiac
- Gastro-intestinal
- Urinary
- Genital
- Vascular
- Musculoskeletal
- Neurologic
- Haematologic
- Endocrine
- Psychiatric

Appendix B

Durban Institute of Technology

PHYSICAL EXAMINATION: SENIOR

Patient Name : _____ **File no :**_____ **Date :**_____
Student : **Signature :**

VITALS:				
Pulse rate:			Respiratory rate:	
Blood pressure:	R	L	Medication if hypertensive:	
Temperature:			Height:	
Weight:	Any recent change? Y / N		If Yes: How much gain/loss	Over what period

GENERAL EXAMINATION:		
General Impression		
Skin		
Jaundice		
Pallor		
Clubbing		
Cyanosis (Central/Peripheral)		
Oedema		
Lymph nodes	Head and neck	
	Axillary	
	Epitrochlear	
	Inguinal	
Pulses		
Urinalysis		

SYSTEM SPECIFIC EXAMINATION:

CARDIOVASCULAR EXAMINATION

RESPIRATORY EXAMINATION

ABDOMINAL EXAMINATION
NEUROLOGICAL EXAMINATION
COMMENTS
NEUROLOGICAL EXAMINATION: See Regionals
Clinician: **Signature :**

Appendix C

DURBAN INSTITUTE OF TECHNOLOGY
REGIONAL EXAMINATION - CERVICAL SPINE

Patient: _____ File No: _____

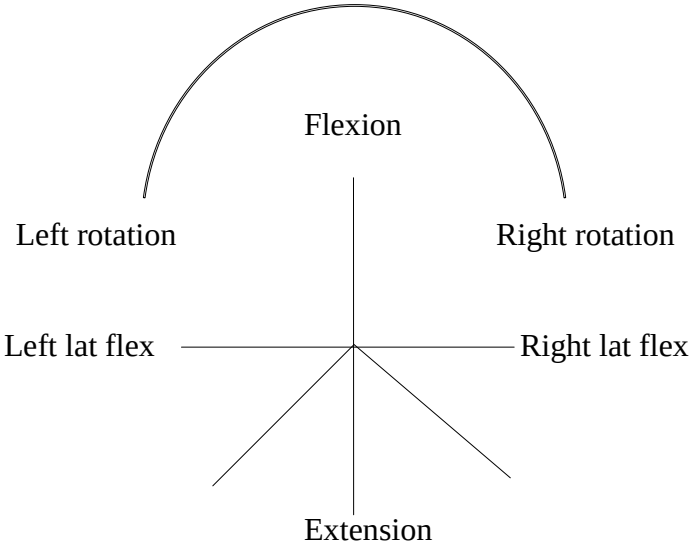
Date: _____ Student: _____

Clinician:_____ Sign: _____

OBSERVATION:

Posture
Swellings
Scars, discolouration
Hair line
Body and soft tissue contours

Shoulder position
Left :
Right :
Shoulder dominance (hand):
Facial expression:



RANGE OF MOTION:
Extension (70º):
L/R Rotation (70º):
L/R Lat flex (45º):
Flexion (45º):

PALPATION:
Lymph nodes
Thyroid Gland
Trachea

ORTHOPAEDIC EXAMINATION:

Tenderness		Right	Left
Trigger Points:	SCM		
	Scalenii		
	Post Cervicals		
	Trapezius		
	Lev scapular		

	Right	Left		Right	Left
Doorbell sign			Cervical compression		
Kemp's test			Lateral compression		
Cervical distraction			Adson's test		
Halstead's test			Costoclavicular test		
Hyper-abduction test			Eden's test		
Shoulder abduction test			Shoulder compression test		

Dizziness rotation test			Lhermitte’s sign		
Brachial plexus test					

NEUROLOGICAL EXAMINATION:

Dermatones	**Left**	**Right**	**Myotomes**	**Left**	**Right**	**Reflexes**	**Left**	**Right**
C2			C1			C5		
C3			C2			C6		
C4			C3			C7		
C5			C4					
C6			C5					
C7			C6					
C8			C7					
T1			C8					
			T1					
Cerebellar tests:		Left		Right				
Disdiadochokinesis								

VASCULAR:	Left	Right		Left	Right
Blood pressure			Subclavian arts.		
Carotid arts.			Wallenberg's test		

MOTION PALPATION & JOINT PLAY:

Left: Motion Palpation:
Joint Play:
Right: Motion Palpation:
Joint Play:

Upper Thoracics:
Motion Palpation:
Joint Play:

BASIC EXAM: SHOULDER:
Case History:

BASIC EXAM: THORACIC SPINE:
Case History:

ROM: Active:
Passive:
RIM:
Orthopaedic:
Neuro:
Vascular:
Observ/Palpation:

ROM: Motion Palp:
Active:
Passive:
Orthopaedic:
Neuro:
Vascular:
Observ/Palpation:

Appendix D

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 E

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.

0 _____ 100

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.

0 _____100

APPENDIX F

ALGOMETER READINGS:

Patient Name: _____

File number: _____

Visit	Date	Trigger point(s) affected	Reading
1st			
2nd			
3rd			
4th			

APPENDIX G

CROM MEASUREMENTS FOR LATERAL RANGE OF MOTION

Patient Name……..

File Number…….

CROM MEASUREMENTS IN DEGREES

	LEFT LATERAL FLEXION	RIGHT LATERAL FLEXION
PATIENT CONSULTATION 1 DATE:		
PATIENT CONSULTATION 2 DATE:		
PATIENT CONSULTATION 3 DATE:		
PATIENT CONSULTATION 4 DATE:		

APPENDIX H

LETTER OF INFORMATION

Title of Research:

The relative effectiveness of myofascial manipulation versus ischaemic compression in the treatment of myofascial trigger points of the upper trapezius muscle.

NAME OF RESEARCH STUDENT: Richard Shacksnovis H.TECH C (031 2042205)

NAME OF RESEARCH SUPERVISORS: Dr Andrew Jones M.DIP.C, CCSP, CCFC (031 2042244)

Dr Charmaine Korporaal M.Tech.C, CCSP, CCFC, ICSSD (031 2042611)

Dear Patient

Welcome to my research project. You have been selected to take part in a clinical trial comparing two forms of treatment for myofascial pain syndrome. This is an extremely common condition causing neck and upper back pain associated with tender points in the muscles of the neck and upper shoulders (called myofascial trigger points), which often results in a considerable loss of neck mobility and function.

The aim of this study:
Is to compare the efficacy of two treatment approaches in the management of myofascial pain syndrome.

What will happen during the study period:
You will be allocated into one of two groups by a third party. You will undergo a full case history, physical and cervical spine regional examination prior to the first treatment, which will take approximately 1 ½ to 2 hrs. You will then be required to be available for 3 more treatments within a two-week period, which will be of 30 minutes each. The treatments are safe and are unlikely to cause any discomfort or adverse side effects, as they will follow a protocol similar to that used in clinical practice.

Within the study time you will be also asked to help fill in certain questions, which will aid to keeping a record of your progress in the study time frame.

All patient information is confidential and the results of the study will be made available in the Durban Institute of Technology library in the form of a mini-dissertation.

What do you need you to do:

- You will need to refrain from having any other form of treatment for your neck and upper back pain throughout the duration of this study, including the use of analgesics and anti-inflammatory drugs.
- You will be asked to refrain from any strenuous physical activities for the duration of this study as this is known to aggravate the condition.
- You will be asked to inform the researcher if any of the conditions of this study have been breached in any way.
- If you have any of the following conditions you will be excluded from the study, as they are contra-indicated for the treatment protocols used in this research:

  Contra-indications to massage or massage type therapy
  Anti- coagulant therapy
  Fracture/ Dislocation/ Bone Tumours/ Infections

Risks

There are minimal risks involved in the treatment offered in this study, which may include a period of transient discomfort, however the overall benefits are hypothesised to include decrease pain and discomfort associated with this condition.

Costs / Remuneration

Your treatment will be free of charge and you are free to withdraw at any stage if you wish to do so. A further two treatments will be provided free of charge should you still need them in the form of normal clinical practice techniques.

Questions and Queries

Please don't hesitate to ask questions on any aspect of this study. Your full co-operation will assist the Chiropractic profession in expanding its knowledge of this condition and the treatment thereof.

Thank you.

Yours sincerely

Richard Shacksnovis
(Research student)

Dr. Andrew Jones
(Research supervisor)

APPENDIX I
INFORMED CONSENT FORM **Date:**

TITLE OF RESEARCH

THE RELATIVE EFFECTIVENESS OF MYOFASCIAL MANIPULATION VERSUS ISCHAEMIC COMPRESSION IN THE TREATMENT OF MYOFASCIAL TRIGGER POINTS OF THE LEVATOR SCAPULAR AND UPPER TRAPEZIUS MUSCLES

NAME OF RESEARCH STUDENT: Richard Shacksnovis (031 2042205)

NAME OF RESEARCH SUPERVISOR: Dr Andrew Jones (031 2042244)

PLEASE CIRCLE THE APPROPRIATE ANSWER:

1. Have you read the research information sheet?
YES / NO
2. Have you had the opportunity to ask questions regarding this study. YES / NO
3. Who have you spoken to? _____
4. Have you received satisfactory answers to your questions? YES / NO
5. Have you had an opportunity to discuss this study?
YES / NO
6. Have you received enough information about this study?
YES / NO
7. Do you understand the implications of your involvement in this study? YES/NO
8. Do you understand that you are free to withdraw from this study
    a) at any time YES / NO
    b) without having to give a reason for withdrawing? YES / NO
    c) without affecting your future health care? YES / NO
9. Do you agree to voluntarily participate in this study? YES / NO

Please ensure that the researcher completes each section with you. If you have answered NO to any of the above, please obtain the necessary information before signing

PATIENT/SUBJECT
Name_____ Signature_____

WITNESS
Name_____ Signature_____

RESEARCH STUDENT
Name_____ Signature_____

pain referral