

*THE EFFECTS OF MUSIC THERAPY IN
CONJUNCTION WITH CHIROPRACTIC
MANAGEMENT OF MUSCLE TENSION
HEADACHES*

BY :

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requirements for the Master's Diploma in Technology in the
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ABSTRACT

This study proposes to evaluate the combined effects of music therapy and chiropractic treatment in the management of muscle tension headaches, in terms of the patients' response, in order to establish the efficacy of music therapy as an adjunct to chiropractic management of muscle tension headaches.

It was hypothesized that music therapy and chiropractic treatment combined have a more beneficial effect, in that it would reduce muscle tension headaches to a greater extent than chiropractic treatment alone, thus reducing the severity, duration and frequency of muscle tension headaches.

The diagnostic criteria for muscle tension headache were consistent amongst the majority of authors. The most common cause was attributed to psychological or occupational stress on the posterior neck musculature i.e. an increase in muscle tension. An increase in muscle tension in muscle tension headache sufferers measured with an electromyogram was reported on by various authors. A decrease in electromyogram readings in response to music therapy has also been measured.

Certain authors have attributed muscle tension headaches to cervical facet joint dysfunction. The presence of myofascial trigger points occurring concurrently with a muscle tension headache was mentioned.

The majority of authors were in agreement as to the most beneficial type of music to be used. The music is to have a

slow, steady beat, be quiet and commonly described as slow baroque or classical music.

The mechanism of pain suppression is also generally agreed on, and best described by Forster and Palanstanga as the "Gate control theory" .

The sample was derived from those patients who presented themselves to the clinic, either in response to the advert or out of their own accord.

A complete case history, physical examination and radiographic examination, where diagnostically indicated, were used to establish whether the patient fulfilled the inclusion criteria for this study.

The cervical spine range of motion was determined by the researcher, by means of a manual goniometer. The case history, physical examination and radiographic examination were performed by the researcher.

The data needed to test the hypothesis was obtained from questionnaires, cervical range of motion measurements and pain disability indices. The following information was determined from these measurements:-

- the change in severity, frequency and duration of the muscle tension headache
- the change in cervical spine range of motion
- the change in the patients' disability
- the change in the number of tablets consumed by the patient for the symptomatic relief of the muscle tension headache.

Patients were assigned to either the control group (Group A), or the experimental group (Group B), by means of random sampling. Group A received only chiropractic treatment, and group B received music therapy and chiropractic treatment.

Group B were given a music therapy tape to take home, and were requested to listen to it as often as they possibly could. Both groups were seen twice a week for five weeks, thus a total of ten treatments. After this five week treatment period the patient was requested to not receive any treatment for the muscle tension headache for one month. After this month they were reevaluated in the above mentioned aspects.

Paired T-tests were used to determine the change within each group, and unpaired T-tests were used to determine the difference between the two groups for the following :

- severity of the muscle tension headache
- frequency of the muscle tension headache
- duration of each muscle tension headache
- number of tablets consumed for the
symptomatic relief of muscle tension headache
- pain disability
- range of motion of the cervical spine

Both groups showed a decrease in the severity, duration and frequency of the headaches.

The tablet consumption of both groups decreased significantly between the initial and the follow-up visit.

There was a significant decrease in pain disability for both groups, between the initial and the follow-up consultation. There was no change in range of motion of the cervical spine for either group.

There was no statistically significant difference between the groups, indicating that music therapy did not enhance the effect of chiropractic management of muscle tension headaches.

UITTREKSEL

Hierdie studie is van voorneme om die gesamentlike effek van musiekterapie en chiropraktiese behandeling te evalueer in die beheer van spierspanningshoofpyne, wat betref die pasiënt se reaksie, wanneer die doeltreffendheid van musiekterapie as 'n adjunk van chiropraktiese behandeling van spierspanningshoofpyn gebruik word.

Volgens die hipotese het musiekterapie en chiropraktiese behandeling saam 'n meer heilsame effek, deurdat dit die spierspanningshoofpyn tot 'n groter mate as net chiropraktiese behandeling alleen sal verlig. Dus is daar 'n vermindering in die intensiteit van die spierspanningshoofpyn, asook in die duur en herhaling daarvan.

Die diagnostiese kenmerke van spierspanningshoofpyn was deurlopend dieselfde volgens die meerderheid outeurs.

Die mees algemene oorsaak word toegeskryf aan sielkundige of beroepstres wat die agterste nekspiere aantast.

Die toename van spierspanning in spierspanningshoofpynlyers, soos gemeet deur 'n elektromiogram is deur 'n verskeidenheid van outeurs aangeteken.

Daarenteen is 'n afname in elektromiografiese lesings as gevolg van musiekterapie ook al gemeet.

Sekere outeurs het ook al die oorsaak van spierspanningshoofpyne aan servikale faset-gewrigswanfunksie toegeskryf.

Melding is ook al gemaak van die teenwoordigheid van miofasiale snellerpunte wat saam met spierspanningshoofpyn voorkom.

Die meerderheid outeurs het egter saamgestem oor watter tipe musiek die voordeligste sou wees om te gebruik.

Die musiek moet rustig wees, tesame met 'n stadige, reëlmatige ritme. Dit word gewoonlik as stadigebarok of klassieke musiek beskryf.

Oor die algemeen word daar saamgestem oor die meganisme van pyn onderdrukking. Dit word die beste beskryf deur Forster en Palanstanga as die " Gate control " teorie.

Die eksperimentele groep is verkry uit pasiënte wat uit hul eie by die kliniek aangemeld het, of op die advertensie gereageer het.

'n Volledige geskiedenis van die pasiënt, fisiese en radiografiese ondersoek, waar diagnosties aangedui, is gebruik om te bepaal of die pasiënt aan al die insluitings kriteria vir die studie voldoen.

Die beweegafstand van die servikale ruggraat is deur die navorser gemeet deur middel van 'n manueel-goniometer.

Die pasiënt se geskiedenis, fisieke en radiografiese ondersoek is deur die navorser self uitgevoer.

Die data wat benodig is om die hipotese te toets, is soos volg verkry : vraelyste, bewegings afstand van die servikale ruggraat en aanwysers van onbekwaamheid as gevolg van pyn.

Die volgende informasie is van bogenoemde metings verkry:-

- die verandering in intensiteit, duur en herhaling van die spanningshoofpyn.

- die verandering in die bewegings afstand van die servikale ruggraat.

- die verandering in die pasiënt se onvermoë om sekere take te verrig.

- die verandering in die hoeveelheid tablette wat geneem word vir die simptomatiese verligting van spanningshoofpyn.

Pasiënte is in twee groepe verdeel : die kontrol groep (Groep A) of die eksperimentele groep (Groep B), deur middel van willekeurige toetsing.

Groep A het net chiropraktiese behandeling ontvang, en groep B het musiek terapie tesame met chiropraktiese behandeling ontvang.

'n Musiek terapie band is aan pasiënte in groep B gegee om huis toe te neem, en hulle is versoek om so dikwels as moontlik daarna te luister.

Albei groepe is twee keer per week behandel vir 'n tydperk van vyf weke, en het dus 'n totaal van tien behandelinge ontvang.

Na 'n periode van vyf weke van behandeling, is die pasiënt gevra om geen behandeling vir die spannings hoofpyn te ondergaan vir 'n tydperk van een maand.

Na verstryking van hierdie periode is die pasiënte weer in die bogenoemde aspekte ge-evalueer.

Gepaarde T-toetse is gebruik om die verandering in elke groep vas te stel, en ongepaarde T-toetse is gebruik om die verskil tussen die groepe vas te stel onder die volgende hoofde:

- die verandering in intensiteit van die spanningshoofpyn.
- herhaling van die spanningshoofpyn.
- duur van elke spanningshoofpyn.
- die verandering in die hoeveelheid tablette wat geneem word vir die simptomatiese verligting van spanningshoofpyn.

- die verandering in die pasiënt se onvermoë om sekere take te verrig.
- die verandering in die bewegings afstand van die servikale ruggraat.

Albei groepe het 'n vermindering in intensiteit, duur en herhaling van die spannings hoofpyn aangetoon.

Die gebruik van tablette in albei groepe het betekenisvol verminder tussen die eerste en die laaste besoek.

Daar was 'n aansienlike vermindering in die pasiënt se onvermoë om sekere take te verrig vir albei groepe, tussen die eerste en die laaste besoek.

Daar was geen verandering in bewegings afstand van die servikale ruggraat vir albei groepe nie.

Daar was geen statisties betekenisvolle verskil tussen die twee groepe wat kon aangedui het dat musiek terapie die effek van chiropraktiese behandeling van spannings hoofpyn sou verhoog nie.

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ABBREVIATIONS

CMCC : Canadian Memorial College of Chiropractic

EMG : Electromyogram

GI : Gastrointestinal

CHAPTER

ONE

THE PROBLEM AND

ITS SETTING

1.1 PROBLEM STATEMENT

This study proposes to evaluate the combined effects of music therapy and chiropractic treatment in the management of muscle tension headaches, in terms of the patients' response, in order to establish the efficacy of music therapy as an adjunct to chiropractic management of muscle tension headaches.

1.2 HYPOTHESIS

- 1) It is hypothesized that music therapy and chiropractic treatment combined has a more beneficial effect, in that it reduces muscle tension headaches to a greater extent than chiropractic treatment alone, thus reducing the severity, duration and frequency of muscle tension headaches.

1.3 DELIMITATIONS

- 1) Children under the age of 14 will be excluded from the study
- 2) Only pre-selected, slow baroque music, which has previously been shown to induce muscle relaxation, will be utilized. A tape of selected slow baroque music, compiled by Shani Grové will be utilised.
- 3) The following will be considered to have no effect on the patients' response:
 - position of patient
 - humidity
 - barometric pressure
 - climatic temperature
 - recreational and occupational activities
 - sex
 - creed or religious affiliation
- 4) The scope of chiropractic treatment will include only chiropractic adjustments of the neck and upper thoracic spine, massage of the posterior neck and upper back muscles, myofascial trigger point therapy and patient education.
- 5) The myofascial trigger point therapy used will include only needling and stretch exercises for the patient.
- 6) A patient with a headache other than muscle tension headache will not be accepted into the study.
- 7) Only primary muscle tension headache sufferers will be used for the study.
- 8) A patient with a muscle tension headache which is secondary

to a systemic disease, trauma, cervical spondylosis, cervical discogenic anomalies, eye strain, or any cause other than psychosocial stress, will be excluded from the study.

9) Pregnant women will not be treated, as no X-rays may be taken.

1.4 ASSUMPTIONS

- 1) It is assumed that participants do indeed have muscle tension headaches, based on the diagnostic criteria.
- 2) It is assumed that the slow baroque music will have the effect claimed by various authors, and will be applicable to patients irrespective of race, culture, education and sex.
- 3) It is assumed that chiropractic treatment is beneficial in the management of muscle tension headaches.
- 4) It is assumed that the samples have been drawn from a population which is normally distributed.
- 5) It is assumed that the variance of all the groups are homogeneous.
- 3) The variables to be measured are continuous and achieve interval measurement.

1.5 DEFINITIONS

1. Music therapy

The planned application of music and it's components and their influence on people, to be beneficial in physiological, psychological and emotional integration of the individual during the treatment of a sickness and disability. (*Hauptfleisch, 1990*)

2. Muscle tension headache

A type of headache due to prolonged overwork of the neck or scalp muscles, emotional strain, or both, affecting especially the occipital region.

3. Chiropractic

This is a science of applied neurophysiologic diagnosis based on the theory that health and disease are life processes related to the function of the nervous system: irritation of the nervous system by mechanical, chemical, or psychic factors is the cause of disease; restoration and maintenance of health depend on normal function of the nervous system. Diagnosis is the identification of these noxious irritants and treatment is their removal by the most conservative method.

(Dorland's Illustrated Medical Dictionary, 1988)

4. Chiropractic treatment

The wholistic approach to health care using adjustments, physical modalities, massage, myofascial trigger point therapy, and patient education.

5. Chiropractic adjustment

5. Chiropractic adjustment

The mobilisation of disrelated functional spinal units by means of specific manual manipulative techniques.

6. Chiropractic management

This entails the correction of disrelationships between functional spinal units by means of specific manipulative techniques, physical modalities, patient education with regards to perpetuating factors, nutritional deficiencies, occupational hazards, recreation and exercises, as well as the elimination of any active myofascial trigger points.

7. Slow Baroque music

This is the slow movements of music written by baroque composers such as Bach, Handel, Vivaldi, Pachelbel and Scarlatti, during the seventeenth century.

8. Muscle relaxation

Defined as a lessening of tension and/or the mitigation of pain. (Dorland's Illustrated Medical Dictionary, 1988) This can be assessed subjectively by the response of the patient to questionnaires, or objectively by palpation of the involved muscle.

9. Diagnostic criteria

- 1) The occipital region is initially involved and the pain later spreads to the parietal, frontal and facial regions.
- 2) A distinguishing feature is that the pain is bilaterally situated in 90% of cases.

- 3) The pain is described as a squeezing tightness, a constriction, or presents as a tight hat band.
- 4) The headache is persistent and sustained in its nature.
- 5) The pain varies in intensity and frequency, and is often relieved by alcohol.
- 6) Pain is normally absent or minimal on waking, and the headache develops as the day progresses.
- 7) There is an absence of prodromata.
- 8) The patients' sleep pattern is undisturbed.
- 9) Anxiety is frequently accompanied by light-headedness and dizziness.
- 10) Cold drafts normally precipitate or aggravate the headache.
- 11) On examination the jaw, neck, scalp, and face musculature are taut.
- 12) Active or latent trigger points may be present in one or more of the neck, facial or upper back muscles.
- 13) Due to the taut muscles and the trigger points, a decreased cervical range of motion is exhibited.

(Jamison, 1991)

10. Patient education

The patient is instructed how to change or adapt certain factors believed to be causing or aggravating the condition. These factors include perpetuating factors, occupational stress, recreational activities and nutritional and dietary deficiencies. The education includes exercises designed for the patient, to assist in the rehabilitative process.

11. Patient response

The subjective patient response will be measured in terms of:- frequency, severity and duration of the muscle tension headaches

- pain disability index

Objectively, patient response will be measured by means of:-

- range of motion of the cervical spine

12. Myofascial dysfunction syndrome

This is pain and tenderness and other referred phenomena and dysfunctions attributed to myofascial trigger points.

13. Active trigger points

A focus of hyperirritability in a muscle or it's fascia that is symptomatic with respect to pain. It refers a pattern of pain at rest and/or on motion that is specific for the muscles. An active trigger point is always:-

- tender
- prevents full lengthening of muscles
- weakens the muscles
- usually refers pain on direct compression
- mediates a local "twitch" response of muscle fibers when adequately stimulated.

14. Latent trigger points

This is a focus of hyperirritability in a muscle or its

fascia that is clinically quiet with respect to spontaneous pain. It is painful only when palpated. A latent trigger point may have all the other characteristics of an active trigger point, from which it is to be distinguished.

15. Myofascial trigger point therapy

Myofascial trigger point therapy used can be spray and stretch, ischaemic compression or needling of the trigger point. The corrective actions include a stretching exercise programme for the involved muscles and the elimination of perpetuating factors.

16. Primary muscle tension headache

This is a headache which is attributable to muscle contraction which results from psychosocial stress.

1.6 IMPORTANCE OF THE STUDY

Background:

Music is currently therapeutically utilized in the treatment of many physical and mental disorders. Current research is continuous on the physiological and psychological effects that music has in it's therapeutic application. Music therapy could possibly be incorporated into the chiropractic management, which advocates a wholistic approach to health care.

Need for solution:

According to Raskin (1988), the prevalence of muscle tension headache in the population at large is not that clearly documented. Various studies indicate that up to 40% of the population suffer from muscle tension headache. He also mentions that the use of certain techniques such as biofeedback for the treatment of muscle tension headache, are too expensive and the results have not been shown to be significantly better than pharmacotherapy.

(Raskin, 1988)

At present the treatment protocols for muscle tension headaches is diverse, ranging from psychotherapy to pharmacotherapy, with patients attempting almost anything to attain relief. Many patients have pursued amongst others, psychotherapy, relaxation techniques and pharmacotherapy. The diversity of the treatment protocols is due to the fact that the mechanism of muscle tension headache is still speculative, and therefore a precise treatment

protocol is yet to be established. Pharmacotherapy seems to take preference in the treatment of muscle tension headache, even though the best results are a 50% improvement in 65% of patients. It seems to be the most convenient method of treatment for many people. In the Pharmaceutical Journal (1992), in the UK 20% of the over the counter drugs are analgesics. In South Africa it is 13,2% of all the over the counter drug sales. The amount of people treating their headaches with over the counter drugs is 60% in the UK and 91% in Australia, which is the highest rated ailment treated with non-prescription drugs.

(Fassihi et al, 1992)

But pharmacotherapy is costing the consumer large amounts of money each year. A study reported on in the Pharmaceutical Journal (1992), comparing the costs of over the counter (OTC) drugs to prescription drugs revealed that it is cheaper for people to purchase OTC drugs than to visit their physician and purchase prescription drugs. The expected cost of OTC drugs by the year 2000 is estimated at US \$38700 million! With up to 20% of these drugs being analgesics, headache treatment could cost US \$7740 million per year by the year 2000! The amount for 1987 was US \$13300 million for all OTC drugs, and therefore US \$2660 million for OTC analgesics. This figure has been calculated to be increasing at a rate of 9% per year. Many of these drugs have side effects and can be habit forming.

(Fassihi et al, 1992)

In a study by Vernon (1988), chiropractic treatment has been shown to be effective in up to 80% of cases, with no side effects for the patients.

There are also many days of work lost due to muscle tension headache, through either staying home due to the severity of the headache or through seeking treatment for the headache. We need a solution that is going to be easy to apply and which is cost effective. Even in this world of advanced technology, we have not found a cure for these headaches, and this is evident from the variation of products on the market claiming to relieve muscle tension headaches.

Music therapy, is a relatively new approach and sufficient research has not been done in this area. The few studies that have been done indicate a reduction in the severity and frequency of muscle tension headaches. It would constitute a method that is convenient for the headache sufferer to use, as is pharmacotherapy, but without the costs involved and the analgesic side effects.

Description of solution:

Patients will be evaluated subjectively using the pain disability index (*see appendix 4*) and the muscle tension headache severity, frequency and duration recorded in the headache questionnaire (*see appendix 2*), and objectively by measuring their cervical range of motion (*see appendix 8*), before the commencement of the music therapy, which will be followed by the chiropractic treatment. Their cervical range of motion will be reevaluated after the conclusion of treatment. The control group will not be exposed to any music therapy and will be evaluated as above, before and after the chiropractic treatment. A reduction in the frequency of muscle tension headaches would signify a decrease

in the number of working days lost, ultimately influencing the economy.

Benefits:

The advantage of using music therapy in the treatment of muscle tension headaches is that it is provident of time and money. Music therapy has the added benefit of having no side effects which do occur with many of the drugs for muscle tension headaches at present available. The well-being of the patient is our main concern, and a therapy that alleviates or prevents these muscle tension headaches will be welcome to both the patient as well as the chiropractor.

Feasibility:

The application of music therapy is not restricted to a clinic or consulting room. It can be applied while studying, driving a car, doing housework and almost any other activity. The music therapy cassettes are relatively inexpensive. It can easily be used as a home therapy by the patient, thus helping the chiropractor in his wholistic management of muscle tension headaches.

If shown to work, it can help to prevent the muscle tension headache before it begins, as well as alleviate the headache once it has started.

1.7 SUMMARY

This study will determine the effects of music therapy as an adjunct to the chiropractic management of muscle tension headaches, in a practicable form of self help therapy to lessen the cost of treatment and to enhance the well-being of the patient. It could also be applied in other ways such as in an office environment or in the chiropractors consulting rooms, to facilitate chiropractic treatment.

CHAPTER

TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Music therapy is a controversial field of study, which, although it has existed for many centuries, it is only lately being recognised, utilised and researched. The literature is not very extensive, most of it is still unpublished, but it is opening many possible avenues to research. The literature is interesting and more often than not indicates that music therapy is practicable and has many healing properties. We are often being exposed to many different styles of music, but we do not recognise the manner in which that particular music is affecting us. Only recently have we begun to realise that music can be more beneficial than just something to listen to.

Chiropractic is another domain of interest. Much research has been done, and is continuing. The original claims made by the first chiropractors were that chiropractic heals everything!

Through research they have refuted this claim and have been able to indicate in which areas chiropractic is of most benefit.

" When practice runs ahead of knowledge, there is the danger that arrogance, dogma, and ritual may replace humility, the search for knowledge, and experimentation. There is need for research that is skilfully and imaginatively planned, carefully executed, and judiciously interpreted and applied. The planning, execution, interpretation, and application of research are interrelated parts of an ongoing process; to do any one of them well requires an understanding of the entire process. "

(Music in Therapy, 1968)

2.2 TYPES OF HEADACHES PREVALENCE AND PHYSIOLOGICAL CHANGES

Muscle tension headaches are extremely prevalent in anxious and tense individuals. Jamison (1991) states that muscle tension headaches may constitute the psychophysiological translation of anxiety into a physical symptom. Psychoneurotic depression and emotional problems are more prevalent in individuals with muscle tension headaches.

In the book *"Health Promotion for Chiropractic Practice"* by Jamison (1991), she mentions the following headaches as being the most often encountered in primary contact practice :-

- a) Headaches caused by cervical spondylosis
- b) Tension headache
- c) Migraine
- d) Cluster headache.

She compiled the table on the following page as a comparison of the above four types.

| | Caused by cervical spondylosis | Tension headache | Migraine | Cluster headache |
|---------------------------------------|---|----------------------------|---|---|
| Family history | - | ± | ++ | |
| Age of onset | increases with age | variable | under 20 years | 20 - 40 years |
| Site | Occipital | Bilateral | Unilateral | Unilateral |
| Character | Nagging ache | Pressure/constricting band | Throbbing | Deep Pain |
| Intensity | Mild / moderate | Moderate | Severe | Severe |
| Frequency | Daily | Daily | < 1 per week | 1-3 / day |
| Duration | 1 - 6 hrs | Continuous | 4-6 hrs. Can be 24 hrs. | 1 - 120 mins |
| Periodicity | Worse in morning; better as day progresses | Worse as day progresses | 2 / month | Bouts over 2 - 12 week period |
| Aggravating or precipitating factors. | Neck movement, trauma | Anxiety / Stress | Alcohol The "Pill" Glare Tyramine Hypoglycaemia | Alcohol |
| Relieving factors | Muscle relaxation, heat, Adjustments, Massage | Alcohol | Sleep | Pressure on temporal artery |
| Associated findings | Scalp paraesthesia Stiff neck | Anxiety Fatigue | Prodromata GI/visual symptoms | Stuffy nose Tearing Red eyes Nausea Sudden onset & abrupt end |

TYPES OF HEADACHES

(Jamison, 1991)

The muscle contraction headache is described by Gatterman (1990) as follows:-

- 1) Location - Occipitofrontal, frontotemporal, or holocranial, neck.
- 2) Pain character - Dull, non-throbbing, stiff muscles.
- 3) Frequency - not stated.
- 4) Duration - Few to several hours.
- 5) Temporal factors - May be relieved with rest/sleep.
- 6) Precipitating factors - Stress, emotional conflict, depression.
- 7) Associated symptoms - Neck or scalp tightness.
- 8) Treatment - Manipulation, trigger point therapy, physical therapy, massage, ice, biofeedback, minor analgesics, non-steroidal anti-inflammatory agents muscle relaxants, antidepressants.

It may have features of vascular headache - throbbing pain, may be designated tension-vascular. (Gatterman, 1990)

Cephalalgia reports on a study by Wessely et al. in 1989 at the University of Vienna, Austria, they found the following :-

Muscle tension headache is usually pressing/tightening in quality, mild or moderate in severity, bilateral and does not worsen with routine physical activity. Nausea, photophobia or phonophobia may occur, also increased EMG level of pericranial muscles at rest or during physiological stress. There exists a chronic and episodic type of muscle tension headache.

(Cephalalgia, 1988)

They state that at the moment of relaxation a physiological affect appears. This could be observed by a decrease in EMG

amplitudes, the conductivity of the skin and also an increase of the ability to relax by deep respiration.

(Cephalalgia, 1989)

Jamison, (1991) describes muscle tension headache as follows:-

- 1) The occipital region is initially involved and the pain later spreads to the parietal, frontal and facial regions.
- 2) A distinguishing feature is that the pain is bilaterally situated in 90% of cases.
- 3) The pain is described as a squeezing tightness, a constriction, or presents as a tight hat band.
- 4) The headache is persistent and sustained in its nature.
- 5) The pain varies in intensity and frequency, and is often relieved by alcohol.
- 6) Pain is normally absent or minimal on waking, and the headache develops as the day progresses.
- 7) There is an absence of prodromata.
- 8) The patients' sleep pattern is undisturbed.
- 9) Anxiety is frequently accompanied by light-headedness and dizziness.
- 10) Cold drafts normally precipitate or aggravate the headache.
- 11) On examination the jaw, neck, scalp, and face musculature are taut.
- 12) Active or latent trigger points may be present in one or more of the neck, facial or upper back muscles.
- 13) Due to the taut muscles and the trigger points, a decreased cervical range of motion is exhibited.

(Jamison, 1991)

According to Raskin (1988), there is a large degree of overlap between muscle tension headache and migraine headache. From certain studies he compiled the following table:

| | | % Migraine | % Tension |
|----------------------------|-----------------|------------|-----------|
| Age of onset | < 20 years | 55 | 30 |
| | > 20 years | 45 | 70 |
| Premontory symptoms | | 60 | 10 |
| Frequency | Daily | 3 | 50 |
| | < Weekly | 60 | 15 |
| Duration | Constant, daily | 0 | 20 |
| | 1-3 days | 35 | 10 |
| Throbbing pain | | 80 | 30 |
| Location | Unilateral | 80 | 10 |
| | Bilateral | 20 | 90 |
| Vomiting with attacks | | 50 | 10 |
| Family history of headache | | 65 | 40 |

Raskin pointed out that muscle tension headache and migraine are possibly different expressions of one disorder mechanism.

The most common age that muscle tension headaches start is between 10 and 20 years of age. (24% start at this age.) The next

most common age group is that between 20 and 30, followed by 30 - 40, 0 - 10 and then 40 - 50. The onset is very rarely after the age of 50 years.

Raskin describes the character of the pain as dull, pressing, or bandlike. The headache is said to wax and wane in intensity during the day. It has no specific location in the cranium. The headache presents on waking or shortly thereafter, and persists throughout the day, unrelated to stress and anxiety. He claims that neck pain does not accompany muscle tension headache any more than with other headache syndromes. Raskin reports on a study (Lance and Anthony, 1966) in which it was found that muscle tension headache sufferers have a higher incidence of epilepsy than do migraine sufferers.

(Raskin, 1988)

Ehrmantraut (1980), states that 90% of all headaches are tension headaches. These headaches occur as often in men as in women. He describes a muscle tension headache as one that usually starts at the rear of the head, which eventually radiates forward to involve both sides of the head. It is often described as a tight band around the head. He attributes physical and emotional causes to muscle tension headaches. The immediate source of pain is from tension in the muscles of the neck, shoulders and skull. This tension is usually, but not always, attributable to emotional tension. A physical cause could be due to lengthy postural stresses. Emotional causes can be anger, frustration guilt, or related emotional states, which can not be released from the body and result in contraction of the muscles. Another prominent cause of muscle tension headache is depression. He

believes that headache sufferers may simply take life too seriously !

(Ehrmantraut, 1980)

According to Weisberg et al. (1989), the most prevalent headache is muscle tension headache. The clinical features of muscle tension headache is outlined as follows.

Character:- Bilateral tightness over occipital, frontal, temporal area, often circumferential.

Duration:- 1 hour to many days.

Recurrence:- Fluctuates with life stress.

Onset:- gradual and without warning.

- mostly in the afternoon, but can occur upon rising.

Age:- any age.

Sex:- mostly women.

On physical examination, only tightness and tenderness of the affected muscles is noted.

(Weisberg, 1989)

Spira (1992), states that muscle tension headache diagnosis should present no difficulty to the clinician if the diagnostic criteria are strictly adhered to. The features of a muscle tension headache, according to Spira, are:

- 1) Symmetry
- 2) Bifrontal, bioccipital and nuchal distribution
- 3) Mild to moderate severity
- 4) Stable intensity profile
- 5) Accentuation as the day progresses
- 6) Frequency is often high and, at times, daily
- 7) Absence of migrainous features

Spira summises that the diagnosis is complicated by not adhering to these criteria and some attacks with a vascular features (migraine) are included. He also states that the presence of migraine such as lateralization, debilitating severity, nausea, vomiting or photophobia excludes the diagnosis of muscle tension headache.

(Spira, 1992)

According to Lance (1973), 18% of patients with muscle tension headache have a family history of headache in the family. He describes the muscle tension headache as one which is usually bilateral. The character of the headache is dull and persistent and is undulating in intensity as the day progresses. The headache is known to develop after certain stress. Usually the headache is daily, but can occur only ten times a month. The only accompanying signs are mild photophobia, slight nausea, rarely vomiting, difficulty in concentrating and sometimes also psychomotor symptoms.

Lance maintains that a third of the patients have an aspect of depression involved in the cause of the muscle tension headache. Amongst the aggravating factors are anxiety, stress, noise and glare. He also has found that this type of headache is relieved by alcohol.

On physical examination, the muscles are hypertonic and the patient appears restless. He does not specify which muscles are mostly hypertonic, but it seems to be hypertonicity of all the muscles in the body.

(Lance, 1973)

The clinical feature of this muscle tension headache are

described by Wall and Melzack (1984) as follows : steady, non-pulsatile ache. The pain has also been described as a tightness or bandlike or a cramp. The muscle tension headache is usually located bilaterally and occipitally. It can be found in the temporal, parietal and/or frontal regions as well. The headache may be sustained with varying intensity for weeks, months or even years.

Many posterior headaches are found to be due to cervical spondylosis. For this extensive manipulation of the neck should be done with care. An operation is not indicated if there is only pain present.

(Wall & Melzack, 1984)

They define a muscle tension headache as having a frequency greater than four headaches per month, a diffuse pain in the head and neck region described as dull and aching.

The following table on characteristics of headache subjects was devised by Feuerstein et al., from various headache questionnaires:-

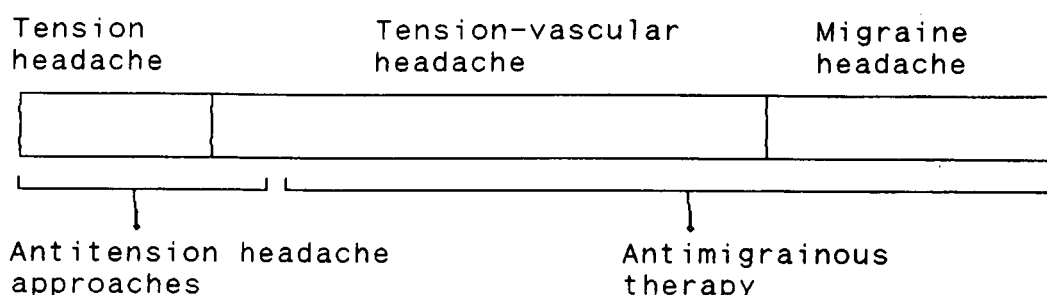
| | Migraine | Muscle contraction | Mixed |
|------------------------------------|----------|--------------------|-------|
| Age | 35.6 | 32.1 | 34.6 |
| Age of onset | 18.8 | 11 | 16.2 |
| Frequency (per month) | 6.5 | 10.6 | 8.6 |
| Duration (hrs) | 16.5 | 7.6 | 14 |
| Severity (1-5) | 4 | 3.4 | 4 |
| Stress as precipitating factor (%) | 63.6 | 87.5 | 100 |
| Medication : | | | |
| Mild analgesics | 18.2 | 44.4 | 45.5 |
| Strong analgesics | 72.7 | 100 | 74.7 |
| Vasoconstrictors | 36.4 | 0 | 18.2 |

(Feuerstein et al., 1982)

Spira highlights the new classification of headache by the International Headache Society, which classifies tension and tension-vascular headaches under the term "tension-type" headache. He is of the opinion that this term obscures rather than clarifies the diagnosis. He also feels that this complicates the choice of treatment.

Spira maintains that muscle tension headaches and migraine headaches should be kept as distinct entities, and that there is a spectrum between the two in which we find headaches with progressively increasing migrainous (vascular) features.

The following figure demonstrates the treatment of choice depending on where on the spectrum the headache occurs:



He agrees with other authors in saying that migraine headaches could develop from muscle tension headaches. He also says that partial response to treatment of a migraine headaches, a headache which is indistinguishable from muscle tension headache, or tension-vascular headache may remain. The severity of these latter two headaches is believed to be of a lower severity.

Once again, as many have already summised, Spira states that perhaps when we discover the pathophysiology of migraine headache, we may realise that muscle tension headache is its mildest form of expression.

He outlines three problems encountered when dealing with the diagnosis of muscle tension headache. The first is when muscle tension headache coexists with attacks that have migrainous features. The solution requires recognition and treatment of the tension component before the more severe migraine attack establishes itself.

The second problem is when the muscle tension headache is part of a more widespread tension syndrome. This implies that the muscle tension headache could comprise part of a tension syndrome of which cervical spondylosis is an example. A more severe

syndrome is when there is muscle tension headache accompanied by pain extending from the suboccipital area to the sacroiliac area. Spiras' solution is that the physician must be aware of an increase in contraction of the involved muscles.

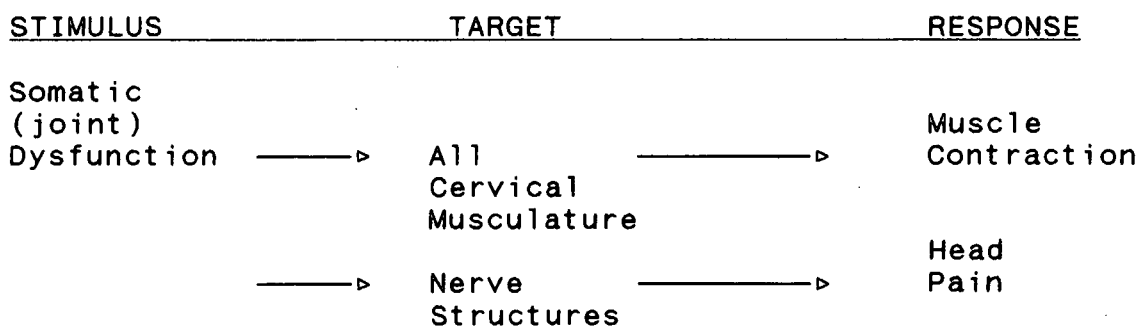
A third problem is when the muscle tension headache is mild. The patient will then describe the headache as a "fuzziness" or "dizziness".

(Spira, 1992)

2.3 AETIOLOGY AND MECHANISM OF MUSCLE TENSION HEADACHE

Vernon (1988) describes the mechanism of muscle tension headache as follows : There are articular and ligamentous nociceptors in the posterior motion segment, which accompany intra-articular inclusions such as joint meniscoids. When these nociceptors become irritated by mechanical or chemical stimuli, they transmit local joint pain, which can initiate arthrogenic muscle spasms of particularly the segmental musculature. Referred pain may also result due to activation of convergent neurones. Thus joint dysfunction plays a large role in muscle tension headaches. These joint dysfunctions have been alluded to by many practitioners who use manipulative procedures of the spine.

Vernon also describes the following chiropractic model of muscle tension headache :



(Vernon, 1988)

Jamison (1991) explains that muscle tension headache is a primary headache attributable to psychosocial stress. This indicates that muscle tension headache is a headache caused by psychosocial situations which cause tension in the muscles and subsequently cause a muscle tension headache.

(Jamison, 1991)

In her book "Chiropractic management of spine related disorders", Gatterman (1990) describes the mechanism of muscle tension headaches as follows:- The muscle hypertonicity can be primary or secondary to the muscle tension headache. Primary muscle hypertonicity is caused by acute, traumatic muscle strain or microtraumatic or chronic postural strain.

A traumatic injury to the cervical spine will induce muscle spasm, as well as inflammation of the surrounding muscles and irritation to the myofascial connection of the cranial periosteum. Nerve roots can become entrapped in these irritated tissues. Chronic postural strain is aggravated by occupational stress. This occurs when the person assumes a slumped posture with a "poked" head and a hyperlordotic cervical spine. The postural muscles are usually statically loaded and under continuous eccentric contraction, while the arms are being used in a repetitive manner. This type of posture is frequently seen in office workers and assembly line workers.

Low level chronic foci of tenderness and local occipital or nuchal and suboccipital pain is produced by irritation to the tendinous periosteal junctions. The chronically stretched muscles respond with low-level hypertonicity and trigger points in the region of the muscle spindles. These trigger points in the cervical muscles can refer pain in a cephalad direction, following constant and specific patterns. The pain that results may be due to referral from the trigger points, or from secondary entrapment of accompanying neurovascular structures.

Muscle spasm and splinting which are secondary to joint hypermobility occur with the arthrokinetic reflex. (The

arthrokinetic reflex is the joint regulation of postural muscle tone, via postural and kinesthetic sensations, due to mechanoreceptors in spinal joints, the labyrinth, eyes and skin. - as described by Wyke in 1967) The intra-articular nociceptors, when irritated by mechanical or chemical stimuli produced by local joint pain, initiate arthrogenic muscle spasm with referred pain due to activation of convergent neurons. The arthrokinetic reflex can also be triggered by joint fixation or hypomobility.

The role of joint dysfunction in producing headaches is greatly underestimated, and the value of manipulation in relief of these headaches is also underestimated. The use of motion palpation determines movement restriction of fixed vertebrae. Gatterman refers to a study by Lewit which indicates that the majority of movement restriction is between occiput and atlas. Jirout found headaches in 90% of persons with C2 - C3 fixation. Bogduk reported that upper cervical hypomobility was the major cause for muscle tension headache. Jull found a high incidence of joint dysfunction between C0 - C1, - C2 and C2 - C3, and below C4 this incidence decreased. He also stated that in 55% of the population studied, headache sufferers exhibited an increased incidence of upper cervical joint stiffness.

(Gatterman, 1990)

Cephalalgia reports on a study in 1989 on temporal muscle blood flow in chronic tension-type headache, by M. Langemark, et.al, of the department of neurology, Gentofte Hospital, University of Copenhagen, DK 2900, Hellerup, Denmark, it was hypothesized that this type of headache was of ischaemic origin, based on early

reports of alleviation by vasodilators and lack of effect or worsening by vasoconstrictors.

They found no change in blood flow and also no correlation between the pressure-pain threshold and the corresponding blood flow.

Another study in 1989 J. Shoenen et al. in Belgium measured the EMG values of head and neck muscles during different conditions. Many studies like theirs have shown an increase in EMG values in patients with chronic tension type headaches. This did not change with the position of the patient.

After a course of biofeedback therapy coupled with sophronisation, EMG levels decreased significantly in all muscles. They also found a high correlation of the improvement of the muscle tension headache severity index with the reduction of EMG levels.

This indicates that EMG activity is on average increased in pericranial as well as neck muscles in tension-type headaches. The reduction of EMG levels after therapy has been shown in other biofeedback studies as well as with tricyclic pharmacotherapy.

(Cephalalgia, 1989)

A second study in 1989 by J. Shoenen et al. in Belgium undertook to investigate the pressure pain thresholds in pericranial muscles and at an extracephalic site, the Achilles tendon, in headache patients and controls. They used a pressure algometer with a tip of 0.5 cm² was used to assess pain sensitivity. They found a high correlation between the pressure pain thresholds determined by the algometer and those determined manually by the same observer. The pressure pain thresholds were significantly

lower in patients suffering from tension-type headaches compared to the controls. This was found at the pericranial spots as well as the extracranial areas.

This again confirms that patients suffering from chronic tension-type headache are characterized by decreased pressure pain thresholds in pericranial structures while migraineurs are not. The finding of decreased pressure pain threshold at the achilles tendon suggests that the increased sensitivity to pain may be generalized.

Cephalalgia reports on a study by Bogduk in Australia reveals that cervical headache may be caused by any of the structures innervated by the first 3 cervical nerves. These include the joints, ligaments and muscles of the upper three cervical segments, including sternocleidomastoid and trapezius muscles, the dura mater of the posterior cranial fossa and upper spinal cord and the vertebral artery.

(Cephalalgia, 1989)

According to Jamison (1991) patients with muscle tension headaches are often tense, anxious, or depressed. Ischaemia is considered to play a large role in muscle tension headaches. A muscle spasm which lasts for more than two minutes may occlude local blood vessels for a long enough period to produce pain. This pain persists after the muscle contraction has subsided and may be referred to other areas of the head.

(Jamison, 1991)

Raskin (1988) maintains that muscle contraction is more a consequence rather than a cause of muscle tension headache. A study on frontalis muscle contraction revealed that muscle

contraction occurs to a greater degree in anxious subjects. This implies that emotionally disturbing situations may result in contraction of scalp muscles, which can become sustained and cause tenderness and pain. This pain probably arises due to compressed intramuscular arterioles and subsequent ischaemia which persists after the muscles have relaxed. Muscle tension headaches have often been found to be associated with increased muscle contraction of the neck and scalp muscles, both during a headache as well as in headache free periods. These studies have been done using electromyography.

Intramuscular vasoconstriction as a cause for muscle tension headaches has been supported by studies in which vasodilators such as amyl nitrate, ethyl alcohol and nicotinic acid, has caused a diminution of the headache. However, this has been refuted by other studies in which amyl nitrate has been found to increase the severity of muscle tension headaches in up to 40% of cases. A intracerebral arterial dilator, histamine, has also been shown to cause a throbbing headache in 50% of muscle tension headache sufferers, and not at all among the control group. The small conjunctival vessels have been photographed during a muscle tension headache attack, and have been shown to be constricted for as long as the headache persisted. Temporal artery pulse amplitudes were found to be lower in patients with muscle tension headaches than in control subjects. A study to which Raskin refers, Onel et al, 1961, in which clearance of radioactive sodium from the splenius capitus muscle was studied, showed that the removal is greater during an attack compared to during a headache free period. This indicates that the gross effective

circulation to the muscle is increased during a muscle tension headache. This sodium removal has been explained in a way which does not necessitate an increased blood flow i.e. it could be due to the opening of closed capillaries, increased filtration and resorption, and an acceleration of the lymphatic circulation.

(Raskin, 1988)

Raskin (1988) reports that a cause of muscle tension headache could be psychological. It was believed that anxiety expressed in a physical form resulted in muscle tension headaches. He states various studies in which this psychological cause has been a factor in precipitating the muscle tension headaches. He concluded that the most common psychological problems were dependence, sexuality and control of urges. He points out that these studies were done on patients who had long standing headaches, and that these psychological findings could be a result of living with the chronic pain. Personality studies on muscle tension headache sufferers have reported hypochondriasis, depression and hysteria as a common trait.

(Raskin, 1988)

According to Ehrmantraut (1980), the cause of muscle tension headaches can be emotional or physical. He attributes the pain to the tension in the muscles of the neck, shoulders, and skull. He states that this tension is due to emotional tension in the persons life situation. Physical causes of tension can be lengthy postural stresses. The usual cause is due to emotional states such as anger, aggravation, frustration or guilt. These emotions are often prevented from being expressed and this tension build up goes to the muscles causing them to contract.

He describes the trapezius muscle as being the most important muscle in the body as far as muscle tension headaches are concerned. The trapezius muscle is often held in a contracted state when we walk, work or perform any movement of the upper limbs, and this decreases the circulation to the muscle. He suggests self massage of this muscle to alleviate the headache.

(Ehrmantraut, 1980)

Weisberg et al. (1989) explain the perception of pain of a muscle tension headache as arising from steady contraction of the muscles attached to the skull. These muscles include frontalis, temporalis, trapezius and sometimes paraspinous muscles. The sustained contraction of the muscles creates a state in which lactic acid accumulates. This accumulation can induce vasodilation and thus introducing a vascular component to the headache. These muscles are tensed for long periods of time due to persons trying to cope with the day to day stress, anxiety, hostility, frustration or suppressed anger.

(Weisberg et al., 1989)

In an article on treatment of muscle tension headache using muscle relaxation, the aetiology of muscle tension headache is attributed to muscle tension and vasoconstriction.

(Tasko & Hinkle, 1973)

Feuerstein et al. (1982) maintain that the data on the triggers of muscle tension headaches is not very detailed, but that stress is frequently reported to be a major contributing factor.

The mechanism has not been well substantiated and is assumed to primarily be the consequence of sustained contraction of the

skeletal muscle of the head and neck which results in ischaemic pain.

They report on two studies that suggest that the temporal artery of migraine and muscle tension headache patients tends to constrict to stimuli while in non-headache patients the artery dilates. This study did not evaluate the reactivity to aversive or stressful stimulation. This vasoconstrictive tendency may indicate a stereotypic response of headache patients.

Resting EMG levels were found to highest in migraine subjects, followed by muscle contraction and then non-headache control subjects. The levels did not change significantly between the groups when aversive stimuli were applied.

The study they carried out revealed that the role of temporal artery, skeletal muscle and general autonomic reactivity to stress in muscle tension headaches is still unclear. Early studies have suggested that stress or increased anxiety is related to elevated levels of skeletal muscle activity and head pain of a dull aching or tight pressure nature. This relationship is not well documented.

(Feuerstein et al., 1982)

According to Spira, 1992, the aetiology of muscle tension headache includes an element of increased muscle contraction. Stress, anxiety, depression and muscle strain have been identified as triggers. There is often a nuchal component involved which lies in the distribution of the trapezius muscle and may extend as far down as the interscapular area.

The trigger of the headache does not necessarily indicate a diagnosis for muscle tension headache. *(Spira, 1992)*

Lance suggests that the most common factor in muscle tension headaches is the inability to relax the muscles of the face, scalp and neck. Vascular reactivity of the muscles, or an accumulation of pain-provoking substances in the muscles can also be causative agents of the headache.

(Lance, 1973)

Wall & Melzack, 1984, explain the mechanism of muscle tension headache as being skeletal muscle spasm which is related to local pathology and its central influences. This mechanism involves the following three reflex arcs :

a) A multisynaptic reflex of withdrawal usually initiates muscle spasm. Any local pathology will stimulate nerve fibers and the impulse is then transmitted directly to the spinal cord and then to the ventral roots. From here the stimulus is said to pass via efferent nerves to the neuromuscular junction. This results in acute contraction of the muscle and movement from the painful stimulus occurs.

b) Polysynaptic pathways and the lemniscal system are also stimulated. The initial stimulus is conducted via these paths, up the spinal cord to thalamic and central levels. Here the stimulus is interpreted as painful.

c) The brain sends impulses via the reticulospinal system to activate the gamma efferent neurons which contract the muscle spindle.

d) This contracting muscle spindle evokes a monosynaptic stimulus which travels directly to the ventral horn and causes a discharge in the efferent peripheral nerve as well as muscle contraction. This last reflex arc (muscle spindle contraction) is a

monosynaptic pathway and subsequently related to the tendon stretch reflex. Ordinarily the contracting muscle inhibits firing of the muscle spindle which terminates this stretch reflex, allowing the muscle to relax. The state of activity of the gamma motor system determines the degree of muscle tone. If the gamma efferent system continues to fire (due to cortical influence or pathology) the spindle remains taut and the muscle contracts continuously until the contraction itself becomes painful. This results in the pain, spasm, anxiety and pain cycle.

(Wall & Melzack, 1984)

2.4 THE MECHANISM OF PAIN

According to Forster and Palastanga (1985), pain is often considered to be a pathological state in itself by patients who often are happy to have the pain relieved, even if the underlying pathology is unaffected.

For the perception of pain there is a chain whereby peripheral receptors are stimulated by noxious physical or chemical agents. This stimulus is carried by the peripheral nerves to the spinal cord, up the cord, through the brainstem and into the cerebral cortex where pain is appreciated at a conscious level.

Along this pathway a number of synapses occur. To modulate (i.e. relieve pain) the impulses need to be inhibited on their route to the cerebral cortex.

Nociceptive nerve endings are stimulated either mechanically by trauma or muscle spasm, or chemically by chemicals released by injury to the tissues, or by accumulation due to metabolic activity. The degree of stimulation is governed by the amount of chemicals present. Removal of these agents has been postulated to reduce the level of nociceptive stimulation. Ice and heat are often used to try and achieve this.

This nociceptive stimulus is carried to the cord along a slow-conducting, non-myelinated C fiber, or along a faster myelinated A-gamma fiber. These fibers enter the cord through the posterior route. This input is known as afferent input.

All this afferent input must pass through synapses in the substantia gelatinosa and nucleus proprius of the posterior horn. At this level the "pain gate", postulated by Melzack and Wall in

1965, operates.

This theory suggests that for pain to pass through the gate there must be unopposed passage for nociceptive information arriving at the synapses in the substantia gelatinosa. However, if the gate is also concurrently receiving impulses produced by stimulation of thermoreceptors or mechanoreceptors (transmitted by large diameter myelinated fibers), then this traffic predominates with resultant presynaptic inhibition of the small-diameter nociceptive information.

For the gate to be open to nociceptive traffic, the input has to be of a predominantly small-diameter nociceptive nature. (With superimposition of large-diameter afferent information, the gate is closed to nociceptive traffic.) Many physiotherapeutic agents cause stimulation of endings connected to large diameter nerves, eg. manipulation, TENS, heat ice, massage, vibration and movement can produce a reduction in pain by "closing the pain gate".

If nociceptive information is allowed through the gate, this information will travel up the lateral spino-thalamic tract of the spinal cord to the thalamus, and then to the cerebral cortex. As the stimulus passes through the brainstem it may cause an interaction between the periaqueductal area of grey matter (PAG) and the raphe nucleus in the mid-brain. These nuclei form part of the descending pain suppression system and their descending neurones can release an endogenous opiate substance into the substantia gelatinosa at the spinal cord level. The chemical nature of this endogenous opiate, which may be Beta-endorphin or enkephalin, is such as to cause inhibition of transmission in the nociceptive circuit synapses. This is achieved by blocking the

release of the chemical transmitter (substance P) in the pain circuit.

If physiotherapeutic agents are applied which cause stimuli to flow along nociceptive fibers, this effect could be achieved. Thus if a stimulus such as ice, TENS, UV counter-irritation etc.. is applied, then the release of enkephalin or Beta-endorphin could reduce pain at a spinal level. Pharmacological evidence supports this view, as when patients experiencing pain relief from TENS are given the anti-morphine agent *naloxone*, their pain returns.

(*Forster & Palastanga, 1985*)

The vibration of sound waves, as described by Campbell (1989), could be therapeutic in stimulating the nociceptive fibers, and releasing enkephalin or Beta endorphin.

Scartelli (1984), used electromyographic biofeedback to provide immediate information concerning imperceptible muscle activity.

(*Scartelli, 1984*)

2.5 THE HISTORY OF MUSIC AND MUSIC THERAPY

Cambell states that in every cosmological myth sound and music are a major link between God and the people of the earth. The magical sounds of the elemental spirits, the secret languages of the animals and totems, the secrets of the shamans were all held in the sounds of the drums, rattles, and sonic invocations that arose from the depths during dreams and visions. " Our modern mind is has become so cluttered that it keeps us away from the power and enlightenment on which every text of wisdom insists."

(Campbell, 1989)

According to Schipkowensky, in the book "Music and the brain" by Critchley in 1980. music is the most ancient of arts. Unlike most other arts it has natural predecessors, for nature is full of noises and sounds which, like birdsong, provide tuneful melodies. We are always surrounded by songs from birth until death, at every happy and sad occasion. Man not only uses his voice, but has created various instruments to express his innermost emotions with sound.

The primitive healers resorted to song when giving medical advice. Many of these rituals lasted a few days. Music was considered an essential part of the healing process.

Music therapy attained its proper significance in the work of Orpheus (c. 1350 B.C.), a Thracian man of genius. This native of the Rhodopian mountains praised the cosmic harmony, which ought to illuminate man's mental life, to the accompaniment of a golden lyre. He would tame man's passions with his enchanting music, and reach the bottom of the most unfeeling hearts, cure

patients and even revive the dead !

He anticipated future scientific medical trends centuries before the development of Greek culture. The beginnings of Greek drama were laid in the Dionysiac festivals. The legendary Thracian king and healer Zalmoxis, mentioned by Socrates in Plato's "Charmides", held the idea of man's spiritual and bodily integrity as a whole, an irrevocable association of somatotherapy and psychotherapy. Orpheus, on the other hand, in his prophylactic and curative practice, employed music and poetry to restore harmony between Cosmos and man, living things and inorganic matter. His philosophy was the pith of Orphism which, through the medium of Pythagorean teaching, exerted considerable influence in the doctrines of Plato, Aristotle and other philosophers of ancient Greece. In all their teachings an important part was assigned to music in the fields of education, constructive interpersonal relations, art, religious ceremonies and public life. Music was considered indispensable for the preservation of mental and bodily health of the individual and the cure of functional and even organic disease.

The idea of an omnipresent harmony originally held by Orpheus, and then by Pythagoras and his disciples, penetrated much of the scientific work of antiquity and remained operative until recent times. In the rhythm of matter in its organic and inorganic state this idea of harmony holds true. In the universe is rhythm, but not together with harmony. The universal harmony is transformed by cosmic cataclysms, social calamities and individual sufferings. The movement of matter has no beginning or end, and it comprises consonance and disharmonies too. Its

rhythm remains irrevocable. This primary nature of rhythm accounts for its important role in the curative ceremonies of primitive tribes.

(Critchley, 1980)

Many legends depict how sound has played a part in creation. The Egyptian god "Thot" was believed to have created the world through his voice. The Persian and Hindu cosmogenics indicate that the universe was created from an auctostic substance. Babylonians and Greeks related the cosmos of sound through a mathematical concept of sound vibrations connected with numbers and astrology.

(Alvin, 1966)

Hauptfleisch (1985), states that sickness implicated the inability to perform social obligations for primitive man. Healing was not only concerned with the reduction of pain, but to return the sick person to the society to perform his obligations. Every possible cure was sought to achieve this. This is where music therapy had its' beginnings. The first important figure in music therapy is Marcus Tullius Cicero (106-43 BC). He stated that there is nothing so closely related to our feelings as rhythmical cadences and musical sounds. Since then music therapy has slowly progressed over the years, and in the last century, the research on psychological and physiological effects of music being well documented.

(Hauptfleisch, 1985)

In his book, Lee (1989) portrays an extensive history of music through the ancient Greek and Roman cultural traditions. The underlying theme is that music has always been used to achieve health and harmony of the body, i.e. a healing force.

(Lee 1989)

The editor of SAJMT reported that in 1992, Music Therapy was accepted by the Medical and Dental Council as a paramedic discipline, with gratitude to Prof. Gunther Pulvermacher.

(Bull, vol., 10 no.2, 1992)

2.6 TYPES OF MUSIC THERAPY

Critchley (1980) reports that throughout the centuries many "studies" were done comprising single observations and monographs. This resulted in not many publications.

Five varieties of music therapy are described:-

- a) Background music therapy - this is music played during a normal working day to a group of people so as to provide a certain mood.
- b) Contemplative music therapy - this is when music is matched on an individual basis according to patients' needs.
- c) Combined music therapy - this is where music is linked with overall influences by means of other therapeutic procedures, such as dance, hypnotism, calisthenics, autogenic training, electro-sleep, painting, poetry.
- d) 1-Executive music therapy - this is where the individual sings with or plays the instrument. 2-Executive iatromusic - This is specifically for children with mental problems.
- e) Creative music therapy - this is when catharsis is effected

by means of song or instrumental composition.

(Critchley, 1980)

Background music therapy as described by Critchley (1980) will be used in this research project.

Hanser (1985), questions whether relaxing music has clearly been defined. She states that the validity and reliability of measurement techniques need to be addressed to establish the true effects of music listening.

(Hanser, 1985)

In the book, Rehabilitation, Music and Human well-being, the type of music used is called new age music. This is a form of specific sounds rather than actual music. This form is supposed to be more beneficial than actual music. They maintain that music as we know it, causes us to respond in a predetermined pattern, whereas the new age music is designed to allow the body to establish it's own natural response.

(Lee, 1989)

The following list was recommended by Elvera Thomas, Honourary Life president of the Music Therapy Society of South Africa.(see appendix 13)

a) MUSIC FOR RELAXATION AND REVERIE

| | |
|---------------|---------------------------------|
| WAGNER | -Evening Star (from Tannhauser) |
| ZAVIER | -Romantic Flute of Pan |
| DEBUSSY | -Clair de Lune |
| RAVEL | -Pavane for a Dead Princess |
| HALPERN-KELLY | -Ancient Echoes |
| BRUCH | -Scottish Fantasy |

VIVALDI -Oboe Concertos

b) MUSIC TO RELIEVE TENSION

J S BACH -Air on a G String

MCKUEN -Concerto for Ballon and Orchestra

GRIEG -Holberg Suite

BEETHOVEN -Symphony no.6 - 1st and 2nd movements

PACHELBEL -Canon in D

HOVHANESS -Mysterious Mountain

MOZART -Concerto for flute and harp

VIVALDI -Flute Concertos

-Four Seasons

GUILANI

MANTOVANI -Guitar concertos

(Elvera Thomas, see appendix 13)

Linda Smith (1992) writes that most research she has read is fairly general in the description of the type of music used.

Usually speak of:

- slow, quiet music
- decibel level of 45-60dB
- pulse of 50 beats per min.

Couple the music with instructions to relax, feel loose, heavy or other "moods" or "states".

Start with - BACH's Air on a G String

then - Pastoral Symphony from HANDEL'S Messiah

then - "Venus" and "Jupiter" from HOLST'S The Planets

(this progresses from something quiet with a definite pulse to something more loosely floating.)

Linda Smith states that Halpern suggests that " higher tones are

more effective in the head ", and therefore music with higher tones should be used.

(Linda Smith, see appendix 12)

According to Priestley the following pieces of music are relaxing:- MOZART -Clarinet Concerto

- Quintet in A

DELIUS - On Hearing the First Cuckoo in Spring

SAMUEL BARBER - Adagio for strings

(Priestley, 1975)

Audrey Wethered describes calming and soothing music as:

A decrease of volume and/or speed. No insistent beat or accent.

Quiet, flowing music, or music with a definite form.

BACH - Jesu, Joy of Man's desiring.

- Air on a G String

SAMUEL BARBER - Adagio for strings.

BRAHMS - Waltz No. 2

She maintains that the choice is purely personal.

(Wethered, 1973)

Shani Grovè has compiled a set of tapes with baroque music on that will be used for the purpose of this study.

(see appendix 15)

The procedure used is described by Hughes & Birkhead (1993) as a method that can be used safely by most persons, irrespective of the circumstances. It can be applied by the layman and will almost always produce favourable results. Merely listening to music which fulfils the following criteria:

- Slow steady beat (approx. 40-60 beats per min.)
- Orderly, non-emotional form and character.
- Low volume.

Best results have been attained with slow movements by the composers of the Baroque period i.e. Bach, Händel, Corelli, Vivaldi, Teleman, Albinoni.

(Hughes & Birkhead, 1993)

In her article Redmond (1984) discusses the choice of music for treating an ailment. She points out that music should not be chosen on one's own personal taste for another person. She goes on to explain a concept devised by Professor Eagle at Southern Methodist University: Entrainment. Slow baroque music is described as being in synchronisation with the body's own rhythm. This is the ideal music for achieving a relaxed state of mind. When the patient has "locked in" with this music, it is called entrainment.

Another method mentioned, on page 64, is the iso-principle. The mood of the patient is matched to the music and then gradually the music is changed to the type of music that will achieve the results that are desirable. This change is done gradually so that the patients' mood can change appropriately.

Entrainment and the iso-principle have a considerable impact on relaxation.

Slow baroque music is known to calm an agitated person. It regulates the breathing, relaxes the tensed muscles and frees the mind and body which enables it to heal itself.

"Not only does music-sound-influence behaviour, it well may be the origin of behaviour. Such potential power demands that music

be selected with the greatest care possible."

(Redmond, 1984)

The limited documentation on the type of music used in experiments compels us to rely on our present observations. According to Alvin (1966), the effects that a piece of music produces depends on the different elements of sound. These elements are : frequency (pitch)

intensity

tone colour

interval, creating melody and harmony

duration, creating rhythm and tempo.

Pitch, intensity and tone colour are regarded as inherent in sound and cause thalamic responses which do not need higher brain functions to be interpreted. The other elements are regarded as requiring more intellect to comprehend.

A slow rhythm is described as having a relaxing effect. A soft volume creates an atmosphere of intimacy or persuasiveness. Rhythm is a very dynamic factor and expresses an alternation of tension and relaxation by means of stresses, accentuations, breathing spaces, strong and weak beats. Rhythm is said to be able to provoke anything from hysterical behaviour to inducing sleep. Very primitive rhythms are often used in sophisticated pieces of music, and for this reason music also appeals to the unsophisticated listener.

(Alvin, 1966)

Stephanie Merritt (1990) states that classical music is most commonly used for learning, healing, and self-exploration. This is because many scientists and music therapists who have

extensively studied all types of music, agree that classical music has the greatest therapeutic value of all music types. Rock music does not supply the inspiration and spiritual connection that most of us hunger for. Rock consists of chaotic and disturbing sounds which disturb the rhythms of our body and mind. Various studies have been done in support of this. Certain classical music, with a slow tempo, slows down the heart rate, breathing rate, and changes brain waves, as well as producing a sense of order and unity. Not all classical music has this effect though. The music has to be carefully chosen.

New age music is becoming more popular for relaxation and healing. It has themes which are cosmic and global, environmental, or ethnic. As music is sometimes said to be culturally bound (has a certain effect on only one culture) New Age music can influence all cultures as it often lacks direction and / or melody.

Baroque music , composed between 1600 - 1750, is highly structured and precise. It has an energetic movement as well as a slow movement and a steady pulsation that keeps a person from becoming tired. It produces a sense of security and order due to its' predictability and dependability. It is thus used to integrate the entire brain. Baroque composers are Bach, Handel, Vivaldi, and Corelli, to name a few.

(Merritt, 1990)

2.7 THE EFFECTS OF MUSIC

2.7.1 MUSIC AND ALPHA RHYTHMS

Ehrmantraut (1980) writes that for many years it has been known that a specific state of relaxation of the body muscles results in a frequency of electrical activity in the brain known as alpha brain waves. The proposal was made that this relationship could be reversed, i.e. if one could induce the brain to produce alpha waves, the body musculature would relax. In later years this relationship has been verified with experiments. The method most commonly used to achieve this state of alpha brain waves is transcendental meditation. This involves the repetition of a chant for twenty minutes. This state can also be achieved by specific methods of breathing. Ehrmantraut claims that achieving this alpha state just twice a day will be beneficial in reducing one's tension and relieve the headache. Relaxation is seen as very important in reducing the headache. This refers to both muscular and emotional tensions.

(Ehrmantraut, 1980)

Gardner describes four types of brain waves in human beings that may be produced by musical pulses :

Beta - 13-30 Hz.

- Rapid waves occurring when awake and in a rational state.

Alpha - 8-13 Hz.

- Slower waves occurring when we relax, but are still awake

Theta - 4-7 Hz.

- very slow waves occurring just before sleep or during

deep meditation.

Delta - 0.5-4 Hz.

- ultraslow waves occurring in deep sleep.

(Gardner, 1990)

In her book, *Thank You Brain* (1990), Shani Grové discusses the physical structure of the brain. She does not place much emphasis on the differences between the two hemispheres, but rather discusses the concept of using more brain.

The right brain deals with spatial orientations, spatial patterns and concrete objects. Music and picture are connected with this side of the brain. It gives us a wholistic view.

The left brain deals with analysis, sequences, deductions and is concerned with language and words.

She sites examples where slow baroque music has been used :- for cows to give more milk, hens to lay more eggs, plants to grow better and bear larger fruit and flowers !

Other types of music have been indicated for treatment of pain and depression, such as Don Campbell's "Angels" which was played for terminally ill cancer patients, and a substantial percentage recovered. Classical music has been use in a suggestopaedic approach to enable people to learn new languages.

Shani Grové explains that slow baroque music will change the brain waves to alpha rhythm, which lowers the body tension, but at the same time renders the brain more alert. *(see appendix 15)*

(Grové, 1990)

Responses to listening to slow baroque music are described by Hughes and Birkhead (1993) as follows :- Alpha waves have been found to increase by 4-6%, and beta waves to decrease by up to

6%. The pulse slows down by about 5 beats per minute, blood pressure drops by about 4 divisions. Respiration slows down and the whole body relaxes as the muscular activity decreases. Awareness and mental efficiency increase and the subject has a sense of physical and emotional well being.

(Hughes & Birkhead, 1993)

In her book Shani Grove concentrates on how to improve the learning process. This is achieved by causing relaxation of the body but maintaining alertness of the brain. With treating muscle tension headaches, we wish to achieve the same physical results.

Shani Grové then explains what effect music has. It affects the mind and the body. A certain tune will conjure up certain feelings, which all of us have experienced. She attributes this effect of the music on the mind and the body to three basic elements of music : sound, beat and rhythm, which are all present in the body. The body is said to resonate the music.

Slow baroque music changes the brain waves to alpha rhythm, which is a brain pattern which reflects a relaxed state, yet bringing about an increased awareness. In alpha state, one is able to understand, absorb and remember far better.

PET scans of the brain have been done whilst listening to different types of music, and it revealed that more parts of the brain are active during listening to classical music.

As the right area of the brain is more involved with rhythm and emotion, the music tends to activate areas on the right hand side of the brain. As the hemispheres are connected by the corpus callosum, the left side of the brain is also more active.

She states that research has shown that of all types of music, the slow baroque music, as well as selected pieces of music by composers such as Shankar and Halpern, work the best.

Slow baroque music lowers the body tension and the blood pressure.

She quotes Don Campbell as saying that music makes the brain grow.

Shani, as many others, suggests that the music be played in the background. If the person does not like the music, it should not matter as the music should not be listened to, but merely be heard in the background. Trained musicians are the only people who are affected differently by the music as they tend to concentrate on the music instead of enjoying it as background music. Different race groups who are unfamiliar with this type of music also benefit from it. Thus she is not in agreement with many authors who claim that music is culturally bound.

(Grové, 1990)

In an article in the International Journal of Behavioral Geriatrics, it is stated that music is emotionally evocative and is thought to primarily involve right hemisphere activity. This right hemisphere activity is thought to be more associational and holistic than left hemisphere processes. Pleasant emotional associations likely to be triggered by music might serve to reinforce the relaxation process, thereby increasing the benefit to the patient.

(Linoff & West, 1982)

In her book, Merritt (1990), says that our responses to music are not conscious responses. We have been manipulated with music for a long time already such as with music that advertisers use to

sell their products. Background music in a shop can cause many people to become irritable. She states that we are music and we live and breathe sound. We are constantly responding to all sounds around us whether we notice them or not. All through time it has been noted how persons and nations respond to different types of music. We all take in many sounds without realising how they are affecting our minds and bodies.

Pain and disease often have an emotional root cause. Music can help prevent and ameliorate many physical ills.

(Merritt, 1990)

2.7.2 THE MECHANISM OF MUSIC THERAPY

Campbell (1989) maintains that the mid portion of the brain, the limbic system, regulates the tone or emotion of the body. It is here that the basic sounds of expression are made. When we chant or hum for long periods, we can stimulate this limbic area to reduce stress and give us a sense of well being.

Sound waves vibrate in the atmosphere around the earth and our ears respond to a certain range of these frequencies. Not consciously hearing a sound does not mean that we don't receive the sonic stimulation in a different manner such as through our skin, hair and bones. The vibration is there, modifying the air around us. When one of the conscious senses is defective, others become enhanced so that communication between the inner and outer worlds can be more facile.

Tone is any sound which is prolonged enough to enable us to hear it. To "tone" the body usually means to stimulate or reinforce health. A "tonic" is used to balance the body. This is the primary purpose of the vibratory sound made within the body. We can use sonic vibration in a harmonic context to heal the imbalances of the body.

(Campbell, 1989)

In an article, in the South African Journal of Music Therapy, the effects of music on the body are discussed. Sound is vibration and therefore the entire universe is potentially sound. Music is sound that has been organised by man so that he can utilise the power of sound. Bodily rhythms are affected by the vibrations caused by sound. Our universe is rhythmic, our bodies

are rhythmic, and our sense of hearing enables us to convert musical sounds into intellectual or emotional ideas. Our bodily rhythms will attempt to align themselves with the rhythm of whatever music we hear. When listening to music all the parts of the body vibrate at their own different frequencies, but are all in harmony with each other. The music actually massages the body. It has a particular effect on the limbic system of the brain which is the control centre of autonomic functions. The heart rate can be influenced by the tempo of the music. This in turn affects the blood pressure. Respiration is said to change in frequency depth and rhythm. Brain wave activity is also affected by music. This has a marked effect on intellectual levels and on the stress experienced by the individual. All these physical changes manifest in the relevant bodily rhythms in an attempt to synchronise with the rhythm of the music being heard.

(Hughes & Birkhead, 1993)

Zietsman (1985) agrees that there are vital body rhythms and states that they organise and induce maturation and development during ontogenesis.

(Zietsman, 1985)

Hughes and Birkhead (1993) also state that as one listens to the music the bodily rhythms begin to synchronize with the slow steady beat of the music. As the functions of the body slow down, the brain activity slows down to alpha rhythm, the body relaxes and awareness is increased which lessens the stress of the body. As the relaxation deepens, so the listening to the music increases, resulting in an increased relaxation. The music

should be played for at least ten minutes, and preferably it should be played as background music. The best results have been attained by listening to the music in a comfortable position such as in a comfortable, straight chair, in a relaxed and upright position, with the spine comfortably erect. This should be done once to twice a day.

(Hughes & Birkhead, 1993)

Music is a simple form of rhythmical vibrations. These are perceived through nervous channels including the skin and the bone.

(Alvin, 1966)

Gaston (1968) maintains that each culture has it's own traditions, just as each has it's own music. He states that music from a different culture will have very little meaning if it is not "understood" culturally by the listener..

(Music in Therapy, 1968)

Zietsman (1985) and Hauptfliesch (1985) are in agreement with Gaston on this concept of music being culturally bound. Zietsman feels that the person will not be able to identify with music not of his culture.

(Zietsman, 1985 and Hauptfleisch, 1985)

Gardener (1990) also agrees that music is a personal choice and each culture has its own selections. Therefore a person can not relate to a music form to which he is not accustomed.

(Gardner, 1990)

In contrast, Shani Grovè does not agree that the effects of music is bound by culture.

(Shani Grovè, 1989)

In their article " The aio connection ", Eagle & Harsh point out

that the sense of hearing is the only sense which we can not easily control. A person can close their eyes (sight), refrain from taste, block their nose and breathe through their mouth, and even refrain from tactile sensation, but they can not easily close their ears, even in sleep. The Greeks consider hearing to be the basic perceptual attribute of humankind. The Greeks believe that music is beautiful and aesthetic. It is believed to be a healing power.

Pain is seen as a warning system of the body. Pain is subjective and is perceived and interpreted by the mind as pain. Each person has a different association for pain as well as for music which is also a sensory stimulus interpreted by the brain. Pain is divided into acute, chronic and psychogenic. Acute and chronic are self explanatory. Psychogenic pain is when there is a lack of physical stimuli to which the pain can be attributed. The stimulus can be one of three mechanisms :

Anxiety / tension

Hysterical conversion

Hallucinogenic.

Music and pain share some psychoneurological processing areas. The most notable is the limbic system. This is where sensory input is relayed, memory storage is directed, and motor output is mobilized i.e. ensures that the response is the most beneficial for self preservation of the organism. The limbic system is responsible for emotional output. Music and pain are both sensory input, and both evoke emotional output. As the pain and music both follow very similar neural pathways, they can affect each other.

There are various psychoacoustical connection between pain and music. Frequency is how we determine the severity of any pain, and how the pitch of a musical tone is determined. A change in frequency in a body part, due to injury, leads to the stimulus of pain. Intensity/loudness is the amount of time in which energy and pressure are exerted i.e. the more energy, the more pain and the more energy, the louder the music. Wave form/Timbre, or quality of pain and music are determined by the distribution of energy. Duration / Time is incorporated into the above three factors. The duration can be manipulated by perceived pitches, loudness, tone, rhythms, beats and tempos. This technique can expand the sense of time and be used as an analgesic. Location /Localization is the subjective impression of where the pain or music is coming from. Once located, pain can be altered by changing the rhythm and frequency by means of carefully selected music.

If music can be brought into close resonance with the pain vibration, the psychological perception of pain can be altered or eliminated. *(Eagle & Harsh, 1988)*

Zietsman (1985) States that rhythm is the most fundamental component of music. *(Zietsman, 1985)*

Merrit (1990) also describes rhythm as a major component of music, and as being the primal force in our lives. Resonators placed close to each other tend to synchronize themselves at the same frequency. This can occur with rhythms around the body as well.

A study done at Ohio Statue University found that music lowered the psychological stress of exercise. It keeps the athletes from

getting tired, enabling them to push harder with less effort. Music also regulates breathing and promotes better muscle coordination. *(Merritt, 1990)*

Scartelli (1984) hypothesised on the mechanism of music producing physiological responses as the sedative music producing right hemisphere (cerebral) processes and acting as an inhibiting agent for left hemisphere activities. In his study he found that the combination of music and biofeedback produced a mean decrease in the EMG levels.

(Scartelli, 1984)

The results of a study by Rider (1984) indicate that music causing a shift from tension to relaxation was the single most effective condition in reducing pain and EMG levels.

(Rider, 1984)

In the article by Bailey (1986) the primary mechanism by which music therapy reduces pain is attributed to distraction which alters pain perception. i.e Music refocuses attention to more pleasing sensations.

(Bailey, 1986)

Maslar, (1986) agrees with the above statement by Bailey. She also refers to the iso principle which has been described by Gatewood. This iso-principle states that when two stimuli enter the nervous system simultaneously, only the stronger stimulus enters the consciousness. i.e. When focusing on the music stimulus (stronger), the pain stimulus is excluded.

(Maslar, 1986)

This iso principle was devised by Altshuler in 1948. It entails matching the mood of the patient to the music and then gradually

changing the music to the type of music that will achieve the results that are desirable. This change is done gradually so that the patients' mood can change appropriately.

(*Redmond, 1984*)

2.7.3 PHYSIOLOGICAL RESPONSES TO MUSIC

Critchley and Henson, in Critchley's book "Music and the brain", in 1980, claim that it has been known for many years already that perceptual and emotional musical experiences lead to a change in blood pressure, pulse rate, respiration, the psychogalvanic reflex and other autonomic functions. They recorded the nature and extent of these phenomena. They came to the following conclusions:

1) The autonomic response depends on:-

- a) its reactivity, that is the lability or stability of the autonomic regulatory process. This in turn is influenced by constitution (predisposition), age, sex, mode of life, physical fitness, general state of health or temporary factors as fatigue, drinking alcohol or coffee, and so on;
- b) emotional reactivity; and
- c) attitudes toward music, the importance of music in the subject's life, and also upon his immediate attitude towards the piece of music presented in the test situation.
- d) the kind of music presented

2) The system of maximal response (comparing cardiovascular with respiratory and galvanic skin responses) depends mainly on

- a) the character of the subject's individual autonomic response i.e. the same stimuli cause different autonomic responses in different people.
- b) the type of music which is being played.

(dance music or orchestral marches produce predominantly motor responses, while other

pieces are more liable to produce respiratory or cardiovascular responses.)

3) There are marked differences in reactivity between the performer and the listener

4) Autonomic reactions of various systems:-

a)Cardiovascular

General increases occur in response to music. This may be an expression of pleasure and approval, but also of displeasure and disapproval.

b)Respiration

During the playing of music, changes in frequency and depth of respiration occur as well as the relation between inhalation and exhalation occur. This includes tendencies towards rhythmical or arrhythmical respiratory activity.

c)Psychogalvanic reflex.

This showed great sensitivity, but single calibrations were difficult and the response fatigued during lengthy tests. Any other distraction led to responses which could be misinterpreted.

d)Motor activity

Critchley and Henson found that under laboratory condition it is possible to assess muscular activity electromyographically during the perception of music. Increased muscular activity during the process of listening to music as evidenced by an increase in the number and amplitude of muscle action potentials. There are also quantitative as well as qualitative differences between various muscular segments; for instance, between cranial muscles and those of the extremities.

At rest only minor differences occur between muscular activity in the forehead region and in the legs. While the subject listens to a record of dance music the effect of the music goes, so to speak, "into the legs" ; muscle action potentials increase sharply in the legs and relatively slightly in the frontalis muscles. A reverse effect is found during a silent arithmetical task, when there is a greater increase in muscular activity in the region of the brow than in the legs. Listening to Bach's Brandenburg concerto no. 6 enhances crural and, to a lesser degree, frontalis muscular activity. With temporary marked augmentation of the sound volume a very pronounced increase of muscle action potentials in both leg and forehead was noted. While listening to a performance of Bach's Brandenburg concerto No.1, fluctuations of muscle activity were recorded; these changes were reproducible by repeat performances and they occurred at the same passages. The pulse rate increased at the beginning of the presentation and continued at a raised level. At the end of the performance oscillations of the pulse rate occurred synchronously with the respiration and presumably indicated an alteration in the respiratory regulation. The respiratory rate increases at the beginning, temporarily coupled with a decreasing respiratory volume, the latter, however, subsequently showed an increase. At a certain passage bradypnoea was noted temporarily; repeat performances showed the reproducible nature of this response at exactly the same passage. At the end of the performance the respiratory rate fell to levels which were less than half those at the peak. The increase of muscle activity, pulse rates and respiratory rates which occur

at the beginning of the musical presentation are the expression of a generally raised level of activation.

The recording of the ankle jerk represents an indication of muscle tone and it's changes. This test is carried out with the use of an apparatus permitting the elicitation of the reflex with stimuli of equal strength delivered at regular intervals. Music induces changes in the reflex caused by changes in muscle tone. When a subject was asked to squeeze an ergonometer, an instrument to measure the strength of the handgrasp at regular intervals and with equal effort he will be unable to carry out the test properly while music is being played. Lullabies invariably decrease and march songs increase muscular strength.

4) The effect of tranquillizers

An almost complete suppression of music-induced autonomic responses was noted after the administration of tranquillizers.

(Critchley, 1980)

In an article in the International Journal of Behavioral Geriatrics, an experiment using music therapy in the treatment of muscle tension headaches, the results showed a decrease in the agitation and tension of the sternocleido muscles within the first six treatment sessions. Certain of the medication was reduced and others were completely discontinued.

(Linoff & West, 1982)

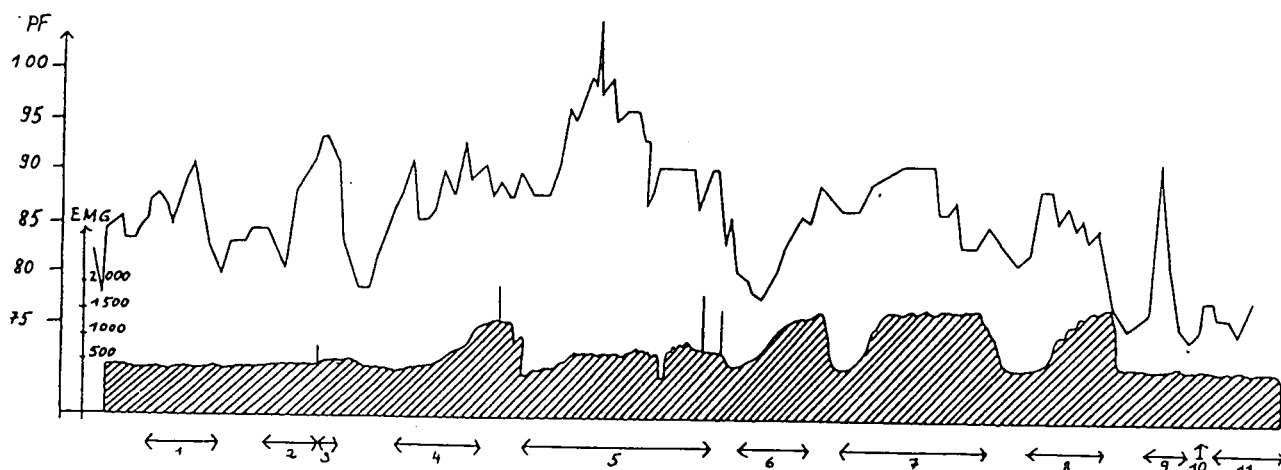


Figure 7 Pulse rate and integrated muscular activity while the subject was listening to: (1) Brahms' "Wiegenlied", (2) the hooting of sirens (firefighting vehicles), (3) the grating of a saw, (4) Concertino No. III in A flat, G. B. Pergolesi, (5) Kalinka, (6) Telemusic, K. Stockhausen, (7) Bach's Toccata in D minor, (8) Dixieland music, and (9) during an arithmetical task, (10) associated with a cough, (11) during relaxation.

(Critchley, 1980)

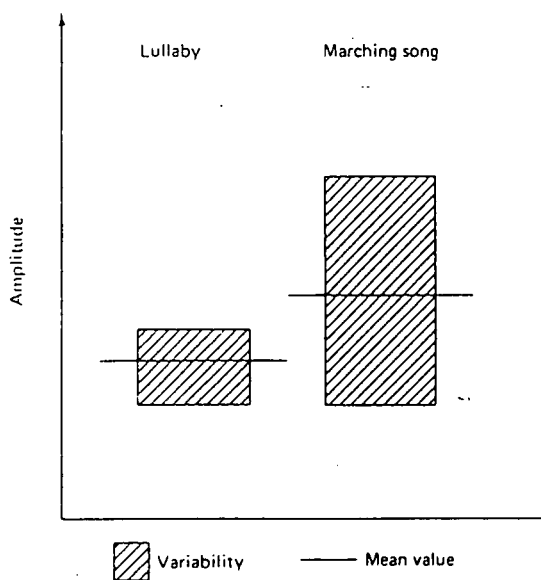


Figure 8 Music-induced changes of the ankle jerk.

(Critchley, 1980)

In her article she quotes Gaston as saying that music is an essential function of man. It influences mans behaviour, it relaxes one and it adds meaning to significant ritual. She also mentions that music has an effect on heart and pulse rates, blood pressure, respiration, galvanic skin response, muscular and motor responses and brain waves. *(Redmond, 1984)*

Even the simplest of music is evocative of sensations and can create moods. It does this through the elements it contains. Therapeutically the effects of music have been well observed, but the kind of music used has not been well documented.

(Alvin, 1966)

Since 1966, many more observations as to the type of music to use have been better documented.

Zietsman (1985) states that the changes induced by "baroque music" are a decrease in blood pressure, a reduction of muscle tone and a slower pulse rate.

(Zietsman, 1985)

In an article by Bailey (1986), some physiological responses to music are mentioned :

- Capacity to increase or decrease muscular energy
- Affects volume of pulse and blood pressure
- Alters mood

(Bailey, 1986)

In her article, Hanser (1985), mentions the responses of the body to music are a change in galvanic skin response, change in muscle tone, heart rate and blood pressure, and gastric motility, shifts

in mood and attitude as well.

(Hanser, 1985)

According to Alvin (1966), some physical responses of the body are an involuntary increase or decrease in breathing. Skin resistance also changes involuntarily. A high or low pitch can produce the corresponding effect of nervous tension or relaxation. This does not depend on the character of the music. Music has also been shown to have an effect on the pulse rate.

(Alvin, 1966)

Results vary depending on :- The subject's general reactivity
(ability to convert music sounds
into rhythm, sense and
understanding).

- The subject's general disposition
i.e. age, sex health, immediate
factors such as fatigue, sensitivity
to the surroundings and illness.

(Hughes & Birkhead, 1993)

2.8 TREATMENT OF MUSCLE TENSION HEADACHE

2.8.1 MEDICAL TREATMENT OF MUSCLE TENSION HEADACHE

Various studies on the treatment of muscle tension headaches show biofeedback to be of great value. The use of tizanidine in small doses also proved effective. *(Cephalalgia, 1989)*

Infiltration of procaine into the contracted muscles causing the muscle tension headache may relieve a component of the headache but rarely results in the total removal of head pain.

(Raskin, 1988)

The main treatment of headaches seems to be pharmacotherapy. This is often in the form of over the counter drugs. 60% of headaches in the UK, and 91% in Australia, are treated with over the counter drugs.

(Fassihi et al., 1992)

In another article in the Chemist & Druggist (1991) it is stated that the use of analgesics every day actually causes headaches. Analgesics such as aspirin and paracetamol were mentioned as examples of these over the counter analgesics. The mechanism is that when the sufferer feels a headache coming on, or wakes in the morning with a headache they take an analgesic. But this headache is proposed to be a withdrawal symptom of the previous analgesic. The patient therefore gets into a vicious cycle. The withdrawal of the drugs needs to be done in hospital to control the withdrawal effects. These drug induced headaches were found to exist only in people treating themselves for headaches and not in others taking the drug for other reasons such as rheumatoid arthritis. *(IIR Scientific and technical, 1991)*

In another article in *Chemist & Druggist* (1991), the average annual % growth rate between 1988 and 1991 was given as 9% for analgesics. Of the complaints of persons purchasing over the counter drugs, headaches rated as 66%, second only to colds which were 70%.

(Mintel Report, 1991)

Ehrmantraut (1980), describes the medical approach to muscle tension headaches as the "analgesic and tranquillizer route". The analgesics raise the pain threshold, and the tranquilizers lower the muscle tension.

Ehrmantraut also discusses the components of the drugs used to relieve headaches. These being mainly aspirin and acetaminophen. Aspirin reduces fever and inflammation and raises the pain threshold. Acetaminophen is an analgesic and an antipyretic, but is not as antipyretic as aspirin.

(Ehrmantraut, 1980)

Raskin (1988) believes that the attitude of the physician plays a major role in treating muscle tension headaches because often the cause is emotional. He points out that it is important to inform the patient that a recurring headache at present cannot be permanently cured. He claims that only the severity and frequency of the headaches may be reduced. He feels that psychotherapy is to be considered if the emotional problem per se warrants that approach. The mainstay of therapy is pharmacotherapy and relaxation techniques.

As stress and anxiety have been recognised as a cause of muscle tension headache, so relaxation may abort or lessen the severity of recurring headache. Raskin feels that even with other methods

pharmacological intervention is almost always necessary. The use of intravenous dihydroergotamine has been found to be effective in relieving the muscle tension headache. Raskin feels that the best method is prophylactic agents such as daily intake of amitriptyline. He shuns the use of dependence-generating drugs such as analgesics or sedatives. Other drugs that have been found effective have been diazepam, chlordiazepoxide, meprobamate, maprotiline, imipramine and a belladonna-ergotomine-phenobarbital combination. He does not advocate the permanent intake of these drugs, but rather an initial treatment time with the drugs the being reduced gradually. If the headache recurs, the drug is reinstated for another cycle.

(Raskin, 1988)

The treatment protocol prescribed by Weisberg et al. (1989) is that of simple analgesics, amitriptyline, biofeedback and psychological support. The following steps are important in the treatment of muscle tension headaches:- The patient must be seen as having real pain and not simply brushed aside and given an analgesic. They should be assured that they do not have a serious disease. The physician should be realistic and explain to the patient that the headaches can probably be reduced, but not eliminated completely.

The origin of the problem must be sought as it is often due to life circumstances which need to be changed. Weisberg et al. also mention that neck massage, muscle relaxation, and biofeedback techniques can be helpful. The use of medicines is also advocated. Three main groups are distinguished. Muscle relaxants, psychotropics and analgesics. He has found that

muscle relaxants are not very effective. A problem with using drugs, is of course, dependence. Thus the daily use of medicine is discouraged. They describe the treatment of muscle tension headache as difficult and thus needs to be individualized.

(Weisberg et al., 1989)

Spira describes three approaches in the treatment of muscle tension headache. The first is to clearly explain the muscle tension headache to the patient. This will allay any anxiety the patient may have. This then leads him to his next approach which is pharmacotherapy.

Here he advocates the use of simple or compound analgesics. He does state that when the analgesics are taken too frequently, the duration of their effect is reduced. Eventually the headache attacks no longer respond to the analgesics. In this case he recommends tricyclic antidepressants. He points out that the medication must be explained to the patient as far as the action and side effects are concerned.

He also recommends stress management even though he feels that stress does not play a significantly large role in the aetiology of muscle tension headache.

(Spira, 1992)

Lance feels that the ideal in the treatment of muscle tension headache is not to prescribe any medication. He feels that a form of psychotherapy can be very beneficial. The first step is to reassure the patient that they do not have a serious disorder. The second step is to draw to the patients attention the physical signs of his tension i.e. hypertonic muscles, and to teach them to relax these muscles with relaxation exercises. Hot packs and

massage may be helpful in these cases.

(Lance, 1973)

2.8.2 CHIROPRACTIC TREATMENT OF MUSCLE TENSION HEADACHES

The role of manipulation in the treatment of muscle tension headaches is greatly underestimated.

(Gatterman, 1989)

In a study by Vernon (1988) he reported up to 80% success with muscle tension headache patients. He found significant decrease in frequency, duration and severity.

Vernon also contributes these muscle tension headaches to myofascial dysfunction syndrome. The mechanism is either direct involvement of the muscles or secondary entrapment of the neurovascular components eg. greater occipital nerve in the trapezius muscle. In his studies, chiropractic treatment involved adjustments of the cervical spine. This was reported in several studies to be the most effective form of treatment for muscle tension headaches. This effectiveness of manipulative treatment still needs much research as most studies have been small. Headache sufferers were evaluated for vertebral misalignment of the cervical spine. Results indicated significant differences between controls and headache sufferers in incidence and degree of lateral tilting of C1 and C3. Static misalignment as well as motion dysfunction of the upper cervical spine was noted in various studies of persons with muscle tension headaches.

(Vernon, 1988)

Jamison also points out that manipulation or rather correction of subluxation is very beneficial in the treatment of muscle tension headache.

(Jamison, 1991)

Studies on headache have been done in chiropractic research, and

have revealed that the muscle tension headaches respond very favourably to chiropractic treatment, and in some cases the headache did not recur for a year.

(Leach, 1986)

2.8.3 MUSIC THERAPY IN THE TREATMENT OF MUSCLE TENSION HEADACHES

There is not extensive literature on the treatment of muscle tension headache using music therapy. A few studies have been done on the treatment of "headache".

In a study using music therapy, reported on by Scartelli (1984), EMG was found to be reduce frontalis muscle tension which had been causing head pain. *(Scartelli, 1984)*

Epstein, Hersen and Hemphill (1974), found that the muscle tension headache levels and medication requirements were low during biofeedback. Anti-tension exercises were found to have a sustained decrease in headaches.

(Epstein et al., 1974)

In a study by Kibler and Rider in 1983, the effect of music on stress was measured by changes in finger temperature. The groups received either sedative music, progressive muscle relaxation or both, and no significant change was found between the groups. The temperature of all groups was found to increase immediately after treatment.

(Kibler and Rider, 1983)

Karim (1990) found that music therapy decreased the frequency and severity of the muscle tension headache. She suggested that experiences which induce higher relaxed states offer an effective treatment for headache disorders.

(Karim, 1990)

2.8.4 OTHER METHODS OF TREATMENT OF MUSCLE TENSION HEADACHES

Raskin (1988) states that even though there is general agreement that stress and anxiety are important correlates of muscle tension headache, intensive psychotherapy has not been practical nor satisfactory for most patients.

(Raskin, 1988)

Ehrmantraut (1980) suggests a method by which the blood circulation in the muscles is increased in order to relieve these muscle tension headaches. This ensures an adequate supply of oxygen to the muscles and an adequate removal of waste products of metabolism such as lactic acid from the muscles. This is achieved by massaging the affected muscles with a brush. When the involved muscles are contracted for long periods of time, either from physical positions or nervous tension, the circulation is decreased in the muscles and the waste products build up in the muscles.

The state of contraction of the muscles is affected by the load put on them, thus posture has an effect on how much load is put on the muscles. He recommends correction of posture.

(Ehrmantraut, 1980)

Raskin (1988) mentions that massage, manual stretching of the involved muscles, hot tub baths and local heat application should not be overlooked. He also mentions other relaxation techniques such as meditation, hypnosis and yoga. Controlled studies in the effectiveness of these methods are still wanting. Biofeedback techniques have also received attention, but the expense of this procedure leads Raskin to believe that it may not be necessary

to achieve the same end result as other methods. Some patients have received sufficient relief from relaxation techniques, but for most, pharmacotherapy is necessary. He states that relaxation is preferable in that patients can continue to practice at home and receive occasional reinforcement from the physician.

(Raskin, 1988)

In an article on the treatment of muscle tension headaches using relaxation methods, relaxation exercises were taught to the subjects. The results were a significant decrease in the number of headaches per week as well as a decrease in the duration of the headaches. The procedure used was simple relaxation of the musculature of the neck and upper back muscles. This indicates that relaxation of these muscles does indeed decrease the frequency and duration of the headaches.

(Tasko & Hinkle, 1973)

2.8.5 THE TREATMENT OF HEADACHE WITH MUSIC

In the early nineteenth century, a medical man, Benoit Mojan, proposed some principles of application. He pointed out that the following considerations should be made:

- The nature of the illness
- The taste of the person for certain tunes or others
- The effect that may be produced on him by certain melodies rather than others
- To avoid the use of music in cases of headaches, earaches and in all cases where there is excessive excitability in the system
- The sounds must be moderated as their intensity could stimulate too strongly
- The sounds should increase gradually, be varied and the music should not last for long.

(Alvin, 1966)

Many authors have claimed that music reduces muscle hypertonicity, which is synonymous with muscle tension headaches. Thus in this particular study on muscle tension headaches, it is believed that music therapy has a great role to play.

In an article in the International Journal of Behavioural Geriatrics an article by Linoff & West (1982) outline the treatment of muscle tension headache with music. The case was that of a 89 year old, organic, seriously ill nursing home patient with a history of thirty years of muscle tension headaches. The headaches were increasing in severity. The

traditional relaxation methods were inappropriate in this case. A procedure where verbal instruction with music was used.

On examination increased tension of the right sternocleidomastoid muscle was noted. The treatment lasted for nineteen sessions, after which the patient felt & appeared more comfortable, reported decreased headaches and improved interpersonal interactions with the therapists. His headache medications were reduced or even discontinued. They state that although the method of music therapy has been successful in the treatment of younger patients, it must be adapted to the geriatric patient where we often find multiple ailments.

(Linoff & West, 1982)

Merritt states that music used on patients with migraine headaches reduced the number, intensity and duration of the headache, by inducing relaxation.

Music is also said to be able to strengthen or weaken a muscle.

(Merritt, 1990)

No other published works could be located with regards to the treatment of muscle tension headache using music therapy.

2.9 SUMMARY

The majority of authors are very similar in their diagnostic criteria for muscle tension headache. The majority agree that there is an increase in muscle tension in muscle tension headache sufferers. An increase in muscle tension as measured with an EMG was reported on by Schoenen (1989), Raskin (1988), Feuerstein et. al. (1982), . A decrease in EMG readings in response to music therapy was measured by Rider (1984).

Another cause of muscle tension headaches has been attributed to joint dysfunction (Gatterman, 1990)

The presence of trigger points occurring concurrently with a muscle tension headache was mentioned by Jamison (1991) as well as Gatterman (1990)

The majority of authors were in agreement as to the most beneficial type of music to be used. The music is to have a slow, steady beat, be quiet and commonly described as baroque or classical music.

The mechanism of pain suppression using music is also generally agreed on, and best described by Forster and Palanstanga as the "Gate control theory" .

Chiropractic treatment (manipulation) was highlighted as the treatment that was the most effective in the treatment of muscle tension headaches.

No study could be located in which both treatment protocols to be used in this study were used in combination.

CHAPTER

THREE

MATERIALS AND METHODS

3.1.1 THE PRIMARY DATA

- 1) A questionnaire on their headache: frequency
severity
duration
- 2) Objective measurement of their range of motion
- 3) Pain Disability index.

3.1.2 THE SECONDARY DATA

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3.2 CRITERIA GOVERNING THE ADMISSIBILITY OF DATA

Data from completed headache questionnaires and the pain disability index were used.

The complete case history (*see appendix 5*), physical examination (*see appendix 6*) and x-rays, if indicated, were used to ensure that the patient was able to receive the treatment that was to be applied.

The range of motion of the cervical spine was determined by the researcher. The case history, physical examination and X-ray taking was also done by the researcher.

3.3 RESEARCH METHODOLOGY

A sample size of 30 persons was used.

When the patient presented to the clinic, he was requested to complete the following forms :-

- Patient Information (*see appendix 1*)
- Symptom diagram (*see appendix 11*)
- Headache questionnaire (*see appendix 2*)
- CMCC neck disability index (*see appendix 3*)
- Pain disability index (*see appendix 4*)

The patient was then evaluated in terms of :-

- Comprehensive case history (*see appendix 5*)
- Complete physical examination (*see appendix 6*)
- Regional examination of the cervical spine (*see appendix 7*)

This information was collated, and the researcher then decided whether the patient satisfied the delimitations for this research project.

If the patient qualified for the project, he/she was assigned to either the control group (Group A), or the test group (Group B). Group A received only chiropractic treatment, and group B received music therapy and chiropractic treatment. Each patient was requested to sign a consent form to be able to participate in the research project (*see appendix 18*), and was given a covering letter for the group they were in (*see appendix 16 and 17*) to explain the treatment that they would be receiving.

Each patient was given a headache diary for the group that they were in, (*see appendix 9 and appendix 10*) to be completed at home each day. This recorded the headache severity, frequency

and duration, as well as any medication that the patient was on, and for those in group B, how often they listened to the music tape. The patient was requested to refrain from any analgesics, and if he found it necessary to take an analgesic, it was to be recorded in the headache diary. (see *appendix 9* and *appendix 10*) If it was deemed necessary, the patient had cervical x-rays taken before any treatment was given.

When the first treatment commenced, the patient was evaluated by the researcher in terms of range of motion (see *appendix 8*) of the cervical spine, and motion palpation of the cervical spine (see *appendix 19*), as well as the subjective severity, frequency and duration of the muscle tension headaches recorded in the headache questionnaire (see *appendix 2*).

Following this, if the patient was in group A, he was requested to lie supine and relax for ten minutes. If the patient was in group B, he was requested to lie supine and listen to the music therapy tapes through earphones for ten minutes. The earphones being used were COMET JB 271 stereo headphones. The tape deck was a PANASONIC RX-FS410.

When this time had elapsed, the researcher proceeded with the chiropractic treatment of the patient. After treatment the patient was again evaluated in terms of range of motion (see *appendix 8*) of the cervical spine, and motion palpation of the cervical spine (see *appendix 19*).

The patients in group B were given a music therapy tape to take home, and were requested to listen to it as often as they possibly could.

On subsequent visits, the patient was requested to complete a

pain disability index (see appendix 4), before treatment commenced. The patient was also evaluated in terms of range of motion (see appendix 8) of the cervical spine and motion palpation of the cervical spine (see appendix 19) before treatment commenced. After each treatment the patient was evaluated in terms of range of motion (see appendix 8) of the cervical spine and motion palpation of the cervical spine (see appendix 19) .

Each patient was seen twice a week for five weeks, thus a total of ten treatments. When the five week treatment period was completed, the patient was requested to not receive any treatment for one month, after which he was reevaluated:- subjectively in terms of - headache questionnaire on the severity, frequency and duration of the headache during that month.

(see appendix 2)

- the pain disability index. (see appendix 4)

The patients were also evaluated objectively in terms of range of motion (see appendix 8) of the cervical spine and motion palpation of the cervical spine (see appendix 19).

3.4 TREATMENT OF THE PROBLEM

3.4.1 DATA NEEDED

The data needed to test the hypothesis was obtained from

- the questionnaires
- the cervical range of motion measurements
- pain disability indices

The following information was needed from these measurements:-

- the change in severity, frequency and duration of the muscle tension headache
- the change in their range of motion of the cervical spine
- the change in their disability
- the change in the number of tablets consumed

3.4.2 LOCATION OF THE DATA

This data was collected from the patients who presented to the clinic, and who had qualified for the study according to the diagnostic criteria for muscle tension headache. This data was recorded by means of questionnaires.

3.4.3 OBTAINING THE DATA

The patients completed :

- the headache questionnaire (*see appendix 2*)
- the CMCC neck disability index (*see appendix 3*)
- the pain disability index (*see appendix 4*)
- the headache diary (*see appendix 9 and appendix 10*)

The researcher completed:

- the cervical range of motion (*see appendix 8*)
- the location of any myofascial trigger points.

3.4.4 TREATMENT OF THE DATA

The questionnaires were screened to ensure that they have been filled out fully and correctly. The researcher was always present whilst these questionnaires were being completed.

A: THE HEADACHE QUESTIONNAIRE

The main aim of this questionnaire was to aid in determining the inclusion criteria of the patients, i.e. to aid in the selection of those who may participate in the study. This was only completed by the patient on the initial visit.

Duration of the muscle tension headache was determined before treatment commenced, at the end of the last (tenth) treatment, and after a one month observation period (during which the patient did not receive any treatment). The duration of the headache was measured in hours. The Paired T-test was used to assess if there was a significant change within the same group. An unpaired T-test was used to assess the difference in change between Group A and Group B. The assumption that the differences are normally distributed was made. A graph of means comparing the duration of the headache of the two groups was drawn.

Frequency was evaluated as duration was. Frequency was measured

as number of headaches per week. A graph of means comparing the frequency of headache of the two groups was drawn.

Severity was measured at each treatment. It was rated on a scale of 1 to 10. To evaluate the change within the group a paired T-test was used. The change between the groups was assessed using unpaired T-tests. A comparison of means between group A and group B were plotted on a graph.

Tablet consumption

The number of tablets consumed was determined using this questionnaire, before any treatment commenced, and after the one month observation period (during which the patient did not receive any treatment). The number of tablets was measured in tablets taken per week. The Paired T-test was used to assess if there was a significant change within the same group. An unpaired T-test was used to assess the difference in change between Group A and Group B. The assumption that the differences are normally distributed was made. A graph of means comparing the tablet consumption of the two groups was drawn.

B: CERVICAL RANGE OF MOTION

Each patient was rated according to "Guides to the evaluation of permanent impairment by the American Medical Association." (see *appendix 14*). The changes within each group was analysed using a paired T-test. The differences between the groups was determined using unpaired T-tests.

C: PAIN DISABILITY INDEX

The following aspects were considered:-

- Family/Home responsibilities
- Recreation
- Social activity
- Occupation
- Sexual behaviour
- Self care
- Life-supporting activities

These were each rated separately on a scale of 1 to 10. Each aspect was evaluated as was the severity rating of the muscle tension headache i.e. A paired T-test to determine any change within the group, and an unpaired T-test for any difference in changes between the groups.

3.4.5 INTERPRETATION OF THE DATA

A: THE HEADACHE QUESTIONNAIRE

The data was interpreted by comparing the changes within a group and between the groups. This indicated whether there was a difference in the severity, duration and frequency of the muscle tension headaches as well as any change in the number of tablets consumed. A decrease in any of the above was indicative of improvement. The rate of decrease was able to be measured only for severity, as this was the only reading that was possible to record at every treatment. The readings within the group indicated the effect of chiropractic treatment on the condition.

The data collected concerning the severity after the month break in treatment was compared to the data at the last treatment in order to establish whether the treatment had been long lasting.

B: CERVICAL RANGE OF MOTION

The impairment of range of motion of the cervical spine (see *appendix 14*) was compared between the two groups and within the group. A decrease in the impairment of the whole person was indicative of improvement of the patient. Once again a decrease within the group indicated that the chiropractic treatment was of benefit to the patient.

Again data collected after the month break in treatment was compared to the data at the last treatment in order to establish whether the treatment had been long lasting.

C: PAIN DISABILITY INDEX

This measured the degree to which the condition influences the patients life. A decrease in disability would indicate an improvement of the condition.

These forms of measurement indicated which treatment was of most benefit to the patient, i.e. either chiropractic alone, or combined with selected music. Data collected after one month was treated as for range of motion.

3.5 THE SAMPLE

3.5.1 SAMPLE SELECTION

The sample selected was from a group who had all been diagnosed as having muscle tension headaches. This was done by choosing blocks of size four. The patients were divided into blocks of four which have two A's and two B's. We then chose a sequence of random numbers between one and six by means of throwing a dice. The blocks of four were as follows:

BABA - no.1

BAAB - no.2

AABB - no.3

BBAA - no.4

ABBA - no.5

ABAB - no.6

Throwing the dice yielded the following results :-

2, 6, 3, 4, 1, 4, 1, 2.

This lead to the allocation :- BAAB ABAB AABB BBAA BABA BBAA BABA BA.

The patients were placed in a group depending on when they came in for the initial consultation.

3.5.2 LOCATION OF THE SAMPLE

The sample was derived from those patients who presented themselves to the clinic, either in response to the advert or out of their own accord.

CHAPTER

FOUR

RESULTS

4.1 STATISTICS

The data was analysed using the computer software programme "STATGRAPHICS PLUS VERSION 6, supplied by Manugistics, Inc."

A: SEVERITY OF MUSCLE TENSION HEADACHE

Severity is rated using a numeric pain rating scale of 1 to 10. Severity within each group was analysed using one sample analysis (paired T-test). The following were analysed :-

- between each treatment (1 - 10)
- between treatment ten and the follow-up treatment
- between treatment one and treatment ten
- between treatment one and the follow-up treatment.

This was done for group A and group B. The results for group A and group B were similar. The following is a table of comparison of the change in severity within each group in terms of mean \pm standard deviation:-

TABLE 1

| | Treat 1 | Treat 2 | Treat 10 | F/U | Sample Size |
|---------|-----------------|--------------------|--------------------|-----------------|-------------|
| Group A | 7.33 \pm 1.58 | 2.76 \pm 2.39 | 0.82 \pm 1.53 | 3.53 \pm 2.37 | 15 |
| Group B | 7.22 \pm 1.48 | 2.76 \pm 2.17 | 0.94 \pm 2.06 | 3.5 \pm 2.68 | 15 |

Both groups show a significant change between the first and second treatments (Group A : $p = 8.82433E - 7$

Group B : $p = 0.0000011677$). This change is a decrease in severity rating. There was no significant change between the subsequent visits. From treatment ten until the

follow-up, there was a significant change, however this change was an increase in severity rating. There was a significant change between the severity ratings at treatment one and treatment ten. (Treatment 1 A & B :- $p=0.836$)

This change was a decrease in severity. Thus the change created between the first two treatments is maintained up till treatment ten. However, the total change between treatment one and the follow-up treatment was significantly different. (i.e the severity rating overall has decreased)

Table of confidence intervals:-

TABLE 2

| | TREAT 1 - 2 | TREAT 2 - 3 | TREAT 10 - F/U |
|---------|-------------|--------------|----------------|
| GROUP A | 3.39 - 5.75 | -0.17 - 2.14 | -4.14 - -1.29 |
| GROUP B | 3.28 - 5.64 | -0.58 - 1.33 | -4.04 - -1.09 |

From the above table, we can deduce that the change, i.e. reduction in severity, that occurred in group A between treatment 2 and 3 could have been clinically significant, but it is not a large enough change to be statistically significant. ($P=0.088$) See Figure 1 and Figure 2:- comparison of means between Group A and Group B.

Figure 1 : Headache severity

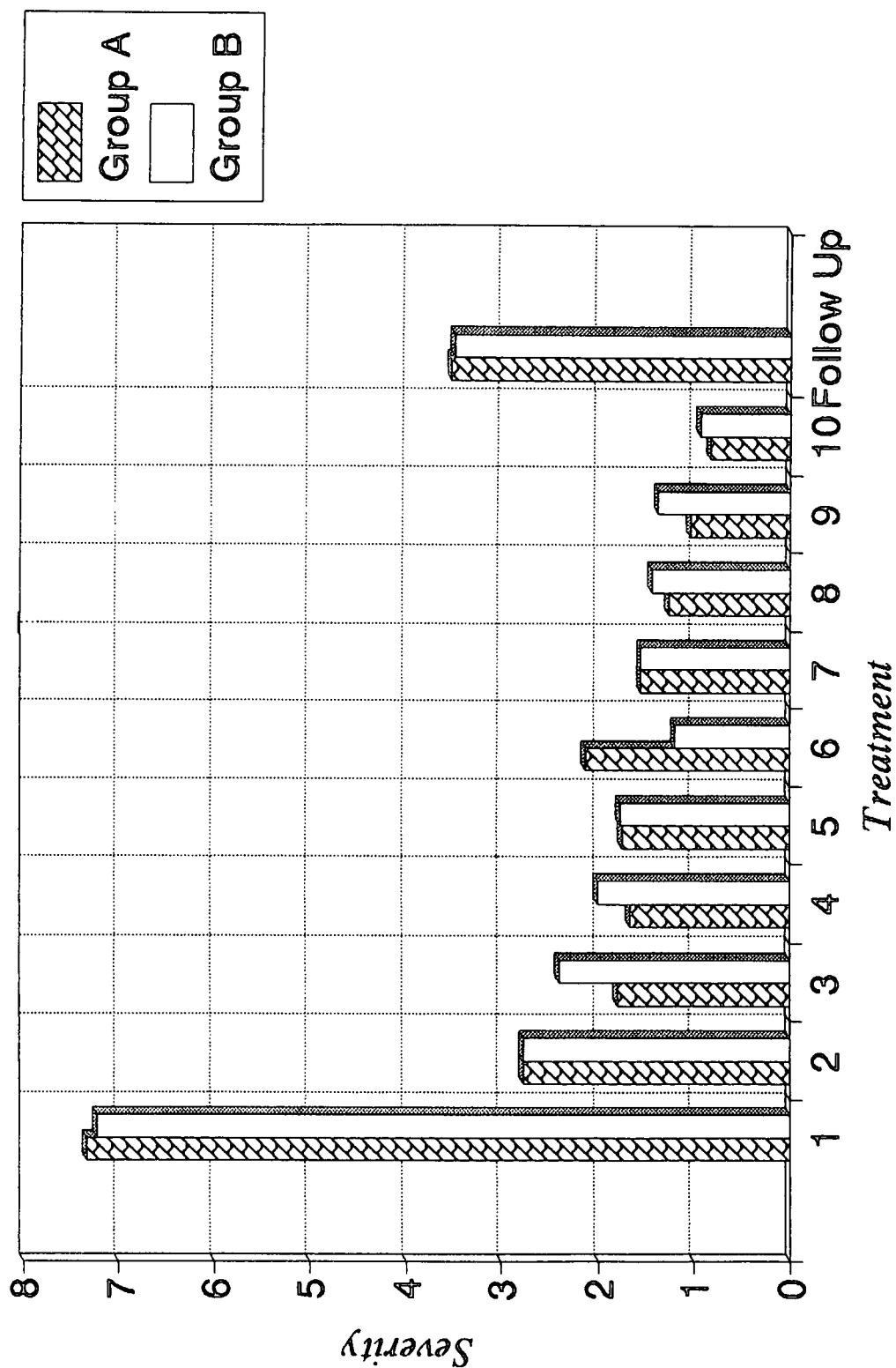
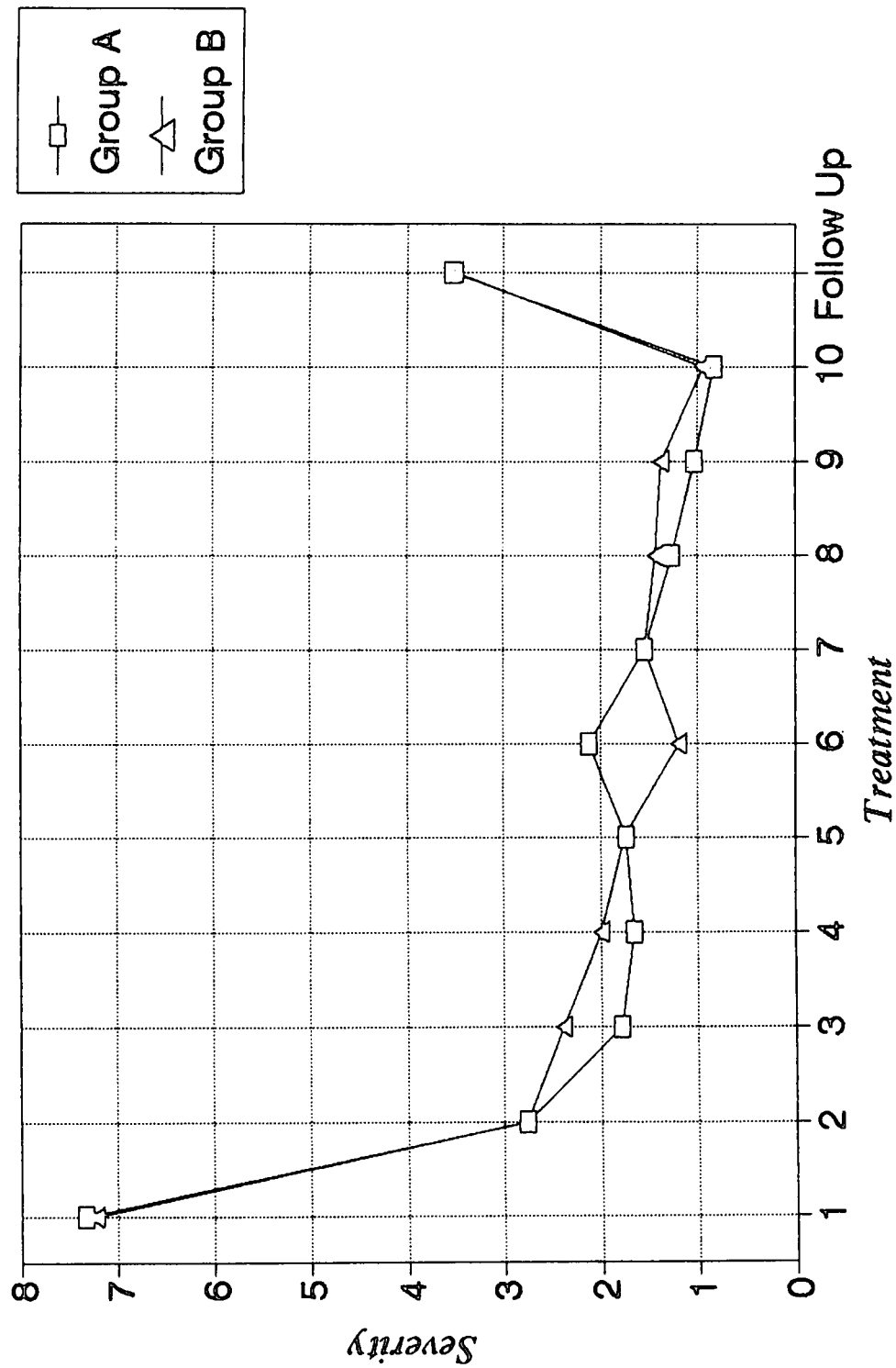


Figure 2 : Headache severity



A two sample analysis (unpaired T-test) was done to analyse the differences, if any, between the groups. The following were analysed :-

- treatment 1
- treatment 2
- treatment 10
- follow-up treatment.

TABLE 3

| Treatment | Confidence interval | Significance level |
|-----------|---------------------|--------------------|
| 1 | -1.03 - 1.26 | 0.84 |
| 2 | -1.7 - 1.7 | 0.99 |
| 10 | -1.47 - 1.24 | 0.86 |
| follow-up | -1.86 - 1.93 | 0.97 |

No statistically significant difference was noted between the two groups at treatment 1, 2, 10 or the follow-up treatment.

B:- FREQUENCY

Frequency was measured as number of muscle tension headaches per week. The change in frequency of the headache within each group was analysed using a paired T-test. The frequency at the initial consultation was compared to that of the follow-up visit.

The following is a table of comparison of the groups, of the average \pm standard deviation of the frequency of headaches.

TABLE 4

| | INITIAL | FOLLOW-UP | Sample Size |
|---------|----------------|-----------------|-------------|
| GROUP A | 3.74 \pm 2.5 | 1.88 \pm 1.77 | 15 |
| GROUP B | 5.12 \pm 2.5 | 2.33 \pm 2.96 | 15 |

For Group A and B this indicated that the frequency at the initial consultation was significantly higher than at the follow-up visit. Unpaired T tests were used to determine if any significant differences exist between the groups. At treatment one the mean for group B was 1.38 higher than that for group A. At the follow-up treatment the mean for group B was 0.45 higher than that of group A. This difference is not large enough to be statistically significant.

Table of confidence intervals and significance levels for frequency of headaches within each group:-

TABLE 5

| | Confidence Interval (95%) Initial 1 - follow-up | Significance Level |
|---------|--|--------------------|
| GROUP A | 0.61 - 3.11 | 0.007 |
| GROUP B | 0.88 - 4.68 | 0.007 |

From the table we can deduce that there is a statistically and clinically significant change between the initial and the follow-up treatment for both groups. ($p = 0.007$)

A two sample analysis was done to determine any change in frequency between the groups. The following is a table of confidence intervals and significance levels between the groups at initial and follow-up treatment :-

TABLE 6

| | Confidence Interval (95%) | Significance level |
|-----------|---------------------------|--------------------|
| Initial | -2.27 - 1.37 | 0.62 |
| Follow-up | -33.15 - 13.09 | 0.38 |

We can deduce that there is no significant difference between the groups at the initial and at the follow-up treatment.

See Figure 3 and Figure 4 for a comparison of means

Figure 3 : Frequency of Headache

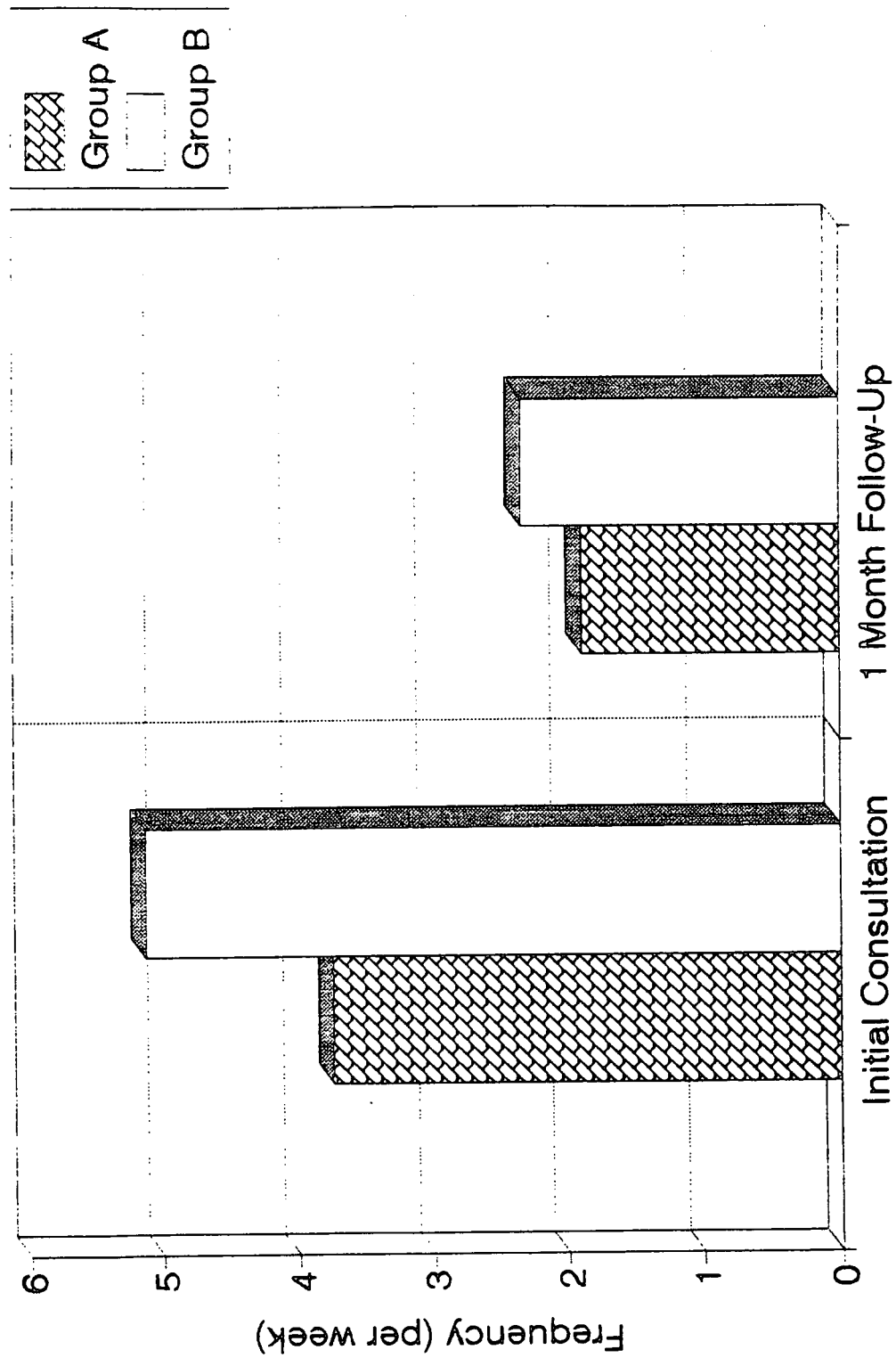
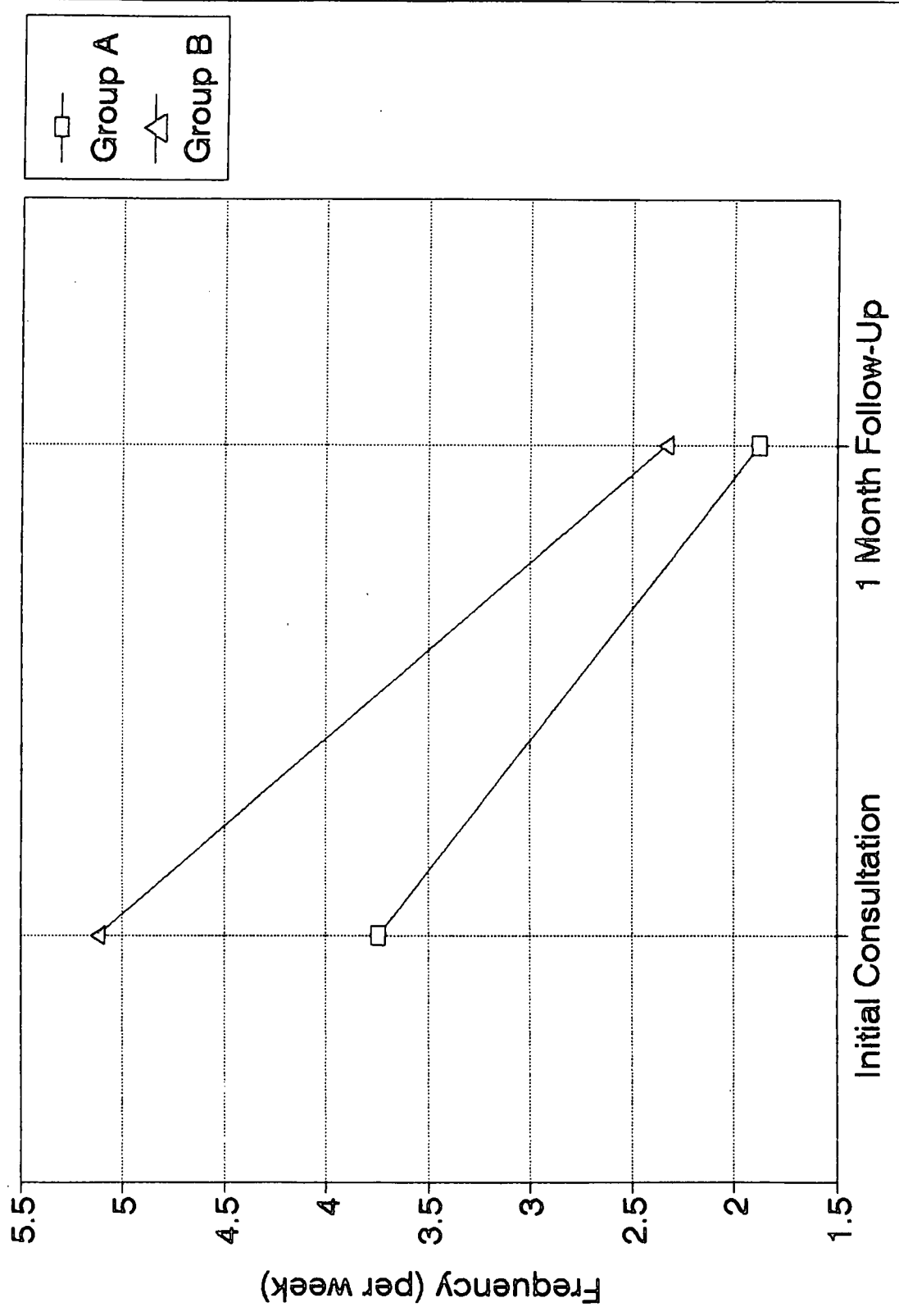


Figure 4 : Frequency of Headache



C:- DURATION

Duration of the muscle tension headache was measured in hours. The change in duration of the headache within each group was analysed using a paired T-test. The duration at the initial consultation was compared with that of the follow-up visit. The following is a table of comparison of the groups, of the average \pm standard deviation of the duration of the headache at the initial consultation :-

TABLE 7

| | INITIAL | FOLLOW-UP | Sample Size |
|---------|-------------------|------------------|-------------|
| GROUP A | 22.03 \pm 30.05 | 9.49 \pm 15.15 | 15 |
| GROUP B | 32.07 \pm 31.73 | 7.43 \pm 7.13 | 15 |

For Group A and B this indicated that the duration at the initial consultation was significantly higher than at the follow-up visit. (Group A : $P = 0.018$, Group B : $P = 0.008$)

Unpaired T-tests were used to determine if any significant differences exist between the groups. At treatment one the mean for group B was 10.04 higher than that of group A. At the follow-up treatment the mean for group A was 2.06 higher than that of group B. This difference is not large enough to be statistically significant though.

Table of change in headache duration between initial and follow-up treatment within each group:-

TABLE 8

| | Confidence Interval (95%) | Sample size | Mean \pm standard deviation |
|---------|---------------------------|-------------|-------------------------------|
| GROUP A | 2.53 - 22.56 | 15 | 12.55 \pm 18.07 |
| GROUP B | 7.71 - 42.71 | 15 | 25.21 \pm 30.30 |

From the table we can deduce that there is a statistically and clinically significant change (decrease in duration) between the initial and the follow-up treatment for both groups.

Two sample analysis was done to determine any differences between the groups.

Table of confidence intervals and significance levels between the groups at initial and follow-up treatment :-

TABLE 9

| | Confidence Interval (95%) | Significance level |
|-----------|---------------------------|--------------------|
| Initial | -33.15 - 13.09 | 0.38 |
| Follow-up | -7.07 - 11.19 | 0.65 |

We can again deduce that there is no significant difference between the groups at the initial and at the follow-up treatment.
($P > 0.05$)

See Figure 5 and Figure 6 for comparison of means.

Figure 5 : Duration of Headache

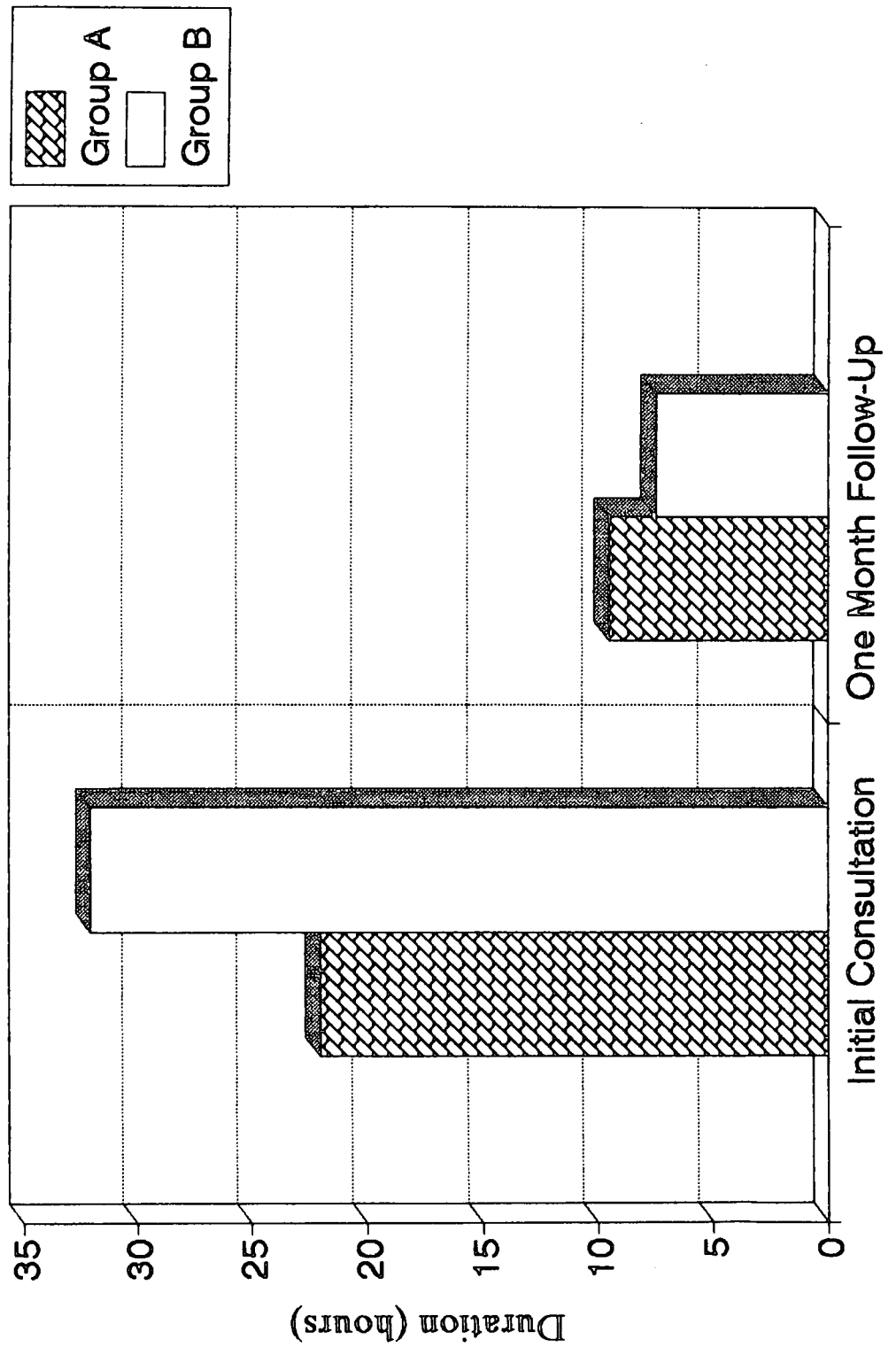
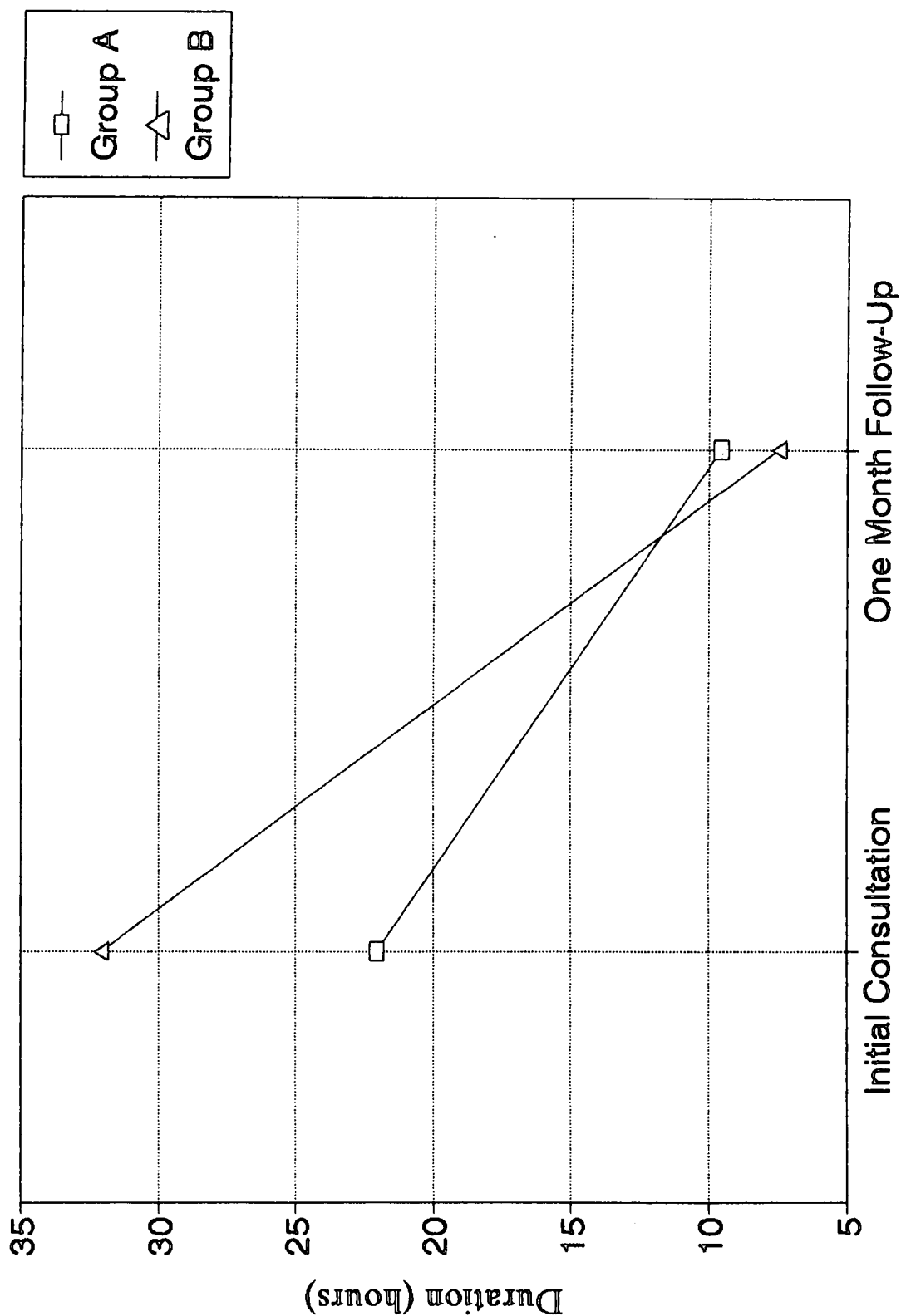


Figure 6 : Duration of Headache



D:- TABLET CONSUMPTION

Tablet consumption was measured as number of tablets consumed per week. The change in tablet consumption within each group was analysed using a paired T-test. The number of tablets consumed at the initial consultation was compared with that of the follow-up visit.

The following is a comparative table of change of tablet consumption within each group (mean \pm standard deviation).

TABLE 10

| | INITIAL | FOLLOW-UP | Sample size |
|---------|-------------------|-----------------|-------------|
| GROUP A | 14.13 \pm 18.26 | 5.42 \pm 9.24 | 15 |
| GROUP B | 11.35 \pm 14.45 | 2.65 \pm 3.3 | 15 |

For Group A and B this indicated that tablet consumption for both groups on initial consultation was significantly higher than at the follow-up visit.

Table of confidence intervals and significance levels for tablet consumption within each group:-

TABLE 11

| | Confidence Interval (95%) Initial 1 - follow-up | Significance level |
|---------|--|-----------------------|
| GROUP A | 2.53 - 22.56 | 0.018 |
| GROUP B | 7.71 - 42.71 | 0.008 |

From the table we can deduce that there is a statistically and clinically significant change (decrease in tablet consumption) between the initial and the follow-up treatment for both groups.

Unpaired T tests were used to determine if any significant differences exists between the groups. At treatment one the mean for group A was 2.78 higher than that of group B. At the follow-up treatment the mean for group A was 2.47 higher than that of group B. Thus there is no statistical difference between the two groups.

Table of confidence intervals and significance levels between the groups at initial and follow-up treatment :-

TABLE 12

| | Confidence Interval (95%) | Significance level |
|-----------|---------------------------|--------------------|
| Initial | -9.53 - 15.10 | 0.65 |
| Follow-up | -2.41 - 7.97 | 0.28 |

The table indicates that there is no significant difference between the groups at the initial and at the follow-up treatment. See Figure 7 and Figure 8 for comparison of means.

Figure 7 : Tablet Consumption

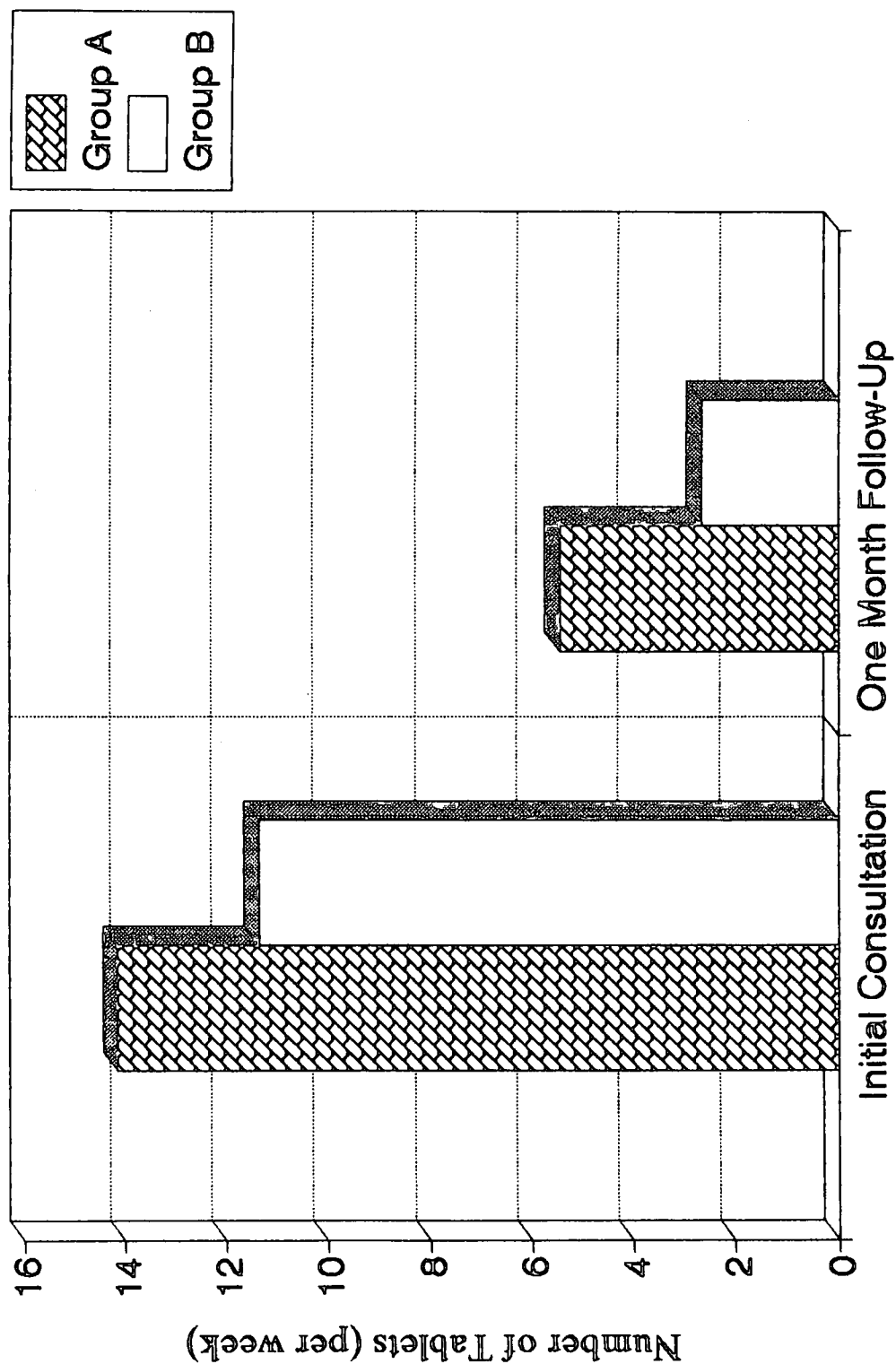
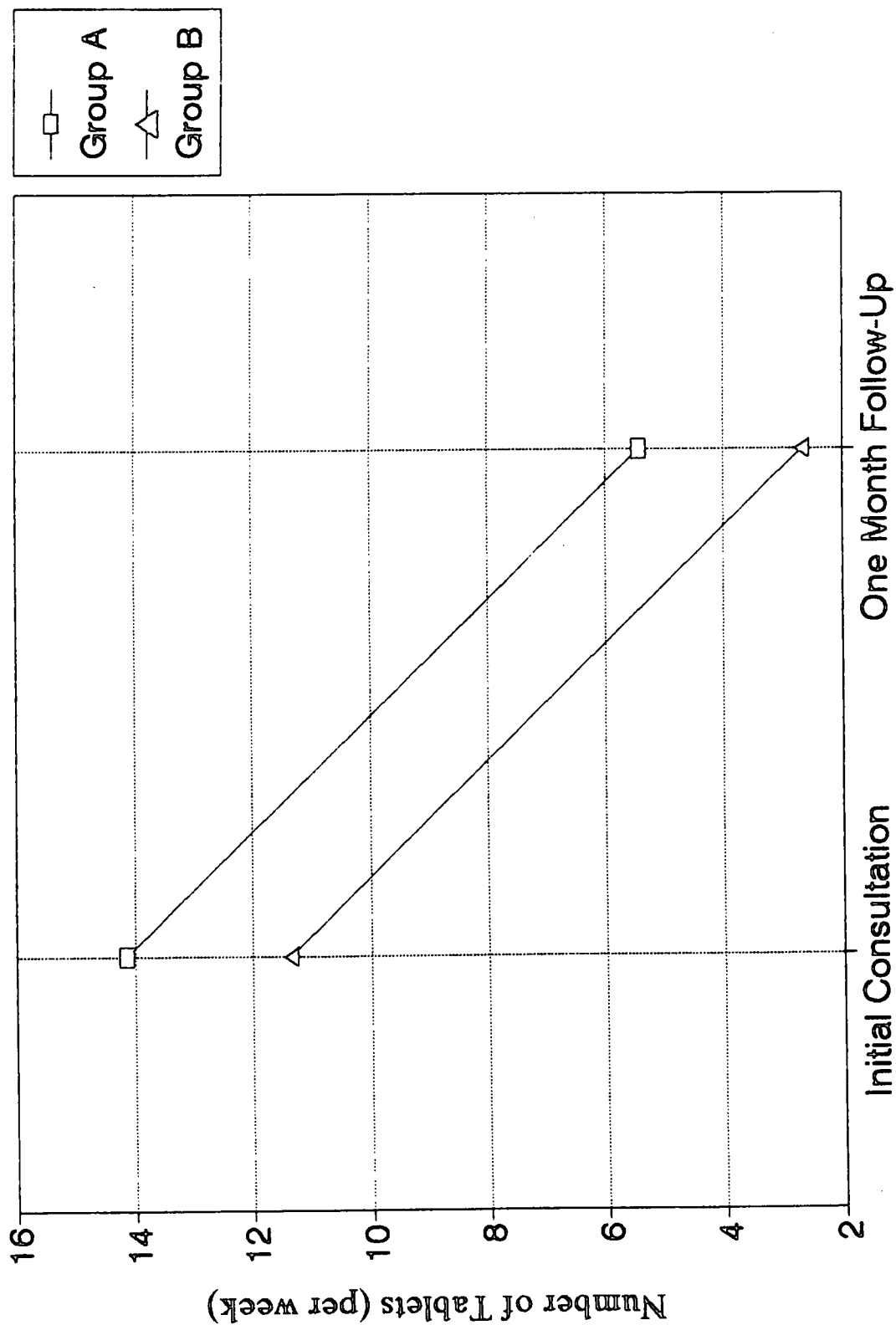


Figure 8 : Tablet Consumption



E:- PAIN DISABILITY INDEX

This was rated as a score out of 70. The pain disability within each group was analysed using one sample analysis (paired T-test). The following were analysed :-

- between each treatment (1 - 10)
- between treatment ten and the follow-up treatment
- between treatment one and treatment ten
- between treatment one and the follow-up treatment.

This was done for group A and group B. The results for group A and group B were similar, except between treatment 2 and 3. The following is a table of comparison of pain disability within the groups in terms of the mean \pm standard deviation:-

TABLE 13

| | GROUP A | GROUP B |
|--------------|-------------------|-------------------|
| Treatment 1 | 25.93 \pm 15.16 | 23.8 \pm 12.19 |
| Treatment 2 | 18 \pm 14.01 | 15.33 \pm 13.85 |
| Treatment 3 | 10.8 \pm 13.22 | 11.97 \pm 10.11 |
| Treatment 9 | 13.13 \pm 15.61 | 8.4 \pm 10.76 |
| Treatment 10 | 8.4 \pm 11.78 | 3.93 \pm 7.6 |
| Follow-up | 12.73 \pm 13.74 | 9.33 \pm 9.72 |

Both groups show no significant change between the first and second treatments (Group A:- P=0.99, Group B:- P= 0.06). There was a significant change between treatment 2 and 3, and treatment 9 and 10 for group A. In both instances there was a decrease in pain disability. The pain disability decreased between every treatment, but it was only statistically significant between

treatment 2 and 3, and treatment 9 and 10. There was, however, also a total decrease in pain disability between the first and tenth treatment. The other treatments showed no statistical change for either group. There was a significant change between the pain disability index at treatment one and treatment ten for group A and group B. This change was a decrease in pain disability. There was no significant change in pain disability between treatment 10 and the follow-up treatment. When the first and the follow-up treatment were compared, there was a statistical difference (a decrease in pain disability index). (Group A :- $P = 0.001$, Group B:- $P = 0.002$)

A two sample analysis (unpaired T-test) was done to analyse the differences, if any, between the groups. The following were analysed :-

- treatment 1
- treatment 3
- treatment 10
- follow-up treatment.

No statistically significant difference was noted between the two groups at treatment 1, 3, 10 or the follow-up treatment.

Table of confidence intervals and significance levels between the groups :-

TABLE 14

| Treatment | Confidence level | Significance level |
|-----------|------------------|--------------------|
| 1 | -8.16 - 12.42 | 0.67 |
| 3 | -9.97 - 7.64 | 0.79 |
| 10 | -3.15 - 12.09 | 0.24 |
| f/u | -5.5 - 12.3 | 0.44 |

From the above table, we can deduce that there is no statistically significant difference between group A and group B throughout the course of treatment. The confidence interval for both groups at all the treatments includes 0, and the significance level is larger than 0.05, resulting in the conclusion that there is no difference between the groups.

See Figure 9 and Figure 10 for comparison of means between Group A and Group B.

Figure 9 : Pain Disability

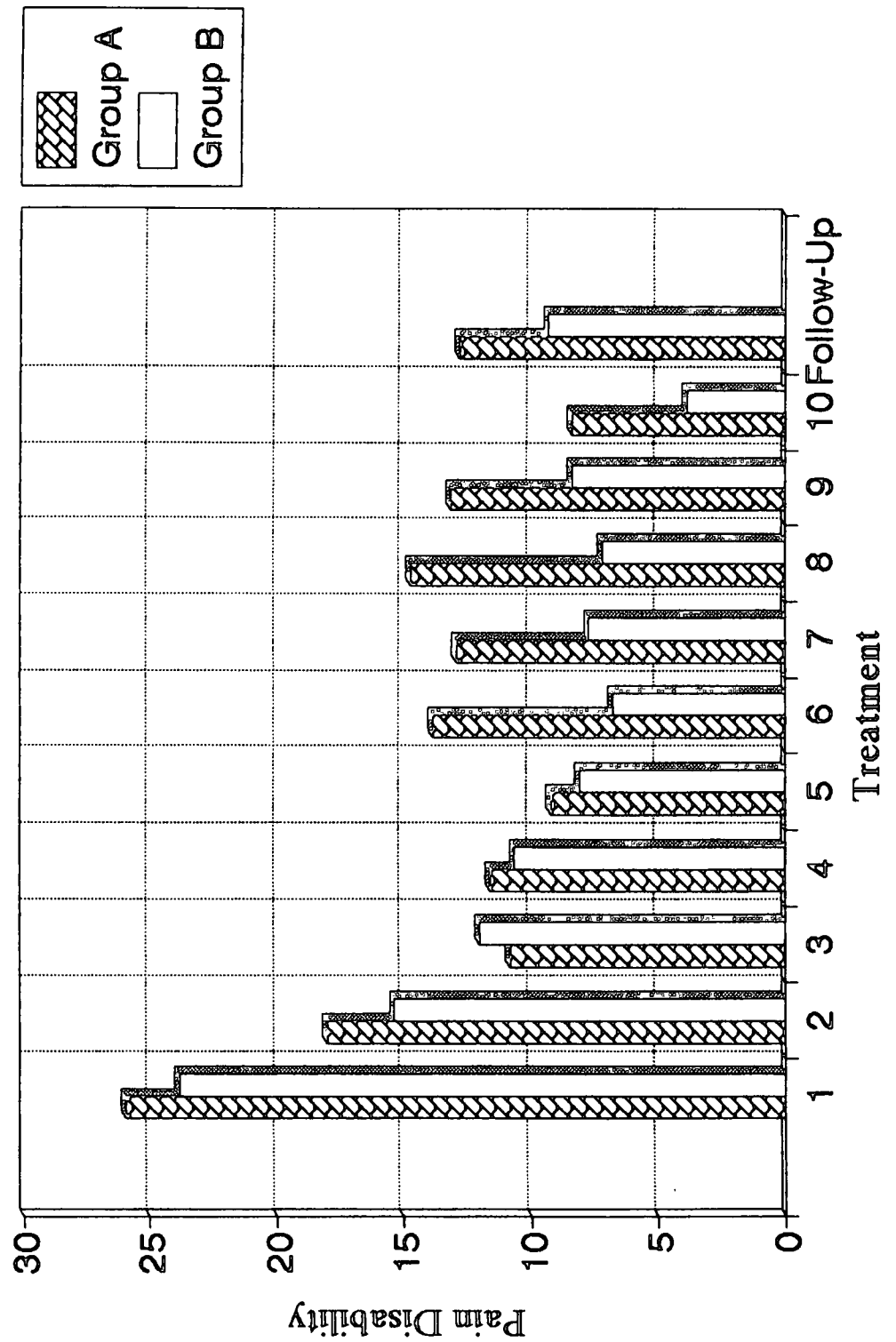
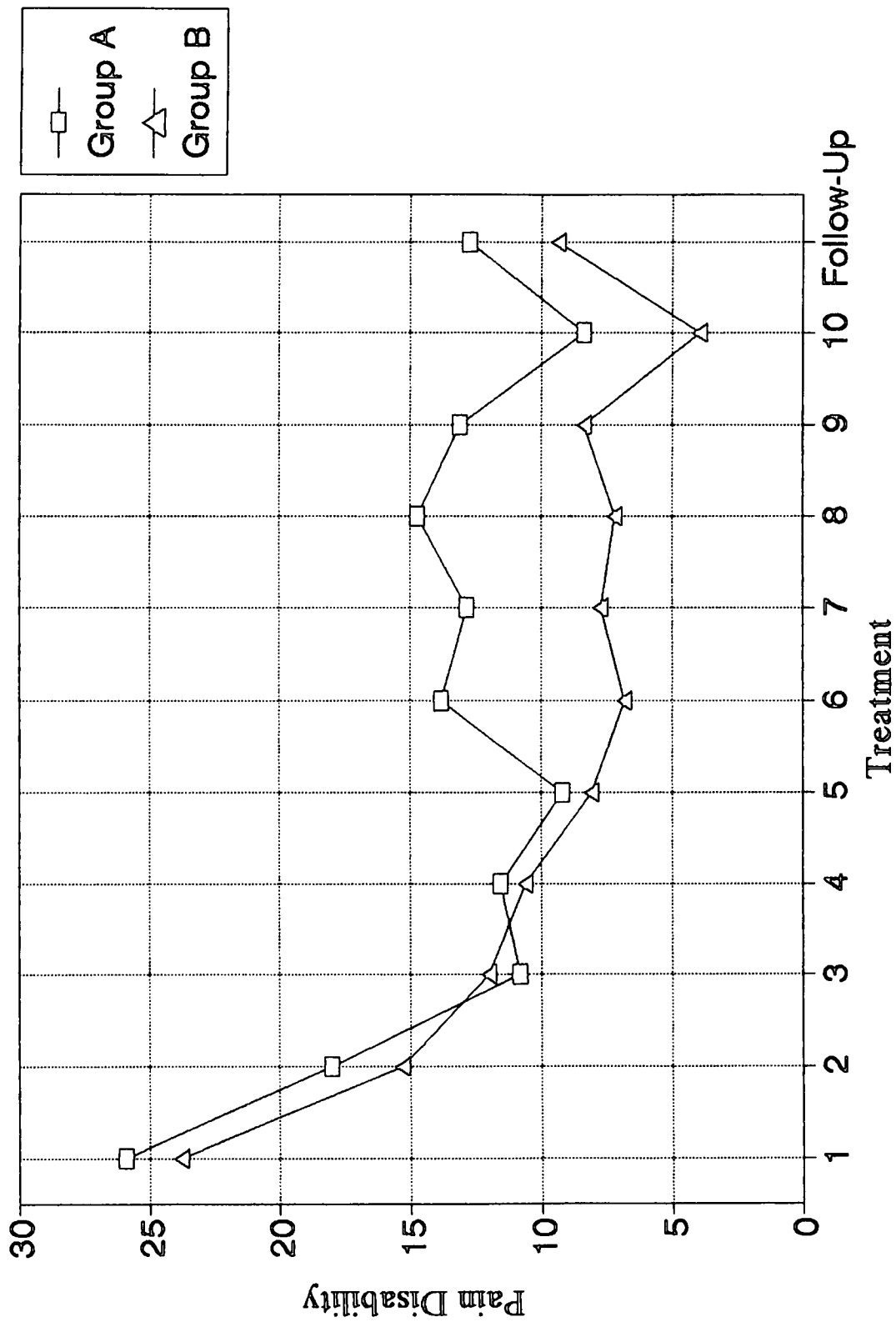


Figure 10 : Pain Disability



F:- IMPAIRMENT RATING - Range of motion of the cervical spine

The total impairment of each patient was calculated according to the AMA, before and after each treatment. The changes, if any, within each group were determined using one sample analysis (paired T-test). The following were analysed :-

- between each treatment (1 - 10)
- between treatment ten and the follow-up treatment
- between treatment one and treatment ten
- between treatment one and the follow-up treatment.

This was done for group A and group B. The results for group A and group B were similar. No statistical difference could be shown within the group.

A two sample analysis (unpaired T-test) was done to analyse the differences, if any, between the groups. The following were analysed :-

- treatment 1
- treatment 10
- follow-up treatment.

No statistically significant difference was noted between the two groups at treatment 1, 10 or the follow-up treatment.

No graph was drawn, as no difference existed within each group nor between the groups.

4.2 DISCUSSION AND INTERPRETATION OF PROCESSED DATA

4.2.1 DEMOGRAPHIC DATA

Of the 41 patients screened, 30 qualified for the research. Of the 11 excluded, 3 had migraine headaches, two had systemic disease, two had emotional involvement, one was pregnant, two had cervical facet syndrome and one was psychosomatic.

Two of the females were on the contraceptive pill. Both had on advice of a medical practitioner discontinued the use of the pill for a few months, in an attempt to relieve the muscle tension headaches. They experienced no relief from the muscle tension headaches, and subsequently began using the pill again.

TABLE 15

AVERAGE AGES :-

| Group A | | Group B | |
|---------|--------|---------|--------|
| Male | Female | Male | Female |
| 34.86 | 34.13 | 45 | 31.58 |
| 34.47 | | 34.26 | |
| 34.37 | | | |

The average age for the females was 32.6

Average age for the males was 37.9

The ratio ♂:♀ was 1:2

25 were white, and 5 indian.

15 were married.

15 had children.

3 had low back complaints as well as the muscle tension headaches. The low back complaint was not attended to for the purposes of this study.

4.2.2 SEVERITY

Severity was measured on a numerical rating scale of 1 to 10. The severity of the muscle tension headache decreased from an average of 7.33 to 3.53 for group A, and from 7.22 to 3.5 for group B. Both groups showed a significant decrease in the severity of the muscle tension headaches. There was no difference between the groups. The addition of music therapy to the one group did not decrease the severity more than in the group which received only chiropractic treatment.

4.2.3 FREQUENCY

The frequency of the muscle tension headache was measured in number of headaches per week. The frequency reduced from an average of 3.74 to 1.88 headaches per week for group A, and from 5.12 to 2.33 headaches per week for group B. The frequency of the headache decreased for both groups. There was no statistically significant difference between the groups in terms of frequency of the headache.

4.2.4 DURATION

The duration of the muscle tension headache was measured in

hours. The duration of the headache reduced from an average of 22.03 hours to 9.49 hours for group A, and from 32.07 hours to 7.43 hours for group B. Both groups showed a reduction in the duration of the headaches when the initial and one month follow-up treatments were compared. There was no difference between the groups. The duration of the muscle tension headache at the follow-up visit was significantly less than the duration measured at the initial visit.

4.2.5 TABLET CONSUMPTION

The number of tablets consumed for the symptomatic relief of the muscle tension headache was measured in number of tablets consumed per week. The number decreased from an average of 14.13 to 5.42 tablets per week for group A, and from 11.35 to 2.65 tablets per week for group B. The tablet consumption of both groups decreased significantly between the initial and the follow-up visit. There was no difference between the two groups.

4.2.6 PAIN DISABILITY

Pain disability was measured using a pain disability index with a scale of 0-70. The pain disability decreased from an average of 25.93 to 12.73 for group A, and from 23.8 to 9.33 for group B. There was a significant decrease in pain disability for both groups between the initial and the follow-up consultation. There was no difference between the groups.

4.2.7 CERVICAL RANGE OF MOTION

Range of motion of the cervical spine remained unaltered for both groups between the initial and the follow-up visits. It appears that the range of the cervical spine is not associated with muscle tension headaches. This could be due to the scale used to measure the range of motion. (see discussion)

CHAPTER

FIVE

DISCUSSION

CHAPTER FIVE

GENERAL DISCUSSION

The measurement of the severity of muscle tension headache poses a statistical problem in that no consistent scale is available to measure this severity. The majority of researchers use a visual analogue scale or a numerical pain rating scale. For the purpose of this study, it was decided to use a numerical pain rating scale of 1 to 10. The severity established in this study, utilising this measurement method, was 8.9 for group A and 8.7 for group B. In the study by Feuerstein et al. (1982) they used a numerical pain rating scale of 1-5 and found a severity of 3.4.

The frequency of the muscle tension headache for group A, at the initial consultation, was 1.24 to 6.24 (an average of 3.74) headaches per week, and for group B 2.62 to 7.62 (an average of 5.12) headaches per week. This compares favourably to a study by Lance (1973) who found that muscle tension headaches occurred 2 to 7 times per week. In a study by Raskin (1988) he established that 50% of muscle tension headache sufferers were found to have daily headaches. Spira (1992) reports that the headache occurs daily, and Feuerstein et al. (1982) found a frequency of 2.65 per week.

At the initial consultation the duration of the muscle tension headache in this study was an average of 22.03 hours for group A and an average of 32.07 hours for group B. This is not substantiated by Raskin (1988) who found the headache to have a

duration of 24 - 72 hours in 10% of patients and constant in 20%. Weisberg (1989) reports the duration to be from as little as 1 hour to as long as many days. The study by Feuerstein et al. (1982) reported duration as 7.6 hours, which is considerably less than found in this study.

The number of tablets consumed reduced from 14.13 tablets per week, to 5.42 tablets per week for group A and from 11.35 to 2.65 tablets per week for group B. This significant reduction in the number of tablets consumed by patients holds obvious benefits to the patient, as most pharmacocutics have side effects and can be costly.

The pain disability reduced from 25.93 to 12.73 for group A, and from 23.8 to 9.33 for group B. This indicates that the muscle tension headache no longer interferes with the patients life to the same extent as before treatment.

The range of motion of the cervical spine remained unaltered for all patients throughout this study. This implies that the range of motion of the cervical spine is probably not related to muscle tension headaches. The rating scale used, devised by the American Medical Association (*see appendix 14*), could be the reason for this. The range of motion had to change by 10° in order for it to be a significant change, according to this scale. Most changes in the cervical range of motion were less than 10° . A scale of 3° - 5° would be more accurate. The manual goniometer used was not as accurate as was needed for this study. A

goniometer which is fixed, which would minimise operator irregularity, would be more accurate.

Feuerstein et.al. (1982) found the average age of muscle tension headache sufferers to be 32.1 years. In this study the average age of the muscle tension headache sufferers was 34.37 years. Jamison (1992) and Weisberg (1989) found that muscle tension headaches may occur at any age. Raskin (1988) stated the most common age for onset of muscle tension headache was over 20 years of age.

In this study the male to female ratio was 1:2. This differs to the study by Ehrmantraut (1980), where the male to female ratio was equal. The study by Weisberg (1989), found that mostly women suffer from muscle tension headaches, which compares favourably with this study.

The presence of trigger points occurring concurrently with a muscle tension headache was mentioned by Jamison (1991) as well as Gatterman (1990).

In this study, active trigger points were not found to be of high incidence. Only two of the patients in the study were treated by dry needling to eliminate the trigger points.

Thomas (1993), Smith (1992), Priestley (1975), Grovè (1990), SAJMT (1993), Alvin (1966) and Merrit (1990) are in agreement as to the most beneficial type of music to be used. The music is to have a slow, steady beat, be quiet and commonly described as

baroque or classical music. The music used in this study is in accordance with these findings.

Scartelli (1984), Epstein, Hersen & Hemphill (1974) and Karim (1985) performed studies investigating the effects of music therapy in the management of muscle tension headaches. The above studies indicate that music therapy does relieve muscle tension headaches. No study was found in which chiropractic treatment was incorporated with music therapy in the management of muscle tension headaches. Other modalities such as biofeedback were used in most studies using music therapy.

Statistically, there were no differences between the groups before treatment commenced, during treatment or after conclusion of the treatment. Both groups improved in all aspects measured, except range of motion of the cervical spine which remained unaltered.

The hypothesis that music therapy would compliment the effects of the chiropractic treatment can not be accepted. The results indicate that there was no difference between the groups. Chiropractic treatment or the combination of chiropractic treatment with music therapy reduces the muscle tension headache effectively.

CHAPTER

SIX

CONCLUSIONS AND

RECOMMENDATIONS

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

The severity, duration and frequency of the muscle tension headache were significantly decreased, to the same extent, for both groups. It can be concluded that chiropractic management of muscle tension headaches is effective. The addition of music therapy did not enhance the results statistically.

The reduction in the number of tablets consumed, is of benefit to the patient. It can be concluded that this reduction not only benefits the patient financially, but also physically in that there are no drug related side effects.

The pain disability index reflected to what degree the muscle tension headache interfered with the patients life. The reduction in the pain disability index for both groups allows the conclusion that both treatments aided in reducing the influence that the muscle tension headache had on the patients life.

The cervical range of motion which remained unaltered leads to the conclusion that range of motion of the cervical spine is probably not related to muscle tension headaches. As mentioned in the previous chapter, a scale with increments of 3°- 5° would be more accurate than the AMA evaluation of permanent impairment (*see appendix 14*) scale used. A fixed goniometer is recommended to minimise operator irregularity.

An increase in the sample size will ensure a more realistic

analysis of the data.

Neither the psychological aspect of the muscle tension headache, nor a possible psychological cause of the headache was investigated in this research project. As many have stated that muscle tension headaches can be caused by psychological factors, this area is one which needs further investigation. (*Jamison, 1991; Lance, 1973; Ehrmantraut, 1980; Raskin, 1988; Gatterman, 1990; Weisberg 1989; Spira, 1992*)

Subjectively, the researcher noted that patients in the group receiving music therapy (group B) stated that they felt much better overall when listening to the music. It is recommended in future that a general well being scale be used to determine if there was a difference between the groups as far as their well being is concerned.

In many studies performed using chiropractic treatment of muscle tension headaches, the levels of subluxation were noted. They were mostly situated in the upper cervical spine. This study did not note the levels of subluxation, but it was observed that most patients had subluxation of the upper cervical spine.

As was indicated in the review of the literature, both music therapy as well as chiropractic treatment have been shown to be beneficial in treating muscle tension headaches, but these results can not be compounded by combining the two treatments.

The addition of music therapy did not decrease the muscle tension

headache more than only chiropractic management.

It is suggested that a study be done using only music therapy, without chiropractic treatment, for one group and only chiropractic treatment for the other group.

It was noted that the muscle tension headache regressed for both groups during the one month follow-up period. A longer follow-up period is suggested to determine whether the headache will return to the original intensity.

It is recommended that the patients in group B are monitored with respect to the time spent listening to the tape each day and that this information be analysed.

The patients in group B should be clearly instructed to have the music as background music. It is also recommended that the chiropractic treatment of group B be done with the music as background music and not as a separate relaxation exercise before the chiropractic treatment.

As previous exposure to music therapy and other relaxation techniques influences how a person responds to any future treatment, such previous exposure should be recorded.

To increase the differences in the treatment of the groups, group B could be given relaxation exercises as well as background music.

In conclusion, the incorporation of music therapy into the chiropractic management of muscle tension headaches does not enhance the results achieved by only using chiropractic management.

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APPENDICES

APPENDICES

- 1 Patient information
- 2 Headache Questionnaire
- 3 CMCC Neck Disability Index
- 4 Pain Disability Index
- 5 Case History
- 6 Physical Examination
- 7 Cervical Spine - Regional Examination
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TECHNIKON NATAL CHIROPRACTIC DAY CLINIC

11 RITSON ROAD, BEREA, DURBAN 4001

TELEPHONE (031) 2252205

PATIENT INFORMATION

Surname: _____ File # _____

Given Names: _____ Intern: _____

Address: _____
(Home) _____

_____ Code: _____

Employer: _____

Occupation: _____

Telephone Number's: _____ (Home)

_____ (Work)

Date of Birth: _____ Age: _____
 Y M D

Marital status: Single Married Divorced Separated Widowed

Sex: Male Female

Medical doctor's name: _____

 Date of last visit: _____

Chiropractor's name: _____

 Date of last visit: _____

Homoeopath's name: _____

 Date of last visit _____

P.T.O.

HEADACHE QUESTIONNAIRE

(Derived from Canadian Memorial
Chiropractic College Migraine
Trial Headache History)

Patient name _____

Date _____ / _____ / _____

1) Age _____

2) Male _____ / Female _____

3) Occupation _____

4) Onset _____ Total duration _____
Hour _____ Weeks _____

5) Initial precipitating event
NO YES

1. Trauma _____ /

2. Menses _____ /

3. Primary _____ /

Work Stress _____ /

4. Childhood _____ /

5. Illness _____ /

6. Other _____ /

(Specify _____)

TYPICAL HEADACHE

6) Frequency of headache
Daily _____

_____ / week

_____ / month

7) Duration of headache

Time of onset _____

Duration _____ Hours

_____ Days

8) Severity Rate on the
following scale the
Severity of the headache:

1 2 3 4 5 6 7 8 9 10
(none) (worst)

9) Location

NO YES

1. Occipital _____ /

2. Temporoparietal _____ /

_____ /

3. Frontal _____ /

4. Facial _____ /

5. Orbital NO yes

6. Vertex _____ /

7. Mandibular _____ /

10)

1. Neck pain _____ /

2. Upper back pain _____ /

11)

1. Unilateral _____ /

Right _____ /

Left _____ /

2. Bilateral _____ /

12)

1. Focal _____ /

2. Diffuse _____ /

3. Radiating _____ /

13) Character NO YES

1. Pressure _____ /

2. Steady ache _____ /

3. Throbbing _____ /

4. Stabbing _____ /

14) Associated Symptoms

NO YES

1. Nausea _____ /

2. Vomiting _____ /

3. Dizziness _____ /

4. Aura _____ /

5. Visual _____ /

6. Smell _____ /

7. Kinesthetic _____ /

8. Other _____ /

9. Visual _____ /

disturbance _____ /

10. Abdominal pain _____ /

11. Photophobia _____ /

12. Phonophobia _____ /

13. Jaw pain _____ /

15) Diurnal

| | |
|--------------------|---|
| 1. Awakes at night | / |
| 2. Morning | / |
| 3. Afternoon | / |
| 4. Evening | / |
| 5. All day | / |
| 6. Variable | / |

16) Precipitation

| | | |
|--------------------------|----|-----|
| | No | Yes |
| 1. Hunger | / | |
| 2. Tension/Stress | / | |
| 3. Fatigue | / | |
| 4. Weather change | / | |
| 5. Movement of head/neck | / | |
| 6. Certain foods | / | |

17) Aggravation

| | |
|------------------------|---|
| 1. Menstruation | / |
| 2. Sneeze/cough | / |
| 3. Exertion | / |
| 4. Head/neck movements | / |
| 5. Motion | / |
| 6. Noise | / |
| 7. Light | / |

18) Medications

| | | |
|--------------|----|-----|
| | NO | YES |
| 1. None | / | |
| Analgesic | | |
| 2. Aspirin | / | |
| 3. Tylenol | / | |
| 4. Florinal | / | |
| 5. Ibuprofen | / | |
| 6. Other | / | |

Abortive

| | |
|-------------|---|
| 7. Ergot | / |
| 8. Cafergot | / |
| 9. Other | / |

Preventative

| | |
|------------------|---|
| 10. Inderal | / |
| 11. Isoptin | / |
| 12. Methysergide | / |
| 13. Other | / |
| 14. Homonal/BCP | / |

19) Self-Help

| | |
|---------------|---|
| 1. Lying down | / |
| 2. Massage | / |
| 3. Heat | / |
| 4. Cold | / |
| 5. Food | / |
| 6. Other | / |

Past Treatment

20) Previous diagnosis?

21) Past diagnosis?

| | | |
|------------|----|-----|
| Specialist | NO | YES |
| | NO | YES |
| 1. CT scan | / | |
| 2. EEG | / | |
| 3. Other | / | |

22) Past treatments

| | | | |
|-----------------|----|-----|----------|
| | | | Helpful? |
| | NO | YES | NO YES |
| 1. G.P. | / | / | / |
| 2. Biofeedback | / | / | / |
| 3. Acupuncture | / | / | / |
| 4. Chiropractor | / | / | / |
| 5. Dentist | / | / | / |
| 6. Other | / | / | / |

General health

23) Do you have any seperate pain in

| | | |
|---------------|----|-----|
| | NO | YES |
| 1. Neck | / | |
| 2. Upper back | / | |
| 3. Lower back | / | |

24) Are you taking any medication?

| | |
|-------------------|---|
| 1. Anticoagulant | / |
| 2. Vallium | / |
| 3. Antidepressant | / |
| 4. Antihistamine | / |
| 5. Other | / |

25) Have you had any recent illnesses or operations?
NO YES

26) Do you have
1. High blood pressure
2. Vascular disease
3. Neurological disease
4. Other diseases

Lifestyle

27) 1. Are you married?
2. Do you have children?
Boys# Girls#

28) Are you a smoker
How much?

29) Family history of headache
1. Mother
2. Father
3. Grandparents
4. Sibling
5. Children

30) How would you rate your job stress
1. Low
2. Medium
3. High

CMCC NECK DISABILITY INDEX

PATIENT NAME: _____ FILE #: _____ DATE: _____

This questionnaire has been designed to give the doctor information as to how your neck pain has affected your ability to manage in everyday life. Please answer every section and mark in each section only the ONE box which applies to you. We realise you may consider that two of the statements in any one section relate to you, but please just mark the box which most closely describes your problem.

Section 1 - Pain Intensity

- ☐ I have no pain at the moment.
☐ The pain is very mild at the moment.
☐ The pain is moderate at the moment.
☐ The pain is fairly severe at the moment.
☐ The pain is very severe at the moment.
☐ The pain is the worst imaginable at the moment.

Section 2 - Personal Care (Washing, Dressing etc.)

- ☐ I can look after myself normally without causing extra pain.
☐ I can look after myself normally but it causes extra pain.
☐ It is painful to look after myself and I am slow and careful.
☐ I need some help but manage most of my personal care.
☐ I need help every day in most aspects of self care.
☐ I do not get dressed, I wash with difficulty and stay in bed.

Section 3 - Lifting

- ☐ I can lift heavy weights without extra pain.
☐ I can lift heavy weights but it gives extra pain.
☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example on a table.
☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
☐ I can lift very light weights.
☐ I cannot lift or carry anything at all.

Section 4 - Reading

- ☐ I can read as much as I want to with no pain in my neck.
☐ I can read as much as I want to with slight pain in my neck.
☐ I can read as much as I want with moderate pain in my neck.
☐ I can't read as much as I want because of moderate pain in my neck.
☐ I can hardly read at all because of severe pain in my neck.
☐ I cannot read at all.

Section 5 - Headaches

- ☐ I have no headaches at all.
☐ I have slight headaches which come in-frequently.
☐ I have moderate headaches which come in-frequently.
☐ I have moderate headaches which come frequently.
☐ I have severe headaches which come frequently.
☐ I have headaches almost all the time.

Section 6 - Concentration

- ☐ I can concentrate fully when I want to with no difficulty.
☐ I can concentrate fully when I want to with slight difficulty.
☐ I have a fair degree of difficulty in concentrating when I want to.
☐ I have a lot of difficulty in concentrating when I want to.
☐ I have a great deal of difficulty in concentrating when I want to.
☐ I cannot concentrate at all.

Section 7 - Work

- ☐ I can do as much work as I want to.
☐ I can only do my usual work, but no more.
☐ I can do most of my usual work, but no more.
☐ I cannot do my usual work.
☐ I can hardly do any work at all.
☐ I can't do any work at all.

Section 8 - Driving

- ☐ I can drive my car without any neck pain.
☐ I can drive my car as long as I want with slight pain in my neck.
☐ I can drive my car as long as I want with moderate pain in my neck.
☐ I can't drive my car as long as I want because of moderate pain in my neck.
☐ I can hardly drive at all because of severe pain in my neck.
☐ I can't drive my car at all.

Section 9 - Sleeping

- ☐ I have no trouble sleeping.
☐ My sleep is slightly disturbed (less than 1 hr. sleepless).
☐ My sleep is mildly disturbed (1-2 hrs. sleepless).
☐ My sleep is moderately disturbed (2-3 hrs. sleepless).
☐ My sleep is greatly disturbed (3-5 hrs. sleepless).
☐ My sleep is completely disturbed (5-7 hrs. sleepless).

Section 10 - Recreation

- ☐ I am able to engage in all my recreation activities with no neck pain at all.
☐ I am able to engage in all my recreation activities, with some pain in my neck.
☐ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck.
☐ I am able to engage in a few of my usual recreation activities because of pain in my neck.
☐ I can hardly do any recreation activities because of pain in my neck.
☐ I can't do any recreation activities at all.

PAIN DISABILITY
INDEX

Patient name _____ Date ____ / ____ / ____

The following scales are designed to measure the degree to which your headache influence various aspects of your life. I would like you to rate the overall influence of your headache on your life, and not just when it is at it's worst.

On the scales, zero indicates no disability, and ten indicates total disruption or prevention by your pain.

1. Family/home responsibilities. This category refers to activities related to the home or family. It includes chores and duties performed around the house (eg. yard work) and errands or favours for other family members (eg. driving the children to school).

| | | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | | | | | | | total |
| no | | | | | | | | | | disability |
| disability | | | | | | | | | | |

2. Recreation. This category includes hobbies, sports, and other leisure time activities.

| | | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | | | | | | | total |
| no | | | | | | | | | | disability |
| disability | | | | | | | | | | |

3. Social Activity. This category refers to activities which involve participation with friends and acquaintances other than family members. eg. parties, theater, concerts, dining out, and other social events.

| | | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | | | | | | | total |
| no | | | | | | | | | | disability |
| disability | | | | | | | | | | |

4. Occupation. This category refers to activities that are a part of or directly related to one's job. This includes nonpaying jobs as well, such as that of a housewife or volunteer worker.

| | | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | | | | | | | total |
| no | | | | | | | | | | disability |
| disability | | | | | | | | | | |

5. Sexual Behaviour. This category refers to the frequency and quality of one's sex life.

| | | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | | | | | | | | | | total |
| no | | | | | | | | | | disability |
| disability | | | | | | | | | | |

6. Self Care. This category includes activities which involve personal maintenance and independent daily living (eg. taking a shower, driving, getting dressed, etc.)

| | | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| no | | | | | | | | | | total |
| disability | | | | | | | | | | disability |

7. Life-support activity. This category refers to basic life-supporting behaviours such as eating, sleeping, and breathing.

| | | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|------------|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| no | | | | | | | | | | total |
| disability | | | | | | | | | | disability |

TECHNIKON NATAL CHIROPRACTIC DAY CLINICCASE HISTORY

Patient: _____ Date # _____

File #: _____

X-ray #: _____

Age: _____ Sex: _____ Occupation: _____

Intern: _____ Signature: _____

FOR CLINICIAN'S USE ONLY

Initial visit clinician: _____

Signature: _____

Case History:

Examination:

Previous: TN
OtherCurrent: TN
Other

X-ray Studies:

Previous: TN
OtherCurrent: TN
Other

Clinical path. lab.:

Previous: TN
OtherCurrent: TN
Other

Case status:

PTT: Conditional: Signed off: Final sign out:

Recommendations:

Intern's case history

1. Source of history:
2. Chief complaint: (patient's own words)

3. Present illness:

Location

Onset

Duration

Frequency

Pain (character)

Progression

Aggravating factors

Relieving factors

Associated S & S

Previous occurrences

Past treatment and outcome

6. Current health status and life-style:

Allergies

Immunizations

Screening tests

Environmental hazards
(home, school, work)

Safety measures
(seat belts, condoms)

Exercise and leisure

Sleep patterns

Diet

Current medication

Tobacco

Alcohol

Social drugs

7. Family history:

Immediate family:

Age

Health

Cause of death

DM

Heart disease

TB

HBP

Stroke

Kidney disease

CA

Arthritis

Anaemia

Headaches

Thyroid disease

Epilepsy

Mental illness

Alcoholism

Drug addiction

Other

Genital

Vascular

Musculoskeletal

Neurologic

Haematologic

Endocrine

Psychiatric.

TECHNIKON NATAL CHIROPRACTIC DAY CLINICPHYSICAL EXAMINATION

Underline abnormal findings in RED and elaborate on back of relevant page, if necessary.

Mark "NAD" if normal.

Patient: _____ File # _____

Last name

First name

Clinician: _____ Signature: _____

Intern: _____ Signature: _____

Date: _____

Height: _____ Weight: _____ Temp: _____

Rates: Heart: _____ Pulse: _____ Respiration: _____

Blood pressure: Arms: L / R /

Legs: L / R /

General appearance:

Shoulder:

- skin
- symmetry
- ROM - glenohumeral
 - scapulo-thoracic
 - acromioclavicular
- elbow
- wrist

Chest measurement

- inspiration
- expiration

Visual acuity

Breast examination:

Inspection:

- skin
- size
- contour
- nipples
- arms overhead
- hands against hips
- leaning forward.

Palpation:

- axillary lymph nodes.

SEATED EXAMINATION.

Spinal posture

Head

- scalp
- skull
- face
- skin

Eyes

- conjunctiva
- sclera
- eyebrows
- eyelids
- lacrimal gland
- nasolacrimal duct
- alignment
- corneal reflex
- ocular movement

L
III IV VI

R
III IV VI

- visual fields
- accommodation
- iris
- pupils
- red reflex
- optic disc

ROM:

Flexion: 45 chin to larynx
chin to sternum
Extension: 55 forehead parallel
to floor
L.lat.flex: 40
R.lat.flex: 40
L.rot.: 70
R.rot.: 70

Flex.

L.Rot.

R.Rot.

L.Lat.
flex.

R.lat.
flex.

Ext.

lymph nodes
trachea
thyroid
carotid arteries (thrills, bruit)

CN V

CN VII

CN VIII (nystagmus)

CN IX

CN XI

TMJ

Inspection

ROM

deviation

Palpation

crepitus

tenderness

Cardiovascular:
auscultation (aortic murmurs)
Allen's test

SUPINE EXAMINATION

JVP

PMI

auscultation heart (L.lat.recumbent)

respiratory excursion

percussion chest (anterior)

breast palpation

The abdomen:

Inspection:

skin

umbilicus

contour

peristalsis

pulsations

hernias (umbilical/incisional)

Auscultation:

bowel sounds

bruit

Percussion:

general

liver

spleen

Palpation:

superficial reflexes

cough

light

rebound tenderness

deep

liver

spleen

kidneys

aorta

intra-/retro-abdominal wall mass

shifting dullness

fluid wave

Acute abdomen:

where pain began and now

cough

tenderness

guarding/rigidity

rebound tenderness

Rovsing's sign

psoas sign

obturator sign

cutaneous hyperaesthesia

rectal exam

Murphy's sign.

Neurological:

dermatomes

L1

L2

L3

L4

L5

S1

muscle strength

hip flexion

knee extension

ankle dorsiflexion

plantar flexion

tendon reflexes

patellar

Achilles

plantar reflex

Rectal examination:

Inspection

sacrococcygeal & perianal areas

Palpation

sphincter tone

tenderness

induration

nodules

prostate

seminal vesicles

Mental status

Appearance and behaviour:

level of consciousness

posture and motor behaviour

dress, grooming, personal hygiene

facial expression

affect

Speech and language:

quantity

rate

volume

fluency

aphasia (prn)

Mood

Thought processes (logical, relevant, organized)

Memory and attention:

orientation (time, place, person)

remote memory

recent memory

new learning ability

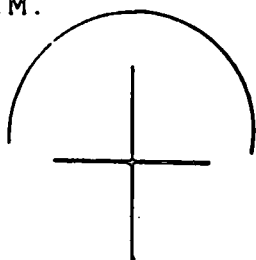
Higher cognitive functions:

information and vocabulary (general & specialised knowledge)

abstract thinking.

TECHNIKON NATAL CHIROPRACTIC DAY CLINICREGIONAL EXAMINATION - CERVICAL SPINEObservation:

posture
size
swellings
scars
discoloration
hair line
R.O.M.



Flexion 45° chin to larynx
chin to chest
Extension 70° Forehead parallel to
ground

| | | |
|----|---------------------|------------------|
| / | painless limitation | L. Rotation 70° |
| // | painful limitation | R. Rotation 70° |
| | | L. lat. flex 45° |
| | | R. lat. flex 45° |

Palpation: lymph nodes
trachea
thyroid gland

Orthopaedic:

tenderness:
trigger points:
SCM
trapezius
scaleni
levator scapulae
posterior musculature
doorbell sign
cervical compression
Kemp's test
lateral compression
cervical distraction
Adson's test
Halstead's test
costoclavicular test
hyperabduction (Wright's) test
Eden's (traction) test
shoulder abduction test
shoulder depression test
dizziness rotation test
Lhermitte's sign
Brachial plexus tension
O'Donoghue manoeuvre

Neurological:

Dermatomes:

L.

R.

RANGE OF MOTION
of the cervical spine

NAME:.....

DATE:.../.../.....

PRE-TREATMENT :-

| | Patient ROM (in degrees) | Accepted normal ROM (in degrees) |
|------------------------|-----------------------------|--|
| FLEXION | | 45° |
| EXTENSION | | 45° |
| ROTATION (LEFT) | | 80° |
| (RIGHT) | | 80° |
| LATERAL BENDING (LEFT) | | 45° |
| (RIGHT) | | 45° |

POST-TREATMENT :-

| | | |
|------------------------|--|-----|
| FLEXION | | 45° |
| EXTENSION | | 45° |
| ROTATION (LEFT) | | 80° |
| (RIGHT) | | 80° |
| LATERAL BENDING (LEFT) | | 45° |
| (RIGHT) | | 45° |

HEADACHE DIARY

Patient name: _____ Date: _____

| DAY: | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---|---|---|---|---|---|---|
| Date: | | | | | | | |
| 1) Did you have a headache today ? (yes or no) | | | | | | | |
| 2) If yes, how long did it last ? (in hours) | | | | | | | |
| 3) How severe was it ? (0-10) None.....= 0 Mild.....= 2 Moderate.....= 4 Heavy.....= 6 Severe.....= 8 Horrible.....= 10 | | | | | | | |
| 4) Rate your activity today: Normal.....= 0 Minimal effect on activity.....= 1 Interference with work or leisure.....= 2 Absent from work or school.....= 3 | | | | | | | |
| 5) Medication taken :- a) How much of which kind ? _____ _____ _____ | | | | | | | |
| b) How often ? _____ _____ _____ | | | | | | | |
| 6) Did you play the tape today? (yes or no) | | | | | | | |
| 7) If yes, how often? | | | | | | | |
| 8) Rate the severity of the headache after playing the tape: None.....= 0 Mild.....= 2 Moderate.....= 4 Heavy.....= 6 Severe.....= 8 Horrible.....= 10 | | | | | | | |

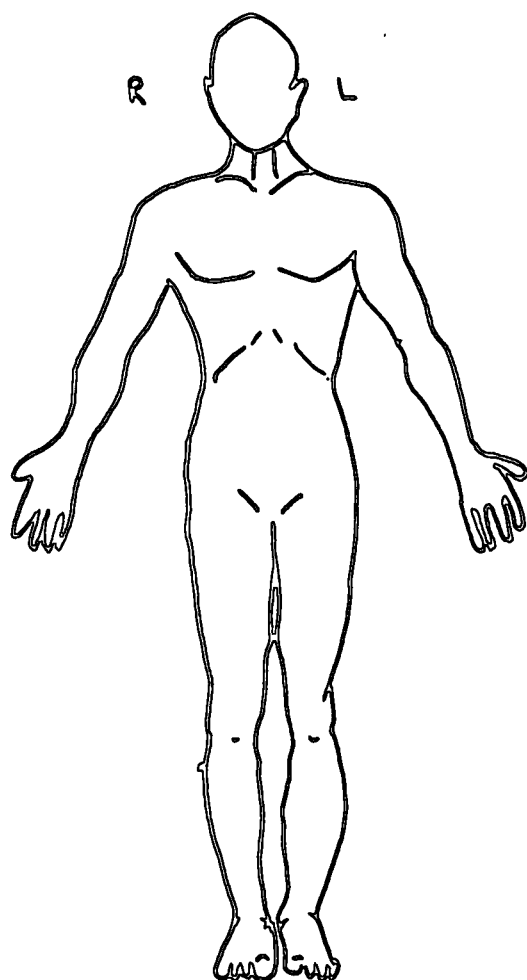
SYMPTOM DIAGRAM

PATIENT NAME: _____ FILE#: _____ DATE: _____

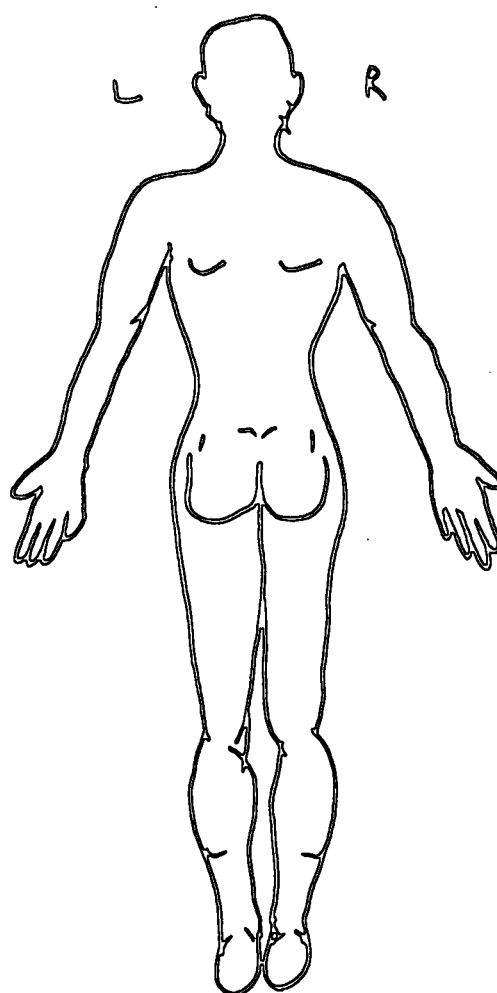
In the diagrams provided below, please mark the areas on your body which you feel best represent the pain(s) or sensation(s) you are experiencing. Please include all areas. Use the symbols provided below. Also, in order to complete the picture, please draw in your face.

SYMBOLS

| | | | |
|---------------|-----|------------------|-------|
| numbness | === | pins & needles | |
| | === | | |
| burning | xxx | stabbing & sharp | //// |
| | xxx | | //// |
| dull & aching | +++ | stiff & tight | 222 |
| | +++ | | 222 |



FRONT



BACK

4. Puggat Cso.
 Adcockvale Cat.
 Ant Elizabeth
 26 August 1992

Dear Konrad

I am sorry to have kept you waiting so long. I hope what little information I have for you will still be useful.

you asked what music to use for relaxation. Most of the research I have read is fairly general in its description of the music used. Usually researchers simply speak of slow, quiet music. A decibel level of 45-60 dB has been suggested, and a music therapist I know prefers a pulse of approximately 50 beats per minute. slow music definitely slows the pulse rate. I have achieved an average drop of approximately one third within two or three minutes of listening to slow, quiet, harmonious music. In cases of muscular tension I usually couple the music with instructions to relax, feel loose, heavy, etc., and if a client is particularly tense, I find that an instruction to tense briefly before relaxing helps. I start with Bach's Air on a G String, followed by the Pastoral Symphony from Handel's Messiah, after which I progress to "Venus" and "Jupiter" from Holst's The Planets. The idea is to go from something quiet with a definite pulse to something more loosely floating. Once clients are used to relaxing (i.e. after a few sessions) I use music like that which Halpern describes. I would suggest you go to a music shop and ask to listen to some New Age recordings without persuasion or a strong bias and see what they can offer you. Also, as Halpern suggests, and as I have heard several other people attest, higher tones are most effective in the head, so try for something fairly high.

One popular method of measuring tension is an electromyograph. Galvanic skin response might work too. Other measures of relaxation include skin temperature and questionnaires. Body temperature and urinary corticosteroids would probably not be suitable in your case.

2

Thank you for the Helson article. Unfortunately, what he has said in the article is as much as I know. I hope to do research in this field next year. At the moment all I have is many half-formulated questions.

I have enclosed copies of a few articles which you may find helpful to some or other degree. Good luck with your research. Please let me know how it turns out.

yours sincerely
Linda Smith

MUSIC FOR RELAXATION AND REVERIE

- | | |
|---------------|-------------------------------------|
| WAGNER | - Evening Star (from Tannhauser) |
| ZAMFIR | - Romantic Flute of Pan |
| DEBUSSY | - Clair De Lune |
| RAVEL | - Pavane for a Dead Princess |
| HALPERN-KELLY | - Ancient Echoes |
| BRUCH | - Scottish Fantasy |
| VIVALDI | - Oboe Concertos |

MUSIC TO LIFT LOW FEELINGS

- | | |
|--------------|---|
| DELIBES | - Coppelia |
| BEETHOVEN | - Piano Concerto No. 5 (Emperor) |
| DVORAK | - Symphony No. 8 - Slavonic Dances |
| MOZART | - Symphony No. 35 - Haffner |
| HANDEL | - Water Music - Music for the Royal Fireworks |
| GROFE | - Grand Canyon Suite |
| MENDELSSOHN | - Symphony No. 4 (Italian) |
| PARRY | - Jerusalem |
| HANDEL | - Choruses from Messiah and Israel in Egypt |
| RACHMANINOFF | - Piano Concerto No. 2 (final movement) |

MUSIC TO RELIEVE TENSION

- | | |
|-----------|---|
| J S BACH | - Air on a G String |
| McKUE | - Concerto for Ballon and Orchestra |
| GREIG | - Holberg Suite |
| BEETHOVEN | - Symphony No. 6 - 1st and 2nd Movements |
| PACHELBEL | - Canon in D |
| HOVHANESS | - Mysterious Mountain |
| MOZART | - Concerto for Flute and Harp |
| VIVALDI | - Flute Concertos, Four Seasons |
| GIULIANI | - Guitar Concertos |
| MANTOVANI | |

MUSIC TO SLEEP

- | | |
|------------------|---|
| ROTH | - You are the Ocean |
| NIGHT MUSIC | |
| SCHUBERT | - Ave Maria |
| MASSINET | - Meditation from Thais |
| BRAHMS | - Lullaby |
| SCHUMANN | - Traumerei (Dreams) |
| DEBUSSY | - Prelude to the Afternoon of a Faun |
| | - Clair De Lune |
| J S BACH | - Air on a G String |
| PALESTRINA | - Pope Marcellus Mass |
| PACHELBEL | - Canon in D |
| VAUGHAN WILLIAMS | - Fantasia on a Theme of Thomas Tallis |
| BARBER | - Adagio for Strings |
| HUMPERDINK | - Children's Prayer (From Hansel & Gretel) |

MUSIC FOR CLARITY

- | | |
|---|---|
| J S BACH | - Brandenburg Concertos |
| SOUNDTRACK | - Born Free |
| TIBETIAN BELLS | |
| PSALMS OF DAVID | |
| TELEMANN | - Concerto for 3 violins and Orchestra |
| WEBER | - Oberan Overture |
| BRAHMS | - Violin Concerto |
| SCARLATTI | - Harpsichord Sonatas |
| HANDEL | - Water Music |
| Orchestral music of J S Bach | |
| Baroque String music of Telemann, Vivaldi, Albinoni, Corelli, Torelli. | |

Guides to the

Evaluation

of

Permanent Impairment

2nd Edition



Cervical Region — Flexion and Extension

Abnormal Motion

1. Place the patient in the neutral position (Figure 67).

2. Center the goniometer (Figure 67), with its base in line with the superior border of the larynx (C5) and its arm extended vertically along the mastoid process. Record the goniometer reading.

3. Flexion: With the patient bending the head as far forward as possible (Figure 68), follow the range of motion with the goniometer arm. Keep the goniometer arm along the mastoid process. Record the angle that subtends the arc of motion.

4. Extension: Starting from the neutral position with the patient bending the head as far backward as possible (Figure 69), follow the range of motion with the goniometer arm. Keep the goniometer arm vertical along the mastoid process. Record the angle that subtends the arc of motion.

5. Consult the abnormal motion section of Table 46 to determine the impairment of the whole person.

Example: 30° active flexion from neutral position (0°) or any 30° arc of retained active flexion is equivalent to 1% impairment of the whole person.

6. ADD the impairment values contributed by flexion and extension. Their sum is the impairment of the whole person that is contributed by flexion and extension abnormalities of the cervical region.

Ankylosis

1. Place the goniometer base as if measuring the neutral position (Figure 67). Measure the deviation from the neutral position with the goniometer arm and record the reading.

2. Consult the ankylosis section of Table 47 to determine the impairment of the whole person.

Example: A cervical region with ankylosis at 30° flexion is equivalent to 23% impairment of the whole person.

Consult Table 46 if radiographic methods are chosen to determine impairment due to ankylosis.

TABLE 46
IMPAIRMENT OF CERVICAL, THORACIC AND LUMBAR REGIONS DUE TO ANKYLOSIS, DETERMINED BY RADIOGRAPHIC METHODS

| Favorable (neutral) Position | % Impairment of Whole Person | Unfavorable Position | % Impairment of Whole Person |
|------------------------------|------------------------------|----------------------|------------------------------|
| Any 2 cervical | 2 | Any 2 cervical | 4 |
| Any 3 cervical | 5 | Any 3 cervical | 10 |
| Any 4 cervical | 7 | Any 4 cervical | 14 |
| Any 5 cervical | 9 | Any 5 cervical | 18 |
| Any 6 cervical | 12 | Any 6 cervical | 24 |
| Any 7 cervical | 14 | Any 7 cervical | 28 |
| C7 and T1 | 2 | C7 and T1 | 4 |
| Any 2 thoracic | 1 | Any 2 thoracic | 2 |
| Any 3 thoracic | 2 | Any 3 thoracic | 4 |
| Any 4 thoracic | 3 | Any 4 thoracic | 5 |
| Any 5 thoracic | 4 | Any 5 thoracic | 7 |
| Any 6 thoracic | 5 | Any 6 thoracic | 9 |
| Any 7 thoracic | 5 | Any 7 thoracic | 11 |
| Any 8 thoracic | 6 | Any 8 thoracic | 13 |
| Any 9 thoracic | 7 | Any 9 thoracic | 15 |
| Any 10 thoracic | 8 | Any 10 thoracic | 16 |
| Any 11 thoracic | 9 | Any 11 thoracic | 18 |
| Any 12 thoracic | 12 | Any 12 thoracic | 20 |
| T12 and L1 | 3 | T12 and L1 | 6 |
| Any 2 lumbar | 3 | Any 2 lumbar | 6 |
| Any 3 lumbar | 6 | Any 3 lumbar | 12 |
| Any 4 lumbar | 9 | Any 4 lumbar | 18 |
| Any 5 lumbar | 12 | Any 5 lumbar | 24 |
| C1—C7 | 14 | C1—C7 | 28 |
| T1—T12 | 10 | T1—T12 | 20 |
| L1—L5 | 12 | L1—L5 | 24 |
| C1—T12 | 23 | C1—T12 | 28 |
| T1—L5 | 21 | T1—L5 | 39 |
| C1—L5 | 32 | C1—L5 | 56 |

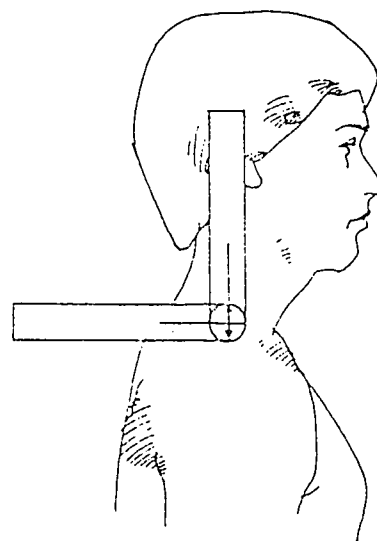


Figure 67

TABLE 47
IMPAIRMENT DUE TO ABNORMAL MOTION
AND ANKYLOSIS OF THE CERVICAL REGION—
FLEXION-EXTENSION

Abnormal Motion
Average range of FLEXION-EXTENSION is 90 degrees
Value to total range of cervical motion is 40%

| Flexion from neutral position (0°) to: | Degrees of Cervical Motion | | Impairment of Whole Person |
|--|----------------------------|----------|----------------------------|
| | LOST | RETAINED | |
| 0° | 45 | 0 | 4% |
| 15° | 30 | 15 | 3 |
| 30° | 15 | 30 | 1 |
| 45° | 0 | 45 | 0 |

| | | | |
|--|----|----|----|
| Extension from neutral position (0°) to: | | | |
| 0° | 45 | 0 | 4% |
| 15° | 30 | 15 | 3 |
| 30° | 15 | 30 | 1 |
| 45° | 0 | 45 | 0 |

| | |
|------------------------|-----|
| Ankylosis | |
| Region ankylosed at: | |
| *0° (neutral position) | 14% |
| 15° | 19 |
| 30° | 23 |
| 45° (full flexion) | 35 |

| | |
|------------------------|-----|
| Region ankylosed at: | |
| *0° (neutral position) | 14% |
| 15° | 19 |
| 30° | 30 |
| 45° (full extension) | 60 |

*position of function

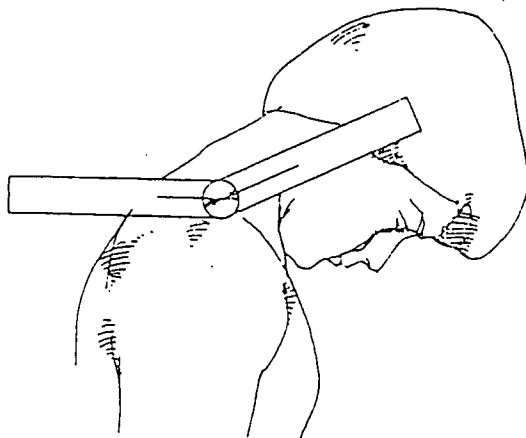


Figure 68

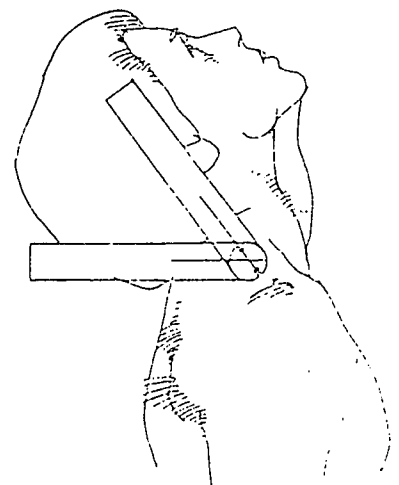


Figure 69

Cervical Region — Lateral Flexion and Bending

Abnormal Motion

1. Place the patient in the neutral position (Figure 70). Note the lateral extension or abduction of the arms to steady the shoulders.
2. Center the goniometer over the back of the neck (Figure 70), with the base on the vertebra prominens and the goniometer arm along midline of the neck. Record the goniometer reading.
3. Left lateral flexion: Starting from the neutral position with the patient bending the neck to the left as far as possible (Figure 71), follow the range of motion with the goniometer arm. Record the angle that subtends the arc of motion.
4. Right lateral flexion: Starting from the neutral position with the patient bending the neck to the right as far as possible (Figure 71), follow the range of motion with the goniometer arm. Record the angle that subtends the arc of motion.

5. Consult the abnormal motion section of Table 48 to determine the impairment of the whole person.

Example: 30° active left lateral flexion from neutral position (0°) or any 30° arc of retained active left lateral flexion is equivalent to 1% impairment of the whole person.

6. ADD the impairment values contributed by left lateral flexion and right lateral flexion. Their sum represents the impairment of the whole person that is contributed by abnormal lateral flexion of the cervical region.

Figure 70

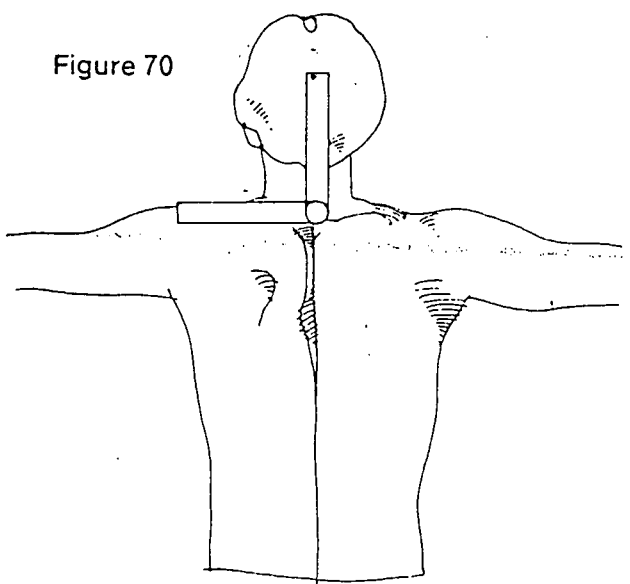


Figure 71

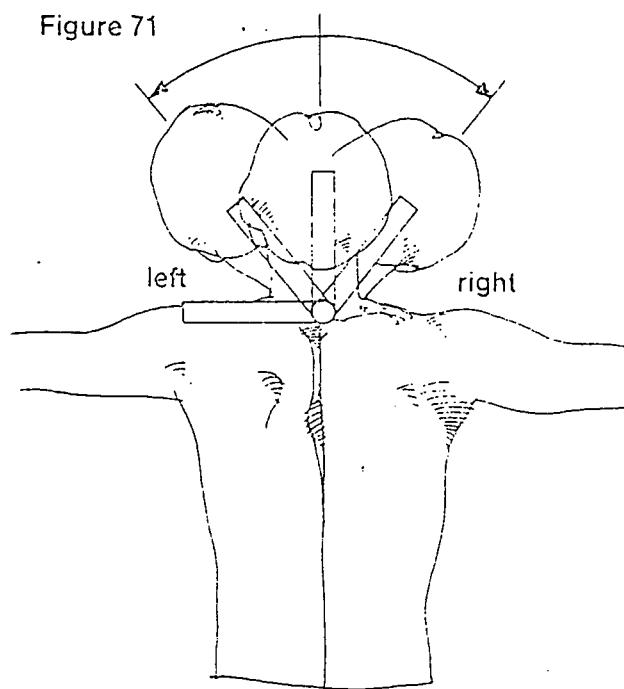


TABLE 48
IMPAIRMENT DUE TO ABNORMAL MOTION
AND ANKYLOSIS OF THE CERVICAL REGION—
LATERAL FLEXION

Abnormal Motion

Average range of LATERAL FLEXION (lateral bending) is 90 degrees

Value to total range of cervical motion is 25%

| Right lateral flexion from neutral position (0°) to: | Degrees of Cervical Motion | | Impairment of Whole Person |
|--|----------------------------|----------|----------------------------|
| | LOST | RETAINED | |
| 0° | 45 | 0 | 3% |
| 15° | 30 | 15 | 2 |
| 30° | 15 | 30 | 1 |
| 45° | 0 | 45 | 0 |

| Left lateral flexion from neutral position (0°) to: | Degrees of Cervical Motion | | Impairment of Whole Person |
|---|----------------------------|----------|----------------------------|
| | LOST | RETAINED | |
| 0° | 45 | 0 | 3% |
| 15° | 30 | 15 | 2 |
| 30° | 15 | 30 | 1 |
| 45° | 0 | 45 | 0 |

Ankylosis

| Region ankylosed at: | | Impairment of Whole Person |
|-------------------------------|--|----------------------------|
| 0° (neutral position) | | 15% |
| 15° | | 20 |
| 30° | | 25 |
| 45° (full right lat. flexion) | | 30 |

| Region ankylosed at: | | Impairment of Whole Person |
|------------------------------|--|----------------------------|
| 0° (neutral position) | | 15% |
| 15° | | 20 |
| 30° | | 25 |
| 45° (full left lat. flexion) | | 30 |

*position of function

Ankylosis

1. Place the goniometer base as if measuring the neutral position (Figure 70). Measure the deviation from the neutral position with the goniometer arm and record the reading.

2. Consult the ankylosis section of Table 48 for the cervical region to determine the impairment of the whole person.

Example: A cervical region with ankylosis at 30° right lateral flexion is equivalent to 25% impairment of the whole person.

Consult Table 46 if radiographic methods are chosen to determine impairment due to ankylosis.

Cervical Region — Rotation

Abnormal Motion

1. Place the patient in the neutral position (Figure 72); the examiner should prevent motion of the shoulders by placing the hands on the patient's shoulders. The goniometer is not used.

2. With patient rotating the head to the right and left as far as possible (Figure 73), record the range of motion in each direction, estimating the arc described by the chin as it turns from the neutral position.

Figure 72

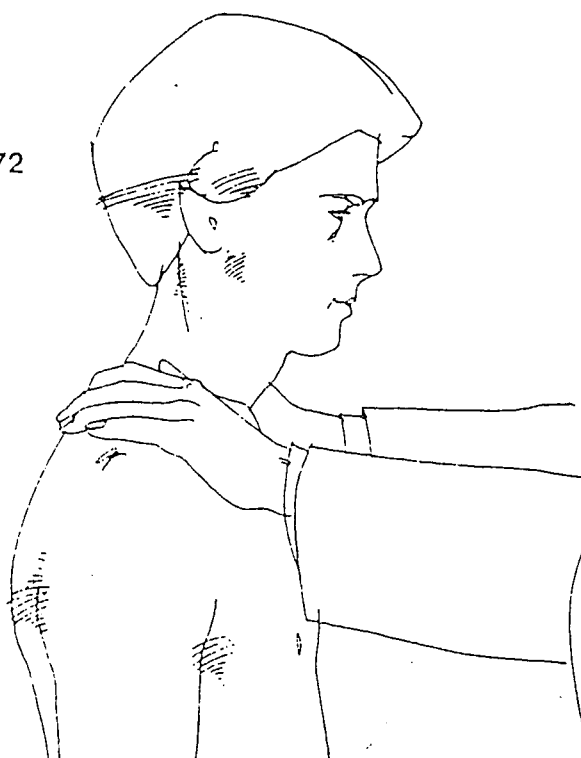


Figure 73

3. Consult the abnormal motion section of Table 49 to determine the impairment of the whole person.

Example: 20° active left rotation from neutral position (0°) or any 20° arc of retained active left rotation is equivalent to 3% impairment of the whole person.

4. ADD the impairment values contributed by left rotation and right rotation. Their sum is the impairment of the whole person that is contributed by abnormal rotation of the cervical region.

Ankylosis

1. Estimate by the position of the chin the angle at which the cervical region is ankylosed.

2. Consult the ankylosis section of Table 49 to determine the impairment of the whole person.

Example: A cervical region with ankylosis at 20° right rotation is equivalent to 17% impairment of the whole person.

Consult Table 46 if radiographic methods are chosen to determine impairment due to ankylosis.

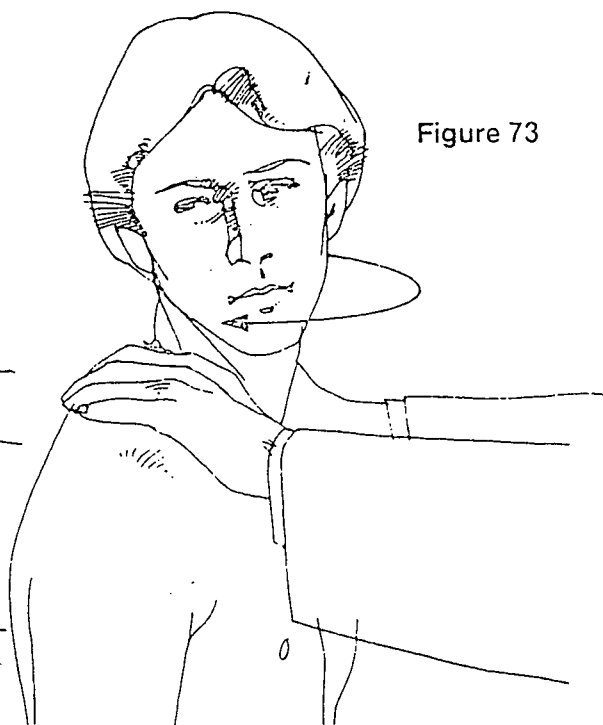


TABLE 49
IMPAIRMENT DUE TO ABNORMAL MOTION
AND ANKYLOSIS OF THE CERVICAL REGION—
ROTATION

Abnormal Motion
Average range of ROTATION is 160 degrees
Value to total range of cervical motion is 35%

| Right rotation from neutral position (0°) to: | Degrees of Cervical Motion | | Impair- ment of Whole Person |
|--|-------------------------------|----------|---------------------------------------|
| | LOST | RETAINED | |
| 0° | 80 | 0 | 4% |
| 20° | 60 | 20 | 3 |
| 40° | 40 | 40 | 2 |
| 60° | 20 | 60 | 1 |
| 80° | 0 | 80 | 0 |
| Left rotation from neutral position (0°) to: | | | |
| 0° | 80 | 0 | 4% |
| 20° | 60 | 20 | 3 |
| 40° | 40 | 40 | 2 |
| 60° | 20 | 60 | 1 |
| 80° | 0 | 80 | 0 |
| Ankylosis | | | |
| Region ankylosed at: | | | |
| 0° (neutral position) | | | 14% |
| 20° | | | 17 |
| 40° | | | 21 |
| 60° | | | 25 |
| 80° (full right rotation) | | | 28 |
| Region ankylosed at: | | | |
| 0° (neutral position) | | | 14% |
| 20° | | | 17 |
| 40° | | | 21 |
| 60° | | | 25 |
| 80° (full left rotation) | | | 28 |
| *position of function | | | |

TABLE 50
IMPAIRMENT DUE TO ABNORMAL MOTION
AND ANKYLOSIS OF THE THORACOLUMBAR—
REGION—FLEXION-EXTENSION

Abnormal Motion
Average range of FLEXION-EXTENSION is 120 degrees
Value to total range of thoracolumbar motion is 40%

| Flexion from neutral position (0°) to: | Degrees of Thoracolumbar Motion | | Impair- ment of Whole Person |
|---|------------------------------------|----------|---------------------------------------|
| | LOST | RETAINED | |
| 0° | 90 | 0 | 9% |
| 10° | 80 | 10 | 8 |
| 20° | 70 | 20 | 7 |
| 30° | 60 | 30 | 6 |
| 40° | 50 | 40 | 5 |
| 50° | 40 | 50 | 4 |
| 60° | 30 | 60 | 3 |
| 70° | 20 | 70 | 2 |
| 80° | 10 | 80 | 1 |
| 90° | 0 | 90 | 0 |
| Extension from neutral position (0°) to: | | | |
| 0° | 30 | 0 | 3% |
| 10° | 20 | 10 | 2 |
| 20° | 10 | 20 | 1 |
| 30° | 0 | 30 | 0 |
| Ankylosis | | | |
| Region ankylosed at: | | | |
| 0° (neutral position) | | | 20% |
| 10° | | | 22 |
| 20° | | | 24 |
| 30° | | | 27 |
| 40° | | | 29 |
| 50° | | | 31 |
| 60° | | | 34 |
| 70° | | | 36 |
| 80° | | | 38 |
| 90° (full flexion) | | | 40 |
| Region ankylosed at: | | | |
| 0° (neutral position) | | | 20% |
| 10° | | | 27 |
| 20° | | | 34 |
| 30° (full extension) | | | 40 |
| *position of function | | | |

Dear Kendrah, the new edition of Thank you Brain should be out shortly. Publishers Human & Rousseau. You may order through CNA.

THANK YOU BRAIN
Box 13068
Vincent 5217

BAROQUE MUSIC FOR IMPROVED CONCENTRATION AND MEMORY. SELF-MOTIVATION/GOAL SETTING/RELAXATION.

The book, THANK YOU BRAIN, describes a study approach which enables you to utilise your brain more effectively and teaches you to switch on a positive state of mind, thereby motivating yourself - a basic requirement for successful studies. It also comprises life skills which will help you to increase your self-confidence and control in any sphere - from sport to public speaking.

Two audio cassette tapes comprising SLOW BAROQUE MUSIC, recommended in the book, but not available in shops, were compiled. These slow movements from baroque composers like Bach, Handel, Vivaldi, Pachelbel and Scarlatti change the brain waves to alpha rhythm, which lowers the body tension, but at the same time renders the brain more alert. Students may play this music in the background while studying as it improves concentration, understanding and memory. It enhances a positive, calm, controlled state of mind, whether you are doing creative work, driving a car, preparing a presentation or conducting a conversation.

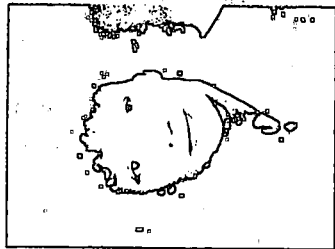
A 3rd cassette tape comprises the ANCHOR which is a self-motivation and self-empowerment technique developed to a large extent from suggestopaedia and neuro-linguistic programming. The technique comprises the following: First the individual goes through a relaxation exercise and then, in his mind's eye, he is taken back to a good experience which made him feel confident and in control. This good feeling of mastery and confidence is then anchored onto himself and acts as a trigger which empowers him to motivate himself instantly to e.g. get down to studying, get going with tasks that he does not enjoy, achieve better results in sport and work, and write tests and exams more effectively. The ANCHOR is used to change a negative pattern of failure, tension and a lack of confidence into a pattern of success, control and confidence. On the other side of the ANCHOR tape is a powerful GOAL SETTING exercise.

There are two RELAXATION EXERCISES on the 4th cassette tape. The ability to relax enhances control of the self as well as the ability to make full use of brain potential. These exercises also improve the ability to visualise - a technique which is important to master in order to set goals, improve memory and create a positive state of mind.

The tapes can be ordered from the above address at R40.00 each. Postage for one or more tapes is R4.00 extra.

I am also writing on the therapeutic
effects of music in my new book,
The Brain Dance. Let me know

how your research is going. I am
sure we can swap info on books
& articles to read.



Shani Grové
MA (Pret) HED (UNISA)
Product Manager
Anglo American
Central Training Unit
Maccauvillei, Vereeniging

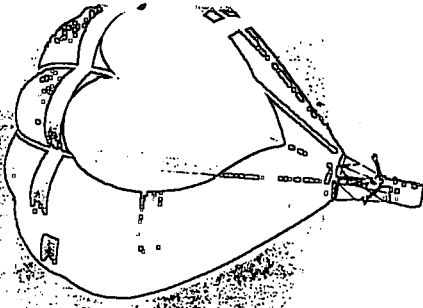
Thank you, Brain is an adventure into the magic web of your brain and your untapped potential. It will teach you to control your mind and to become a confident, effective, creative person.

If you are a student you will learn to increase your marks significantly and will be able to write tests and exams in a relaxed and controlled manner.

Thank you, Brain is also a book on life skills which will teach you to take control of your life and become a self-fulfilling person.

THANK YOU BRAIN

SHANI GROVÉ



THANK YOU BRAIN

A revolutionary approach
to life and study skills

SHANI GROVÉ

ISBN 0 620 15018 1



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About this book . . .

We may experience more in a single week of our lives now than our great-grandparents experienced in a whole lifetime. The world in which we live is highly complex and demanding. In order to cope with all the demands made by our parents, friends, employers, husbands, wives, lovers, work, colleagues, the political situation, the economics of the country, our financial position and, possibly most of all, ourselves, we constantly need to develop new skills. We live in a world of all-at-onceness where we are in contact with the whole world every day. Never before in the history of mankind has life been so complex, so multifaceted, and so full of tension and anxiety.

Thank you, *Brain* covers many facets of life and study skills. These will empower you to cope effectively and dynamically with life. The multi-dimensional approach to life and study skills that you will encounter in this book have a cumulative effect and offer immediate and positive results.

The state of mind is of primary importance in everything we do. Research has shown unequivocally that our state of mind and what we think influence the chemistry of the brain and the secretions from the glands. These changes in our bodies, in turn, affect what we do, how we do it, whether we become ill, how we feel about ourselves and others, and how effective and successful we are in every aspect of our lives.

Anchoring, the instant, self-motivating technique

One of the most valuable skills you will learn in this book is to develop control over your state of mind and to motivate yourself by literally switching yourself on thereby gaining instant control, enthusiasm, motivation and confidence.

The anchor is used by people to start doing anything they dislike doing, e.g. studying, cleaning things, doing exercises, going on a diet, etc. It is used with great success for test and exam writing. When one uses anchoring certain chemicals are secreted in the brain and these orchestrate an optimum state of mind which increases energy levels and intellectual capacity, and enhances the general functioning of the body and mind.

The following is a dramatic example of how this technique worked for a matriculant:

Ron and his parents had moved to South Africa from the United Kingdom. He always found Afrikaans a problem and owing to his dislike of the language and his subsequent demotivation he never managed to attain more than 24 % in this subject. In order to pass matric he had to pass Afrikaans. The author counselled him for about an hour, taught him the anchor technique and provided him with a baroque music tape. A dramatic change of attitude was immediately noticeable. Ron managed to achieve a D symbol for Afrikaans in his final matric exams.

Maths

Why do scholars and students experience so many difficulties with mathematics when Tony Buzan, the great expert on how to use one's full brain potential, says that we are all innately capable of obtaining PhD's in mathematics?

- o Firstly, people do not always possess the skills that will allow them to utilize their brain potential optimally. Thank you, *Brain* will teach you these skills.

- o Secondly, this is probably the subject most acutely influenced by emotions - feelings of fear, disappointment, frustration, self-doubt, negativism and giving up. These feeling form actual physical barriers in the brain as the chemistry and electric charges are affected. In order to overcome this negative self-fulfilling prophesy one needs to change one's state of mind. The author has seen a student's maths marks double and an electrical engineering students' marks move up from the bottom to the top of the class. In these two cases anchoring was used in conjunction with relaxation techniques, slow baroque music playing in the background while doing maths or studying, and learning to programme the brain positively.

If you want to be in control of your life and tap your unused brain potential optimally, using methods that are easy and fun, this book is for you.

(Slow baroque music tapes as well as tapes on anchoring, goal setting and relaxation are available through mail order.)

THANK YOU, *BRAIN* WILL TEACH YOU A VARIETY OF LIFE AND STUDY SKILLS WHICH WILL PUT YOU IN CONTROL OF YOUR LIFE

- o How to programme your brain to empower yourself
- o Goal setting, using techniques that are not only effective, but also great fun
- o Anchoring - a technique of instant self-motivation
- o Getting to know your strengths
- o Changing life patterns that do not work for you
- o How your thinking changes the chemistry of the brain and consequently your actions. How to use this information to your advantage
- o How to handle stress
- o How your state of mind influences everything you do, and how you can influence your state of mind
- o When you make pictures in your imagination your brain interprets this as reality. How to use constructive visualization to become what you want to be
- o How to remove psychological blocks
- o How to develop the ideal attitude towards studying by switching on a positive state of mind
- o Steps, breaks and revision in study
- o Memory systems
- o Brain maps
- o Exam techniques
- o Developing creativity
- o How to increase your marks significantly in all your subjects, specifically in maths
- o The use of slow baroque music to lower tension, render the brain alert and improve concentration considerably

Dear Patient,

Welcome to my research project. I am investigating the effect of chiropractic treatment of muscle tension headaches. Please be assured that all information is strictly confidential, and will not be incorporated into the results. Please be as accurate as possible when completing the relevant questionnaires. Your cooperation in this respect is appreciated.

Yours sincerely

Kendrah Michels

Dear Patient,

Welcome to my research project. I am investigating the effect of music therapy in conjunction with chiropractic treatment of muscle tension headaches. Please be assured that all information is strictly confidential, and will not be incorporated into the results. Please be as accurate as possible when completing the relevant questionnaires.

The tape given to you consists of various pieces of slow baroque music. The tapes were compiled by Shani Grove, a counselling psychologist. Please play the music in the background while you are busy with any activity, eg. driving, cooking, studying or just relaxing. When you have a headache or are feeling tense, please play the tape while you relax for a while.

Your cooperation in this respect is appreciated.

Yours sincerely

Kendrah Michels

This is to confirm that I, _____,
am willing to participate in the research project of Kendrah
Michels.

I understand that the treatment will entail chiropractic
treatment of muscle tension headaches.

I undertake to the best of my ability to adhere to the designated
programme and to comply with the requests of the researcher.

I also understand that all personal information is strictly
confidential.

Sign:- _____

Date:- _____

MOTION PALPATION

Patient name: _____ Date: _____

Subjective findings:

Objective findings:

| Flex | Ext | Left LF | AR | PR | C0 | Flex | Ext | Right LF | AR | PR |
|-------|-------|------------|-------|-------|----|-------|-------|-------------|-------|-------|
| ----- | ----- | ----- | ----- | ----- | C1 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | C2 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | C3 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | C4 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | C5 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | C6 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | C7 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | T1 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | T2 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | T3 | ----- | ----- | ----- | ----- | ----- |
| ----- | ----- | ----- | ----- | ----- | T4 | ----- | ----- | ----- | ----- | ----- |

Other:

Assesment:-

Treatment:-