Vol-6, Issue-1 June 2017

ISSN 2248-9460 (Print) ISSN 2395-1753 (Online)

INDIAN JOURNAL OF PHYSICAL THERAPY AND REHABILITATION An International Peer Reviewed Journal

12



Minutes of brisk walking benefit health



Janardan Rai Nagar Rajasthan Vidyapeeth (Deemed To Be University), Udaipur

Our Beloved Founder



Late Manishi Pt. Janardan Rai Nagar 16th June 1911 - 15th August, 1997

Popularly known as 'jannu bhai', the Late manishi's vision, farsightedness and sacrifice have enabled us reach the stature we enjoy today. He lit the lamp of knowledge by giving birth to an institution , named 'Hindi Vidyapeeth' on August 21, 1937 to spread education among those who were economically handicapped, and thereby enable them to learn the meaning of freedom Since then, the institution has been catering to the growing educational needs of an economically poor society having a rich sociocultural heritage. Although the Manishi is not amongst us today, his ideals inspire us to fulfil the mission of imparting qualitative education to the society through preservation of our long cherished sociocultural values. We cherish his deeds and ideals, and strive to walk on the path shown by him.

Vice Chancellor's Message



It gives me immense pleasure to Learn that the 6th volume of indain journal of physical therapy and rehabilitation is being published by department of physiotherapy. Sincere effort and knee interest taken by the members of department in the development of academic and research activities deserve all the admiration. I wish to express with a deep sense of joy and satisfaction on the relase of this volume and the same moment to continue even in greater magnitude in the coming years so that the department accomplishes commendable place in the luminous field of physiotherapy at the international level.

Wishing all a scintillating success.

1h.h

Prof. S.S. Sarngdevot Vice Chancellor

Principal's Message



I have immense pleasure to gather that the Department of Physiotherapy, Janardan Rai Nagar Rajasthan Vidyapeeth (Deemed) University, Udaipur, is going to publish its 6th Volume of Indian Journal of Physical Therapy and Rehabilitation this year.

We must engage in research and voice our opinions by publishing them in this, our local journal. To ensure wide leadership, the journal will carry a variety of articles of general interest, as well as

scientific articles, based on topic relevant to our region articles in the following categories are welcome: editorials, letter to editor, major and minor reviews, original research, notable clinical cases, to conference report, new technique, clinical update. With so many categories, this is a major mile stone for the Physiotherapy field and I appreciate all my staff and colleagues in the health care sector to accept and support this journal.

Please contribute articles to this journal in a timely manner to ensure it become a important forum for the exchange of ideas and knowledge which will ultimately translate to better health care.

My congratulation to entire team of my Department of Physiotherapy working for this remarkable endeavor and I wish Editor-in-Chief all the best for the successful publication of the journal.

Shauld

Dr. Shailendra Mehta Principal, Department of Physiotherapy

Editorial Desk



It gives me immense pleasure to write editorial for this 6th volume of IJPTR. The Department of Physiotherapy J.R. Nagar Rajasthan Vidyapeeth University Journal with a vision to promote physiotherapy science including all the specialities of Physiotherapy and uptake knowledge through new innovative research papers, case reports and Review articles in various field of physiotherapy specialities. This Journal with consistent precious publications ultimately aims to reach out to the International standards.

Our world is changing we face mounting challenges of Health Care to name a few. Their solution will require new ideas, discoveries, talents and innovations the fruits of research. To achieve them we must start by changing the way we do research there has to be free movement of people & ideas.

At this Juncture i wish to express my profuse thanks to all those who made an appreciable contribution for this journal and further i anticipate that their majestic effort shall continue, so to bring greater glory to our endeavors.

The arena of physiotherapy which as a matter of fact, works as a back bone of medical rehabilitation field should further be developed, for greater benefit to our suffering humanities

l implore & solicit all our members to spare no stone unturned in this noble and glorious mission.

I whole heartedly wish to express my deepest sense of gratitude to Honb'e chancellor & Honb'e Vice chancellor for their untiring help, relentless support and tremendous encouragement without which the present work would not have achieved its glorious completion.

On the behalf of editorial board I request to all the physiotherapist academicians, clinicians, research scholars and students to contribute articles for this Journal.

I pray to Almighty to grant all of us still greater success in times to come.

Dr. S.B. Nagar) Editor in Chief

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INDIAN JOURNAL OF PHYSICAL THERAPY & REHABILITATION

VOLUME -6 ISSUE-1 JUNE 2017

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EFFECT OF SNAGS TECHNIQUE ON HEART RATE AMONG PATIENTS WITH UPPER CERVICAL DYSFUNCTION

Mitali Badulkar *

Maneesh Arora **

Parul Raj Agrwal ***

ABSTRACT

Background: Mulligan's mobilization techniques are thought to increase the range of motion as well as correct the alignment of spine. The aim of this study was to investigate the effect of SNAGS technique on heart rate among patients with upper cervical dysfunction with vagus nerve impingement.

Need of the study: To best of our search there is dearth of literature pertaining to the involvement of vagus nerve at the upper cervical complex dysfunction and thus its effect on heart rate.

Methodology: 80 subjects were taken on the basis of inclusion- exclusion criteria in this study. Pre intervention heart rate was recorded .SNAGs technique was given to the patient's atlas vertebrae to side it was stuck. Post intervention heart rate was noted.

Result: The data was analysed using SPSS version 16. Descriptive statistics was used to summarise the variables. Paired T Test was used to see the effects of intervention on heart rate in our study population. There was reduction in heart rate by 5.2 beats/min which was found to be statistically highly significant ($p \square 0.001$).

Conclusion: The study concluded that SNAGS technique was effective in correcting the impingement caused to vagus nerve as measured through HR in patients with upper cervical dysfunction.

Key words: Cervical dysfunction, Vagus nerve impingement, Heart rate, Heart rate alteration.

INTRODUCTION

Cervical spine dysfunction

The cervical spine dysfunction is a common condition. It is represented by a group of signs and symptoms that involve pain and limitation of range of the physiological movements, tenderness and/or pain on cervical muscles at palpation.

There is a variety of reasons for cervical spine pain apart from obvious trauma or a history of trauma. These include mainly postural or degenerative causes. An increasing proportion of the population spend long periods sitting or in sustained positions. This occurs in both the work and social environment which in fact, is creating an increase in these types of conditions seen, specifically in the younger and more sedentary population.

Conditions under upper cervical dysfunction⁵ are cervical spondylosis, Neck pain as a result of forward head posture which could also lead to Cervicogenic headaches¹, Prolapsed intervertebral disc, Muscle imbalances and trigger points⁴, Vertigo etc.

Cervical spine dysfunction may lead to misalignment

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most commonly of upper cervical joint complex especially the atlas. Many vital structures pass through the upper cervical joint complex, upper cervical joint complex, one of the most important being the vagus nerve. Vagus nerve exits the skull through the jugular foramen and passes vertically down the neck within the carotid sheath, lying between the internal jugular vein and internal carotid artery as far as upper border of thyroid cartilage, and then between the same vein and common carotid artery until it reaches the roof of the neck. In the neck the vagus gives cardiac branches, two or three in number from superior and inferior cervical levels.² the vagus provides heart with its parasympathetic supply.

Thus any misalignment of atlas vertebra in the upper cervical joint complex leads to effect on vagal action which consequently does not carry out its function of antagonist to the sympathetic system properly, causing increased heart rate, also painful stimuli is carried by unmyelinated 'c'fibers to synapse with pressor area of 'vasomotor cortex' therefore, their activation causes sympathetic stimulation producing tachycardia and rise in BP. Normal heart rate for an adult is 70-80 beats / min.³

Cervical spine pain is a common ailment seen these days. Medically, this is often diagnosed by radiography and treated with anti-inflammatory medication. While medication assists in short term pain relief, symptom relief, and masking of pain, it does not address or treat the underlying causes of cervical spine dysfunction. Therefore numerous techniques such as muscle energy techniques, chiropractic manipulation, Maitland mobilization, stretching, and myofacial release, kneeding, SNAGS, NAGS, MWM'S, traction etc. have now been developed for correction of misaligned spine. SNAGS is technique which first distracts (opens) and then compresses (closes) the zygapophyseal joint ipsilateral to the side of pain, and perhaps slightly distracts the uncovertebral cleft. The therapist applies the appropriate accessory zygapophyseal glide while the patient performs the symptomatic movement. This must result in full range pain free movement. SNAGs are most successful when symptoms are provoked by a movement and are not multilevel. They are not the choice in conditions that are highly irritable.⁶ Although SNAGs are usually performed in weight bearing positions they can be adapted for use in non-weight bearing positions.⁷

To best of our search there is dearth of literature pertaining to the involvement of vagus nerve at the upper cervical complex dysfunction and thus its effect on heart rate. Impingement of vagus nerve due to misalignment of atlas vertebrae can also influence the function of Gastro Intestinal system and Cardio Vascular systems affecting the Heart Rate so, upper cervical complex evaluation for impingements should also be considered while looking for dysfunctions related to Heart Rate caused by decreased vagal tone.

METHODOLOGY

This study is an experimental study to determine the effect of SNAGS Technique on HR among patients with upper cervical complex dysfunction. The study was conducted in the various opd's of private institute in Dehradun. All subjects between the age limits 20 -60 years visiting the opd's were taken in the study. Simple random sampling was done. Participants with cervical spine dysfunction who were in age group 20-60 years of either gender with Any dysfunction of cervical spine due to rotation of C₁-C₂ vertebras and were willing to participate were included in the study. Patients with any cardiac conditions which may alter the heart rate, Fractures of the cervical spine, Any acute muscle pathology. (e.g. Strain), Any diagnosed medical or surgical condition in which SNAGS technique cannot be used, Systemic diseases affecting the vertebral column preferably cervical spine (e.g. Infections), Patients having vertigo problem and Uncooperative patients were excluded from the study.

SNAGs TECHNIQUE:

This technique is extremely useful in restoring upper cervical rotation and especially when manipulation is contraindicated.

The patient is seated and the therapist stands behind him. The therapist placed the pad of his thumb on the transverse process of the atlas vertebra on the opposite side of restricted rotation and it is superimposed by his other thumb. The patient is then asked to slowly rotate his head to the restricted side as the therapist provides a gliding force ventrally on C1 with his thumb to assist the movement. The thumb pressure is not released until the neck returned to midline. The patient must feel no pain.3 sets of 8 repetitions are performed.⁷

Prior to starting of the study, ethical approval was taken. 130 subjects were screened in the earlier phase of HR study.80 subjects participated in the study based on inclusion and exclusion criteria.Procedure was explained in detail to the participants, following which the written informed consent was taken .Patient was made to relax for 5 mins so that anxiety factor doesn't influence the HR reading. Motion palpation was done for cervical vertebrae to check the side of the stuck atlas (C1) vertebra. Pre intervention heart rate was recorded. SNAGs Technique was given to the participants on their affected side. Post intervention heart rate was measured within 1 min of the treatment. Data recorded and analysed.

DATAANALYSIS:

The data was analysed using SPSS version 16. Descriptive statistics was used to summarise the variables. Paired T Test was used to see the effects of intervention on heart rate in our study population. p value < 0.05 was considered significant.

RESULT:

Mean age of participant was 35.5 years (SD±12.2).The gender distribution in our study was, 41.2% male and 58.8% were female participants.

The mean Heart rate of the participants before the intervention was 80.1 ± 7.2 beats/min and after the intervention the mean heart rate recorded was 74.9 ± 7.0 beats/min (table 1). There was reduction in heart rate by 5.2 beats/min which was found to be statistically highly significant (p \Box 0.001).

Table 1 Showing change in	heart rate following SNAGS [†]	technique:
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Heart rat	e	Mean ± Standard deviatio	n	P valu	e
Pre interventio	n	80.1 ± 7.	2	*	*
Post interventio	n	74.9 ± 7.	0		

Highly significant

In our present study mean age of participant was 35.7 ± 12.2 years. 41.1% of participants were male and 58.8% were females (fig 3).



FIGURE 3 – Showing gender distribution of the participants

DISCUSSION

This study was designed to check the effect of SNAGs technique on heart rate among patients with upper cervical dysfunction with vagus nerve impingement.

The study was conducted on 80 participants with cervical dysfunction. The mean age of the participants was 35.7 ± 12.2 years, in which there were 41.1% males and 58.8% females. In the present study the numbers of females were more as compared to males with cervical dysfunction. This was similar to study conducted by <u>Wendy Rheault, Chris Byers</u> et al where author reported higher distribution of female population with cervical dysfunction. The purpose of this study was to investigate the intertester reliability of the cervical range of motion device (CROM). The CROM was used to measure subjects with a history of cervical dysfunction. The sample consisted of 22 subjects (15 female and 7 male)⁸

This could be because most of the females are usually involved in task requiring less physical work thereby promoting their sedentary lifestyle which is reported one of the contributory factor for cervical dysfunctions.⁹ One of the many reasons for cervical spine dysfunction in females could be due to the misalignment of cervical and thoracic curveswhich could be result of faulty postures developed in females from their early adolescence due to breast development and joint laxity¹⁰ thus inclining their posture towards relative thoracic kyphosis leading to compensatory changes in the cervical spine resulting in forward head posture and neck pain.^{11,12}

In addition to above reason Geertje A.M. ArieÈns, Willem van Mechel, Paulien M. Bongers et.al also studied that neck pain could also be associated with psychological risk factors. However the psychological factors were not learnt in our study. The recent prevalence data showed that in a general population the 1 year prevalence of neck pain was 15% and 17% of males and females respectively.^{13,15,17} The prevalence data in occupational setting was even more impressive. Skov et al. (1996) reported 1 year prevalence of neck pain in sales people (n=1304) with females being predominant.¹⁸

In our study the mean baseline heart rate of participants was 80 ± 7.2 beats/min which was towards the higher side of normal range of heart rate ³.literature revealed the neck pain can influence the sympathetic activity. As all the participants in our study had symptomatic increased neck pain which could have

influenced the baseline HR of the participants.¹⁴

Following SNAGS technique, in our study there was a reduction in heart rate by5.2 beats/min which was highly significant ($p\Box 0.001$) statistically. This decrease in heart rate could be due to reduction in pain which was noted following correction of misaligned spine. Abid Ali, Syed Shakil-ur-Rehman, and Fozia SibtainEt al reported in study which was done on 102 patients of non specific neck pain that SNAGS technique was very effective with isometric exercises training of the neck.¹⁹

Other reason for HR reduction could be misalignment or the atlas vertebra being rotated causing impingement of the vagus nerve passing on either side of the upper cervical complex. This impinged vagus nerve on the side of rotated atlas can cause various dysfunctions in the gastrointestinal system, cardiovascular systems etc^2 due to reduction in the parasympathetic action of the nerve. This decrease in the parasympathetic action cannot be noted by checking the direct action of vagus on the viscera's of our body .This is where the cardiovascular system comes in place. The heart rate is regulated by constant parasympathetic action of vagus on the heart, called vagal tone.¹⁶ when vagus gets impinged in the upper cervical complex; it causes decrease in the parasympathetic action of vagus on the heart causing increase in heart rate.

In our study the cervical misalignment was corrected via SNAGS technique. As compared to other technique SNAGS can be given in sitting or standing which has real advantage. When improvement takes place in functional posture they are more likely to be retained.⁷

SNAGS is a pain free technique whereas other techniques like manipulations etc. are painful and can have serious complications if not done correctly and can cause increase in heart rate due to pain.

This shows that our intervention has resulted in significant reduction in heart rate which in turn affirms that the misaligned atlas can result in impingement of the vagus however the anxiety factor could not be measured. Also objective assessment of pain was not done.

Future scope of the study can be that the heart rate could be measured within 5 min and 10 min to check the long term effect of the intervention, More objective assessment could be used for checking rotation of C1vertebra, Joint range of motion of Cervical spine can also be measured.

Conclusion:

The present study concluded that SNAGS technique was effective in correcting the impingement caused to vagus nerve as measured through Heart Rate in patients with upper cervical dysfunction.

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RECIPROCAL INHIBITION MUSCLE ENERGY TECHNIQUE Vs STRETCHING IN PIRIFORMIS SYNDROME: A RANDOMIZED EXPERIMENTAL STUDY.

Krishna Kumar Singh*

Shekhar Singh **

Introduction: Low back pain a common disabling condition in present days. Many patients with piriformis syndrome present with low back pain, so a skilled clinician is important to distinguish piriformis syndrome from other causes of lo-backache. Piriformis syndrome can be managed effectively by conservative means such as NSAID, spasm relief medications and physiotherapeutic such as stretching exercises, US therapy, TENS etc.

Objective: To compare effectiveness of PIR and the conventional stretching exercises after application of hot packs on functional outcomes.

Materialandmethods: 30 subjects with back pain, reporting to P.T. Department, were evaluated for piriformis syndrome and were grouped in Group–A (Experimental Group) and Group-B (Control Group) randomly. Patients were selected on the basis of inclusion and exclusion criteria's and their base line data with respect to age, gender and hip internal rotation range of movement by goniometer, pain in VAS and disability level by MODQ were noted. After 10 days of intervention hip internal rotation range of movement, pain in VAS and disability level by MODQ was noted.

Date Analysis: It was carried out by using Mann-Whitney's u'test for subjectively assessed data and unpaired 'T' test for objectively assessed data, with 95% confidence interval.

Results: The subjects treated with PIR (MET) with piriform is syndrome that is experimental group (Group-A) showed a statistically significant decrease in pain (P=0.000), amount of hip internal rotation restriction (P=0.000) and disability level according to MODQ (P=0.000) after 10 days of intervention as compared to the control Group (Group-B) that received conventional stretching exercises only.

Conclusion: Both groups showed improvement following 10 days of treatment but experimental group (Group-A) showed a significant decrease in pain, amount of hip internal rotation restriction in degrees and disability level as per MODQ following application of PIR (MET) compared to control Group (Group-B) conventional stretching exercises for piriformis syndrome.

Key words: Piriformis syndrome, post-isomeric relaxation technique, muscle energy technique, manual therapy, stretching exercise.

INTRODUCTION

Piriformis syndrome (PS) is a condition in which the piriformis muscle becomes tight or has spasm and irritates the sciatic nerve. This causes pain in the buttocks region and may even result in referred pain in the lower back and thigh. Patients often complain of pain deep within the hip and buttock and for this reason, piriformis syndrome has also been referred as "Deep Buttock Syndrome". Piriformis syndrome is predominantly caused by a shortening or tightening of the piriformis muscle, and while many things can be attributed to this, they can all be categorized into two main groups: Overload (or training errors) and Biomechanical Inefficiency.

Yeoman, based on the intimate anatomic relationship of the sacroiliac joint (SIJ), the piriformis muscle (PM) and the sciatic nerve, reported that sciatica may be caused by a so called "periarthritis" involving

* Professor and Principal, Jaipur Physiotherapy College, Mahraj Vinayak Global University, Jaipur. ** Assistant Professor, Jaipur Physiotherapy College, Mahraj Vinayak Global University, Jaipur. the anterior sacroiliac ligament, the PM and the adjacent branches of the sciatic nerve 2.

In 1938 Beaton and Anson3 examined 240 human cadavers, they described six variations of sciatic nerve exit and considered that the close relationship of the piriformis muscle and the nerve affects the latter in cases of muscle infection or generally in cases of muscle spasm, specified when the PM is pierced by the nerve.

Commonly muscles covering posterior aspects of the hip joint form two layers i.e. outer layer consists of gluteus maximus and tensor fasciae latae, while inner layer consists of short external rotators of hip such as piriformis, superior gemellus, obturator internus, inferior gemellus and the quadratus femoris. The piriformis is the abductor and external rotator of the hip and is a flexor of the hip in walking. It rises from the pedicles of the II, III and IV sacral vertebrae and adjacent portion of the bone lateral to the sacral foramina the muscle passes the greater sciatic foramen and coursing laterally is inserted by a round tendon into the superior border of the greater trochanter. So it is in contact with the anterior ligament of the sacroiliac joint and the root of the first, second and third sacral nerves. Its lower border is closely related to the whole of the sciatic nerve elements 1985⁴.

Although the syndrome was described originally in 19455, there was no universal agreement about its diagnosis and treatment, thus affecting epidemiologic analysis¹.

Bernard et al6 in their review of 1293 patients referred to their clinic with low back pain, cited an incidence of 0.33% for piriformis syndrome. While pace and Nagle7 reported 45 patients with piriformis syndrome gleaned from 750 patients with an incidence of 6.1 and female to male ratio was 6 to 1.

The literature reveals that piriformis syndrome is more often encountered in patients 30 to 40 years old and sporadically in patients younger than 20 years.³

Robinson has been credited with introducing the term "piriformis syndrome" in 1947^5 .

He stated that sciatica is a symptom and not a

disease, because it is seldom caused by a primary neuritis, and he defined that the term piriformis syndrome should be applied to the type of sciatica that is caused by an abnormal condition of the piriformis muscle that is usually traumatic in origin.⁵

He stated that piriformis muscle and fascia become compressed between the swollen muscle fiber and the bony pelvis, leading to an

entrapment neuropathy. He also found that the piriformis was stretched after a few degree of leg raising. So that with muscular spasm or inflammation, the sciatic nerve may be directly compressed by the piriformis muscle.

The etiology of this syndrome is thought to be injury of the piriformis muscle resulting in spasm, edema and contractures of the muscle and subsequent compression and entrapment of sciatic nerve⁴. Yeoman (1928) stated that any lesion of the SI joint may cause inflammatory reaction of the piriformis muscle and its fascia4. The other possible causes of piriformis syndrome are-a history of blunt trauma in the gluteal region such as fall, activities that increases activities of hip rotators (constrictions of hip rotators.), prolonged sitting on hard surfaces, idiopathic, pregnancy unusual overload of the muscle which may be caused by attempting to refrain from a fall, surgery due to rough handling during anesthesia, extreme unusual positioning of the hips or prolonged weight bearing on the buttocks during the surgical procedure.

The common features of piriformis syndrome are:

1. Patient complains of buttock pain with or without leg pain which is aggravated by sitting or activities of the lower extremities.

2. Buttock tenderness extending from the sacrum to the greater trochanter, piriformis muscle tenderness on palpation or rectal or pelvic examination and aggravation of symptoms by hip flexion, adduction, and internal rotation in the absence of low back or hip pathologies showing:-

1. Leg length discrepancy.

2. Weak hip abductors.

- 3. Pain on resisted abduction in the sitting position.
- 4. Pain when rising from a sitting position.
- 5. Patient present with dyspareunia and also rectal pain exacerbated by bowel movements because of the location of the piriformis muscle deep in the pelvic floor.
- 6. Pain in the inguinal area.
- 7. Sciatic pain associated with piriformis shortness, straight leg raising reproducing the pain, while external rotation of the relieves it, since this causes slackness of the piriformis.

Though that patient with piriformis syndrome may present with some or all of above clinical features, the following are considered as cardinal features or piriformis syndrome:-

- 1. A history of trauma to the sacroiliac and gluteal area.
- 2. Pain in the region of the sacroiliac joint, greater sciatic notch and piriformis muscle extending down to the leg and causing difficulty in walking.
- 3. Acute exacerbation of chronic pain brought on usually by stooping or lifting which can be greatly relieved by traction of the effected leg.
- 4. The presence of a palpable sausage shaped mass over the piriformis muscle during acute exacerbation of the pain and tenderness to pressure, is almost a pathologic sign,.
- 5. A positive Lasegue's sign.
- 6. Gluteal atrophy may be present depending on the duration of the conditions.
- 7. Pain and weakness on resisted abduction, external rotation of the thigh.
- 8. Pain on forced internal rotation of the extended thigh (+ve Freiberg s sign).

The clinicians considered different tests to come to a clinical diagnosis of piriformis syndrome. The most commonly used tests are- Freiberg's sign, Pace sign, Beatty's maneuver, Stretch test, Palpation test and SLR.

With increasing knowledge of neurophysiology and

its clinical implications in recent times, many physiotherapists are trying to take advantage of these in rehabilitation of patients. One among these is muscle energy technique (MET), where a physiotherapist uses different neuromuscular physiological principles in treatment of musculoskeletal disorders such as pain, muscle spasm and muscle shortening etc. This is again of various types such as isometric type or isotonic type or isokinetic type. One of the muscle energy technique (MET) that is post isometric relaxation (PIR) technique which works on neurophysiological principles, states that after a muscle is contracted, it is automatically in a relaxed state for a brief latent period. The effect of MET (PIR), which causes a sustained contraction on the Golgi tendon organs, seems pivotal. The responses to such a contraction seem to be to set the tendon and the muscle to a new length by inhibiting it.

Lewitt K, in 1984 had stated about usefulness of MET in treatment of trigger points in the myofascial pain and found that MET is very effective in treating myofascial pain and restoring resting length of the affected muscle.¹²

However, there is hardly any study that could find out the effectiveness of MET in form of Post Isometric Relaxation (PIR) in piriformis syndrome especially after application of hot pack to piriformis muscle. As pain and spasm cycle is the major problem of the patient and therapist all efforts are being made to relieve patients discomforts by using most convenient and psychosomatically suitable therapeutics such as MET and hot packs.

Hot packs being a relatively superficial heating modality in comparison to other heating modalities with respect of depth of penetration, usually gets more absorbed in tissues with higher water content such as muscle. Thus, it increases local circulation and helps in relieving the local spasm and inflammatory process resolution in piriformis muscles. So, it is helpful in soft tissue stretching with minimal discomfort and reducing the signs and symptoms of piriformis syndrome.

This study was undertaken to find out the effectiveness of MET in the form of PIR in

the treatment of pirifomis syndrome flowing the application of hot pack to the piriformis muscle area considering the above neurophysiological principles of therapy.

Procedure

Subjects were recruited from Mahraj Vinayak General Hospital with back pain or pain in the hip, who reported to the physiotherapy department, were screened after finding their suitability as per in the inclusion criteria and exclusion criteria's and then they were requested to participate in the study. The subjects willing to participate in the study were briefed about the nature of the study and the interventions.

After briefing, their informed written consent was taken. Their demographic data were collected. Participating subjects were evaluated in detail for the study needs with special emphasis on three positive signs out of the tests such as Pace sign or Freiberg's sign or Beatty maneuver or stretch test. The other areas assessed during this were for quantification of pain profile by using Visual analog scale, hip range of motion (internal rotation by goniometer, and disability level by Modified Oswestry Disability Questionnaire (MODQ)).

After these, 30 subjects were allocated to two groups namely, experimental Group (Group-A) and Control Group (Group-B). Randomization was done by envelope method based on computer generated randomization list.

Tools Used :

- Modified Oswestry disability questionnaire (MODQ)
- ✤ Visual analog scale (VAS)
- Goniometer

Inclusion Criteria :

- ✤ Age group- 30 to 50 years
- Subject with piriform syndrome showing positive sign for the all special test
- ✤ Pain more than or equal to 4 in VAS.
- * Subjects who are willing to participate.

Exclusion Criteria:

- ✤ Pain arising from Hip joint
- Pain due to Neurological and spinal origin
- ✤ Sacro-iliac dysfunction
- + Fixed deformities of lower limb and spine
- ✤ Pain from pelvic origin
- Any disorder of lower limb that might warrant treatment.

Following this, all the subjects were positioned on prone lying comfortably. The affected side piriformis muscle area was palpated for tenderness and trigger point sand the whole muscle bulk was subjected to application of hot packs exposure for 20 minutes. Then the subjects of control group (group-B) were treated with conventional piriformis stretching for 20 seconds, repeated for 5 times in each session.

Subjects in experimental group (group-A) were treated with PIR (MET) for 20 seconds along with above common regime of treatment and it was repeated for five times per session. This method is based on the test position for shortened piriformis muscle described by Lewit. Here the patient remains in supine position, the treated leg is placed into flexion at the hip and knee, so that the foot rests on the table lateral to the contra lateral knee. The leg on the side to be treated is crossed over the other straight leg.

The angle of hip flexion should not exceed 60 degrees. The practitioner places opposite hand on the contra lateral ASIS to prevent pelvic motion, while the other hand is placed against the lateral aspect of the flexed knee, as this is pushed in to resisted abduction to contract piriformis for 20 seconds. Following the contraction, the practitioner eases the treated side leg in to adduction until a sense of resistance is noted; this is held for 20 seconds and repeated for 5 times per session for 10 days.

At the end of 10 days of treatments, pain in visual analog scale, hip range of motion (internal rotation) and disability level as per MODQ were assessed and noted.

Statistical Analysis And Results:

The details of the participants with respect to age, gender VAS score, and Hip IR range of motion and level of disability as per MODQ were noted prior to intervention as base line data. After 10 days of regular physiotherapy interventions, VAS score, Hip IR range of motion and level of disability as per MODQ were noted. The statistical analysis for above two groups were performed to find out mean, SD and the statistical significance between PIR and conventional stretching exercises following application of hot packs to both groups having piriformis syndrome. The sex ratio of two groups was analyzed by chi-square test with Yates correction. Baseline features were compared between groups using the unpaired't' test for continuous data. Inter group comparisons between the groups were also achieved with the unpaired't' test. Mann Whitney 'U' test was carried out for subjectively assessed data such as VAS score and MODQ values. The statistical analysis was conducted at a 95% confidence level and a P value less than 0.05 was considered as statistically significant.

SL. NO.	Study parameters	Experimental	Control group ("P" value
	(VAS)	group (group-A)	group- B	i valuo
		(Mean ± SD)	$(Mean \pm SD)$	
1.	Pretreatment VAS	8.2 ± 0.88	7.9 ± 1.57	0.512
2.	Postreatment VAS	2.5 ± 1.05	5.7 ± 1.38	0.000
3.	VAS Difference	5.7 ± 0.96	2.2 ± 0.94	0.000

DEMOGRAPHIC PROFILE

The mean age of control group was 43.6 years with standard deviation 10.10 years, age ranging from 34 to 60 years and that of experimental group was 43.6 years with standard deviation of 11.35 years, age ranging from 22 to 60 years respectively. The difference in mean age of two groups was not statistically significant ("t"-0 and "p" value=1).

SL	Gender		Experime	Experimental group		Control group		group
NO.	Ger	ider	(Group-	(Group-A, N-15)		(Group-B, N-15)		B, N-15)
1	Fem	ales	10			11		
2	Ma	iles	5			4		
Expe	riment	al Gro	up Control	Group				
(Gro	up-A, I	N-15)	(Group	-B, N-15)	~		DF	"P"
Mean		SD	Mean	SD				value
43.6		11.35	43.6	10.10	0		28	1

Visual Analogue Scale Analysis

The mean and SD values of pre-intervention stage VAS for group-A and group-B were 8.2 + 0.88 and 7.9 +1.57 respectively. The VAS difference between two groups were not statistically significant during pretreatment stage (P=0.512).



While the mean and SD values of VAS in post treatment stage for group - A and group-B were 2.5 +1.05 and 5.7 + 1.38 respectively, the group-A demonstrated a statistically significant reduction in pain comparing to group-B (P=0.000). As far mean and SDs of VAS difference between pre and post treatments phases are concerned for two groups, they were 5.7 + 0.96 for group - A and 2.2 + 0.94 for group -B respectively. There was a statistically significant reduction in VAS score in group-A comparing to group-B (P=0.000).

Hip Internal Rotation Range of Motion Analysis (in Degree):

The mean and SDs values of pre-intervention stage hip internal range of motion for group-A and group-B were 12.9 + 2.38 and 13.3 + 2.69 respectively. The difference of degrees of hip internal rotation restriction between two groups was not statically significant during pre-treatment stage ("t" = 0.503 and "p" = 0.619).

While the mean and SDs values of post-treatment study of hip internal rotation range of motion for group-A and group-B were 3.7 + 1.95 and 8.4 + 2.38 respectively. The group A demonstrated a statistically significant decreases in Hip IR range of motion restriction comparing to group-B during post treatment stage ("t" = 5.949 and "p" = 0.0.00).

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SL NO	Study parameters HIP IR range of motion	Experimental Group (group-A) Mean ± SD	Control Group (group-B) Mean a SD	Value	DF	"P" Nalue
L	Pre- treatment Hip IR	129±238	13.3 ± 2.69	0.503	28	0.619
2//	Post- treatment Hip IR	37±195	84=238	5.949	28	0.000
5	Hip IR difference (Pre and Post)	92±314	49±201	4,424;	28	0.000



As far as mean and SDs values of hip internal rotation range of motion restriction difference between pre and post treatment stages are concerned for two groups. They were of 9.2 + 3.14 for group - A and 4.9 + 2.01 for group-B respectively. There was a statistically significant decrease in hip IR range of motion restriction in group-A comparing to group-B during post treatment stage (i.e. "t" = 4.424 and "p" = 0.0.00).

Disability Level (As per MODQ) Analysis (In percentage): The mean and SD values of preintervention stage disability level as per MODQ for group-A and group-B were 68.2 + 7.85 and 68.7 + 8.47 respectively. The difference of disability level between two groups was not statistically significant (P=0.838).

51 No.	Study parameter (MODQ is %)	Experimental Group (group- A) Mean * 5D	Control group (group-B) Mean = SD	-P- value
1	Pre-treatment MODQ	68.2 = 7.85	68.7=8.47	0.838
2	Post-treatment. MODQ	17:7:# 7:83	48.6 ± 8.91	9,000
3	MODQ difference (pre and post)	50.5 = 6.78	20.1 = 4.94	0.000



While the mean and SD values of post treatment stage disability level as per MODQ for group-A and group-B were 17.7 + 7.83 and 48.6 + 8.91 respectively. There was a statistically significant reduction in disability level in group-A comparing to group-B (P=0.000).

DISCUSSION

The statistically significant decrease in pain in VAS seen in experimental group could be attributed to physiological and therapeutic effects of hot packs and MET (PIR). Hot packs usually gets absorbed more in tissues with high fluid content especially muscle.

Piriformis muscle being a deep seated muscle must have got adequate heating effects, which could have reduced chronic inflammatory process and subsequently has reduced spasm and increased flexibility of this muscle. While application of PIR must have further facilitated the resolution of chronic inflammatory lesions and spasm of the piriformis muscle due to its effects similar to the soft tissue techniques such as stretching of soft tissue in affected area, moving of fluids out of inflamed area and reflexly relaxing muscles13 . The MET must have also health in restoring normal resting length of affected piriformis muscle due to its effect of restoring integrity of the myotonic stabilizing system (at least temporarily13).

Again its is thought the suprasegmental system as well as the muscle spindle receptors are reprogrammed by MET46. MET (PIR) to Piriformis muscle must have restored its near normal functional strength due to reduction in muscle inhibitions and increased its flexibility with respect to day to day requirements.

Due to above change, MET (PIR) must have also

restored sacral torsion "as per muscle energy model" during walking where piriformis muscle plays a greater roel13 ,thus, allowing normal alignment in lumbopelvic sacral hip complex during walking and other activities of day to day life. Therefore subjects in experimental group have shown a statistically significant increase in hip internal rotation range of movement and also decrease in disability level as per MODQ.

Lewit K et al in 198412 in their study, had found that MET (PIR) when applied while the muscle is in a stretched position, produced greater relief in pain, spasm and tenderness in the affected muscle.

Probably all the above effect of MET have helped in resolution of pathological changes of piriformis muscle and decrease stress on the sciatic nerve by piriformis muscle.Thus, the subjects in experimental group that is who received MET, had shown statistically significant decrease of pain in VAS, increase in hip internal rotation range of motion decrease in disability level as per MODQ.

Control Group (Group-B) showed some improvements with respect to study parameters but the same was not statistically significant because hot packs and stretching exercises of piriformis muscle alone must not have contributed much to normal alignment of spine, sacrum, pelvis and hip. At the same time, it must have contributed to increase inflexibility of piriformis muscle. Thus, there was not much improvement in symptomatology of the patients in the Control Group (Group-B).

Limitations

- 1. Short duration study: The study was carried out only for 10 days, which was not sufficient to bring out a significant change especially in control group.
- 2. Small sample size: Though the study showed a statistically significant improvement in patients treating with PIR but a larger group study is necessary for further reinforcement of this study.
- 3. Follow up: There was no follow up of case after 10 days of treatment.

Further Recommendations

The suggestions for further studied are as follows:

- 1. The study should include a large group.
- 2. The study should be carried out for more than 10 days.
- 3. The study should include follow up for standardization of PIR in piriformis syndrome.

Conclusion

On the basis of result of this study it can be conducted that post isometric relaxation technique of MET is an effective physiotherapeutic intervention along with hot pack for pain relief, and decreasing in disability in patients who are suffering from piriformis syndrome?

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RELATIONSHIP OF MUSCLE STRENGTH AND 'Q' ANGLE IN KNEE OSTEOARTHRITIS

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MS Indira **

Abstract :

The knee is the most common weight bearing joint affected by osteoarthritis (OA), with the disease predominantly affecting the medial compartment of the tibio femoral joint. Muscle weakness is common in individuals with knee osteoarthritis and has been suggested to contribute to abnormal knee joint mechanics. The study focuses on gluteus medius and quadriceps muscle strength on q angle variations of osteoarthritis knee. The observational study was done with 50 OA knee subjects, over a period of one month at Physiotherapy department of Vels University. The subjects were assessed of their muscle strength using MRC grading and Q angle determined by surface markings. The results indicate that the 't'tests shows statistically significant reduction in gluteus medius and quadriceps muscle strenge in Q angle with p < 0.01. hence there is a positive relationship between muscle strength and Q angle of OA knee.

Keywords: osteoarthritis, gluteus medius, quadriceps, Q angle

Introduction

Osteoarthritis is also known as a degenerative joint disease. The knee is the most common weight bearing joint affected by osteoarthritis, with the disease predominantly affecting the medial compartment of the tibial femoral joint. The main factor associated with osteoarthritis is an abnormal increase in the mechanical stress in the some part of the articulating surface. It occurs most commonly from the group of above 50 year, above 80% of the 65% and above population in the country suffers with wear and tear. In which 40% of people suffers with osteoarthritis. Those with osteoarthritis knee have 25% to 45% loss of knee extension strength and 19% to 25% loss of knee flexion strength.

It is also felt that proximal joint muscle weakness could influence this process. Tibial torsion is the angle formed between transmalleolli axis and transverse axis of the knee joint. Abnormal torsion has an impact on the ankle and knee biomechanics during gait, thus affecting external loading of the knee joint, which in turn lead to osteoarthritis. Excessive internal tibial torsion may contribute to an internal foot progression angle and has been associated with medial compartment degenerative arthritis of the knee in the adult.

The q angle of the knee is a measurement of the angle between the quadriceps muscle and Patella tendon and it provides useful information above the alignment of the knee joint. It is likely to influenced by the muscle strength of varying group of muscles that alter the mechanics of knee other that Quadriceps alone. Gluteus Medius weakness is very common among people above age 50 and more evident with obesity indicating the mechanics change in the knee joint too. Thus this study aims to establish the level of weakness of Gluteus medius and Quadriceps influencing on Q angle of OA knee.

Methodology: The observational study done over a

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period of 4 months , with a sample of 50 OA knee subjects was carried out at Physiotherapy department of SOPT, Vels University after obtaining ethical clearance. Informed consent was obtained and subjects were included based on the inclusion criteria of females aged above 40 years diagnosed with unilateral OA knee. Subjects with rheumatism, recent injury to hip, knee, ankle and foot of the involved side, deformities, knee joint surgery, and neurological involvement were all excluded. for both the affected and unaffected sides. The subjects muscle strength was measured in standard test positions using MRC grading of Kendall. The Q angle was measured with long arm goinometer using surface markings and recorded. The standing position was adopted to get the recordings on loaded knee and as is best recommended position.

The data was recorded and statistically analysed using't'test for the two –sample assuming unequal variances comparing affected and unaffected leg measures.

All the measurements were taken by a blinded assesse

	affected knee Gluteus medius	unaffected knee Gluteus medius
	strength	strength
Mean	3.24	4.54
Standard Error (SE)	0.0883	0.0712
Observations	50	50
Hypothesized Mean Difference	0	
Df	94	
t Stat	11.4576	Significant
"p' value	7.70056E-20	"p" < 0.01; Level of significance

Table 1: comparing the data of gluteus medius strength on affected and unaffected side indicating significant change in unaffected knee.

Table 2: comparing the data of Quadriceps muscle strength on affected and unaffected side indicating significant change in unaffected knee.

	affected knee Quadriceps strength	unaffected knee Quadriceps strength
Mean	3.18	4.48
standend error	0.0934	0.0714
Observations	50	50
Hypothesized Mean Difference	0	
Df	92	
t Stat	11.0582	Significant
"p' value	1.9861	"p" < 0.01; Level of significance



Figure 1: The comparison of data between affected and unaffected knee

Discussion

The study has been aimed to compare the gluteus medius, quadriceps muscle strength and Q angle variation of osteoarthritis knee. The gluteus medius was weak compared to the normal side could further detoriate the mechanics of the knee. The weakness of gluteus medius can be attributed to the gender and obesity. The quadriceps weakness could be vice versa with directly proportional to the osteoarthritis.

Decreased muscle strength has repeatedly been reported in arthritis patient. The present study has also recorded the similar finding .the studies of healthy subject have reported relationships between muscle strength and functional status. Furthermore an association between muscle strength and risk of recurrent falls. Obviously muscle strength and endurance translates into good functional capacity and lessened disability .that is one of the reasons why muscle strength is linearly and negatively correlated with disability in patient with osteoarthritis.

The q angles have shown to be increased in the OA knee, possibly as the degeneration progresses and more pain and immobility could be aggravating factors.

Conclusion: There is positive relationship between muscle strength, Q angle and Osteoarthritis knee and negative relation between muscle strength OA knee.

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TENNIS ELBOW - EFFECTS OF ELBOW MWM ON SHOULDER ROM

Shekhar Singh *

Abstract

Clinical observations have suggested a relationship between shoulder range of movement (ROM) and lateral epicondylalgia. This study reports the effect of an intervention of a mobilization with movement (MWM) applied to the elbow, on shoulder rotation ROM in subjects with lateral epicondylalgia.

Thirty two subjects with lateral epicondylalgia were included. In a one-group pretest-post-test design, ROM of shoulder internal and external rotation were measured by goniometer before and after the application of the MWM, of both the unaffected and the affected limbs.

Significant differences in pre-intervention external rotation ROM were found between unaffected and affected shoulders of subjects with lateral epicondylalgia, but no significant difference remained post-intervention.

It may be concluded that restriction of shoulder rotation ROM is present in patients with lateral epicondylalgia, probably due to a facilitated level of shoulder rotator muscle tone. Shoulder internal and external rotation ROM increases significantly following MWM to the elbow, in subjects with unilateral lateral epicondylalgia.

These findings suggest that the MWM causes a neurophysiologically mediated decrease in resting muscle

Introduction:

Lateral epicondylosis (LE) is the most common complaint with complex aetiological and pathophysiological factors on the lateral side of elbow. It is characterized by pain at the lateral aspect of the elbow, commonly associated with resisted wrist or finger extension and gripping activities (Noteboom, Cruver, Keller, Kellogg, & Nitz, 1994; Stephens, 1995; Vicenzino & Wright, 1996). LE is also known as lateral epicondylitis, lateral epicondylalgia, tennis elbow, or tendinitis of the affected forearm extensor muscles (e.g. extensor Carpi radialis brevis tendonitis) (Bisset et al., 2007; Vicenzino & Wright). It affects 1–3% of the adult population, occurs mainly as episodes in the dominant arm of patients aged 35-50 years, and is equally distributed between men and women (Smidt et al., 2002; Stratford & Levy, 1994).

Mobilization with movement (MWM) is a system of manual therapy interventions developed by Brian Mulligan that combine a sustained manual `gliding' force to a joint with concurrent physiologic (osteokinematic) motion of the joint, either actively performed by the patient, or passively performed by the operator (Mulligan 1992, 1993, 1995). The manual force, or mobilization, is theoretically in- tended to cause repositioning of 'bony positional faults' (Mulligan 1993). The intent of MWMs is to restore pain-free motion at joints that have painful limitation of range of movement (ROM) (Mulligan 1995).

The specific manual therapy intervention utilized in this study is the `MWM for tennis elbow' described by Mulligan (1992, 1995, 1999) The technique used in this study is fully described in a previous paper (Abbott et al. 2001). In some severe cases, a variable degree of deficit of elbow ROM may be seen (Noteboom et al. 1994). The presence of a difference in shoulder ROM in patients with LE has not previously been reported. A change in shoulder ROM following a manual intervention to the elbow has been previously reported, by the primary investigator of this study (Abbott 1998). A deficit in

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shoulder ROM may have implications regarding intervention, particularly in occupational health. A change in shoulder ROM following manual therapy to the elbow would suggest that pre-intervention limitation was not a mechanical limitation, but rather was neurophysiologic in nature.

Prevalence of the disorder ranges from 2.8% in the general population with increases up to 7.4% in the engineering industry. Despite being widely known as tennis elbow, more cases can be attributed to mechanical stress related to occupation than to tennis. The irony of this disease is that only 5% to 10% of those with "tennis elbow" actually play tennis. Peak incidence occurs between 45-54 years of age with the dominant arm typically affected. Some indicate that LE has been described as a self-limiting condition with 89% of those diagnosed reporting decreases in pain at 1 year, whereas others have estimated as much as 40% of those diagnosed experience prolonged symptoms leading to impaired function. In tennis the injury risk was fairly similar for males and females. In most patients aged over 30 the condition may be considered to be a degenerative process, the onset of symptoms being hastened by overuse of the arm.

In case of Tennis elbow active movement causes repeated breakdown in the formation of scar tissue, which subsequently prolongs the inflammatory reaction and leads to the formation of adhesions. Current evidence following surgical intervention indicates that LE is a chronic disorder demonstrated by the presence of degenerative changes, such as increased fibroblasts and disorganized collagen, as opposed to inflammatory cells. These findings are contradictory to the widely used term *epicondylitis*, which describes an inflammatory condition. It has recently been recommended that the term *epicondylitis* be replaced with *epicondylosis*, a more accurate descriptor of the underlying degenerative process, or the generalized term *eicondylalgia*.

Although the etiology of tennis elbow is unclear, the primary factor is most likely to be a mechanical predisposition of the elbow associated with a force overload. Cabot believes that acute lateral epicondylitis has an inflammatory basis involving parts or all of the extensor tendon aponeurosis . Chronic lateral epicondylitis however is caused not only by the inflammation in the extensor tendons but also by contracture of the anterolateral elbow capsule.

The treatment of tennis elbow is often a frustrataing experience for the clinicians due to the frequent failure of obtaining a symptomatic improvement in the patient. This failure is equally apparent in both conservatively & surgically treated patients. Therefore the management of tennis elbow both at early and late stages has been suggested to be primarily a conservative approach. It is therefore important to substantiate an effective, noninvasive, conservative therapy for this disabling affliction. A wide array of physiotherapy treatments have been recommended for the management of LET.

One particular manipulative therapy technique that has been receiving considerable attention in the literature in the management of LE is Mulligan's Mobilization with Movement (MWM). The MWM technique is a non-thrust manipulative technique performed in the following fashion: The therapist first identifies a physical activity that the patient reports to be painful. Most often this entails the patient clenching the fist, a task that is frequently impaired in LE. The patient is next instructed to perform the identified painful task while the therapist provides a laterally directed glide to the elbow. Preliminary findings have suggested that the orientation of the lateral glide and the amount of manual force applied by the therapist is critical to the effective application of this technique. Directing the lateral glide force somewhat posterior or directly lateral is most effective. The MWM is typically repeated for 6 to 10 repetitions per visit and then repeated over several follow-up sessions. Perhaps most critically, the MWM should be repeated as part of a home exercise program between physical therapy visits.

The purpose of this study was to establish whether a difference exists between the shoulder internal or external rotation ROM of the affected extremity versus the unaffected extremity of persons with LE and the

shoulder internal or external rotation ROM of the affected extremity of persons with LE improves after the application of the MWM.

METHODS

Subjects were recruited from those included in a trial of the effect of MWM on LE symptoms and grip strength (Abbott et al. 2001). Exclusion criteria included persons who had a) bilateral lateral epicondylalgia; b) surgery for lateral epicondylalgia within the last twelve months; c) history of fracture of either humerus, radius or ulna that they knew to limit ROM; d) history of shoulder surgery that they knew to limit ROM; or e) history of rheumatoid disease, or f)neurologic impairment including stroke or head injury. Also excluded were subjects who responded negatively to the MWM trial (Abbott et al. 2001). Elimination of subjects who respond negatively to the MWM trial is consistent with established principles of clinical decision-making in the application of all mobilizations with movement (Mulligan 1993, 1995; Vicenzino & Wright 1995).

Materials

A gravity-dependent goniometer (Johnson Industries, USA) was used for the shoulder ROM measurements.

Reliability

Intratester reliability assessment of goniometric measurement of shoulder internal and external rotation was performed prior to the commencement of data collection for this study. Thirty trials of each measurement (three trials on each of ten normal volunteers) were performed by the investigator, who was unable to see the face of the goniometer. The goniometer was read by the research assistant. Intraclass correlation coefficients were high for both internal rotation (0.98) and external rotation (0.92), indicating excellent reliability of repeated measures. The standard error of measurement (SEM) was estimated to be 2.54 degree for internal rotation and 3.09 degree for external rotation.

Procedure

The research protocol is summarised as follows:

- 1. Subjects signed a consent form to participate in the study, and completed a brief questionnaire
- 2. Subjects were instructed to lie supine on a treatment table. The comparable sign movement was established (Abbott et al. 2001)
- 3. By random assignment, either the left or right arm was designated to be tested first.
- 4. Goniometric measurement of passive shoulder internal and external rotation ROM was performed (Norkin & White, 1995). The investigator performed the goniometry, but was unable to see the face of the goniometer, which was read and recorded by the research assistant. The end-point of ROM was considered to be that reached by gravity alone, without overpressure applied by the investigator. Both limbs were measured in the same manner, in the order dictated by random assignment.
- 5. The investigator performed the MWM to either the left or the right elbow (according to the random assignment). On the unaffected side the patient performed the same movement that would have reproduced elbow pain on the affected side. Based on the suggestion of Mulligan (1995), the patient performed motion up to ten times while the MWM was being applied. If the pain returned prior to achieving ten, no further repetitions were performed.
- 6. The limb tested was re-measured for gonio-metric ROM
- The investigator performed the MWM to the remaining elbow, and subsequently re-measured the ROM of that shoulder. Total subject time was approximately 15 min.

Data analysis

The shoulder rotation ROM goniometry data are matched samples (pre-post, or affected unaffected). The one-tailed t-test was used to compare group means, as clinical observations indicated a unidirectional effect of the intervention on the dependent variables. The statistical package used for data analysis was SPSS 21.0 (SPSS Inc., Chicago, Ill., USA). The a priori level of

significance was set at a=0.05. Although the SEM would allow lower, clinical significance for goniometric ROM was set at the more conservative standard of 58 (Boone et al. 1978; Boon & Smith 2000).

Results

Thirty-two subjects were referred for this study. Six subjects were ineligible (two with bilateral epicondylalgia, one with medial epicondylalgia, one without a comparable sign, and two with a negative response to MWM). Two subjects declined to participate in the study, and one potential subject was unable to be contacted. The twenty-three subject who fulfill the inclusion & exclusion criteria were included in this study. Subjects had experienced LE for an average of sixteen months. Analysis by the w2 test confirmed that the distribution of the data was not significantly different from that designed by the normal curve. The t-test was, therefore, able to be used to obtain the following results. Shoulder rotation range of motion Means for pre-intervention and post-intervention ROM are provided in Table 1. Pre-intervention, shoulder external rotation range of motion of the affected limb was significantly less than that of the unaffected limb (P=0.038) (Table 2). The pre- intervention difference in internal rotation between the affected and unaffected limbs was not statistically significant (Table 2). Post-intervention, shoulder rotation ranges of motion for the affected limb versus the unaffected limb were not significantly different (Table 2).

Table -1. Properties of sample					
Demography of subjects	No. of subjects				
Gender					
Male / female	18 /5				
Limb dominance					
Right / Left	17 / 5				
Affected Limb					
Dominant / Non-Dominant	14/9				

Table-2. Shoulder ROM				
Passive ROM	Pre-	Post-	Difference	Significance
	Intervention	Intervention	between Mean	(<i>p</i>)
Shoulder IR Affected	43.3°	60.0 °	16.7 °	< 0.006
Shoulder IR Unaffected	48.4°	59.4 °	11.1 °	0.006
Shoulder ER Affected	77.0 °	84.4 °	7.2 °	0.001
Shoulder ER Unaffected	83.7 °	87.6 °	3.9°	0.048

Table -3. Influence of limb dominance on Passive ROM					
PROM- Affected Limb	Pre-Intervention	Post-Intervention	Significance		
			(<i>p</i>)		
Shoulder IR					
Dominant limb (14)	44.9 °	58.5 °	0.001		
Non-Dominant Limb (9)	50.5 °	63.1 °	0.005		
Shoulder ER					
Dominant limb (14)	82.0 °	86.7 °	0.045		
Non-Dominant Limb (9)	78.6 °	85.3 °	0.007		

DISCUSSION

This study was of a one-group repeated measures design. Because the study does not include a control group, it is considered a quasi-experimental design (Portney &Watkins 1993), and as such it has inherent limitations. Threats to internal validity, such as maturation or history effects, and treats to external validity, such as sample bias, are limitations inherent to this design. This design was chosen, however, because threats to internal validity were minimised by completing the data collection within a single testing session (Portney & Watkins 1993)

Normative values for shoulder rotation ROM may have provided a useful comparison, however the literature does not provide normative values for a comparable demographic, using a similar scapulastabilised goniometric method (Norkin & White 1995; Boon & Smith 2000).

Deficit in affected limb shoulder rotation range of motion:

In this group of subjects with lateral epicondylalgia, the affected limb demonstrated a deficit in external rotation ROM, compared to the unaffected limb, prior to intervention. This effect cannot be explained by an effect of limb dominance, as analysis of shoulder external rotation of the dominant limb versus the non-dominant limb, regardless of side of LE, demonstrated no significant difference.

It is possible that either the deficit of ROM came first, and led to the LE, or that the LE came first and caused a decrease in shoulder ROM. The author speculates that the latter is true; given that the data indicate that the shoulder external rotation ROM was normalized post-intervention (i.e. rotation ROM of the affected shoulder was not different to that of the unaffected shoulder post-intervention, whereas prior to intervention the measures were different). The initial limitation of shoulder external rotation ROM noted in this group of subjects may be due to facilitated muscle activity of the shoulder musculature, as a response to distal symptoms. This view is supported by the finding of greater ROM post intervention. It was identified that injuries to an animal's limb causes facilitation of not only the muscles crossing that area, but also muscles remote to the injured area. Several other investigators have reported facilitated muscle activity due to musculoskeletal injury, either locally or remote to the area, in both humans and animal models (Johansson & Sojka 1991; Ben-Yishay et al. 1994; Indahl et al. 1995; Indahl et al. 1997; Hall et al. 1998).

Intervention to the elbow causes an increase in shoulder rotation range of motion:

This study found that MWM to the elbow leads to a change in shoulder internal and external rotation ROM, greater than that which could be explained by measurement error (including learning or `warm-up' effects). This finding supports the clinical observation that a peripheral manual therapy technique may increase proximal ROM (Abbott 1998). The mechanism underlying the improvement in ROM is unclear, however it seems likely that MWM to the elbow acts neurophysiologically, to decrease the level of contractile activity of the shoulder rotator muscles, thereby allowing the shoulder to move through a greater passive range of motion.

Non-contractile (i.e. capsular, ligamentous, fascial, or bony) limitation of the shoulder would not be mechanically affected by a technique to a distal joint that leaves the shoulder rested in a static, loose-packed position throughout the procedure. Several studies have documented the neurophysiologic effects of manual therapies (Sullivan et al. 1991; Vicenzino et al. 1994; Vujnovich & Dawson 1994; Murphy et al. 1995). The presence of elbow pain may elevate the level of facilitation of the motor-neurone pool in the spinal cord, either by direct neuronal pathways within the spinal cord, or via the cortex. MWM eliminates the elbow pain (Abbott et al. 2001), which would hypothetically reduce any abnormal facilitation, allowing the motor-neurone pool to return to a lower level of excitation.

CONCLUSION

A manual therapy technique to the elbow significantly changed internal rotation and external rotation ROM of the shoulder, in patients with unilateral

lateral epicondylalgia, both on the affected side and the unaffected side. External rotation range of motion of the shoulder was significantly limited in patients with unilateral lateral epicondylalgia. It is theorized that limitation of shoulder ROM was due to facilitated muscle activity of the shoulder musculature, and that the MWM reduces this level of facilitation, thus allowing increased shoulder ROM.

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TO STUDY THE EFFECTIVENESS OF SEDATING LI-2 (LARGE INTESTINE) MERIDIAN POINT WITH MICRO CURRENT STIMULATION, IN INHIBITING HAMSTRING OVER ACTIVITY & IMPROVING HAMSTRING FLEXIBILITY IN ATHLETES

Gagandeep Arora *

Abstract

Background: Changes in apparent leg length"(leg retraction) have been used by many as a means of locating subluxation in various Joints. The leg assessment is based on the assumption that unequal muscular contraction (e.g. hyper irritable muscles) about the spine and pelvis have the ability to retract one leg relative to the other.

Method: Subjects were assessed for hamstring overactivity with the help of isolation test for hamstring muscle in prone leg length testing according to inclusion criteria Also subjects were screened for hamstring tightness with the help of measuring hip R.O.M by goniometer. They were evaluated quantitatively for hamstring overactivity by measuring R.M.P of hamstring muscle through EMG.

The selected subjects were then given microcurrent stimulation on Li-2 (large intestine) meridian point for 30 seconds three times with 3 seconds rest period in between. After intervention the two things were tested RMP of hamstring muscle and ROM of hip joint.

Results: The results of the study suggest that t-value for Hamstring tightness is 1.130 which corresponds to p-value >0.01. It means results are significant at more than 10%, which is non-significant and t-value for Hamstring overactivity is 13.97 which corresponds to p-value <0.0005. It means results are significant at less than .05%, which is highly significant.

Conclusion: Inhibition of hamstring muscle occur by the stimulation of Li-2 meridian point but there is no improvement in hamstring flexibity.

Introduction

Janda suggested that a normal of activation during prone hip extension is the hamstrings followed by the gluteus maximus followed by the contralateral erector spinae followed by the ipsilateral erector spinae.

The most common sign of a faulty movement pattern is over activation of the hamstrings and erector spinae and delayed or absent contraction of the gluteus maximus3.

Dominance or hypertrophy of the hamstrings usually is associated with hypotrophy or inhibition

of the gluteus maximus on the ipsilateral side and hypertrophy of the thoracolumbar paraspinals. The hamstring muscles function synergistically with the gluteus maximus to produce hip extension. When there is gluteus maximus inhibition, the hamstrings substitute with hip extension during gait propulsion; therefore, gluteal atrophy often is associated with hypertrophy of the hamstrings on the ipsilateral side2

Large intestine meridian point :The large intestine meridian is one of the biggest energy channels in the body. Another name for this meridian is the Hand Yang Ming meridian. Its partner is The Foot Yang Ming, better known as the stomach meridian. This implies an inner

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relationship between the stomach and the large intestines Once the energy in the body moves through the large intestine meridian, it then moves into the stomach meridian. The large intestine meridian runs from the tip of the finger (LI-1) to the corner of the nose (LI-20).

Location of Li-1 meridian point

Chinese Name: Shangyang (English translation: Metal Yang)

Location : On the radial end of the distal phalanx of the index finger, .1cun (finger cun) distance from the corner of the nail.

Location of Li-2 meridian point

Li-2 meridian point is located On the radial side of the index finger distal to the 2nd metacarpophalangeal joint in a depression at the border of the red and white skin.

The body's electrical capabilities were studied at least as early as 1830, when the Italian Carlo Matteucci is credited as being one of the first to measure the electrical current in injured tissue. Bioelectricity received less attention after the discovery of penicillin, when the focus of medical research and treatments turned toward the body's chemical processes7.

The timer-relay system allows the practitioner to read out the meridian condition, deliver a burst of current to tonify or sedate, and then immediately read out the change produced in that meridian on the Meter. Thus the entire principal meridian system can potentially be assessed and brought into balance in a few minutes. Tonificationand sedation is chosen through the current Polarity control, and selection of proper frequency.

Electroaccupuncture and manual accupressure seems to stimulate different areas of brain. In studying the both on Li-4, Kong etal (2002) found that electroaccupuncture mainly produce fMRI signals increase in precentralgyrus, the post central gyrus/ inferior parietal lobule and putamen; in contrast manual needle manipulation produced decrease in fMRI signals. In the posterior cingulated gyrus, the superior temporal gyrus and the putamen8.

A Microcurrent Electrical Neuromuscular

Stimulator or MENS (also microamperage electrical neuromuscular stimulator) is a device used to send weak electrical signals into the body. Such devices apply extremely small (less than 1 milliampere) electrical currents to nerves using electrodes placed on the skin. One microampere (uA) is 1 millionth of an ampere and the uses of MENS are distinct from those of "TENS" which runs at one milliamp(mA) or one thousandth of an ampere9.

Aim Of Study:

To study the effectiveness of sedating Li-2 (Large Intestine) meridian point with microcurrent stimulation, in inhibiting hamstring overactivity and improving hamstring flexibility in athletes.

Methodology

All Sportspersons of different sport academies from Dehradun who had history of hamstring related problems. For taking Sample size a list was made by total of 218 individuals, were found to match the inclusion and exclusion criteria, 30 athletes were randomly selected by Lottery method for intervention through random sampling of Quasi-Experimental design.

U'r Physiotherapy, fitness and sports medicine clinic, B-10, janpath, Dehradun was the place of study.

Inclusion Criteria included individuals of age between 18years to 35 years, Either gender male or female, athletes with a history of hamstring or back of thigh problem, athletes with suspected hamstring overactivity primary or secondary to gluteus weakness, posterior kinetic chain dysfunction ,S.I. joint strain and athletes with Hamstring Tightness i.e Hip R.O.M. < 800.

Exclusion criteria excluded athletes with acute hamstring muscle strain ,hamstring overactivity other than musculoskeletal dysfunction like spasticity, failure to show Hamstring isolation test i.e. on isometric contraction, hamstring showing negative leg length, athletes with normal Hamstring Flexibility i.e Hip ROM>800.

Microcurrent stimulation of Li-2 meridian point was Independent variable and Hamstring overactivity

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and Hamstring Flexibility were Dependent variable.

Tools used for research were Microcurrent Equipment, Electromyography Equipment, Goniometer and Stopwatch.

Results:

For both the groups , Group A (pre-experimental) and Group B (post-experimental), the mean & SD values are calculated for both components i.e Hamstring overactivity and tightness.

The results of the study suggest that t-value for Hamstring tightness is 1.130 which corresponds to p-value >0.01. It means results are significant at more than 10%, which is non-significant.

The t-value for Hamstring overactivity is 13.97 which corresponds to p-value <0.0005. It means results are significant at less than .05%, which is highly significant

	Pre-Experimental	Post-Experimental
Mean	69.16	71.1
t-		
value	1.130	

Hamstring Flexibility

Table 1:comparison of mean values of group A and group B for hamstring flexibility.

Hamstring resting Membrane potential (microvolts)

	Pre-Experimental	Post-Experimental
mean	66.03	29.29
t-value	12.07	
	13.77	

Table 2:comparison of mean values of group A and group B for hamstring Resting Membrane Potential.







Discussion:

The stimulation of the Li-2 meridian point leads to decrease in hamstring muscle activity. Previously it was considered that muscle tone is regulated by propioceptors or mechanoreceptors present in the muscle , ligament and tendons and Fascia was considered mainly a mechanical structure. But recent research by Michell and schmid 1977, cottingham 1985, on Fascial Plasticity, described that fascia is richly innervated by sensory receptors (Type 3 and Type 4) which originate from free nerve endings called interstitial myofascial tissue receptors.

Most of these receptors are unmyelinated and thinly

mylienated, hence are slower than Type 1 and Type 2 which are known to originate in muscle spindles. These fascial receptors have two type of fibre, Low threshold pressure unit and High threshold pressure Unit.

Accupuncture meridian points are the areas of the skin with low threshold units, stimulation of these points by microcurrents cause the activation of these low threshold pressure unit of the interstitial myofascial tissue receptors which inturn cause the development of action potential in them. This action potential travels through a different pathway to Central Nervous system. In response to these afferent stimuli the C.N.S responds by powerfully changing the gamma motor neuron INDIAN JOURNAL OF PHYSICAL THERAPY & REHABILITATION 29

activity and weak effect in alpha motor neurons which causes the reduction of excess muscle tone and activity.

While discussing any changes in motor organization, it is important to realize that the central nervous system does not operate 'in muscles' but as a motor unit . so the regulation of the gamma motor system by C.N.S. will influence that activity of related motor unit not only the isolated muscle.

When a muscle is sedated and relaxed, electrical energy along its meridian is decreased, on the other hand if we tone a muscle and cause it to contract, energy along the muscle meridian is increased22. Similarly when a muscle is overactive or overdominated , electrical energy along its meridian is overfacilitated because not the individual muscle is involved but whole motor unit is involved, so if we try to inhibit a muscle (which in turn will be inhibited by whole motor unit) and it will be relaxed after meridian balancing.

The effect of sedation of a muscle can be due to some inhibitory reflex, but long lasting effect can be achieved by balancing these meridians. Hamstring muscle spasm overactivity leads to blockage of energy flow along the meridian will cause it overcongested, and the adjacent meridian to whom it supply it will be deplected or drained. So by electroaccupuncture the overstimulated merdian need to be sedated and adjacent meridian need to be supplied energy by tonification.

The diminution of RMP amplitude value measured during sedation of hamstring muscle support the notion of change in the quality of resistance. Caruso Leisman described the muscle activity tests as one that evaluates a transitory state named quality of resistance.

While the mechanism of efficacy are not well established, a few studies have shown that there may be correlation between the traditional Chinese medical system of acupuncture and microcurrents. A study published in 1975 by Reichmanis, marino and becker concluded in part that At most accupunture points on most subjects there was greater electrical conductance maxims than at control sites. The theory elaborated by Pierre Mathieu a Victoria biomechanics specialist and TCM practitioner was that the MENS is running one order of amplitude closer to the bodys actual currents of only a few picoamp which are one millionth of a microamp itself. The stimulation therefore is more in coherence with the body own circuitry.

Unlike TENS , Microcurrents electrical stimulation is usually administered through hand held probes positioned so that current flows between them through the painful area for10secs. The vast majority of pain problems can be treated with <10 applications of 10secs probe treatment. many patients are free of pain in < 2mins and there is generally a significant residual effect often las

Ting from at les 8 hours to as long as 3 weeks or more, so this is very less duration of time needed for the treatment outcomes can reduce the duration of rehabilitation in chronic cases.

Conclusion :

Inhibition of hamstring muscle occur by the stimulation of Li-2 meridian point but there is no improvement in hamstring flexibity.

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SACRALISATION OF LUMBAR VERTEBRAE OR LUNBO SACRAL JOINT

Mukesh Goyal *

Abstract :

Background: Lumbar backache is a very common problem nowadays. Sacralisation of lumbar vertebrae is one of the cause for that. During routine osteology teaching a sacrum with incomplete attached lumbar 5 vertebrae is seen.

Observation: Incompletely fused L 5 vertebrae with sacrum is seen. The bodies of the vertebrae are fused but the transverse process of left side is completely fused with the ala of sacrum. But on the right side is incompletely fused. **Conclusion:** The person is usually asymptomatic or may present with symptoms which include spinal or radicular pain, disc degeneration, L4/L5 disc prolapse, lumbar scoliosis and lumbar extradural defects. In transitional lumbosacral segmentation, it was observed that the lumbosacral intervertebral disc is significantly narrowed. The incidence of disc herniation is found to be higher and can occur even at young ages. There was also relationship established between transitional vertebrae and the degree of slippage in spondylolytic spondylolisthesis. In addition, this anomaly has known implications in the field of disc surgery.

KEYWORDS: Radicular Pain, Scoliosis, Herniation, Spondylolytic.

INTRODUCTION

In modern life backache is common complaint. Low back pain (LBP) is quite a common ailment affecting about 80% of the population in their life time [1]. One of the causes is sacralization of lumbar vertebra. Lumbosacral transitional vertebrae (LSTV) occur as a result of congenital anomaly in the segmentation of the lumbosac- ral spine. LSTV includes either the involvement of L5 in sacrum or S1 into the lumbar vertebrae. Sacralization means addition of sacral elements by the incorporation of Fifth lumbar vertebra. The incorporation of the fifth lumbar vertebra with the sacrum may be unilateral or bilateral producing partial or complete sacralisation. Complete sacralization consists of complete bony union between the abnormal transverse process and the sacrum. Incomplete sacraliza- tion shows a well defined joint line between the process and the sacrum.

Bertolotti 1st observed the LSTV and stated that

these abnormal verte- brae may produce low back pain due to arthritic changes which occur at the site of false articula- tion[2]. LSTV are common with the prevelance ranging from 1-20% [3, 4]. Some previous workers have suggested the role of LSTV in low back pain [5, 6], whereas others have contra- dicted the role of LSTV [6,7]. This case is been highlighted to help clinicians to rule out LSTV/ sacralisation while diagnosing a case of low back pain.

CASE REPORT

During routine study of osteology in the Department of Sriganganagar College of Allied Health Sciences, Tantia University, Sri Ganganagar a sacrum with partial fusion of Lumbar 5 vertebrae was seen. The case is of sacralisation of lumbar vertebrae or LSTV.

OBSERVATIONS

The body of the sacrum and L5 not fused but the transverse process on left side was completely fused and on right side not fused.

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Measurement of vertical length of Lumbar 5 vertebrae-5.0cm

Measurement of distance between transverse processes of L5 vertebrae- 5.7cm

Measurement of vertical and transverse diameter of intervertebral foramina-

Left- 1.5cm and 0.6cm Right- 1.5cm and 1.65cm Fig. 1: Showing Sacralisation of Lumbar Vertebrae

Fig1:



DISCUSSION

To understand the LSTV or sacralisation, we need to know the embryological origin of lumbar vertebrae. It commences at 3rd week of intrauterine life. All vertebrae originate from somites that form along the cranial-caudal axis, on either side of the notochord, from presomatic mesoderm. These somites differentiate further into dermomyotome (future inner dermis and muscle) and sclerotome. Each sclerotome consists of loosely packed cells cranially and densely packed cells caudally. Some densely packed cells move cranially opposite the center of myotome where they form intervertebral disc

.The remaining densely packed cells fuse with the loosely arranged cells of immediately caudal sclerotome to form mesenchymal centrum, body of vertebra. The mesenchyamal cells surrounding the neural tube form neural arch. Ossification of vertebra begins in 8th week & ends by 25th year. There are two primary centers & five secondary centers present in each vertebra[8].Secondary centers are one for the tip of spinous process, one for the tip each transverse process & two each for annular epiphyses. The primary cause of LSTV is cranial shifts that mean sacralization of the last lumbar vertebrae & partial shifts which mean unilateral fusion of the transverse processes. Literature is unclear about exact origin of LSTV; it is likely a product of both genetic predisposition (Hox gene product concentration) and developmental influences. Various studies have been done to find out the causes, incidence and clinical features of sacralisation of lumbar vertebrae. Kharinar and Nachale found 6.6% of cases in their study[9]. Which Correlate with the observations done by Chet Savage(7%, 2005)[10]. Magora and Schwartz found 20.8% sacralization in his study[11]; Sacralization was found in 11.1% cases by Kubavat dharati et al [12].Peter et al reported 6.2% sacralisation[13]. Otani et al. stated that a lumbosacral transitional vertebra was found more often in patients with disc herniation (17%) than in the control group(11%)[14].

The person is usually asymptomatic or may present with symptoms which include spinal or radicular pain, disc degeneration, L4/L5 disc prolapse, lumbar scoliosis and lumbar extradural defects [15]. In transitional lumbosacral segmentation, it was observed that the lumbosacral intervertebral disc is significantly narrowed[16,17,18]. The incidence of disc herniation is found to be higher and can occur even at young ages [19,20,21]. There was also relationship established between transitional vertebrae and the degree of slippage in spondylolytic spondylolisthesis [22]. In addition, this anomaly has known implications in the field of disc surgery. There are reports of surgery being performed at the wrong lumbar level [23] and the presence of a transitional vertebra may contribute to this error. It has been demonstrated that the discs immediately above the transitional vertebra were significantly more degenerative (disc protrusion or extrusion) compared with the disc found between the

transitional vertebra and the sacrum [24,25]. Also, nerve root canal stenosis has been found at the level suprajacent to the transitional vertebra [24]. According to Castellvi et al. the transitional vertebrae cause abnormal torque movements above these anomalous vertebrae, a fact that could result in disc degeneration [26]. Aihara et al. in an anatomical study of 70 cadavers claimed that the iliolumbar ligament at the level immediately above the transitional vertebra is much thinner and weaker than in cadavers without a lumbosacral transitional vertebra[25].

LSTV therefore may be one of the causative factors for low back pain and the importance of its identification in patients with low back pain cannot be ignored. Complications of sacralization of 5th lumbar vertebra causes pain are actual pressure on nerves or nerve trunks, ligamentous strain around the sacralization, compression of soft tissues between bony joints, by an actual arthritis if a joint is present, by a bursitis if a bursa is present. Failure to recognize & to find LSTV during spinal surgery may have serious complications. LSTV is associated with disc herniation, sciatic pain in some individuals. During delivery of baby, pelvis fails to expand in sacralization.

Pain erupts 1st time in young age & frequently history given is pain for few years. The improper formation and union of somites can cause vertebral abnormalities, including block vertebrae, cleft vertebra, and unilateral and bilateral hemivertebrae[27]. Lumbar spine experiences more abuse from normal functions than any other part of human skeleton[19,20]. According to M.U. Eyo et al to be able to give support to and bear the weight of the body, the integrity of all the vertebrae in the spine, particularly in the lower back must be maintained[28,29].

Conflicts of Interests: None REFERENCES

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A COMPARATIVE STUDY OF INFERIOR GLIDE VERSUS MOVEMENT WITH MOBILIZATION (MWM) ON ABDUCTION IN PATIENTS OF ADHESIVE CAPSULITIS OF SHOULDER WITH GRADE-3

Vinita Baghela *

BACKGROUND

Peri-Arthritis shoulder is characterized by pain, progressive restriction in joint range of motion due to Peri-Arthritis tightness which result in loss of function of shoulder joint over the years. The stiff shoulder was labeled initially Peri-Arthritis by duplay in 1872, then Peri-Arthritis shoulder by Codman in 1934 and later adhesive capsulitis by Neviaser in 1945 Peri-Arthritis shoulder (adhesive capsulitis) is a disorder characterized by pain and loss of motion or stiffness in the shoulder.

It effects about 2% of the population. It is more common in the woman between the age of 40 to 70 years old. The process involves thickening and contracture of the capsule surrounding the shoulder joint.

AIMS AND OBJECTIVES

To evaluate the effectiveness of the Maitland mobilization compare to the MWM to improve the joint ROM in chronic Peri-Arthritis shoulder grade -3.

To find out the effect of Maitland Mobilization to improve joint ROM.

To find out the effect of Capsular stretching to improve joint ROM.

To find out correlation difference between these two technique.

METHODOLOGY

For the present study an experimental approach with a pretest posttest design was used .population included grade 3 adhesive capsulitis patients from OPD. A treatment program of Maitland mobilization was given to Group A and movement with mobilizationwas given to Group B along with other exercises likependularexercises, shoulder wheel, finger ladder.

DISCUSSION AND RESULTS

The analysis within the group showed that both the groups showed significant improvement in pain, SPADI score and ROM. Thus both the mobilization techniques are beneficial but more significant improvement is noticed in group *B*, which suggest that Movement with Mobilization is more effective as compared to Maitland Mobilization inferior glide. There is significant improvement in pain and disability and ROM after both the treatments but more significant improvement occurs after application of MWM which suggest that MWM is more effective as compared to inferior glide of Maitland mobilization.

KEYWORD: Peri-Arthritis, Maitland Mobilization, capsulitis, MWM

1. Background of the Problem

Peri-Arthritis shoulder is characterized by pain, progressive restriction in joint range of motion due to Peri-Arthritis tightness which result in loss of function of shoulder joint over the years. The stiff shoulder was labeled initially Peri-Arthritis by duplay in 1872, then Peri-Arthritis shoulder by Codman in 1934 and later adhesive capsulitis by Neviaser in 1945 Peri-Arthritis

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shoulder (adhesive capsulitis) is a disorder characterized by pain and loss of motion or stiffness in the shoulder.

It effects about 2% of the population. It is more common in the woman between the age of 40 to 70 years old. The process involves thickening and contracture of the capsule surrounding the shoulder joint.

Some physicians have described the normal course of a Peri-Arthritis shoulder as having three stages.

STAGE ONE : in the "freezing "stage, Which may last from 3 weeks to 9 months, the patient develops a slow onset of pain. As the pain worsens, the shoulder loses motion.

STAGE TWO : in the "freezing "stage, is marked by a improvement in pain but the stiffness remains. This stage generally lasts 6 months to years.

STAGE THREE :in the "freezing "stage, is during which the shoulder motion slowly returns toward normal .this stage generally lasts 1 to 2 years.

Treatment option frozen shoulder will generally get better on its own. However , this takes sometime occasionally up to 2 to 3 years treatment is aimed at pain control and restoration of motion . The first goal is pain control.

MWM (Movement with mobilization).

Has a significant degree of inherent laxity with a surface area that is twice that of the humeral head .This redundancy allows for a wide range of motion.

The treatment of Peri-Arthritis shoulder should initially be conservative, with the emphasis on MWM of the joint structure MWM for the inferior shoulder should be perfume by the patients as a part of the motion.

2. Need and Significance of The Study

This study is concentrating on improving R.O.M. by the use of appropriate mobilization technique and also to find out the difference between maitland mobilization and MWM i.e which technique is more beneficial in improving R.O.M. in patients suffering from adhesive capsulitis of shoulder with grade -3.

3. Statment of The Problem

This study is done to find which mobilization

technique is better ie whether maitland mobilization is better than MWM in improving R.O.M. in patients suffering from adhesive capsulitis shoulder grade -3

The study is entitled as

A comparative study of inferior glide versus movement with mobilization (MWM)on abduction in patients of adhesive capsulitis of shoulder with grade-3.

4. Operational Definitions

VAS Scale :- It attempts to represent measurement quantities in terms of a straight line placed horizontally or vertically on paper . The endpoint of the line are labeled with descriptive or numeric terms to anchor the extremes of the scale & provide.

A frame of reference for any point in the continuum between them. Commonly the entire visual analog line is 10cm long, but distance of 15&20cm are also used. The patients is asked to bisect the line at a point representing self assessed position on the scale. The patients score is then obtained by measuring from the zero mark to the mark bisecting the scale.

SPADI :- It is a self administered questionnaire developed to evaluate patients with shoulder pathology. It consist of 13 items in two subscales pain (5 items) and disability (8 items).

5. Aims and Objectives

Aim

To evaluate the effectiveness of the maitland mobilization compare to the MWM to improve the joint ROM in chronic Peri-Arthritis shoulder grade -3.

Objectives of Study

- 1. To find out the effect of Maitland Mobilization to improve joint ROM.
- 2. To find out the effect of Capsular stretching to improve joint ROM.
- 3. To find out correlation difference between these two technique.

6. Hypothesis

Alternate Hypothesis

There will be significant difference in the joint ROM

after application of maitland mobilization and MWM in PA shoulder.

Null hypothesis

There will be no significant difference between these two techniques after application in PA shoulder.

7. Methodology in Brief

For the present study an experimental approach with a pretest post test design was used .population included grade 3 adhesive causalities patients from OPD. A treatment program of maitland mobilization was given to Group A and movement with mobilization was given to Group B along with other exercises like pendular exercises, shoulder wheel, finger ladder. Exercises regime was followed in similar fashion in both the Groups. Hot fermentation is also given before mobilization in both the group for relaxation .The tools selected for outcome measurement were VAS scale for pain and SPADI for both pain and disability caused due to pain full limitation of shoulderand R.O.M. for noticing both limitation before mobilization and improvement after mobilization statistical analysis of data is done with t-test.

2.REVIEWS

R HEISER-2013

Joint mobilizations are used as an intervention for improving range of motion, decreasing pain and ultimately improving function in patients with a wide variety of upper extremity diagnoses.

GOODWEEL M et al.(2012) in their self controlled cross over study they studied the effects of lumbar PA mobilizations in 26 subjects with low back pain and divided into 2 groups which is allocated randomly . one received PA mobilizations and another received a control intervention . they concluded that lumber PA mobilizations may be a useful intervention in some low back patients17.

DETTORIJEt al (2011)In their study, compared the effects of flexion and extension back exercises and posture among the 149 subjects with acute low back pain . these subjects were divided into 3 group and received flexion exercises and posture, extension exercises and

posture and no exercises and posture for 8 week. Outcome were assessed 1,2,4&8 weeks after treatment onset. lastly they concluded that exercises were slightly more effective than no exercises when patients with low back pain were treated 16.

ELNAGGAR IM et al, (2010)In their study, compared the effects of spinal flexion (group1)and extension (group-II) exercise on low back pain severity and thoracolumbar spinal mobility in chronic mechanical but they concluded that flexion exercises had an advantage in increasing that sagittal mobility within a short period of time 15.

RAINVILLE J et al, (2009)this study was to find out comparison of total lumbosacral flexion and true lumber flexion measured by a dual inclinometer technique on 75 patients with chronic low back pain . their result suggest that total flexion seems to be more relevant to outcome after intensive rehabilitation and total lumbosacral flexion may be as equally relevant as true lumber flexion in the measurement of trunk mobility in the chronic low back pain patients21.

MULLIGAN'S,(2007)

There are an increasing number of report espousing the clinically beneficial effects of mulligan mobilizations with movement (MWM) treatment techniques

R.KELLY GARRETT (2006)Is a senior research fellow in the center for research on information technology in organization (CRITO) at the university of California , Irvine . he is concerned with the ways in which activists and the public are using new information and communication technologies (ICTs) to shape their engagements with contentious political topics. His recent research focuses on how people's exposure to political information is related to their partisan beliefs. This work was the basis of a report the coauthored for the pew internet & American life project in late 2004. He has also given invited talks on this topic at the Harvard law school ,the university of north Carolina, and Michigan state university.

MARIA MOUTZOURI et al ,(2005)In this double blinded study; they studied the effects of the mulligan

sustained natural Apophyseal glided (SNAG) mobilization in the lumber flexion range on 49 subjects which were randomly divided into two group .one received SNAG mobilization and another sham mobilization at the level of L3 & L4 spinal levels with active flexion in sitting were performed . they concluded that SNAG mobilization did not demonstrate significant differences in flexion ROM when compared to sham mobilization.

KIKA KONSTANTINOU et al,(2005)This study investigates the immediate effects of flexion mobilization with movement techniques (MWM) on spinal range of motion in 26 subjects with low back pain. subjects received an MWM intervention and a placebo were recorded immediately before and after each intervention using double inclinometer and visual analog scales. Their conclusion produced statistically significant , but small , immediate spinal mobility increases but no pain reduction12.

3. RESEARCH METHODOLOGY

3.1 Research Approach

Experimental study

3.2 Research design

The study design adopted for present study was pretest-post test design.

3.3 Study settings

The study was conducted on Grade-3 periarthritis shoulder patients who attended the OPD.

3.4 Sample design

Sample consist of 60 patients Grade 3 periarthritis shoulder.

3.5 Sampling method

By using convenient sampling sixty subjects studied were divided into two groups of 30 each.

Group A - Maitland mobilization.

Group B - MWM.

Inclusion Criteria

- 1. Painful limitation of active shoulder abduction.
- 2. Pain or limitation with the functional movement

pattern of hand behind back or hand behind head.

Exclusion Criteria

- 1. Physician diagnosis of adhesive capsulitis, calcific tendanitis confirmed by radiology.
- 2. Systemic or neurological disorder.
- 3. Cervical radiculopathy.
- 4. History of shoulder surgery.
- 5. Corticosteroid injection within the past month.
- 6. Subjects who had recived physical therapy treatment for their shoulder within the past three months.
- 3.6 Time and Duration of Study

Duration of the study was 6 months

Data was collected by a period of 2 months

3.7 Materials and Tools

Pen	Paper
VAS Scale	SPADI
Goniometer	

3.8 Data Collection Process

Prior sanction was obtained for the study (Appendix - 3). The patients were taken for primary evaluation and if the patients fulfilled the inclusion criteria they were selected for the study and were divided into two groups.

Group A (Maitland Mobilization)

Group B (MWM)

Assessment was taken of all the 60 patients using VAS scale, SPADI, ROM at 0 day, 6th week and follow up at 8th week.

3.9 Procedure

After screening for inclusion and exclusion criteria patients were tested for pain by VAS, pain and disability by SPADI and availability of movement by measuring ROM by Goniometer.

Treatment Protocol

 Pendulum Stretch - 10 Revolutions in each direction once a day as symptoms improve, diameter of swing is increased but not forced. when patient is ready for more stretch is increased by holding a light weight (3to 5 pounds) in swinging arm.

- 2. Towel Stretch -10 to 20 Times a day.
- 3. Finger walk 10 to 20 times a day.
- 4. Cross body reach hold the stretch for 15 to 20 sec. 10 to 20 times a day.
- 5. Outward rotation- rotate the lower part of the affected arm outward 2 or 3 inches & hold for 5 sec. repeat 10 to 15 times, once a day.
- 6. Inward rotation -hold for 5 sec. repeat 10 to 15 times, once a day.

- 7. Inferior Glide-10 to 15 times, once a day.
- 8. MWM 3 sets of 10 repetitions were applied with one min. between sets. once a day.
- 9. Hot Fomentation (By Hot Packs) Prior to exercise for 10 to 15 minutes.

3.10 Statistical Test Used

Student t test was used to compare pain, disability, ROM between groups and within groups.

Group response to treatment was analyzed using paired t test. The formula used is .

S=? $((?d^2-n?(D?)?^2))n-1$ Where n = Number of patients s = Standard deviation

d = Difference between the initial and final reading

 $?d^2 =$ Mean difference between initial and final reading



4. DISCUSSION AND RESULTS

4.1 Discussion

The study is an comparative study of inferior glide versus movement with mobilization on abduction in patients of adhesive capsulitis of shoulder with grade 3.

The mean age of the subjects were almost similar in both groups and the patients were selected according to inclusion criteria.

The outcome measures taken were pain by VAS disability score by SPADI and ROM by goniometer.

The analysis within the group showed that both the groups showed significant improvement in pain, SPADI score and ROM. Thus both the mobilization techniques are beneficial but more significant improvement is noticed in group B, which suggest that Movement with Mobilization is more effective as compared to Maitland Mobilization inferior glide. Pain was measured by VAS scale, which is simple and frequently used method for assessment of variation of intensity of pain.

On VAS the group B shows a gain of 2.6667 and group A shows a gain of 2.2666 after treatment.

On SPADI group B shows a reduction of 22.5333 and group A shows a reduction of 13.4 after treatment.

On ROM group B shows a gain of 4.6667 and group A shows a gain of 4.5667 after treatment.

4.2 **RESULTS**

There is significant improvement in pain and disability and ROM after both the treatments but more significant improvement occurs after application of MWM which suggest that MWM is more effective as compared to inferior glide of Maitland mobilization.

5. SUMMARY LIMITATION AND SUGGESTIONS

5.1Summary

This study was performed to compare the effect of mobilization in adhesive capsulitis grade 3.

60 subjects were choosen according to inclusion criteria and randomly divided in two groups.

Student t test and paired t test was used to compare the difference in VAS score, SPADI, and ROM.

5.2 Limitations of the Study

- 1. This study assessed only the effect on grade 3 adhesive capsulitis.
- 2. Since study time was short only limited sample size is considered for study

5.3 Suggestion

- 1. Large sample can be utilized in future
- 2. Studies on other grades can also be done.

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"TO CHECK THE RELIABILITY AND CONCURRENT VALIDITY OF A NEW METHOD FOR TESTING THE LENGTH OF TENSOR FASCIA LATAE"

Sumeeta Khaund Grover *

Background

Few investigations include both strengthening and proprioceptive exercises in the treatment of bilateral knee osteoarthritis. Though previous studies give us some insight in to the role of individual strengthening and exercise proprioceptive exercises in knee OA but none of the studies have studied the combined effect of strengthening exercises and proprioceptive oxercises in knee OA. Thus, it is intended to check the efficacy of proprioceptive and strengthening exercises in knee OA to reduce pain and functional disability and improve joint position sense. **Methods**

In this study 24 subjects who met the inclusion criteris were randomized into three groups three groups. Group A were given conventional treatment (SWD and static quadnceps). Group B were given strengthening exercises along with SWD. Group C; which were given strengthening exercises and proprioceptive exercises along with SWD. Outcome measures were pain, functional disability and joint position sense.

Results

All the groups significantly improved in VAS and WOMAC scores after intervention po. 05, knee reposition error score (joint position sense) only improved in proprioceptive exercises group. The proprioceptive exercises group demonstrated greater improvement in VAS and WOMAC scores as compared to other two groups. **Conclusion**

This study between three groups comparing proprieceptive treatment to strengthening and proprioceptive exercises suggest that combination of the two brings

Study Design

The study was a randomized controlled trial.

Objective

To compare the effectiveness of proprioceptive exercises and strengthening exercises and combination of two along with short wave diatheramy in treatment of osteoarthritis of knee in terms of pain and functional disability.

Background

Few investigations include both strengthening and proprioceptive exercises in the treatment of bilateralknee osteoarthritis. Though previous studies give us some insight in to the role of individual strengthening and exercise proprioceptive exercises in knee OA but none of the studies have studied the combined effect of strengthening exercises and proprioceptive oxercises in knee OA. Thus, it is intended to check the efficacy of proprioceptive and strengthening exercises in knee OA to reduce pain and functional disability and improve joint position sense.

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Results

All the groups significantly improved in VAS and WOMAC scores after intervention po. 05, knee reposition error score (joint position sense) only improved in proprioceptive exercises group. The proprioceptive exercises group demonstrated greater improvement in VAS and WOMAC scores as compared to other two groups.

Conclusion

This study between three groups comparing proprieceptive treatment to strengthening and proprioceptive exercises suggest that combination of the two brings better rellet to the subjects of knee OA in reducing pain and functional disability.

Introduction

Osteoarthritis (OA) is the most common joint disorder, a prevalence that increases with age and sex specifications". Among adults 45-74 years of age or older. symptomatic disease occurs in approximately 12.1% population' Before 50 years of aoe the provalence of OA in most joints is higher in men than in women. After about 50 years of age, women are often affected with hand, foot and knee OA than men3In subjects with no joint pain who have radiographic changes of OA. quadriceps weakness predicts radiograph progression and pain". These findings suggest that the weakness may occur before arthritic damage.

Nevertheles, exercises to strengthen the quadriceps relieve joint pain in persons with OA of knee'. the strangthaning exercises are beneficial for knee OA by several pathways. improving strength. improving psychological well-being. All of these may interact and have an additive effect on the symptoms of OA'. Barret et al. (1991) has reported impaired proprioception for the patilents sullering from knee osleoarthritis. Few investigations have investigated the relationship between impaired proprioception and performance or other measures of functional status in OA. In addition Birrninghsm et al. (2001) stated that quadriceps sensory dystunction that is, decreased proprioceptive acuity. has recently been demonstrated in patients with knee OA and proposed as a factor in the pathogenesis or progression of the condition. If correct, restoration of these sensorimotor deficits with strengthening may retard progression of knee OA and reduce disability. Although it is generally accepted that a rehabilitation program improves the functional capacity, pain and sensoriomotor function of patients, there is lack of agreement about what such a rehabilitation program should include (Roddy et al. 2005). Many previous studies have generally used sophisticated and expensive apparatus. Which limits their application to a community setting"10. Though the above mentioned studies give us some insight in to the role of proprioceptive exercises in knee OA but none of the studies have studied the combined effect of strengthening exercises and proprioceptive exercises in knee OA. Thus, in this study it is intended to check the efficacy of proprioceptive and strongthening exercises in knee OA to reduce pain, functional disabllity and improve joint position sense.

Patlents and Methods

Under convenience sampling, 30 subjects were recrulted from the physlotherapy department of in Udaipur hospitals and. The subjects were screened by means of a screening form one of the three groups-group A proprioceptive treatment group). group B (strengthening exercise treatement group) and group C (strengthening exercise and proprioceptive exercise) by simple randomization method.

Inclusion Criteria

- 1. Diagnosed cases of osleoarthritis grade 2 and 3 (As reported by radiologist).
- 2. Age group 45-60 years
- 3. Bilateral osteoarthritis.
- 4. Gender post meno pausal female

Exclusion criteris

- 1. Neurologic disorder (e.g. parkinson's disease, Alzheimor's disease)
- 2. Steroid injection in past 2 months
- 3. Infiammatory arthritis

- 4. Metal implants in lower limb
- 5. Osteoporosis
- 6. Knee ligament/Meniscal injury

Group A received short wave diathermy and static quadriceps exercise, Group B received short wave diathermy and strengthening exercises and Group C received short wave diathermy and strengthening exercises and Group C received short wave diathermy. strengthening exercises and proprioceptive exercises.

Intervention

1. Before starting the exercises, patients were given treatment for pain reduction by Diatheramy diathermy. The patients were positioned supine and comfortably on the treatment plinth. Patient in each groupreceived 20 min of SWD thrice a week for four weeks (12 treatments) applied by malleable electrodes by contraplanar method (chitra, 2007)". The intensity of the SWD was based on each subject'stoferance but all the subjects were advised that they should feel justcomfortable warmth (Low and Reed, 2000).

2. Strengthening exercises (Gail D, 2005)" Static quadriceps in knee extension- Patient is positioned fully supine. Patient contracts the quadriceps femoris muscle and pushes knee down while maintaining the fool in full dorsiflexion, each contraction is held for 6 sec with a 10 sec rest between repetitions. 10 repetitions are done.

Standing terminal knee extension- Patient stands with a resistive band behind a slighthy flexed knee. Patient contracts the gluteal and quadriceps femoris muscle to fully straighten the hip and knee. Each contraction is held for 3 seconds, 10 repetitons were done and resistance is increased as tolerated by the patient.

Closed chain exercise, one of the two exercises is performed 3 times per week. Patiend should progress to tha most challenging activity that he or she can successfully complete with minimal or no pain.

a. Seated leg press-Patient is seated holding a resistive band in both the hands :

A patient places his or her foot aginst the band, then

straightens the knee by straightens the knee by pushing the foot down and forward by contracting the gluteal and quadriceps femoris muscles. Each contraction is helf for 3 seconds with knee as straight as possible,patient slowly return to the starting position and repeat for 30 sec bout.Progression is made by using bands of high resistance and additional bouts.

b. Partial squats-patient stands with arm support as needed, patient performs a partial squal, keeping the knees centered over the feet return to standing by contracting the quadriceps femoris and glutealmuscles. Each contraction is held for 3 seconds with hips and knees as straight as possible. Progress to full body weight without support and additional bouts.

3. Proprioceptive exercises. (chita et al. 2007)"

a. One leg balance-it involed standing on affected foot with relaxed upright posture and other leg flexed at knee. hip and ankle, this position was held for one minute followed by rest for 10 to 20 seconds and was repeated twice more After a brief rest three similar repetitionswere carried out for unaffected leg (Fig a).

b. Blind advanced one leg balance-it was same like one log balance, expect that the patient was asked to keep his/her eyes completelyclosed while performing the routine, and then was repeated twice again(Fig b).

c. Toe walking-Here the patient was made to walk for 20 meters high up on the toes with loes pointing straight ahead, then walk with toes pointing straight ahead. then walk with toes pointing outwards and thenwalk with toes pointing imwards after a short rest repeat it once again(Fig C)

d. Heel walking-Walking for 20 meters on heels with toes pointing straight ahead, walking on heels with toes pointing out and walking on heels with toes pointing in. After a short rest, the procedure wasrepeated once more (Fig d)

e. Gross leg body swing-Leaning slightly forward with hands on wall for support and weight on affected leg. other leg was swung in front of the body pointing toes upwards as foot reaches its farthest point of motion. Then swing this unaffected leg back to the unaffected side as faras comfortably possible, again pointing toes up as foot reaches its final point of movement. Repeat this overall motion 15times with erect body posture and good balance, rest for a few seconds, and then 15 similar repetitions with the unaffected leg as weight-bearing limb was performed (Fige)

Treatment was given three times per week for four weeks. In this study the outcome measures were-:

All outcome measures were measured at baseline, end of week 1. end of week 2. end of week 3 and end of week 4.

Pain-was measured using the visual analoguo. Functional disability-was measured using the Western Ontario and McMaster Universitios Osteoarthritis Index (WOMAC) Joint position sense-was measured using inclinometer by Reposition error test (Higgins and Perrin, 2000)

Procedure for reposition error test-all the subjects were familiarized with the procedure by explanation, demonstration and adequate practice repetition. Inclinometer was attached to the distal thigh of dominant extremityapproximately one inch above knee joint line. Patient is standing with back against wall and is blindfolded to eliminate visual coes, Patient squats to 30 degree of knee flexion and maintains this position for 15 sec, return to starting position of 0 degree extension, Following a 15 sec rest period patient then attempts to reposition themselves at the predetermined angle, degree of error from 30 degree knee flexion target anlge is recorded and average over three trials is used for data analysis (Higgins and Perrin, 2000)13.

Inclinometer for assessing joint pasition sense (Reposition error lest)

Statistical Analysls

A Total of 30 patients were screened for possible study eligibility. 28 patients satisfied the eligibility criteria, were recrulted into study and underwent baseline measurement. Four patients in this study did not complete the treatment. There were two dropouts from Group A, one each from Group B and Group C. Total of 24 subjects, includingfemales45. completed the study. Age of subjects in this study was between 60 years. The mean age of subjects in Group A was 51.5 (4.30) Years. Group B was 49.5 (+2.44) years, and Group C was 51.62 (+3.96) years. There was no significant difference between the mean ages of all the three groups. Group A had 8 females patients, Group B had 8 females GroupC had 8 female patients.

Readings of the variables taken at the baseline and at the end of first second, third and fourth week were analyzed for intragroup differences using repeated measure ANOVA and paired samples t-test with Bonfarroni correction. Intergroup differences were analyzed using one way ANOVA.

For intergroup differences result was considered significant if p value d 0.05 and for intragroup differences result was considered significant if p-valued 0.01.

Results

Within Group analysis of pain scores-The repeated measures ANOVA results for VAS scores revealed a significant difference within all groups.

Between group analysis of pain scores- The analysis of VAS scores Between all the groups suggested that there were no significant differences at the baseline (p=0.397) and at the end of 1st week (p=0.052) At the end of 2 nd week there was significant difference between the groups (p=0.002). at the end of 3rd week there was significant difference between the groups (p=0.000), at the end of 4th week there was significant difference between the groups (p=0.000), at the end of 4th week there was significant difference between the groups (p=0.000).

Within Group Analysis of WOMAC Scores. The analysis of WOMAC score between the groups suggested that there were no significant differences between baseline (p=0.110) and week 1 (p=0.467) At the end of 2nd week there was significant difference between the groups (p=0.003). At the end of 3rd week there was significant difference between the groups (p=000). At the end of 4 th week there was significant difference between all the groups (p=.000).

Graph 1: Comparison between mean values of VAS



Graph 2 : Comparison of mean values of WOMAC



Within Group Analysis of Reposition Error Test acores- The results of repeated ANOVA and post-hoc ttest showed no significant differences in Reposition scores in group A and B. But in Group C there was statistically significant improvement in baseline and week 4.

Between Group Analysis of Reposition error test-The analysis of reposition error score between the groups suggested that there ware no significant differences between baseline (p=0.193). week 1 (p=0.144). week 2 (P=0.135), week 3 (P=0.095) and week 4 (P=0.113).



Graph 4 : Comparison of percentage improvements in all outcome measures



Graph 3:Comaparison of mean values of Reposition error scores

Outcome measures	Percentage of Group A (Proprioceptive treatment)	Improvement Group B (strengthening exerclases)	Group c (strengthaning and proprlocaptive Exercieses)
Pain (VAS)	24.84%	35.72%	44.71%
Disability (WOMAC)	41.03%	57.60%	68.48%
Joint position serise (RET)	2.70%	3.08%	9.35%

Table 1 : Percentage of improvement in alloutcome measures across the three groups

Discussion

The purpose of this study was to determine the effectiveness of Proprioceptive axarcises along with strengthening exercises in improving pain and disability in patients with knee osteoarthritis. In all the three groups-pain. disability and joint position sense were taken as the dependent variables to assess the improvement between the groups and within the group. The findings of the present study suggest that the addition of proprioceptive exercises and strengthening exercises reduces patient's pain and disability more effectively than strengthening exercises or Proprioceptive physiotherapy alone over a 4 week period. Statistical analysis revealed no significant differences in key demographic variables and baseline measurements of pain, disability and active angle replication test suggesting that all the groups had homogenous distribution of patients.

In this study VAS was usaed to measure pain. A statistically significant difference was found between all the groups. Maximum reduction of pain was in group C (37x0.02mm). this is in favor of our research hypothesis.Pain relief in this group is inaccordance with a case report of 70 year old lady with

osteoarthritis of knee who found moderate pain relief by proprioceptive exercises as done by childs et at (2002)". Reduction in pain in Group a (Proprioceptive treatment) and B (strengthening exercise group) is consistent with previous findings which state that both dynamic and isomelne resistance training reduced parceived knee joint pain" Proprioceptive training reduced parceived knee joint pain" Proprloceptive training activities provide patient with an opportunity to adapt to potentially destabilizing loads on the knee during rehabilitation. give additional exposure to pivoting, quick starting and stopping and quick changes in direction and challenge their balance capabilities. Strengthening exerclese are recommended to reduce pain and improve physical function in knee O.A., but there is minimal information on its long term impact. it is theorued that because elevated plasma a endorphin, a nauro transmitter inhibitory to pain signal, has been observed in response to prolonged rhythmic exercise (Thoren et al, 1990) leading to increased a eondorphin production might decrease pain experienced by persons with osteoarthritis".

In the present study WOMAC score was used to

asses overall knee lunction since its validity and reliability is already established" The analysis of disability score reveals no significant difference at baseline There was significant improvement in Group B (Strengthening exercises) and C (strengthening exercise and propricoceplive exercises) as compared to Group A (Proprioceptive treatment) but maximum difference in mean score of Group C (52 mm), supporting ourresearch hypothesis. Both the treatment groups A and B resulted in significant improvements in all the vartables compared to the Proprioceptive therapy group. A study by Folson et al (2009) states that proprioceptive acuity as assossed by the accuracy of reproduction of the angle of knee llexion has modest effects on pain and physical function limitation in knee osteoarthritis. This could be due to pain relial, reduction in stiffness. increased lubrication of joint, gain in strangth of weak muslces, correctmechanical loading. Improved joint stability and thus increased quality of movement and improved proprioception which in tum provides participants an opportunity to adapt to potentially destablizing load on knee during the study period". Hurley at al (2004) have reported that proprioception is closely related to functional performance and walking speed. This is in accordanca with this study which shows greater mean difference in proprioceptive exercises group than with other two groups.

In the study joint position sense was measured by reposition error test (RET). The analysis of RET at basaline revaals no significant differences between all the three groups. At the end of 4th week mean differences were not significant between all the groups. There was improvement in all the groups which supports the study that proves general exercise training can increase proprioceptive performance (Bernauer at al. 1994) Maximum reducation in mean was in Group C (0.48*). The difference between the moderate improvement in other two groups as compared to Group C and greator improvament in this group was probably due to specific proprioceptive exerclses. Proprioceptive information along (without visual loodback) can correct up to 95* % of velocity and timing errors associated with sudden perturbation in resistance during a multi-joint movement sequence"

Group A propriociptive Group B (strengthening exercises) and Group C (Proprioceptive and strengthening exercises) does not show any statistically significant difference at the and of 4 week study period. This is in accordance with a study done by solor at al. 2005 in which 6 weeks of proprioceptive and balance training was given to treatment group while the control group did not receive any exercise but there was no significant differences by the end of training in weight baaring joint position sense. Therefore, it may be concluded that proprioceptive acuity takes longer duration to shoe significant improvement.

Sample size was small and data was collected from limited place that limits the generalizability of the results. The duration of study was short (4 weeks) therefore long term effectiveness of propriocaptive exercises was not avaluated. Neither the subjects nor the therapist were blinded to group assignment. The cohort of patients with knee osteoarthritis wre predominately female, hence generalizability of our findings may not necessarily be applicable to the entire population of individuals with osteoarthritis.

This study showed that patients affected with OA knee. When performed proprioceptive exercises along with strengthening exercises showed

significant reduction in pain and functional disability and improvement in propnocoption as compared to patients performing strengthening exercises along. Thus proprioceptive exercises can be incorporated along with strengthening exercises in patients of knee ostooarthritia.

Conclusion

Management of ostecarthritis. which deleriorales with imbalance between the stress applied to the articular cartilage of the joint and its ability to withstand it, requires being more extensive than mere analgesics. This study between three groups comparing proprioceptive treatmant to strangthaning and strengthening and proprioceptive exercises suggest that combination of the two (proprioceptive exercises suggest that combination of the two (proprioceptive and strengthaning exercises) brings better relief to the subjects of knee ostoarthritis in reducing pain and functional disability. However, reposition error scores (joint position sense) did not improve sigificantly in proprioceptive and strengthening exercise group than other two groups. These results partly accept and parthy reject the experimental hypothesis suggesting that using proprioceptive exercises and strengthening exercises together will produce statistically significant difference in paln, disability and but joint position sense may take longer duration to show significant differences.

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COMPARISON OF EMPLOYEES ATTITUDE AND BEHAVIOR IN PHYSIOTHERAPY COLLEGES AND REHABILITATION & PHYSIOTHERAPY CENTERS IN RAJASTHAN

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Back ground and introduction

The Human Resources field evolved first in 18th century Europe from a simple idea by Robert Owen and Charles Babbage during the industrial revolution. These men knew that people were crucial to the success of an organization. They expressed that the wellbeing of employees led to perfect work. Without healthy worker(HRH) or "health workforce" is defined as "all people engaged in actions whose primary intent is to enhance health", according to the World health organization's report 2006 Human resources for health are identified as one of the core building blocks of a health system. They include physicians, physiotherapists, nurses, midwives, dentists, allied health professions, community health workers, social health workers and other health care providers, The healthcare industry employs over 4 million people, making it one of the largest service sectors in the economy. Physiotherapy and rehabilitation organization in today's era utmost need to serve.

Methodology

It was included in the study and analysis through bar graphs and charts wherever necessary to study the comparative data. Questionnaire technique helped in getting the depth study by directly interacting with the focus group and the physiotherapist. The universe of the study was confined to the state of Rajasthan. In this manner total 15 private physiotherapy colleges were selected and 10 government rehabilitation and physiotherapy centers and 15 rehabilitation and physiotherapy centers were selected and 20 each from government and private institutions were selected. The study was based on sample stratified random sampling. Various statistical techniques like mean, standard deviation was calculated. The design is 2X3 factorial therefore the Two-way ANOVA was used.

Conclusion

there is significant difference in Employees Attitude and Behavior between Rehabilitation & Physiotherapy Centers and Other Institutions there is significant difference in Employees Attitude and Behavior between Government Institutions and Private Institutions.

key word: Human Resources, health workforce, Employees Attitude

BACK GROUND

The federal government has other responsibilities, including setting national health care standards and ensuring that standards are enforced by legislative acts such as the Canada Health Act (CHA).

Constitutionally the provinces are responsible for the delivery of health care under the British North America (BNA) Act; the provinces and territories must abide by these standards if they wish to receive federal funding for their health care programs .The federal government also provides direct care to certain groups, including veterans and First Nation's peoples, through the First Nationals and Inuit Health Branch (FNIHB). Another role of the federal government is to ensure disease protection and to promote health issues .The federal government demonstrates its financial commitment to Canada's human resources in health care by pledging transfer funds to the provinces and direct funding for various areas. For example, in the 2003 Health Care Renewal Accord, the federal government

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provided provinces and territories with a three-year CAD 1.5 billion Diagnostic/Medical Equipment Fund. This was used to support specialized staff training and equipment that improved access to publicly funded services.

The third group - private physicians - is generally not employed by the government, but rather is selfemployed and works in a private practice. They deliver publicly-funded care to Canadian citizens. Physicians will negotiate fee schedules for their services with their provincial governments and then submit their claims to the provincial health insurance plan in order to receive their reimbursement The federal government has other responsibilities, including setting national health care standards and ensuring that standards are enforced by legislative acts such as the Canada Health Act (CHA)

Canada differs from other nations such as the United States of America for numerous reasons, one of the most important being the CHA. As previously mentioned, the CHA sets national standards for health care in Canada. The CHA ensures that all Canadian citizens, regardless of their ability to pay, will have access to health care services in Canada. "The aim of the CHA is to ensure.

The health care system in the United States is currently plagued by three major challenges. These include: rapidly escalating health care costs, a large and growing number of Americans without health coverage and an epidemic of substandard Health insurance premiums in the United States have been rising at accelerating rates. The premiums themselves, as well as the rate of increase in premiums, have increased every year since 1998; independent studies and surveys indicate that this trend is likely to continue over the next several years care.

Approximately 92% of Germany's population receives health care through the country's statutory health care insurance program, Gesetzliche Krankenversicherung (GKV). GKV designed an organizational framework for health care in Germany and has identified and constructed the roles of payers, providers and hospitals. Private, for-profit companies cover slightly less than 8% of the population. This group would include, for example, civil servants and the selfemployed. It is estimated that approximately 0.2% of the population does not have health care insurance.

Developing countries struggle to find means to improve living conditions for their residents; countries such as Ghana, Kenya, South Africa and Zimbabwe are seeking human resources solutions to address their lack of medically trained professionals. Shortages in these countries are prevalent due to the migration of their highly educated and medically trained personnel.

Professionals tend to migrate to areas where they believe their work will be more thoroughly rewarded. The International Journal for Equity in Health (2003) suggested that those who work in the health care profession tend to migrate to areas that are more densely populated and where their services may be better compensated. Health care professionals look to areas that will provide their families with an abundance of amenities, including schools for their children, safe neighborhoods and relatives in close proximity. For medical professionals, the appeal of promotions also serves as an incentive for educating oneself further .As one becomes more educated, the ability and opportunity to migrate increases and this can lead to a further exodus of needed health care professionals.

The World Health Organization (WHO) estimates a shortage of almost 4.3 million physicians, midwives, nurses and support workers worldwide. The shortage is most severe in 57 of the poorest countries, especially in sub-Saharan Africa. The situation was declared on World Health Day 2006 as a "health workforce crisis" - the result of decades of underinvestment in health worker education, training, wages, working environment and management.

INTRODUCTION

The closing decade of 20th century has witnessed a growing importance of HRM both at business and national level. The turbulent business climate brought in the work of liberalization, globalization and changing technologies are offering complex and challenging situations to managers. Human Resource is continuously evolving in organizations and that HRM

can and must intervene in the emergent process in order to influence the speed and direction of the development of people. HRM can enhance or hinder the dynamics of evolutionary change of the qualifications and motivations of the workforce and thus influence the development path of human resource. Indian organizations are tending to become competitive to meet globally prevalent standards; there is no government or international agency that does not realize the importance of human element. The world bank, the United Nations and its constituent bodies including UNDP, UNIDO, WHO and ILO, all recognize the need for and the improvement of the system to manage people in their organizations. The systems, instruments and strategies which they practice as being of strategic importance at a given point of time, for a given country or group of countries may vary but the focus is uniform, Rao (1996).

In the world titled towards passion for excellence and customer delight either in product or service providing organization, the only way to survive and grow is to develop the new strategies for managing people with standardized techniques and equipment's, but no organization can assemble its overnight results. People with desired qualifications, technical and managerial experience, personality traits such as aptitude for research and development, work attitude, initiative, concern for excellence, the potentialities and capabilities are not readily available. Hence every organization needs to develop its human resource over a period of time, and only the choice the organization are left with, is to develop them, if they cannot get them readily from an open market, Mufeed (2000). In this background, HRM has to play a crucial rule in terms of making employees to learn, change and adopt themselves for organizational objectives. Adaptability of organization has never been so important then it is today. HRM has to play a catalytic role in building and facilitating right kind of work environment. HRM is formulated on the convention that people are important and their involvement is necessary for an organization to be effective, this convention is translated in to practice through a Varity of programmes to facilitate individuals for better adjustment to the environment. In the present scenario organizations face multiple opportunities and threats from turbulent business environment, increased competition, changing customer demands and the constant challenges to maintain consequences among organizational dimensions such as technology, strategy, culture and process. Keeping organization healthy and visible in today's world is a daunting task. Individuals in organizations drive themselves to find satisfaction in and through work, fighting obsolescence of one's knowledge and skills, maintaining dignity and purpose in pursuit of organizational goals and achieving human connectedness and community in the work place. Simply survival-continuation to have an adequate job is a major challenge now a day in the light of constant layoffs and cutbacks. Although new jobs are being created at second rates and old jobs are being destroyed at an accelerating pace. "Knowledge work" is replacing "Muscle Work'*. In present era, the greatest problem that industries are facing is how to increase the productivity. Although this task will require many efforts on many fronts include manufacturing, technology, strategies and the decision making. For most companies the best opportunity for improving productivity lies in the more efficient inhabitation of human resources. The technology for improving Human Resource Management (HRM) is already at hand. Therefore the problem is not to invent the technology, but to implement what we already know; HRM has its origin in the Hawthorne studies of Elten Mayo and Fritz Roethlisberger in 1930's and 1940's, and it was further developed in 1950's, 1960's, and 1970's by people like Douglas McGregor and Rensis Likert. Over the past few years, however a number of companies in the west have come to recognize that one means of increasing productivity and profits is to improve the management of their human resource and workforce, which they had under estimated. Actually human resource is a company's asset representing a sizable investment which includes the cost of recruitment, training and development and thus is the greatest investment in physical resources. Companies that have adopted this viewpoint have started searching for ways to utilize human resources effectively.

As yet only few companies have actually implemented this idea namely SBI, Texas Instruments, Xerox, Donnelly Mirrors, Linton, Wipro, Infosys, and Satyam etc and by adopting this philosophy they have been appreciated by all the Stakeholders. The Human Resource Management (HRM) occupies the prime position of all disciplines in management and deals with many resources. Earlier there were land, labour and capital. Later these resources were expanded to include men, material, machinery and money. In present nuclear age and globalization it may be appropriate to expand the scope of resources further such as human ware, info ware and organ ware. Among these resources find human resources playing a dual rule- a resource as well as a motive force for all other resources. Human beings are also responsible for manipulating all other resources by way of developing, utilizing, commanding and controlling all other resources like material, machines, money, infrastructure and land (Nair; 1999).

HRM in a classical sense refers to the acquisition, development, motivation and maintenance of human capital. This in turn increases the productivity, quality goods and superior services and enhances the profitability of the organization. The people are considered principle resources of an organization and to manage the people is the most important aspect of every organization (Lata& Nair; 1999). Thus, the manpower is that resource through which management wants to direct and control all other resources like material, machine, money and others. To keep this human power happy and content is the most important objective of every organization. In order to meet this objective management must design and implement a set of policies, procedures and practices. These should be aimed at enhancement the human development. HRM is a very fruitful process to be applied not only to industries but also in the social service sector. All these strategies, systems and techniques that an organization uses to help its employees, acquire and strength their compatibilities which are vivid under HRM technologies. Separate HRM departments, Proper HRD systems and climate, performance appraisal system, training, organization development and interventions, career planning,

rewards, employee welfare systems, quality of work, Job enrichment and human resource information system are being used as HRM mechanism by the organizations worldwide. According to (Storey; 1995), HRM is a strategic and coherent approach to the management of an organization. The people working there who individually and collectively contribute towards achievement of its goals. HRM can be regarded as a set of interrelated policies with an ideological and philosophical reinforcement (Storety; 1989). It is concerned with the employment, development and reward of people in organizations and conduct of relationship between management and the workforce.

The Institute of Personnel management London has defined HRM as that part of management concerned with people at work and with their relationship in to an effective organization. The people who make up an organization and having concern for the wellbeing of the individual and of working groups, to enable them to make their best contribution to its success. The Edward Flippo (1999), has defined HRM as planning, organizing, directing and controlling of the procurement, development, compensation, integration, maintenance and separation of human resource, so that individual organizational and societal objectives are accomplished. The overall purpose of HRM is to ensure that the organization is able to achieve success through people. HRM aims to provide a range of services which support the achievement of corporate objectives as part of the process of running the organization. HRM enables the organization to obtain and retain the skilled, committed and well-motivated workforce. It enhances and develops the inherent capabilities of people and creates an environment in which harmonious relationship and team work can flourish. Further it helps the organization to balance and adopt an ethical approach for managing employees which is based on the concern for the fairness and mental wellbeing of the people.Health human resources ("HHR") also known as "human resources for health" ("HRH") or "health workforce" is defined as "all people engaged in actions whose primary intent is to enhance health", according to the World Health Organization's World Health Report

2006

OBJECTIVE OF THE STUDY

To comparison of employees attitude and behavior in physiotherapy colleges and rehabilitation & physiotherapy centers

METHODOLOGY

The universe of the study was confined to all physiotherapy college and physiotherapy &rehabilitation centers in the state of Rajasthan There were about15 physiotherapy colleges and 25 physiotherapy and rehabilitation center in Rajasthan. The study was based on sample stratified random sampling. The whole universe was divided in to two strata's (1) physiotherapy colleges and (2) rehabilitation centers, and physiotherapy centers. After the stratification of the universe small samples were drawn on random basis using random tables. Descriptive and inferential statistic were widely used to interpret the fact and to arrive at conclusion.

Two way ANOVA test was administered for testing the significance of difference in variables and attributes. Exact sampling test such as t and F test were applied. Correlation and ratio were calculated to convert their absolute information in to relative information

RESULT AND ANALYSIS

Comparison of Employees Attitude and Behavior in Physiotherapy Colleges and Rehabilitation & Physiotherapy Centers

Institutions	Physiotherapy Colleges	Rehabilitation & Physiotherapy Centers
Ν	15	25
Mean	37.400	34.000
Std. Deviation	2.384	2.901
Std. Error Mean	0.616	0.580
Mean Difference	3.400	
't'	3.824	
p value	0.000	

The above table shows that the mean scores of Physiotherapy Colleges on Employees Attitude and Behavior is found to be 37.400 while the mean scores of Rehabilitation & Physiotherapy Centers on Employees Attitude and Behavior is found to be 34.000. The mean difference was found to be 3.400, the 't' score was found to be 3.824 which is significant at 0.01 level. It infers that there is significant difference in Employees Attitude and Behavior between Physiotherapy Colleges and Rehabilitation & Physiotherapy Centers.

CONCLUSION

On the basis of mean score it is concluded that in

Physiotherapy colleges the Employees Attitude and Behavior is significantly better in comparison to Rehabilitation & Physiotherapy Centers.

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A STUDY TO ASSESS THE EFFECTIVENESS OF REBOUNDING EXERCISE ON LYMPHEDEMA

Shailendra Mehta *

Abstract

Background : Rebounding is a fantastic exercise for those with Lymphedema, arthritis sufferers and other similar conditions. Lymphedema is a swelling that develops as a result of an impaired lymphatic system. Your lymphatic system has no pump and cannot move fluid on its own. When you jump up and down on a rebounder, or trampoline, you are helping push that fluid throughout your body. The study was aimed at evaluating the effectiveness of rebounding exercise on lymphedic patients. A total of 30 patients those suffers with lymphedema has been taken from govt & private hospital, Udaipur, and the rebounding exercise was practiced for the selected samples. Condition of the lymphedema was analyzed before and after the study. Collected data was analyzed using descriptive and inferential statistics. A high significant On an average, in experimental group, lymphedic patients are having 56.6 % improved where as in control group, on an average, lymphedic patients are having only 6.3 % improved

Conclusion:

Rebounding exercise could be an effective vascular rehabilitation training program for vascular remodeling in lymphedema patients

Keywords: Reboundine exercise, lymphedema, vascular rehabilitation

Background:

Lymphedema as defined as the abnormal accumulation of protein-rich fluid in soft tissues, results from a dysfunction of the lymphatic system.

This dysfunction can be either a congenital abnormality in the development of the lymphatic system, or a secondary obstruction, destruction, or malfunction of the lymphatic pathway. It is a common and troublesome problem.

Rebounding affects the lymphatic system much like a massage does. The lymphatic system is the metabolic rubbish bin of the body. It rids you of toxins such as dead and cancerous cells, nitrogenous wastes, fat, infections viruses, heavy metals, and other assorted junk cast off by the cells.

Unlike the cardio-vascular system, there is no "pump" driving the fluid round the body. When on the rebounder, the "jump" motion at the top of the jump forces the lymphatic valves to open, the "push" motion closes these valves at the bottom of the jump. This creates a "pump" effect which effectively moves and recycles the lymph and the entire blood supply through the circulatory system many times during the course of the rebounding session, providing a free-flowing system that drains away the potential poisons from our body.

This lymphatic drainage eliminates waste products quickly and efficiently both during and after exercise (lactic acid dissipation)

Get started with a gentle bounce, 2 -3 minutes once or twice each day, with your feet staying on the mat surface - this is called the "health bounce". If you have balance problems due to inflammation then use the stability bar. Gradually progress to small jumps off the rebounder. At no time, even during vigorous exercise, will your feet leave the mat surface by more than 6 inches.

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Methods :

Sample Thirty(30) patients with a diagnosis of primary or secondary unilateral lymphedema of either the upper or the lower limb with observable swelling of the involved limb were the subjects.

None of the subjects received active treatment for lymphedema within the six months period before entering the study.

Exclusion criteria: - active cancer cases, influencing drugs including diuretic, signs of infection in the affected limb (redness, rash, red streaks, hotness, pain), evidence of contraindications to treatment: uncontrolled hypertension, congestive heart failure, renal insufficiency, and venous thrombosis.

Treatment Intervention :

All patients underwent complete physical examination and were evaluated for their eligibility in participating in this study. The scheme of the study was discussed in detail with the patient prior to start. All the patients received six sessions; three sessions weekly (for two weeks) in two points of the study: week 1 and week 7. Then, the patient was instructed to do the same regimen at home for the following 4 weeks (at week 3 and week 9.

The "health bounce" is performed for two to three

minutes once or twice a day. In the health bounce, stand on the trampoline and lightly move your heels up and down. Your feet remain in contact with the base. To increase the challenge of the bounce as you progress, move your heels from side to side in a twisting motion

Assessment and Outcome Measures:

Baseline and demographic data were recorded for each subject and included the age, limb circumference duration of lymphedema, side of the swelling. The follow up measures were recorded at week 12

Results:

Patient Characteristics Thirty patients with unilateral extremity lymphedema were enrolled in this study.

Treatment Outcomes :

All the recruited patients received the program as designed in the study.

There was a significant difference (p < 0.05) in the circumferential measures of the affected LL (113.71 \pm 26.91) as compared to the non- affected control

 $L L(103.41 \pm 22.02)$ was found. This might be explained by the fact that most of our upper limb cases were secondary; either to mastectomy with axillary lymphadenectomy

limb	8an 120	Т	Р
Affected LL	113.71 ± 26.91	t 1.026	P <0.05
Control LL	103.41 ± 22.02		

Discussion:

The challenge of living life with lymphedema is daunting. The swelling from pooling lymphatic fluid never completely disappears. At times, depending on various factors, it can lessen. There are many ways to help disperse the fluid, but it always returns, and for good reason. When the normal lymphatic flow in the body has been disrupted by the removal of lymph nodes, lymphatic fluid needs somewhere to go, and when it can't travel, lymphedema sets in.

The lymphatic system is a huge network of tissues and organs that help rid the body of dangerous toxins. Its primary function is to transport lymphatic fluid throughout the body. The lymphatic fluid contains white

blood cells specifically designed to fight infection. The lymphatic system is similar to a busy interstate. When there are no obstructions, the lymphatic fluid flows freely in one direction through the circulatory system of veins and capillaries. The lymphatic vessels are connected to lymph nodes, which help filter lymphatic fluid. Everything is designed to work perfectly. The tonsils, spleen, adenoids and thymus are all part of the lymphatic system. Throughout the body, there are hundreds of tiny lymph nodes. Just like a busy interstate, this system is set up to keep the lymphatic fluid moving Dave Scrivens, Certified Lymphologist, which was published in the Well Being Journal Vol. 17, No. 3. In his article, Mr. Scrivens says, "The body has a built-in need for activation. The lymph system, for example, bathes every cell, carrying nutrients to the cell and waste products away. Yet the lymph is totally dependent on physical exercise to move. Without adequate movement, the cells are left stewing in their own waste products and starving for nutrients, a situation that contributes to arthritis, cancer and other degenerative diseases. Vigorous exercise such as rebounding [jumping on a therapeutic mini-trampoline] is reported to increase lymph flow by 15 to 30 times. Also, bones become stronger with exercise. Vertical motion workouts such as rebounding are much different and much more beneficial and efficient than horizontal motion workouts, such as jogging or running. The lymph fluid moves through channels called "vessels" that are filled with one-way valves, so it always moves in the same direction. The main lymph vessels run up the legs, up the arms and up the torso. This is why the vertical up-anddown movement of rebounding is so effective to pump the lymph.

Dr. Scrivens also says, "The lymphatic system is the metabolic garbage can of the body. It rids you of toxins such as dead and cancerous cells, nitrogenous wastes, infectious viruses, heavy metals, and other assorted junk cast off by the cells. The movement performed in rebounding provides the stimulus for a free-flowing system that drains away these potential poisons. Unlike the arterial system, the lymphatic system does not have its own pump. It has no heart muscle to move the fluid around through its lymph vessels. There are just three ways to activate the flow of lymph away from the tissues it serves and back into the main pulmonary circulation. Lymphatic flow requires muscular contraction from exercise and movement, gravitational pressure, and internal massage to the valves of lymph ducts. Rebounding supplies all three methods of removing waste products from the cells and from the body

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COMPARISON OF THE THERAPEUTIC EFFICACY OF PHONOPHORESIS AND CRYOTHERAPY AS COMBINED THERAPY IN THE MANAGEMENT OF REPETITIVE STRAIN INJURY (RSI)

Vinod Nair *

OBJECTIVES

Repetitive strain injury is the single largest category of workplace injuries and is responsible for almost 30% of all workers in companies. Repetitive strain injury (RSI) is a general term used to describe the pain felt in muscles, nerves and tendons caused by repetitive movement and overuse. This study was designed to compare the therapeutic efficacy of Phonophoresis and cryotherapy as combined therapy in the management of repetitive strain injury (RSI).

METHODS

Sixty (60) subjects were assigned randomly to one of three groups:

Double-modality therapy (DMT) group (n=20) received cryotherapy and 15% methyl salicylate phonophoresis, PHONOPHORESIS group (n=20) received 15% methyl salicylate phonophoresis and CRYOTHERAPY group (n=20) received cryotherapy.

Ultrasound at an intensity of 2 W/cm² and frequency of 1MHz was used to apply methyl salicylate while intermittent cryotherapy was the mode of application. Subjects? pre- and post-treatment pain perception scores (PPS) using visual analogue scale (VAS) were assessed and the sessions of treatment in all groups were recorded. Treatment was administered on alternate days and discharges were made in all groups when subjects were pain free.

RESULTS

The study has demonstrated therapeutic efficacy of DMT, but it was not superior to the single treatment protocol of phonophoresis or cryotherapy. However, it might take fewer sessions in the DMT group to treat and make more than 90% of the patient's pain free and fit to return to active performance.

KEYWORDS : Cryotherapy, Double-modality therapy, Repetitivestraininjury, Phonophoresis, Ultrasound

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INTRODUCTION

Repetitive strain injury (RSI) which are usually due to strenuous activity account for roughly 30% of patient complaints in the primary health care settings (Childs et al, 2005) and are a leading cause of work absenteeism worldwide (Beeb et al, 2005). Repetitive strain injury constitutes the largest proportion of injuries among athletes (Reilly and Hardiker, 1983). Report has indicated that more than 60% of men and women who work on the computer have complained of pain resulting from various RSI (Idowu et al, 2005). The most common term used to describe these disorders is musculoskeletal injury (MSI). Some examples of repetitive strain injury are Carpal Tunnel Syndrome, Tendinitis, Tenosynovitis and Bursitis. Common symptoms are Pain in the hands, arms, shoulders, neck, back, legs or feet and May include swelling, numbness, tingling and a feeling of heaviness and/or tiredness in the affected area Some workers may experience multiple symptoms due to more than one

injury Low back pain (LBP) is not only one of the most common musculoskeletal injury in industrialised societies, but it is the most costly, and it is the primary cause of disability in persons under age 45 years (DeRosa and Porterfield, 1992).

Physical treatments (i.e phonophoresis, cryotherapy, etc.) have been used for many years and are currently being used to reduce pain, control swelling or inflammation and improve or restore function in the management of RSIs. Phonophoresis which is the use of ultrasound (US) to enhance percutaneous absorption of topical drugs in the management of RSIs and dermatological conditions has been a widely applied clinical therapeutic procedure. It is believed to accelerate functional recovery by decreasing pain and promoting healing. In a comparative study involving iodex phonophoresis (n = 15), iodex iontophoresis (n =15) and a placebo (n = 15) in the management of shoulder periarthritis, Bumin and Can (2004) did observe that iodex phonophoresis and iodex iontophoresis were significantly effective in decreasing pain as compared to the placebo. The application of cold (otherwise known as cryotherapy) for the treatment of injury or disease, particularly for increasing pain threshold, decreasing inflammatory reaction and spasm following MSIs (Swenson et al, 1996; Yagiz, 2006) has been advocated by some researchers as the sole treatment to be used during all phases of soft tissue injury (Cote et al, 1988; Swenson et al, 1996). In a systematic review of some randomised controlled trials (RCTs) to indentify the efficacy of ice in the management of pain and swelling resulting from soft tissue injury, it is reported that cryotherapy seems to be effective in decreasing pain and speeds return to full activity (MacAuley, 2001; Hubbard and Denagar, 2004). Phonophoresis or Cryotherapy in isolation or in combination with other therapies has become widely used regimen for reducing pain, inflammation and improving or restoring function in managing RSIs (Kellett, 1986; Palmer and Toombs, 2004; Wilson and

Best, 2005). Davis (1991) has recommended the application of cryotherapy as a single treatment protocol for hours (i.e 72 hours) when there is trauma (i.e rotator cuff syndrome) before resorting to phonophoresis for the remaining period of treatment. Literature has indicated that cold application prior to phonophoresis produces an intense hyperemia which may improve the absorption and distribution of the medication to effect pain relief and resolution of inflammation (Santiesteban, 1983). The recognition of the importance of pain control in the recovery from RSIs to enable the injured persons return to participation (athletes) or return to work (typical population) has prompted clinicians to continue to explore more aggressive pain management strategies (Brolinson and Sampson, 2003; Hubbard et al, 2004). Some reports (Santiesteban, 1983; Balogun, 1990) suggested that phonophoresis and cryotherapy can be combined (double-modality therapy - DMT) in the management of RSIs for better outcome. Sequel to this, pain clinics and sport centres have adopted as a tradition the treatment protocol of combining phonophoresis and cryotherapy (DMT) in the management of RSIs worldwide. Despite the general acceptance and the frequency at which this treatment approach (DMT) is being practiced, there is dearth in the literature to support the practice or demonstrate its efficacy or superiority over the single treatment protocol (Balogun, 1990; Ball, 2002). The practice is probably or largely based on anecdotal evidence rather than on empirical data. Clinical opinion just isn't good enough anymore. Hence, it is incumbent upon the clinician or the therapist to collect information or data to support clinical decision making with something more than physiologic philosophy based on opinion. Randomised clinical trials are required therefore, to support clinical decision making on the use of phonophoresis and cryotherapy as combined treatment (DMT) protocol for optimal outcome or response following RSI management.

MATERIALS AND METHODS

Sixty (60) patients (40 males, 20 females; mean 34

years; range 18 to 70 years) who sustained repetitive strain injury were all recruited as they presented before the physician for treatment at the various hospitals in Udaipur. Only subjects who sustained not more than one repetitive strain injury (i.e subjects with multiple injuries were not eligible) with acute onset of symptoms or occurring as an acute exacerbation of chronic lesion were included in the study. Subjects who were on any form of analgesics (steroids and non-steroidal antiinflammatory drugs - NSAIDs), muscle relaxants and any form of physiotherapy treatments were all excluded from the study. Subjects with open wounds over the injury sites, pregnancy, disease conditions (e.g. thrombophlebitis, cardiac disease patient with pacemaker, tumour, etc) and those allergic to topical methyl salicylate or cold which contra-indicate the treatment protocols used in this study were all excluded. The use of NSAIDs or analgesics and any other form of treatment was not permitted or allowed throughout the study period. Before entry into the study all subjects voluntarily signed the informed consent forms after the protocol for the trial was explained to them. All procedures involving the subjects met criteria.

PROCEDURE

On completion of history, careful clinical and radiographic examination the sixty (60) subjects whose injuries were classified as follows :- rotator cuff syndrome (n=10), ankle sprain (n=8), knee sprain (n=6), patellar bursitis (n=7), low back pain (n=12), muscle strain (n=11), tennis elbow (n=3), hamstring tendinitis (n=2), De Quervain tenosynovitis (n = 1) were randomly assigned to one of three treatment groups:

- (i) Double-modality Therapy (phonophoresis and cryotherapy combined) (n=20)
- (ii) Phonophoresis Group (n=20)
- (iii) Cryotherapy Group (n=20)

An independent researcher generated the randomisation sequence by writing the treatment groups and placed in sequentially numbered opaque sealed envelopes which were used to assign the subjects to their respective groups. Neither the primary researchers nor any other person that was involved in treatment allocation were aware of the randomisation schedules (Brolinson and Sampson, 2003). The ultrasound and the transducer (1MHz and 3MHz machine treatment head) were all tested and certified functional. Subjects pain perception was subjectively assessed or measured and recorded using a 10cm visual analogue scale (VAS) marked "no pain" at one end and "worst pain ever" at the other end. After the subjects were carefully educated on the use of VAS and it was observed that subjects could identify their pain levels or scores on the scale without any difficulties. This form of assessment was considered most appropriate because of its high level of repeatability when used serially on the same patient. Sensory test was conducted among the subjects to ascertain that there was no sensory loss. Subjects were instructed and made to understand that at no time during phonophoresis should they suffer discomfort. There might be a sensation of very mild warmth, but other than that only the pressure and the movement of the transducer should be felt. Any other sensation should be reported at once. All subjects assigned to cryotherapy were made to understand that sensation like cold, burning, aching and numb (Kellett, 1986) would be felt during the treatment procedure which causes no harm. Finally, subjects were comfortably supported and positioned to maximise circulation to the area being treated when they were ready for treatment.

The subjects in DMT group (n = 20) received cryotherapy and phonophoresis as combined therapy (DMT). Intermittent cryotherapy (MacAuley, 2001; Bleakley et al, 2006) using ice pack (16cm x 12cm) was applied directly over the patients conditions for 10 minutes. The ice pack was then removed after the initial 10 minutes application and allowed the treatment part to rest at room temperature for 10 minutes. The ice pack was reapplied immediately following the expiration of the rest period for another 10 minutes (total cryotherapy period = 20 minutes). At the expiration of the second ice pack application the treatment part was cleansed with a towel and continuous ultrasound at an intensity of 2 W/cm^2 and frequency of 1MHz was used to apply 1.5g of 15% methyl salicylate cream thoroughly mixed with 1.5g of aquasonic gel as coupling medium for 6 minutes. The ultrasound head was moved over the part under treatment about one-half $(1\frac{1}{2})$ the width of the transducer at approximately 2 to 4 cm/sec; using small, continuous and overlapping circular movements to avoid or prevent periosteal pain (Santiesteban, 1983). These treatment values or settings were selected to capture both the thermal and non thermal effects of ultrasound in other to optimize transdermal methyl salicylate 15% delivery (Byl, 1995; Cagnie et al, 2003). The subjects in PHONO group (n = 20) received a "live" phonophoresis as a single treatment protocol. The treatment procedure (phonophoresis) was exactly the same as applied in DMT group. All subjects in CRYO group (n = 20) received cryotherapy. Intermittent cryotherapy was applied directly over the subjects? conditions with the same procedure described in DMT group. At the expiration of cryotherapy application, the treatment part was cleansed with a towel Treatments were administered on alternate days in each group until subjects were fit for discharge. At the end of weeks 1, 2, 3 and 4 after treatment in each group, subjects posttreatment pain perception scores (PPS) were assessed and recorded.

Assssment and recording of pre-and post-treatment pain perception scores (PPS) were blinded from the researchers to reduce or eliminate bias (assessment by neutral assessors). Treatments were terminated and subjects discharged in all groups when subjects felt pain was sufficiently relieved and no longer needed treatment.

STATISTICALANALYSIS

Descriptive and inferential statistics using the Statistical Packages for the Social Sciences (SPSS) was used for data analysis. Independent and paired mean difference tests (t - test) were used to compute subjects repeated measures within all groups while a one - way ANOVA (Klaiman et al, 1998) was used to compute measures across the groups with the level of significance for all tests set at 0.05.

RESULTS

Two hundred and seventy-five (275) treatment sessions were recorded in all the groups - 72 (26.2%) was recorded in the DMT group, 105 (38.2%) recorded in the PHONO group while the CRYO group recorded 98 (35.6%) respectively. The result indicates no statistical significant (P>0.05) difference in the mean treatment sessions between the three groups. The number of subjects discharged on or before completion of treatment term in all the three groups is presented in Table 1. While all subjects were fit for discharge without necessarily completing the 12 sessions of treatment (initially designed for the study) in DMT group, 5% (1) of the subjects in CRYO and PHONO groups received the full term treatment (i.e. 12 sessions of treatment) respectively. Nineteen (95%) subjects in the DMT group were fit for discharge after receiving treatment for 1 to 5 sessions. Only 12 (60%) and 13 (65%) subjects in PHONO and CRYO groups respectively were fit for discharge after the same duration of treatment. While no subjects were fit for discharge in the PHONO group after receiving 1 to 2 treatment sessions, the DMT and CRYO groups recorded 6 (30%) discharges respectively. Furthermore, at the completion of 10 sessions of treatment, DMT group had discharged all subjects (100%) pain free while PHONO and CRYO group recorded 95% discharges respectively.

Table 1: Subject Discharge Pattern

Number of sessions	Number of discharged subject/group		
on discharge	DMT	PHONO	CRYO
1-2	6(30%)	0	6(30%)
3-5	13(65%)	12(60%)	7(35%)
6-10	1(5%)	7(35%)	6(30%)
12	0	1(5%)	1(5%)

DMT=Double-Modality Therapy (Phonophoresis + Cryotherapy), PHONO = Phonophoresis, CRYO = Cryotherapy

Table 2. Comparison of	pain Perception Scores
------------------------	------------------------

GROUP	PAIN PERCEPTION SCORES	
	Pr - Trainert	Post – Treatment
	Base 15	Mean \pm SD
DMT ($n = 20$)	5.50 ± 0.89	$1.95 \pm 0.76*$
PHONO(n = 20)	5.05 ± 0.69	$1.85 \pm 0.81*$
CRYO $(n = 20)$	5.20 ± 1.24	$2.50 \pm 1.15*$

DMT=Double-Modality Therapy (Phonophoresis + Cryotherapy), PHONO = Phonophoresis, CRYO = Cryotherapy *=P<0.05

Table 2 shows that the three modalities (DMT, PHONO and CRYO) were equally and significantly (P < 0.05) effective in producing optimal pain relief among the subjects and no group was superior to the other. No subject complained of any discomfort or adverse effect; such as periosteal pain, skin allergy, frostbite or nerve palsy; instead the subjects reported treatments were effective, tolerable and pleasant. All subjects felt satisfied with their level of pain relief and requested for discharge accordingly.

DISCUSSION

The use of phonophoresis and cryotherapy in isolation or in combination with other therapies in the management of repetitive strain injury has been widely reported. They are widely used regimen for reducing pain, inflammation and improving function. On the contrary, the use of phonophoresis and cryotherapy as combine therapy (DMT) protocol has gained general acceptance and popularity in the clinical setting, but there is no existing clinical trial in the literature to suggest or indicate its efficacy (Ball, 2002). This study is the first that has reported with empirical data the efficacy of DMT. The study has further indicated that DMT was not superior to the single treatment protocol of phonophoresis or cryotherapy which has debunked the belief that has been probably or largely based on anecdotal evidence (Santiesteban, 1983; Balogun, 1990).

The groups did not show significant difference in the overall discharge pattern. The DMT group discharged all subjects (100%) after 10 sessions of treatment while PHONO and CRYO group discharged 95% of their subjects who were pain free. However, the discharge pattern in the DMT group suggests it might take fewer sessions (about 5 sessions) to treat and make more than 90% of the subjects with the type of repetitive strain injury (RSI) included in this study pain free, side effect free and fit to return to active performance. The fewer treatment sessions may be an advantage for the subjects (patients), the employer and the clinician. On the part of the subjects, absenteeism from work to keep hospital treatment appointments and subsequent loss of work

hours is minimized; while the workload usually experienced by the clinician may be reduced. On the other hand, with the pressure to treat athletes who sustained RSI safely and efficiently in order to get them back to effective performance as quickly as possible (Hubbard et al, 2004), DMT protocol may have an edge or advantage over other modalities.

Phonophoresis and cryotherapy have demonstrated significant pain relief among the subjects in this study which has corroborated the works of Klaiman et al (1998), Kozanoglu et al (2003), and Hubbard and Denegar (2004). This has further reduced the inconsistency or controversies associated with the level of efficacy of the modalities. Phonophoresis simply produces thermal effect from the ultrasound which increases kinetic energy of molecules in the drug and in the cell membrane, dilates points of entry such as hair follicles and the sweat glands, and increases the circulation to the treated area (Byl, 1995; Cagnie et al, 2003). These physiological changes enhance the opportunity for drug molecules (e.g methyl salicylate 15%) to diffuse through the stratum corneum (SC) and be collected by the capillary network in the dermis (Byl, 1995), thereby initiating pain relief. The mechanism by which cryotherapy decreases pain after injury is however a contentious issue (Bleakly et al, 2006). Pain relief with cold application could be due to altered nerve conduction velocity (NCV), inhibition of nociceptors, etc. (Algafly and George, 2007; Herrera et al, 2010). Intermittent cryotherapy application helps sustain reduced muscle temperature without compromising the skin and allows the superficial skin temperature to return to normal while the deeper muscle temperature remains low (MacAuley, 2001).

The current study has indicated significant therapeutic efficacy of DMT, but it was not superior to the single treatment protocol of phonophoresis or cryotherapy. However, the discharge pattern in the DMT group suggests it might take fewer sessions (about 5 sessions) to treat and make more than 90% of the subjects with the type of repetitive strain injury (RSI) included in this study pain free, side effect free and fit to return to active performance.
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A STUDY TO FIND OUT THE EFFECTIVENESS OF VESTIBULAR REHABILITATION IN IMPROVING DAILY LIFE FUNCTIONS IN ELDERLY (60-75)

Mamta Sehrawat *

ABSTRACT

Background of the study: EIB is a condition which can affects the elite and recreational athletes at any level. An athlete suffering from EIB may present with the several complaints during exercise. Spiro metric parameters such as FEV1 and PEF can be used as main diagnostic tools for EIB. Recognition of EIB helps in subsiding complications and improving the health of the athlete, it could help in providing better conditions for athletes with asthma considering the prophylactic and therapeutic use.

Aim and Objective of the Study: The main aim of the study is to evaluate the effect of exercise (free running) on bronchospasm in the football players of Punjab State Universities by measuring the pulmonary functions parameters such as FEV1, PEF/MMEF at different intervals of exercise.

Methodology: This is an observational cross sectional study. In this study, 107 elite football players of 17 to 25 years of age from the 3 State Universities of Punjab were taken on the basis of inclusion criteria. Then Spiro metric parameters (FEV1, PEF/MMEF) were recorded at pre, post 5 minutes and post 12 minutes of exercise. Mean standard deviation and percentile was used to prepare summary statistics. Unpaired t - Test was the tool for statistical analysis at the p < 0.05 level of significance between the various demographic parameters.

Results: The total prevalence of EIB among the 3 State Universities was found to be 18.69%.

Conclusion: It is concluded from the study that elite football players are prone to EIB, and the possible cause can be the temperature, relative humidity, duration and intensity of exercise. Players should take some effective measures such as warm up, stretching prior to the game in order to prevent themselves from EIB. **Key words:** EIB, spirometery, pulmonary functions, FEV1, PEF/MMEF

OBJECTIVES:

To find out the effectiveness of vestibular rehabilitation in improvement of daily life functions in elderly (60-75)

DESIGN:

SETTING:

Randomized control trial is conducted to examine the association between the vestibular disability and vestibular rehabilitation. 50 subjects including both sexes will be taken who can understand instructions and were not suffering from neurological disorders such as stroke, parkinsonism etc. Shramjeevi Physiotherapy department in Udaipur

Aggrawaldharmshala Physiotherapy department in Udaipur

In and around my locality

SUBJECTS:

50 subjects of both sexes with age group 60 to 75

Subjects who can understand instructions, Cooperative subjects, ABC scale between 10-90.

MAIN OUTCOME MEASURES:

- 1. Activities of daily living
- 2. ABC (The Activities-specific Balance Confidence)

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scale for Balance

3. Berg-Balance Scale

RESULTS:

Vertigo decreased and independence in activities of daily living improved significantly. Improvement was not affected by age, gender, or history of vertigo.

CONCLUSION:

For many patients a simple home program of vestibular habituation head movement exercises is related to reduction in symptoms and increasing independence in activities of daily living.

Background

Balance is one of those 'ordinary' body functions we do not think about until its disruption. Sit in a violently spinning roller coaster ride for a few minutes, however, and then try to walk upright. You'll become actualy aware that your vestibular system, located in your inner ear has been upset1. The dizziness and nausea you feel are symptoms that the roller coaster ride disrupted the normal functioning of the system that maintains proper balance.

The Vestibular System

The vestibular system, which is a contributor to our balance system and our sense of spatial orientation, is the sensory system that provides the dominant input about movement and equilibrioception. The vestibular sense provides information related to movement and head position and is important for development of balance, coordination, eye control, attention, being secure with movement and some aspects of language development 2,3.

Symptoms of Vestibular Impairment

Disorders of the vestibular system are characterized by vertigo, disequilibrium, disorientation, and blurred vision2.

Vertigo

Vertigo, a specific kind of dizziness, refers to illusion of self-motion, usually described as a sense of spinning or falling, although the person is actually sitting or lying still. Vertigo seems to be caused by an inequality in the signals ascending the vestibular nerves to the vestibular nuclei. When the signals are equal, as is the case for persons without disabilities and for persons with total bilateral vestibular loss, the person doesn't experience vertigo.

Disequilibrium

Disequilibrium refers to poor balance or a sense of being unable to correct postural displacements off the gravitational vertical. Because the vestibular system has projections from the vestibular nuclei to the spinal cord, the system generates postural reflexes that compensate for head movement when the head moves off the center of gravity. Disequilibrium can be caused by loss or impairment of the labyrinthine righting responses, which generates a compensatory postural reflex to maintain the head's upright position in response to movement of the trunk. Disequilibrium is also caused by other kind of sensory loss as well as various orthopedic problems, such as leg-length discrepancy, subluxed bones in the foot, or muscular weakness 5.

Disorientation

Disorientation refers to the sense of not knowing one's location in egocentric space, such as the direction of the gravitational vertical, or one's location in geographical space. Vestibular function is more directly involved in egocentric orientation5.

Blurred Vision

Blurred vision can be caused by an impaired vestibuloocular reflex. This reflex is the compensatory oscillopsia, disequilibrium, blurred vision while moving, disorientation, or a combination of the above. The functional assessment of these patients reflects these problems.

Vestibular Rehabilitation

Vestibular rehabilitation is an exercise approach to the remediation of disequilibrium and dizziness symptoms associated with vestibular pathology.

The aim of vestibular rehabilitation are -

- 1. To decrease dizziness,
- 2. Increase balance function, and

3. Increase general activity level.

The exercises are designed dependent on the impairements identified through evaluation, to promote CNS compensation for the deficits of the vestibular system.

Physiological basis for Vestibular Rehabilitation

Vestibular rehabilitation is based on the following principles:

- 1. Adaptation: It refers to a long term improvement in the vestibular systems ability to adapt to head movement, achieved by the movement of an image across the retina.
- 2. Habituation: It refers to reduction in symptoms and pathological responses produced by repetitive exposure to the provoking stimulus. It is central process. Movements should be

practiced 2 to 3 times per day.

- 3. Substitution: These exercises synthesize the use of vision and somatosensory cues with vestibular cues to enhance central programming to improve gaze stability and postural stability.Pathology within the vestibular system leads to an alteration in the bilateral reliance on sensory information. Patients with bilateral vestibular loss substitute vision and proprioception for use of vestibular information.
- 4. Compensation: Compensation is a gradual process of functional recovery that is probably of central origin11.Patient's with vestibular loss use different compensatory strategies to improve their ability to see clearly during a head rotation12.

VR Exercises 30

1. Basic exercises:

" Shake & Nod; eyes open, eyes closed, visual fixation.

" Progress from sitting, standing, then walking (starting slowly if necessary, increasing speed).

2. General activities:

" ball games, walking on different surfaces or in different places, sports dance and exercise, travel.

3. Special exercises:

" for unsteadiness, turning over in bed, reaching, dealing with different visual patterns / environments.

Aim of Study

To find out the effectiveness of vestibular rehabilitation in improvement of daily life functions

in elderly (60-75)

Need or purpose of study

Purpose of study is to find out the effectiveness of vestibular rehabilitation in improvement of daily life functions in elderly (60-75), suffering from the problem of disequilibrium, blurred vision, disorientation, and vertigo.

Hypothesis

There is significant effect of vestibular rehabilitation in improvement of daily life functions in elderly

Null Hypothesis

There is no significant effect of vestibular rehabilitation in improvement of daily life functions in elderly

Size of sample:

 $50\ subjects\ are\ included$, male and females age group between $60\ to\ 75$

Sample technique:

Randomized control trial

Design of study:

Experimental study

Resource of data:

Orbit Hospital, gurgaon.

Inclusive criteria:

Both sexes with age groupbetween 60 to 75

Subjects who can understand instructions (Cooperative subjects)

ABC scale between 10-90

Exclusive criteria:

- Subjects below 60 and above 75
- Subjects with systemic illness

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. Subjects with neurological conditions

examine the association between the vestibular disability and vestibular rehabilitation. 50 subjects

ABC scale below 10 and above 90

Outcome measure:

- 1. ABC (The Activities-specific Balance Confidence) scale for Balance
- 2. Berg-Balance Scale

Procedure:

Randomized control trial will be conducted to



Cawthorne-Cooksey exercises

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Days	Types of exercises	Frequency	Intensity	Time
0-15 days	Cawthorne Cooksey exercises	Five days/week	Three repetitions daily	10-15 min
	Postural stability exercises		Three repetitions daily	
	General conditioning exercises		Single times a day	
15-30days	Cawthorne Cooksey exercises	Five days/week	Five repetitions daily	15-20min
	Postural stability exercises		Five repetitions daily	
	General conditioning exercises		Twice a day	
30-45days	Cawthorne Cooksey exercises	Five days/week	Five repetitions daily	15-20min
	Postural stability exercises		Five repetitions daily	
	General conditioning exercises		Twice a day	
45-60days	Cawthorne Cooksey exercises	Five days/week	Five repetitions daily	20-30min
	Postural stability exercises		Five repetitions daily	

RESULTS:

There is significant improvement in BMI, fat and hip-waist ratio in middle aged women after the abdominal strengthening exercises.

BMI: 1st day BMI mean as compare to 1st month BMI mean is 28.68 ± 27.58 and S.d. is

 $3.600{\pm}3.59$ and t test is 54.44 and P value is .001.

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ACTIVITIES SPECIFIC BALANCE CONFIDENCE (ABC) SCALE

	Mean	N	Std.	Std.	r	Mean	t	p value
			Deviati	Error		Differen		
			on	Mean		ce		
1stda	56.738	50	21.106	2.98491	.998	1.81800	10.828	.000
у	0		49					
8thw	58.556	50	20.981	2.96724				
k	0		59					





Wiean	05.80
S.D.	4.14

	Mean	Ν	Std.	Std.	r	Mean	t	p value
			Deviati	Error		Differen		
			on	Mean		ce		
1stda	37.020	50	12.397	1.75325	.989	2.90000	10.929	.000
у	0		32					
8thw	39.920	50	11.823	1.67206				
k	0		26					

BERG BALANCE SCALE





7

Result Discussion

Vertigo decreased and independence in activities of daily living improved significantly. Improvement was not affected by age, gender, or history of vertigo.

Limitation of Study :

- " Sample size limited to 50
- " This study is done over female only
- " Age group is between 40-60.

Future Scope:

- " Further study can be done on age group other than 40-60.
- " Further study can be done over males.
- " Other exercises rather than abdominal strengthening can be done for reduction of weight.

CONCLUSION

In this study the aim was to evaluate the effectiveness of abdominal strengthening exercises in reduction of waist circumference in middle aged women. Based on results of statistical analysis, this study found that abdominal exercises reduce the waist circumference in middle aged women. For many patients a simple home program of vestibular habituation head movement exercises is related to reduction in symptoms and increasing independence in activities of daily living.

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SHORT TERM, MID TERM AND LONG TERM EFFECT OF OSTEOPATHIC MANUAL THERAPY (OMT) ON OXYGEN SATURATION IN COPD PATIENTS WHEN COMPARED TO CONVENTIONAL CHEST EXERCISES.

Harish s Krishna * Ivor Peter D'Sa * * Vishnu Sharma *** Himavivekanandan ****

ABSTRACT

Background : Chronic obstructive pulmonary disease is a global health concern and is major cause of chronic morbidity and mortality worldwide. Musculoskeletal changes in COPD are characterized by limitation in thoracic expansion with loss of mobility and movement at costochondral, costotransverse and costovertebral joints, tightness and spasm of intercostal muscles.

Objectives: Aim of the present study was to study the immediate effect of osteopathic mobilization of ribcage on oxygen saturation in patients with COPD.

Methods : 105 males of age group 45 to 70 years who had at least a year history of COPD were divided in to two groups. One group was given osteopathic manual therapy(OMT) technique (65nos) and the other group received conventional home based chest expansion exercises(40nos), intensive spirometry, upper extremity mobilisation exercises. Oxygen saturation was measured using pulse oxymeter post intervention at 30 minutes(short term), post 24 hours(midterm) and 3 months (long term)post.

Results : The values obtained were statistically analysed using the t- test. There was a significant reduction in oxygen saturation in both groups in short term and midterm, but the saturation level improved significantly in long term. There was no significant difference between the improvements among the groups.

Conclusions: Osteopathic Manual Therapy technique and conventional exercises are useful in improving oxygen saturation in patients with COPD but there is no difference seen between the two groups.

Keywords: COPD, Conventional exercises, Osteopathic manual therapy, Oxygen saturation.

INTRODUCTION

COPD is the limitation of airflow that is not fully reversible. The airflow limitation is usually progressive and associated with an abnormal inflammatory response of the lungs to noxious particles, gases. Chronic airflow limitation characteristic of COPD is caused by a mixture of small airway disease (obstructive bronchiolitis) and parenchymal destruction (emphysema), the relative contribution vary from person to person"- the global initiative for chronic obstructive lung diseases (GOLD). Exposure to tobacco smoke is most significant risk factor of chronic obstructive pulmonary disease. The second most risk factor is alpha antitrypsin deficiency and certain occupational exposures.

Chronic obstructive pulmonary disease is a global health concern and is major cause of chronic morbidity and mortality worldwide. American thoracic society has defined COPD as a disease state characterized by the presence of air flow limitation due to chronic bronchitis, emphysema, bronchial asthma and bronchiactasis, the

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air flow obstruction is progressive may be accompanied by airway hyper reactivity and may be partially reversible

Chest physical therapy has an important role in a medical team to assist in resolving critical problems deriving from COPD. The goals of Chest physical therapy in COPD are- clearance of excess secretions, prevention of lung atelectasis and improvement of chest mechanics.

Physical therapy for chronic obstructive pulmonary disease basically aims to relieve bronchial obstruction by postural drainage with percussion, positioning, breathing exercise, autogenic drainage, active cycle of breathing etc. Among the various techniques used as interventions the thoracic lymphatic drainage with and without activation is the vast studied one. Thoracic lymphatic drainage helps in relieving bronchial obstruction as well as reducing residual volume of lungs. In addition to that it helps in better lymphatic drainage. Reviews show the next aim for chest physical therapy is to counteract the musculoskeletal changes in COPD.Musculoskeletal changes in COPD are characterized by limitation in thoracic expansion with loss of mobility and movement at costochondral, costotransverse and costovertebral joints, tightness and spasm of intercostal muscles.

Oxygen saturation refers to the extent to which haemoglobin is saturated with oxygen. Hemoglobin is an element in the blood that binds with oxygen to carry it through the blood stream oxygen saturation level usually measured through pulse oxymeter and is normally 95-100%. In patients with COPD, however the oxygen saturation level leads to drop below normal, especially where they are exerting themselves.

To check the devastating complications of COPD which adversely affects the lung function, different treatments should be well coordinated to improve lung expansion by increasing the rib cage mobility.Use of osteopathic mobilization of rib cage(cost vertebral and thoracic facet joints) and intercostals muscle stretching for COPD has a long tradition among osteopathic professionals but remains a novel approach in the larger biomedical community. Only a very few a studies have attempted to measure the effect of such procedures in pulmonary function tests.(journal of manipulative physical therapy). Even though the patients undertook osteopathic treatment for COPD reported reduce work of breathing and the immediate effects of the techniques are contradictory. Various studies proved that the residual volume of the lungs were more when checked within 30 minutes after the treatment.

Traditional CPT s an invariable component is thoracic lymphatic drainage. This technique has been extensively studied and used by treating physicians and physical therapists. The technique was first described by Miller in 1927. It was specifically developed to improve the antibody response in the body through increased lymphatic flow, to improve the forced expiration ratios. The immediate effects of thoracic lymphatic drainage without activation and osteopathic techniques (rib cage mobilization, intercostals muscle stretch)according to an extensive literature review are found to be contradictory. The immediate effects of thoracic lymphatic drainage without activation and osteopathic techniques (rib cage mobilization, intercostals muscle stretch) on lung function s were not studied separately. The aim of the study was to investigate the immediate(30 minutes) effect of osteopathic manual therapy and conventional treatment on oxygen saturation among chronic lung disease patients.

MATERIALS AND METHODS:

105 Subjects were selected from the population group satisfying the inclusion criteria from the patients of the department of general medicine, respiratory medicine of AJ hospital and research centre, and two old age homes in Mangalore by using purposive sampling. Informed consent was obtained from the subjects before recruiting in the study. The subjects were randomly assigned to two group: Group A (Intervention group, subjects who receives OMT) and Group B. (control group, subjects who receive conventional treatment). The subjects of intervention group received the osteopathic manual therapy (OMT) and the control group received conventional chest expansion exercises, incentive spirometry, and upper extremity mobilization exercises.Pre and immediate post treatment oxygen saturation was measured using a finger pulse oximetry (OXYCHECK tm). The inclusion criteria for the study were males between age group 45-75 years, with minimum of one year history of chronic lung disease. (Referred by the pulmonologist). The subjects with acute illness, infections, fracture- rib/ thoracic vertebrae, other permanent orthopaedic chest wall/ thoracic vertebral deformities were excluded from the study.

OMT application technique:



Thoracic vertebral P-A glides - (pic-1)

Patient was asked to sit erect without back support at the edge of the bed. The therapist s arm supported the patient s head and neck from anterior for upper 3 thoracic spines andtherapist's trunk supported the patient s body from behind. For mid and lower spine movements the anterior support was given over the sternum by keeping a roll of cloth between the support hand and the sternum. Using thumb and V grasp the therapist performed graded P-A glides (small and large amplituderhythmic oscillations at the beginning and at the end of the range)through thespinous process of the first till 12th thoracic vertebrae.13

Rib glidings.

The therapist stood behind the patients and supports subject s left trunk. The web space of the therapist s right hand contacts the posterior border of the right first rib. The therapist's hand is rolled slightly backward to position the trapezius muscle out of the way. While the therapist's left arm supports patients head and neck, move through an arc of flexion and extension to locate neutral position. The therapist's right arm guides a right to left translator movement at T1 while concurrently gently right side bending the patients neck, which encourages left rotation at T1. Thepatient was asked to take a deep breath and exhale. During exhalation the therapist provided small amplitude rhythmic oscillations at the beginning of the range. The same procedure was repeated for the left side.13



Ribs-1 and 2-(for right side)-(pic-2)



Ribs-3-12(for rightside)(pic-3)

Subject was made to sit at the edge of bed, therapist stood behind the patient. The therapist grabs the patient's right upper extremity, therapist s right hand thumb and index finger glides over the lower ribs in cranial direction with inspiration. The movement was held for 7-10 seconds and repeated several times.

Conventional breathing and chest expansion exercises, upper extremity ROM exercises:

This included the following exercises -

- 1. Diaphragmatic breathing exercise
- 2. Segmental breathing exercises- lateral costal expansion, posterior basal expansion, lingual expansion, apical expansion,
- 3. Side bendings with inspiration, trunk rotations with inspiration.
- 4. Upper extremity abduction, flexion with inspiration and expiration.
- 5. purse lip breathing
- 6. Incentive spirometry-

The subject was seated in semi upright position. The patient was asked to take 3 to 4 slow easy breathes and maximally exhale the fourth breath. The spirometer was

then placed in the mouth and the patient was asked to maximally inhale through the spirometer and hold the inspiration for several seconds. The patient was asked to repeat it 5 to 10 times per day.

DATAANALYSIS:

Following statistical formulae were used for data analysis:

Mean which is the simplest measure of central tendency. Standard deviation is defined as the square root of the average of square deviations. Unpaired t -test is applied to unpaired data of independent observation made on individuals of two different or separate groups or sample drawn from two populations.Paired t-test is applied to paired data of independent observation from one sample only when each individual gives a pair of observations.

RESULTS: MEAN VALUES Table-1/ graph-1

OXYGEN	GROUP	-A	GROUP-B			
	MEAN	SD	MEAN	SD		
PRE	97.4366	1.19203	97.4906	1.10284		
MIN30	97.3662	1.13691	96.8679	1.17731		
HR24	97.4085	1.11583	97.0943	1.18101		
MONTH3	97.7887	.92452	97.8679	.83292		



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For gr-A- the mean values decreased slightly post 30min of treatment and continue to increase 24 hours post and 3 months post.

For gr-B- the mean value has decreased significantly after 30 minutes and increased after 24 hours and 3 months. For both the groups the mean values reduced immediately after treatment.

PRE POST COMPARISON-GROUP-A

GROUP-A	AVERAGE	T-VALUE	P-VALUE	RESULT
PRE-MIN30	.07042	.608	.545	NS
PRE-HR24	.02817	.266	.791	NS
PRE-MONTH3	.35211	2.772	.007	SIG
MIN30-HR24	.04225	.297	.768	NS
MIN30-MONTH3	.42254	2.661	.010	SIG
HR24-MONTH3	.38028	3.101	.003	SIG

Table Graph - 2

THE GRAPH SHOWS THE AVERAGE OF MEAN DIFFERENCE IN OXYGEN SATURATION





For group-A even though the saturation Pre- 30 min post- the values decreased ,but its not statistically significant, which again continued so fromPre- 24 hrs post. But Pre- 3 months post- there is a significant improvement in saturation.

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GROUP-B	AVERAGE	T-VALUE	P-VALUE	RESULT
PRE-MIN30	.62264	5.271	.000	SIG
PRE-HR24	.39623	2.547	.014	SIG
PRE-MONTH3	.37736	2.735	.009	SIG
MIN30-HR24	.22642	1.218	.229	NS
MIN30-MONTH3	1.00000	6.187	.000	SIG
HR24-MONTH3	77358	4.561	.000	SIG

PRE POST COMPARISON- GROUP-B Table-3/ graph-3

THE GRAPH SHOWS THE AVERAGE OF MEAN DIFFERENCE IN OXYGEN SATURATION



With in group difference

In group-B Pre- 30 min post there was a significant reduction in saturation and continued so during Pre- 24 hours, but better than 30 min post. Pre-3 months post- there is a significant improvement in saturation.

OXYGEN	GROUP	MEAN	SD
PRE-MIN30	А	.0704	.97576
	В	.6226	.85993
PRE-HR24	А	.0282	.89398
	В	.3962	1.13238
PRE-MONTH3	А	3521	1.07036
	В	3774	1.00434
MIN30-HR24	А	.0423	1.20044
	В	.2264	1.35365
MIN30-MONTH3	А	.4225	1.33804
	В	1.0000	1.17670
HR24-MONTH3	А	.3803	1.03325
	В	.7736	1.23478

BETWEEN GROUP COMPARISON Table-4/graph-4

Table - 5

OXYGEN	T-VALUE	P-VALUE	RESULT
PRE-MIN30	3.278	.001	SIG
PRE-HR24	2.022	.045	SIG
PRE-MONTH3	.133	.894	NS
MIN30-HR24	.800	.425	NS
MIN30-MONTH3	2.501	.014	SIG
HR24-MONTH3	1.928	.056	NS

The Graph Shows The Comparison Ofaverage Mean Difference In Oxygen Saturation Between The Groups



Between group difference-

PRE- 30 MIN POST and Pre- 24 hours post - both groups the values decreased but gr-A s reduction is not significant when compared to group-B. Pre- 3 months - both groups the value increased considerably but no difference between the groups.

Discussion

COPD is a condition which has many systemic manifestations. The correlation of COPD with changes in blood pressure, heart rate and respiratory rate is well documented. The baro and chemoreceptors which alerts during hypoxemia and hypercapnia is less responsive in COPD patients. The saturation level in COPD patients are maintained by an elevated respiratory rate. The saturation fell down drastically in both groups after the session.when compared the fall was more with conventional group. The fall in saturation is best explained with exercise induced spasm which happened with both treatments. All the patients undergone the study reported an elevated breathing strain immediately after the treatment , which disappeared later. This is common after chest mobilizations and breathing exercises. but there was no additional benefits reported for patients undergone OMT session. Both the groups had a better saturation level than pre sessions after 3 months of regular exercises. when compared between the groups the conventional treatment group s saturation level was better when compared to OMT group. This study explains the benefits of regular breathing exercises for COPD.

Conclusion

The study was initiated to understand the effectiveness of osteopathic manual therapy in COPD patients. It is done in 105 patients in two groups one

undergone OMT sessions, second with conventional physical therapy breathing exercises. oxygen saturation was measured prior to session, 30 minutes,24 hours, and 3 months post treatment sessions. For both the groups saturation fell down immediately after the session, but the conventional group s reduction was more than OMT ones.and regained by 24 hours and by 3 months of regular rehabilitation. Even though the saturation level was better than the pre session readings for both the groups,the conventional group s level was better than OMT one. This study shows the effectiveness of regular exercises in the betterment of COPD patients.

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