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Effectiveness of ischemic compression v/s myofascial release on myofascial trigger point of upper trapezius.

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ABSTRACT

Myofascial trigger point is a hyperirritable spot, usually within a taut band of skeletal muscle or in the muscle fascia which is painful on compression and can give rise to characteristic referred pain and motor dysfunction. The aim of this study was "Effectiveness of Ischemic compression v/s Myofascial release on myofascial trigger points of upper trapezius". The study design was Experimental. Patients (*n* = 30) were randomly assigned to group a (*n* = 15) treated with myofascial release and cryotherapy and group b (*n* = 15) treated with ischemic compression and cryotherapy and they were assessed at baseline and after 7 days. Outcome measures included pain intensity by visual analog scale and neck disability index. Statistical analysis was done using paired t-test. Post treatment analysis suggests significant result among groups. The ischemic compression (group B) shows greater significant improvement in vas (p=0.0001), neck disability index (p=0.0001) compared to myofacial release (group A).The result shows that there is significant between ischemic compression and myofascial release in reducing pain of trigger point upper trapezius. Ischemic compression shows greater effectiveness as compared with Myofacial release in treatment of trigger point pain of upper trapezius.

Keywords: Ischemic compression, Myofacial release, Myofascial trigger point, Upper trapezius, Visual analogue scale.

INTRODUCTION

Neck pain can have an insidious (mechanical) or traumatic onset. Mechanical neck pain is defined as pain in the cervical spine and shoulder area with symptoms provoked by neck postures, movements, or palpation of the cervical muscles. Neck pain constitutes a significant health care problem affecting 45% to 54% of the general population [1].

This myofascial pain syndrome clinically presents as referred pain, limitation in joint range of motion and a twitch response which is caused due to mechanical deformation of facial and muscular areas known as myofascial trigger points (MTPts). A high percentage of muscular pain leads to myofascial pain syndromes. [2]

Myofascial pain syndrome is a complex pain disorder characterized by a steady dull ache referring to a specific reference zone from a myofascial trigger point (Mtrp) within a palpable band of muscle. abnormal stresses on the muscles from sudden stress on shortened muscle, skeletal asymmetry are thought to be common causes of myofascial pain. Poor posture, assumption of a static position for a long period also has been implicated in myofascial pain [3]

Myofascial trigger point is hyper irritable spot located within a taut band of skeletal muscle that is painful on compression or on stretch and that can give rise to a typical motor, sensory and autonomic component motor aspect include disturb motor function , muscle weakness muscle stiffness and restricted range of motion . Sensory aspects include local tenderness referral pain peripheral and central sensitization. [4]

Trigger points form in the muscle's fibres, close to the motor end plate (neuromuscular junction). Excess acetylcholine (Ach) is released at the synapse, usually associated with overuse or strain, leading to release of calcium. Resulting ischemia creates an O2 deficit and energy crisis without available ATP, calcium ions, which are keeping the gates open for ach to keep flowing, cannot be removed. A chemically sustained contracture (without motor potentials) is different from a contraction (voluntary with motor potentials) and a spasm (involuntary with motor potentials). Actin myosin filaments shorten in the area of the motor endplate. A contracture "knot" forms the characteristic trigger point nodule. The remainder of the sarcomeres of that fibre are stretched, creating the palpable taut band. [5]

The initial change in muscle that is associated with myofascial pain seems to be the development of the taut band, which is in term a motor abnormality. Several mechanisms have been hypothesied to explain this motor abnormality, the most accepted one is the "Integrated Hypothesis" first developed by Simmons. Later expanded by Gravin and Simmons' integrated hypothesis is a six-link chain that starts with the abnormal release of acetylcholine. This triggers an increase in muscle fibre tension (formation of taut band). The taut band is thought to constrict blood flow that leads to local hypoxia. The reduced oxygen disrupts mitochondrial energy metabolism reducing ATP and leads to tissue distress and the release of sensitizing substances. These sensitizing substances lead to pain by activation of nociceptors and also lead to autonomic modulation that then potentiates the first step: abnormal acetylcholine release.

Grewin expanded this hypothesis by adding more specific details. He stated that sympathetic nervous system activity augments acetylcholine release and that local hypoperfusion caused by the muscle contraction (taut band) resulted in muscle ischemia or hypoxia leading to an acidification of the pH. The prolonged ischemia also leads to muscle injury resulting in the release of potassium, bradykinins, cytokines, ATP, and substance P which might stimulate nociceptors in the muscle. The end result is the tenderness and pain observed in myofascial trigger points. Depolarization of nociceptive neurons causes the release of. Calcitonin gene related peptide CGRP inhibits acetylcholine esterase, increases the sensitivity of acetylcholine receptors and release of acetylcholin eresulting in SEA. In recent studies Shah et al. confirmed the presence of these substances using microdyalisis techniques at trigger point sites. Elevations of substance P, protons (H+), CGRP, bradykinin, serotonin, nor epinephrine, TNF, interleukins, and cytokines were found in active trigger points compared to normal muscle or even latent trigger points. The pH of the active trigger point region was decreased as low as pH 4 (normal pH value is 7,4) causing muscle pain and tenderness as well as a decrease in acetylcholine esterase activity resulting in sustained muscle contractions. [6]

Trapezius being one has to act continuously to hold the head in upright position thus prone for formation of latent trigger point, which with use of inefficient posture like chin forward posture, emotional stress can get activated to become active trp. Location of trigger point in upper trapezius is mid-way between C7 spinous process & acromion. [7]

The mildest symptoms are caused by latent trigger point that cause no pain but cause some degree of functional disability. More severe involvement results in pain related to the position

of the muscle or muscular activity. The most severe level involves intermittent or continuous pain at rest. [8]

Ischemic compression a manual therapy technique, works on same principle of applying sustained pressure to the trigger point and easing the muscle tension. The compression is gradually applied with the finger, thumb, elbow relatively to how much the patient can tolerate and maintained for as long as 90 seconds. [9]

Various physiotherapy protocols have been advocated in the past like rest, heat, US, MWD, TENS spray and stretch and post- isometric relaxation in treatment of trapezius spasm. These treatments give temporary relief. There are no supporting controlled studies in decreasing pain which arise from trigger point. Myofascial release is a soft tissue mobilization technique is defined as the facilitation of mechanical, neutral and psycho-physiological adaptive potential as interface via the myofascial system. [10]

Hence the study was done effectiveness of ischemic compression v/s myofascial release on myofascial trigger point of upper trapezious.

MATERIAL & METHODOLOGY

The subjects from an institutional based Orthopedic and Physiotherapy in clinical practice referred by orthopedic consultant with neck pain were screened by a Therapist. The included subjects were of age group 20-35 years, pain from last one month, limitation of neck movements due to pain, both male and female, palpable tender spot in the upper trapezius muscle. They were excluded History of cervical spine surgery, Skin diseases and lesions in the area of trapezius, Any sensory disturbances in the trapezius region, Neck and back deformities like torticollis, scoliosis,

Informed consent was obtained from all subjects. Demographic data were collected from the subjects. Pre participation evaluation form consisted of chief complaint, history, VAS, disability by using neck disability index. Then the subject was asked to mark a visual analogue scale with the average pain intensity for their pain. Examiner then palpated the region of upper trapezius and marked all the trigger points that matched the inclusion criteria.

Sampling technique

All 30 subjects were randomly assigned and divide into two groups. Groups: Group-A (n=15) MFR + cryotherapy, Group-B (n=15) ischemic compression+ cryotherapy.

Assessment of pain

The Neck disability index (NDI) is designed to measure neck specific disability. The questionnaire has 10 items concerning pain and activities of daily living including personal care, lifting, reading, headaches, concentration, work status, driving, sleeping and recreation. The measure is designed to be given to the patient to complete and can provide useful information for management and prognosis those with neck pain.

Visual Analogue Scale which is a 10cm scale provided to the patient with two base references of “no pain” and “severe pain”. The patient is asked to place a perpendicular line on the VAS scale that represents their pain intensity.

Interventions

Myofascial release

Myofascial release was given to the upper trapezius with using ulnar border of both palms of the therapist (Figure 3). At that time patient was in position of side flexion of cervical spine to opposite side.

Ischemic compression

Subjects treated with ischemic compression in sitting Patients was placed supine on the couch with his head fully on the surface of the couch, to reduce tension in the upper trapezius muscle. [10] Arm was positioned in slight shoulder abduction with the elbow bent and their hand resting on their stomach. To perform this IC to the upper trapezius, therapist stands at the head of the couch. First, using a pincer grasp moved throughout the fibres of the upper trapezius and made note of the any active trigger points. To locate a trigger point, palpate the muscle to feel for a taut band or a twitch response in the muscle belly. A common location of upper trapezius trigger points is in the middle of the muscle belly, approximately 1 to 2 inches medial to the acromion process of the scapula. Once located on the trigger point, apply an IC by gradually applying pressure to the trigger point with your thumb. The patient will likely feel referred pain in

a question mark pattern (along the back of the neck, around the side of the head, and then a focused pain right behind the eye). Keep in communication with the patient, checking to ensure that in staying within the limits of his pain tolerance. Hold this technique for approximately 20 seconds to 1 minute, patient tells you that pain has diminished, or until feels the muscle fibre begin to relax under your pressure. Once feel this release, gradually release pressure. All identified trigger points was treated. Then apply a few effleurage strokes to flush out the area and follow up with a passive stretch to the muscle. This was repeated for three to five times for three sessions per week for 7 days.

Cold pack

Cold pack was given over upper trapezius region in sitting position for 20 Minutes.

Outcome measures

The effectiveness of treatment was assessed by conducting two measurements. The subjective pain assessment was taken by visual analogue scale (VAS) which is reliable for disability in patients with chronic musculoskeletal pain and neck disability index**.** Physiotherapist ''A'' who was blinded to group allocation, took all post treatment outcome measures at end of 7 sessions.

Statistical analysis

All statistical analysis was done using instat software. Normality of data was checked by using paired t-test. Among two groups VAS & NDI scores were following the normality test significant was set at p=0.05. Descriptive analysis was used to calculate mean and standard deviation.

RESULT

Table 1 = GROUP A NDI

NDI	MEAN		S.D		P VALUE	T VALUE	RESULT
	PRE	POST	PRE	POST			
Pain intensity	2.26	1.13	0.96	0.63	0.0001	5.264	Extreamly significant
Personal care	0.73	0.13	0.45	0.35	0.0004	4.583	Extreamly significant
Lifting	1.6	0.6	1.45	0.82	0.0059	3.240	Very significant
Reading	1.13	0.46	0.74	0.63	0.0124	2.870	Significant
Headache	0.66	0.06	0.97	0.25	0.0335	2.358	Significant
Concentration	1.2	0.26	1.14	0.59	0.0035	3.500	Very significant
Work	1.46	0.8	1.12	0.77	0.0359	2.320	Significant
Driving	0.06	0.33	1.03	0.61	0.0032	3.556	Very significant
Sleeping	0.53	0.2	0.83	0.41	0.0961	1.784	Quite significant
Recreation	1.66	0.13	1.03	0.35	0.0011	4.090	Very significant

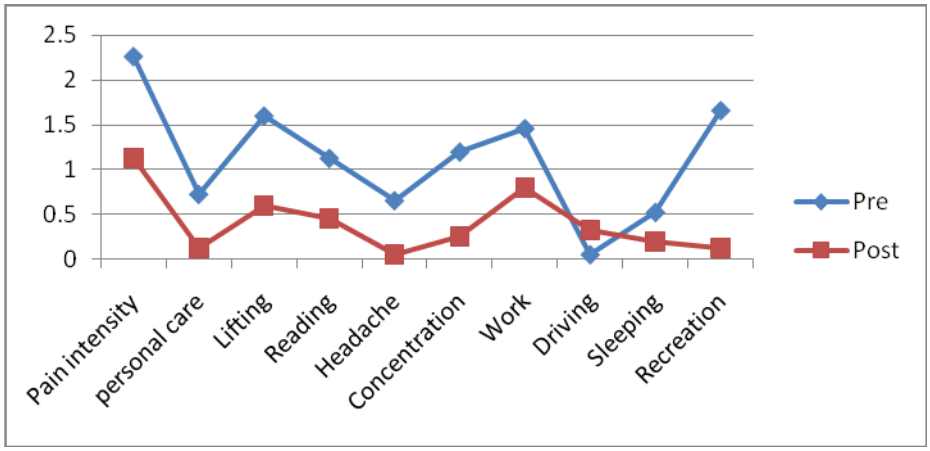


Table 2 NDI GROUP B

NDI	MEAN		S.D		P VALUE	T VALUE	RESULT
	PRE	POST	PRE	POST			
Pain intensity	2.26	0.86	0.96	0.51	0.0001	5.501	Extreamlysignificant
Personal care	0.66	0.06	0.48	0.25	0.0004	4.583	Extreamly significant
Lifting	1.6	0.26	1.45	0.59	0.0006	4.394	Extreamly significant
Reading	1	0.2	0.75	0.56	0.0004	4.583	Extreamly significant
Headache	0.66	0.06	0.97	0.25	0.0335	2.358	Significant
Concentration	0.86	0.26	1.12	0.59	0.0070	3.154	Very significant
Work	1.2	0.26	1.01	0.45	0.0021	3.761	Very significant
Driving	0.86	0.2	1.12	0.56	0.0271	2.467	Significant
Sleeping	0.53	0.13	0.83	0.35	0.1109	1.702	Not significant
Recreation	1.13	0.13	0.99	0.35	0.0002	5.123	Extreamly significant

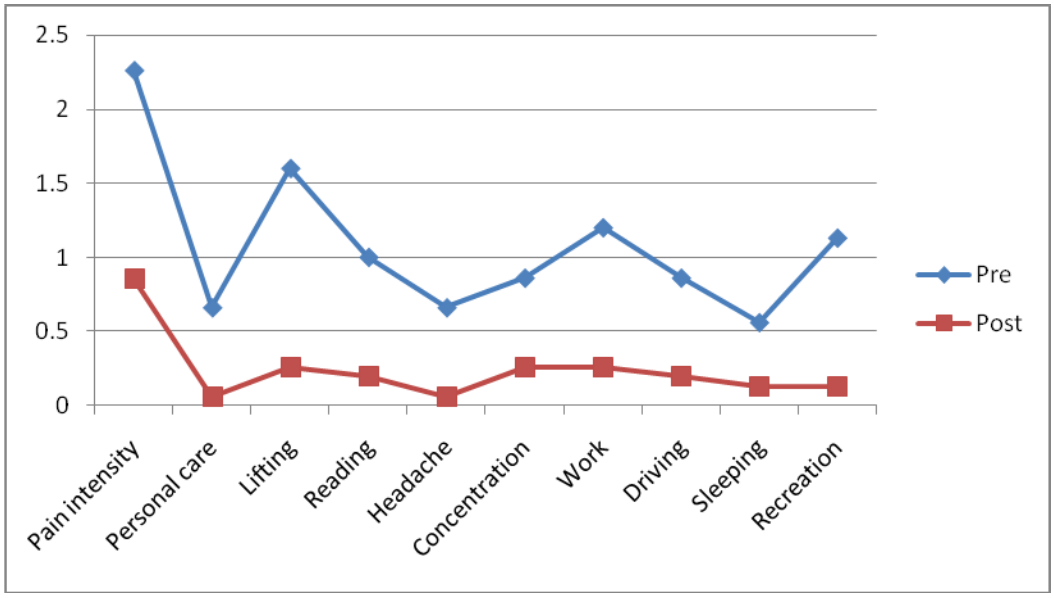


Table 3 = NDI total

NDI	GROUP A		GROUP B	
	PRE	POST	PRE	POST
MEAN	11.8	4.13	10.8	2.46
SD	4.79	3.46	4.82	2.92
P VALUE	0.0001		0.0001	
T VALUE	8.074		9.018	
RESULT	Extreamly significant		Extreamly significant	

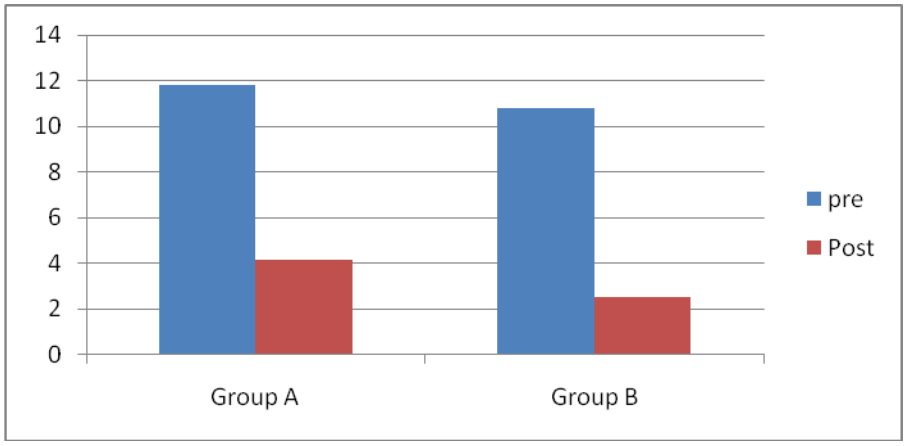
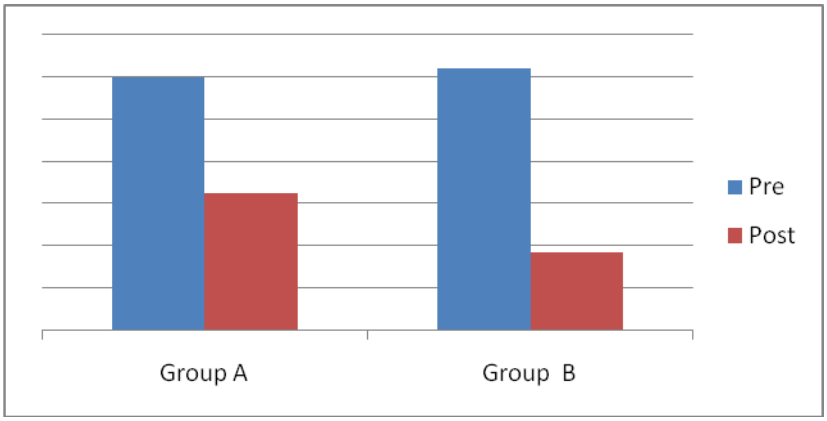


Table 4 = VAS Scale

VAS SCALE	GROUP A		GROUP B	
	PRE	POST	PRE	POST
MEAN	6	3.26	6.2	1.86
SD	1.30	1.53	1.52	1.35
P VALUE	0.0001		0.0001	
T VALUE	8.271		10.013	
RESULT	Extreamly significant		Extreamly significant	



DISCUSSION

Mechanical neck pain is defined as pain in the cervical spine or shoulder area with symptoms provoked by neck postures, movements, or palpation of the cervical muscles. Neck pain constitutes a significant health care problem affecting 45% to 54% of the general population [11].

Ischemic compression is a technique which use in physical therapy, where blockage of the blood in an area of the body is deliberated made so that resurgence of blood flow ill be occureupon release. Ischemic compression is commonly applied to trigger point, where enough sustained pressure is applied to a trigger point with a tolerable amount of pain, and as discomfort is reduced, additional pressure is gradually given [12].

Myofascial release (MFR) is an alternative therapy that claims to treat skeletal muscle immobility and pain by relaxing contracted muscles, improving blood and lymphatic

circulation, and stimulating the stretch reflex in muscles [13].

Ahmed sami mohamed et al says that ischemic compression is help in relieving pain .but there are few study which suggest the comparison effect. hence the study to compare the effectiveness of ischemic compression v/s myofacial release .

30 sample were randomly selected and divided into two group. Group a treated with MFR with cryotherapy. There was used two outcome measure, neck disability index and visual analogue scale the study was done with student pair t-test

Group A –In neck disability index the study shown there is extremely significant result in pain intensity and personal care (p=0.0001, p= 0.0004) and very significant result was lifting, concentration, driving , recreation (p=0.0059, p=0.0035, p=0.0032, p=0.0011).

There is significant result in reading, headache, work (p=0.0124, p=0.0335, p=0.0359) but there is quit, Significant result in sleeping (p=0.0961).The total scoring of neck disability index the result was shown Group B- Treated with ischemic compression with cryotherapy the result was shown in neck disability index extremely significant in pain intensity, personal care, lifting, reading, recreation (p=0.0001, p=0.0004, p=0.0006, p=0.0004, p=0.0002) but in concentration and work shown very significant result (p=0.0070, p=0.0271) and significant in headache , driving (p=0.0335, p=0.0271) but in sleeping not significant result was found(p=0.1109).

In Group A and Group B, its overall effectiveness on neck disability total scoring was found after treatment which shows $P = 0.001$ which is significant

In visual analogue scale the study was extremely significant (p=0.0001). After intervention it was observe that both ischemic compression as well as myofascial release are useful for trigger point release which was proved significant but on comparison Ischemic compression is more superior than Myofascial release.

CONCLUSION

There is significant of ischemic compression v/s myofascial release in reducing pain of trigger point upper trapezius. But Ischemic compression is more effective as compared with myofascial release in treatment of trigger point pain of upper trapezius.

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