Original

COMPARISON OF POST ISOMETRIC RELAXATION WITH MCKENZIE EXERCISES WITH RESPECT TO NECK PAIN AND RANGE OF MOTIONIN NONSPECIFIC NECK PAIN

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Abstract

Keywords: post isometric relaxation, McKenzie exercises, nonspecific neck pain

Introduction: Nonspecific neck pain is defined as mechanical pain that occurs anywhere between the occiput and upper thoracic spine and surrounding muscles without any specific ideology. McKenzie is frequently used to treat spine-related ailments, as patients frequently have complaints in their extremities that started in the spine. Centralizing the symptoms back to the spine is the aim. The migration of symptoms from the distal to the proximal parts of the body is known as centralization. Post Isometric Relaxation (PIR) is the result of a brief submaximal isometric contraction of a single muscle or group of muscles, followed by a decrease in muscular tone. Autogenic inhibition is the basis for PIR's operation.

Method: Subjects are derived from Doon paramedical (PG) college, Dehradun (Uttarakhand). Including 12 males and 24 females in the age group of 25 to 40 years was included in the study after obtaining informed consent. Out of 36 subjects, 18 subjects participated in group A and 18 subjects participated in group B. Treatment was given alternatively for 4 days a week and was followed for 3 weeks. Each session lasted for 30 minutes. All the subjects were taught home exercise program and given ergonomic advice. Both the groups included hot fomentation for 15 minutes prior to starting any exercise regime. Group A - the subjects in this group received post isometric relaxation 5 repetitions each time and group B received McKenzie 10 repetitions each exercise.

All the participants were explained about the purpose of study. The subjects were screened for inclusion and exclusion criteria and baseline measurement was taken. Eligible subjects were randomly allocated into two groups. **GROUP A** underwent hydrocollator pack and post isometric relaxation. Treatment was given alternatively for 4 days a week and was followed for 3 weeks. Each session lasted for 30 minutes. GROUP B-Underwent treatment with hydrocollator pack and McKenzie.

Result: This study showed that both MET and McKenzie were useful in improvement of pain and range of motion but the post isometric relaxation was more effective in improvement of range of motion and pain than the McKenzie.

1.INTRODUCTION

Neck pain is a common musculoskeletal disorder found in almost 67% of the population during the major part of their life span. Nonspecific neck pain is defined as mechanical pain that occurs anywhere between the occiput and upper thoracic spine and surrounding muscles without any specific ideology. Neck pain may be caused by a number of factors, some of which are known and some still unknown. Females

generally are more predisposed to developing neck pain than males [1,2]. Frequently seen causes of neck pain are awkward occupational postures of heavy loads and carrying out of physically demanding work. Symptoms may arise from various structures in the neck like muscles, ligaments, nerves as well as joints and bones of the spine. However, neck muscle shows a strong tendency to develop hypertonic and spasm. Greater sensitivity of the neck musculature of any situation alters proprioceptive input from the neck muscles. Therefore main cause of neck pains is muscle tightness. Clinically positive signs include tenderness in the posterior neck region ,asymmetry and restriction of movements [3,4] .The diagnosis is mainly based on clinical examination. Various imaging techniques may be helpful in diagnosing specific conditions responsible for neck pain. Usually they are of little help when no underlying pathology condition is suspected. Then conventional therapy for non specific neck pain includes cervical collar ,cervical traction. moist heat ,neck strengthening exercise program and postural correction. Manual therapy for neck pain includes manipulation and mobilization .Various studies have shown that high velocity techniques may correct joint restriction but not the restriction due to muscles pull .post isometric relaxation is claimed to be effective method for acute tension in soft tissues problems that preclude immediate spinal adjustments, reduces muscles spasm that is responsible for spinal fixation reduces pain and lengthen the tightened neck muscles to normalise cross cervical range of motion and is very effective for muscles in acute and subacute non specific neck pain[7,8,9,10].

McKenzie is frequently used to treat spine-related ailments, as patients frequently have complaints in their extremities that started in the spine. Centralizing the symptoms back to the spine is the aim. The migration of symptoms from the distal to the proximal parts of the body is known as centralization. The onset of centralization indicates a preference for direction and is a positive indicator. Conversely, a deterioration is indicated by peripheralization, which is the transfer of pain from the spine to the extremities.

The McKenzie method Is widely considered to be a highly effective program for patients with non specific spinal pain. This studies include in the review suggests that McKenzie therapy is more effective than most comparison treatments at short term follow up full comparison treatments included non steroidal anti inflammatory drug and back massage with back gear advice strength training with therapist supervision, spinal mobilization and general mobility exercises.

Post Isometric Relaxation (PIR) is the result of a brief submaximal isometric contraction of a single muscle or group of muscles, followed by a decrease in muscular tone. Autogenic inhibition is the basis for PIR's operation. Post isometric relaxation may be a biomechanical event that is a combination of viscoelastic, creep and plastic changes in the muscle a number of studies have found that viscoelastic stress relaxation is evident in human skeleton muscle when the stretched muscle is isometrically contracts, the contracting filament plays tension and stretch on tissues which cannot be stretched by passive stretch. Another study showed that resting tension in skeleton muscle is taken up by mainly by the Mayo fibrils and as the muscle stretches to limit the range of motion. It is attributed to the viscoelastic elements of the connective tissue mobilization and generally mobility exercises[11,12,13].

2.METHODOLOGY

Study design- randomised control trial

Subjects are derived from Doon paramedical college, Dehradun (Uttarakhand). Including 12 males and 24 females in the age group of 25 to 40 years was included in the study after obtaining informed consent. Out of 36 subjects, 18 subjects participated in group A and 18 subjects participated in group B. All patients data was collected before randomization eligible patients were randomized to one of the 2 treatment groups on the basis of permuted block randomization. Inclusion criteria includes age group between 25 to 40 years, both male and female patients having acute or subacute non specific neck pain.(for acute neck

pain should not last longer than 4 weeks and for subacute neck pain not longer than 4 to 12 weeks). Exclusion criteria involves cervicogenic headache radiculopathies patients having radiating pain, severe osteopenia, whiplash associated disorders previous cervical spine surgeries ,vascular diseases of neck ,progressive neurological deficit, serious medical conditions like hypertension, renal failure etc, rheumatoid arthritis, vertebrobasilar insufficiency. These patients were assessed mainly by medical history and clinical examination before entering the study. Instruments included couch, hydrocollator pack, goniometer which measures the range of motionProtocol- 36 subjects were taken where 12 males and 24 females qualified inclusion criteria. Then 2 groups were formed that is Group A which included post isometric relaxation technique and Group B which included McKenzie technique. The study protocol was reviewed at Doon paramedical college and hospital Dehradun.Outcome measures -VAS scale : The pain VAS is a one-dimensional measure of pain intensity that is used to track patients' pain development or to compare pain severity among individuals with similar diseases. Goniometer: Used to measure the range of motion of neck. A brief description of procedure was given to the patients and thereafter the informed consent was taken. The patients medical history and current clinical status were obtained. Thereafter, once it was established that the patients were free from any specific ideology and fulfilled the inclusion criteria they were included in the study. After the process of screening examination and informed consent the patient rated their pain intensity on numeric pain rating scale functional outcome on neck disability index and followed by a goniometric examination of survical range of motion. Thereafter subjects were randomly allocated to Group A and Group B. Treatment was given to both groups after the application of hydrocollator pack.

Tests: The Spurling's test (also known as the Maximal Cervical Compression Test and the Foraminal Compression Test) is performed during a musculoskeletal examination of the cervical spine to look for cervical nerve root compression, which causes Cervical Radiculopathy.

The Cervical Distraction Test:Neural foramen as well as joint capsule is tested during cervical distraction test.neck extensor muscles are tested secondarily.

The subject in experimental group(group A) received post isometric relaxation therapy and subjects in control group(Group B) received McKenzie exercises. Treatment was given alternatively for 4 days a week and was followed for 3 weeks. Each session lasted for 30 minutes. All the subjects were taught home exercise program and postural reeducation. Both the groups included hot fomentation for 15 minutes prior to starting any exercise regime. Group A -The subjects in this group received post isometric relaxation. **Post isometric relaxation for upper trapezius** includes: patient position And therapist position: the patient is in supine position ,arm alongside the trunk, therapist starts at the head side and stabilizes the shoulder using palm of one hand while the other hand is used to cup the ipsilateral mastoid process. Line of movement: neck flexion, contralateral full site bending followed by slight ipsilateral rotation provided towards the side being treated. The patient was instructed to move the head back to the table and to shrug the stabilised shoulder with equal force against the therapist resistance to maintain the isometric contraction for about 10 seconds. After the isometric contraction the patient was asked to relax. A gentle stretch was applied for 10 seconds with the same passive movement to reach a new muscle range. 5 repetitions were given at a time. **For levator scapulae**, patient position and therapist position; the patient position is supine with the arm stretched out and supinated on the side to be treated therapist stands at the head side of the patient and place his opposite hand to stabilise the patient shoulder so that the therapist 4 arm supports the patients neck while the other hand supports the head. Line of movement: neck into neck into full flexion lateral flexion and quotation away from the side to be treated was provided the patient was instructed to move the head back to the table while at the same time slightly shrugging the shoulder with equal force against the therapist resistance to maintain the isometric contraction for 10 seconds. After

the isometric contraction the patient is asked to relax full a gentle stretch is applied for 10 seconds with the same passive movement to reach a new muscle range reputations given for levator scapulae is 5 times.

Head retraction: Hold for 10 secs for 10 repetitions,Neck extension in supine position: 10 repetitions,Neck extension in sitting: 10 repetitions,Left and right lateral bending: 10 repetitions,Head turning: 10 repetitions,.Neck flexion in sitting: 10 repetitions.

3.RESULT

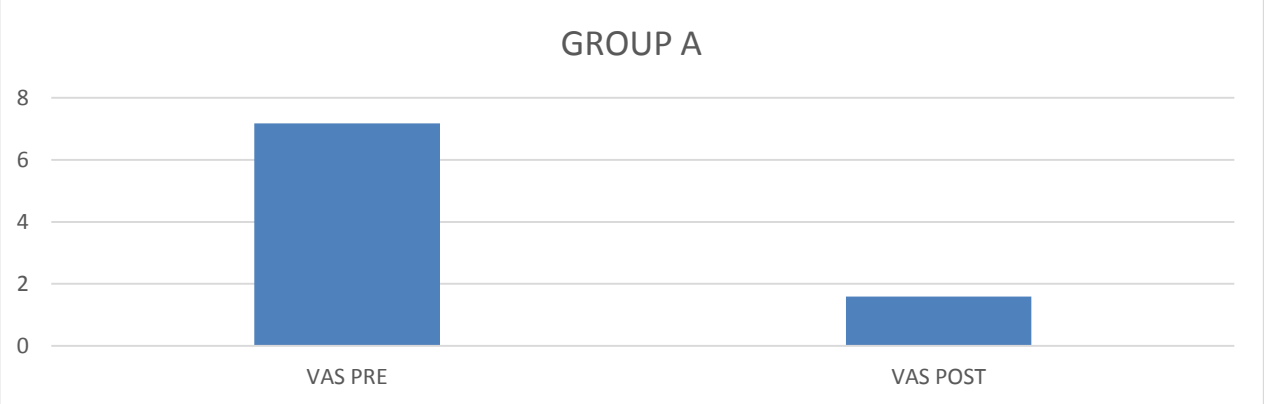
The data was analzsed using statistical software JASP version 0.17.3.

To analzse the difference of VAS in group A and group B paired t test was applied. The p values < 0.001 in group A and group B were extremely significant.

GROUP A (Post isometric relaxation)

DESCRIPTIVE ANALYSIS	VAS (PRE)	VAS(POST)
MEAN	7.176	1.588
SE OF MEAN	0.214	0.150
STANDARD DEVIATION	0.883	0.618

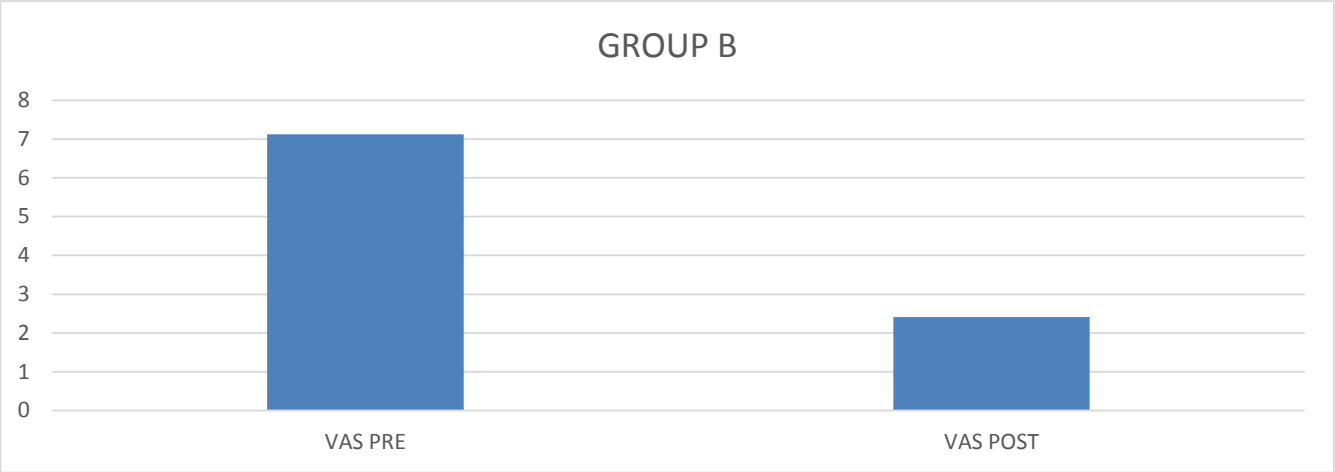
Mean difference = 5.588



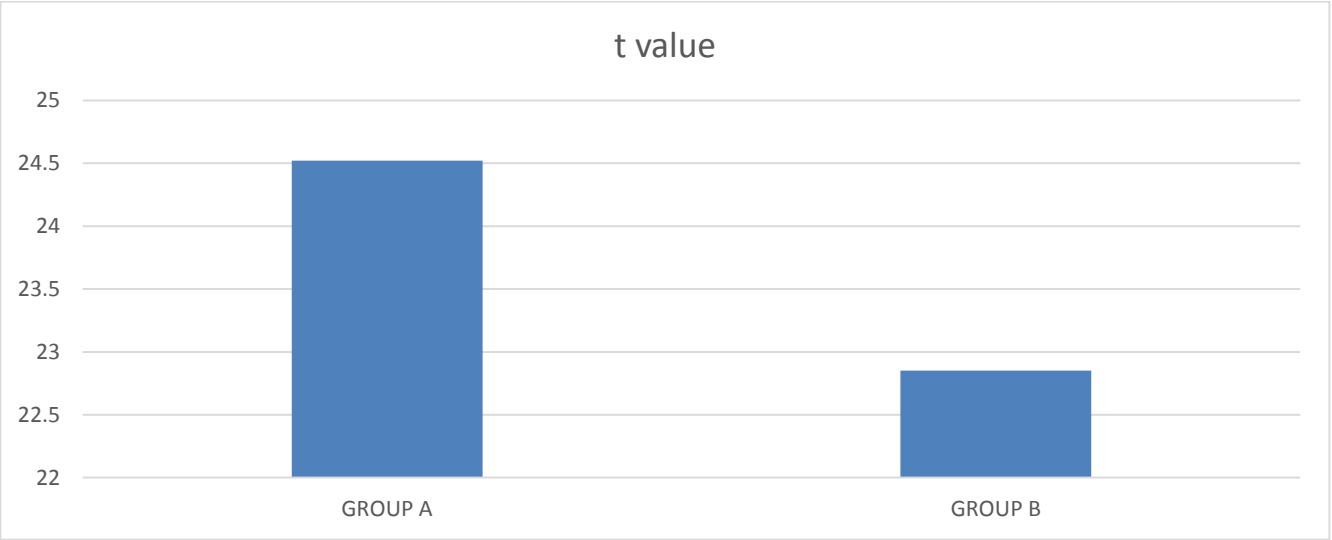
GROUP B(MECKENZIE)

DESCRIPTIVE ANALYSIS	VAS (PRE)	VAS(POST)
MEAN	7.118	2.412
SE OF MEAN	0.208	0.123
STANDARD DEVIATION	0.6	0.507

Mean difference = 4.706



VAS	t value	df	p
Group A	24.52	16	<0.001
Group B	22.85	16	<0.001



Graph showing t value of group A and group B

COMPARISON WITHIN GROUP

The t values of group A(Post isometric relaxation) was found to be greater than that of group B(Meckenzie) indicating a major difference in pre and post analysis of mean within the group where $p < 0.05$ is preferred as statistically significant and here p is < 0.001 which is considered as statistically highly significant .Hence it rejects the null hypothesis and supports the alternative hypothesis. Further the mean difference in group A was found to be more than that of group B indicating better results.

4.DISCUSSION

This study demonstrated that there was significant improvement neck pain and range of motion in Group a as compared to Group B. Although there are numerous studies that have addressed the issue of manual therapy in neck pain but no studies have utilised post isometric relaxation as intervention study in neck pain and so it complements with previous studies that investigated the effect of muscle energy technique

on survival thoracic and number range of motion.

The current study suggests that both treatments along with postural reeducation training consists of shoulder retraction exercises and application of hot packs resulted in overall improvement in range of motion and pain full the percentage increase in range of motion was more in Group a as compared to Group B. These findings are comparable to the research of captain Eric Wilson which showed that muscle energy technique decreases disability and improves function range of motion in patients with low back pain.

Recent study clearly demonstrated significant improvement in pain that is in VAS scale and survival range of motion in both groups this improvement in Group a possibly may be due to rapid hypo algesic effects of mobilization that is induced analgesia and is generally consistent with the proposed mechanisms of action for the post isometric relaxation and is used to treat somatic dysfunctions that result in survical motion restriction. Both the groups demonstrated similar trends in their improvement as depicted in the line diagram for pain all the subjects showed marked reduction in VAS when compared to their baseline values.

LIMITATION OF STUDY

- The sample size was small.
- The consumption of non steroidal anti inflammatory drugs or muscle relaxants was not controlled.
- There was number long term follow up.

FUTURE RESEARCH

- Further studies can be done with wider sample including different subjects with different age group.
- Survival range of motion instrument can be used As for measuring all the range of motion.
- Post isometric relaxation can be applied in the treatment of somatic dysfunctions not only in the spine but also in ribs extremities and pelvis.

5.CONCLUSION

This study investigated comparison between post isometric relaxation and McKenzie exercises combined with whom exercises in individuals with non specific neck pain. Both therapies demonstrated significant improvement in pain and survival range of motion therefore both interventions had significant therapeutic effect. The effects of treatment in both groups were maintained up to 3 weeks. It was noticed that Group A required fewer sessions for the optimal benefit as compared to Group B. Hence the finding of the study suggests that post isometric relaxation as significant tool than McKenzie group for non specific neck pain.

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