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EFFECTS OF MOBILIZATION TECHNIQUES ON PAIN AND CERVICAL RANGE OF MOTION IN CERVICAL PAIN

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ABSTRACT

Neck pain or cervicalgia is a common disorder, disabling the individual to various degrees. Two-thirds of the population has neck pain at some point in their lives. Neck pain may arise due to muscular tightness in both the neck and upper back, or compression of the nerves emanating from the cervical vertebrae. The aim of present study was to analyze the effectiveness of mobilization techniques in neck pain and the effectiveness of mobilization techniques in increasing neck range of motion. The study design was randomized controlled trial. It was used to examine the effects of mobilization techniques on neck pain and active cervical range of motion. This study was conducted at the out-patient physiotherapy department, Liaquat National Hospital. Thirty female patients with nonspecific neck pain were included in the study from department of physiotherapy. Data collection included demography, treatments and active ranges of motion. Data were analyzed for the treatment effects of mobilization on cervical pain and range of motion (ROM). Clinical outcome variables were analyzed within group with a paired t-test. None of the participants reported any adverse effects from mobilization. Thirty percent patients had acute neck pain while rest had chronic pain. Significant difference ($p< 0.05$).was found on pain and cervical ROM pre and post treatment. The study provides the evidence that cervical mobilization techniques are effective in any kind of neck pain and to increase ROM and that there is no risk of serious adverse effects from mobilization techniques

Key words: Mobilization, cervicalgia, Range of motion (ROM).

INTRODUCTION

Non specific neck pain is frequent often persistent or recurrent. Its course is usually episodic and improvement is of variable degrees but complete recovery is unusual for most patients (Guzman *et al.*, 2008). Cervical or neck pain is a general term used to designate any musculoskeletal disorder in the cervical region. Various pathologies are most commonly related to degenerative changes or inflammation of cervical structures such as inter-vertebral discs, articular facets joints or nerve roots. Neck pain is a very common, disabling and costly condition (Côté *et al*., 2008, Hogg-Johnson *et al.*, 2010). Manual techniques are routinely used in the management of non-specific neck pain and appear to provide effective pain relief for at least some cases. (Bronfort *et al*., 2004; Gross *et al.*, 2004; Hurwitz *et al.*, 1996; Koes *et al.*, 1991; Sairgiovannis and Hollins, 2005). These techniques include manipulation, a high velocity thrust directed at the joints of the spine, and mobilization techniques that do not involve a high velocity thrust. Both manipulation and mobilization are more effective in relieving chronic neck pain than general practitioner care (Koes, 1991; Sairgiovannis and Hollins, 2005; Bronfort *et al.*, 2001) or no treatment controls (Gross *et al.*, 2004). Thus the present study is carried out to study the effectiveness of mobilization techniques in cervical pain with an increase in cervical range of motion and decrease in pain.

MATERIAL AND METHODS

The study design was randomized controlled trial and designed to study the effects of mobilization techniques on neck pain and active cervical range of motion. This study was conducted at the out-patient physiotherapy department, Liaquat National Hospital, Karachi during January 2011and March 2012

PATIENTS

A sample size of thirty female patient's age of 37 ± 6.1 years with nonspecific neck pain were recruited from department of physiotherapy, Liaquat National Hospital. Demographic data was collected on Performa. All patients had to sign a written consent. Cervical test were performed and visual analogue scale was used to analyze pain intensity. All patients had an assessment that included history and different tests were performed for inclusion and exclusion criteria.

PROTOCOLS AND PROCEDURES

The patients were asked to perform each of the six cervical movements (flexion, extension, right and left lateral flexion, and right and left rotations). If each active movement exhibits a full range of pain-free motion, then some

passive overpressure is applied at the extreme of each movement (Petty and Moor, 2001). Movements can be combined. Any number of positions could be used such as Flexion then rotation, Extension then rotation, Flexion then lateral flexion, Extension then lateral flexion, Compression or distraction can be added. Mobilization is a passive movement performed in such a manner, particularly in relation to speed of movement that is at all times within the ability of patient to prevent the movement. It is performed to relief pain and increase range and pain free functional movements (Maitland, 2005)

Treatment data collection:

The pre- treatment data included neck pain at rest and on movement. Active ranges of motion were collected. The test were performed for assessment ; including , vertebral artery test, spurling test, distraction test , movements under compression , sharp purser tests were used. Once the examination was completed, the patients were given mobilization techniques according to the pattern of pain. Grade I and II were used for pain and III and IV for muscle spasm and range of joint motion. All the participants had 15 sessions and at the last visit all were assessed for pain and cervical range of motion

Pain measurement:

Neck pain was measured using visual analogue scale (VAS). It was a 10 mm line with pain descriptors marked "no pain" at one end and "worst pain" at the other end. The patients were asked to report their perceived pain level, both at rest and on most painful movement. Neck movement was assessed using goniometer. The patient's ROM was assessed while sitting with feet rested on the ground, the hips and knees positioned at right angle and their back against a chair. Six conventional movements of the cervical spine were measured in order from flexion, extension, left lateral flexion, right lateral flexion, left rotation, and right rotation. The patients were instructed to perform a maximally active movement in each direction.

INCLUSION and EXCLUSION CRITERIA

The inclusion criteria were of neck pain with or without radiation to arms and limited range of motion. Exclusion criteria were taken as, individuals with motor vehicle accident or significant trauma to neck, malignancy, infection, inflammatory disorder or fracture, with any signs of cervical spinal cord compression, quada equina signs, undergone spinal manipulative therapy within previous 6 months ,any neck surgery in the previous 12 months, rheumatoid arthiritis, spondylolesthesis, a positive vertebral artery test contraindicates certain treatment techniques to the cervical, were not included and thus taken as exclusion criteria.

DATA ANALYSIS

Data was analyzed for the treatment effects of mobilization on cervical pain and ROM. Clinical outcome variables were analyzed within group with a paired t-test (difference before and after treatment) SPSS 11. Pain, cervical ROM (extension, cervical rotation right(R), cervical rotation left (L) was analyzed pre and post treatment. $P<0.05$ was considered objectively significant.

RESULTS

Thirty female patients with mean age 37 ± 6.1 were included in this study, and none reported any adverse effects from mobilization .Thirty percent patient had acute neck pain while others had chronic pain. At baseline patient's pain on VAS was 6.5 ± 1.8 and after treatment 2.1 ± 1.38 (Fig. 4) and was significantly different with p value $p<0.005$. Pre treatment cervical extension was 64 ± 7.8 and after treatment was 73.1 ± 4.82 (Fig. 1) and was significant with $p<0.005$. Cervical rotation(R) (Fig. 2) and cervical rotation (L) (Fig. 3) at baseline were 63.6 ± 12.7 and 64.3 ± 12.1 respectively. After treatment the values were 73 ± 10.1 and 72.8 ± 11.3 respectively. The results were significant with $p<0.005$. Results of clinical outcome of pre and post treatment are summarized in Table I and Figure 1-4.

Forty percent of the patients reported their decrease in symptoms. Their pain and other radiating symptoms became proximal immediately and within 24 hours of treatment. Ten percent of the patients reported mild increase in pain with certain techniques. Fifty percent patients took long to reduce their symptoms. The majority of reactions, such as local discomfort, increase in intensity of pain, mild numbness, have been reported to begin within 24 hours of treatment and immediately applying the technique, and reported to be resolved within 24 hours of treatment.

Table 1. Pre –treatment and post-treatment clinical data of patients.

VARIABLES	PRE-TREATMENT MEAN (SD) n=30	POST TREATMENT MEAN (SD) n=30
CERVICAL EXTNSION	64±7.8	73.1±4.82∗
CERVICAL ROTATION (R)	63.6±12.7	73±10.1∗
CERVICAL ROTATION (L)	64.3±12.1	72.8±11.3∗
PAIN	6.5±1.8	2.1±1.38∗

∗ Statistically significant $p<0.05$

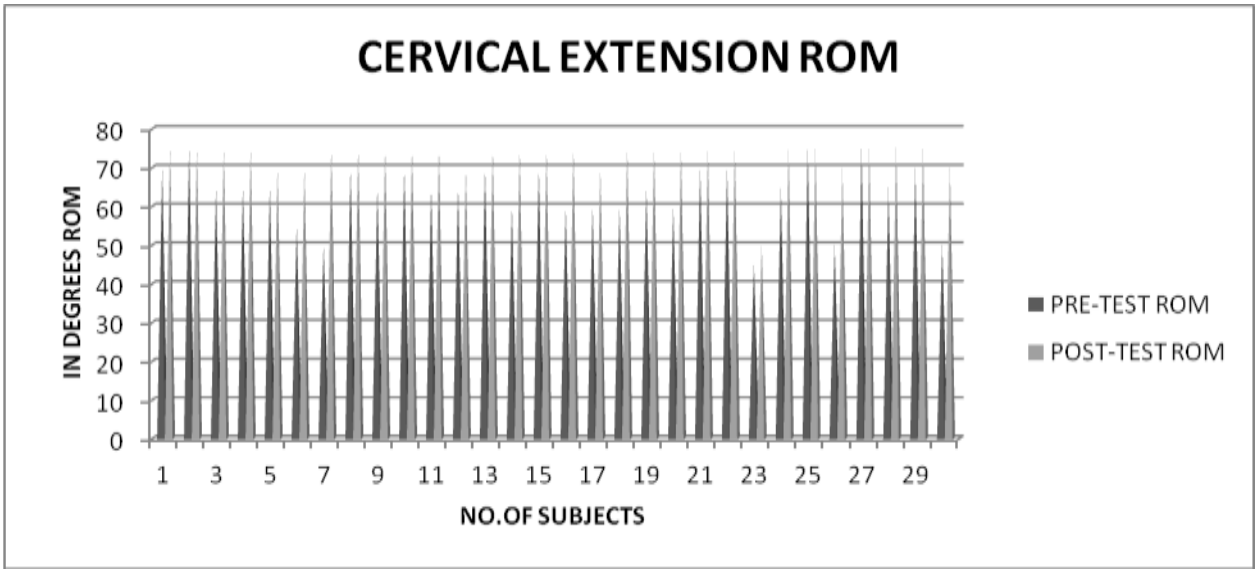

Fig. 1. Pre and post cervical extension ROM of thirty female patients.

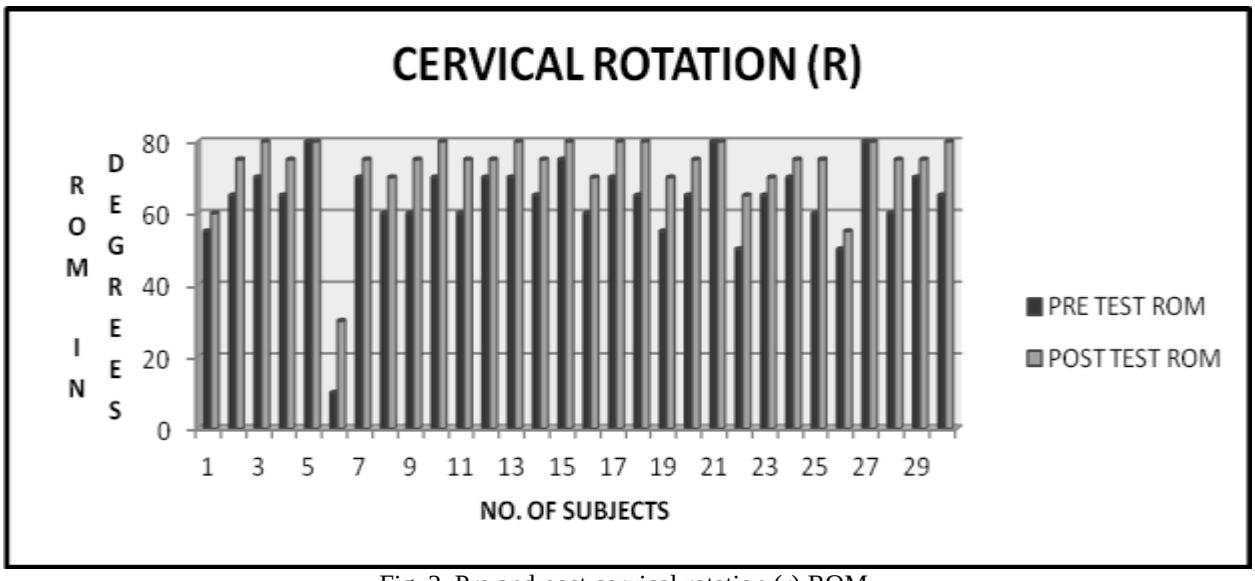

Fig. 2. Pre and post cervical rotation (r) ROM.

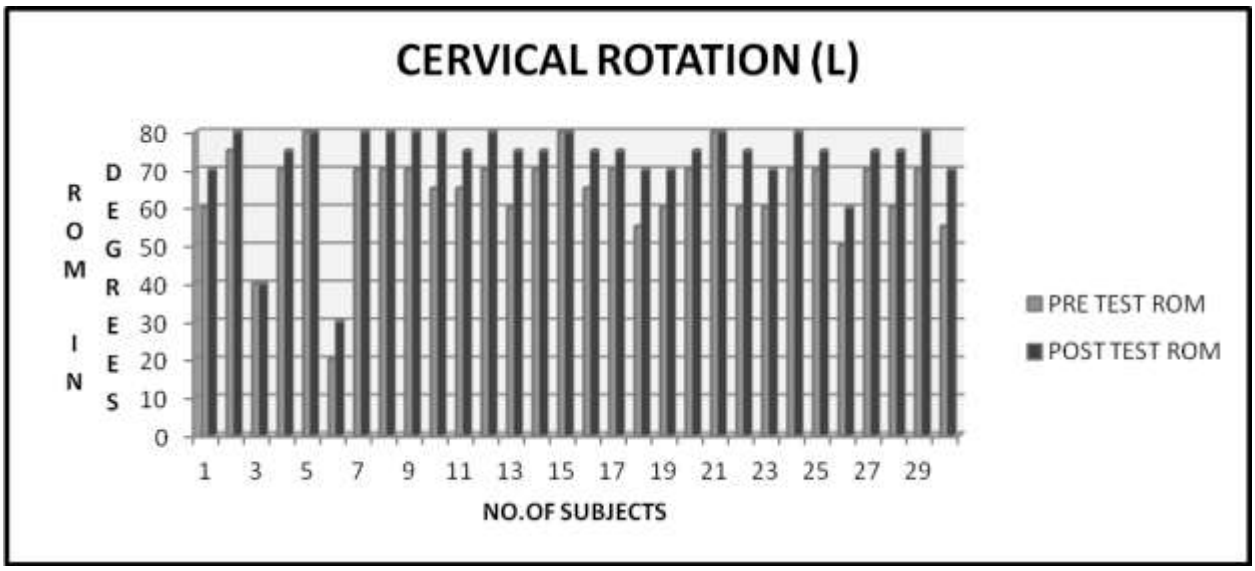

Fig. 3. Cervical rotation (l) results of thirty patients pre and post treatment ROM.

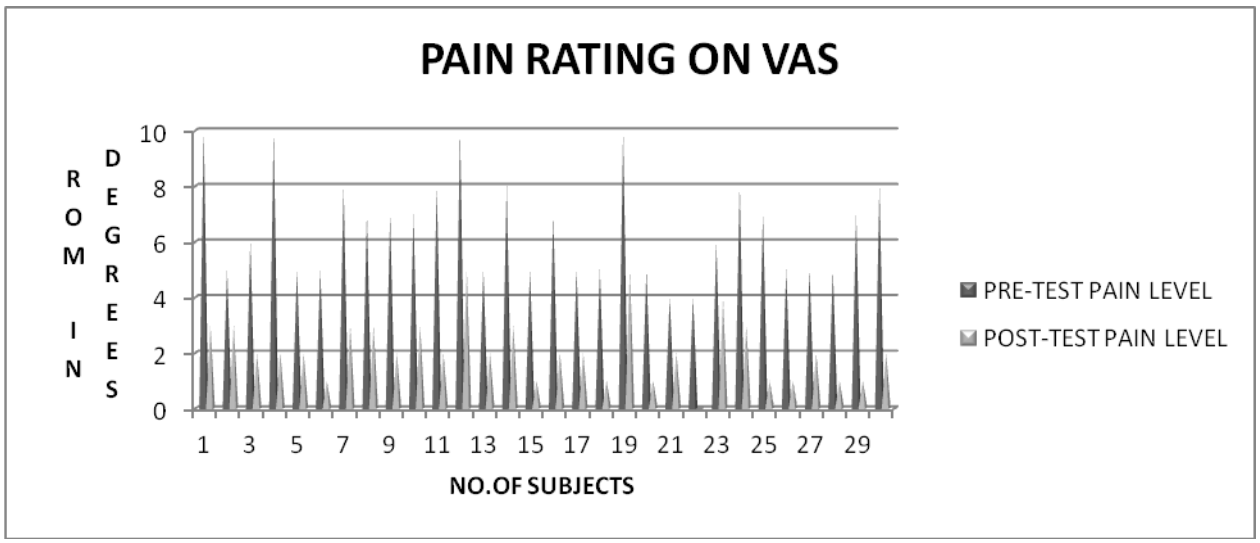

Fig. 4. Pain rating description of thirty patients for pre treatment and post treatment pain level.

DISCUSSION

The result of the present study demonstrates significant effects of different mobilization techniques on pain and cervical ROM. Although, there are a variety of techniques that are usually utilized however in this study few techniques have been standardized. There are four grades of mobilization, such as; Grade I, a small amplitude movement near starting position of the range (Maitland, 2005), Grade II, a large amplitude movement that caries well into the range. It can occupy any part of range that is free of stiffness or muscle spasm (Maitland, 2005). Grade III also a large amplitude movement, but one that does move into stiffness or muscle spasm (Maitland, 2005), Grade IV , a small amplitude movement stretching into stiffness or muscle spasm (Maitland, 2005)

A patient received different techniques according to the symptoms. Majority of patients reported decrease in pain intensity immediately after treatment and after 4-5 sessions, regardless of the mobilization techniques used. On the other hand, restoration of ROM took long. For radicular pain, transverse glides found to be more effective than rotation glides.

The manual therapy used in this study was a combination of different mobilization techniques designed to reduce neck pain and to increase range of motion. If any technique centralized or reduced the pain and other

symptoms, was continued to be used. On the other hand, any technique worsened or peripheralized the pain or other symptoms were discontinued and other technique was selected.

For management of neck pain a number of modalities, manual therapies and a variety of strengthening and stretching exercises are being used. In the recent years, mobilization and manipulation for the treatment of neck pain , back pain, and thoracic spine pain is becoming more popular, perhaps it is less used because of their side effects related to certain techniques. Manipulation is associated with a small risk of serious cerebro-vascular injury (Smith, 2003; Terrett, 1987), whereas mobilization is generally considered to be a safer technique. However in clinical situations where manipulation is indicated it is thought to provide better results than mobilization (Leaver *et al.*, 2007).

In the present study a variety of mobilization techniques were used according to the pattern of symptoms for example; unilateral and transverse glide technique were used for unilateral symptoms .some patients found to be uncomfortable with unilateral technique and had pain with thumb pressure so they received transverse technique instead, .and interestingly transverse technique was found to be more effective in reducing pain and other radiating symptoms .For unilateral pain rotation mobilization was also used as a first day treatment but patient reported increase in pain with this technique. But further investigation is required.

It is satisfying to note that there were not any major complication and most of side effects were mild discomfort and pain at the site of treatment. Few studies earlier investigated that techniques directed at thoracic spine result in fewer side effects than techniques directed at cervical or lumbar spine. However that investigation requires more study (Cleland, 2007)

It was also noted that in some cases when mobilization was given at the segment that was involved increased the pain, therefore, mobilization in that case was given at the other segment that was not involved. After 2-3 days, again mobilization was given at the involved segment and produced no pain and found to be more effective, these findings are similar to those reported earlier (Haas *et al.*, 2003). It showed pain reduction with manipulation performed at a segment other than the involved segment.

Mobilization techniques on patients with acute mechanical pain and dysfunction showed quick effects on both with pain and ROM as compared with patient with chronic neck pain. Pain due to rediculopathy found to be reduced immediately after treatment. Numbness associated with radiculopathy also found to be decreased. All cervical ranges are far easier to achieve except for cervical lateral flexion that can be achieved minimal.

CONCLUSION

Present study provides the evidence that cervical mobilization techniques are effective in any kind of pain and to increase ROM. It is also suggested that there is no risk of serious adverse effects from mobilization techniques. Additionally manipulation techniques can be more effective in certain conditions that could be more useful especially for ROM. Future studies should be designed and conducted to help identify such techniques and their effects.

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