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# A study to compare the effect of positional release technique (PRT) versus deep transverse friction massage (DTFM) on pain and disability in patients with mechanical neck pain

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**Abstract**
The purpose of this study was to compare the effect of positional release technique and deep transverse friction massage on pain and disability along with therapeutic exercises in patients with mechanical neck pain. 30 subjects, including both males and females, aged from 18 to 45 years. Patients were allocated randomly into 2 groups. Group a patients received positional release technique and Group B deep transverse friction massage. Pain intensity level and disability was measured using numeric pain rating scale (NPRS), neck disability index (NDI) and respectively pre and post intervention i.e. after 4 weeks intervention. There was significant improvement in both PRT and DTFM groups. Statistical comparison of the result showed that Group A had greater improvement in pain and disability as compared to Group B. PRT along with therapeutic exercises appeared to be more effective than DTFM to reduce pain and disability in patients with mechanical neck pain.

**Keywords:** positional release technique (PRT), deep transverse friction massage (DTFM) numeric pain rating scale (NPRS), neck disability index (NDI), mechanical neck pain

## Introduction

Pain is an unpleasant sensation and emotional feelings that each and every individual experiences. It can be immediate, acute or chronic which may impact your lifestyle, job and independence [1]. Neck pain especially is considered to be a more common health problem in world population. Neck pain is a very common work related musculoskeletal disorder with two-thirds of population having pain at some point in their lives. It is also increasing in intensity, frequency and severity of episodes. As people are increasingly sedentary in nature, live fast-paced and sedentary lives, they place more stress and strain on the upper back and neck regions of their spines [2]. Neck Pain arising from anywhere like superiorly by superior nuchal line, inferior by tip of first thoracic spinous process, and laterally by the lateral border of neck is one of the most common cause in mechanical dysfunction of cervical spine [3].

Mechanical neck pain is mostly common in adulthood [4]. It has a multifactorial origin [5]. Mechanical neck pain is a pain in anatomical region of neck. Although the cause of neck pain is exactly unknown [6] but some of the risk factors associated with neck pain included age, excessive work, carrying of heavy loads, poor posture, mental depression and strain [7]. Another causes of neck pain are varied most causes are believed to be due to sprain or strain in the muscles and soft tissues of the neck. Neck pain is an also most common source of disability in the general adult population. Around 67% of adults will have neck pain sometimes during their life time [8]. Mechanical neck pain refers to pain that has been present for less than 3 months. It does not refer to the severity or quality of pain [9]. Mechanical neck pain is probably due to minor strains and sprains and is often associated with poor postures [10].

Some studies have shown that altered muscle activation and reduced neck muscle strength is a well-known feature of mechanical neck pain, which presents with increased levels of disability [11]. Various literatures suggested that manual therapy is an important and most appropriate option to treat and resolve the symptoms associated with mechanical neck pain. Manual therapy works on tension release associated with soft tissue structures at the neck region. Myofacial release technique is one of the common modes of manual therapy to relief the problems adjunct with mechanical neck pain. Lawrence H. Jones proposed positional release therapy (PRT). This technique involves passive body positioning, which is claimed to elicit immediate and prolonged reductions in tenderness at trigger points and to reduce pain and with musculoskeletal conditions. PRT relies on precise positioning of dysfunctional tissues in ways that allow a spontaneous response that releases or reduces excessive tension and/or muscle spasm.

The mechanisms are thought to result from spindle resetting, reduction in nociceptive sensitivity and circulatory enhancement [12]. On the other hand massage therapy showed the empirical effect in reducing and relieving the symptoms. Deep transverse friction massage is a specific type of connective tissue massage applied precisely to the soft tissue structure such as tendons. It was developed by empirical way by James Cyriax and is currently used in rehabilitative practices**.** The transverse, or Cyriax, method of deep friction massage is often being used in sports medicine [13]. Purpose of this study was to compare the effect of positional release therapy versus deep transverse friction massage in reducing pain and disability in patients with mechanical neck pain.

**Objectives**

1. To evaluate the effect of positional release technique for reducing pain and disability on patient with mechanical neck pain.
2. To evaluate the effect of deep transverse friction massage for reducing pain and disability on patient with mechanical neck pain.
3. To compare the effectiveness of deep transverse friction massage versus positional release therapy for reducing pain and disability on patients with mechanical neck pain.

**Hypothesis**

**Experimental Hypothesis [$H_1$]**

There will be significant difference between the effect of Positional Release Technique versus Deep Transverse Friction Massage in reducing pain and disability in patients with Mechanical Neck Pain.

**Null Hypothesis [$H_0$]**

There will be no significant difference between the effect of Positional Release Technique versus Deep Transverse Friction Massage in reducing pain and disability in patients with Mechanical Neck Pain.

**Methodology**

This study was an experimental design study**.** A total of 47 patients enrolled in this study. 30 out of 47 selected on the basis of inclusion and exclusion criteria in this study. Patients, both male and female of age 18-28 years were participated in this study. The subject diagnosed as having mechanical neck pain which showed signs and symptoms and were requested to participate in study. Purpose of study was explained to the patients. This study was conducted at Physiotherapy OPD, Subharti College of Physiotherapy Meerut. Patients were accessed after obtaining consent form. Subjects were randomly divided into two groups, group A and group B respectively. Group A received moist heat pack, positional release therapy and therapeutic exercises while group B received deep transverse friction massage along with moist heat pack and therapeutic exercises. Duration of pain more than 10 days, NPRS score of more than or equal to 5, NDIQ score of more than or equal to 15 score, all selected patients able to attend at least 3 sessions per week for at least 3 weeks, be in good health were included in the study. In this study, any Congenital anomalies like cervical rib etc., past history of Cervical Trauma, Cervical Radiculopathy, Patient with bilateral trapezius spasm, history of trauma or fracture in upper limb neck, patient suffering from Diabetes Mellitus, any Patient with history of recent surgery to neck or upper back, any patient with neurological complication and any patient with psychological complication were excluded. Tools used in this study were treatment table, towel, cotton, powder, stationary like pen and paper.

**Outcome Measures**

**Numeric Pain Rating Scale (NPRS)**

The numeric pain rating scale (NPRS) is commonly used to measure the pain intensity. The NPRS can be graphically or verbally delivered. When presented graphically the numbers are often enclosed in boxes and the scale is referred to as an 11 or 21 point box scale depending on the number of levels of discrimination offered to the patient. Patients were asked to indicate the intensity of current, best, and worst levels of pain over the past 24 hours using 11 point scale, ranging from 0 (no pain) to 10 (worst pain) [14].

**Neck Disability Index (NDI)**

The NDI has become a standard instrument for measuring self-rate disability due to neck pain and is used by clinicians and researchers alike. Each of the 10 items is scored from 0-5.The maximum score is therefore 50. The obtained score can be multiplied by 2 to produce a percentage score. Occasionally, a respondent will not complete one question or another. The average of all other items is then added to the completed items. Using this system, a score of 5–14 points (10– 28%) was considered to constitute mild disability, 15–24points (30–48%) was considered to constitute moderate disability, 25–38 points (50–68%) was considered to constitute severe disability, and scores above 34 points (68%) indicate complete disability [15].

An appropriate reading of NDI and NPRS was taken on first day (1st day) and last day (28th day)

**Procedure**

Ethical approval was obtained from the research committee of Jyotirao Phule Subharti College of Physiotherapy, Swami Vivekanand Subharti University Meerut. (U.P. India). After a written informed consent form is taken from all the participants were allocated into 2 groups on randomly selection. Both of two groups i.e., group A and group B have 15 participants in each.

**Moist Heat Pack (MHP)**

After assessing the patient, the subjects were first given hydrocollator pack on neck and muscle spasm/tender point area (upper fibers of trapezius muscle unilaterally) region for 15 minutes in both groups to reduce muscles spasm and pain and to improve the extensibility of tissues. The temperature of hydrocollator pack was adequate for the targeted area. The hydrocollator pack was well covered with mackintosh sheet. During this phase therapist asked the patient about temperature of hydrocollator pack and his/her suitability towards the procedure.

**Application of Positional Release Therapy (PRT)**

Total 15 subjects were given Positional Release technique (PRT) after application of moist heat pack for 10 minute. The subjects received PRT were in supine lying with the therapist sitting on the affected side, tender points were located along with the upper fibers of trapezius muscle. The subject's head was laterally flexed towards the side of tender point, then therapist grasps the subject's forearm and abducts shoulder to approximately $90^0$ and adds slight flexion or extension to fine-tune. The ideal position of comfort achieved was held for a period of 90 sec and followed by passive return of body part to an anatomically neutral position continued for 5 minutes. Treatment duration was 3 sessions per week for 4 weeks.

**Application of Deep Transverse Friction Massage (DTFM)**

To perform the massage, initially the treatment area was cleaned with water using cotton and the area was dried before applying treatment. Later, power was applied on to the treatment area in order to reduced friction hereby, preventing blister formation. To use a reinforced finger (i.e.

middle finger over the index finger) that is just large enough to friction completely across the muscles. The skin was dry and talcum used. It was extremely important that during friction, the fingers of the therapist's hand and the skin of the patients moved on as one to prevent bruising. The massage must be directly over the site of lesion and pain. The fingers move with the skin and do not slide over it. Massage across the grain of the affected tissue. The thicker the structure, the more the friction is given. The technique is to sweep back and forth over the full width of the tissue. Massage should not be given to acute injuries or over highly swollen tissues. A few minutes of this method will produce numbness in the area, and exercise or mobilization can be instituted. The principle element of the friction was to go across the tissue with as much pressure as the patient can tolerate. Treatment duration was 15 minutes/session for 3 days in a week for 4 weeks.

**Therapeutic Exercises**

Isometric neck flexion exercises were performed from sitting position, low back support was provided with hold for 6 seconds, and then relaxes for 6 seconds. These procedures were repeated 15 times and chin tuck (chin in) exercises (for deep neck flexor muscles) were performed in supine lying position. In these exercises, a roll of towel was placed which was placed suboccipitally to monitor the subtle flattening of the cervical lordosis that occurs with the contraction of the longus colli muscle. The patient asked to carefully nod his head as he/she was saying "yes" while not restoring to retraction, while not strictly involvement of superficial flexors, and without fast, jerky cervical flexion movement and hold for thirty seconds and recurrent 3 times.

**Data Analysis**

All analysis was obtained using SPSS version 20.0. Demo graphic data of the patients including age only was summarized. The dependent variables for the statistical analysis were NDI and NPRS. A base line data was taken at the beginning of the study (pre-test values) on 1st day and after the completion of the treatment sessions (post-test values) on 12th day to analyze the difference in and between the groups. Paired and un-paired t-test was used to evaluate the score difference in and between the groups. A level of o.o5 was used to determine the statistical significance.

**Table 1:** Showing comparison of NPRS score between Group A and Group B

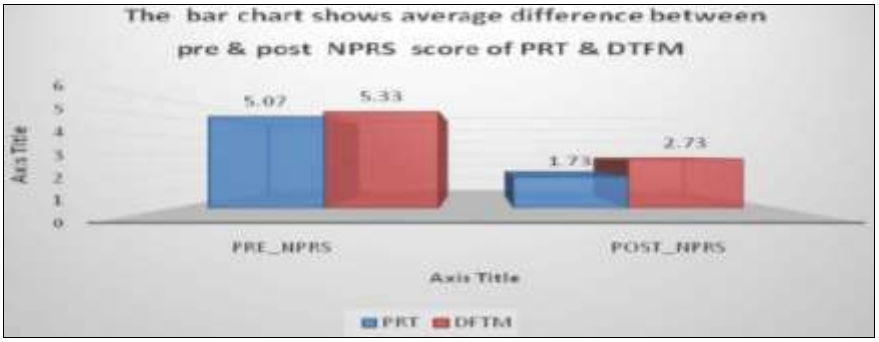
| Groups | Time Periods | Mean | SD | SEM |
|---|---|---|---|---|
| Group A | Pre (1st Day) | 5.07 | 0.799 | 0.206 |
| | Post (12th Day) | 1.73 | 0.594 | 0.153 |
| Group B | Pre (1st Day) | 5.33 | 1.047 | 0.270 |
| | Post (12th Day) | 2.73 | 1.033 | 0.267 |

**Table 2:** Showing comparison of NDI score between group A and group B

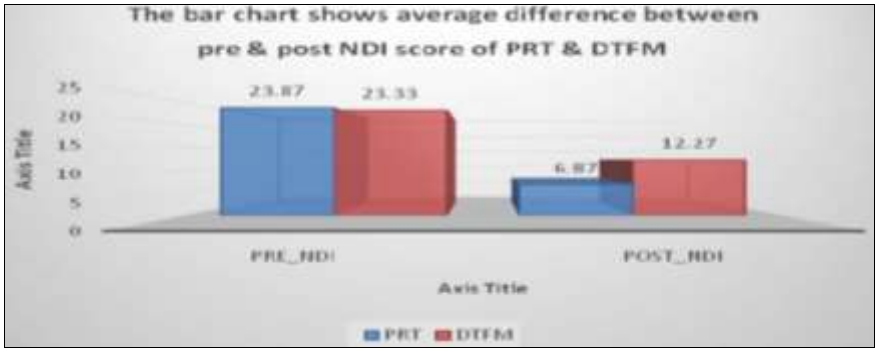
| Groups | Time Periods | Mean | SD | SEM |
|---|---|---|---|---|
| Group A | Pre (1st Day) | 23.87 | 7.230 | 1.867 |
| | Post (12th Day) | 6.87 | 3.962 | 1.023 |
| Group B | Pre (1st Day) | 23.33 | 4.995 | 1.290 |
| | Post (12th Day) | 12.27 | 3.535 | 0.913 |

**Table 3:** Showing pre to post t-test value and p-value of NPRS and NDI score of group A and B

| Groups | t-test value | t-test value | p-value (p<0.05)* |
|---|---|---|---|
| Group A | Pre-Post NPRS | 0.784 | 0.001 |
| | Pre-Post NDI | 0.235 | 0.003 |
| Group B | Pre-Post NPRS | 0.491 | 0.053 |
| | Pre-Post NDI | 0.398 | 0.081 |




**Graph 1:** Showing difference between pre-post NPRS score of group A (PRT) and Group B (DTFM)




**Graph 2:** showing difference between pre-post NDI score of group A (PRT) and Group B (DTFM)

**Result**

A sample of size 30 (15 in Positional Release Therapy Group & 15 in Deep Transverse Friction Massage Group) was studied individually for NPRS and NDI score at base line 1st and 12th day respectively. (Table-1 and Table 2) represents the mean, S.D. and standard error of mean of Positional Release Therapy Group and Deep Transverse Friction Massage Group for pre NPRS and NDI score and post NPRS and NDI score respectively. The unpaired t' test was applied to find the significant difference between pre and post NPRS and NDI score in Positional Release Technique Group & 15 in Deep Transverse Friction Massage Group respectively, which shows a significant difference in both the groups separately at 5% level of significance (P<.05) (Table – 3) Above mentioned data shows that the both therapies PRT and DTFM are effective in reducing pain and disability further application. Unpaired t' test was used to calculate the significant difference between two therapies (PRT and DTFM), on comparison Table – 3 shows't' value of Group A (pre-post NPRS is 0.784 and pre – post NDI is 0.235) while the 't'value of Group B (pre-post NPRS is 0.491 and pre- post NDI is 0.398).

**Discussion**

A comparative study has been done to see the comparative effect of positional release therapy and deep transverse friction massage to reduce pain and disability at cervical spine. The study was done on 30 patients were equally divided in to two groups (Group A and Group B). The NPRS and NDI were used for measuring the pain and disability at cervical region of spine. Total duration was 4 weeks while pre and post measurement had taken 1st day and 28th day respectively. Within the group pre and post values were assessed by unpaired t' test in both the groups which has mentioned in (Table- 3). In group A, P-value was significant i.e. P<0.05 with NPRS score as well as NDI score (0.001) and (0.003) respectively whereas group B shows P-value i.e. P<0.05 with NPRS score as well NDI score (0.053) and (0.081) respectively seeing the values the study shows that this technique found more improvement to increase in reducing pain and disability as compared to that technique.

The measurement has been taken for pain and disability by NPRS and NDI. The measurement has been taken on each treatment on 1st day till 12th day. All the 30 patients in positional release therapy and deep transverse friction massage for pre and post interventional study are expressed in terms of mean and S.D. further, the application of unpaired t' test to find the significant difference between pre and post interventional study in positional release technique and deep transverse friction massage, which revealed significance difference for the 15 patients each group individuals at 5% level of significance. A study was conducted by Sumit Raghav et.al on the effect of mulligan's technique (SNAG's) versus deep transverse friction massage on patient with mechanical neck pain [16]. This study was done to find out the difference between the effect of two manual therapies i.e., SNAG's and DTFM, on patients with mechanical neck pain. The study was of an experimental design, with 30 subjects, 12 were female, 18 were male, and all subjects were assigned into two groups, 15 subjects in each, according to criteria (inclusion & exclusion) and carried out at physiotherapy OPD of CSS Hospital. In both groups, disability & pain were assessed by using the NDI & NBQ score respectively. The collected data were of men and standard deviation of NDI & NBQ score and has been analyzed using SPSS software. Paired T-test was used to find the difference between two groups. The results showed that there was significant difference in pain and disability with their outcome score NDI and NBQ score (p=0.000).

Another study was conducted by Sheetal Rajawadha *et al*. [17] on Effect of muscle energy technique and positional release therapy on Quadratus lumborum in sub-acute mechanical low back pain. The purpose of this study was to compare the effectiveness of muscle energy technique and positional release technique on quadratus lumborum along with conventional physical therapy treatment in patients with sub-acute mechanical low back pain. 60 subjects, including both males and females, aged from 18 to 45 years. Subjects allocated randomly into 2 treatment groups. Group A received muscle energy technique and Group B received positional release technique. Pain intensity level and lumbar range of motion was measured using visual analogue scale (VAS), modified Schober test (MST) and finger to floor test (FTFT) respectively pre and post intervention i.e. after 2 weeks intervention. There was significant improvement in both MET and PRT groups. Statistical comparison of the result showed that Group B had greater improvement in pain as compared to Group A. PRT along with conventional treatment appeared to be more effective than MET to reduce sub-acute mechanical low back pain.

A study was conducted by Khyati Varshney and Sumit Raghav [18] on short term effect of positional release therapy versus conventional physiotherapeutic programme on pain and disability among undergraduate physiotherapy students with non-specific neck pain. The study was a randomized controlled trial with a sample of 10 subjects, 6 were female, 4 were male, and all subjects were assigned according to criteria (inclusion & exclusion) and carried out at physiotherapy OPD of CSS Hospital, Meerut. The subjects were equally divided into two groups such as group A (5 subjects, 2 male and 3 female), Group B (5 subjects, 2 male and 3 female). Pain and disability was assessed by using VAS and NDI questionnaire respectively. The subjects were reassessed at 3 weeks after completion of intervention. All analysis was obtained using SPSS version 20.0. Base line data of the patients including pain and disability were summarized. The dependent variables for the statistical analysis were VAS and NDI score. A base line data was taken and analyze. Paired and unpaired t-test was used in this study. A level of significance 5% was used to determine the statistical significance. On measurement of Mean, Standard Deviation, t-test value and p-value, the results showed that there was significant difference in pain and disability with their VAS and NDI score (p=0.000) respectively. On comparison the data of group A showed significant difference in pre to post score VAS and NDI than the data of group B. Study concluded that the difference from 1st to 21th day in VAS &NDI score which shows that Positional release therapy (PRT) was more effective than conventional Physiotherapeutic programme in order to decrease pain and disability in patients with no-specific neck pain.

**Conclusion**

The study shows that the therapies utilized for protocol were

effective for improving mechanical neck pain and disability. The study revealed that both therapies were effective in reducing pain and disability, but on comparison, positional release therapy was more effective than deep transverse friction massage in term of improvement of pain and disability at the level of 5% significance. This study concludes that the patients who received positional release therapy along with moist heat pack has more impact on pain and disability as compared to those received deep transverse friction massage along with moist heat pack follow-up 4 weeks protocol.

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**Conflict of Interest:** None

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