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Immediate effects of lumbar manual traction on pressure pain threshold in information technology professionals

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Abstract
Title: Immediate effects of Lumbar manual traction on pressure pain Threshold in information technology professionals.
Background: Lumbar spine is the most involved region in people who are involved in working for long duration which demands sitting. This usually results in pain, decreased ROM which eventually results in work disability. By using lumbar manual traction on L5 pain pressure threshold can be increased which will help in limiting the pain and increase the ROM.
Aim: To determine the effect of lumbar manual traction on pressure pain threshold on information technology professionals.
Method: Study involved 30 participants (information technology professionals). Pain pressure threshold with the help of a pressure algometer was taken pre and post intervention and then data analysis was done using paired "t" test.
Outcome Measure: The outcome measure was the pressure algometer.
Result: The data of the present study was analyzed using statistical method of paired t test. The Result showed statistically highly significant increase in the pain pressure threshold post manual traction. The T values obtained were 7.503, 6.924, and 5.757 which were considered as highly significant.
Conclusion: From the present study we conclude that lumbar manual traction increases the pain pressure threshold in information technology professionals.

Keywords: lumbar manual traction, pain pressure threshold, pressure algometer

1. Introduction

Computers have become a personification of modern life, being used in every aspect of life from calculating grocery bills, banking operations, telecommunication, name any sphere and one will find computer. With use of Internet technology distances carry information anywhere in the world is accessible just with a click of mouse. India has been in the vanguard in cyber world with IT industry developing into a major service provider. India being the forecast in the cyber world, there is an urgent need to understand the dynamics of these problems and prevent it from assuming epidemic proportions [1]. The term work-related musculoskeletal disorders (WMSD) comprises various conditions both clinically defined and clinically undefined that affects the nerves, tendon, muscles and support structures; the conditions are products of the accumulated effect repeated traumas associated with the labor risk factors. The most common cause for these disorders is static body positions, repetitive movements, prolonged muscular contraction, and the use of force [2].

Prevalence of Work-related Musculoskeletal Disorders (WMSD's) is increasing among Computer workers throughout the world. Approximately 76% of Indian population have musculoskeletal discomfort in different epidemiology in Computer professionals. More than 10% of of the computer user group 0-2 % of the controls reported daily pain in neck, shoulder, upper extremity, and lumbar region. Various factors contribute to Back Pain in Information Technology Professionals and these factors include Individual risk factors, Work-related physical risk factors such as poor posture, Work related psycho-social factors and Occupational risk factors. The working environment of IT Professionals is unique [3].

Since the time of Hippocrates, there are various form of spinal traction being described for pain relief. The word traction is a derivative of the Latin "tractico", which means "a process of drawing or pulling [4]. Traction has been used as a medical intervention since antiquity [5]. It is widely used for the treatment of lumbar spine conditions and for improving joint mobility, pain relief and for normalization of neurological deficits. It is more effective than hot packs, corset, massage, manipulation and bed rest. Traction improves signs and symptoms by both biomechanical effects, such as separation of the intra vertebral motion segment and neurophysiologic effects, and modulation of nociceptive input in either the ascending or descending pathway [6].

Lumbar traction force applied is continuous or intermittent either manually or mechanically. Aim of the lumbar traction is to decrease the back pain related with back muscle spasms and lumbar nerve root impingement. It is used for treating herniated disc, degenerative disc diseases and osteoarthritis. It also increases the space between vertebrae and promotes healing. It is applied in longitudinal force to the spinal column. It is very effective and does wonders for realigning a dislocation and stabilizing the injuries of lumbar spine.[7]

The Mulligan concept is an integral component for many manual physiotherapists in the clinical practice. Brian Mulligan established the techniques of this concept in New Zealand in the 1970s. The concept has its foundation built on Kaltenborn's (1989) principles of restoring the accessory component of physiological joint movement [8]. Brian Mulligan has developed a most ingenious and inventive

compilation of manual techniques. Techniques are performed in symptom free or pain-free range of motion a factor that possibly makes it, safer than many other manual therapy approaches. Mulligan has described various techniques such as Bent Leg Raise, Compression Straight Leg Raise and Traction Straight Leg Raise (TSLR) [9].

Pressure pain threshold (PPT) has been used extensively to evaluate the perception of Pain, and the efficacy of therapeutic interventions for the treatment of pain [10]. PPT was defined as the amount of force required to elicit a sensation of pain distinct from pressure or discomfort [10]. Pressure pain threshold (PPT) is an investigative tool for measurement of muscle tenderness [11]. Mechanically evoked pain, and the pressure pain threshold (PPT), is a popular model for inducing acute, experimental pain. Algometry is been used widely in both clinical and laboratory settings and is a useful technique in determining PPT measures. Pressure algometry is a manual procedure that requires a perceptual response from the participant or patient. The reliability of PPT data is, therefore, dependent upon both the application technique of the observer, and also the ability of the patient or participant to provide a consistent verbal indication of the PPT level [12]. the algometer tested had high reliability and validity values when compared with force plate readings. This supports previous research by Fischer, Ylinen *et al*., and Nussbaum and Downes, demonstrating acceptable intra-examiner reliability of pressure rate application. Considering these results, it may be safe to claim that, with practice, the use of this algometer is reliable and valid.[13]

2. Aim

- To determine the effect of lumbar manual traction on pressure pain threshold on information technology professionals.

3. Material and Method

3.1 Design

The design was experimental study conducted in Department of Orthopedic Physiotherapy, Dr. A.P.J. Abdul Kalam College of Physiotherapy, PIMS, Loni. The study duration was for 2 months. The outcome measure was Pressure Pain Threshold for identifying severity of pain was assessed before and after the lumbar manual traction. The study was approved (Ref. No. PIMS/CPT/IEC/2018/558) from the Institutional Ethical Committee of Dr. A.P.J. Abdul Kalam College of Physiotherapy, Pravara Rural Hospital. Written informed consent was obtained for experimentation with human subjects.

3.2 Participants

Study was done using simple random sampling. 60 participants were screened out of which 30 participants were selected for the study were Information Technology Professionals from Pravara Rural Hospital, Loni.

4. Procedure

All the participants were selected from Pravara Institute of Medical Sciences, Loni and were screened according to inclusion and exclusion criteria. The participants were explained about the type of study benefits and hazards. Then informed written consent was obtained from the participants regarding the procedure prior to the study. Then they were evaluated for pressure pain threshold using Algometry device and the pressure pain was noted after that the participants were given lumbar manual traction and then the effect of the traction was noted by using the Algometry device.

Patient Position: Crook Lying. Therapist Position: Standing towards the foot end of the patient.

Belt Placement: Therapist secures the belt at the desired lumbar level. Belt is secured at the radical groove outside the therapist's arm.

Hand Placement: Therapist makes fists with both hands and rests them on the foot end of the plinth.

Traction: Therapist applies the traction by shifting his body weight backwards i.e., simply leans back to apply vertical pull/traction along the long axis of the vertical column.

Traction is sustained (for 30 secs).

Patient's own body weight will counterforce.

According to Mulligans Grades

Day one Grade one Loosen will be given.

Day two Grade two Tighten will be given.

Day three Grade Three Stretch will be given.

Before and After the Traction Pressure Pain Threshold will be checked.

5. Statistical Analysis

Table 1: Comparison of mean in pre and post intervention of Lumbar Manual Traction

Grades	Mean ±SD		P value	T value	Result
	Pre	Post			
Grade 1	9.83 ±1.93	10.93±1.98	<0.0001	7.503	Extremely significant
Grade 2	11.56±1.68	12.46±1.88	<0.0001	6.924	Extremely significant
Grade 3	12.76± 1.88	13.83± 2.35	<0.0001	5.757	Extremely significant

Results of this study stated that, it is extremely significant.

6. Discussion

The present study "Immediate effect of lumbar manual traction on pressure pain threshold in Information Technology Professionals" was conducted in department of Orthopedic Physiotherapy in Dr. A. P. J. Abdul Kalam College Of Physiotherapy; Loni, Taluka Rahata, District Ahmednagar, Maharashtra, India. In this study thirty (30) information technology participants with the age 25 to 45 years were included and Pressure Pain Threshold (Algometer) was taken as outcome measures. The main purpose of this study was to find out the immediate effect of lumbar manual traction in low back pain of information technology professionals. In this study 30 participants were given manual lumbar traction for 3 days with 3 different grades for 30 secs. The Karltenbon Grades were given which are loosen, tighten and stretch. First day Grade one was given which is loosen. Second day Grade two was given which is tighten. Third day Grade three was given which is stretch. Pressure Pain threshold was checked before and after the Lumbar manual traction. The study was carried out by L. Exelby on The Mulligan Concept: its application in the management of spinal conditions in UK concluded that the

strength and enduring capabilities of this concept lie in the founder's philosophy of encouraging integration of these techniques into individual therapist clinical practice. This has resulted in constantly evolving concept that has stood the test of the time. Clinical examples serve to illustrate the general use the concept's principles and how it can also be incorporated with the functional activity to assist in correcting joint positional faults improved quality movement patterns. In the light of present physiotherapy evidence-based practice, a future research direction for this concept is proposed which is similar to our result [8].

The effects of spinals traction are distraction or separation of the vertebral bodies; a combination of distraction and gliding of the facet joints; widening of the intervertebral foramen; tensing of the ligamentous structures of the spinal segment; stretching of the spinal musculature; and straightening of spinal curves.[4] Muscle spasms result in nonalignment of the vertebrae. Consequently, muscle spasm leads to pain and adhesion. Lumbar traction decreases pressure on the vertebral foramen by releasing tension in the spinal muscles. It is used to reduce muscle spasms and improves alignment. Lumbar traction reduces pressure on the vertebrae and tension in soft tissue. Also, the nucleus pulposus can be moved inward by lumbar traction [14]. Another study carried out by Aatit Paungmali, Patroporn Sitilertpisan *et al*. on Intra-rater Reliability of Pain Intensity, Tissue Blood Flow, Thermal Pain Threshold, Pressure Pain Threshold and Lumbo-Pelvic Stability Tests in Subjects with Low Back Pain in USA concluded that the test-retest reliability of various quantitative measures that could be utilized in a study to investigate characteristics and evaluate effects of intervention for on low back pain. It suggests that most of the measures are reliable for the study of non-specific low back pain, however the CPT should be applied with care as it has potential of measurement error and a great variation among individuals. Therefore, a robust measurement procedure and a familiarization protocol should be considered for obtaining an acceptable reliability, minimizing measurement and systematic errors, and eliminating the learning effect [15]. There was an immediate increase in the pressure pain threshold after applying the lumbar manual traction, but the long-term effect was not evaluated. Manual traction for lumbar region is also very helpful in increasing the ROM, limiting the pain. People who work for longer time which involves sitting, it usually affects the spine which creates a discomfort while working which results in pain and decrease ROM so by applying manual traction on the spine this can be overcome.

7. Conclusion

The present study concluded that there is significant effect of manual lumbar traction on pressure pain threshold in information technology professionals.

8. Limitation

- Despite the widespread use of traction there's little where therapists know about the mode of effect and its application.
- Small sample size
- Study conducted was for a short duration.

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