



Immediate effect of ankle manual distraction on pressure pain threshold in peons

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Abstract

Background: Ankle joint is the most common joint involved in people who are involved in working for long duration which demands standing continuously. This usually results in pain, decreased ROM which eventually results in work disability. By using ankle manual distraction on ankle joint pain pressure threshold can be increased which will help in limiting the pain and increase the ROM.

Objective: The objective of this study was to find out the effectiveness of ankle manual distraction on pain pressure threshold in peons.

Method: Study involved 30 participants (peons). Pain pressure threshold with the help of a pressure algometer were 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 distraction. T value was 9.907 which is considered as highly significant

Conclusion: From the present study we conclude that ankle manual distraction increases the pain pressure threshold in peons.

Keywords: manual distraction, pain pressure threshold, pressure algometer

1. Introduction

Gait and mobility impairments are very common and are usually associated with increased risk of falling among nursing home residents and peons [1]. Among peons and manual handling workers musculoskeletal symptoms are prevalent in single and multiple body regions. Among manual handling workers lower back symptoms were the most frequent followed by the shoulders, then the upper back, hips-upper legs, and neck and then ankle [2]. Among the working population pain at multiple sites concurrently is a common phenomenon. It poses a considerable threat to work ability. It is considered as an important risk factor for reduced work ability [3]. Musculoskeletal pains has effects on work disability which are direct and immediate [4].

Pressure pain threshold is defined as the minimal amount of pressure that produces pain. Commonly used pressure algometer is a simple handheld pressure algometer (PA) with a spring, although more sophisticated electrical devices have been developed with a strain or pneumatic pressure gauge. The PA is placed perpendicular to the tissue surface and pressure is applied steadily at a constant rate. Compression should be applied slowly enough to allow the subject time to react when the subject complains of pain. Once the subject complains of pain the action of pressure is stopped [5].

Pain pressure thresholds occur at the minimum transition point when the pressure applied is sensed as a pain. It is used for determination of hot spot tenderness and diagnosis of myofascial pain dysfunction syndrome and its syndrome characterized by tender myofascial trigger points. The term algometer may denote pressure tolerance testing or the maximum amount of pressure one may endure [6].

The exact mechanism of action for distraction is unknown however it is believed that the biologic aspects of cartilage regeneration are most likely to occur in a mechanically

unloaded, well aligned limb. The stiffness may allow for sufficient stress shielding of the circular ring fixator at the ankle joint to allow subchondral bone remodeling which is of clinical benefit [7].

Effect of manual distraction on ankle joint on pain pressure threshold has not been studied on peons as it is studied on subjects with history of ankle pain and foot pathology hence, to know whether there will be a significant change in pain pressure threshold this study is conducted.

2. Materials and Methods

Type of Data: Data was primary collected by principal investigator

Study Design: Experimental

Sample size: Sample size for the study of 30 peons

Study population: age of 18 to 23 peons

Sample method: simple random sampling

Study Duration

- **Equipment to be used :** pressure algometer

Materials to be used

- Consent form
- Data collection sheet
- Recording Sheet
- Pen
- Pencil

Selection Criteria

- **Inclusion criteria**

Participants included will be:

- Peons.
- Both male and female peons.
- Those willing to participate.

Exclusion criteria

Participants excluded will be:

- Peons with any pathological conditions.
- Pre-existing neurological or other orthopedic conditions

3. Procedure

Pre and post pressure pain threshold will be measured and the differences would be compared. Pressure algometer would be placed on medial malleoli and pressure threshold would be measured before applying distraction, later distraction would be applied. The subject would be in supine position when distraction would be applied. Distraction would be given for 30 seconds, once the distraction is applied, pressure pain threshold would be measured. Once the measurements are noted that would be compared whether there is a significant increase or decrease in the pressure pain threshold.

4. Results

In this study 30 peons were taken out of which 15 were males and 15 were females with the age group between 18-23 years of age. Pre and post distraction outcomes were taken and compared out of which the mean of pre distraction was 14.029 and mean of post distraction was 16.029. The P value is <0.0001 which is considered extremely significant. The T value is 9.907 with 34 degrees of freedom.

Table 1

PRE	14.029	P value	T value	Result
POST	16.029	0.0285	9.907	Highly Significant.

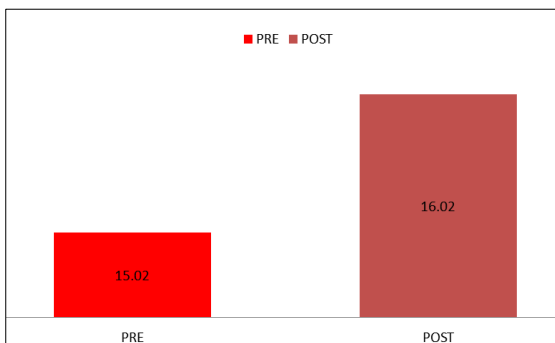


Fig 1

Table 2: Demographic Data

Age	18-23 Years
Gender	No. Of peons
Males	15
Females	15

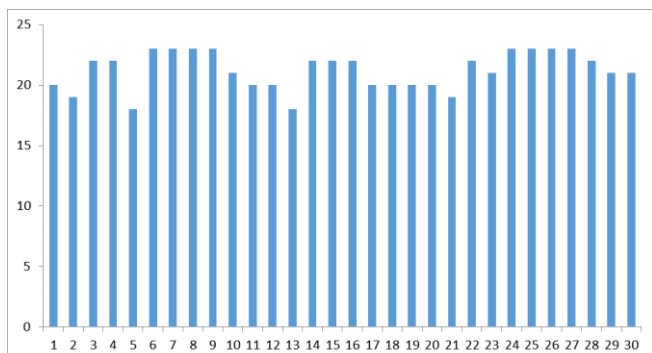


Fig 2

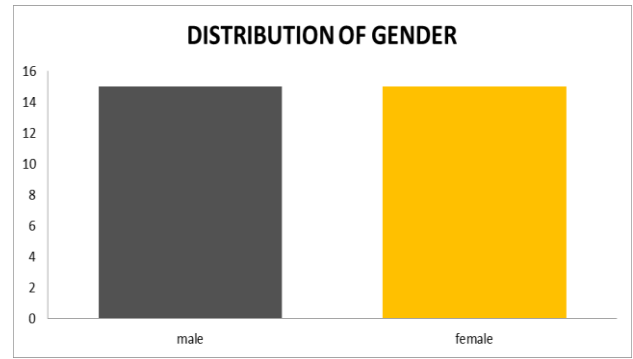


Fig 3

5. Discussion

The present study “Immediate effect of ankle manual distraction on pain pressure threshold on peons.” was conducted in the department of musculoskeletal physiotherapy in Dr. A.P. J. Abdul Kalam College of physiotherapy, Loni, Taluka Rahata, District Ahmednagar, Maharashtra, India.

In this study 30 peons with age 18-23 years were included and pain pressure threshold were taken as outcome measures. The main purpose of this study was to find out the effect of manual ankle distraction on pain pressure threshold in the peons. Therapeutic mechanism for the widely taught and employed manual physical treatment mobilization have been vaguely proposed and minimally investigated. Investigations that have been carried out of mechanical effects of both the process as well as its implied structural-anatomical-biomechanical changes have generally been unsupportive of either. There is a growing realization that the clinical consequence of mobilization may be largely (if not altogether) neurological, i.e. through the activation of various endogenous pain inhibitory systems.

For capsular restrictions joint mobilization is indicated. Before applying joint mobilization technique it is important to know the underlying history. To maintain long term function and mobility joint mobilization is essential. Joint mobilization also provides a neurophysiologic effect that reduces the pain and muscle spasms and mot only to restore motion. While applying this technique, the practioner should maintain close approximation to the joint being mobilized and also use the legs and the body to transfer weight and provide the force needed for the mobilization. Preliminary evidence has suggested that ankle joint mobilization improves the contributions of spinal influences on ankle muscle activation in individuals with ankle joint pathology, but there is a considerable gap in understanding cortical contributions to muscle activation following joint injury. However it is unknown how joint mobilization concurrently affects cortical and spinal neural motor pathways, as well as clinical measures of patient function. The investigators hypothesized that the higher intensity joint mobilization will result in a greater increase in cortical and spinal activation of the fibularis and soleus muscles than the lower intensity joint mobilization. Grade V joint mobilization will result in greater improvement in ankle dorsiflexion ROM than the lower intensity.

Another study was conducted by Pamela Teys, Lenne Bisset, Bill Vicenzino about the specific manual therapy techniques used to treat painfully limited shoulders and their effects on range of movement and pressure pain threshold. The previous study was to investigate the initial effects of Mulligans

mobilization with movement technique on shoulder range of movement in the plane of scapula and pressure pain thresholds in participants with anterior shoulder pain which showed the positive results indicate that the specific manual therapy treatment has an immediate positive effect on both range of movement and pain in subjects with painful limitation of shoulder movement.

As considering the results of this study on the shoulder joint, the result of the present study are also showed significant result of the immediate effect of mobilization on the pressure pain threshold on ankle joint which states that initial effects of Mulligans mobilization with movement technique on pressure pain threshold are also effective for ankle joint.

As study stated by Max Zusman, A new neurological model whose induction parameters conform quite closely to the clinical process names, mechanical stimulus –induced inhibition of pain through the creation of long term depression of central nervous system synaptic function. Joint mobilization is one of the methods to enhance the frequency of discharge from the mechanoreceptors, thereby diminishing the intensity of many types of pain. Joint mobilization techniques help to regain the accessory motions. Mitigating capsular restrictions and breaking adhesions, distracting impacted tissue, and prociding movement and lubrication for normal articular cartilage are the effects of joint mobilization. Pain reduction and decreased muscle tension are achieved through the stimulation of fast-conducting fibers (type A-Beta and A-alpha fibers) to block small pain fibers (type C afferent fibers) and through the activation of dynamic mechanoreceptors which produces reflexive relaxation, this same mechanism is responsible for effecs produced after mobilization in the following study.

A study was conducted by Ki-Seong, Seong-Doo Park on the effects of mobilization and active stretching on the difference of weight bearing distribution, low back pain, and flexibility in pronated –foot subjects in which the range of flexion and extension motion of the lumbar vertebra and low back pain degree and difference of the weight bearing were measured before and after the experiment. The model of ankle mobilization and calf muscle stretching of pronated foot significantly improved the range of motion and extension motion of the vertebrae. The exercise of this study showed that the model of ankle mobilization and calf muscle stretching of pronated foot had positive effects on improving range of flexion and extension motion of the vertebrae.

Long term effects of mobilization for four weeks showed effective results on the pressure pain threshold on shoulder joint which states that on the basis of the results of the present study, future studies can be conducted in order to analyze the long term effect of mobilization on ankle joint.

There was an immediate increase in the pain pressure threshold after applying the manual distraction but the long term effect was not evaluated. Manual distraction for ankle sprains is also very helpful in increasing the ROM, limiting the pain. People who work for a longer time which involves standing for a long duration, it usually affects the ankle joint which creates a discomfort while working which results in pain and decreased ROM so by applying manual distraction on the ankle joint this can be overcome.

6. Conclusion

The present study concluded that there is a significant effect of ankle manual distraction on pain pressure threshold in peons.

7. References

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