



EFFECTIVENESS OF RIGID TAPING AND ANKLE STRENGTHENING EXERCISE v/s ANKLE STRENGTHENING EXERCISE ON DYNAMIC BALANCE IN CHRONIC ANKLE INSTABILITY IN CONSTRUCTION LABOURERS – A COMPARATIVE STUDY

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ABSTRACT

Background: Lateral ankle sprains are very common injury among 80% of injury to the ankle this can cause damage to muscle, nerve, and ligament Repeated lateral ankle sprain cause chronic ankle instability Patients with chronic ankle instability often exhibit in strength because muscle weakness is associated with chronic ankle instability Strength training reduce Sordination and lack of postural control. Ankle Tapping using rigid tape gives mechanical restriction of ankle movement and reduces the risk of repeated lateral ankle sprain. **Purpose of study:** according to evidence chronic ankle instability is the most prevalence simpairment in construction labours there is lack of evidence have observe the effect of added rigid tapping with ankle strengthening exercise resulting reduce chronic ankle instability in association of rigid tapping and stander ankle strengthening protocol can assist in expanding the knowleged in field and may reduce the treatment duration. **Aim:** To compare the effectiveness of rigid tapping and ankle strengthening exercises vs ankle strengthening on dynamic balance in construction labour having chronic ankle instability. **Methodology:** The study was performed between Jan 22 to Jun 22 sample size of 30 labours who are working for more than 4-5 years and had lateral ankle sprain at least 6 months back were taken into consideration. SEBT Test where performed before and after the intervention. In group 1 strengthening session were performed with resisted band was done for 3 time a week for 4 week and pre and post data was collected and analysed group 2 Strengthening + rigid Tapping was done for 3 time a week for 4 weeks pre and post data was collected and analysed. **Study Design:** comparative study. **Outcome Measure:** Star execution Balance Test. **Result:** In this study group received rigid tapping and strengthening exercise protocol the P value is less than 0.0001 which consider statistically significant functional reach Distance on SEBT in chronic ankle instability in construction labours with pre and post test score where group 2 Received only strengthening protocol the P value is less than 0.0001. **Conclusion:** Based on this study we can conclude that rigid tapping + strengthening exercise are effective than only strengthening exercise in chronic ankle instability in construction labours.

KEYWORDS : chronic ankle instability , ankle strengthening , Rigid tapping , Dynamic balance

INTRODUCTION

Foot and ankle must be stable to provide an adequate base of support and function as a rigid lever for pushing off when walking, running or jumping. In contrast, the foot must also be mobile to adapt to uneven terrain, absorb shock and dampen the rotation impose by proximal joints of lower extremity.

As per the data available, out of total population in India, approximately 315 million people are laborer's and out of which 94 million people are construction workers, facing a lot of health problems because of manual material handling activities at the workplace. Construction industry is the second largest industry of the world.

This industry is most hazardous in the world, it includes constant use of manual handling of heavy construction work. They face job-related safety and ergonomic hazards from lifting heavy loads. The mean age of construction workers is 28 years. The mean work hours are 10 hours/day or 68 hours/week.

Lateral ankle sprain is very common injury account for 80 % of injury to the ankle this muscle, nerve, can cause damage to the ligament. Repeated occurrence of lateral ankle sprain can lead to chronic ankle instability which is characterized by subjective feeling of recurrent instability.

Repeated episode of giving way weakness during physical activity. Patient with chronic ankle instability often exhibit in strength because muscle weakness is associated with chronic ankle instability.^[1]

Strength training is an essential part of rehabilitation protocol to reduce the residual symptoms and we hope to prevent further episode of instability. Strength training improve the physical conditioning of participant with ankle instability. Strength training is thought to promote muscular gain during the first 4 to 6 week because it enhances neural factor therefor strength training may improve proprioception and balance deficits.^[1]

Most author who has investigated the effect of strength training in people with chronic ankle instability have use resistive band exercise for 4 to 6 weeks.

Weak muscle strength cause decrease co – ordination and lack of

postural control caused by motor sensory function in the ankle muscle, tendon, and soft tissue Ankle tapping using rigid adhesive tape is used to promote ankle that are unstable or at risk of injury through the mechanical restriction of ankle movement.^[1]

Need Of Study

According to evidences chronic ankle instability is the most prevalence impairment in construction labors. Rigid taping and ankle strengthening exercise are both readily available, reliable and valid measures for reducing chronic ankle instability. However, there are lack of evidences have observed the effect of added rigid tapping with ankle strengthening exercises results in reducing chronic ankle instability. An association of rigid tapping with standard ankle strengthening protocol can assist in expanding the knowledge in the field of dynamic balance and may reduce the treatment duration in various pathological states of the lower limb.

Review Of Literature

1) Six occupational groups were examined in this study. The mean age of the construction workers was 28.17 years. The mean work hours per day and per week for the construction workers were 10.43 hours and 68.14 hours, respectively. A total of 107 (39.92%) workers worked for more than 12 hours per day. Almost all the construction workers worked overtime every week for which they were paid extra.

2) This paper investigated frequency and continuity of work-related musculoskeletal symptoms for construction workers. A questionnaire survey and structured interviews were conducted. It was found that the musculoskeletal symptom is common among most construction workers, practically in their upper extremities and lower back.

All respondents reported that they had experienced at least one musculoskeletal symptom in the 11 body locations including neck, shoulder, upper back, upper arm, elbow, forearm, wrist, lower back, hip, knee, and ankle. Recommendations to reduce problems occurred for work-related musculoskeletal symptoms were also discussed. References Amell, T.; Kumar, S. 2001. Work-related musculoskeletal.

Aim

To compare the effectiveness of rigid tapping and Ankle strengthening exercise vs Ankle strengthening on dynamic Balance in construction laborer's having chronic ankle instability.

Objectives

- To study the effect of rigid taping and ankle strengthening on dynamic balance in construction laborer's having chronic ankle instability.
- To study the effect of ankle strengthening exercises alone on dynamic balance in construction laborer's having chronic ankle instability.
- To compare between them.

Hypothesis

Null hypothesis -

There will be no add on effect of rigid taping and ankle strengthening exercise over ankle strengthening exercise in construction laborer's having chronic ankle instability.

Alternative Hypothesis -

There will be add on effect of rigid taping and ankle strengthening exercise over ankle strengthening exercise in construction laborer's having chronic ankle instability

Methodology

- 1) Sample size- 30
- 2) Study design- Comparative study
- 3) Sampling method- purposive sampling
- 4) Study population- laborer's
- 5) Study setting - construction site in and around Pune
- 6) Study duration- 6 months

Inclusion Criteria:^[4]

1. Laboure's who are working since 4-5 Years
2. work time 10 hours /Day or 64 hours/week
3. Age (20-30 years)
4. Gender Male and female
5. 1 or 2 lateral ankle sprain for at least 6 months back.
6. Recurrent ankle sprain

Exclusion Criteria:

- 1) Acute ankle ligament injury
- 2) Any Neurological Condition
- 3) Peripheral vascular condition
- 4) Any Congenital Deformity
- 5) pregnant women

Materials Used

- 1) Paper
- 2) Star excursion balance scale.
- 3) Measuring tape
- 4) Rigid tape, Under wrap
- 5) TheraBand

Procedure

- Study was begin with the presentation of synopsis to an ethical committee and clearance would obtained.
- Baseline testing for isometric strength was performed
- Session for the resisted band group 3 / week for 4 week under the supervision of the researcher.
- The procedure are based on TheraBand and protocol developed by DOCHETRY ELAL
- Exercise are in 4 directions
 - Dorsiflexion
 - Plantar Flexion
 - Inversion
 - Eversion
- Participants were instructed to use only the involve ankle joint to maintain a consistent pace of approximately 3 to 5 second per repetition
- Each week (For consecutive 4 weeks) participants are progressed by increasing number of sets (From 3 sets to 4 sets of 10 repetition) and band resistance (Light blue[heavy], Dark blue [super heavy]) or both.^[1]

Outcome Measure

Star Excursion Balance Test (SEBT) scale – The person performing the test must maintain his balance on one leg while using other leg to reach as far as possible in 8 different directions. The point of reach is marked and distance is measured in cm (3 readings are taken and average is considered) and reading is normalised by dividing it with limb length multiplying by 100.^[3]

DATA COLLECTION AND ANALYSIS:

Table 1: Comparisons For SEBT Medial In Group 1 And Group 2.

SEBT MEDIAL					
GROUP		MEAN	SD	T VALUE	P VALUE
GROUP 1	PRE	94.12	6.67	23.82	0.0001
	POST	99.32	6.80		
GROUP 2	PRE	81.86	10.48	17.80	0.0001
	POST	84.73	10.37		

Table 2: Comparisons For SEBT Posteromedial In Group 1 And Group 2.

SEBT POSTEROMEDIAL					
GROUP		MEAN	SD	T VALUE	P VALUE
GROUP 1	PRE	97.04	7.46	23.04	0.0001
	POST	101.8	7.28		
GROUP 2	PRE	76.74	20.07	1.45	0.1672
	POST	84.76	7.39		

Table 3: Comparisons For SEBT Anteromedial In Group 1 And Group 2.

SEBT ANTEROMEDIAL					
GROUP		MEAN	SD	T VALUE	P VALUE
GROUP 1	PRE	84.94	6.26	8.3004	0.0001
	POST	91.0	5.48		
GROUP 2	PRE	81.71	9.11	11.57	0.0001
	POST	84.36	8.82		

RESULTS

In this study group 1 received Rigid Tapping and Strengthening exercise protocol the P value is <0.0001 which consider Statistically Significant functional reach distance on SEBT in chronic ankle instability in construction labourers with pre and post test score

DISCUSSION

This study was done to see the add on effect of rigid tapping over standard strengthening protocol for chronic ankle Instability in construction workers.

Total 30 participants selected on the basis of inclusion and exclusion criteria and were divided into group A (15 participants) and group B (15 participants)

Group A received standard ankle strengthening exercise protocol with rigid tapping group B received only standard ankle strengthening protocol.

CAI is characterized by a range of deficits that can be evaluated along a continuum of sensorimotor measures. It is apparent that conscious perception of afferent somatosensory information, reflex responses, and efferent motor control deficits are present with ankle instability¹.

The main causes of chronic ankle instability that have been found are: decreased proprioceptive abilities because of a loss of mechanoreceptors and decreased muscle strength of invertor and evertor muscles. When lateral ankle sprain (LAS) occurs, damage not only occurs to the structural integrity of the ligaments but also to various mechanoreceptors in the joint capsules, ligaments, and tendons about the ankle complex.

We believe the more likely mechanism for our results was the muscle spindle for strengthening exercise. The muscle spindle has two basic physiologic Responses. The static response signals sustained spindle Length (i.e. sustained muscle stretch) and instantaneous spindle Length, while the dynamic response signals the rate of Length changes. In addition to the sensory endings, the Spindles also receive connections from static and dynamic gamma-efferent nerves, which enhance the afferent responses. We believe it is possible that the strength training may have increased gamma-efferent activity. Specifically, the spindle May have been more sensitive to instantaneous stretch, Resulting in greater acuity in sensing joint position^[6] We found that strength training protocol increased joint position sense in subject with functional ankle instability. These finding suggest that strength training can play dual role of increasing both strength and joint position sense.^[8]

When afferent input is altered after injury, appropriate corrective muscular contractions may be altered. Thus, damage to the mechanoreceptors surrounding the ankle joint with an LAS may

contribute to functional impairments and chronic instability subsequent to initial injury.

The improved pro- pception in this study might be related to the close contact between smechano-Receptors; which helped in improving the precise foot position Sense. Also, taping may provide more cutaneous Cues that increase the muscle afferents at the spinal cord level and Increase the motor neuron pool excitability (Feuerbach et al., 1994). Besides taping have been reported to increase the Perceptions of stability.^[8]

CONCLUSION:

Based on this study, we can conclude that rigid taping and strengthening exercise are effective than only strengthening exercise in Chronic Ankle Instability in construction labors.

Limitations:

- Sample size was less.
- Not keeping the tape for longer time due to their nature of work

Future Scope:

- same study can be conducted on the different population (athlete, obese population)

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