



IMMEDIATE EFFECT OF JOINT MOBILIZATION ON ANKLE PAIN AND ROM IN CHRONIC ANKLE SPRAIN.

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ABSTRACT

Background: The ankle joint is the most commonly injured joint of the musculoskeletal system. Ankle sprain are the most common musculoskeletal injury. Dorsi flexion range of motion and pain deficit have been identified following ankle sprain. Talocrual joint mobilizations have been demonstrated to improve dorsi flexion range of motion.

Objectives: The purpose of this study was to evaluate immediate effect of joint mobilization on ankle pain and ROM in chronic ankle sprain.

Method: A randomized controlled study, 54 participants with age group of 17-45 years were included in this study. All participants were randomly allocated into two groups. Group-A treatment group/mobilization group (n=27) and Group-B control group/exercise group (n=27). Group-A received mobilization and group-B received only exercise. Immediately after post intervention DFROM and NPRS were measured. All outcome measure were assessed pre-treatment and immediately post-treatment.

Result: A total of 54 subjects were analyzed and the results were obtained using parametric t-test for within group and independent t-test for between group comparison. The results of this study demonstrate a greater mean increase of 19.37 in DFROM and 1.14 in NPRS found in group-A that mean increase of 18.40 in DFROM and 0.96 in NPRS found in group-B. Which shows that joint mobilization technique improves dorsiflexion range as compared to exercise. But there is no significant relevance with pain.

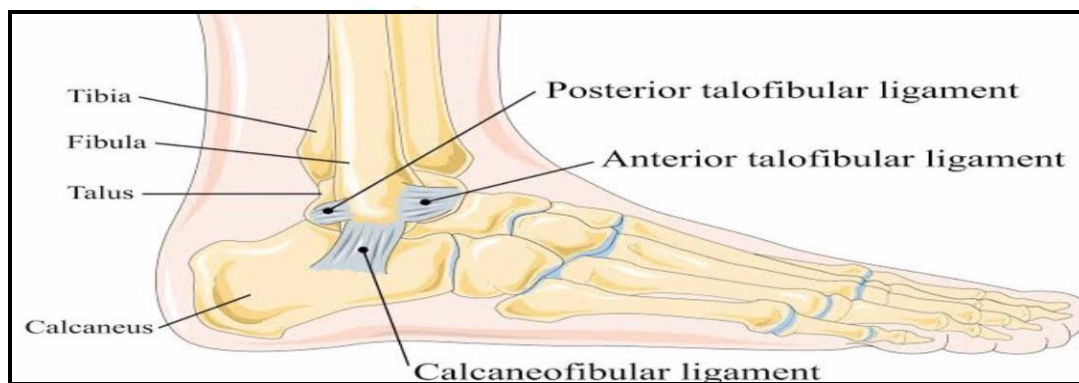
Conclusion: This study has shown that the joint mobilization technique led to greater improvement in dorsiflexion range of motion as compared to exercise. Improve in pain remain same in both groups.

Keywords: Ankle ROM, Chronic ankle sprain, Joint Mobilization, NPRS, Pain.

Overview

The ankle is the most commonly injured joint of the musculoskeletal system. Traumatic ankle injuries, which include sprain, fractures, dislocation, contusion and ruptures of tendons lead to pain and reduced functional capacity of the lower limb. During both the sub-acute and chronic phase after ankle injuries, the fibroplasias process increases the stiffness of the connective tissue, which limits the joint range of motion. The chronicity of this condition may lead to joint misalignment, with decreased posterior glide of talus and consequently, limitation in dorsi flexion ROM.¹

Ankle sprain are of the most common musculoskeletal injuries and have a particularly high incidence among physically active individuals. Additionally, ankle sprain have a high recurrence rate which is associated with the development of chronic ankle instability.²



MATERIALS & METHODS

Study design:

- Randomized controlled study

Participant recruitment:

- Young healthy adults both male and female with chronic ankle sprain.

Source of data:

- Nearby community, South Gujarat Area [Hospital, physiotherapy OPD]

Sample size:

- Sample size – 54
- Treatment group – 27, Control group – 27
- Sample size was calculated using G-Power version 3.1.9.2.
- Effect size – 0.8

- Power – 0.80
- Alpha error – 0.05

Sample method:

- Purposive sampling

Materials:

- Goniometer
- NPRS scale
- Consent form
- Data collection sheet

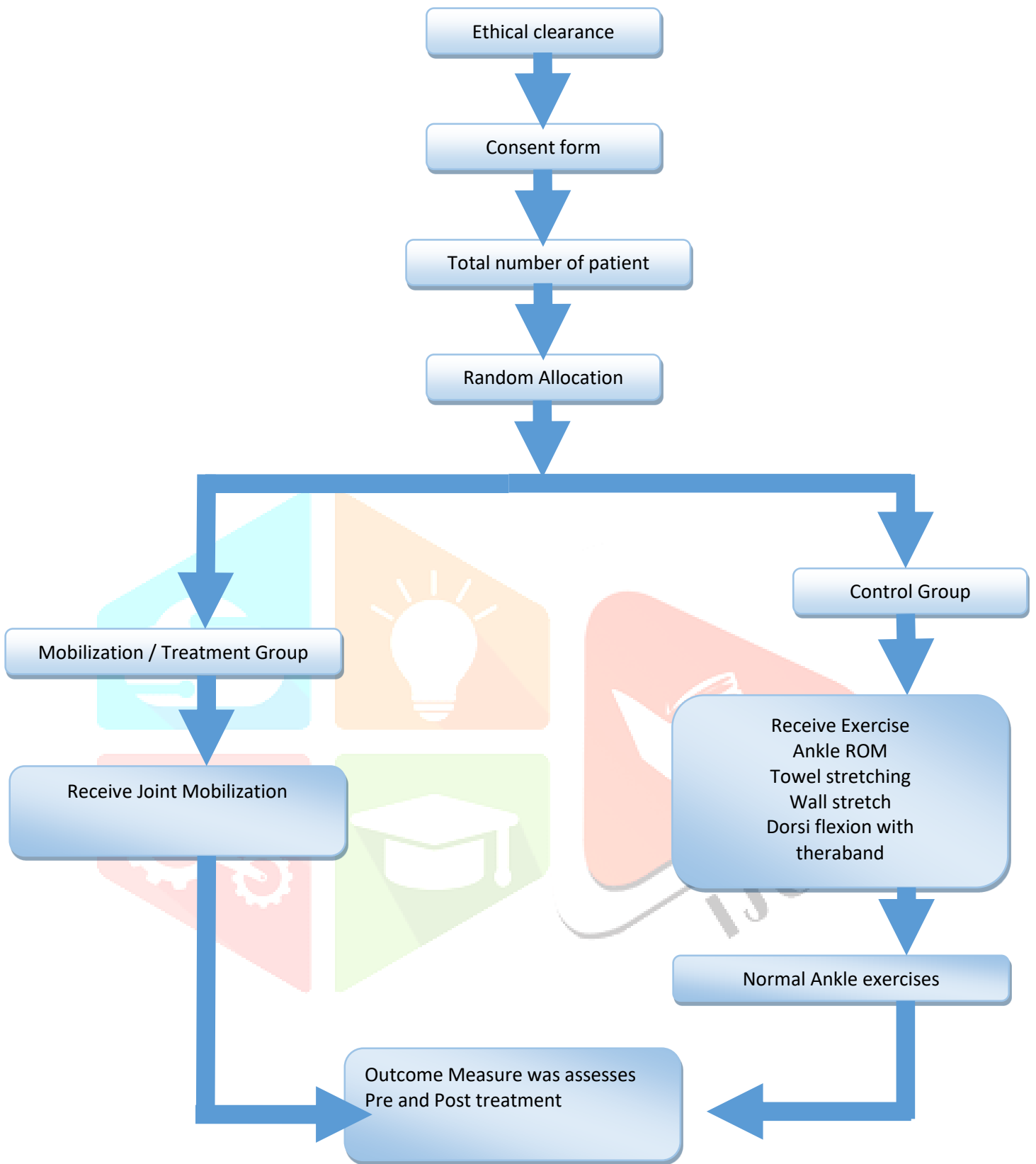
Inclusion criteria:

- Both Male and Female
- Age- 17 to 45 years
- Willing to participate
- Lateral ankle sprain:- 1 week to 4 week.

Exclusion criteria:

- Lower limb fracture < 1 year
- Neurological Impairment
- Medial ankle sprain
- Acute ankle sprain





Group A: Talocrural mobilization

- Indication: to increase dorsiflexion.
- Participant position: supine with the leg supported on the table and the heel over the edge.
- Therapist position and hand placement: stand to the side of patient. Stabilize the leg with upper most hand. Place the palmer aspect of the web space of other hand over talus. Wrap fingers and thumb around the foot to maintain the ankle in resting position.
- Mobilizing force: glide the talus posteriorly with respect to tibia by pushing against the talus.
- **Group B: Exercise group**
- Participants in these groups were performed following exercises:
- Towel stretching (30 seconds hold- 3 repetition), Wall stretch (30 seconds hold – 3 repetitions, Dorsiflexion with TheraBand (10- 15 repetition), Ankle ROM exercise.

Outcome measures:

- Ankle range of motion
- Numerical Pain Rating Scale

Statistical Analysis:

The study was conducted to study immediate effect of joint mobilization on ankle pain and range of motion in chronic ankle sprain. For this purpose, data were collected in form of chronic lateral ankle sprain. All outcome measure were assessed pre-intervention and post-intervention immediately.

All statistical analysis was carried out using specific software (SPSS version 20) and the statistical significance level was kept at $p < 0.05$. The confidence interval was set at 95% and a value < 0.05 was considered significant.

Normal Distribution and Statistical Test used

All the data were tested for normal distribution.

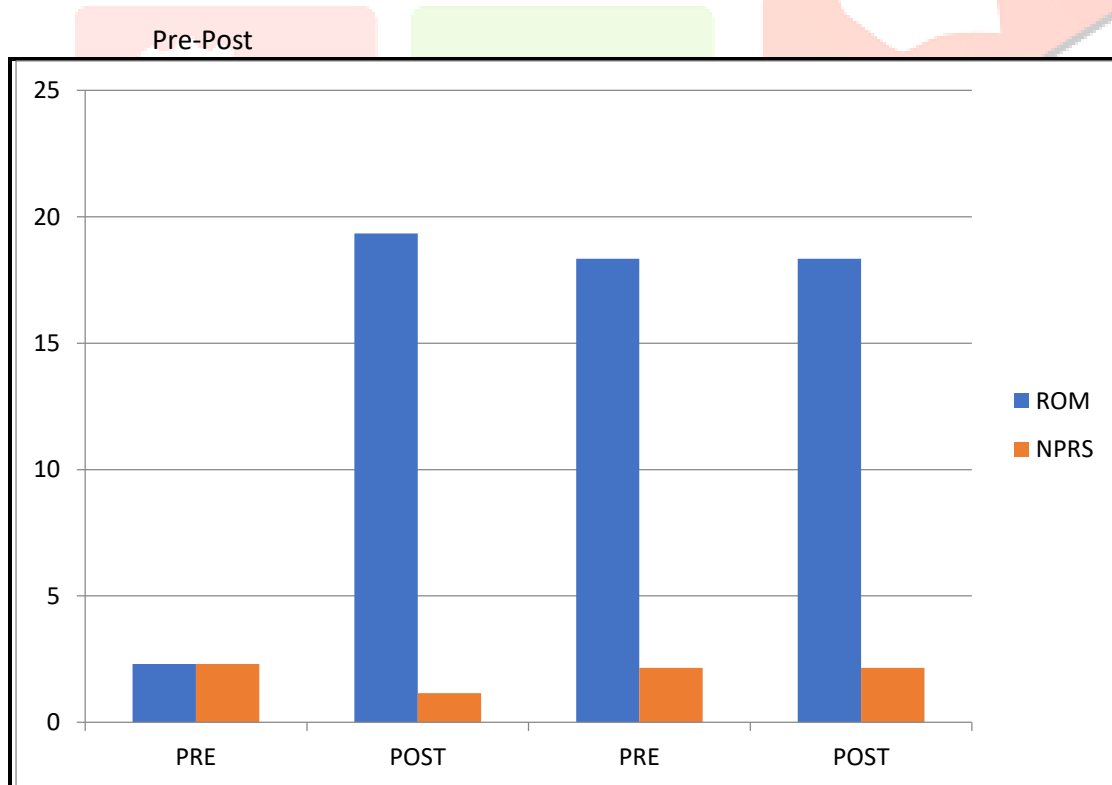
The parametric test was used for normally distributed data. Paired t-test was used to determine pre and post difference.

Response to intervention

Descriptive statistics were carried out for all the outcome measure pre intervention, immediate post – intervention, and difference of pre and post – intervention in term of mean and standard deviation.

Result for between groups using independent t-test

Variable	Sig(2-tailed)	Mean Difference	Std Error Difference	t-test for Equality of Means 95% Confidence Interval of the Difference Lower	t-test for Equality of Means 95% Confidence Interval of the Difference Upper
Pre ROM	.410	2963	3564	-4189	1.0115
Post ROM	.004	-1.000	3355	-1.6733	-3267
Pre NPRS	.650	-1111	2437	-6002	3780
Post NPRS	.443	-1852	2398	-6664	2960



Results

The result of this study demonstrate a greater mean increase of 19.37 degrees in dorsi flexion range of motions & 1.14 in numerical pain rating scale found in group A (treatment group / mobilization group) than mean increase of 18.40 degrees in dorsi flexion range of motion and 0.96 in numerical pain rating scale found in group B (control group).

Both groups A (treatment group) and B (control group) shows an immediate increase in dorsi flexion range of motion and decrease in numerical pain rating scale. But group A (treatment group) shows more improvement in dorsi flexion range of motion and in numerical pain rating scale as compare to group B (control group).

Furthermore, **within group** analysis for group A (treatment group / mobilization group), and group B (Control group) was carried out using paired t-test and the result showed a significant difference in DFROM (dorsi flexion range of motion) score and NPRS (numerical pain rating) score ($p < 0.05$).

Furthermore, **between groups** analysis was done by using independent t-test. Between group analysis for group A (treatment group/ mobilization group) and group B (control group) was carried out and the result showed significant difference in DFROM (dorsi flexion range of motion) score ($p < .004$) but not in NPRS (numerical pain rating scale) score ($p > 0.05$). Which indicate both group A (treatment group / mobilization group) and group B (control group) shows improvement in DFROM but not in NPRS.

Discussion: The present study was designed to evaluate the immediate effect of joint mobilization on ankle pain and range of motion in chronic ankle sprain with the inclusive age of 17 to 45 years. A total of 54 subjects were analyzed and the result was obtained using t- test. However, joint mobilization intervention provides greater immediate increase in ankle dorsi flexion range of motion as compare to exercise only. As well as both joint mobilization and exercise interventions provide same beneficial effect on pain.

The results of the present study demonstrated that there is a significant difference found $p < 0.000$ in DFROM and NPRS immediately after post intervention in joint mobilization. This finding is supported by a study which was done by Rafael Duarte Silva, et al (2016) who found that anteroposterior talus mobilization technique was beneficial in improving range of motion and pain in participants with subacute and chronic ankle injuries : a randomized controlled trial. They conclude that grade 3 mobilization improved ankle dorsiflexion range of motion as compare to SG (Sham group).⁹ Changes in pain was similar in both

groups. Present study demonstrates a mean increase of 19.37° in dorsiflexion range of motion and 1.14 in numerical pain rating scale which is greater than exercise group. This finding is supported by David Cruz-Diaz, et al (2014) who studied effect of joint mobilization on chronic ankle instability: a randomized controlled trial. This study evaluates the effect of joint

mobilization, in which movement is applied to the ankle dorsiflexion range of motion of patients with chronic ankle instability, randomized trial with repeated measures and follow up period. Ninety patients with a history of recurrent ankle sprain, self-reported instability and a limited dorsiflexion range of motion were randomly assigned to either the treatment group (joint mobilization, 3 weeks, two sessions per week) or in control group. They conclude that joint mobilization techniques applied to subjects suffering from CAI (chronic ankle instability) were able to improve ankle dorsiflexion range of motion. These results suggest that joint mobilization could be applied to patients with recurrent ankle sprain to help restore their functional stability.¹³

Limitation of Study

In this study long term effect of joint mobilization on dorsiflexion range of motion is not known. Furthermore, it is not known if repetition and an appropriate dosage of intervention over time might lead to longer lasting effects.

Sample size of the study is small.

There is an unequal ratio of male and female in the study population.

Future Recommendation

Further studies should increase the number of session's trial designs and a follow up to evaluate the long-term benefits of treatment. Further study can be done with large sample size.

Conclusion: This study has shown that the joint mobilization technique leads to greater improvement in dorsiflexion range of motion as compared to exercise. Improvement in pain remains same in both groups.

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