Research Paper

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Effect of Fibular Repositioning Tapingamong Intercollegiate Athletes with Acute Ankle Inversion Sprain-Double Blinded Randomized Controlled Trial

Medical Science

KEYWORDS : Acute Ankle Inversion Sprain, Positional Fault of Fibula, Mulligan's Fibular Repositioning Taping, Dynamic Stability

GarvitShukla	Resident Physiotherapist, St. Ignatius Hospital, Honnavar, Karnataka, India
Jagatheesan Alagesan	Professor, Saveetha College of Physiotherapy, Saveetha University, Chennai, India.
Iyyappan Manickavasagam	Senior Physiotherapist, Dubai Physiotherapy & Rehabilitation Centre, Al Safa, Dubai.

ABSTRACT

Ankle sprains make up about 15% of all athletic injuries, with a reported 23,000 ankleligament injuries occurring each day. This study aims tofind out the effectiveness of Mulligan's mobilization fibular repositioning taping along with ultrasound therapyto improve dynamic stability in acute ankleinversion sprain.74subjects with acute ankle inversion sprain were randomly divided into two groups. Experimental group received Mulligan'smobilization fibular repositioning taping and ultrasound, control groupreceived sham taping with ultrasound. The outcome measures used were star excursion balance scale and visual analogue scale. Both groups were homogenous at baseline and showed significant improvement in both outcome measures at the end of the intervention with p less than 0.001. Mulligan's mobilizations FRT is more effective than conventional physiotherapy in reducing pain and equally effective in improving thedynamic stability in subjects with acute ankle inversion sprain.

Introduction

Ankle sprains make up about 15% of all athletic injuries, with a reported 23000ankle ligament injuries occurring each day. Ankle sprains are one of the most common and potentially disabling injuries seenin general population as well as in sports persons. They are particularly common in basketball,volleyball, soccer, modern dance and ballet. Most subjects fully recover, but an estimated20 to 40% develop chronic symptoms of pain and instability.1,2In the high risk activities of jumping and running sports ankleproblems account for up to 25% of all time lost due to injuries. In basketball theycomprise more than 50% of major injuries and in soccer and volleyball more than 25%.2

Among all injuries in ankle joint, 85% of cases are due to inversion of foot in plantar flexed and internally rotated position as theforce of inversion is increased.3The structure on the lateral aspect of ankle joint which is believed tobe commonly injured is anterior talofibular ligament(ATFL) followed by calcaneofibularligament(CFL). The posterior talofibularligament(PTFL) is rarely sprained.Recurrence of ankle inversion sprain is 40% in the subjects who had been treated byearly protected mobilization, plaster or surgical repair.4

Mild acute ankle sprains are managed by rest, ice, compression, elevation(RICE), conventional physiotherapy treatment and strengthening exercises. Conventional physiotherapy treatment consists of ultrasound therapy and interferential electrical stimulation.5Isometric exercises to the muscles in the area should be started as early as pain allowstomaintain the strength of the muscles of lower leg and foot.Advanced stage of rehabilitation protocol consists of agility drills and proprioceptivetraining.6Moderate and complete ruptures in ankle sprains can be managed eithersurgically or conservatively.Chronic recurrent ankle sprain are managed by deep transverse friction massageto the ligament and specific joint mobilization in the directions of restriction.

Mobilization techniques are useful in ankle sprain to reduce pain. Mobilization techniques includes proximal tibio-fibular joint mobilization, rearfoot distraction mobilization, lateral glides and eversion mobilization, talocrural joint anterior to posterior mobilization, ankle eversion mobilization and dorsiflexion self-mobilization.7A randomized control trial by Green et al states that anteroposterior glide to talus along with RICE protocol is useful to achieve pain-free dorsiflexion and toimprove stride speed.8

There are very less evidences and studies done to find the efficacy of Mulligan'sMobilization Fibular Repositioning Taping (FRT) and sham taping in reducing pain andimproving dynamic stability in acute ankle inversion sprains.This study aims to find out the effectiveness of Mulligan's mobilization fibular repositioning taping along with ultrasound therapy in acute ankleinversion sprain.In this study therapeutic ultrasound is used in combination with Mulligan'smobilization FRT to experimental group and ultrasound with sham taping to control group to reducepain and improve dynamic stability in acute ankle sprain.

Methodology

This double blinded randomized controlled study was conducted in physiotherapy outpatient department of teaching institution. The intercollegiate athletesof both genders reporting to physiotherapy department with ankle sprain within the duration of 72 hours, with pain not more than 6 in visual analogue(VAS), negative anterior drawer test, negative talar tilt test and not receiving any medication for pain were included in the study. 74 subjects fulfilling these criteria were randomly allotted into experimental or control group using closed envelop method after baseline assessment and signing informed consent. The outcome measures used were VAS for ankle pain and Star Excursion Balance Test(SEBT) for dynamic stability, tested by a physiotherapist having more than five years of clinical experience and blinded to group allotment.

Ultrasound therapy with pulse ratio of 1:4, intensity of 0.25-0.5W/cm2 for the duration of two to three minutes over the lateral aspect of ankle joint was the treatment given for both groups. In addition to this experimental group received Mulligan Mobilization and subsequently taped to maintain the corrected alignment using Mulligan's FibularRepositioning Taping technique using 2 strips of 35mm rigid strapping tape9 for 48 hours/session , for seven sessions on alternative daysfor two weeks.8 Mulligan's mobilization is provided to the subject in supinelying, the glide is given in dorso cranial direction by the thenar aspect of onehand, the free fingers curl around the tendoachilles and the thenar aspect of otherhand lies under the medial malleolus.10

Control group received Mulligan's mobilization and shamtaping with no positional fault correction using 2 strips of 35mm rigid

strapping tape8for 48 hours/session, for seven sessions on alternative days for two weeks.9

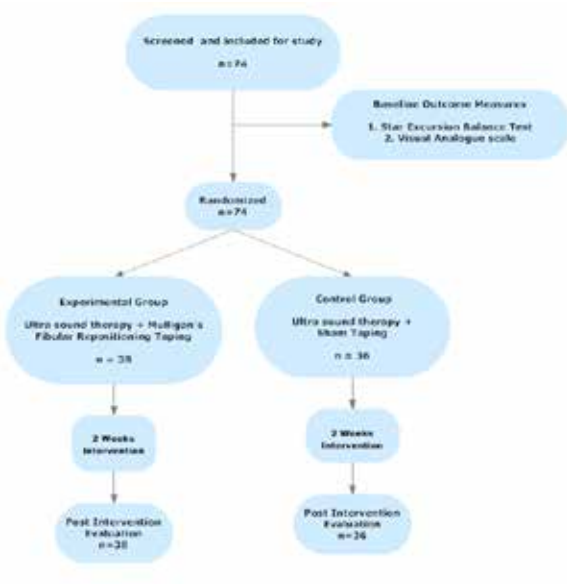


Figure-1: CONSORT Diagram

Data Analysis and Results

The data were analysed by using IBM SPSS-20. Paired t-test was used for finding within group difference and independent t-test for between group comparisons before and after intervention with significance set at p <0.05. Thirty eight subjects in experimental group and 36 subjects in control group were randomly assigned from 74 eligible subjects. Table-1 shows the demographic details of the subjects included in the study.

Table-1: Demographic details

	Experimental Group	Control Group
Male	20	21
Female	18	15
Age in years (Mean±SD)	22.3±3	22.8±5
Duration in hours (Mean±SD)	58.7±4	57.8±2

Homogeneity of groups at baseline was tested by independent t-test for both variables. The pain scores showed p=0.865 and dynamic stability scores showed p=0.075. Bothgroups showed statistically significant reduction in pain and improvement in dynamic stability with p less than 0.001, details are shown in table-2.

Table-2: With in group analysis of pain and dynamic stability

			Mean	Std. Deviation	Std. Error Mean	t	p
Experimental group	SEBT	Before	55.31	8.48	1.55	-11.161	<.001
		After	66.42	11.89	2.17		
	VAS	Before	5.30	0.70	0.13	14.603	<.001
		After	2.80	0.81	0.15		
Control group	SEBT	Before	59.22	8.19	1.49	-32.783	<.001
		After	62.02	8.24	1.50		
	VAS	Before	5.33	0.80	0.15	10.521	<.001
		After	3.70	0.92	0.17		

The analysis of after intervention values of pain for both groups showed p < 0.001 proved statistically significant difference between two interventions in reduction of pain favouring experimental group. There was no significant difference between groups in the improvement of dynamic stability with p=0.101.

Discussion

A seven session of treatment on alternative days is given to the subjects of bothgroups and pre and post intervention outcome measures are taken. The result of thisinterventions shows that there was a significant reduction in pain in boththe groups. In experimental group it may be due to the correction of the positional fault of fibula10-12and in control group due to ultrasoundtherapy.13There was no significant improvement in dynamicstabilityin acute ankle inversion sprain. It is due to there is no effect ofmulligan's taping on static or dynamic balance in subjects with ankle sprain.14

Guo et al stated that mobilization with movement (posteroanterior glide) shows significant improvement on dorsiflexion range of motion and significant changes on spatial, temporal variables of gait cycle.15 Mulligan believed that when the foot is forcibly inverted beyond the natural range the lateral ligament is usually insignificantly damaged. The fibula wrenched forwards on the tibia and positional fault occurs. So he proposed the use of manual repositioning of the fibula using posterior-superior glide with non-elastic Fibular repositioning taping (FRT).10-12

Sawkins et al found that placebo (proprioceptive) taping is also effective in ankle instability when compared to mechanical taping and no taping.16The greater effect of Mulligan's taping may be due to the fact that tapingcorrected the positional fault of fibula, thus repositioning of the fibula at the inferiortibiofibular joint. However Mulligan's mobilization may help in relieving the paintemporarily and the taping maintains the correction of the positional fault of fibula. The results of this study may be applied to the general population with acuteankle sprain. This study did not include follow-up period and therefore no conclusionscan be drawn about the long term benefits of the interventions.

Conclusion

Mulligan's mobilizations FRT is more effective than conventional physiotherapy in reducing pain and equally effective in improving thedynamic stability in subjects with acute ankle inversion sprain.

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