

# Effectiveness of Therapeutic Ultrasound and Exercises with Dynamic Taping in Atfl Injury University Level Football Player- Single Case Study

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## I. INTRODUCTION

Ankle sprain is an injury of the lateral ligament complex of the ankle joint. The injury is graded on the basis of severity. Anterior talofibular ligament is the most commonly injured ligament in ankle sprain.

Grade I is a mild stretching of the ligament complex without joint instability; Grade II is a partial rupture of the ligament complex with mild instability of the joint (such as isolated rupture of the anterior talofibular ligament) and grade III involves complete rupture of the ligament complex with instability of the joint.

Ankle sprain in sport may result in decreased performance, absence from competition and adverse psychological effects.

Following an acute ankle sprain, pain, swelling and ecchymosis are common, which may contribute to reduced mobility and function, as well as occupational absence.

The incidence of ankle sprain is higher in females compared with males.

The sport category with the highest incidence of ankle sprain was indoor/court sports, with a cumulative incidence rate of 7 per 1,000 exposures. There is a significantly higher risk of sustaining a lateral ankle sprain compared with syndesmotic and medial ankle sprains.

Kendrick in 2009, had produced Dynamic Tape (DT), a visco-elastic nylon and lycra blend material with 4-way stretch.

Dynamic tape acts by the mechanism of Load absorption, Force contribution and Modifying movement.

It reduces load on the lateral ligament complex of the ankle by decelerating plantar flexion/inversion, approximating the joint to augment force closure and enhance stability and proprioception and providing a facilitation of the peronei.

Ultrasound is a sound of frequency above 15,000 cycles per second (15kHz). It is used in health care as a diagnostic tool and in the treatment of acute soft tissue injuries.

## II. METHODOLOGY

Study Design: Experimental

Study Type: Pre Test Post Test

Sample Size: 1

Sampling Method: Convenient Sampling

Study Duration: 1 Month

Study Setting: Chennai

## III. PROCEDURE

### Case Description

A 21 year old university level football player came to the Physiotherapy OP with a complaint of pain and swelling over the lateral aspect of the right ankle.

He had a history of twisting his ankle during the football match he last played. The mechanism was inversion with plantar flexion of the ankle, following which he was unable to weight bear fully.

He did not give a history of past episodes of similar pain.

## III. PRE TEST EXAMINATION

*On Observation* – swelling was present on the lateral aspect of the right ankle

*On palpation* – warmth and grade 2 tenderness was present over the lateral aspect of the right ankle.

### On Examination

Active Range Of Motion of the right ankle joint was measured using a Goniometer and was found to be, plantar flexion – 0° – 25°, dorsi flexion – 0° – 10°, inversion and eversion 0°- 15°.

VAS – 8/10

Valgus Stress test – positive. As the valgus stress test was positive and swelling and tenderness were present, it was diagnosed as ATFL injury.

### Intervention

Therapeutic ultrasound was given to the patient with the following parameters

Frequency – 1MHz

Mode - Pulsed with a ratio of 1:1

Intensity – 1 W/cm<sup>2</sup>

Following ultrasound, dorsiflexion and plantar flexion, inversion eversion exercises with loop band was given.

Dynamic taping is then applied.

### Post Test Examination

After the intervention was given swelling was reduced, the pain score on VAS was 2/10.

Active ankle range of motion had increased to dorsiflexion 0°- 20°, plantar flexion 0°-45°, inversion and eversion 0°- 25°.

### IV. RESULT

An objective increase in the range of motion was observed after the treatment.

The ankle dorsiflexion range of motion had increased to dorsiflexion 0°- 20°, plantar flexion 0°-45°, inversion and eversion 0°- 25°.

The pain score VAS scale had reduced from 8 to 2.

### V. DISCUSSION

This study evaluated the effect of therapeutic ultrasound, dynamic taping along with loop exercises in ATFL injury.

From an ankle sprain mechanism perspective, the main purpose of taping should primarily be to control the ankle inversion and plantar flexion angle.

Taping reduces load on the lateral ligament complex of the ankle by decelerating plantar flexion/inversion, approximating the joint to augment force closure and enhance stability and proprioception and providing a facilitation of the peronei.

Dynamic taping allows full, unrestricted range of motion even when taping multiple joint. Dynamic tape has no rigid end point like kinesio tape, and can stretch in all directions.

It uses strong elastic energy to absorb load to decelerate movement. Energy is then stored in the form of elastic potential energy and reinjected as kinetic energy once shortening commences. Hence, this helps weak, injured and fatigued muscles.

In a few previous studies it was found that ultrasound therapy does not enhance recovery or help to reduce pain and swelling after an ankle sprain. Also it was stated that the ability to stand on the affected for and ankle does not improve.

However in this study therapeutic ultrasound along with loop exercises and dynamic taping has proved to bring about a

positive effect by reducing pain and also increasing ankle joint range of motion.

Elastic-resistance exercises are commonly used in rehabilitation because they enable us to use a safe and effective closed kinetic chain (CKC) progressive overload to rehabilitate the injured patient.

The resistance can be easily adjusted in small increments to match the patient's progress by increasing or decreasing the stretch of the elastic tubing when using elastic resistance to rehabilitate an injured joint.

In this study 4 weeks of training with elastic-resistance exercise was given to the ankle plantar flexors, dorsiflexors, invertors and the evertors.

### VI. CONCLUSION

It was found that therapeutic ultrasound and dynamic taping have a positive effect in increasing ankle range of motion and decreasing pain.

### VII. LIMITATION AND RECOMMENDATIONS

Only one sample was included in the study.

ATFL injury was only considered in the study.

For further studies many samples can be included.

Dynamic taping can be used for other injuries of the ankle.

More exercises can be included.

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