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Effect Of Addition Of Mwm With Met On Rom And Function In Patient With History Of Talus Fracture: A Case Study

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Abstract:

Introduction: One of the common injuries that is fractures of the talus with an incidence of 0.1-0.85% of all fractures. Due to the unique shape and location of the talus, significant stress is often required to fracture the neck of the talus. The exact mechanism may be either from a hyper dorsiflexion force from an axial load on the forefoot while the talus is fixed between the calcaneus and tibia. Because of the high degree of energy required to fracture the neck of the talus, most talar fractures are displaced and, if not anatomically reduced, can be associated with serious complications such as hindfoot deformity, arthritis, or AVN. To treat talus fracture patient non pharmacologically MWM with MET and conventional therapy can help manage these non-pharmacologically.

Aim: The aim of the study is to find the effect of addition of MWM with MET on ROM and function in patient with history of talus fracture after 21 of intervention. Many patients with talar neck fractures are polytraumatized, and therefore it is important to adequately evaluate the patient according to Advanced Trauma Life Support (ATLS) protocols and rule out associated injuries.

Design: Single subject case study

Method and procedure: The method used in this study is effect of MWM with MET on range of motion and function in patient with post-operative talus fracture. Surgery comminated fracture of left talus and avulsion fracture of ACL. A formal informed consent was taken from the patient VAS Score and Ankle dorsiflexion was taken on day 0 and day 21. The pre and post outcome measures was compared to evaluate the significance of the study.

Result: Results show improvement in in pain score and ankle dorsiflexion range of motion after 21 days of intervention.

Conclusion: This case study concludes that there is effect of MWM with MET on ROM and function in patient with history of talus fracture.

KEYWORDS: Talus fracture, muscle energy technique and range of motion.

I. INTRODUCTION

Fractures of the talus are less common injuries with an incidence of 0.1-0.85% of all fractures. The talus is unique in that it has a poor vascular supply and 60–70% of the talus surface is covered by articular cartilage but no muscle attachment.[1] These are always associated with high-speed injuries, most often traffic accidents followed by a fall from a height. The male to female prevalence rate is 4:8:1.[2] Multiple articulations, poor blood supply and complex structures create special difficulties in achieving an acceptable result even with optimal treatment, and therefore require stable internal fixation of these fractures.[3] Due to the unique shape and location of the talus, significant stress is often required to fracture the neck of the talus.[4] The exact mechanism may be either from a hyper dorsiflexion force from an axial load on the forefoot while the talus is

fixed between the calcaneus and tibia.[5] Many patients with talar neck fractures are polytraumatized, and therefore it is important to adequately evaluate the patient according to Advanced Trauma Life Support (ATLS) protocols and rule out associated injuries.[6] Because of the high degree of energy required to fracture the neck of the talus, most talar fractures are displaced and, if not anatomically reduced, can be associated with serious complications such as hindfoot deformity, arthritis, or AVN.[7.8]

Although frequently referred to as the 'ankle joint', there are a number of articulations which facilitate motion of the foot.[9] The ankle joint complex is made up of the talocalcaneal (subtalar), tibiotalar (talocrural) and transverse-tarsal (talocalcaneonavicular) joint.[10] The key movement of the ankle joint complex are plantar- and dorsiflexion, occurring in the sagittal plane; abduction and adduction occurring in the transverse plane and inversion-eversion, occurring in the frontal plane.[10,11] Combinations of these motions across both the subtalar and tibiotalar joints create three-dimensional motions called supination and pronation. Both terms define the position of the plantar surface of the foot (sole).[12,13] When a fracture is unstable difficult to maintain it's an acceptable position by non-operative means this is most frequent indication for internal fixation. In some fracture in order to secure rigid immobilization and allow early mobility of the patient.[14] When it has been necessary to perform open reduction for any other such as an associated neurovascular injury.[15] To treat talus fracture patient non pharmacologically MWM[16] with MET[17] and conventional therapy can help manage these non-pharmacologically.[18]

II. PURPOSE OF THE STUDY:

This case study aimed to determine the effect of addition of MWM with muscle energy technique on ROM and function in patient with history of talus fracture.

III. MATERIALS AND METHOD:

3.1 Participant:

A single patient was taken as subject with a history of talus fracture. Surgery comminated fracture of left talus and avulsion fracture of ACL. Open reduction internal fixation use of screws and plating use in talus fracture, a use of button in avulsion fracture. Decrease in range of motion about 20-degree flexion and complains of pain and swelling in medial side of ankle and front of knee. Also followed by 1 ½ month POP advice by surgeon. After the 1 ½ month of surgery. She came at Jaipur physio junction clinic for the treatment.

3.2 Experimental case study:

A single subject was selected. A comprehensive assessment was taken of the subject, before starting the intervention. Demographic data and details of subject were taken and written consent was obtained prior to the commitment of the study.

3.3 Exercise and training interventions:

Duration: 4 weeks, 3 sessions per week.

Protocol: -

- Duration: 4 weeks, 3 sessions per week.
- Session Structure:

S.No.	Protocol	Procedure	Repetitions
1	Mobilization with Movement (MWM)	Performed for dorsiflexion and plantarflexion using Mulligan belt technique. The patient actively performs dorsiflexion and plantarflexion, guided by the therapist's applied glide.	3 sets of 10 repetitions each movement per session.
2	Muscle Energy Technique (MET)	Applied to surrounding muscles (e.g., gastrocnemius, soleus, tibialis anterior/posterior). Hold-relax technique: 5 repetitions for each muscle group.	Each contraction held for 5–7 seconds with 3–4 seconds relaxation
3	Conventional Rehabilitation	Active ROM exercises. Proprioceptive training using wobble board or foam pad. Functional tasks: step-ups, gait training.	Each exercise will be performed 10 times 2 repetitions a day.

Fig 1: Resisted dorsiflexion

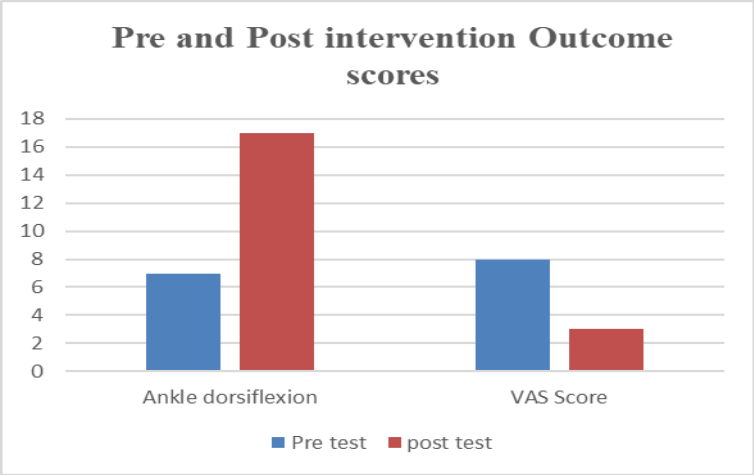
Fig 2: Muscle energy technique

IV. RESULT:

Results show improvement after 21 days of intervention in pain score and range of motion that is ankle dorsiflexion. Pain score is measured by VAS Scale and ankle dorsiflexion which is measured by Goniometer. First reading was taken on the initial day i.e. Day 0 and second reading was taken on day 21, readings of day 0 and day 21 were compared using MS-Excel.

S.NO.	Outcome Measures	Pre Intervention Score	Post Intervention Score
1.	VAS Score	8	3
2.	ROM (Ankle Dorsiflexion)	7 degrees	17 degrees

Table I: Shows Pre and Post Intervention outcome measure value



Graph I- Graphical representation of pre and post intervention outcome measures

V. DISCUSSION:

The purpose of the study was to see the effect of muscles energy technique with strengthening exercises of flexor and extensor muscle group to improve the ankle dorsiflexion range in open reduction internal fixation of talus fracture. The effect of the training program was measured by the VAS scale and goniometer tool in which 2 values were taken on Day 1 and Day 21, to check the improvement of range of motion and function respectively. Single female subject was taken for muscle energy technique with strengthening of flexor and extensor muscle group to improve the ankle dorsiflexion range in open reduction internal fixation of talus fracture. The goniometer range and VAS score were taken to compare the state of range of motion and function and thereby to evaluate the effects of Muscle energy technique with strengthening of flexor and extensor muscle group in improving the ankle dorsiflexion range in post operated open reduction internal fixation of talus fracture. The pre reading and post reading of VAS were 8/10 and 3/10 respectively. The pre- and post-reading for ankle ROM 7 degree and 17degree respectively. The result of this study denotes MWM with MET to improve the ankle dorsiflexion range in open reduction internal fixation of talus fracture. The observed improvements are most likely attributable to the manual physical therapy intervention, which allowed the therapist to focus treatment on the specific structures that produced pain and limited function for patients.[18]

Since manual physical therapy involves direct application of therapist-applied manual forces in procedures intended to modify the quality and range of motion of the target joint and soft tissue structures, the overall improvement in pain. stiffness and functional activities, as it is a clinical approach used by the physiotherapist to diagnose and treat soft tissues and joint structures for the purpose of modulating pain and increasing range of motion.[19] Techniques used in manual physical therapy are aimed at relaxing tense muscles and restricted

joints in order to decrease pain and increase flexibility. Soft tissue work applies pressure to the soft tissues of the ankle such as the muscles. This pressure helps in relaxing muscles, increasing circulation and ease pain in the soft tissues.[20]

VI. CONCLUSION: This case study concludes that there is effect of MWM with MET on range of motion and function in Patient Post-operative Talus fracture has a significant improvement in increase ankle range of motion. These findings shed light on the potential benefits of MWM with MET on range of motion and function in Patient Post-operative Talus fracture patient. This novel approach has the potential to enhance the management and recovery outcomes for this specific patient population.

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