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TO SEE THE EFFECT OF MULLIGAN MOBILIZATION WITH MOVEMENT AND TAPING TO MANAGING PAIN IN CASE OF ACUTE GRADE 2 ANKLE SPRAIN

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Abstract

Physiotherapists frequently use manipulative therapy techniques to treat dysfunction and pain resulting from ankle sprain. This study was design to demonstrate the effect of Mulligan's mobilization with movement (MWM) technique and Taping to manage pain in case of acut grade 2 Ankle Sprain. Thirty subjects with acute grade II lateral anklesprains served as their own control in a repeated measures that measured the initial effectsof the MWM treatment on weight bearing dorsiflexion and Taping.

Keywords: Mulligam mobilization with movement; Ankle; sprain; Taping; Dorsiflexion Range of motin; Pain.

INTRODUCTION

The lateral ligament complex of the ankle, described as the body's ''most frequently injured single structure'' (Garrick, 1977), is mechanically vulnerable to sprain injury. At extremes of plantarflexion and inversion, influenced by the shorter medial aspect of the ankle mortise, the relatively weak anterior talofibular ligament (ATFL), posterior talofibular ligament and calcaneofibular ligament (CFL) are prone to varying grades of rupture, often via minimal force (Hockenbury and Sammarco, 2001).

Immediate inflammatory processes produce acute anterolateral pain and oedema, with avoidance of movement and weight bearing (Wolfe et al., 2001). Subsequent losses of joint range, particularly dorsiflexion, and muscle strength results in significant gait dysfunction. Recent data from our laboratory highlights the presence of a dorsiflexion deficit not only in the acute stage, but also in the subacute stage (Yang and Vicenzino, 2002).

Early physiotherapy intervention consists of rest, ice, compression, elevation (RICE) and electrotherapy modalities to control inflammation, as well as manipulative therapy and therapeutic exercise techniques to address impairments of movement and strength (Wolfe et al., 2001; Hockenbury and Sammarco, 2001). Green et al. (2001) investigated the impact of combining nonweight- bearing talocrural anteroposterior (AP) passive mobilisations, believed to restore dorsiflexion range.

The mobilization with movement (MWM) treatment approach for improving dorsiflexion post-ankle sprain combines a relative posteroanterior glide of the tibia on talus (or a relative anteroposterior glide of the talus on the tibia) with active dorsiflexion movements, preferentially in weight bearing (Mulligan, 1999). Claims of rapid restoration of pain-free movement are associated with MWM techniques generally (Mulligan, 1993, 1999; Exelby, 1996). Through examination of the effects of MWM on ankle dorsiflexion in asymptomatic mildly restricted ankle joints, Vicenzino et al. (2001) found that both the weight bearing and non-weightbearing variations of the dorsiflexion MWM technique produced significant gains in dorsiflexion range.However, weight bearing treatment techniques are widely believed to be superior to non-weight-bearing techniques, as they replicate aspects of functional activities(Mulligan, 1999).

MWM is a manual therapy treatment technique in which a manual force, usually in the form of a joint glide, is applied to a motion segment and sustained while a previously impaired action (e.g. painful reduced movement, painful muscle contraction) is performed. The technique is indicated if, during its application the technique enables the impaired joint to move freely without pain or impediment (Mulligan, 1993). The direction of the applied force (translation or rotation) is typically perpendicular to the plane of movement or impaired action and in some instances it is parallel to the treatment plane (Mulligan, 1992, 1993, 1996).

Taping has many roles such as to support the ligaments and capsules of unstable joints by limiting excessive or abnormal anatomical movement. Taping also enhances proprioceptive feedback from the limb or joint. Finally taping can support injuries at the muscle-tendon units by compressing and limiting movement and secure protective pads, dressings and splints.

After an acute ligament sprain of the ankle, compressive strapping is often recommended to control oedema (McCluskey et al 1976). Very few studies have been published to evaluate the efficacy of taping to achieve limb or joint compression, with Viljakka (1986) and Rucinski et al (1991) arriving at conflicting conclusions as to the effect of bandaging on acute ankle oedema. Two Cochrane reviews have helped in our understanding of the best approach for treating acute ankle sprains. First, Kerkhoffs et al (2002a) analysed results from 21 trials of acceptable quality. They provided clear overall evidence that it is better, in terms of return to work and sport, pain, swelling, instability, range of motion and recurrence of sprain, for patients to be treated with various ankle braces or supports rather than total immobilization.

Mulligan mobilization with movement technique is effective in case of sub acute ankle sprain but taping is also effective in case of sub acute ankle sprain. (Sacha lardenoye et al).demonstrate the combined effect of mulligan mobilization with movement and taping in case of grade 2 acute ankle sprain. Sprain Injuries to the medial and lateral ankle ligament The aim of this study is to complex (ankle sprains) are one of the most common musculoskeletal injuries and account for approximately 10% of all injuries treated in the casualty department (Frey, Bell, Teresi, Kerr, & Feder, 1996; Lynch & Renstrom, 1999). The incidence of ankle ligament sprains in the athletic population ranges from 11% to 15-20% (A.C.C., 2003; Balduini, Vegso, Torg, & Torg, 1987; Lynch & Renstrom, 1999; Safran, 1999a), and ankle sprains have been cited as the most common sporting injuries (Boyce, Quigley, & Campbell, 2005; Gross & Lui, 2003; Stasinopoulos, 2004; Verhagen et al., 2004).

Ankle inversion sprains accounting for to 85% of all ankle injuries occurring in young sporting populations. Ankle sprains are often recurrent (9% compared to 7% of total injuries) possibly due to damage to the ligament complex and the effect of the sprain on the proprioception pathways, and returning to sport before the ligament has time to heal properly (Woods, Hawkins, Hulse, & Hodson, 2003).

Ankle inversion sprains are among the most common of ankle injuries occurring in young sporting populations, accounting for to 85% of all ankle injuries and are often recurrent, adding to the incidence of these, often painful and debilitating injuries to the soft tissue structures around the ankle are a major cause of short term disability and pain; they often result in loss of function, which can have economic consequences due to lost working days.

In addition to the costs of time off work or sport, there are surcharges for medical attention, investigations and materials such as tape and compression bandages and private surgery. Poor management of soft tissue injuries in the acute stage can lead to long term adverse effects, such as early onset degenerative joint disease, chronic instability and chronic pain which can affect lifestyle. Chronic soft tissue injuries of ligaments, tendon and fascia account for the majority of injuries which result in prolonged instability and time of work, therefore finding the most efficacious treatment is a necessity. The goal of early management is to reduce these long term consequences, however if inappropriately applied, these treatments can also cause adverse reactions or outcomes.

PURPOSE OF STUDY

To see the effect of mulligan mobilization with movement and taping to managing pain in case of acute grade 2 ankle sprain

HYPOTHESIS

Experimental Hypothesis:

There is a effect of mulligan mobilization with movement and taping in patients with acute grade2 ankle sprain.

Null hypothesis:

There is no effect of mulligan mobilization with movement and taping in patients with acute grade2 ankle sprain.

Ankle joint is a complex joint due to its articular, ligamentous and tendinous anatomy. The anterior talofibular ligament restricts anterior translation and internal rotation of talus inside the mortise. The coupled motion during plantar flexion happens as internal rotation and anterior translation of talus aided by deltoid ligament. The calcaneofibular ligament restricts inversion of the talocrural and subtalar joint. The posterior talofibular ligament restricts inversion and internal rotation after calcaneofibular ligament and anterior talofibular ligament undergo injury.

According to Konradsen and Voight (2002) an inversion torque was produced on loading a cadaveric leg, when the unloaded foot was positioned in 30 degree inversion, full plantar flexion and 10 degree internal tibial rotation. The collision with 20 degree inverted foot in swing phase follow through forced the foot into full limit of inversion, plantar flexion and internal tibial rotation.

According to Denegar CR et al (2002) in normal biomechanics the instantaneous axis of rotation of talocrural joint translates posteriorly during dorsiflexion, but in anterior malaligned talus or with restricted posterior talar glide the axis of rotation is shifted anteriorly leading to joint dysfunction.

According to Baumhauer JF et al (1995) previous history of sprain, limited range of motion and reduced dorsiflexion and plantar flexion strength ratio, elevated eversion to inversion ratio have been attributed to predisposing to inversion injury.

According to Eren OT et al (2003) high malleolar index (posteriorly positioned fibula) is attributed to predisposing factor to sprain.

Green T in 2001 used a Modified Lidcombe Template to measure the pain free dorsiflexion range of motion occurring in talocrural joint. The template consisted of 2 boards joined by an adjustable hinge. One board served as a footplate and other was placed under the subject's calf. The adjustable hinge served as the axis of rotation of template in vertical plane and the board placed under the subject's calf allowed for adjustment in horizontal plane. The measurement was standardized by measuring both force applied and the angle of dorsiflexion at which the subject first experienced the pain (Matyas T, Bach T; 1985). The force applied was standardized throughout the trail by spring balance and the direction of force was standardized by spirit level attached to the spring. The device showed high intrarater and interrater reliability of which 29% were in exact agreement and 84.5% were within 2 degrees, ICC=0.94.[5]

The conventional management of ankle sprain is RICE in acute stage of injury. The functional treatment procedures with early initiation of weight bearing as tolerated, early mobilization, proprioceptive training, balance training has been advocated to provide early functional rehabilitation to subjects.

According to Bahr R (2004) and Bruce Beynnon B, (2004) the management of sprain concentrates on static and dynamic stability, gaining normal ankle range of motion, optimal strength of peroneal, dorsiflexors, plantar flexors, and invertor muscles of ankle and retraining ankle strategy.

According to Kerkhoffs et al (2002) functional treatment is superior to immobilization and surgical intervention in areas of pain on activity, quality of performance on return to sport/work, objectives instability on x-ray views and patient satisfaction.

Collins et al (2004) conducted a double-blinded randomized controlled trial with a crossover design approach. In this study 14 subjects with grade 2 ankle sprain were taken. The dorsiflexion in weight-bearing and thermal pain threshold were calculated. All the subjects undergo 3 treatment conditions-Mulligan's mobilization with movement technique for dorsiflexion, placebo group and control group (Taping).Results showed that the taping improved the recovery rate in treatment with Mulligan's mobilization with movement technique.

T O'Brien, B.Vincenzino (1998) conducted a single case study to investigate the effects of Mulligan's with movement technique mobilization for acute lateral ankle sprain. The technique used in this study was posterior glide to distal fibular while patient actively inverted the ankle. In the study 2 subjects with acute ankle sprain were used to control for natural resolution of ankle sprain. Subject I underwent ABAC protocol while subject II BABAC protocol where A was no treatment phase B was treatment phase and C was post

treatment return to sport phase. The outcome measures Modified Kaikkonen test functional outcome, VAS for pain and range of dorsiflexion and inversion were measured pre and post of each intervention session. Results showed rapid improvement of range of motion (inversion and dorsiflexion) and immediate decrease in pain.[10]

Hence from the above studies we can infer that anterior-to-posterior talar glide technique in both Maitland and Mulligan mobilization is effective in treating ankle inversion sprain than the RICE protocol alone. The above studies also infer that Maitland's grades of mobilization is significantly effective in improving dorsiflexion range in acute ankle sprain. However, Mulligan's mobilization had shown effective results in treating ankle sprain in subacute condition. The study done by T O'Brien, B.Vincenzino (1998) shows the effectiveness of Mulligan's mobilization with movement technique in improving dorsiflexion range of motion in acute ankle sprain but the study design leads to limitation of generalization of its findings. However, it does provide the knowledge to conduct a random clinical trail in utility of Mulligan's mobilization with movement technique in the treatment of acute ankle inversion sprain and to compare the results with Maitland's grades of mobilization to find the best effective treatment method for improving the recovery rate in acute ankle inversion sprain.

Mulligan's dorsiflexion mobilization with movement technique significantly increases talocrural dorsiflexion initially after application in subacute ankle sprains. The absence of hypoalgesia post-application suggests a predominant mechanical rather than hypoalgesic effect behind the technique's success. Further research using a larger sample is required to determine the exact mechanism behind this.

Mulligan's peripheral MWM techniques are commonly utilised within musculoskeletal physiotherapy. This review of the MWM prescription at peripheral joints highlighted that this area of research has strengths, limitations and inconsistencies. The specific parameters identified for MWM prescription in the literature, is variable and in general inconsistently implemented and explained. The efficacy of MWM's appears to be well established for various joints and pathologies, as shown by previous reviews, however due to the methodological quality of studies, and gaps in particular areas of both prescription and application, it is apparenthat furtherresearch is warranted into the specific parameters of MWM's. The proposed algorithm may be integrated into clinical practice, to aid in the inclusion of all necessary components established from this review. To conclude, this manual therapy technique is widely used and advocated for many aspects of peripheral joint dysfunction.[42]

Ankle strapping/taping with elastic tape for intervention of an acute ankle grade 2 injury; Joint mobilization techniques are indicated in cases of joint dysfunction, due to restriction of accessory joint motion causing pain or restriction of motion during normal physiologic movement. Arthrology, there may be numerous causes of loss of accessory joint movement. The most common of these include capsuloligamentous tightening or adherence; internal derangement, as from a cartilaginous loose body or meniscus displacement; reflex muscle guarding; and bony blockage, as from hypertrophic degenerative changes. From this it should be clear that the proper indication for using specific mobilization techniques is loss of accessory joint motion (joint-play movement) secondary to capsular or ligamentous tightness or adherence.

METHODOLOGY

No of subject:

Total 30 subjects were taken on the basis of exclusion and inclusion criteria

Space and location:

Subject were taken from IIMSR and various hospital in lucknow.

Selection Criteria

Inclusion criteria

- Patient with grade 2 acute ankle sprain
- Age- 18-50 years
- Sex- Male/Female

Exclusion criteria

- Ankle fracture
- Achilles tendonitis
- Heel pain

STUDY DESIGN:

Pre and post test control group design.

VARIABLES

Independent variable

- Mulligan mobilisation with movement
- Taping
- Routine physiotherapy

Dependent variable

- Pain on VAS
- ROM on Goniometer

INSTRUMENTATION

1) Visual Analogue Scale
2) Goniometer

PROTOCOL

Subjects were taken on the basis of inclusion and exclusion criteria.

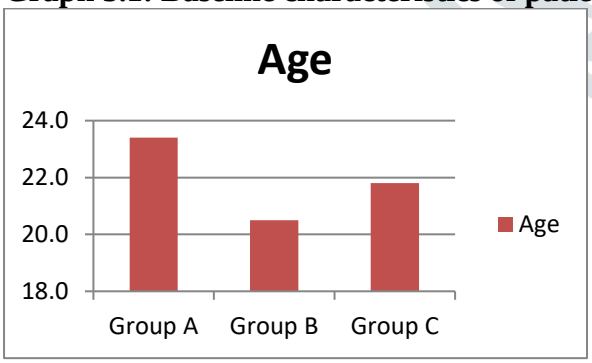
Group A: No of subject = 10 (Mulligan mobilisation with movement + Taping + Routine Physiotherapy)
Group B: No of subject=10 (Taping + Routine Physiotherapy)

Group C: No of subject=10 (Routine Physiotherapy)

RESULT

Total 30 subjects were included in the study (20 male and 10 female). The subjects is divided into three equal groups contain 10 subjects in each group. Table 1 shows the mean age and standard deviation of Group A, B and C. The mean age for group A is 23.40 and standard deviation 5.33. The mean age for group B is 20.50 and standard deviation 2.22 and The mean age for group C is 21.80 and standard deviation 2.57.

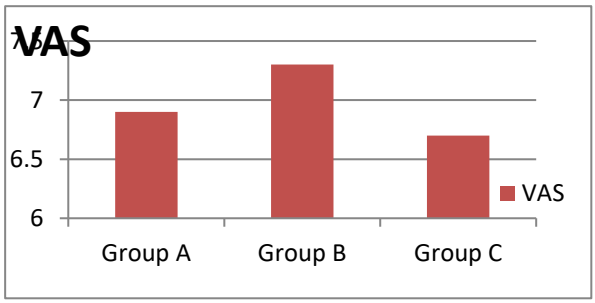
Graph 5.1: Baseline characteristics of patients with graph



Pain intensity

The pain intensity (VAS) was measured on day 0, Day 1. Day 7, Day 14, (pre test data as VAS 0, post data as VAS 1, after one 7 days (represents VAS 7) ,at 14 day of treatment (represents VAS 14)).for within group analysis repeated ANOVA was applied with in group variation of F (f =23.60) .between the group variationF(f=10.14)
analysis was conducted using one way ANOVA with level of significance ,α set at 0.05. 1 comparison of pain intensity (VAS) within groups.

Graph 5.2: Baseline characteristics of VAS with graph

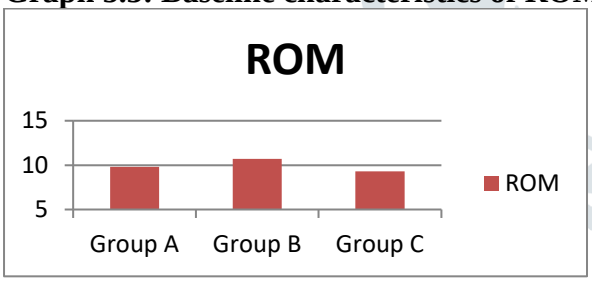


The range of motion (ROM) was measured on day 0, Day 1. Day 7, Day 14, (pre test data as VAS 0, post data as VAS 1,after one 7 days (represents VAS 7) ,at 14 day of treatment (represents VAS 14) .for within group analysis repeated ANOVA was applied with in group variation of F (f =8.82) ,between the group variationF(f=16.89) analysis was conducted using one way ANOVA with level of significance ,α set at 0.05. 1 comparison of pain intensity (VAS) within groups.

Table 5.3: Table 2.Efeect of intervention on ROM over different time period

ROM	Group A	Group B	Group C	Significance
0 Day	9.80±2.44	10.70±0.94	9.30±0.94	F=1.94,p=0.162
1 Day	12.10±1.96	11.20±1.22	10.70±1.15	F=2.24,p=0.12
7 Day	13.90±0.87	12.40±1.07	11.50±0.84	F=2.24,p=0.00
14 Day	15.60±6.99	13.20±1.03	12.30±0.94	F=35.55,p=0.00
ANOVA	Within group variations F=8.82,p=0.00 & Between group variation F=16.89,p=0.00			

Graph 5.3: Baseline characteristics of ROM with graph



On comparing the values between pre test i.e VAS 0 and post test (VAS 1) reading on day 1,is significant improvement was noted p=0.00, t=8.80 and the paired mean differences is 1.3667.

On comparing the values between post test i.e VAS 1 and post test (VAS 7) reading on day 7,is significant improvement was noted p=0.00, t=9.42and the paired mean differences is 1.7000.

On comparing the values between post test i.e VAS 7 and post test (VAS 14) reading on day 14,is significant improvement was noted p=0.00, t=10.84 and the paired mean differences is 1.2667.

On comparing the values between pre test i.e ROM 0 and post test ROM 1 reading on day 1,is significant improvement was noted p=0.00, t=7.167 and the paired mean differences is 1.06.

On comparing the values between post test i.e ROM 1 and post test ROM 7 reading on day 7,is significant improvement was noted p=0.00, t=7.077 and the paired mean differences is .98.

On comparing the values between post test i.e ROM and post test ROM reading on day 14,is significant improvement was noted p=0.00, t=6.810 and the paired mean differences is .88.

The values of Post Hoc Testsfor VAS suggests, the treatment response of Group B is better than Group C and Group A is Better than Group B

While comparing the group a versus group b on day 0 (pre treatment) the mean differenceis 0.40 and the p value is p=0.47 ,on day 1 (post treatment) the mean difference is -1.80 and the p value is p=0.001, on day 7 the mean difference is -2.50 and the p value is p=0.001 , on day 14 the mean difference is -2.20 and the p value is p=0.001.

While comparing the group B versus group C on day 0 (pre treatment) the mean differenceis 0.60 and the p value is p=0.28 ,on day 1 (post treatment) the mean difference is -0.60 and the p value is p=0.32, on day 7 the mean difference is -0.10 and the p value is p=0.79 , on day 14 the mean difference is -2.20 and the p value is p=0.58

While comparing the group c versus group A on day 0 (pre treatment) the mean differenceis 0.20 and the p value is p=0.72 ,on day 1 (post treatment) the mean difference is -1.20 and the p value is p=0.06, on day 7 the mean difference is -2.60 and the p value is p=0.00 , on day 14 the mean difference is -2.40 and the p value is p=0.00

The values of Post Hoc Testsfor ROM suggests, the treatment response of Group B is better than Group C and Group A is Better than Group B

While comparing the group a versus group b on day 0 (pre treatment) the mean differenceis 0.90 and the p value is p=0.22 ,on day 1 (post treatment) the mean difference is 0.09 and the p value is p=0.19, on day 7 the mean difference is 1.50 and the p value is p=0.001 , on day 14 the mean difference is 2.40 and the p value is p=0.001.

While comparing the group B versus group C on day 0 (pre treatment) the mean differenceis 0.50 and the p value is p=0.49 ,on day 1 (post treatment) the mean difference is 0.50 and the p value is p=0.46, on day 7 the mean difference is 0.90 and the p value is p=0.04 , on day 14 the mean difference is 0.90 and the p value is p=0.04.

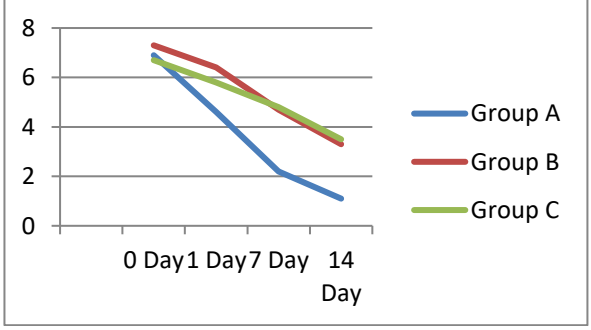
While comparing the group c versus group A on day 0 (pre treatment) the mean differenceis -0.50 and the p value is p=0.49 ,on day 1 (post treatment) the mean difference is -1.40 and the p value is p=0.46, on day 7 the mean difference is -2.40 and the p value is p=0.01 , on day 14 the mean difference is -3.30 and the p value is p=0.01.

Table 5.7: Post hoc multiple comparison between groups for ROM

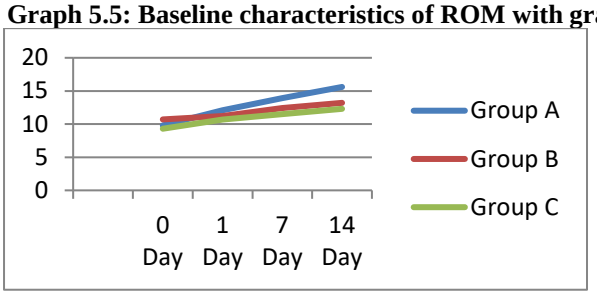
ROM	Post hoc multiple comparison Mean difference & p – value

	Group A Vs Group B (Mean difference & p- value)		Group B Vs Group C (Mean difference & p- value)		Group C Vs Group A (Mean difference & p- value)	
	Mean difference	p-value	Mean difference	p-value	Mean difference	p-value
0 Day	-0.90	0.22	0.50	0.49	-0.50	0.49
1 Day	0.90	0.19	0.50	0.46	-1.40	0.46
7 Day	1.50	0.001	0.90	0.04	-2.40	0.001
14 Day	2.40	0.001	0.90	0.04	-3.30	0.001

Graph 5.4: Baseline characteristics of ROM with graph



Graph 5.5: Baseline characteristics of ROM with graph



DISCUSSION

This study was designed to the effectiveness of two different modes of combination therapy i.e. **mulligan mobilization with movement and taping technique** in the management of pain in case of acute grade 2 ankle sprain.

In this study, we examined the three experimental groups i.e. group A (MWM+ Taping+ Routine Physiotherapy), group B (Taping+ Routine Physiotherapy) and group C (Routine Physiotherapy). The results of our study indicates that on VAS, the treatment response of group C is better than group B and group B is better than group A, and in ROM for dorsiflexion of ankle the treatment response of group C is better than group A and group A is better than group B.

The results further suggest that all the techniques are effective in the treatment of acute grade 2 ankle sprain but there is significant difference in the degree of improvement among all the three groups.

IMPROVEMENT WITH MULLIGAN MOBILISATION WITH MOVEMENT AND TAPING WITH ROUTINE PHYSIOTHERAPY

While Comparison of the post treatment mean value of group A for mulligan mobilisation with movement and taping with routine physiotherapy to pre treatment mean value, there is a significant improvement were noticed in all the three groups on day 1, day 7,day 14

In the group A, the mean value noticed on the VAS scale is 6.90 with standard deviation 1.28 on day 0, whereas from day 1 mean value gradually decreases to 4.60 with standard deviation 1.83, on day 7 mean value 2.20 with standard deviation 0.78 and on day 14 the mean value is 1.10 with standard deviation 0.31.

The mean value noticed for ROM for dorsiflexion is 9.80 with standard deviation 2.44 on day 0 , whereas from day 1 mean value gradually increases to 12.10 with standard deviation 1.96, on day 7 mean value 13.90 with standard deviation 0.87 and on day 14th the mean value is 15.60 with standard deviation 6.99.

JM technique is thought to provide effective treatment for dysfunction and pain. In the case of ankle dysfunction, talocrural joint mobilization with the RICE protocol (Rest, Ice, Compression, and Elevation) provides a positive change in pain-free dorsiflexion and improves stride speed compared to RICE alone (Green et al.,2001). Seiger and Draper (2006) recommend joint mobilization as one of the treatments for limitation of ankle dorsiflexion after ankle fractures.

Our findings are further in agreement with the result obtained by The target of JM for ankle dorsiflexion is focused on three joint: the talocrural joint, the subtalar joint and the distal tibiofibular joint. However, most previous reports mentioned the talocrural joint (Green et al., 2001; Seiger and Draper, 2006), even though JM for the distal tibiofibular joint is used to reduce both chronic pain and improve ankle ROM. Mulligan suggested that a positional fault of the fibula (movement of the lateral malleolus anteriorly during dorsiflexion) often occurred after ankle sprains or chronic ankle instability (Mulligan, 1995).

The study of O' Brien and Vicenzino 1988 , Whitman et al , 2005 Subjects: acute and sub-acute lateral ankle sprains suggested that MWM treatment technique Significantly greater immediate improvements in functional mobility ,Improvements were maintained at the short term and long term follow up.

The effects of Mulligan's mobilisation with movement technique was studied by Collins et al (2004). The initial effects of manual mobilisation with subacute ankle sprains on dorsiflexion range of motion (both pressure pain and thermal pain) were evaluated. Using a crossover design an initial effect of Mulligan's technique on dorsiflexion range of motion for pre- to post-application in one session was found, compared to placebo and control group.

IMPROVEMENT WITH TAPING AND ROUTINE PHYSIOTHERAPY

The findings of our study suggested that both methods are effective in the treatment of acute grade 2 ankle sprain, but the combination of mulligan mobilisation with movement and taping with routine physiotherapy is more effective in the treatment of acute grade 2 ankle sprain.

While Comparison of the post treatment mean value of group B for taping with routine physiotherapy to pre treatment mean value, there is a significant improvement were noticed in all the three groups on day 1, day 7,day 14

In the group B, the mean value noticed on the VAS scale is 7.30 with standard deviation 1.15 on day 0, whereas from day 1 mean value gradually decreases to 6.40 with standard deviation 0.96, on day 7 mean value is 4.70 with standard deviation 0.67 and on day 14 the mean value is 3.30 with standard deviation 0.48.

The mean value noticed for ROM for dorsiflexion is 10.70 with standard deviation 0.94 on day 0 , whereas from day 1 mean value gradually increases to 11.20 with standard deviation 1.22, on day 7 mean value 12.40 with standard deviation 1.07 and on day 14th the mean value is 13.20 with standard deviation 1.03.

Our findings are further in agreement with the result obtained by Chung-Wei Christine Lin[1], Claire E. Hiller[2], Rob A. de Bie[3]Functional support is preferable to immobilization for most ankle sprains. Functional support involves the use of a removable and variable immobility device and therefore often includes an exercise component in the treatment. A meta-analysis found significant differences in favor of functional support, which included brace, elastic bandage, tape, soft cast, or wrap over immobilization.12 Differences in favor of functional support included a higher percentage of people returning to sports, shorter time to return to work, less persistent swelling, and greater range of motion

IMPROVEMENT WITH ROUTINE PHYSIOTHERAPY

While Comparison of the post treatment mean value of group C for routine physiotherapy to pre treatment mean value, there is a significant improvement were noticed in all the three groups on day 1, day 7,day 14

In the group B, the mean value noticed on the VAS scale is 6.70 with standard deviation 1.25 on day 0, whereas

from day 1 mean value gradually decreases to 5.80 with standard deviation 1.03, on day 7 mean value is 4.80 with standard deviation 1.03 and on day 14 the mean value is 3.50 with standard deviation 1.26.

The mean value noticed for ROM for dorsiflexion is 9.30 with standard deviation 0.94 on day 0 , whereas from day 1 mean value gradually increases to 10.70 with standard deviation 1.15, on day 7 mean value 11.50 with standard deviation 0.84 and on day 14th the mean value is 12.30 with standard deviation 0.94.

Verhagen et al (2004) suggest that theeffect of exercise therapy is not only relevant for preventionof injuries but may also have a rehabilitative effect in thetreatment of acute ankle sprains.

CONCLUSION

The results indicates that **mulligan mobilization with movement and taping technique** both are effective modalities in the treatment of Ankle Sprain alone, but the combination of both the technique along with conventional therapy is more effective than individual one. It reduced pain and improves range of motion. Up to date, no treatment has been universally successful; therefore, there is a need for development of an effective regime. This study was designed to create a treatment protocol and to see if a combination of physical modalities and **mulligan mobilization with movement and taping** could potentially alleviate the non surgical management of Ankle Sprain.

However, further studies are required based on the larger scale along with control group to confirm the findings of present study. There is no long term follow up data was recorded past 2 weeks, therefore the measurement and evaluation of outcome results for the short term, intermediate term and long term can be framed with future research. The gender difference can be considered to differentiate the treatment outcome in male group compare to female group.

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