



The Different Effect of Wobble Board Exercise And Elastic Resistant Band Exercise on Stabilization of The Ankle Joint In The Case of Ankle Sprain

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ABSTRACT

Objective: To identify that proprioceptive training using a wobble board is different from ankle muscle strengthening training using elastic resistance rubber in reducing foot and ankle disability in cases of chronic ankle sprains.

Methods: This article is used an experimental method, to see the difference between wobble board exercise and ankle muscle strengthening training using elastic resistance rubber in reducing foot and ankle disability in cases of chronic ankle sprains. The first treatment group was wobble board exercise and Group II was ankle muscle strengthening training using elastic resistance rubber. FADI measurements were carried out before and after treatment with a pre-test and post-test group design.

Results: exercises using Wobble Board and Elastic Resistant Band have differences, they can be used to reduce foot and ankle disability according to needs by taking into account age, tissue conditions, workload, and position at work.

Conclusion: Proprioceptive training with a wobble board can reduce foot and ankle disability in cases of chronic ankle sprains with values before 25.90+ 15.56 and after treatment 6.60 + 5.03. Ankle muscle strengthening training with elastic resistance rubber can reduce foot and ankle disability in chronic ankle sprain cases with a value before treatment 44.90 + 18.80 after treatment 13.80 + 10,30. Differences in proprioceptive training using a wobble board with ankle muscle strengthening training with elastic resistance rubber in reducing foot and ankle disability in cases of chronic ankle sprains with a difference of 19.30±12.57 in Group I and 31.10±12,19 in Group II.

INTRODUCTION

The foot and ankle are formed by 3 joints, namely the talocrural articulation, the subtalar articulation and the distal tibiofibular articulation. The foot and ankle are very complex joint structures consisting of many bones, ligaments, muscles and tendons that serve as stabilization and locomotion of the body. Muscles and ligaments are joint stabilizers, including sensorimotor (Carolyn Kisner & Colby, 2016). In this component of the foot and ankle joints, plantar flexion, dorso flexion, inversion and eversion will occur. The function of the ankle as a weight supporter allows injury to the body. ankles.

Ankle sprain injuries can occur due to overstretching of the lateral complex ligaments of the ankle with a sudden inversion and plantar flexion that occurs when the foot is not fully supported on the floor/ground, which generally occurs on uneven ground/floor surfaces. The ligaments in the lateral ankle include: the anterior talofibular ligament which functions to resist movement in the direction of plantar flexion. The posterior talofibular ligament is responsible for resisting movement toward inversion. The calcaneocuboid ligament serves to resist movement in the direction of plantar flexion. The talocalcaneus ligament which functions to resist movement towards inversion and the calcaneofibular ligament which functions to resist movement towards inversion (Chan et al., 2011).

Factors that can facilitate the occurrence of ankle sprain injuries are muscle weakness, especially the muscles around the foot and ankle joints (Khairunnisa & Fitriana, 2020). Weakness or looseness of the ligaments in the foot and ankle joints, poor balance ability, uneven sports field surface, inappropriate shoes or footwear and daily activities such as work, exercise, walking and others (Needle et al. al., 2013). Interventions that can be applied to the treatment of foot and ankle disability in chronic ankle sprains are exercise therapy. Exercise therapy is one of the physiotherapy modalities that can be used to restore muscles, ligaments, tendons, bones and nerves, with the aim of increasing ROM, increasing muscle strength, increasing proprioceptive abilities, restoring balance and postural control, reducing foot and ankle disability and activity. everyday life will return to normal (Carolyn Kisner & Colby, 2016).

Proprioceptive training using a wobble board is the provision of training using a balance board (wobble board). Wobble board training is a dynamic stabilization

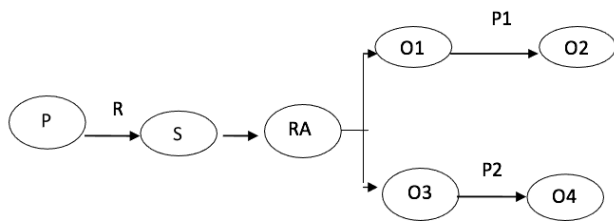
exercise in a static body position, namely the body's ability to maintain stabilization in a fixed position by standing one or two feet on the wobble board (van der Wees et al., 2006). The advantages of proprioceptive training with a wobble board are training the muscles of the lower extremities from the pelvis to the foot and ankle simultaneously in increasing foot and ankle muscle strength, proprioceptive, stability, balance so that foot and ankle disability decreases and daily activities become normal (C Kisner & Colby, 2012).

The principle of this exercise is to improve the function of controlling body balance. During exercise, the stimulation received by the intrafusal and extrafusal fibers enriches the sensory input that will be sent and processed in the brain for processing so that it can determine how much muscle contraction can be given. Some of the responses sent back to the extrafusal will activate the Golgi tendon and then there will be an improvement in the coordination of intrafusal fibers (myofibrils) and extrafusal fibers (Golgi tendon organs) with afferent nerves in the muscle spindles so that a good proprioceptive is formed (Miller Jude, 2011). Ankle muscle strengthening training using elastic resistance rubber aims to increase the strength of the foot and ankle propulsion muscles, so as to be able to maintain anatomical position, increase muscle tone, increase stretch reflex which can prevent re-injury, and improve foot stability (O'Driscoll & Delahunt, 2011).). Muscle strengthening training using elastic resistance rubber, in the form of isotonic exercises can help and improve muscle weakness caused by damage to the lateral ligament complex. Increased muscle strength is obtained by continuous training so that tonic muscle strength can increase capillary blood circulation which can increase phasic muscle strength which will result in additional recruitment of motor units in the muscles which will activate the Golgi body so that the muscles will work optimally, so that stability is formed. good for the ankle, in reducing foot and ankle disability in cases of chronic ankle sprains (O'Driscoll & Delahunt, 2011) .

METHOD

This study used an experimental method, to see the difference between wobble board exercise and ankle muscle strengthening training using elastic resistance rubber in reducing foot and ankle disability in cases of chronic ankle sprains. The first treatment group was wobble board exercise and Group II was ankle muscle strengthening training using elastic resistance rubber. FADI measurements were carried out before and after

treatment with a pre-test and post-test group design. The form of this research design can be described with the following pattern:



Picture 1 : Research Plan

Information :

P : Population

S : Sample

R : Random

RA : Random Allocation

O₁ : Measurement results of foot and ankle disability index (FADI) in group I before being given proprioceptive training with a wobble board.

P₁ : Treatment in group I (proprioceptive training using a wobble board with a dose of 3 times a week, 3 sets, 1 set for 1 minute in 6 weeks.

O₂ : Measurement results of foot and ankle disability index (FADI) in group I after being given proprioceptive training with a wobble board.

O₃ : The results of the measurement of the foot and ankle disability index (FADI) in group II (control) before being given muscle strengthening training with elastic resistance rubber.

P₂ : The treatment in group II was muscle strengthening training with elastic resistance rubber with a dose of 3 times a week, 3 sets, for 30 minutes in 6 weeks.

O₄ : The results of the measurement of the foot and ankle disability index (FADI) in group II after being given muscle strengthening training with elastic resistance rubber.

RESULT

The research sample on chronic ankle sprain cases was obtained from all patients who went to RSUD DR. Mohamad Saleh, Probolinggo City on June 20–August 1, 2021, consisting of 12 men and 8 women aged between 17-35 years. Samples were obtained from referrals to bone specialists and Physiotherapy examinations. The sample was divided into 2 groups, according to the inclusion and exclusion criteria with a randomized allocation method between placement as a sample group proprioceptive training with a wobble

board and ankle muscle strengthening training with elastic resistance rubber in reducing foot and ankle disability in cases of chronic ankle sprains. From the number of samples taken, the first group will be referred to as Treatment Group 1 with a sample of 10 people who were given proprioceptive training with a wobble board and in the second group referred to as treatment group 2, which consisted of 10 people who were given ankle muscle strengthening training with elastic resistance rubber. . Prior to training, at the beginning of the program, the foot and ankle disability value was measured using the Foot and Ankle Disability Index (FADI). Furthermore, the sample was given 18 exercises and at the end of the program a re-measurement was carried out, this was done to determine the success rate of disability reduction from each treatment that had been given training.

Table 1 shows the characteristics of respondents related to age, weight, height, and body mass index, both in the proprioceptive training group with a wobble board (Group I), and in the muscle strengthening training group with elastic resistance rubber (Group II).

In Group 1 with the number of samples (n = 10) it was found that the average age was 21.70 + 4.90 with a minimum age of 17 years and a maximum age of 35 years, the average body weight was 56.20 + 5.43 with a minimum body weight of 45 kg and body weight maximum 63 kg, average height 158.90 + 5.15 with a minimum height of 148 cm and a maximum height of 165 cm. and an average BMI of 20,761+ 1,865 kg/m² and a minimum BMI of 19,48 kg/m² and a maximum BMI of 24,60 kg/m². In Group II with the number of samples (n = 10) it was found that the average age was 21.40 + 3.80 with a minimum age of 19 years and a maximum age of 33 years, the average body weight was 57.20 + 6.52 with a minimum weight of 45 kg and maximum weight 68 kg, Average height 165.90 + 5.33 with height a minimum body weight of 160 cm and a maximum height of 175 cm and an average BMI of 25.175+ 9.14 kg/m² and a minimum BMI of 17.17 kg/m² and a maximum BMI of 23.43kg/m².

Based on Table 2 the percentage of age in this study was the most chronic ankle sprains obtained at the age of 16-25 years. This age is the age group of late teens who have high physical activity. The highest percentage of gender in the study was male compared to female. The highest percentage of BMI in Treatment Group 1 and Treatment Group 2 in this study was 18.50 - 25.00 kg/m². These data are included in the normal

BMI category. The highest percentage of activities and hobbies for futsal players, ankle sprains in this study were found in futsal players.

DISCUSSION

The subjects of this study were 20 people who were divided into 2 treatment groups, each group consisted of 10 people. Group I was given proprioceptive training with a wobble board and Group II was given muscle strengthening training with elastic resistance rubber.

The ages involved in this study ranged from 17-35 years, Group I had a mean (21.70 + 4.90) and Group II, (21.40 + 3.80), the age most injured in this study was age 17-25 years. This is in line with research which states that the incidence of chronic ankle sprains can occur in several age groups but generally occurs in adolescents and adults (Kim et al., 2013).

The description of gender shows that the research sample in Group I is 6 (60%) male and 4 (40%) female, while Group II is 6 (60%) male and 4 female. (40%) people. This illustrates that in this study gender is not a consideration that affects the assessment aspect in the study and has no association with an increase in foot and ankle disability in chronic ankle sprains.

Description of body mass index (BMI) Average body weight 56.20 + 5,432 with a minimum weight of 45 kg and a maximum weight of 63 kg, Average height 158.90 + 5,152 with a minimum height of 148 cm and a maximum height of 165 cm. and the average BMI is 20.76 + 1.86 kg/m² and a minimum BMI of 19.48 kg/m² and a maximum BMI of 24.60 kg/m².

Group II with the number of samples (n = 10) it was found that the average age was 21.40 + 3.80 with a minimum age of 19 years and a maximum age of 33 years, an average body weight of 57.20 + 6.529 with a minimum body weight of 45 kg and maximum body weight 68 kg, average height 165.90 + 5.33 with a minimum height of 160 cm and a maximum height of 175 cm and an average BMI of 25.175 + 9.14 kg/m² and a minimum BMI of 17.17 kg/m² and a maximum BMI 23.43kg/m². This shows that BMI is not one of the considerations that affect aspects of the study and is not associated with a decrease in foot and ankle disability.

The description of the types of hobbies and work activities shows that the research sample of group I with a level of frequent playing futsal is 4 (20%) people, playing basketball 1 (5%), dancing hobby 1 (5%) people, volleyball 1 (5%) people, recreation 2 (10%)

people, civil servants 1 (5%) people. While the second group with the level of frequent playing futsal as many as 4 (20%) people, playing basketball 3 (15%), volleyball 1 (5%) people, civil servants 1 (5%) people, playing badminton 1 (5%). This is in line with research that explains that the causative factor, ankle sprains can occur when doing activities, especially sports activities with a percentage of 41.1% - 70% (Needle et al., 2013).

CONCLUSION

Proprioceptive training with a wobble board can reduce foot and ankle disability in cases of chronic ankle sprains with values before 25.90 + 15.56 and after treatment 6.60 + 5.03. Ankle muscle strengthening training with elastic resistance rubber can reduce foot and ankle disability in cases of chronic ankle sprains with values before treatment 44.90 + 18.80 after treatment 13.80 + 10.30. Differences in proprioceptive training using a wobble board with ankle muscle strengthening training with elastic resistance rubber in reducing foot and ankle disability in cases of chronic ankle sprains with a difference of 19.30±12.57 in Group I and 31.10±12.19 in Group II.

SUGGESTION

Proprioceptive training methods using a wobble board and ankle muscle strengthening training with elastic resistance rubber can be used in cases of chronic ankle sprains, physiotherapy needs to consider the patient's socioeconomic status. Multi-center studies were designed in multiple sites with the same protocol and using better doses.

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Table 1. Distribution of Samples by Age, Weight, Height, BMI in Treatment Group 1 and Treatment Group 2

Variable	Group			
	Wobble board(n=10)		Rubber Elastic elasistance (n=10)	
	Average+ SD	Min ; Maks	Average + SD	Min : Maks
Age (year)	21,70± 4,90	(17 : 35)	21,40 ± 3.80	(19 : 33)
Weight (kg)	56,20 ± 5.43	(45 : 63)	57,20 ± 6.52	(45 : 68)
Height (cm)	158,90 ± 5.15	(148 : 165)	165,90 ± 5.32	(60 : 175)
BMI	20,761 ± 1.86	(19,48: 24,60)	25,17± 9.14	(17,17: 23,43)

Table 2. Frequency Distribution of Respondents’ Characteristics Based on Age, Gender, BMI, Activities/Hobby Groups I and Group II

Subject Characteristics	Range	Group I		Group II	
		n	%	n	%
Age	16-25	9	45	9	45
	26-35	1	5	1	5
	36-45	0	0	0	0
Gender	Male	6	60	6	6
	Female	4	40	4	40
BMI	17,00 -18,40 (Thin)	0	0	1	5
	18,50 - 25,00 (Normal)	8	4	9	45
	25,1- 27,00 (Overweight)	1	5	1	5
	27,00 – 30,00 (Obesity)	0	0	0	0
Acticities/Hobbies	Futsal	4	20.	4	20
	Basketball	1	5	3	15
	Vollyball	1	5	1	5
	Dance	1	5	0	0
	Employee	1	5	1	5
	Badminton	0	0	1	5
	Refreshing	2	10	0	0