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Randomized Controlled Trial: Effectiveness of Ankle Support in Reducing Ankle Sprain Pain in Futsal Players

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Abstract

Background: Many people worldwide engage in sports as a hobby, for health training, work, fitness, and relaxation. However, physical activity can also lead to injuries, as can workplace accidents, traffic incidents, and mishaps at home. One common injury is an ankle sprain, particularly prevalent among highly active individuals. Several treatments are available for ankle injuries, with conservative early intervention being the preferred approach. The RICE method (Rest, Ice, Compression, and Elevation) is commonly employed initially, which can be supplemented with protection and rehabilitation to form the PRICE regimen. Protection involves immobilization, which aids in pain and swelling reduction. Additionally, medications play a role in alleviating pain and swelling. Following conservative treatment, functional intervention utilizing external support is often employed to enhance ankle joint function and stability. In cases where conservative measures fail to yield satisfactory results, surgical intervention may be necessary to improve joint stability.
Aims: This study aims to assess the effectiveness of ankle support in alleviating pain among futsal players who have sustained ankle sprains.
Methods: The research adopts an experimental design, specifically a randomized controlled trial (RCT), employing simple randomization to form two groups: the control group and the treatment group.
Results: Non-parametric tests utilizing the Mann-Whitney Test yielded a probability value of 0.693 (> 0.05), leading to the rejection of the hypothesis.
Conclusion: Consequently, the study's findings indicate no significant difference in pain reduction between futsal players who use ankle support and those who do not follow ankle sprains.

Keywords: Ankle Support, Pain, Ankle Sprain

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Introduction

Most of the people do sports as a hobby, health training, work, fitness and relaxation. However, exercise can also cause injuries, as can work accidents, traffic accidents and accidents at home (Fong et al., 2007). One common injury is ankle sprain in individuals who have high levels of activity (Janssen et al, 2014). Ankle sprains or sprains are reported to occur in 12-20% of all sports injuries (Nagamoto et al., 2020). With a total of 1,000 cases recorded each year in the United States, whereas in Europe it occurs in 5.3-7% of 1,000 people per year (Kim et al., 2018). In England, it is recorded that 3-10% of Emergency Room (IGD) patients are ankle sprains (Diaz et al., 2006). In Indonesia, there were 85 recorded incidents of ankle sprains in 2009, in 2010 there were 146 injuries, in 2011 there were 353 injuries and in 2012 there were 419 injuries among all athletes who took part in PON XVIII/2012 in Jakarta (Marta and Kawiyana, 2016).

Ankle sprains result in pain and swelling, often occurring on the lateral side of the ankle. Other complaints are mechanical instability and stiffness. If these musculoskeletal disorders occur in the long term, they will cause trauma to the cartilage and cause degenerative diseases (Struijs and Kerkhoffs, 2009). In the acute phase, patients with ankle sprains will lose the range of motion of the joint, also experience pain, swelling, muscle weakness and postural control deficits (Youdas et al., 2009). In addition to the high incidence of ankle sprains that is noteworthy, individuals with a history of ankle sprains have a 3.5 times greater risk of experiencing another ankle sprain compared to those without a previous history (Herzog et al., 2019). Repeated injuries can develop into chronic ankle instability, this instability increases the risk of joint damage and progression to osteoarthritis (Alghadir et al., 2020).

Various treatments are available for ankle injuries. One conservative early treatment option is the RICE (Rest, Ice, Compression, and Elevation) method, which can be supplemented with protection and rehabilitation to form the PRICE regimen (Marta and Kawiyana, 2016). Protection entails immobilization, which effectively reduces pain and swelling, while medication also plays a role in alleviating these symptoms. Following conservative treatment, functional intervention can be implemented using external support to improve both function and stability (Struijs and Kerkhoffs, 2009). In cases where these treatments fail to yield satisfactory results, surgery may be necessary to enhance joint stability (Doherty et al., 2017).

Neoprene ankle support serves to prevent further ankle injuries and provides stability and support during activities. Its design, resembling a decker with a closed heel, utilizes high-quality elastic material to offer compression in the ankle area for comfort and easy application. The ankle support fits snugly in shoes, facilitating participation in sporting activities while also enhancing awareness of the ankle joint's position to prevent further adverse movements that could exacerbate acute injuries. Neoprene material effectively provides compressive support to prevent re-injury and aids in injury recovery. Particularly beneficial during colder months, it retains heat to keep ankles warm, ensuring maximum comfort, and its breathable material prevents skin irritation. Additionally, the hook and loop closure strap at the heel provides extra support to the injured ankle and facilitate compression (Hadadi & Abbasi, 2019).

The intervention in this study used elastic ankle support with malleolus protectors made of silicon material. Good quality elastic material can provide light stabilization.

Figure 1. Neoprene Ankle support

Methods

This type of research uses an experimental research design, randomized controlled trial (RCT). using a simple randomization technique to obtain two groups, namely the control group and the treatment group, with each group consisting of 20 samples. Sample inclusion criteria included samples experiencing ankle pain due to sprains with mild to severe pain levels. during sample data collection, play for 2 x 20 minutes at a time, and play 3 times a week. Samples use shoes that have the same criteria that support playing futsal indoors, including shoe outsoles made from strong and flexible material, with rubber soles that are most appropriate for playing on indoor fields as a reinforcement for footing on the floor so it is not slippery, ankle design on the shoes used Similar to sneakers in general, the ankle is open to free up ankle movement when playing.

Results

Based on the results of research conducted starting June 2023, 40 research respondents were found who met the criteria with a population of 55 futsal players. Consisting of a control group of 20 respondents and an experimental group of 20 respondents. In this presentation, data on respondent characteristics and pretest data will be presented.

Table 1. Gender Characteristics

Gender	Frequency	Percentage
Male	40	100%
Total	40	100%

The subjects in this study were 100% male, it is known that the sport of futsal is identically played by boys.

Table 2. Age Characteristics

Age	Frequency	Percentage
Late Adolescents (17-25 years)	16	40%
Early Adulthood (26-35 years)	19	47.5%
Late Adulthood (36-45 years)	4	10%
Early Elderly (46-55 years	1	2.5%
Total	40	100%

Age distribution according to the Ministry of Health 2009

The percentage of research subjects is mostly in the late teenage and early adult age categories, this is in line with the conditions found in the environment, namely that the hobby of futsal is mostly pursued by children of high school age and teenagers of early adulthood.

Table 3. Body Mass Index

BMI	Frequency	Percentage
Very Skinny	3	7.5%
Skinny	8	20%
Normal	24	60%
Fat	1	2.5%
Obesity	4	10%
Total	40	100%

BMI classification according to the 2014 Balanced Nutrition Guidelines

The results of the characteristics of research subjects based on body mass index (BMI) show that the majority are in the normal category, as many as 24 players or around 60%.

The normality test used was the Shapiro Wilk test because the sample in this study was a small sample (< 50). The purpose of the normality test is to find out what statistics will be used in data analysis, whether parametric or non-parametric statistics. The results of the data normality test can be seen in the table below.

Table 4. Normality Test Results

Variable	*P* Value	Information
Experimental Group Pretest	0.011	Not normal

Control Group Pretest	0.350	Normal
Experimental Group Post Test	0.065	Normal
Post Test Control Group	0.016	Not normal

Based on the Wilcoxon test in the experimental group, the p-value was <0.05, indicating a significant difference before and after using ankle support for pain caused by ankle sprains in futsal players. Additionally, the normality test conducted on the posttest data of both the control and experimental groups revealed that the reduction in pain in the experimental group was normally distributed, whereas the control group exhibited abnormal results. Therefore, the non-parametric Mann-Whitney test was pursued further.

Table 5. Wilcoxon test results

Variable	Mean	z	*P* Value
Experimental group pretest	3.650	-3.925	0.000
Experimental group posttest	2.245		
Control group pretest	2.630	-3.528	0.000
Control group posttest	2.295		

Based on the Wilcoxon test in the experimental group, the p-value was <0.05, indicating a significant difference before and after using ankle support for pain caused by ankle sprains in futsal players. Additionally, the normality test conducted on the posttest data of both the control and experimental groups revealed that the reduction in pain in the experimental group was normally distributed, whereas the control group exhibited abnormal results. Therefore, the non-parametric Mann-Whitney test would be pursued further.

Table 6. Mann-Whitney Test results

Variable	Mean	P Value
Experimental group posttest	2.245	0.693
control group posttest	2.295	

Based on the results of non-parametric tests using the Mann-Whitney Test, the probability value is 0.693 (> 0.05), it can be concluded that the hypothesis is rejected. Thus, it is stated that there is no difference between using ankle support and not using ankle support in reducing pain in futsal players who experience ankle sprains.

Discussion

Research was conducted at GOR Budi Langgeng with two futsal playing clubs, the Al Qolam Futsal club as the intervention group and the Batik Vocational School club as the control group. The results of the hypothesis test in this study are not in accordance with Hadadi & Abbasi's 2019 theory which states that the function of ankle support helps to provide awareness of where the ankle joint is in space so that it is easier to prevent further bad movements which can cause acute injuries to worsen. The theory also states that neoprene ankle supports are suitable for providing compressive support to prevent further injury and continue to help speed up injury recovery.

In the Wilcoxon bivariate test, it was found that significant results in the experimental group showed a p-value of <0.05, so there was a significant difference before and after using ankle support on pain due to ankle sprains in futsal players. However, the results of the effectiveness test via the Mann-Whitney test in both groups were not significant. This could be caused by factors that might influence different test results in the two groups, allegedly due to limited control by researchers in the control group.

In the control group who were not given ankle support intervention, a small number experienced a decrease in the degree of pain, although it was low, this is supported by the theory that manual mobilization of the joint can provide a short-term increase in the dorsiflexion ROM of the ankle joint after an acute ankle injury. Additionally, joint mobilization has been reported to reduce pain in level 1 ankle injuries. Manual therapy combined with exercise therapy produces

better results compared to exercise therapy alone for level 3 ankle injuries (Loudon et al., 2014).

The effects of futsal training and daily activities in the control group are also thought to reduce pain according to the following theory; exercise is often an integral component of the treatment provided. The exercise therapy program consists of neuromuscular and proprioceptive exercises. Exercise therapy programs initiated early after acute injury have been shown to be effective. They can reduce the prevalence of repetitive injuries as well as the prevalence of functional ankle instability (Postle et al., 2012).

Conclusion and Recommendation

Based on the findings, it can be concluded that providing ankle support to alleviate pain from ankle sprains in futsal players was not proven to be effective. This conclusion is drawn from the effectiveness test utilizing the Mann-Whitney test, where the results yielded a p-value greater than 0.05.

Given the lack of effectiveness demonstrated by ankle support in reducing ankle sprain pain among futsal players, it is recommended that alternative strategies be explored for managing and preventing such injuries. Further research could investigate different forms of preventive measures or therapeutic interventions to better address this issue and enhance the well-being and performance of athletes in futsal. Additionally, focusing on strengthening exercises, proper warm-up routines, and education on injury prevention techniques may prove beneficial in reducing the incidence and severity of ankle sprains in this population.

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