


THE EFFECT OF THE USE OF KNEE SUPPORT TO KNEE PAIN OF SKATEBOARD PLAYERS IN SINGARAJA BALI

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<p>Article History</p> <p>Received date: 05-07-2022 Revised date: 13-07-2022 Accepted date: 13-07-2022</p>	<p>Abstract</p>
<p>Keywords:</p> <p>skateboard player, skateboarding, knee pain, knee support, Bali, Indonesia</p>	<p>Background: Due to the nature of skateboarding, including high speeds and extreme maneuvers, such as performing extreme movements that can injure the joint bearing of the knee, injuries often occur when a skateboarder collides with an inanimate object, falling off the skateboard. Knee support is made of elastic material with medial and lateral supports made of metal. With the fixation on the knee as well as support and stabilizer on the knee joint will relieve pain in patients with knee pain so it is expected to reduce pain. Method: This is a quasi-experimental design with one group pre and posttest design. Data was collected in the Singaraja Bali sports hall in September - December 2020. Knee pain was measured using a VAS questionnaire. The samples are 14 skateboarders who play at the Singaraja Bali sports hall. Result: There were 11 males and 3 females as respondents. Pre-test Knee pain VAS score before using knee support is average of 5.93 while the post test score after using knee support for two weeks is average of 2.14. Normality data using the Shapiro Wilk result is not normally distributed. The result of Wilcoxon is p value 0.001. P value is less than 0.05. So it can be concluded that the use of knee support has a significant effect in reducing knee pain in skateboarders. Conclusion: there is an effect of the use of knee support to knee pain of skateboard players. It is advisable for skateboarders to wear knee support when feeling pain.</p>
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Introduction

Due to the nature of skateboarding, including high speeds and extreme maneuvers, such as jumping from heights and performing extreme movements that can injure the knee joint pads, injuries are common when skateboarders collide with inanimate objects, fall from skateboards (Fountain & Meyers, 1996).

Most of the injuries occur when skateboarders make extreme jumps, making the skateboarder fall and injure the knee joint, on average 45% of teenagers skateboarding in Singaraja have knee joint injuries (Tominaga et al., 2015). Due to the nature of skateboarding, which includes high-speed and extreme maneuvers, injuries are common when skateboarders collide with inanimate objects, fall from skateboards, or are involved in vehicular traffic (Shuman & Meyers, 2015). Skateboarding too often without warming up and performing dangerous maneuvers or tricks and performing tricks incorrectly can cause knee pain for skateboarders (Maloney et al., 2021).

Skateboarding is also an extreme sport and in Indonesia it is not very popular but has the potential to be liked by young people in Singaraja Bali. Due to the nature of skateboarding, including high speeds and extreme maneuvers, such as jumping from heights and performing extreme movements that can injure the joint bearing of the knee, injuries often occur when a skateboarder collides with an inanimate object, falling off the skateboard. Knee support is made of elastic material with medial and lateral supports made of metal. Elastic material that has the ability to stretch and return to its original state quickly so that it serves as a fixation on the knee that suffers from knee pain. With the fixation on the knee as well as support and stabilizer on the knee joint will relieve pain in patients with knee pain so it is expected to reduce pain.

Methods

This research was conducted in the Singaraja Sports Center, Bali. The time used in the study was September – December 2020. The research design of the effect of using knee support on skateboarders in patients with knee pain is a quantitative research type using a quasi-experimental design with one group pre

and posttest design. The pre and post designs were used because there was an assessment before the intervention was given and a reassessment after the intervention was given, so that the difference between before and after the intervention could be compared. Skateboarders suffering from knee pain were measured using the VAS (Visual Analogue Scale) questionnaire which has been used extensively in recent decades in pain-related research with reliable, valid and consistent results. The VAS is an instrument used to assess the intensity of pain. Pain using a 10 cm line chart with a scale reading of 0–100 mm.

The method of assessment is that the patient marks himself with a pencil on a scale value that corresponds to the intensity of the pain he feels after being given an explanation from the researcher about the meaning of each scale. The VAS score was determined by measuring the distance between the end of the line indicating no pain to the point indicated by the patient.

The research design of the effect of the use of knee support to knee pain of skateboard players is a type of quantitative research using a quasi-experimental design with one group pre and posttest design. Data was collected in the Singaraja Bali sports hall in September - December 2020. Skateboarders' knee pain was measured using a VAS (Visual Analogue Scale) questionnaire. The population is 14 skateboarders who play at the Singaraja Bali sports hall. All respondents were sampled using the total sampling method

Results

Researchers in conducting this study used a quasi-experimental research design with pre-test and post-test design methods to determine the effect of using knee support on knee pain in skateboarders. Subjects in this study were patients with knee pain as many as 14 people. This research was conducted by filling out pre-test and post-test questionnaires by subjects with knee pain before and after using knee support. Researchers visited respondents to collect data and ask questions about complaints of knee pain. Figure 1 shows a skateboarder using knee support



Figure 1. Skateboarders using knee support

Pre-test result of knee pain VAS score before using knee support is average of 5.93 while the post test score after using knee support for two weeks is average of 2.14. Normality data using the Shapiro Wilk result is not normally distributed. The result of Wilcoxon is p value 0.001. P value is less than 0.05. So, it can be concluded that the use of knee support has a significant effect in reducing knee pain in skateboarders.

Characteristics of Research Subjects

There were 11 males and 3 females as respondents. Majority of respondents were male (79%). The age of the youngest respondent is 21 years, the oldest is 28 years. Of the 14 respondents, 8 people used knee support on the right side, 4 people used knee support on the left side, 2 people used bilateral as shown in table 1.

Table 1. Frequency Distribution

Description	Frequency	Percent (%)
Gender		
Male	11	79
Female	3	21
Age		
21	4	28.57
23	3	21.43
24	2	14.29
26	2	14.29
28	3	21.42
Using Knee Support		
Right	8	57
Left	4	29
Bilateral	2	14

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Source: Primary Data, 2020

The Effect of the Use of Knee Support to Knee Pain

Analysis of the data used to determine the effect of using knee support on knee pain in skateboarders is using the paired T-test, which is to determine the difference in the mean in two measurements on the same sample. The results of the normality test using Shapiro Wilk showed that in the pre-test group, the p-value of functional activity was $0.007 < 0.05$, so it can be concluded that the data were not normally distributed, while in the post-test group, the p-value of functional activity was $0.045 < 0.05$ so that it can be concluded that the data is not normally distributed.

Because the two treatment groups obtained data that were not normally distributed, parametric statistics were used, namely the Wilcoxon test. The results of data analysis on the effect of using knee support on knee pain in skateboarders can be seen in table 2 as follows:

Table 2. Wilcoxon Test Result

Measurement	Mean	T	p value
Post-test	2.14	3.37	0.001
Pre-test	5.93		

Source: Primary Data, 2020

Discussion

The results of statistical tests were carried out using the Wilcoxon test which showed p value of $0.001 < 0.05$ so it can be concluded that there is an effect of using knee support on knee pain in skateboarders. In addition to looking at the results of the analysis of the probability value (p) it can also be seen from the acquisition value of the average (mean) functional activity in the pre-test group of 5.93 while the average (mean) of functional activity in the post-test group is 2.14. This shows that pain in patients with knee pain before using knee support is higher than pain in patients with knee pain after using knee support, so in this case the use of knee support has a significant effect on reducing knee pain in skateboarders.

Based on the research entitled "Use of the Knee Brace Inhibits Deformity in Osteoarthritis", the results of the paired sample t-test analysis in the pre-treatment group were relatively constant (before using an average of 8.3° and after using an average of 8.5°) did not show a significant difference. Due to the nature of skateboarding, which includes high-speed and extreme maneuvers, injuries are common when skateboarders collide with immovable objects, fall from skateboards, or are involved in vehicular traffic (Fountain & Meyers, 1996). With increasing age, especially entering the pre-elderly age, namely over 45 years, it is often found that knee pain sufferers attack men more than women (Kozak-Szkopek et al., 2017).

The knee support that will be used in this study is made of elastic material with metal reinforcement/support on the medial or lateral part. Elastic has the ability to stretch and return to its original state quickly so that it functions as a fixation on the knee with knee pain, stretching is an exercise that must be done to increase synovial fluid production and increase flexibility in muscles and joints. Meanwhile, metal has strong and hard properties so it is suitable to be used as material in the manufacture of knee support which functions as a support and stabilizer for knee joints with osteoarthritis. With fixation on the knee as well as support and stabilizers in the knee joint will relieve pain in patients with knee pain so that it is expected to reduce pain.

Tricks to jump from obstacles that are too extreme and do it too often are one of the causes of knee pain (Rodríguez-Rivadulla et al., 2020). The incidence and prevalence of knee pain vary from country to country, but data from different countries show that exercise-induced pain is among the most common, especially in adults and the elderly. Its prevalence increases with age (Han et al., 2018).

The prevalence increases with increasing age and radiographic data show that knee pain occurs in most people over 65 years of age, and in almost everyone over 75 years of age. Knee pain is characterized by the occurrence of pain in the joints, especially when moving (Paerunan et al., 2019). The

factors associated with complaints of knee pain include weight, age, trauma, muscle atrophy. In addition to the above factors, other factors associated with complaints of knee pain are injury, inflammatory disease, cancer, and osteoporosis (Sembiring, 2018). Too often skateboarding without warming up and performing dangerous maneuvers or tricks and doing tricks incorrectly can make skateboarders' knees feel pain. Tricks to jump from obstacles that are too extreme and do it too often are one of the causes of knee pain (Westoro, 2016).

There are several other studies whose results are in line with this study. Research entitled "Lower Extremity Functional Scale (LEFS): Cross – Cultural Adaption Into Greek and Reliability Properties of the Instrument", the results of the LEFS analysis in musculoskeletal patients on a scale have good variability with the value of paired samples t -test NS, $p=0.658$ (Stasi et al., 2012). Based on the research entitled "The Lower Extremity Functional Scale (LEFS): Scale Development Measurement Properties, and Clinical Application", it was found that the correlation between the results of LEFS and SF-36 has a high level of validity with a value of $r = 0.80$ (95% lower limit CI=0.73) and $r=0.64$ (95% lower limit CI=0.54) (Binkley et al., 1999). Based on the research entitled "The Dutch Lower Extremity Functional Scale was Highly Reliable, Valid and Responsive in Individuals with Hip/Knee Osteoarthritis: a Validation Study", obtained a fairly good validity result with $p<0.01$ (ICC=0.86) (Hoogbeem et al., 2012). Based on the research entitled "Effectiveness of Knee Bracing in Osteoarthritis: Pragmatic Trial in a Multidisciplinary Clinic", the results obtained were knee osteoarthritis outcome score (KOOS) $p=0.12$ and activity of daily living (ADL) $p=0.13$ (Taylor & Todd, 1995).

Conclusion and Recommendation

There is an effect of the use of knee support to knee pain of skateboard players. It is advisable for skateboarders to wear knee support when feeling pain while skateboarding. Recommendations For skateboarders, namely skateboarders, it is necessary to know the importance of preventing further deformity of knee pain by using knee support.

Recommendations For institutions involved, it is better to provide counseling and understanding to the community about the need to use knee support for skateboarders who feel pain.

References

- Binkley, J. M., Stratford, P. W., Lott, S. A., Riddle, D. L., & Network, N. A. O. R. R. (1999). The Lower Extremity Functional Scale (LEFS): scale development, measurement properties, and clinical application. *Physical Therapy*, 79(4), 371–383.
- Fountain, J. L., & Meyers, M. C. (1996). Skateboarding Injuries. *Sports Medicine*, 22(6), 360–366. <https://doi.org/10.2165/00007256-199622060-00004>
- Han, J. S., Geminiani, E. T., & Micheli, L. J. (2018). Epidemiology of figure skating injuries: a review of the literature. *Sports Health*, 10(6), 532–537.
- Hoogeboom, T. J., de Bie, R. A., den Broeder, A. A., & van den Ende, C. H. M. (2012). The Dutch Lower Extremity Functional Scale was highly reliable, valid and responsive in individuals with hip/knee osteoarthritis: a validation study. *BMC Musculoskeletal Disorders*, 13, 117. <https://doi.org/10.1186/1471-2474-13-117>
- Kozak-Szkopek, E., Broczek, K., Slusarczyk, P., Wiczorowska-Tobis, K., Klich-Raczka, A., Szybalska, A., & Mossakowska, M. (2017). Prevalence of chronic pain in the elderly Polish population—results of the PolSenior study. *Archives of Medical Science: AMS*, 13(5), 1197.
- Maloney, S. J., Clark, L. D. D., & Bishop, C. (2021). RELATIONSHIPS BETWEEN JUMPING ASYMMETRY AND PERFORMANCE IN SKATEBOARDERS. *Journal of Australian Strength & Conditioning*, 29(01), 13–19.
- Paerunan, C., Gessal, J., & Sengkey, L. S. (2019). Hubungan antara usia dan derajat kerusakan sendi pada pasien osteoarthritis lutut di instalasi rehabilitasi medik RSUP. Prof. Dr. RD Kandou Manado periode Januari–Juni 2018. *JURNAL MEDIK DAN REHABILITASI*, 1(3).
- Rodríguez-Rivadulla, A., Saavedra-García, M. Á., & Arriaza-Loureda, R. (2020). Skateboarding injuries in Spain: a web-based survey approach. *Orthopaedic Journal of Sports Medicine*, 8(3), 2325967119884907.
- Sembiring, S. P. K. (2018). *Diagnosis Diferensial Nyeri Lutut*. SamuelKarta. com.
- Shuman, K. M., & Meyers, M. C. (2015). Skateboarding injuries: An updated review. *The Physician and Sportsmedicine*, 43(3), 317–323.
- Stasi, S., Papathanasiou, G., Anagnostou, M., Galanos, A., Chronopoulos, E., Baltopoulos, P. I., & Papaioannou, N. A. (2012). Lower Extremity Functional Scale (LEFS): Cross-cultural adaption into Greek and reliability properties of the instrument. *Health Science Journal*, 6(4), 750.
- Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2), 144–176. <https://doi.org/10.1287/isre.6.2.144>
- Tominaga, G. T., Schaffer, K. B., Dandan, I. S., Coufal, F. J., & Kraus, J. F. (2015). Head injuries in hospital-admitted adolescents and adults with skateboard-related trauma. *Brain Injury*, 29(9), 1044–1050.
- Westoro, P. (2016). KECINTAAN SKATERS TERHADAP SKATEBOARD (Studi Fenomenologi Kecintaan Skaters Taman Bungkul Terhadap Skateboard). *Paradigma*, 4(3).