

The Effectiveness of Neuromuscular Taping (NMT) Application and Core Stability Exercise to Increase Agility in the Case of Jumpers Knee at PTPN V Pekanbaru Soccer School

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Abstract

Purpose: Jumper's knee occurs when there is repeated pressure and pulling in the jumping motion causing pathology in the knee which is caused by the tendons attached to the bottom of the patella experiencing irritation, many factors including the continuous pulling on the patella. The purpose of this study was to assess the effectiveness of the application of Neuromuscular Taping and Core Stability Exercise to increase agility in the condition of jumpers knee conditions in soccer school students.

Methodology: This research method is experimental with randomized control pre-test and post-test group design with different tests in both groups. The sample of football school students and the research location is in the PTPN V Soccer field in Pekanbaru. Participants: 12 active male students aged 14-16 years in one group, given the Neuromuscular Taping application and Core Stability Exercise with jumpers knee pathology, examined and measured with the Agility Illionis Test

Results: the test showed an increase in agility with the Neuromuscular Taping intervention and Core Stability Exercises before the intervention 21.33 ± 1.403 and the mean value after the intervention 14.70 ± 0.815 in one group and Test the research hypothesis using Paired Samples Test with significant results $P = 0.000$ ($P < 0.05$) with a mean value of $6,631 \pm 1,037$.

Applications/Originality/Value: The conclusion is the application of Neuromuscular Taping and Core Stability Exercises can increase agility in jumpers knee conditions of PTPN V Pekanbaru soccer school students.

Introduction Section

Jumper's knee is a type of overuse injury also known as patellar tendinosis, patellar tendinopathy, patellar tendinitis, Sinding-Larsen-Johansson disease. This injury is commonly found in sports that involve a lot of jumping and running movements, or repetitive running jumping movements that cause inflammation of the patella tendon (Yılmaz, 2022). Sports that often cause patella tendinitis besides badminton are basketball, football, athletics, volleyball, tennis, figure skaters, baseball, football, bicycle racing, fencing and others. There are also sports that can cause patella tendinitis without any jumping motion, namely weightlifting which is caused by excessive weights when lifting weights (Ortega-Castillo et al., 2020). Apart from sports activities, patellar tendinitis can also be caused not because of exercise but because of doing work that requires a lot of lifting weights such as stock workers in stores. Patella tendinitis can also be caused by conditions such as hips that are too big, a blow to the knee and flat feet can be a cause of patella tendinitis (Boroh, 2016).

One of the physical components of a soccer player is agility. Agility is a component that plays a big role in soccer players to maintain their position so they don't fall easily and get injured when defending and fighting when playing soccer. Soccer players who have good agility have a smaller risk of injury and vice versa, with bad agility the risk of injury will be higher. Agility or agility is a component of the physical condition that is very necessary in sports. Agility in changing movement and direction of movement. Agility is the ability to change quickly and accurately while moving without losing balance. (Amiri-Khorasani et al., 2010.)

Core Stability or Core Exercise by definition is the ability to control the position and movement of the torso through the pelvis and legs to enable optimal production, transfer and control of strength and movement to the terminal segments in integrated kinetic chain activities (Nurpratiwi et al., 2021).

Patellar tendon anatomy

The patella tendon is a straight continuation of the quadriceps tendon, joining the kneecap. The tendon originates inferiorly to the patella bone and inserts into the tibial tuberosity; this tendon is about 6 cm long and about 3 cm wide. The patella tendon functions to help the quadriceps muscle perform knee extension movements, as well as assist active movements to push individuals off the ground in jumping and also function in stabilizing the knee joint in landing (Callaghan et al., 2008).

Core stability Exercise

Core stability Exercise affects the activity of the muscles in the abdominal area so as to create stability. Core exercise activities are influenced by the superficial (global) muscles and deep (core) muscles. Superficial (global) muscles and deep (core) muscles are primarily responsible for maintaining posture. The global muscles, which are multi-segmented, are a large connection that responds to external loads imposed on the trunk that shift the body's center of mass (Wirth et al., 2017). (The muscles in the core provide the torque or force needed to make movement, control movement, or to prevent movement from occurring. Apart from the abdominal muscles, several other muscles are considered core muscles and provide stability to rigidity and dynamic movement function. The point is No major core muscles fulfill the function of both immobile and motionless postures, but all core muscles play a major role in every body movement (Willardson, 2007).

NMT (Neuromuscular taping) is an application of a technique that uses elastic adhesive tape attached to the skin. It produces a local therapeutic effect and directly affects reflex pathways with good results. The use of NMT will provide an increase in the functional ability of muscles by stimulating nerve responses through biochemical, emotional and energy stimulation mechanism to achieve the desired result (Pillastrini et al., 2016).

RESEARCH METHODS

This study is a quasi-experimental study with a randomized control group pre test-post test design for the effectiveness of neuromuscular taping (NMT) and core stability exercises on increasing agility in cases of knee jumpers at PTPN V Pekanbaru Soccer School.

The research was taken from a comparison of values in the period before and after the intervention. Prior to being given a specific physiotherapy examination intervention by palpating the patella tendon and using Agility measurements with Agility Test Illionis. A total sample of 12 people with a dose of 3 times a week for 5 weeks. Ethics in this study pays attention to informed consent and participant consent is obtained before testing or before intervention, and the confidentiality of the respondents is maintained, and the safety of the respondents.

Place and time of this research was carried out at PTPN V Pekanbaru Soccer School and when the research was carried out August 18 – September 30, 2022.

RESULT

Description of Research Data

The results of the description of the characteristics of the research subjects in the following table.

Table 1: Characteristics of Research Subjects

Characteristics n:12	Mean±SD	Min;Max	P
Age	15.42± 0.669	(14 : 16)	0.004

Weight	55.75± 6.077	(42 : 62)	0.029
Height	169.75± 3.519	(161: 74)	0.057
BMI	19.19± 1.776	(15 : 21)	0.065

Based on table 1: Shows the characteristics of the study group with a sample size (n = 12) in one group with core stability exercise intervention, it was found that the average age was 15.42± 0.669, with a minimum age of 14 years and a maximum age of 16 years with a P value > 0.004, so P < 0.05, average body weight. 55.75± 6.077 with a minimum body weight of 42 kg and a maximum body weight of 62 kg with a P value > 0.029 then P < 0.05, average height 169.75± 3.519 with a minimum body height of 161 cm and Maximum body weight is 174 cm with a P value < 0.057, so P > 0.05 and the average body mass index (BMI) is 19.19± 1.776 with a minimum BMI of 15 and a maximum body weight of 21 with a P value < 0.065, so P > 0.05.

Data Normality Test

Table 2: Normality test

Uji Normalitas Shapiro Wilk Test		
Variable	Rerata±SB	P
N=12		
Agility Illionis Test before NMT dan Core Stability Exercise intervension	21.33±1.403	0.857
Agility Illionis Test after NMT dan Core Stability Exercise intervension	14.70±0.815	0.010

Table II: explains the results of the Normality test based on the Shapiro Wilk test on all pre-test and post-test variables in the data group is p > 0.05, so the data is concluded to be normally distributed.

Hypothesis test of the effectiveness of the application of Neuromuscular Taping and Core Stability Exercise to increase agility to jumpers knee conditions in soccer school students.

Table 3: Hypothesis Test

Variable	Mean±SD	P
N=12		

Agility Illionis test before and after NMT and Core Stability Exercise intervension	6.631±1.037	0.000
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Table III: explains the effect before and after the intervention in the treatment group with a significant value P = 0.000 (P <05) with a mean value before the intervention of 21.33 ± 1.403 and a mean value after the intervention of 14.70 ± 0.815. This means that the application of Neuromuscular Taping and Core Stability Exercise interventions to increase agility with jumpers knee conditions in soccer school students with a mean hypothesis of 6.631 ± 1.037. This was explained in research (Sever & Zorba, 2018) that core stability is the stabilization of the center of the body against dynamic movements that occur in the limbs and core muscles. The process of providing core stability exercise interventions involves components of the biomechanics, motor, sensory, and central nervous system which are the center of the kinetic chain in sports activities that can increase core muscle strength, balance and maximize movement control of the upper and lower extremities. Thus the athlete's motor skills such as strength, endurance, coordination, agility, speed, balance in motion such as running, jumping, hitting, spinning and throwing can be expected to develop through increased core strength and NMT stability. Poor core stability will cause the agonist muscles to work harder so they try to compensate for the deficiency. This causes a functional power deficit (Boz, 2020).

Additional interventions for neuromuscular taping. The NMT used in research is carried out by physiotherapists who have received special training by certified and experienced instructors. The NMT that is applied to the knee joint is an elastic band with the kinesiotope brand with shape I 25 cm long and 5 cm wide which is affixed to the medial and lateral patella with the tension level of the tape being pulled 50% from 0% tension so that compression occurs in the area. Kinesiological tape is a water-resistant elastic band that can stretch up to 120-140% of its original length and can stick to the skin for 3-5 days with very little irritation to the skin (Marcolin et al., n.d.).

Application of neuromuscular taping to the knee with compression techniques in jumpers knee neuromuscular taping and core stability exercises can reduce the occurrence of pressure on mechanoreceptors under the skin, provide a positive effect on reducing pain in the short term by increasing blood and lymphatic circulation, improving joint position, increasing muscle activation, increasing flexibility and coordination. able to increase knee stability and joint proprioceptive so as to be able to correct position when motion errors occur and improve dynamic balance With NMT the confidence level of athletes is higher thereby improving performance (Tekin et al., 2018).

Conclusion

The research with the title EFFECTIVENESS OF NEUROMUSCULAR TAPING APPLICATIONS AND CORE STABILITY EXERCISE TO IMPROVE AGILITY WITH JUMPERS KNEE CONDITIONS IN AT PTPN 5 PEKANBARU SOCCER SCHOOL STUDENT. Based on the results of this study, it was concluded that there was an effect of the intervention given to increase agility as measured by the agility illionis test. It can be seen from the analysis of the hypothesis data in the treatment group with a mean value of 6,631 ± 1,037 with a significant value p = 0.000 (p <0.05).

Suggestion

For the next researcher, it is better if the research is carried out in the room, not in the field, so that the research can still be carried out even though the bad weather

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