Kinestetik : Jurnal Ilmiah Pendidikan Jasmani 8 (1) (2024)
Kinestetik : Jurnal Ilmiah Pendidikan Jasmani
https://ejournal.unib.ac.id/index.php/kinestetik/index
DOI : 10.33369/jk.v8i1.33047

Development of Physiotherapy Standard Operating Procedures Case of Ankle Sprain in Basketball Players

Aulia Rahmi *[1], Totok Budi Santoso[2]
[1,2] Physiotherapy, Universitas Muhammadiyah Surakarta, Surakarta, Indonesia

Article Info

Article History :

Received : February 2024

Revised : March 2024

Accepted : March 2024

Keywords:

Ankle Sprain,
Manipulasi,
Pain Ankle,

Abstract

Physiotherapy is a form of health service aimed at individuals and groups as maintaining and restoring body movement functions throughout life. Ankle Sprain is a stretching or tearing that occurs due to (overstretch) trauma to the lateral ligament complex, due to inversion and plantar flexion movements that occur excessively when the foot is unable to provide perfect support on the floor/ground. A common injury to the ankle is Ankle Sprain, a sports injury that often occurs in volleyball and basketball players. To develop Standard Operating Procedures in performing physiotherapy treatment in chronic Ankle Sprain cases. This study was conducted using the research method of developing physiotherapy operational standards with this ankle sprain injury handling model starting with preliminary studies, history taking, assessment, diagnosis, intervention, and evaluation. The type of research conducted is Quantitative research using quasi experimental methods with pretest-posttest control group design. Experimental and control groups conducted an initial test. Both groups received different treatments, where the experimental group received thrust manipulation intervention and the control group received non thrust intervention in the form of myofascial release. There was a significant reduction in pain after manipulation therapy with the thrust and nonthrust methods on two groups were measured using the Numeric Rating Scale and after being evaluated for two weeks the pain did not increase. The provision of thrust and nonthrust manipulation therapy measures is highly recommended for the treatment of ankle pain. However, between the two methods there has not been. However, there is no significant difference between the two methods given the limited time of the study.

*Corresponding email : auliarahmiii26@gmail.com
ISSN 2685-6514 (Online)
ISSN 2477-331X (Print)

INTRODUCTION

Physiotherapy is a form of health service aimed at individuals and groups as maintaining and restoring body movement functions throughout life by using manual handling, motion enhancement, equipment (physical, electrotherapeutic and mechanical) function training, communication. One of the physiotherapy competencies that can be applied to the community is handling Ankle Sprain cases (Amalia et al., 2023). Ankle sprain is a stretching or tearing that occurs due to (overstretch) trauma to the lateral complex ligament, due to inversion and plantar flexion movements that occur excessively when the foot is unable to provide perfect support on the floor / ground, which generally occurs on uneven floor / ground surfaces. So that it causes a limited scope of joint motion and muscle decline and a decrease in functional athlete activities. (Kacaribu & Ismanda, 2021).

Acute Ankle Sprain often occurs due to excessive movement (overstretching and hypermobility) or sudden trauma, causing the ligament structure to stretch or overstretch beyond normal capabilities and resulting in tears, either partial or total. While chronic Ankle Sprain is an injury that occurs due to the accumulation process of repeated ankle injuries over a relatively long period of time (Atmojo & Ambardini, 2019). Ankle Sprain is also a common sports injury in volleyball and basketball players, identifying risk factors is necessary to prevent injuries and prolong their careers (Moré-Pacheco et al., 2019). The initial treatment that can be done when experiencing an injury by using the Rest and Ice method. This Rest and Ice therapy method is carried out as soon as possible after the injury occurs, which is between 48 to 72 hours immediately after the injury occurs. This treatment method is usually carried out in acute injuries, both in sprain and strain, as well as for fractures, especially closed fractures and hematomas (Simbolon et al., 2022).

In addition, physiotherapy interventions that can be done are, Ultrasound, Rest, ice, compression, and elevation, Immobilization, Exercise therapy (Stretching exercises, Strengthening exercises, ROM exercises. (Zc et al., 2020). Exercise therapy is also one of the physiotherapy methods using body function movements both actively and passively to maintain, improve strength, endurance, and cardiovascular ability, mobility and functional abilities. (Kacaribu & Ismanda, 2021). Based on research (Clifton et al., 2016) Ankle sprain is influenced by physical contact between players, with the prevalence of non-physical contact between players at 58.3% and physical contact at 40.2% respectively. In Indonesia, ankle sprain is the second most common type of injury at 27.5%. In Central Java it was 7.7%, with injury rates of 4.3% at school and 3.4% at sports venues (Badan Penelitian dan Pengembangan Kesehatan RI, 2018). Basketball is considered an aggressive sport. It involves frequent jumping, landing and body contact with other players. Therefore, it results in common ankle injuries during basketball play with 15.9% incidence compared to knee (10.7%), trunk (6.5%), thigh (5.4) and leg (5.0%). An overseas survey conducted on 10393 basketball players participating in elite and recreational basketball competitions showed that 45% of ankle injuries occurred while landing (Abd Ghafar, 2016).

Current evidence suggests that physiotherapy interventions for ankle sprain include manual therapy, such as joint mobilization and manipulation, as well as frequent exercise Previous research has also shown that manual interventions directed at the ankle region

result in improved ankle mobility and weight bearing through the foot. In addition, manual therapy directed at the ankle is better than placebo or rest, ice, and compression, along with nonsteroidal anti-inflammatory drugs, for improving range of motion, pain, and function (Domínguez et al., 2013).

Meanwhile, according to clinical practice guidelines (Kacaribu & Ismanda, 2021). Ultrasound and Exercise Therapy (clam shell, squats, bridging langes, skipping) are recommended as strong evidence. In a study of the activity patterns of the tibialis anterior and peroneus longus muscles, patients with functional ankle instability were usually active longer than healthy adults. These results suggest that ankle instability impairs the stability of peripheral ankle reflexes (H. Kim & Moon, 2022).

METHODS

This research was conducted using the development research method. (Iskandar et al., 2021) This research on the development of physiotherapy operational standards with ankle sprain injury handling models begins with preliminary studies, history taking, assessment, diagnosis, intervention, and evaluation. This research is a type of Quantitative research using the Quasi Experimental method with a Pretest-Posttest Control Group design. Experimental and control groups conducted an initial test. Both groups received different treatments, where the experimental group received thrust manipulation intervention and the control group received non thrust intervention in the form of myofascial release.This design is used to determine the effects of acute and chronic manipulation therapy on ankle sprain. The results will be proven by FADI and VAS examination. In this study, the groups were measured before and after receiving the treatment of massage therapy and loading exercise therapy.

Populasi and Sampling

Population, which is a group of people, events or symptoms of something that has certain characteristics (Adnyana, 2021). The population in this study were all individuals who participated in the FKG (Faculty of Dentistry) basketball UKM at Universitas Muhammadiyah Surakarta with 22 members. To limit the sample, the data taken are individuals who experience pain in the ankle. The sampling technique in this study used purposive sampling technique.

1. Inclusion criteria: a) Individuals with a history of grade 1 ankle injury. b) The injury occurred more than 1 month from the time of first response. c) Willing to participate in the study d) Individuals aged 18-22 years old. e) Injury to the lateral part of the ankle.
2. Exclusion criteria: a) Patients have complications of other diseases (fracture, post op, open wounds on the ankle). b) Have a history of other ankle injuries less than 6 months such as fractures and post op.

Materials and Apparatus

Research instruments are tools or facilities used by researchers in collecting by using measuring devices in the form of VAS and LGS to measure the angular degree of movement of the ankle joint, the tools needed in this study are as follows:

1. Data Collection Tools: a) Informed Consent. b) FADI Questionnaire. c) Pain measurement tool using VAS. d) Measuring ROM limitation with Goniometer.
2. Data Collection Methods: a) Conducting preliminary studies on members of UKM Basket FKG at Universitas Muhammadiyah

Surakarta. b) Requesting patient consent to become research samples. c) Distributing FADI and FADI Sport questionnaires to members of UKM Basket FKG at Universitas Muhammadiyah Surakarta. d) Collecting biodata, questionnaires have been completed to prepare a sample in accordance with the inclusion and exclusion criteria. e) Researchers provide interventions to samples that are in accordance with the variables in the study, namely manipulation therapy. f) Before performing the intervention, VAS and LGS measurements were taken first. g) VAS and LGS measurements are taken every day for one week to be evaluated.

Procedures

1. Conducting a preliminary study and obtaining permission from the head of the members of UKM Basket FKG at Universitas Muhammadiyah Surakarta.
2. Distributing informed consent, then distributing FADI and FADI Sport questionnaires to students who participate as members of UKM Basket FKG at Universitas Muhammadiyah Surakarta.
3. Conducting further checks to find inclusion criteria and exclusion criteria.
4. Preparing the research by preparing the tools needed for the research.
5. Conducting the study: a) Pre test (Initial patient condition); Before manual therapy is performed on patients with ankle pain, measurements using VAS and LGS measurements are taken by researchers. b) Intervention; Intervention will be carried out respondents who are already included in the inclusion criteria are given manipulation therapy one by one to determine the development of ankle pain in respondents. c) Post test (patient's final condition); Respondents will be observed for the development of their ankle pain for one week, with one intervention and follow-up every day for one week.
6. Recording of research results

Design or Data Analysis

Data analysis technique is a way to find the meaning of data analysis as an effort to systematically search and arrange the results of observations, interviews and others to increase understanding of the case under study (Rijali, 2018). In this study, the analysis technique is that the data obtained is analyzed using descriptive analysis methods, the data analysis techniques used are as follows:

1. Data reduction: Data reduction is a simplification, sorting and centralizing of raw data obtained from the field, data reduction starts from the beginning of the activity and continues during data collection.
2. Presentation of data: Presentation of data in this study in the form of the results of the subject's development during manual therapy and presented in the form of graphs to make it easier to explain the subject's behavior, the characteristics of the subject that will be displayed in the graph such as name, age, gender and occupation, the data obtained from the graph are interpreted by looking at the increase or decrease in the graph in the initial phase of the patient before being given the intervention and after being given the intervention, if the graph goes up then the intervention is declared effective and if the graph goes down then the intervention is said to be ineffective, with the graph it will also be easier to know the time and results

of the experiment, the independent variable, the design used and the relationship between variables.

3. Conclusion drawing and verifying: The third step in qualitative data analysis according to Miles and Huberman is conclusion drawing and verification. The initial conclusions put forward are still temporary, and will change if no strong evidence is found that supports the next stage of data collection. But if the conclusions put forward at an early stage are supported by valid and consistent evidence when researchers return to the field to collect data, then the conclusions put forward are credible conclusions.

RESULT

The results of this study indicate that there is a significant decrease in pain after the manipulation of thrust and non thrust therapy in the two groups as measured by the VAS and after being evaluated for two weeks, the pain did not increase. using the VAS and after being evaluated for two weeks the pain did not increase.

Table 1. Characteristics of Respondents

Name	Gender	Age	Duration of Complaint	Treatment Type
Y	Men	20 year	1 month	Thrust
S	Women	21 year	1 month	Thrust
N	Women	21 year	2 month	Non Thrust
H	Women	20 year	1 month	Non Thrust

Description:

Thrust: High-speed movement, small, small amplitude movement.
Nonthrust: Slow, gentle movement or pull.

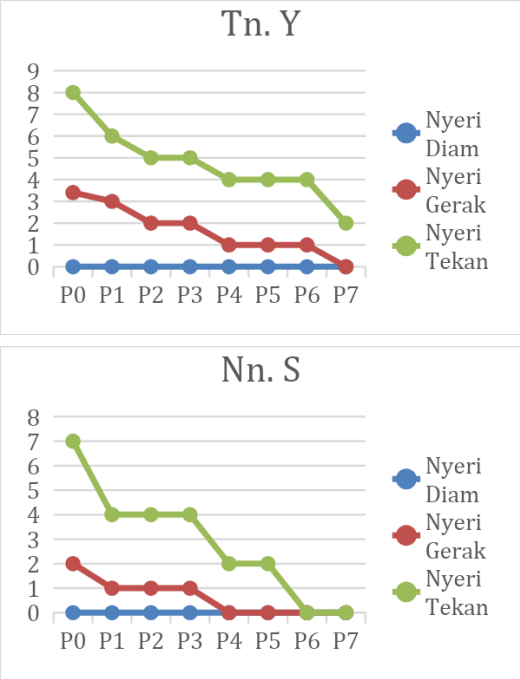

Fig 1. Pain graph of thrust manipulation group

Description:

P0 = Measurement before therapy
P1 = Measurement after therapy
P2 = Measurement 6 hours after therapy
P3 = Measurement 12 hours after therapy
P4 = Measurement 24 hours after therapy
P5 = Measurement 48 hours after therapy
P6 = Measurement 1 week after therapy
P7 = Measurement 2 weeks after therapy
VAS score 0 = No pain
VAS score 1-3 = Mild pain
VAS score 4-6 = Moderate pain
VAS score 7-10 = severe pain

In the graph above, the value of Y pain consists of silent pain 0, motion pain before therapy dropped to 2 after therapy, after 24 hours it dropped to 1 and two weeks after therapy it became 0. In compressive pain 8 after therapy dropped to 5, after 24 hours it dropped to 4 and two weeks after therapy it dropped to 2. In respondent S, silent pain 0, motion pain 2 before therapy dropped to 1 after therapy, after 24 hours it dropped to 0 and two

weeks after therapy remained at a value of 0. In pressure pain 7 after therapy dropped to 4, after 24 hours it dropped to 2 and then one week after therapy it dropped to 0 and after follow-up after 2 weeks it remained at 0.

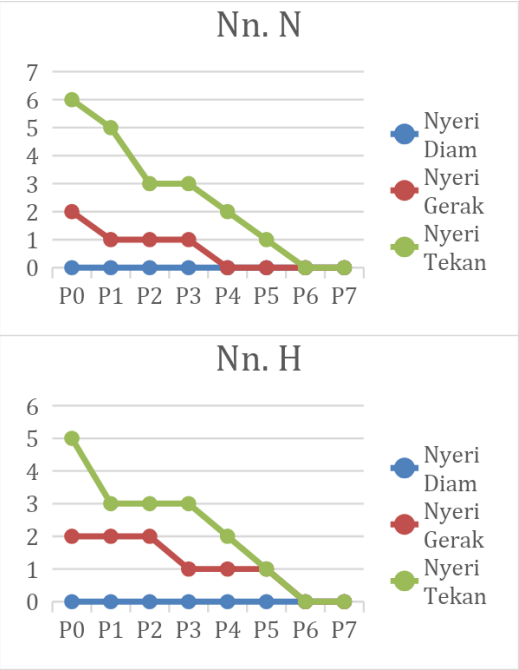

Fig 2. Pain graph of non thrust manipulation group

Description:

P0 = Measurement before therapy

P1 = Measurement after therapy

P2 = Measurement 6 hours after therapy

P3 = Measurement 12 hours after therapy

P4 = Measurement 24 hours after therapy

P5 = Measurement 48 hours after therapy

P6 = Measurement 1 week after therapy

P7 = Measurement 2 weeks after therapy

VAS score 0 = No pain

VAS score 1-3 = Mild pain

VAS score 4-6 = Moderate pain

VAS score 7-10 = severe pain

In the table above, the value of pain N consisting of silent pain 0, motion pain 2 before therapy dropped to 1 after therapy, after 24 hours it dropped to 0 and two weeks after therapy it became 0. In compressive pain 6 after therapy dropped to 5, after 6 hours it dropped to 3, 24 hours dropped to 2 and 48 hours dropped to 1 and one week after therapy it dropped to 0 then two weeks after that it remained at 0. In respondent H, silent pain 0, motion pain 2 before therapy dropped to 1 after 12 hours, after one week it dropped to 0 and two weeks after therapy it remained at a value of 0. In pressure pain 5 after therapy dropped to 3, after 24 hours it dropped to 2, 48 hours it dropped to 1 and one week after therapy it dropped to 0, then after two weeks in follow-up it remained at 0.

DISCUSSION

1. Respondent Characteristics

   The characteristics of the first respondent named Y, aged 20 years and male, have complaints of ankle pain that he has felt for 1 month, the second respondent named S is 22 years old, female, and complaints of ankle pain have been felt for 1 month and 2 weeks, the third respondent named N is 21 years old, female, has complaints of ankle pain that has been felt for 2 months, the last respondent named H is 23 years old, female, with complaints of ankle pain that has been felt for 1 month. The four respondents were students of Universitas Muhammadiyah Surakarta who participated in UKM basketball. The four respondents were divided into two treatment groups, two respondents were given thrust manipulation, namely Y and S and two other respondents were given non thrust manipulation, namely N and H.
2. Thrust and Nonthrust Manipulation Therapy

   Manipulation therapy is a therapeutic technique using hands for the diagnosis and treatment of various

diseases of the neuromuscular, musculoskeletal system, especially joints and muscles. Manipulation therapy and joint mobilization often used in physical therapy clinics have provided strong evidence to improve dynamic postural control (H. Kim & Moon, 2022). According to The American Physical Therapy Association (APTA), manipulation is a high-velocity thrusting exercise with low amplitude at the end of ROM. (Truyols-Domínguez et al., 2013). Thrust is a high-speed, small, small amplitude movement so that the patient cannot prevent the movement. Thrust movements are performed at the end of the affected joint and are used to change the relationship with the joint position, release sounds (clicks), or stimulate joint receptors while non thrust movements are techniques that are used gently in accordance with the limits of joint physiology either actively, passively or stretched and are localized (Truyols-Domínguez et al., 2013).

The techniques performed were lateral glide/eversion rearfoot nonthrust manipulation, anterior/posterior non thrust manipulation, talocrural joint distraction thrust manipulation, subtalar lateral glide nonthrust manipulation and proximal tibiofibular joint thrust manipulation. The intervention was performed for 1x time with 20-30 seconds in each technique given. A study showed that manipulation therapy intervention at the ankle resulted in increased ankle mobility, although mobilization had an initial positive effect on ankle dorsiflexion range of motion, clinical relevance may be limited. Thrust and non thrust techniques provided can reduce pain in the ankle, the neurological effect of thrust manipulation is that it can induce presynaptic inhibition, segmental reflex pathways can inhibit pain and relax muscles or changes in proprioceptive afferents and has a short-term effect on alpha-motoneuron 30-32 excitability and can change the pressure threshold (PPT) (Cleland et al., 2013). The mechanical effects of manipulation therapy can respond to stress through restricted tissue and it is thought that changes in accessory motion will ultimately improve physiological movement (Truyols-Domínguez et al., 2013).

The effect of manipulation therapy is to relieve pain, increase serotonin and endorphin levels and lower the pain threshold. So that it can produce hypoalgesia through excitation of the sympathetic nervous system, decreased heart rate and blood pressure in response to lack of stress. Manipulation therapy also provides an imitative cannabis effect arising from increased levels of endogenous cannabinoids and has a desentization effect by taking over the memory of pain and replacing it with a new one. The three elements contained in manipulation therapy are physiological, psychological and biomechanical elements (Suwondo et al., 2017).

3. Ankle Pain

Ankle pain is pain or soreness in the ankle. Overuse or excessive use of the foot can trigger Ankle pain. The pain is usually felt starting from the toes or heel to the ankle. This type of injury occurs in the musculoskeletal system usually attacking tendons, ligaments and reinforcement. The position of the Ankle is located at the meeting of the tibia and fibula bones which originate from the lower leg of the talus of the foot. All these bones move together at the ankle joint with

the help of an elastic tissue called ligament. This tissue is strong to keep the bones in place so as to allow normal ankle movement (S. K. Kim et al., 2017).

Pain according to IASP (International Association for the Study of Pain) is an unpleasant sensory and emotional experience due to actual or potential tissue damage that tends to damage the tissue (Tahir et al., 2022). Factors causing pain include heat, lactic acid due to tissue ischemia, contusion, bacterial infection, muscle spasme.

CONCLUSION

There is a significant decrease in pain after manipulation therapy with thrust and nonthrust methods in two groups measured using the Numeric Rating Scale and after being evaluated for two weeks the pain does not increase. Therefore it has been proven that manipulation therapy with thrust and non thrust techniques gets a real result. Manipulation therapy is also a safe technique and for the treatment of ankle injuries, it is not costly and practical.

ACKNOWLEDGEMENT

The researcher is very grateful to the players as well as the head of the basketball team and to the people who were involved in this study. be it prayer, encouragement and help.

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