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the Effectiveness of the Rehabilitation Program on the ROM Articulatio Genu Post-Surgery Meniscus Menisectomy Patients at SPPOI Eminence Jakarta

Original Article

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Abstract

Meniscus tear is the second-highest knee injury after ligament injury. Post-surgery meniscus menisectomy is one of the acts performed when the meniscus is injured or torn. After surgery requires a beneficial rehabilitation program to restore knee function as previously required, minimize the risk of Osteoarthritis (OA) and prevent further imposition on the knee. The study is a quantitative experiment using purposive sampling with one group of pre-test post-test. Population all patient SPPOI Eminence. The sample 10 people with details of 7 men and 3 women. Average results of Flexi ROM Articulatio Genu pre-test 98,40°±5,19 with extension ROM Articulatio Genu pre-test 6,60°±1,65. Further, rehabilitation programs (composed of modality therapy, manual therapy, and strengthening) were given a result of flexion ROM Articulatio Genu post- test 135,40°±4,88 and extension ROM Articulatio Genu post-test 1,70°±1,41. Data analysis showed an increase in degrees of flexion 34° and a decrease in extension 4,90°. Complete the T- test with Paired Sample T-test value flexion ROM Articulatio Genu with $P \leq 0,05$ and value extension ROM Articulatio Genu with $P \leq 0,05$. The rehabilitation programs consisted of modality therapy, manual therapy, and strengthening is effective to increase Range of Motion of Articulatio Genu in SPPOI Eminence patient.

Keywords: *strengthening, manual therapy, sports rehabilitation*

INTRODUCTION

Meniscus injury (meniscus tear) ranks second after ligament injury with an incidence of 12-14% with a prevalence of 61 cases per 100,000 people (1). This study is in line with the initial observation data recap at SPPOI Eminence that there were more than 15 meniscus injury patients. A meniscus injury is a condition in which the fibrocartilage tissue in the knee is partially or completely torn (2). Meniscus tears can occur with various causes including excessive loading or sudden changes in the movement of the knee, decreased function, sports activities, or non-sporting activities (squatting and falling) (3) (4) (2).

The meniscus plays an important role in the knee including 1) as a load distribution by increasing the contact area of the femur and tibia, 2) as a shock absorber, 3) stabilizing the joints, 4) lubricating joints, 5) nutrition for cartilage and 6) balance in the knee (5). For this reason, a torn meniscus (Meniscus tear) requires surgical or non-surgical treatment as soon as possible. Because when not treated immediately clinical symptoms will appear, people over 40 years of age will

experience stiffness in the joints which is a typical symptom of OA, and for those under 40 years of age symptoms experience functional limitations (6). For this reason, it is necessary to perform surgery or non-surgery to restore the function of the meniscus and inhibit osteoarthritis (OA) and chondromalacia (7).

Treatment for meniscus tears is divided into two, namely non-surgery and surgery (Meniscectomy/Repair/meniscal transplant) (8). The determination of non- surgery or surgery is classified based on the severity of the meniscus tear (grade): grade I and grade II do not need surgery, only need to do rehabilitation, and grade III do surgery and then do rehabilitation (9). Based on research conducted in South Korea, meniscectomy is the most frequently performed procedure. This is based on the fact that meniscectomy is more widely applied because it has several advantages including preventing further damage to the knee structure and its healing is relatively fast compared to repair or reconstruction (10). After meniscus surgery, several conditions will occur including 1) inflammation around the knee, 2) pain, 3) loss of knee ROM due to muscle tension and 4) loss of quadriceps muscle strength (11); (12). For this reason, postoperative rehabilitation is necessary to restore knee function to its original state and minimize the risk of OA (4).

The rehabilitation program is useful for the tissue healing process to prevent prolonged immobilization which has an impact on strength and structure (13). To be able to develop a rehabilitation program, it is necessary to involve physiotherapy with a strength conditioning coach so that the healing process runs optimally. In preparing the program, the following principles must also be considered: 1) selection of the type of exercise, 2) availability of equipment, 3) exercise frequency, 4) exercise sequence, 5) rest, and 6) weight training. Focus The initial phase of rehabilitation is minimizing swelling and pain, repairing tissue, restoring ROM, and preventing muscle blockage, the role of physiotherapists in this early phase. Furthermore, when the network function has returned to its original state, followed by specific training according to the sport involved by considering the biomechanical analysis, the dominant physical fitness component is used, in this period the strength conditioning coach takes on his role (14).

Several previous studies have examined the effects of carrying out rehabilitation after meniscectomy meniscus surgery. Like the research conducted by (11) using a meta-analysis study by collecting previous studies. In this study using a rehabilitation and home exercise program, then the program was carried out 5 times a week for 2 weeks there was an increase in knee flexion ROM of 2.8^{o} and a decrease in the extension of 2.8^{o}, but in this study, it was also not explained in detail the type of knee flexion. -Type of treatment used. The last study conducted by (15) using mobilization treatment, manual therapy, modality, and exercise showed an increase in knee flexion ROM by 50^{o} within 8 weeks.

Based on observations made at SPPOI Eminence, the previous treatments were not evaluated and the treatment varied, in other words, each therapist gave a different treatment. For this reason, in this study, the treatment was uniform to determine whether the given treatment would provide the same increase in ROM or not and to determine the rehabilitation program (Modality, Manual Therapy, and Strengthening). Based on the results of observations, it was recorded that 15 patients had previously performed meniscectomy surgery at the hospital, then took a rehabilitation program at SPPOI Eminence. Then given rehabilitation therapy in the form of modalities, manual therapy, and strengthening exercises for 5 meetings to find out how effective the rehabilitation program was to increase knee joint ROM (Articulatio Genu).

Based on the description above, the researcher thinks that there is a need for research on "Effectiveness of the Rehabilitation Program (Modality, Manual Therapy, Strengthening) on the ROM (o) Articulatio Genu Post-Surgery Meniscus Menisectomy Patients at SPPOI Eminence Jakarta" so that later will get data on the level of effectiveness in the results of the study, this.

MATERIAL AND METHODS

This research is a quantitative quasi-experiment using purposive sampling with one group pre-test post-test. The criteria for the sample are as follows: INCLUSIONS: 1) Meniscectomy post-

surgery patients who take the rehabilitation program in April 2021; 2) Men and Women; 3) Work as an employee or housewife; 4) Patients who have carried out the phase I rehabilitation program at least 5 times; 4) History of causes of meniscus tear due to falls due to sports activities. Meanwhile, the EXCLUSION criteria: 1) Meniscus meniscectomy post-surgery patients who take the 2020 rehabilitation program; 2) Elderly over 50 years old; 3) Athletes; 4) ROM in phase II; 5) history of meniscus tear degenerative or other injuries. In this study, the researcher used a research instrument in the form of a Goniometer. A goniometer is a tool used to measure the angle or allow the rotation of an object to a certain position.

RESULTS

The pre-requisite test results stated that the data were normally distributed and homogeneous. Furthermore, the data analysis test was carried out and showed a significant change in the ROM Articulatio Genu in the patient. The average results were obtained after measuring the pre-test knee ROM flexion of 98.40° and knee ROM extension of 6.60°. This indicates that there is a decrease in knee joint ROM (Figure 1). Because normal adults generally have a knee ROM of 135° flexion and 0° knee extension (20). This decrease in ROM is one of the consequences of post-surgery (12).

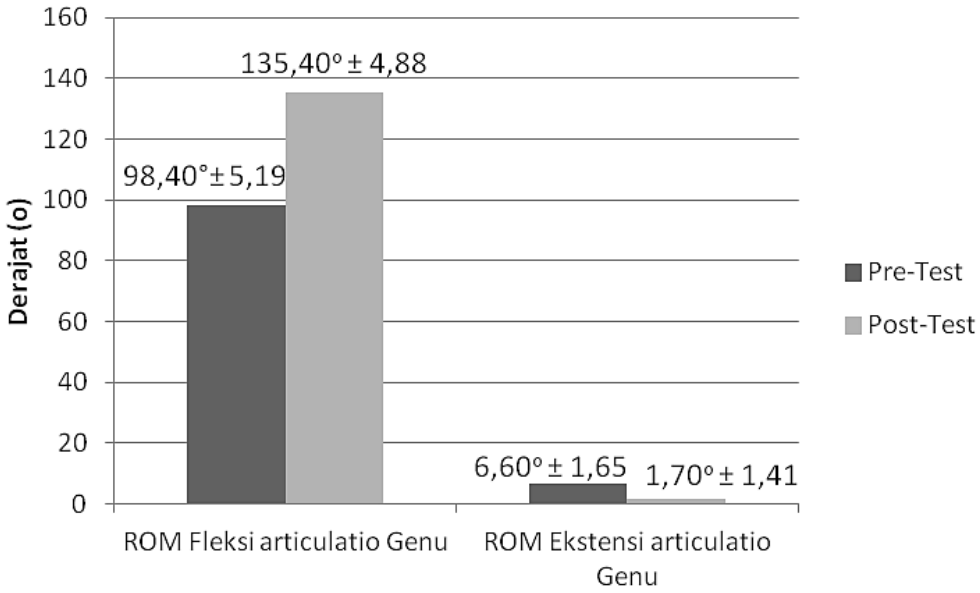

Figure 1. Changes to ROM Articulatio Genu

Post-test data retrieval was carried out after 5 treatment meetings by the phase I rehabilitation process at SPPOI Eminence. An increasement in the degree of flexion after treatment was 37° and a decrease in extension was 4,90°. This is in line with previous research (15) that a rehabilitation program consisting of modality therapy, Manual Therapy, and Strengthening can increase passive flexion from 94° to 115° the percentage increase in passive flexion ROM is ±22.58%. Equipped with research conducted (11) an increase in knee flexion ROM of 2.8° and a decrease in the extension of 2.8°. Based on these data, it can be concluded that the rehabilitation program provides positive changes in knee ROM.

DISCUSSION

This rehabilitation program aims to restore knee function to normal or return to activity. The treatments given in this study were modality, manual therapy, and strengthening. Modality therapy consists of NMES (Neuromuscular Electrical Stimulation) and FUP (Faradic Under

Pressure). Research conducted (16) proves the use of electrical stimulation can restore muscle function and strength and can prevent muscle atrophy.

Manual therapy, manual therapy is a passive movement that is applied directly or indirectly that targets certain structures that are useful for creating changes or reducing pain (17). In the post-surgery meniscus meniscectomy sample who performed rehabilitation at SPPOI Eminence manual therapy, the following treatments weregiven: Patella mobility, prone hange, heel slide, and ankle pumping. Manual therapy is useful for improving knee function. This is supported by a study conducted by (18) which said that heel slide exercises in post-surgery knee patients can significantly improve knee flexion ability. In addition, the application of heel slide exercises can help reduce pain. Then it is complemented by research conducted (17) which states that manual therapy is effective in contributing to the functional restoration of the body.

Strengthening or commonly referred to as strengthening exercises. In phase I this strengthening is given to prevent excessive muscle atrophy in the post-surgery leg. The exercises provided include Quadriceps isometric, ankle exercise, Single Leg Raise (SLR), Glute on the bed, and Seated hip flexion. Giving this strengthening has a positive impact on the muscles around the knee, this is supported by research (19) by doing isometric quadriceps and SLR can reduce quadriceps muscle atrophy. In addition, doing isometric quadriceps can help to increase the ability to extend the knee.

Based on the results of data analysisusing t-test sig value. for flexion ROM articulatio genu P value ≤ 0,05 and sig value for extension ROM articulatio genu P ≤ 0,05. The rehabilitation program is said to be effective if the value of sig. ≤ 0,05. This means that the rehabilitation program (modality therapy, manual therapy, and strengthening) is effective in increasing the ROM of the articulatio genu. When compared with research conducted (11) an increase in knee flexion ROM of 2.8^{o} and a decrease in the extension of 2.8^{o} while in this study an increase in knee flexion ROM of 37^{o} and a decrease in ROM of genu articulatioextension by 4.9^{o}. Constraints in this study are because each person has different abilities for that the load given is different according to the ability of the sample, the limited number of samples that meet the requirements in this study, and in a short the research only takes phase I.

CONCLUSION

Phase I rehabilitation program for post- surgery meniscectomy cases consists of Modality therapy, Manual therapy, and Strengthening therapy. The first step is to give modality therapy treatment which is useful for minimizing muscle atrophy then given manual therapy which is useful for improving knee function and finally given Strengthening which is useful for increasing muscle mass. The rehabilitation program can provide positive changes in increasing the Range of Motion of the genu articulatio with an average increase of 37^{o} flexion and 4.9^{o} extension. The rehabilitation program is effective to increase the Range of Motion (ROM) Articulatio Genu in post-surgery meniscus meniscectomy patients at SPPOI Eminence in phase I.

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CONFLICTS OF INTEREST

Conflict of interest : Authors state no conflict of interest.

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