

Physiotherapy Management of Total Knee Replacement et Causa Bilateral Genu Osteoarthritis

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ABSTRACT

Background: Total Knee Replacement (TKR) et causa Osteoarthritis genu bilateral is a medical procedure for replacing the knee joint with an artificial material in the form of a plate. Weight gain or obesity may be the most common cause of meniscus/joint-cushion thinning. This will cause pain and limited range of motion after knee joint replacement surgery. By providing physiotherapy interventions in the form of IR, Tens and Exercise therapy based on the Rehabilitation Protocol For Knee Replacement Surgery, it is hoped that pain and functional limitations in the knee can return to normal soon. **Purpose:** the aim is to determine the effect of providing physiotherapy interventions in the form of IR, Tens and Exercise therapy in increasing functional ability in conditions after Total Knee Replacement (TKR) and causing bilateral genu osteoarthritis. **Methods:** this program is carried out directly to respondents with post-Total Knee Replacement (TKR) conditions and causes of bilateral genu osteoarthritis by administering 3 times of therapy to obtain results of increased functional ability as measured by scores on the KOOS index, namely T0: 36.406 to T3: 39.554. **Conclusion:** the provision of physiotherapeutic interventions in the form of IR, Tens and Exercise therapy after the case of Total Knee Replacement (TKR) et causa osteoarthritis genu bilateral is proven to reduce complaints in the form of edema, pain, limited range of motion of the joints, and decreased muscle strength which has an impact on increasing the functional abilities of the respondents.

Keywords: Total Knee Replacement(TKR), Bilateral Genu Osteoarthritis, Exercise Therapy, KOOS Index

PENDAHULUAN

Osteoarthritis (OA) is damage that occurs in the joint cartilage which is a degenerative disease, thickening of the subchondral bone, formation of osteophytes at the edges of the joints and a mild inflammatory process occurs in the non-specific synovium. OA is chronic, progresses slowly, results in mild or often non-inflammatory inflammation, deterioration, abrasion of the joint cartilage, new bone forming on the joint surface (Rahmi, 2018)

According to the World Health Organization (WHO), approximately 10-15% of the population aged over 60 years suffer from symptomatic OA with various degrees, with a higher prevalence in the female population than in males. Based on data from the National Health Interview Survey (NHIS) in 2016, 14 million

people suffer from OA in the United States. Meanwhile in Indonesia, 60% of the population suffers from OA and 7.3% occurs at the age of 15 years. The prevalence of OA occurs higher in men than women, with a percentage of 15.5% in men and 12.7% in women. (Samosir et al., 2020). Obesity and increasing life expectancy are the main risk factors for the increasing prevalence of OA, this is expected to continue to increase (Yoga, 2022).

OA is generally a degenerative disease where the structure that has been damaged cannot be restored to its original state or is multifactorial in nature. Severe joint damage with grade 4 can no longer be treated with non-operative measures, so surgery is the choice of either high tibial osteotomy or knee joint replacement which is often called Total Knee Replacement (Halim k, 2021).

Total Knee Replacement (TKR) is a surgical procedure to replace damaged knee joints with artificial materials. In total knee joint replacement surgery, the ends of the bones are replaced with metal and plastic (polyethylene). The cartilage surface that has been damaged in the three parts of the knee joint bone will be removed, then the new bone surface will be coated with an implant. Patients who perform TKR surgery, feel pain and functional limitations of movement after surgery, general limitations are difficulty when walking, patients have difficulty using their knees for activities (Yoga, 2022)

Intervention modalities that can be given for postoperative management (TKR) are by providing Infra Red, Transcutaneous Electrical Nerve Stimulation (Tens) and exercise therapy or exercise. Giving Infra Red, Tens, Exercise therapy in TKR post surgery is effective because it can improve physical function and restore functional abilities more quickly. The provision of exercise is adjusted to the Rehabilitation Protocol For Knee Replacement Surgery, which is seen from how long after the operation is performed. This rehabilitation protocol has 4 phases namely, phase 1-14 days, phase 7-12 weeks, phase 3-6 weeks and phase 13+ weeks after surgery (Evans, n.d.)

In this case, it has entered 3 months postoperatively, so the rehabilitation process is taken in the 7-12 week phase, namely:

Manual Physiotherapy :

a. Patellar Mobilization Exercise

This exercise is done to reduce pain and scar tissue around the knee and increase the Range of Motion (ROM) when bending the knee. This exercise is performed passively in a supine lying position, then move the patella towards the horizontal (right-left) and vertical (up and down) to the fullest (Dhuairi, 2021)

b. Quads And Hamstrings Deep Tissue Massage

Deep Tissue Massage is a massage technique that is almost the same as the Swedish massage technique, with a deeper emphasis. Provision of Deep tissue massage longitudinally and deeply on muscles or soft tissue with encouragement of tissue elasticity

elongation. Deep tissue massage has the goal of relaxing the muscles around the tissue, done passively in a supine lying position, then do deep massage from the distal femur to the maximum proximal femur (Change et al., 2021)

c. Wound Massage With Bio-Oil Or Vitamin E Cream

Wound massage is a technique for giving massage to the incision scar using bio-oil or vitamin E cream which can help launch and improve blood circulation in the legs. Emphasis is made through massage techniques resulting in vasodilation of blood vessels involving reflexes in the muscles on the anterior wall (Tarmizi, 2021).

Range Of Motion / Strengthening Exercise :

a. Core Stabilization Exercise (Bridging)

Giving core stability exercise can increase core muscle strength and giving core stability exercise also plays a role in providing stability to the spine, by giving core stability exercise static and dynamic has an effect on balance. Bridging aims to strengthen m. hamstring, m. quadriceps, and core muscle. Perform the movement actively in a supine lying position, then flex both knees and lift the buttocks slowly holding 8x count (Pratiwi, 2022)

b. Assisted Active Exercise

Assisted active exercise is a movement that is provided with assistance, manually or mechanically, by external forces, because the driving muscles need help to complete the move. This exercise aims to strengthen m. hamstrings, m. quadriceps and core muscles (Purnomo et al., 2019)

c. Squad And Single Leg Stance Mini-Squat

Single-leg squat is a type of exercise without weights to increase strength development, especially in the leg muscles, deep weights as the basis of the exercise, this single-leg squat exercise is carried out by lifting one leg and lowering the footrest with half the intensity of the frequency and long training so that it can cause a training

effect such as increased strength (Strength), explosive power and muscle endurance. With increasing strength (strength), explosive power, muscle endurance, physical abilities can increase in general (Khairudin Afri, 2020).

This exercise aims to strengthen m. hamstrings, m. quadriceps and core muscles. Make active movements by standing tightly against the wall, open your feet shoulder-width apart and your heels should not touch the wall (both feet slightly forward), then do movements such as squatting with your knees not exceeding your toes.

Fungsional Exercise :

- a. Gait Supervision Without Walking Aids
Start walking without assistive devices according to the right way of walking, pay attention to the correct gait walking to get the right results.
- b. Lateral Stepping
Lateral stepping can also maintain dynamic balance in the elderly because this exercise involves a lot of sensory systems, namely the proprioceptive system in the joints and the visual sensory system. Start stepping sideways with crossed legs, this exercise aims to train walking balance (Izzuwardi, 2021)
- c. Heel-Toe Walking
Heel-Toe exercise program Walking has benefits in terms of improve cardiopulmonary fitness and muscle activity and can improve physical health. Heel-Toe Walking or backward walking has a different pattern of muscle activity related to speed walking increases the rhythm and decrease in stride length (Pibriansyah et al., 2021).
This exercise aims to train walking balance, do this exercise in an upright standing position then start walking using your heels and after that it is replaced with your toes.
- d. Star Driving Using The Affected Leg

Start driving with the sore leg. This exercise aims to restore functional activity to normal

e. Exercise Bike

Exercise Bike is a muscle strengthening that functions to maintain balance and increase the power of the lower extremity muscles. Start with Exercise bike, This exercise aims to restore functional activity. This exercise can be done after the patient's balance has improved (Abdurrachman et al., 2019).

Infra Red :

Infra red is the emission of electromagnetic waves with wavelengths between 7,700 Å – 4 million Å. The classification of infrared rays has wavelengths that are above 12,000 Å – 15,000 Å. Penetration of infrared light only reaches the superficial layer of the epidermis, which is about 0.5 mm. Infrared light has a short wave that has a wavelength ranging from 7,700 Å – 12. Providing heating using infrared can cause vasodilation of blood vessels so that blood flow becomes smooth which results in relaxation of the muscles and can also reduce pain (Fadlina, 2022)

TENS :

TENS is a therapeutic procedure that uses stimulating electrical energy nervous system through the surface of the skin. The purpose of TENS is to activate nerve fibers large diameter so that it can cause an analgesic effect that can reduce pain (Milenia & Rahman, 2016)

The decrease in pain intensity can decrease when the dose given is in accordance with the effective dose and according to the respondent's sensitivity threshold. The most effective dose of TENS is the frequency of 80 Hz to 100 Hz, pulse width of 150 µ sec, amplitude according to the sensitivity of the respondent 0-80 mA (Nuach et al., 2014)

Placement of TENS electrodes in the area of pain and proximal to the injury or post-surgical incision can create comfort. Nociceptive processes are inhibited by blocking pain by closing the pain gates by TENS and releasing

endorphins in the body. The inflammatory process will cause a relaxing effect so that pain can be reduced (Nuach et al., 2014)

METODE

This research method uses a case report study which was carried out at the Klaten Islamic General Hospital in the patient Ny. P, 71 years old with a medical diagnosis of Post Surgery Total Knee Replacement Et Causa Genu Bilateral Osteoarthritis. The patient has undergone physiotherapy program 3 times. Complaints that appear in TKR postoperative patients include pain, decreased ROM, decreased muscle strength, edema and decreased functional activity. Provision of physiotherapy interventions in the form of Infra Red, Tens, physiotherapy manuals, strengthening exercises and functional exercises. Measurement of pain using the Numeric Rating Scale (NRS) which is based on the intensity of pain from the numbers 0 to 10. The number 0 means there is no pain. Numbers 1 to 3 are mild pain, numbers 4 to 6 are moderate pain and numbers 7 to 10 are severe pain (Dhuairi, 2021) Measurement of joint range of motion (LGS) with a goniometer to measure movement at the knee. Muscle strength can use Manual Muscle Testing (MMT), to measure edema using the midline and functional activity measurements using the Knee Injury And Osteoarthritis Outcome Score (KOOS) index. This measurement can be done every therapy session.

Results : Evaluate the reduction of edema

Table 1

Therapy	Axis of tibial tuberosity 30 cm proximally	Knee dextra (cm)	Knee sinistra (cm)	Difference (cm)
T0	0 cm	38	34,8	3,2
	10 cm	41	39,4	1,6
	20 cm	48,8	45,1	3,7
	30 cm	56,7	53,1	3,6
T1	0 cm	38	35	3
	10 cm	41	39,2	1,8
	20 cm	48,8	45,1	3,7
	30 cm	56,7	53,3	3,4
T1	0 cm	38,7	45,9	2,8
	10 cm	40,8	39,2	1,6
	20 cm	50,2	46,7	3,5
	30 cm	56,4	53,2	3,2
T3	0 cm	38	35,4	2,6
	10 cm	40,8	39,7	1,1
	20 cm	51	47,8	3,2
	30 cm	55,4	52,5	2,9

Pembahasan :

Complaints that arise in postoperative Total Knee Replacement patients include edema caused by incision injuries after surgery. Before applying the ice pack, the T0 result was obtained from the tibial tuberosity at point 0 cm with a difference of 3.2 cm from point 10 cm, difference of 1.6 from point 20 cm, difference of 3.7 then from point 30 cm, difference of 3.6. The therapist gave ice packs which were effective in reducing postoperative TKR edema. According to Waterman et al. (2012), physiotherapy treatment to reduce swelling with cryotherapy using ice packs for 15 minutes on the knee that has edema is caused because there is still inflammation in the knee after TKR surgery. Giving ice packs can cause cold stimulation to skin tissue along with a decrease in tissue metabolism which can cause local vasoconstriction, causing a decrease

The formation of edema fluid and the production of lymph fluid which can release inflammatory mediators by reducing the permeability of the blood vessel walls resulting in decreased edema.

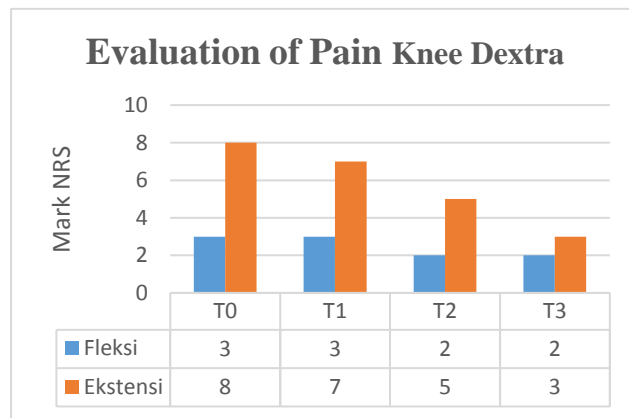
This is in accordance with the results of anthropometric examinations on the circumference of the dextra knee segment at T3 starting from 30 cm proximal to the tibial tuberosity at a point of 0 cm the difference from 3 cm decreased to 2.6 cm, from the point of 10 cm the difference from 1.8 cm decreased to 1, 1 cm, from a point of 20 cm the difference is from 3.7 cm to 3.2 cm and again decreased from the point of 30 cm the difference is from 3.4 cm to 2.9 cm. The results of edema measurements after the cryotherapy intervention showed a decrease in edema. The decrease in edema is influenced by the education of the therapist to the patient to apply ice packs twice a day to accelerate the reduction of edema.

Electrical Nerve Stimulation (TENS) in each therapy session can reduce TKR postoperative pain.

Based on the examination results obtained on the dextra knee using the Numeric Rating Scale (NRS) the results were obtained, namely examination on T0 and T1 silent pain with a value of 3, there was no change because the patient's skin still had incised scars. At T2 and T3 the value is 2, there has been no change because the patient still feels pain when he is silent. For tenderness from T0, the value is 5, there is a decrease in pain in each therapy session, from T1, the value is 4 and T2, the value is 3, it drops to T3, the value is 2, then for motion pain, from T0, the value is 8, changes to 7 on T1, then drops on T2 to a value of 5 and returns decreased in T3 to a value of 3. The decrease in pain in patients was caused by the former incisions starting to dry up and the help of anti-pain drugs consumed by patients such as meloxicam which resulted in a decrease in pain.

Evaluation of Pain Reduction:

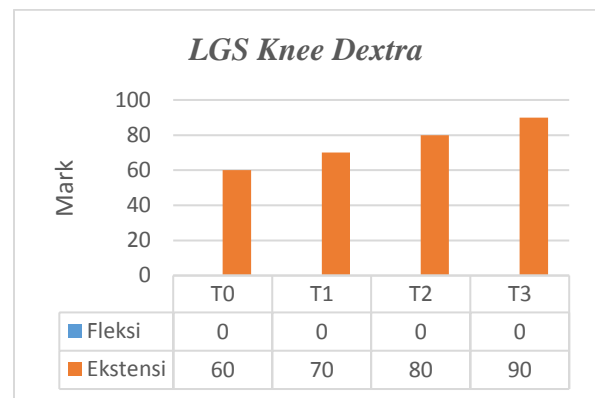
Figure 1



The results of the examination in this patient were pain in the right knee caused by an incision. TKR postoperative pain occurs because the small nerve fibers send a stimulus to the sensory nerve fibers to be sent to the brain, causing pain which causes the incision area repair process to be disrupted. Providing physiotherapy modalities in the form of Transcutaneous

Evaluation of Increased Scope of Motion of the Joints:

Figure 2

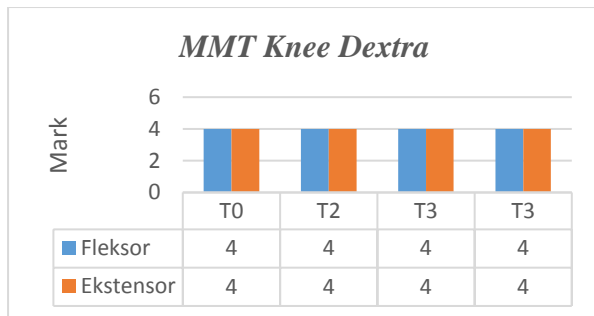


This patient was found to have limited postoperative TKR LGS caused by pain and edema in the incision area on the dextra knee. The exercise is in the form of Manual Physiotherapy. The results of the LGS examination with a goniometer on the knee dextra T0 value S: 0-0-

60° there was an increase in LGS in the knee joint dextra T1 to S: 0-0-70° on T2 it increased to S: 0-0-80° then on examination T3 becomes S: 0-0-90°, from the results of the LGS examination, there is an increase in the range of motion of the joint after TKR surgery. The increase in LGS was caused by a decrease in pain and edema so that patients could exercise optimally and was supported by therapist education for patients to do LGS exercises regularly.

Evaluation of Increased Muscle Strength:

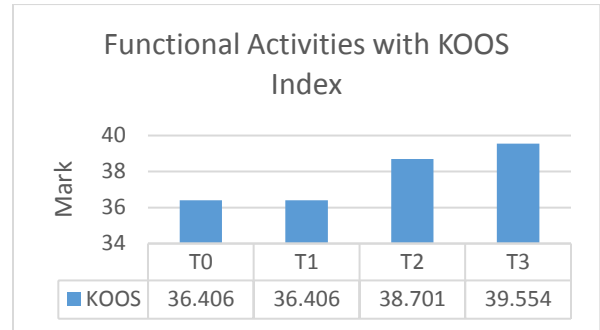
Figure 3



Increased muscle strength can be done with exercise therapy. In the case of TKR postoperative patients, there were complaints of decreased muscle strength caused by TKR postoperatively. The therapist gives Strengthening Exercise. The results obtained in examining muscle strength with MMT on the knee dextra flexion and extension movements at T0 to T3 value 4 have not changed because the patient has not been able to exercise optimally because he still feels pain during activity.

Evaluation of increased functional activity using the KOOS index:

Figure 4



Increased functional activity can be done according to the KOOS index. In the case of TKR postoperative patients, there were complaints of decreased functional activity caused by TKR postoperatively. The therapist gives Functional Exercise. The results obtained in the examination of functional activity with the KOOS index on the knee dextra from T0 and T1 with a score of 36.406 have not changed, T2 to 38.701 has experienced a slight increase, T3 to 39.554 has increased which is not good enough, the increase occurs very little because the patient has not able to perform daily activities to the fullest.

CONCLUSION

Research conducted on patients with medical diagnoses after Total Knee Replacement (TKR) surgery at the Klaten Islamic General Hospital found significant improvements. Providing a physiotherapy program in the form of cryotherapy, Transcutaneous Electrical Nerve Stimulation (TENS), Range of Motion exercise (strengthening) and functional exercise carried out 3 times in therapy sessions obtained results in the form of decreased pain, decreased edema, increased joint range of motion and increased strength. muscles in postoperative TKR patients.

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