

## CASE REPORT:

### MANAGEMENT OF PHYSIOTHERAPY FOR GRADE III KELLGREN-LAWRENCE RIGHT KNEE OSTEOARTHRITIS AT BHAYANGKARA HOSPITAL AWALOEDIN DJAMIN SEMARANG

Akhmad Zaenal Arifin, S.Ftr<sup>a</sup>, Lailatul Maqfiroh, S.Ftr<sup>b</sup>

<sup>a</sup> Physiotherapy Department, Faculty of Health science, University of Muhammadiyah Surakarta

<sup>b</sup> Physiotherapy Department Installation of Medical Rehabilitation, Bhayangkara Hospital Awaloedin Djamin Semarang

Corresponding author:

Akhmad Zaenal Arifin Email : ahmad.zaen.arifin@gmail.com

Lailatul Maqfiroh Email:

#### Abstract

**Background:** Management of Physiotherapy for Osteoarthritis Dextra grade 3 Kellgren-Lawrence accompanied by tight hamstrings and decreased quadriceps muscle strength and decreased range of motion of the knee flexion joint.

**Objective:** To report on the results of a physiotherapy program on Osteoarthritis Dextra grade 3 Kellgren-Lawrence with hamstring tightness and a decrease in quadriceps muscle strength and a decrease in the range of motion of the knee flexion joint.

**Methods:** The patient is a 53-year-old woman with a primary diagnosis of Osteoarthritis Dextra grade 3 Kellgren-Lawrence accompanied by tight hamstrings and decreased quadriceps muscle strength and decreased range of motion of the knee joint for flexion.

Physiotherapy was carried out 5 times with details of TENS in the area around the knee for 13 minutes, ultrasound of the hamstring tendon for 6 minutes, stretching of the hamstring as well as strengthening of the quadriceps muscle with stretching of the hamstrings tendon for 5 times. Therapy 2 times a week.

**Results:** After 5 treatments, the results showed a decrease in pain from a score of 10 to 6, the level of difficulty from a score of 11 to 4 and the level of dependence from a value of 4 changed to a value of 3. The assessment was measured by the Jette scale.

**Conclusion:** In this case there is a significant progress of changing the value on the Jette scale. This is probably because from the initial indication of OA, the patient immediately underwent a physiotherapy process.

**Keywords:** Physiotherapy, Osteoarthritis, tight hamstrings

## Background

Osteoarthritis of the knee (OA) is a chronic progressive disease that imposes a large socioeconomic burden on society and the health care system. muscle activation in knee OA tends to be multifactorial <sup>2</sup>, but there is a very close correlation between decreased proprioception and impaired muscle movement around the knee joint <sup>3</sup>. Cartilage damage also has a very large impact on proprioceptive acuity, this is due to changes in gait patterns due to insufficient proprioceptive stimulation causes unsynchronized load received by the joint so it is not physiological <sup>3</sup>. This condition will cause degenerative changes in the joint <sup>3</sup>. Poor proprioception causes poor muscle control as well and can also be a factor in the development of osteoarthritis <sup>2,3</sup>. The effect of strengthening exercises on muscle tissue<sup>4</sup> will change the irregular matrix fiber environment through gradual inter-joint motion <sup>1,6</sup> and will stimulate mechano growth factors due to an increase in lubrication as a condition for increasing the amount of elastin that has benefits for new tissue replacement. This substance consists of protein amino acids that will be synthesized by facilitating slow movement. In this state, it will process the precipitate and a new distance will be formed in regulating the synthesis of collagen. This mechanism aims to reduce stiffness by increasing contractile protein and the oxidation system in the quadriceps muscle belly, characterized by increased muscle oxygen intake as the beginning of an increase in metabolism and repair of damaged tissue by increasing the production of new tissue, it will increase the range of motion of the knee joint. quadriceps muscles, increasing the resistance and stability of the knee joint so that the load received by the joint decreases. By decreasing the joint load, the pain will decrease so that functional activity will also increase

## Case Presentation

The patient is a 53-year-old civil servant (Mrs. SS) who is currently suffering from Knee Dextra Osteoarthritis. Complaints have been felt since February 28, 2021, without knowing the reason. The pain gets worse when you squat, go up and down stairs and walk a little distance. Pain is not felt at rest. So far, he has been taken to a general practitioner, because the patient still has pain, he is referred to internal medicine at Bhayangkara Hospital Semarang and is recommended for physiotherapy. In the office, he goes up and down stairs every day because the room is on the second floor. Rongten's photo shows that there is a narrowing in the knee joint. A physiotherapy examination was performed if there were limitations of LGS. Decreased quadriceps muscle strength, hamstring tightness, motion pain, and changes in walking pattern in the form of a heel strike phase on the right side are not as good as the left side. Currently being given a physiotherapy program twice a week with the modalities of TENS, Ultrasound and Exercise the hamstring muscles and the quadriceps muscles

## Method

In the implementation of physiotherapy, TENS modalities were given to the area around the knee for 13 minutes, Ultrasound diathermy in the distal hamstrings tendon for 6 minutes. then strengthening the quadriceps muscle as well as stretching the hamstring. The patient sleeps supine on the bed, the right leg is lifted with the knee straight while doing ankle dorsi flexion

movements, the physiotherapist's one hand holds the lower leg, the other hand stretches the hamstring tendon. This is done to the extent of the patient's ability. The movement is done 5-7 times and each movement is carried out for 10-12 seconds with a rest pause of 10 seconds. This exercise therapy is done 2x a week for 3 weeks. In addition, patients are educated to perform movements at home once a day during the therapy period.



## Results

At the beginning of the examination the strength of the quadriceps and right hamstrings was worth 4 and at the end of the therapy session the value was 5, using the jette7 scale, functional ability for pain was 10, the difficulty level was 11 and the dependency level was 4, After the fifth therapy, the pain score was 6, the level of pain was 6 difficulty 4, and dependency level 3.

Table 1 Jette examination before therapy

Criteria	Pain	Addiction	Difficulty
Standing from a sitting position	3	4	1
Walk 15 meters	3	3	1
Naik tangga 3 trap	4	4	2
JTOTAL	10	11	4

Criteria	Pain	Addiction	Difficulty
----------	------	-----------	------------

Standing from a sitting position	1	1	1
Walk 15 meters	2	1	1
Naik tangga 3 trap	3	2	1
JTOTAL	6	4	3

## discussion

The prognosis is generally very good. The sooner the patient identifies the presence of perceived osteoarthritis, the faster the physiotherapist will determine effective action to overcome the problems of OA Knee cases. A decrease in knee joint proprioception (muscle spindle, cutaneous GTO and nociceptors) will affect movement reactions that are not optimal in presenting these proprioceptive stimuli<sup>2,3</sup>. The slightest stimulation received by the GTO of the hamstring muscle then the muscle reaction is more tense than usual. If it lasts long there will be Tightness hamstrings<sup>8</sup>. This will also affect the stimulation received by the quadriceps muscle decreases so that it will result in relaxation and result in decreased muscle strength. This is in accordance with the law of Reciprocal Inhibition<sup>8</sup>. The decrease in proprioception in the knee joint will also affect the pressure in the joint so that it will change the center of pressure CoP. This condition will reduce the stability of the knee joint.

By doing the exercises as above for patients with early symptoms of osteoarthritis, we assume that there will be an increase in quadriceps muscle strength and a better response to proprioceptive stimulation in the quadriceps muscle spindle. The increase in quadriceps muscle strength will make the hamstrings muscle stretched maximally so that it will stimulate the GTO. We already know that when the GTO of the hamstrings is stimulated, it will have a relaxing effect. The balance of the quadriceps and hamstring muscles will improve CoP<sup>10</sup> and joint stability. This will reduce pain and stiffness in the knee joint due to osteoarthritis.

## Limitations

This case report includes only one sample so it cannot be used to generalize to other cases. The author has not found literature that states the right dose for the implementation of quadriceps strengthening exercises and hamstrings stretching. The implementation of the home program has not been able to be carried out as expected because the patient/husband/family sometimes forget to do the exercises, and also the author cannot control the family in providing therapy at home.

## Conclusion

Knee osteoarthritis (OA) is a progressive degenerative disease that affects cartilage, subchondral bone, and synovial membranes. It has a multifactorial etiology and affects about 60% of individuals over the age of 50 years<sup>11</sup> characterized by pain, physical disability, changes in movement and sensation, as well as psychological stress. the pressure in the joint becomes even, the joint becomes more stable. This will reduce cartilage damage<sup>12</sup>, increase muscle strength<sup>13</sup> improve movement patterns and walking patterns so that functional activities of walking, standing from a squatting position and vice versa as well as activities going up and down stairs are better. With early physiotherapy treatment, patients feel signs of osteoarthritis as experienced by Mrs. SS, will make the success rate of treatment higher.

## **Bibliography**

1. Dantas, L. O., Salvini, T. de F. & McAlindon, T. E. Knee osteoarthritis: key treatments and implications for physical therapy. *Brazilian J. Phys. Ther.* **25**, 135–146 (2021).
2. Santos, M. & Gomes, W. Muscle performance, pain, stiffness, and functionality in elderly women with knee osteoarthritis. *Acta Ortopédica ...* (2011).
3. Al-Dadah, O., Shepstone, L. & Donell, S. T. Proprioception deficiency in articular cartilage lesions of the knee. *Knee Surg. Relat. Res.* **32**, 1–7 (2020).
4. Amin, S. *et al.* Quadriceps strength and the risk of cartilage loss and symptom progression in knee osteoarthritis. *Arthritis Rheum.* **60**, 189–198 (2009).
5. Khairurizal, K. Perbandingan Pengaruh Kombinasi Latihan Hold Relax Dan Open Kinetic Chain Dengan Latihan Hold Relax Dan Close Kinetic Chain Terhadap Peningkatan Kemampuan Fungsional Pasien Osteoarthritis Knee. *Nusant. Med. Sci. J.* (2019) doi:10.20956/nmsj.v4i2.6564.
6. Sharma, S. K., Yadav, S. L., Singh, U. & Wadhwa, S. Muscle activation profiles and coactivation of quadriceps and hamstring muscles around knee joint in Indian primary osteoarthritis knee patients. *J. Clin. Diagnostic Res.* **11**, RC09-RC14 (2017).
7. Parjoto, S. Assesment Fisioterapi pada OA Lutut. *TITAFI XV, Semarang* (2000).
8. Page, P., Frank, C. C. & Lardner, R. *Assesment and Treatment of Muscle Imbalance ( The Janda Approach.*
9. Shanahan, C. J., Wrigley, T. V., Farrell, M. J., Bennell, K. L. & Hodges, P. W. Postural response to vibration of triceps surae, but not quadriceps muscles, differs between people with and without knee osteoarthritis. *J. Orthop. Res.* **32**, 989–996 (2014).
10. Azukizawa, M. *et al.* The Effects of Well-Rounded Exercise Program on Systemic Biomarkers Related to Cartilage Metabolism. *Cartilage* **10**, 451–458 (2019).
11. Hafez, A. R. *et al.* Treatment of Knee Osteoarthritis in Relation to Hamstring and Quadriceps Strength. *J. Phys. Ther. Sci.* **25**, 1401–1405 (2013).
12. Hunt, M. A. *et al.* Relationships amongst osteoarthritis biomarkers, dynamic knee joint load, and exercise: Results from a randomized controlled pilot study. *BMC Musculoskelet. Disord.* **14**, 1 (2013).
13. Muyor, J. M. & Arrabal-Campos, F. M. Effects of Acute Fatigue of the Hip Flexor Muscles on Hamstring Muscle Extensibility. *J. Hum. Kinet.* **53**, 23–31 (2016).