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THE EFFECTIVENESS OF CO-CONTRACTION EXERCISE WITH EXTERNAL CLUE FOR QUALITY RULES IN INDIVIDUAL KNEE OA PATIENTS: SINGLE CASE REPORT

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Introduction: Osteoarthritis (OA) is one of the most common conditions that cause disability, especially in the elderly population. Osteoarthritis (OA) is a degenerative and chronic disease of the knee joint. The recommended intervention is Task-Specific Training with Co-Contraction, namely muscle co-activation (coordinated agonist and antagonist muscle activity simultaneously) for joint stability, even in OA knee individuals who function dynamically as a stabilizer, controlling movement during walking. Augmented feedback (External Clue) commonly used in clinical practice and can play an important role in motor learning.
Case Presentation: Mrs. S is 68 years old. The patient has a height of 155 cm and a weight of 70 kg. Mrs. S works as a housewife. The patient had this complaint several years ago. There is no history of illness in the family. Supporting data in the form of X-ray with the interpretation of knee osteoarthritis grade 2. The patient also suffered from mild deformity of the foot towards varus , the presence of crepitus, but the patient did not have local oedema , the absence of pes anserinus bursitis and the absence of joint tendenes.
Management and Outcome: The patient underwent treatment consisting of Task-Specific Training based on Co-Contraction/ Co-contraction with External Clue. The patient is instructed to contract the muscles while walking. Coactivation occurs when the flexor muscles are active during the moment of extension. (External Clue) is the therapist providing additional information about the performance of motor skills so that the patient can get feedback from the patient himself. The data analysis used in this study is a single case report. The design for this study used the ABA design. The sampling technique is the consecutive method with 1 person who fits the inclusion criteria. The research measurement instrument related to the quality of walking used the 6 Minute Walking Test (6MWT). The data analysis technique used descriptive analytic. This exercise program uses Task- Specific Muscle Co-contraction Training with External Clue for one week starting from January 7 to January 14, 2020, with Ethical Clearance Letter no. 2682/B.2/KEPK-FKUMS/XI/2019 conducted by the Health Research Ethics Commission (KEPK) FK UMS.
Discussion: The subjects of this study have typical symptoms of osteoarthritis of the knee, so there is no need for additional examinations to diagnose knee osteoarthritis. This is supported by the existence of pain, stiffness, and locomotor which are common symptoms of knee OA that is focused on a functional approach, namely component important in locomotor retriction is running. Task- specific training is understanding how distraction-based exercise can affect certain functional tasks which helps improve exercise protocols for people with knee OA. The concept of muscle co-

activation from a specific task is muscle co-activation (coordinated agonist and antagonist muscle activity simultaneously) for joint stability, even in OA knee individuals who function dynamically as a stabilizer, controlling movement during walking. Muscle co-activation to help stabilize the joints in the ligaments and distribute pressure on the joint surfaces.

Conclusion: There was a significant increase in individual walking distance of osteoarthritis knee patients.

Keyword: Osteoarthritis, task specific training, external clue, 6 MWT

Introduction

Osteoarthritis (OA) is one of the most common conditions that cause disability, especially in the elderly population (Heidari, 2011). M ccording Nejati et al., (2015) osteoarthritis (OA) is a degenerative and chronic diseases of the knee joint. Osteoarthritis (OA) is one of the leading causes of physical disability and is the most common indication for knee replacement (Küçük et al., 2018). A physical therapist is a program rehabilitation to prevent, and maintain or restore function and optimal quality of life in individuals with loss and disorders of movement (World Confederation for Physical Therapy, 2011).

Task specific training is understanding how distraction-based exercise can affect certain functional tasks which helps improve exercise protocols for people with knee OA (Teixeira et al ., 2011). Augmented feedback, which is commonly used in clinical practice and can play an important role in motor learning. The added augmented feedback can be categorized into knowledge of results and knowledge of performance (Yu & Kang, 2017).

The measuring instrument related to functional ability uses the 6 Minute Walking Test because it assesses the patient's walking ability and also provides an indication of the individual's level of endurance (Teixeira et al ., 2011). In fact, according to Kim et al ., (2019) 6MWT assesses functional walking capacity and endurance in the elderly. Thus, the authors provide a task-specific intervention of co-contraction exercise with external clue which aims to increase the walking distance of individuals with osteoarthritis of the knee.

Case Presentation

The patient is Mrs. S who is 68 years old with a height of 155cm and a weight of 70kg as a retired teacher, the patient's daily activities are housewives. The patient complains of stiffness in the knee in the morning and complains of pain during activities, the patient cannot pray by standing but sitting, from the various complaints it can be concluded that the patient has knee osteoarthritis. The patient also had supporting data in the form of X-ray interpretation of the knee osteoarthritis grade 2, the patient also had other complaints, namely mild deformity of the legs towards varus, presence of crepitus, but no local oedema, no pes anserinus bursitis and no joint tendeness found.

Figure 1. *X-ray knee*

Management and Outcome

Task-specific training based on Co-Contraction/Co-Activation with Augmented Feedback (External Clue) When designing training sessions, we use the basic principles of

motor learning regarding types of practice and feedback . At the start of the training, all patients were assumed to be in the cognitive stage of motor learning, in which patients need to focus on doing a task correctly but often make mistakes that require external feedback to correct (Bove et al ., 2017) . The patient is instructed to contract the muscles while walking. Co-contraction occurs in the early stance phase when activating the VMO muscle, in the late stance phase the activated muscle is the bicep femoris, all treatments are carried out with Augmented Feedback (External Clue) from the therapist. The presence of the provision of external clue patient can learn identify and correct errors, which can m reflected on attention performance on motor skills and control independently functional balance through a referral from therapists.

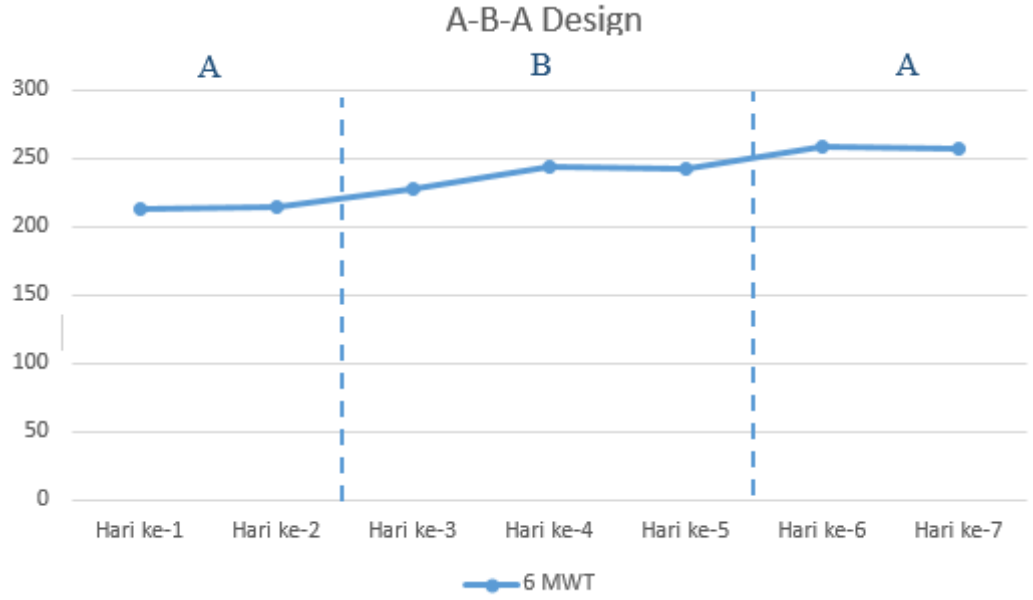

Figure 3. 1 Graph of 6 MWT measurement

In Figure 3.1 the data obtained during the walking mileage inspection are as follows, the first and second days were measured with 6 MWT and no intervention was given, the results were 213.5m and 214.8m. Then it was continued by measuring and giving task specific training interventions based on co-contraction exercise with external clues on the third, fourth and fifth days, the results were 227.5 m, 243.3 m, and 242.7 m. Period I the difference on the second day before the intervention and the third day after the intervention got a result of 12.7 m, period II on the second and fifth days the difference was 27.9 m. The last measurement was carried out on the sixth and seventh days, the results were 258.2 m and 256.8 m, period III the difference on the second and seventh days

got 42 m. Significant changes are found in the results of the distance traveled when walking using the 6 Minute Walking Test.

Discussion

The subjects of this study had typical symptoms of knee osteoarthritis, so no additional examination was needed to diagnose knee osteoarthritis in these subjects. According to Ali (2014) Osteoarthritis symptoms can vary widely among patients, symptoms include joint pain and stiffness. Symptoms vary in severity and change slowly, some patients may show that pain and joint stiffness increase over time and have symptoms that can occur during weight-bearing activities leading to symptoms at rest especially in the morning. In this study, the assessment of the diagnosis of knee osteoarthritis can also use an X-ray examination to evaluate the presence of osteophytes (Braun & Gold, 2012).

Performance-based measures such as the 6 minute walking test, both subjective and objective, are inexpensive and easy to perform, providing valuable information such as disease severity and disease prognosis. This supports the observation of Ateef, et al., (2016) who noted in their study, that an excellent long-term state of excellent test-retest reliability (ICC 0.94) 6 MWT was reported in osteoarthritis of the knee. In clinical practice to be useful in research, Standard Error of Measurement (SEM) is used to identify errors associated with study outcomes, as SEM is reported in scale points i.e. to improve interpretation of patient outcomes and changes (Kennedy, et al ., 2005) . Knowledge of Minimal detectable change (MDC) for physical performance and patient-reported tests commonly used to monitor the severity of knee osteoarthritis, is required to interpret changes in individuals in the context of clinical practice (Naylor et al ., 2014) . The minimum detectable change (MDC) and Standard Error of Measurement (SEM) 6 MWT on the walking distance experienced a significant change because the SEM value of 26.29m was achieved, but the MDC value of 61.34m could not be achieved so it can be concluded that the intervention uses Co-contraction exercise. With External Clue, it cannot be implemented in clinical practice.

Co-activation of the muscles around the knee joint in Osteoarthritis knee patients aims to stabilize the joint during walking. In the feedback process providing information

about movement errors and how the patient corrects errors has a positive effect on improving walking ability by measuring the 6 minute walking test. The increase in the 6 MWT measurement results is influenced by several factors, namely co-activation around the knee joint and the external feedback clue given. The co-activation phase helps stabilize joints and ligaments through the activity of agonist and antagonist muscles. While the provision of external clues results in a feedback process, namely information about movement errors and how the patient corrects errors so that it has a positive effect on improving walking ability (Yu & Kang, 2017), this can be seen from the results of the 6 minute walking test on subjects with the results of 213.5m on the first day and 256.8m on the last day. This measure resulted in a significant improvement in the patient's walking quality.

The advantage of this research is that this research is cost-effective, that is, the value of the success of the intervention is greater than the costs incurred. Although further research is needed regarding the cost-effectiveness and novelty value of this research intervention, it is very high because there are no similar studies.

The drawback of this study is that the investigators in this study were not experienced in treating knee osteoarthritis patients or using the 6 Minute Walking Test and the level of evidence for this study was still low because it used a single case report so it had a high risk of bias.

Conclusion

Giving co-contraction exercise with External Clue can provide a significant increase in the functional ability of individuals with OA Knee, but there is no significant change for patients in terms of pain and stiffness.

Acknowledgments

The authors would like to thank the patients for their cooperation in this study.

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