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# THE EFFECT OF TASK SPECIFIC TRAINING BASED ON CO-CONTRACTION WITH EXTERNAL CLUE FOR FUNCTIONAL ABILITY ON OSTEOARTHRITIS KNEE: SINGLE CASE REPORT

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### Abstract

**Introduction:** Osteoarthritis Knee is a symptom that often comes in elderly people, a chronic progressive condition that causes movement disorders and interferes with activities. The intervention is task specific training. Task specific training is an effective rehabilitation program for balance, walking speed and reducing pain in OA. External Clue is the therapist providing information about the performance of motor skills so that the patient can get feedback from the patient himself.

**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, no pes anserinus bursitis and no joint tenderness.

**Management and Outcome:** The patient underwent treatment consisting of Task Specific Training based on 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 osteoarthritis instrument used is WOMAC (Western Ontario and McMaster Universities) pain T1: 8 to T7: 3, stiffness T1:2 to T7: 2, physical function T1: 24 to T7: 7.

**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 in these subjects. This is supported by international guidelines which state that individuals with signs such as individuals aged >45 years, pain when doing activities, and morning stiffness <30 minutes can be directly diagnosed with knee osteoarthritis. Task specific has the concept of muscle co-contraction where (simultaneous coordinated activity of agonist and antagonist muscles) is considered as the main mechanism for joint stabilization, load distribution, and control of movement during gait. Muscle co-contraction for activities of daily living (ADL) can be combined with different muscles. It is therefore important to understand muscle co-activation strategies across different ADLs and across different muscle combinations.

**Conclusion:** Obtained an increase in functional ability in patients with knee osteoarthritis.

**Keyword:** Osteoarthritis, special task training, external instructions, WOMAC, Functional



## Introduction

Osteoarthritis of the knee (OA) is a symptom that often paralyzes the joints in the knee in adults which can cause disturbances in daily activities and functions (Altman et al., 2015). The prevalence of knee osteoarthritis diagnosed by radiography in participants over 45 years was 19.2% and over 80 years the figure was 43.7%. (Anjum & Abbas, 2016). Meanwhile, the prevalence of knee osteoarthritis is still very high in Indonesia, at 15.5% in men and 12.7% in women from the total Indonesian population of around 255 million people (Ahmad, Rahmawati, & Wardhana, 2018).

It is said to be OA if radiographically to determine the disease of knee osteoarthritis by means of supporting examination using radiography to show joint space width and osteophytes (Braun & Gold, 2012). In addition to radiography, physical examination (PE) is also important to determine knee osteoarthritis (Iversen, et al, 2016). History-taking plays an important role to be packaged with audio-visual information (Oyedokun & Adeloje, 2016). The last examination is noise or crepitus that occurs also illustrates that noise can represent the first symptom of patellofemoral OA (Song et al., 2018). Pain is the main problem that arises in patients with OA. Stiffness is also something that should be considered in causing problems related to inflammation.

Walking is a component of locomotor restriction, this is one type of structured physical activity and the most common in patients with knee OA (White et al., 2015). The fact is that in clinical practice in Indonesia, walking rehabilitation is very rare for people with knee OA. The recommended intervention is task specific training. Task specific training is an effective rehabilitation program to improve functional mobility, balance, walking speed and reduce pain in knee OA (Singh, 2017). Task specific has the concept of muscle co-contraction where (simultaneous coordinated activity of agonist and antagonist muscles) is considered as the main mechanism for joint stabilization, load distribution, and control of movement during gait. To activate the muscles, the therapist uses the External Clue/ Augmented Feedback method. This method is commonly used in clinical practice and can provide an important role in motor learning and can be categorized into knowledge of outcomes and knowledge of performance (Gait, 2017).

The most common disease-specific instrument used to measure and record functional ability related to knee osteoarthritis is the Western Ontario and McMaster (WOMAC) (Konstantinidis & Aletras, 2013). The WOMAC index is the best validated and most widely used outcome measure in subjects with knee osteoarthritis (Sathiyarayanan et al., 2017)..

Based on the above background, the authors are interested in conducting a case study with the title " The Effect Of Task Specific Training Based on Co-Contraction with External Clue for Functional Ability on Osteoarthritis Knee: Single Case Report".



## Case Presentation

The design of this study was carried out with a case study approach on an individual named Mrs. S aged 68 years. 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. The chronology of complaints in patients where the patient complains of stiffness in the knee in the morning <30 minutes and complains of pain during daily activities, especially during prayer, the patient cannot pray by standing but sitting. 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, no pes anserinus bursitis and no joint tenderness.



Fig. 1. Xray knee

An active motion test is performed when the patient is actively moving the knee. On active movement of the knee, the following results were obtained: flexion and extension of the knee, the patient felt pain accompanied by crepitus when actively moved. Passive motion examination is done by the therapist moving the patient's knee by paying attention to the movement pattern. In flexion and extension movements, the patient feels pain accompanied by crepitus when moved passively.

## Management and Outcome

The patient underwent treatment consisting of Task Specific Training based on 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. Activities that may be continuous with previous or subsequent agonist contraction (eg, moment of flexion) to avoid include "agonist" activity in the assessment of antagonists. In giving this Co-Contraction intervention, the therapist uses Augmented feedback (External Clue) on the patient. Augmented feedback (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. Through the provision of

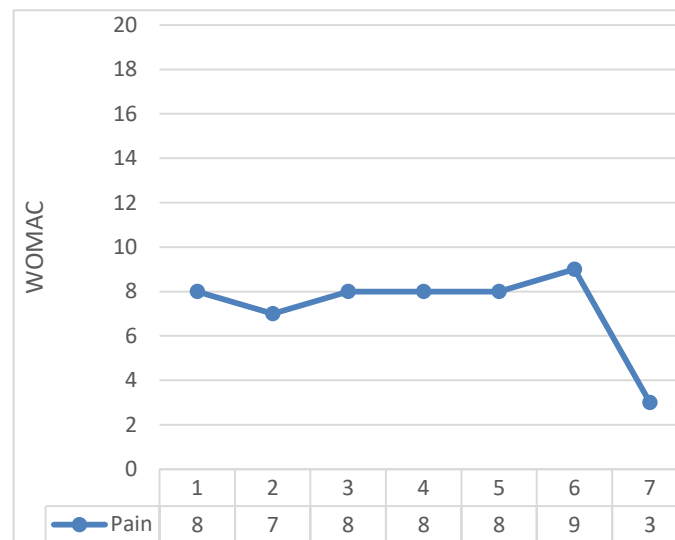


External Clue patients can learn to identify and correct errors and can pay attention to the performance of motor skills, control functional balance independently through the direction of the therapist. The intervention given to the patient was carried out seven times a week.

The osteoarthritis instrument used was WOMAC (Western Ontario and McMaster Universities). A 5-point osteoarthritis index was used to detect patients for OA. The WOMAC index contains a 24 item questionnaire that focuses on pain, stiffness, and functional limitations. Based on the WOMAC scores obtained, patients were categorized as low risk (score 60), moderate risk (score 60-80) and high risk (score 81). The scores of the 24 questions are added up divided by 96 and multiplied by 100% to find out the total score. WOMAC scores were also expressed as a percentage and categorized into low risk ( $\leq 70\%$ ) and high risk ( $> 70\%$ ). If 2 or more pain items, both stiffness items, and 4 or more physical function items were absent, the response was considered invalid and the subscale was not included in the analysis.

The following WOMAC graph is obtained:

a. Item pain in WOMAC



**Fig. 2.** Pain item in WOMAC

In this study, the overall data obtained during the WOMAC pain examination did not show significant changes, where the first and second days were only given the WOMAC questionnaire, the results obtained on the first day (8) and second day (7), third, fourth, fifth day were given the WOMAC questionnaire. and intervention obtained (8) results, on the sixth and seventh day the WOMAC questionnaire was given, the results were on the sixth day (9) and the seventh day (3).



b. Item stiffness in WOMAC

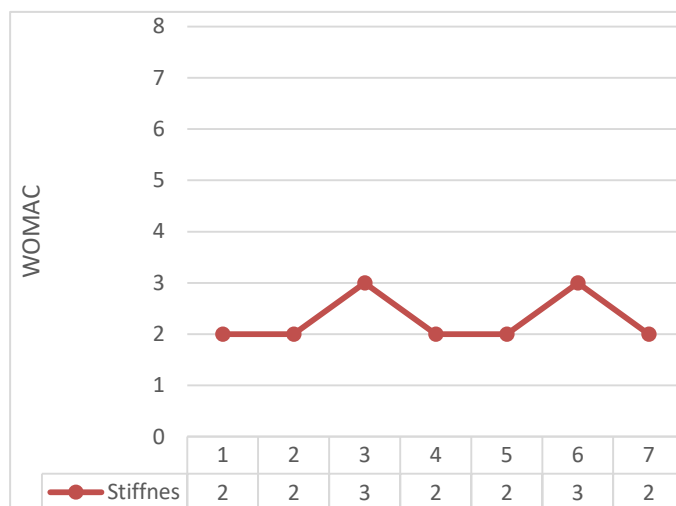


Fig. 3. Stiffness item in WOMAC

In this study, the overall data obtained during the Stiffness examination at WOMAC there were no significant changes, where the first and second days were only given the WOMAC questionnaire, the results were on the first day (2) and the second day (2), the third, fourth, fifth day were given the WOMAC questionnaire and the intervention obtained results. third day (3), fourth (2), fifth (2), on the sixth and seventh day the WOMAC questionnaire was given only the results obtained on the sixth day (3) and the seventh day (2).

c. Item physical function in WOMAC

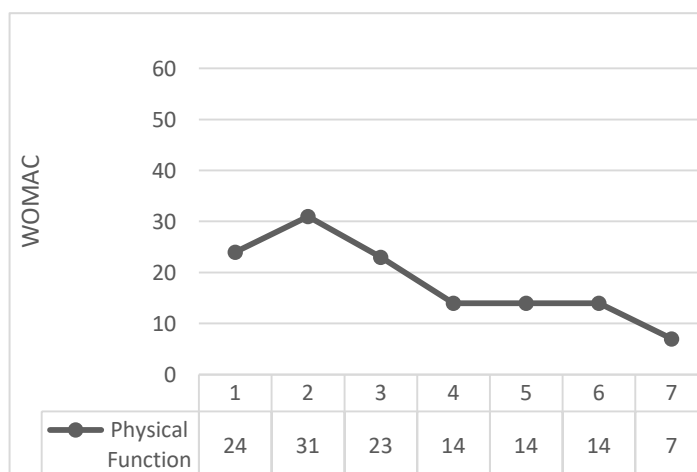


Fig. 3. Item Physical Function in WOMAC



The data obtained during the Physical Function examination on WOMAC can be said to have decreased, where the first day and the second day were only given the WOMAC questionnaire, the results obtained on the first day (24) and second day (31), the third, fourth, fifth day were given the WOMAC questionnaire and the intervention was obtained. the results of the third (23), fourth (14), fifth (14) days, on the sixth and seventh days were given the WOMAC questionnaire only, the results were on the sixth day (14) and seventh day (7). The results above show a significant change on the seventh day.

### **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 in these subjects. This is supported by international guidelines which state that individuals with signs such as individuals aged >45 years, pain when doing activities, and morning stiffness <30 minutes can be directly diagnosed with knee osteoarthritis. In this study, the assessment of the diagnosis of osteoarthritis of the knee can also use an X-ray examination to evaluate the formation of osteophytes, joint space narrowing by intra-articular visualization and a grading scheme of grades in osteoarthritis of the knee (Braun & Gold, 2012).

Research from Smith (2018) and Singh (2017) states that one of the core managements to improve complaints of knee osteoarthritis conditions which include pain, stiffness and physical function is functional strengthening exercises that are land-based exercises. There is evidence that long-term exercise is safe and that there is no risk of structural disease. This is supported by the Profession Profession (2018) which strongly recommends land-based exercise. Research is considered quite effective in terms of cost-effectiveness because it does not require large costs to do it (Manaf et al., 2017).

Task specific has the concept of muscle co-contraction where (simultaneous coordinated activity of agonist and antagonist muscles) is considered as the main mechanism for joint stabilization, load distribution, and control of movement during gait. Muscle co-contraction for activities of daily living (ADL) can be combined with different muscles. It is therefore important to understand muscle co-activation strategies across different ADLs and across different muscle combinations. (Smith, 2018). Augmented feedback (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. Through the provision of External Clue patients can learn to identify and correct errors and can pay attention to the performance of motor skills, control functional balance independently through the direction of the therapist (Mansfield et al, 2018).



Statistically the Minimally Clinically Important Difference (MCID) and Standard Error of Measurement (SEM) WOMAC on pain and stiffness there is no significant change because the MCID value of 8.8 and the SEM value of 5.1 can be concluded that the intervention uses Co-contraction exercise with External Clue. There is no change in the indication of pain and stiffness and cannot be implemented in clinical practice, but at the Physical Function point there is a change and has a value that is more than Minimally Clinically Important Difference (MCID) and Standard Error of Measurement (SEM) it can be concluded that This intervention using Co-contraction exercise with External Clue can be used when the patient is indicated for an increase in Physical Function.

The advantage of this research is that it is cost-effective, where the value of the success of the intervention is greater than the costs incurred, although further research is needed regarding cost-effectiveness. The intervention used is the result of the highest recommendations from several guidelines for knee OA. The novelty value of this intervention is very high because no similar research has been found.

However, apart from having advantages, this research also has disadvantages, such as WOMAC used in this study is still officially translated into Indonesian, so there is a possibility of bias on the enumerator. The enumerators in this study were not experienced in treating knee osteoarthritis patients or using WOMAC. The level of evidence for this study is still low because it still uses a single case report so it has 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 are no significant changes for patient in aspects of pain and stiffness.

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