Physiotherapy Management of Total Knee Replacement Et Causa Osteoarthritis Genu with Transcutaneous Electrical Nerve Stimulation Modalities and Exercise Therapy in Banten Provincial Hospital

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Abstract
Osteoarthritis is a chronic disease that most often occurs in elderly people aged over 65 years. The age-standardized incidence of knee OA is 3.8% worldwide and 80% of patients over 75 years of age have radiologically proven OA. Knee osteoarthritis sufferers usually complain of pain, swelling, limited joint mobility, and stiffness due to inflammation of the synovial joints. OA of the knee can also cause disruption of functional activity and interference with patient work (Thacoor & Sandiford, 2019). This research aims to find out more about the benefits of using TENS in reducing pain and the benefits of exercise therapy in increasing the range of motion of joints and increasing lower leg muscle strength as a result of total knee replacement. This type of research is descriptive and action research with the subject Ny. I with medical records Post total knee replacement dextra surgery. Results of the physiotherapy management process for Total knee replacement et causa osteroarthritis knee dextra with Transcutaneous Nerve Stimulation and exercise therapy in Ny. 1, aged 53 years, came to the Banten Provincial Regional Hospital in November with the problem of pain in the right knee, limited range of motion of the joint, decreased muscle strength, and decreased functional activities such as squatting and going up and down stairs. After undergoing physiotherapy six times from November 16, 2022 to December 19, 2022 using Transcutaneal Electrical Nerve Stimulation (TENS) and Exercise Therapy, the results showed that the level of pain had decreased, the range of motion of the joints had increased, muscle strength had increased, and the patient's functional activity had improved. has increased, although not completely. It is hoped that education and home programs, independent exercises given by therapists to patients must always be implemented with family support to get maximum results and remind patients about what is recommended by the physiotherapist for the patient's recovery and recovery.

Keywords: Physiotherapy, Total Knee Replacement, Osteoarthritis, Transcutaneous Electrical Nerve Stimulation
Introduction

Development of the health sector that brings changes to the condition of society in Indonesia. Health development is essentially an effort carried out by all components of the Indonesian nation which aims to increase awareness, willingness and ability to live healthily for everyone in order to realize the highest degree of health. But health development is hampered by various diseases, where infectious diseases and non-infectious diseases (non-communicable diseases) occur. Infectious diseases such as HIV, tuberculosis, Hepatitis B and influenza, while non-infectious diseases are one of the diseases related to aging factors such as osteoarthritis.

Osteoarthritis (OA) is a chronic degenerative joint disorder that causes disability and affects more than 500 million people worldwide. OA is believed to be caused by wear and tear of articular cartilage, but is now more commonly referred to as a chronic whole joint disorder that begins with biochemical and cellular changes in the synovial joint tissue, leading to histologic and structural changes in the joint and ending with tissue-wide dysfunction, Osteoarthritis (OA). Knee is one of the main causes of disability worldwide.

Osteoarthritis is a chronic disease that most often occurs in the elderly over 65 years. The age standard incidence of knee OA is 3.8% worldwide and 80% of patients over 75 years of age have radiologically proven OA. Sufferers of knee osteoarthritis usually complain of pain, swelling, limited joint mobility, and stiffness due to inflammation in the synovial joints. OA of the knee can also cause disruption of functional activity and interference with the patient’s work (1).

Based on WHO data (2) in 2017, it is estimated that there are 18% of sufferers of genu osteoarthritis in the world in women and 9.6% in men (3). Meanwhile, the prevalence of osteoarthritis in Indonesia is 5% at the age of less than 40 years, 30% at the age of 40 to 60 years, and 65% at the age of less than 61 years. As many as 24% of the world’s population is affected by osteoarthritis, and 83% is osteoarthritis genu, so that osteoarthritis genu is the most common case (4).

Osteoarthritis patients of the knee suffer from a combination of joint pain, stiffness, instability, swelling and muscle weakness. This causes a decrease in quality of life and activities of daily living. 80% of patients with knee OA suffer from decreased mobility while 20% of them suffer from an inability to perform daily activities (5).

Total knee replacement is a safe treatment to reduce pain and restore physical function in patients with severe osteoarthritis that cannot be maintained with physical therapy. Regarding the incidence of arthroplasty taken from 31 countries, it has an incidence rate of 118.8 per 100,000 population per year for THR and 104.3 per 100,000 population per year for TKR in 2007.

Even though arthroplasty is often performed in Indonesia, the study did not mention Indonesia as a source of data. This means that there is very little data collection for arthroplasty procedures in Indonesia, so there is no data available stating the quantity or
quality of arthroplasty procedures in Indonesia (6). The sensation of postoperative pain after TKR can actually be controlled with oral/intravenous drugs combined with peripheral nerve blocks, local infiltration analogs or spinal anesthesia. Sensation of pain and swelling in the extremities can inhibit the patient’s motivation to mobilize early, which results in prolonged hospitalization, delayed functional recovery, and negative psychological responses from the patient. Therefore, adequate pain management and control of local swelling and stiffness after TKR are priorities as they are important for increasing patient satisfaction, preventing complications, and improving quality of life with faster recovery (7).

Develop, maintain and restore body movement and function throughout the life span using manual treatment, movement enhancement, equipment (physical, electrotherapeutic and mechanical), function training, and communication (PMK No. 65 of 2015). Physiotherapy as one of the medical teams responsible in the process of restoring functional ability that occurs in the condition of total knee replacement dextra. In the condition of total knee replacement, physiotherapy procedures can be performed for problematic problems, such as pain, spasm and limited range of motion of the joint. Physiotherapy modalities that can be used are TENS, and quadricep setting exercise therapy.

This research aims to find out more about the benefits of using TENS in reducing pain and the benefits of exercise therapy in increasing the range of motion of joints and increasing lower leg muscle strength as a result of total knee replacement.

Method
This type of research is descriptive and action research with the subject Mrs. I with medical records post total knee replacement dextra surgery.

Result
1. Pain reduction
From the results of the evaluation of the therapy that has been implemented, the following data were obtained:

<table>
<thead>
<tr>
<th>Painful</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shut up</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Motion</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Press</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

It can be seen that after 6 times physiotherapy, there was a decrease in pain. In silent pain from T1= 7 to T6= 1 where there is a decrease from severe pain to no pain. In movement pain from T1=8 to T6=3 where there is a decrease from unbearable pain to mild pain.

After 6 treatments, the patient experienced a decrease in pain as measured using a VAS measuring instrument. A decrease in pain can occur after administering transcutaneous electrical nerve stimulation (TENS). Transcutaneous electrical nerve stimulation (TENS) in total knee
replacement cases activates large diameter nerve fibers so that pain is inhibited in the spinal cord.

TENS for postoperative pain control after total knee replacement published in the US National Library of Medicine states that patients who received a TENS unit after total knee surgery experienced less pain and a reduced need for opioid medications. (Donaldson, R.n.d). The Transcutaneous Nerve Stimulator reduces pain in two ways:

1) Physiologically, TENS stimulates peripheral and spinal/brainstem receptors, dampening the brain's perception of pain, the same receptors targeted by opioids.

2) "Gate Control Theory" TENS fills the pain pathways with electrical stimulation that disrupts the brain causing pain to decrease. (Donaldson, R.n.d)

The mechanism of analgesia produced by TENS can be explained by gate control theory, this theory explains that nerve fibers with a small diameter that carry pain stimuli will go through the same door as fibers that have a larger diameter that carry touch impulses (mechanoreceptors). If the two nerve fibers pass through the same door together, the larger fiber will inhibit the conduction of impulses from the smaller fiber. The gate is normally closed, constantly blocking noniceptive transmission via C fibers from peripheral cells to T cells. If a peripheral painful stimulus occurs, information carried by the C fibers reaches the T cell and the gate opens, causing central transmission to the thalamus and cortex where the impulse is interpreted as painful. TENS plays a role in the gate closing mechanism by inhibiting nociceptive C fibers by providing impulses to activated myelinated fibers (8).

2. The range of motion of the joints

Range of motion with goniometer on knee dextra. From the results of the evaluation of the therapy that has been carried out, the following data is obtained:

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Aktive</th>
<th>Passive</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>0° – 0° – 100°</td>
<td>0° – 0° – 120°</td>
<td>0° – 0° – 135°</td>
</tr>
<tr>
<td>T2</td>
<td>0° – 0° – 110°</td>
<td>0° – 0° – 120°</td>
<td>0° – 0° – 135°</td>
</tr>
<tr>
<td>T3</td>
<td>0° – 0° – 110°</td>
<td>0° – 0° – 120°</td>
<td>0° – 0° – 135°</td>
</tr>
<tr>
<td>T4</td>
<td>0° – 0° – 120°</td>
<td>0° – 0° – 130°</td>
<td>0° – 0° – 135°</td>
</tr>
<tr>
<td>T5</td>
<td>0° – 0° – 125°</td>
<td>0° – 0° – 130°</td>
<td>0° – 0° – 135°</td>
</tr>
<tr>
<td>T6</td>
<td>0° – 0° – 125°</td>
<td>0° – 0° – 130°</td>
<td>0° – 0° – 135°</td>
</tr>
</tbody>
</table>
After physiotherapy was carried out 6 times using TENS modalities and exercise therapy, an LGS evaluation was obtained using a goniometer. The result is an increase in LGS knee flexion $T_1 = 100^\circ$ to $T_6 = 125^\circ$.

3. Manual muscle test

<table>
<thead>
<tr>
<th>Muscle groups</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee flexors</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Knee extensors</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

4. Functional capabilities

<table>
<thead>
<tr>
<th>Total Score</th>
<th>T1</th>
<th>T3</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation</td>
<td>Heavy</td>
<td>Heavy</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Evaluation of the increase in Functional Activity is measured from the values obtained at $T_1$ to $T_6$. The increase in functional ability in total knee replacement is influenced by reduced pain, increased LGS, increased muscle strength, patient motivation and encouragement from the therapist, as well as an environment that supports patient recovery.

**Summary**

Total knee replacement is a medical procedure that is performed by replacing Physiotherapy management process for Total knee replacement et causa osteoarthritis knee dextra with Transcutaneous Nerve Stimulation and exercise therapy in ny. 1, 53 years old, came to the Banten Provincial Regional Hospital in November with the problem of pain in the knee, limited range of motion of the joint, decreased muscle strength, and decreased functional activity, such as squatting and going up and down stairs. After undergoing physiotherapy six times from November 16 2022 to December 19 2022 using modalities.

Transcutaneous Electrical Nerve Stimulation (TENS) and Exercise Therapy showed that the level of pain was reduced, the range of motion of the joints increased, and muscle strength increased, and the patient's functional activity has increased, although not completely.

**Suggestion**

Based on the discussion regarding the case of Total Knee Replacement et causa Osteoarthritis Dextra which has been discussed above, the author would like to provide several suggestions to:

1. To Physiotherapy
   Increase and increase knowledge and insight in theory and practice to face developments in science in diagnosing and treating total knee replacement patients and other cases.

2. To the Patient
   Education and home programs, individual exercises given by therapists to patients must always be
implemented with family support to get maximum results and remind patients of what is recommended by the physiotherapist for the patient’s recovery and recovery.

3. To the Community
Advise the public to get used to a healthy lifestyle and maintain a healthy diet or reduce body weight to avoid becoming excessively obese

Bibliography