



A CASE STUDY ON EXERCISES REDUCES KNEE PAIN AFTER TOTAL KNEE REPLACEMENT SURGERY

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ABSTRACT

The most common cause of knee discomfort in society has been osteoarthritis which causes limitations and disabilities. Medicines are not sufficient to manage the pain complaint of patients with knee osteoarthritis especially grade 3 and 4. A knee replacement is an advance technique to resolve the osteoarthritic complications. Some cases following total knee replacements are having still some pain. Data from a single, 53-year-old female patient was used in the physiotherapy clinic for this investigation. After getting a total knee arthroplasty of her right knee, she continued to experience knee pain. The right knee joint became misaligned and unstable as a result of the ensuing mechanical modifications. Several physiotherapeutic techniques were used in this investigation. By using this approach non-essential revision total knee replacement surgeries could be avoided.

KEY WORDS: total knee replacement (TKR), strengthening exercises, osteoarthritis

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285

INTRODUCTION:

Over 60 years population mostly has been found affected with osteoarthritis. Grade 4 categories of it can only be managed by surgical procedure called as total knee replacement surgery. [1]In the previous three decades, increases in osteoarthritis have been accounted as 48% in order that increases in older population and obesity. [2]Total knee arthroplasty is now on the rise globally in terms of only procedure to face the challenges posed by severe osteoarthritis. [3]Non-surgical treatments included with multiple exercises are needed as a first line approach to the maximum population with grade 4 osteoarthritis. [4]Complete knee replacement has proven to be more effective in terms of functional improvement, pain alleviation, and 10-15 year survival rates, surgical techniques have been

supplanted by be greater than 90%. [5] When a TKA is unstable, it means that the soft tissue that supports it has failed or is unable to operate as a result of the size, position, or combination of components. In 10% to 20% of revision instances, instability after TKA may necessitate surgery. The patient may report giving way, having trouble mounting stairs, and bowing at the knees when under pressure. Soft tissue discomfort, persistent joint stiffness, and joint laxity are examples of physical findings. [6] The literature suggests that the satisfaction percentage might range from 75% to 89%. In the initial five years following main implantation, the rate of revisions is 2.8%, and the rate of reoperations without component exchange is 4.3%. [7] About 60 to 80 percent of revision procedures result in long-term survival after a difficult TKA, which can also lead to



numerous medical, social, and legal issues. They also result in financial hardship, and the primary causes of procedures include instability, polyethylene wear, aseptic loosening, and infection. [8, 9] Many clients have been observed in society to be experiencing these kinds of issues, and there isn't a simple fix for them after TKA, they experience ongoing, chronic knee discomfort. And researchers provide these several explanations. Dynamic issues related to muscular imbalance are among the most likely causes. Additional mechanical causes include implant misalignment and loosening following total knee arthroscopy. [7,8]

Many conservative treatments have been administered to patients, and revision surgeries, however they are unsatisfied. They could be addressed by appropriately employing certain exercises to enhance muscle function. Since every case is unique, the approach to treatment should be customized for each individual. There aren't many case studies that address these kinds of issues. However, in order to provide positive outcomes, these issues still need to be improved upon or managed more effectively through the use of physical therapies. This study aims to overcome complications following total knee arthroplasty causing chronic knee pain.

MATERIALS AND METHODS:

Case description

The 64-year-old male patient who had visited the physical therapy department was complaining of chronic knee discomfort. One year prior, he had right knee totaled in surgery. Patient was in trouble while walking and trying to stand up from sitting position. Analysis and assessment

the patient said that the discomfort in right knee was moderate, scoring a 4 out of 10 on the numerical pain rating scale. His discomfort increased as he began to walk and reached a 8 out of 10 on the numerical pain rating scale. The client was experiencing trouble performing ADLs. On the lower extremity functional scale (LEFS), he scored 35 out of 80. His major goal

was to get back to his life without any discomfort. His knees appeared healthy, free of edema, swelling, and redness. Additionally, the incision site was in good shape. His range of motion at right knees was 115° without any pain. Several physical examinations were conducted in order to evaluate the patient's clinical state based on the patient's history and observation.

THE METHODOLOGY OF TESTS:

1. Varus stress test (Magee, 2009) [20]: this test involved first fully extending the knee and then flexing it 20 to 30 degrees. The patient was placed in a supine position, one hand being used to stabilize the ankle and the other to push laterally on the medial portion of the knee.

The lateral aspect of the knee did not have an excessive gap.

2. The Valgus stress test (Magee, 2009)[20] was performed with the knee fully extended at first, and subsequently with the knee in a 20–30° flexion position. The patient was placed in a supine position, one hand being used to stabilize the ankle and the other to push medially at the knee on the lateral aspect. There wasn't a big void at Test of Lachman (Magee, 2009) [20] — in this patient was in the supine posture. Additionally, the patient's knee was held in a 30 to 45° flexion range. The femur of the patient was pushed the proximal aspect of the tibia forward with one hand while stabilising it with the other. Next, a soft end sensation was detected.

Test of Craig (Magee, 2009) [20]-The patient was prone and had a 90° flexed knee. Additionally, the back of the femur's larger trochanter was felt. After that, the hip was gently rotated medially and laterally until the greater trochanter reached its maximum lateral position or was parallel to the examination table. Next, based on the angle of the lower leg with the vertical, the degree of anteversion was assessed. An 18° angle was discovered. According to Michael T. Cibulika et al. [16], people without pathology have a twisted femur with the head and neck inclined forward

between 15 and 20 degrees from the body's frontal plane.

Table1: muscle grading

S.N	Grade right knee pre	Grade right knee post
1	Knee flexors-3	Knee flexors-4
2	Knee extensors-4	Knee extensors-5
3	Hip flexors-4	Hip flexors-5
4	Hip extensors-3	Hip extensors-4

Manual Muscle Testing (MMT)

Table 2: PAIN SCORE: on NPRS [numerical pain rating scale]

Pre treatment	Post treatment
4 on standing	0 on standing
8 on walking	2 on walking

Fig. 2 following surgery X-ray additionally after surgery. The medial and lateral gaps were maintained, and the AP and LAT views appeared aligned. Even so, minute alterations, like modest implant loosening following surgery, could not be picked up on these radiographs. According to a research by Carlos Higuera et al. [19], early loosening is extremely difficult to assess on x-ray in clinical practice. Additionally, the diagnosis is not evident until after additional x-rays.



Pre-total knee replacement x ray

CLINICAL FINDINGS:

after the patient's initial assessment and examination, the following were the patient's



present impairments:1. Pain in right knee2. Weakness in right lower extremities 3. Unsteadiness in right lower extremities. 4. Reduced capacity for right limbs to bear weight during walking and moving According to the examination and assessment, the patient was in good enough health for the therapy sessions

INTERVENTIONS:

1. The patient signed a consent document before receiving any physical treatment.
2. Daily care was given for a total of 9 weeks. 3. The patient underwent physical therapy once a day for 9 weeks at 15-minute sessions (10 minutes for right).The patient had one daily session of physical therapy at For 9 weeks, do 15-minute sessions (10 minutes for right side).
3. For each compromised muscle group (knee flexors, hip extensors), 30 repetitions were performed, alternating between 15 isometric and 15 dynamic contractions every two minutes.
4. Knee flexion was first increased to 5° during squatting exercises, and then it was steadily increased to 35° to 100°. The patient was taught the recommended activities to help them achieve good outcomes from their treatment. Applying ice to right knee joints helped reduce pain during or after exercise. The patient and care taker were also given written materials and illustrations in case the exercises were forgotten. The quadriceps, as well as the gluteus maximus, medius and minimus, had been more vigilant during the entire therapy session.

TOOLS FOR MEASUREMENT:

Three distinct measurement instruments were employed in this study: 1. The NPRS, or visual analogue scale: [15] Self-reported measurements of symptoms are used to calculate scores. 2. The LEFS, or lower extremity functional scale: [18] A 20-item condition-specific questionnaire is called LEFS. LEFS scores are on a scale from 0 to 80, where a higher score indicates a higher functioning level. 3. The system of the Medical Research Council (MRC):[17].

RESULTS:

Patient received daily care in the clinic.Over the course of 9 weeks, 59 sessions were offered, and appropriate instruction for performing at-home workout programmes was also given. On both sides, his chronic knee pain was reduced to a score of 0/10 on the NPRS system, along with the quadriceps. Following the conclusion of treatment, the Lachman and sitting anterior drawer tests yielded negative results. On right sides, stability and muscular balance between opposing muscle groups were thus attained. After 59 treatment sessions, the patient was pain-free in both knees and showed no symptoms of difficulties walking on her own. His LEFS score increased from 35/80 to 80/80. The patient reported that he had no pain and could walk with ease..

DISCUSSION:

After TKA, knee discomfort is typically reported. It has proven to be effective in relieving pain. But following TKA, 15–30% of individuals still have pain. Total knee replacement operation is not a cure for arthritis. [21]After TKA, it might be challenging to identify the cause of pain. [5, 12]Both mechanical issues and muscular imbalance could be the cause of this. Weakness in the muscles may be the cause of muscular imbalance. Research has indicated a high correlation between the emergence of chronic pain after total knee arthroplasty (TKI) and inadequate management of acute pain. [14] Revision operations that are performed without a clear indication of the intended outcome are also fraught with danger. The purpose of this study was to identify and treat any subtle underlying causes of chronic knee discomfort following total knee arthroplasty.

According to other research, determining the persistence of knee pain following total knee arthroplasty may be aided by assessing the pain characteristics in addition to the patient's medical history and physical examination. Similarly, WikkiWyldeet al.[13] noted that in order to fully comprehend the features and implications of chronic knee pain following total



knee arthroplasty, a comprehensive and multifaceted approach to measuring this pain is required in both clinical and research contexts. Targeted therapy and early detection could help manage this.

This research was done to address the ongoing knee pain that came after total knee arthroplasty. That could be the result of dynamic or functional issues that were addressed with certain stabilising and strengthening exercises. A medical operation that reduced a muscle's ability to function could be the cause of a muscular imbalance. Wolf Peterson and colleagues' study highlighted the reason behind Knee discomfort has several causes. Strength of damaged muscles in this investigation included the quadriceps, gluteus medius, and gluteus exercises for strengthening the minimus enhanced. This can be the reason why both knee joints are more stable. Additionally, this can result in less discomfort in right knee. According to Simon Donell et al. [10], the quadriceps muscle is crucial for patella-femoral tracking. Extensor force efficiency is increased as a result. They therefore increased the stability of right knee joints.

This study showed knee joint instability, which could be brought on by joint laxity.

It could be the result of weak muscles. The reason for the slight misalignment would be this. Following TKA, these mechanical disruptions would consequently cause excruciating knee pain.

Another clinically useful technique is star care which is also based on muscular efforts made to improve the strength of the group of muscles around operated knee joint. It helps in reducing chronic knee pain after total knee replacement surgery. [22] According to a study by Jeffrey Charian et al. [15], appropriate TKA alignment helps to balance the stresses transferred via the soft tissue envelop, which is essential for the joint to fire appropriately. Poor alignment can lead to early failure and subpar functional results, which can loosen components. However, even with radiography, it is

challenging to assess this slight component loosening, which results in joint instability. After TKA, this may also be the reason for ongoing knee pain.

After operation there is still chances to get affected with knee osteoarthritis and pain. [21] According to Alberto Momoli et al. [12], instability is frequently linked to pain due to aberrant stress discharge on the knee. Anterior and posterior cruciate ligaments are overstressed when there is knee flexion instability in the saggital plane. This may also be the reason why pain persists following TKA. Flexion instability was discovered in this study when doing the Lachman test at 30° and the sitting anterior drawer test at 90°. This could also be the reason for ongoing knee pain after total knee arthroplasty. According to a research by Moon Chang et al. [5], neuromuscular disease is the cause of the instability. Weakness in the quadriceps and hip abductor, as well as a medial thrust, are risk factors for recurvatum. This will put too much strain on the soft tissues. Although difficult, knee discomfort and instability can be managed.

LIMITATIONS:

To lessen the effects of knee discomfort following total knee arthroplasty, more research is required to examine the underlying reasons of instability. In our study only one right knee has been the focus point of treatment, so both knee treatments simultaneously are taken. Then significant changes might be found in therapeutic results. Large sample size could explain the things more accurately if taken.

CONCLUSION:

Even if the TKA process has improved, having a painful knee after TKA is not a good result. Clinical efficacy of individualized or interdisciplinary approaches should be assessed to guarantee that patients receive the best care possible. Problems that have been identified should receive targeted interventions. During interventions, any linked factor that could induce discomfort should be taken into

account. It would allow corrective surgeries to be avoided.

CONFLICT OF INTEREST:

The writers say they have no competing interests.

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