

# Total Knee Arthroplasty in Elderly Patient: A Case Report and Literature Review

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DOI: <https://doi.org/10.52403/ijhsr.20221207>

## ABSTRACT

**Introduction:** Osteoarthritis is a dynamic and metabolically active disease that involves all tissue components of the joint, bone, cartilage, synovium, muscle, and ligament. Currently, total knee arthroplasty (TKA) is the most common reason for in patient hospitalization; 3 million women and 1.7 million men have undergone knee arthroplasty.

**Case of Presentation:** We report, A male 65-year-old, slightly non-obese Balinese male with an atraumatic progressive painful of his left knee. The patient had become limited to minimal house activity. He required a walker and/or wheelchair for independent mobility at home. According to physical examination and imaging revealed end stage of osteoarthritis, and we performed total knee arthroplasty. The patient had a good postoperative recovery and was discharged to a rehabilitation facility to continue his therapy. He returned to her home after a week post-surgery and walked independently in non-weight-bearing with a walker. Rehabilitation was continued, initially within the home and then outside the home.

**Discussion:** Treatment designed for knee OA should aim to relieve pain, improve function, and limit disabilities. Knee OA treatment is usually driven by the patient's symptoms and the potential to improve quality of life.

**Conclusion:** Total knee arthroplasty is a frequently performed and successful operation. The complications though not common, are challenging to address and require early recognition and intervention with an appropriate referral to a dedicated arthroplasty surgeon with the requisite expertise for revision surgery when necessary to obtain a favorable clinical outcome

**Keywords:** Osteoarthritis, Knee, Total Knee Arthroplasty, Elderly age, Case report.

## INTRODUCTION

Osteoarthritis is a dynamic and metabolically active disease that involves all tissue components of the joint, bone, cartilage, synovium, muscle, and ligament.<sup>1</sup> The key pathological features are of articular cartilage softening, fibrillation, and then ulceration leading to sclerosis and eburnation of subchondral bone.<sup>2</sup> Articular cartilage degradation leads to release of inflammatory mediators and further joint

damage due to this inflammatory component, thus the frequent reference to 'degenerative arthritis is incorrect. Subchondral cyst and osteophyte formation are later features.<sup>3</sup> Patients with OA of the knee present with symptoms that include joint pain, swelling, stiffness, crepitus, loss of function, and reduced quality of life.<sup>4</sup> The initial management of OA of the knee should be non-operative, however, these measures often provide only limited and

temporary benefit. Not until these options have been exhausted should surgical options be explored.<sup>5</sup>

Currently, total knee arthroplasty (TKA) is the most common reason for inpatient hospitalization; 3 million women and 1.7 million men have undergone knee arthroplasty in the United States.<sup>5</sup> In 2011, 757,000 knee arthroplasties were performed for arthritis. Genetic predisposition, trauma, overuse, obesity, and certain occupations increase the risk for the development of OA of the knee.<sup>6</sup> Here we report a patient with end stage of knee OA, that undergo TKA with good outcome and no limitation range of motion.

### CASE PRESENTATION

Mr. W is a 65-year-old, slightly non-obese Balinese male with an atraumatic progressive painful of his left knee. The patient had become limited to minimal house activity. He required a walker and/or

wheelchair for independent mobility at home. He had difficulty to stand and could no longer climb stairs without assistance. His pain was in proportion to her activities and was unresponsive to nonsteroidal anti-inflammatory drugs (NSAIDs) medication and hyaluronate injections. He had no history of comorbidities related to his knee complaints.

On physical examination, the patient was found to be an alert, oriented male sitting in a wheelchair in no apparent distress. However, He had significant pain on his right knee when he tried to bear-weight. The skin over the right lower extremity was intact and there was no effusion, soft tissue swelling or erythema about the left knee. The left knee was held in a flexed posture (Fig. 1). The left knee range of motion (ROM) was relatively painless but limited to 10-145° of flexion with a 32° (Grade III) fixed valgus deformity.



Figure 1. Clinical Evaluation Before and After Implant Insertion of Left Knee (Intraoperatively)



Figure 2. X-Ray Anteroposterior and Lateral Views of Left Knee Post Operatively

Left knee also had 10° valgus deformity, however, the ROM of the left knee and both hips were painless within normal limits. X-ray demonstrated a significant valgus deformity of the right knee, erosion of lateral femoral condylar bone and severe tricompartmental osteoarthritis. After all of failed attempts of conservative options of treatment, the patient agreed for left total knee arthroplasty. The surgery was performed by the author. Preoperatively, we had assessed the left knee with severe valgus deformity. We found that the lateral aspect was tight. Therefore, initially we decided to use constrained implant in this patient. Unfortunately, due to limited coverage of the state insurance in, the constrained implant was inaccessible. Therefore, we carried on with the surgery using standard non-constrained implant with addition of soft tissue balancing procedure. The patient underwent a TKA with epidural anaesthesia and intra-operative tourniquet. We performed a medial parapatellar approach. First, we performed the tibial cut, perpendicular to the anatomical axis and removed the smallest possible bone amount, especially from the lateral side. After finishing the bone cuts, we once again tried to assess the balance of the tissue. It was found that there was soft tissue imbalance due to the severe valgus deformity. The lateral ligaments were tight with loose medial ligaments as predicted preoperatively. Ideally, this grade III valgus deformity should be corrected with constrained implant. Therefore, as planned preoperatively, we did an alternative soft tissue procedure with non-constrained implant. The MCL origin was cut together with the bone, such as in avulsion fracture. The origin was shifted superiorly in extension. Then, the balanced position was marked. The balancing was continued in flexion position which needs anterior shift of the already marked new position of MCL origin. The new MCL origin was fixed with 3 cortical screws, expecting a bone to bone healing. ROM achieved intra-operatively

was 0–140° of flexion with no valgus deformity (Fig 1). The patella was resurfaced with a 6 mm thickness polyethylene component. This patient used Primary Posterior Stabilized Implant TKA with an 11 mm polyethylene insert. Postoperative X-ray was shown in Fig. 2. Blood lost was estimated about 500 ml. Postoperatively the patient's treatment included: routine DVT prophylaxis, gentle progressive active and active-assisted ROM and non-weight-bearing activities for 5 weeks until clinical union.

The patient had a good postoperative recovery and was discharged to a rehabilitation facility to continue his therapy. He returned to her home after a week post-surgery and walked independently in non-weight-bearing with a walker. Rehabilitation was continued, initially within the home and then outside the home. By three months post-TKA, the patient had achieved 10–90° of right knee flexion, with no recurrence of her valgus deformity. The patient was allowed to do full weight bearing with the help of walker, and was trained to strengthen the quadriceps muscle. The patient also performed passive and active ROM exercise. Six months after surgery, the patient could walk normal with ROM ranged between 0° and 100°.

## DISCUSSION

Osteoarthritis, whether primary, post-traumatic, or secondary to avascular necrosis, osteochondritis, or sepsis, is by far the most common indication for TKA.<sup>6</sup> According to the 2011 American Academy of Orthopaedic Surgeons (AAOS), Evidence-Based Clinical Guidelines for the treatment of symptomatic hip or knee osteoarthritis, strong or moderately strong recommendations for non-operative treatment modalities include weight loss, physical activity, physical therapy programs, and NSAIDs and/or tramadol.<sup>7</sup> Other modalities that were not supported by moderate or strong evidence but are often considered reasonable alternative treatment

options include but are not limited to acupuncture, chondroitin supplementation, hyaluronic acid injections, corticosteroid injections, lateral wedge insoles, and offloading braces.<sup>8</sup>

Treatment designed for knee OA should aim to relieve pain, improve function, and limit disabilities. Knee OA treatment is usually driven by the patient's symptoms and the potential to improve quality of life. Nonoperative treatments of knee OA are often useful for patients with Kellgren and Lawrence Grades 1 to 3, which are "early" stages of OA. However, surgical treatments are generally needed to cure or ameliorate advanced stages of knee OA.<sup>9</sup>

The most common approaches for the standard primary TKA procedure include the medial parapatellar, midvastus and subvastus approaches. The medial parapatellar approach is commonly utilized and entails proximal dissection through a medial cuff of the quadriceps tendon to facilitate superior tissue quality closure at the conclusion of the procedure.<sup>10</sup> Distally, a meticulous, continuous medial subperiosteal dissection sleeve is performed while maintaining intimacy with the proximal tibial bone. The extent of dissection is often dictated by the anticipated amount of deformity to be corrected. In general, this medial release is aggressive in cases of severe varus deformity, and most minimal in cases of moderate to advanced valgus knee deformity. The medial meniscus is also resected with this sleeve of soft tissue.<sup>11</sup>

Alternatives to the standard medial parapatellar arthrotomy include the midvastus and subvastus approaches. The midvastus approach spares the quadriceps tendon.<sup>4-6</sup> Instead, the vastus medialis obliquus (VMO) muscle belly is dissected along a trajectory directed toward the superomedial aspect of the proximal pole of the patella. The subvastus approach also spares the quadriceps tendon and lifts the muscle belly of the VMO off the intermuscular septum. The subvastus approach preserves the vascularity of the patella and is cautioned as it can limit

exposure in particularly challenging cases or in particularly obese patients. However, the main surgical goals of TKA such as, to correct limb alignment, pre-serve joint line position, balance the soft tissues in the coronal plane, balance the flexion/extension gap in the sagittal plan, and create a Q angle that facilitates satisfactory patella tracking.<sup>3,5-9</sup>

There are few absolute contraindications for TKA, including an active infection in the joint and remote infection or bacteremia. Relative contraindications include a significant vascular disease that may lead to poor wound healing and increased risk for infection.<sup>3</sup> There is currently discussion and controversy in the literature about risk stratification and increased complications associated with obesity.<sup>8</sup> Patients with a BMI greater than 30 have an increased risk of infection and medical complications compared to non-obese patients.<sup>10,11</sup> This risk further increases for those with a BMI greater than 40. Patients with BMI over 40 were found to have a statistically significant increase in superficial infection, deep infection, operative time, deep vein thrombosis (DVT), length of stay, renal insufficiency, reoperation, and wound dehiscence.<sup>9,10</sup>

There are some complications of TKA, such as Periprosthetic fractures, Prosthetic Joint infection, aseptic loosening, and other.<sup>8-11</sup>

## CONCLUSION

Osteoarthritis remains the most common indication for total knee arthroplasty. Fortunately, technical developments in knee arthroplasty engineering, implant design, and material science will continue to improve bearing surface tribology, implant fixation, and implant longevity. Total knee arthroplasty is a frequently performed and successful operation. The complications though not common, are challenging to address and require early recognition and intervention with an appropriate referral to a dedicated arthroplasty surgeon with the requisite expertise for revision surgery



when necessary to obtain a favorable clinical outcome.

**Declaration by Authors**

**Ethical Approval:** Not Applicable

**Acknowledgement:** None

**Source of Funding:** None

**Conflict of Interest:** The authors declare no conflict of interest.

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How to cite this article: Ricky Renardi Pratama, Cokorda Gde Oka Dharmayuda, I Gusti Ngurah Wien Aryana et.al. Total knee arthroplasty in elderly patient: a case report and literature review. *Int J Health Sci Res*. 2022; 12(12):46-50.  
DOI: <https://doi.org/10.52403/ijhsr.20221207>

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