

A total Knee Replacement for a Valgus Deformity Angle Greater than 20°: A Case Report

Sakarie Mustafe Hidig^{1,2*} , Shuo Feng¹, Zhi Yang¹, Kaijin Guo¹

¹The Fourth Affiliated Hospital, Zhejiang University School of Medicine, Yiwu, Zhejiang Province, 322000, People's Republic of China.

²Department of Orthopedic Surgery, Affiliated Hospital of Xuzhou Medical University, Xuzhou, Jiangsu, 221002, People's Republic of China.

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Corresponding author:

Sakarie Mustafe Hidig

hidig2015@icloud.com

Abstract:

In the clinic, valgus knees are relatively infrequent. To achieve a balance between the soft tissue and bone and prevent nerve injury, treatments for valgus deviations >20° provide a surgical challenge. The implications of lower-limb valgus deformity greater than 20°, a unique condition, have not been thoroughly examined in many articles. We described a 66-year-old woman who had a severe, permanent valgus deformity in her right knee. The patient's right knee had a preoperative range of motion (ROM) of 30–95° of flexion and a 25° permanent valgus deformity.

Keywords: total knee arthroplasty, valgus deformity, Range of Motion, valgus osteotomy.

1. Introduction

Total knee arthroplasty (TKA) is used to treat knee valgus deformity, and its worldwide prevalence has been documented. 10% of patients requiring a primary TKA present with a valgus deformity (VD). In 2005, (Ranawat AS et al.,2005) described three grades of VD. Lower-limb valgus deformity exceeding 20° is a particular case, with few publications assessing the impact of the severity of the valgus. Valgus deformity in osteoarthritis, for this reason, is a challenge for the surgeon both for gap balancing and implant-constrained choice. Knee valgus deformities can be congenital or develop due to rheumatic disorders, osteoarthritis, post-traumatic arthritis, or an overcorrection after a valgus osteotomy. Joint surgeons, however, face a difficult task when trying to rectify valgus abnormalities greater than 20 degrees. Here, we present a case of severe valgus deformity in a 66-year-old female with a valgus deviation >95° who underwent successful TKA.



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2. Case report

A 66-year-old female with an atraumatic, progressive, painful deformity of her right knee for more than 10 years. The patient began to have knee joint pain more than 10 years ago without obvious triggers. When walking, the pain was relieved when resting, and the patient felt that the pain in the right knee was aggravated before 2 months, and he needed to pull crutches to walk, and the pain in the knee was obvious. The patient went to the outpatient clinic of our hospital one month ago to check the positive and lateral positions of her knees figure 1. There were degenerative changes in her knee joint. To seek further diagnosis and treatment, the patient came to our hospital. During the course of the disease, the patient's diet was good, and there is no fear of a significant change in weight shortly. The patient had a history of hypertension for more than 10 years; the highest hypertension was 170/112mm/day. She was taking metoprolol tartrate and enalapril maleate tablets to control her HTN. Six months ago, she suffered an ankle fracture due to a fall and was treated conservatively. There's no history of infectious diseases such as hepatitis and tuberculosis, and there's no history of chronic diabetes, epilepsy, surgery, blood transfusions, or substance allergies. On physical examination, the patient was found to be an alert, oriented female, However, she had significant pain in her right knee when she tried to walk. The right knee range of motion (ROM) was relatively painless but limited to 30-95° of flexion with a 25° (Grade III) fixed valgus deformity. The right knee had a considerable valgus deformity on X-ray, and a CT scan revealed several cystic foci beneath the surface of the knee joints as well as bone hyperplasia and osteophyte growth. Unevenly, the space between the knees shrunk. The patient consented to right complete knee replacement surgery. The author carried out the operation. We examined the right knee's significant valgus deformity before surgery. The lateral aspect was tight, as we discovered Figure 2.



Figure 1. Shows the Patient's clinical appearance (source: internal documentation).



Figure 2. A-Radiological imaging shows severe valgus deformity knee B-Shows Femoral head Angle C-shows femoral Canal (source: internal documentation).

An intraoperative tourniquet and general anesthetic were used during the patient's TKA Figure 3. A medial parapatellar approach was used. To remove the least amount of bone feasible, particularly from the lateral side, we first performed the tibial cut perpendicular to the anatomical axis. We attempted to reassess the tissue's balance after completing the bone cuts. It was discovered that the significant valgus deformity had caused a soft tissue imbalance. The ROM attained intraoperatively was 5-120° of flexion with no valgus deformity, as preoperative predictions of stiff lateral ligaments and loose medial ligaments had shown to be accurate. A component made of 6-mm-thick polyethylene was used to resurface the patella. This patient underwent TKA with a 4mm-5mm polyethylene insert using AK Medical Tibia 12mm A3,2.5 femoral C+, PS [posterior-cruciate substituting]. Postoperative X-ray was shown in Figure 4 From the skin incision to the wound.

closure, the procedure took two hours. 200 ml of blood was thought to have been lost. Following surgery, the patient had standard DVT prevention, a gradual, progressive active, and active-assisted ROM, and non-weight-bearing exercises for 5 weeks until clinical union. After a successful postoperative recovery, the patient was sent to a rehabilitation center to continue her therapy. After a week following surgery, she was able to walk on her own and started her rehabilitation, first within the home and then outside Figure 5.

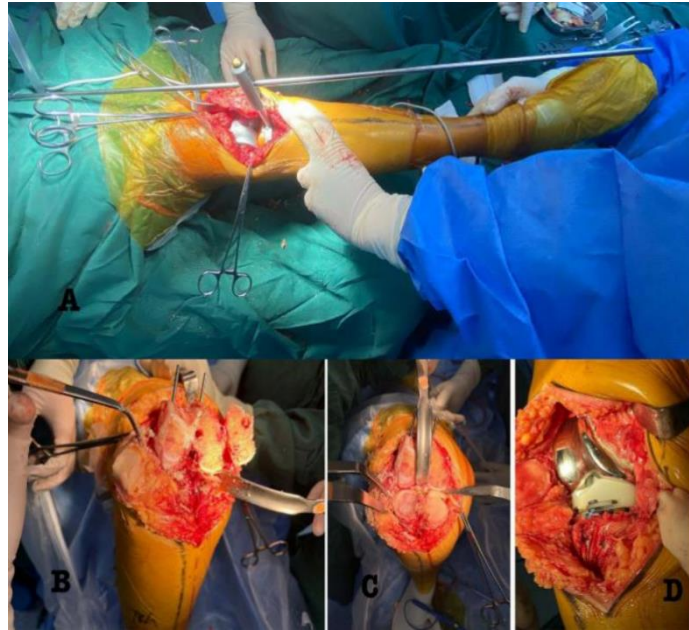


Figure 3. (a) shows the gap checking instrument (b-c) Medial Collateral Ligament (MCL) origin was shifted to superior and anterior (D) showing after we put the PS-12mm prosthesis (source: internal documentation)



Figure 4. (a-b) Radiological imaging shows post-surgery results (source: internal documentation).



Figure 5. Clinical appearance following the surgery; stable while walking (source: internal documentation)

3. Discussion

Orthopedic surgeons face a problem when doing a primary TKA for a valgus knee deformity greater than 20 degrees (Gehrke T et al.,2014) We describe our encounter with a 66-year-old woman who had a Grade III valgus knee in this article. The bone axis was adjusted, and the knee joint was stabilized, using a rotating hinge knee device. Only individuals with significant bone abnormalities or ligamentous instability, particularly elderly patients, should use hinged implants in primary TKA. A medial or lateral parapatellar approach can be used to perform TKA for valgus knee deformities. The lateral patellar incision is commonly used in mild-to-moderate valgus knee deformities to simply release the lateral structure. Given the position of the patella in the present case, the medial parapatellar approach was used. Injury to the peroneal nerve is a common complication of TKA. The Peroneal nerve injury is common when TKA is performed to correct valgus knee deformities, with an incidence of 2% to 3% (Nercessian OA et al.,2005). If necessary, more consideration should be given to tension, which could be reduced by removing the fibular head during the osteotomy of the nerves.

Healy et al. described using a bone block from the epicondyle to recess the MCL's origin. Although technically challenging and potentially detrimental to ligament strength and isometric, these procedures may be required to equalize joint gaps to produce a stable and long-lasting effect (W.L. Healy et al.,1998). We discovered that after using the polymethyl methacrylate bone cement in our situation, the medial section was unstable. We simply caused the medial settings to fail, so we added more bone cement to the gap to close it up. Every surgeon needs to know the loosening of bone cement is still a prominent factor in patients with severe valgus knee failure.

4. Conclusion

A total knee replacement is required to address the challenging surgical problem that the valgus knee presents. For the treatment of a $>20^\circ$ valgus deformity angle coupled with extensive bone abnormalities in the femur and tibia, we discovered that using the polymethyl methacrylate bone cement has some shortcomings and Surgeons should be aware of that, we used posterior-cruciate substitution (PS) TKA. Concerns have been raised about the prosthesis's lifespan. Long-term follow-ups with the patient still need to be done.

Conflicts of interest: The authors have no conflicts of interest to declare.

Ethical approval: Approval to publish case reports is waived by the institution.

Consent: Written informed consent was obtained from the patient for the publication of this case report and accompanying images.

Author's Contribution: Dr.Sakarie Mustafe Hidig conceived and designed this case report and wrote the initial draft of the report. All authors have read and approved the final version of the manuscript.

Data availability statement: Data that support the findings of the study are available from the corresponding author.

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