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CASE REPORT

Functional and radiological results of varus osteotomy of the femur for managing patients with genu valgus with a mature skeleton: A case report.

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Surgery

Abstract

Introduction: Varising osteotomies are an alternative for patients with symptomatic genu valgus who suffer from unicompartmental osteoarthritis. In this way, the load axis is transferred to the healthy medial compartment, reducing symptoms and delaying or preventing the need for arthroplasty.

Case report: According to the radiographic study, three patients were evaluated, and varicose osteotomy was performed using various types of plates.

Results: The patients achieved complete consolidation at 18 months of follow-up with functional results of their daily activities without subsequent complications and with immediate radiological results.

Conclusions: After performing varus osteotomy for valgus deformities, favorable results and improved functionality and stability in the affected knee were obtained. This procedure is an effective treatment for patients with symptomatic genu valgus.

Keywords:

Knee, Genu Valgum, Osteotomy.

Abbreviations

Not declared.

Supplementary information

No supplementary materials are declared.

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Author contributions

Hugo Ernesto Villarroel Rovere: Conceptualization, data curation, formal analysis, acquisition of funds, research, writing - original draft.
María Dolores Delgado Zambrano: Conceptualization, data curation, formal analysis, data analysis, writing – corrections.
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Introduction

Genu valgus is defined as a deficiency in the femorotibial (anatomical) axis beyond the physiological 6-8° of valgus and is characterized by a displacement of the mechanical axis toward the lateral compartment [1]. The physiological genu valgus occurs between 3 and 5 years of age; the alignment is present at 10 years of age and approaches the adult conformation. At 14 years of age, the knee acquires the axes it retains throughout life [2]. Among the possible etiologies are idiopathic, tumorous, degenerative, congenital, infectious, endocrine, neurological, myopathic, metabolic, and traumatic [3].

Varising osteotomies are an alternative in patients with symptomatic genu valgus who suffer from unicompartmental osteoarthritis. In this way, the weight-bearing axis is shifted to the healthy medial compartment, reducing symptoms and delaying or preventing the need for arthroplasty [4– 6]. Distal femoral osteotomies were proposed in 1973 when the femorotibial axis is greater than 12° or when the plane of the joint deviates from the horizontal more than 10° [7 - 9].

This study aimed to demonstrate the functional and radiological results of correcting genu valgus through varus osteotomy in distal femur patients with a mature skeleton.

Case report

Patient 1

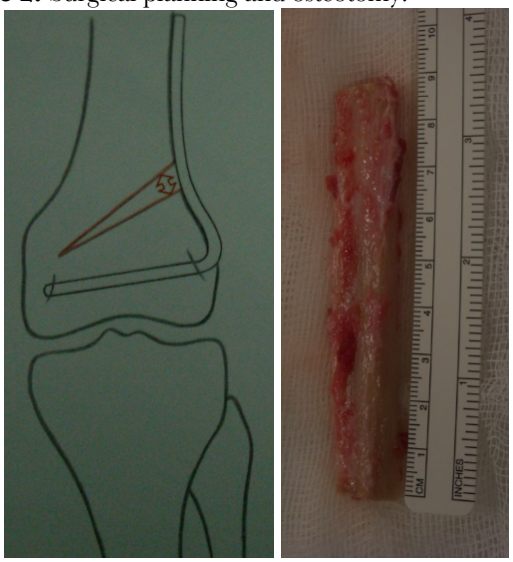
A 51-year-old woman experienced 8 years of joint pain after right knee trauma, and the first diagnosis was medial meniscopathy. Six months prior, arthroscopy was performed, and the patient remained in a knee brace for 3 weeks without clinical improvement. Subsequently, the knee deviated to a valgus of 15 degrees with lateral joint pain, painful flexion of 100°, and extension of 0° (Figure 1).

Figure 1 . Physical examination of the right knee.



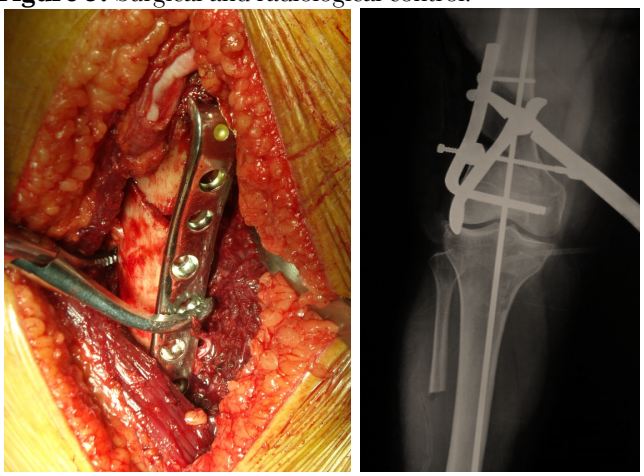
Left: Physical examination of the right knee showing a valgus deformity. Right: X-ray with a measurement angle of 15 degrees.

Figure 2. Surgical planning and osteotomy.



Left: Surgical planning for osteotomy with plate placement. Right: bone graft.

Figure 3. Surgical and radiological control.



Left: Plate placement. Right: Intraoperative radiological control image.

Treatment

An opening varicose osteotomy was performed in the right femur, followed by fixation with a 90-degree condylar plate with a bone graft from the right fibula and tibia (Figure 2 and Figure 3).

Results

The immediate postsurgical control has an angle measurement with 6 degrees of valgus (Figure 4).

Figure 4. Postoperative radiological control.

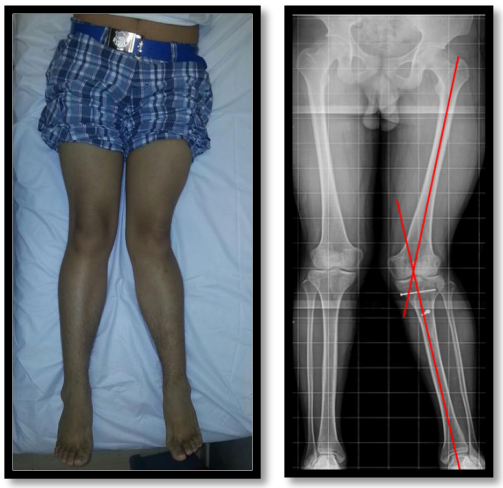


Immediate postsurgical control. I'm worth 6 degrees.

Patient 2

A 17-year-old man with a history of tibial plateau fracture 4 years prior was treated with osteosynthesis with screws. He presented with valgus deformity, accompanied by shortening and internal rotation of the limb during walking (Figure 5).

Figure 5. Physical examination of the left knee.

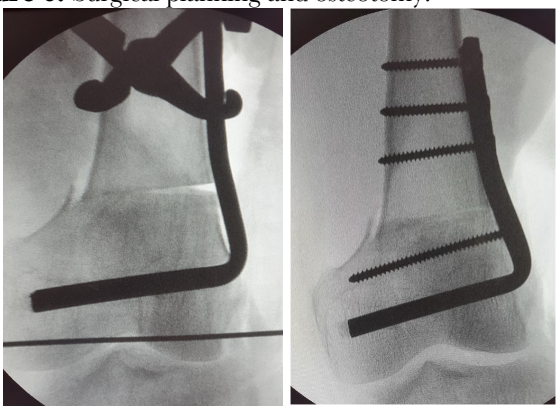


Left: Physical examination of the left knee showing a 20-degree valgus deformity. Right: Telemetry showing a shortening of 1.7 cm.

Treatment

Femoral supracondylar osteotomy was performed using a 95°-angled plate with the application of axial compression (Figure 6, Figure 7, Figure 8).

Figure 6. Surgical planning and osteotomy.



Left: osteotomy. Right: Fixation with a 95-degree angled plate.

Figure 7. Radiological control.



Left: Immediate postsurgical control anteroposterior view. Right: Radiological control lateral view.

Figure 8. Radiological control.

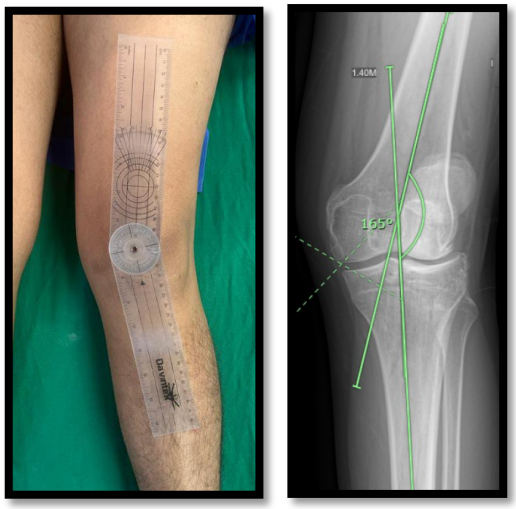


Left: Presurgical telemetry 20 degrees. Right: Postsurgical telemetry at 10 degrees Valgus.

Patient 3

A 31-year-old male patient with a surgical history of left knee arthroscopy 8 years ago (2015), with clinical symptoms for 3 years, presented with pain in the external compartment of the knee associated with valgus deformity, which is currently very intense pain on the VAS. 8/10, when walking 100 meters, the physical examination revealed a 15° valgus deformity; imaging studies reported an alteration of the femorotibial axis of 12 degrees of valgus in addition to signs of osteoarthritis in the external compartment, with degenerative meniscal lesions (Figure 9).

Figure 9. Physical examination of the left knee.

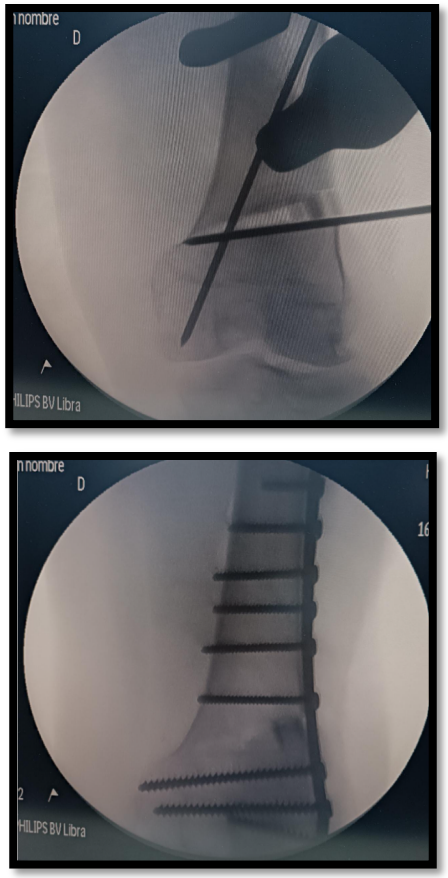


Left: Physical examination of the left knee showing a 15-degree valgus deformity. Right: Knee X-ray with measurement angle.

Treatment

The treatment of choice by the patient's clinic was varus osteotomy of the left distal femur + fixation with a DCP plate + autologous bone graft (fibula) + bench bone graft (femoral head) (Figure 10, Figure 11).

Figure 10. Osteotomy surgery.



Above: distal femur osteotomy. Below: Bone graft placement.

Figure 11. Postoperative radiological control.



Left: Immediate postsurgical control of varicose osteotomy in the genu valgum, anteroposterior view. Right: Radiological control lateral view.

Discussion

Patients who returned for follow-up after 7 and 15 days reported improvement in pain at the surgical site, after which weight-bearing was progressively authorized in subsequent check-ups. At the time of the last follow-up, they showed evident clinical improvement, with mild pain in the affected knee; they walked with a full load without limping when walking. We also viewed a control X-ray, which shows the stability of the implant and osteotomy in consolidation according to the respective evolution time. This evidence showed that after performing the varicose osteotomy in all the patients, the genu valgum was corrected, with a decrease of 90%, which is within physiological ranges.

García et al., in 2011, reported the case of a 15-year-old male patient with a history of trauma 2 years earlier, with valgus of 19° and shortening of 2 cm who underwent surgical treatment based on open wedge osteotomy, taking into account not only valgus motion but also knee shortening. An osteotomy was performed, which was fixed with a condylar blade. A long plaster splint was placed, and isometric quadriceps exercises were indicated from the first day, where it was corrected to 8° of valgus and shortening of 0.4 cm, with a follow-up of 16 months, a period in which there were no complications [10].

In 2013, Dewilde et al. reported that 19 patients were treated with open osteotomy with a Puddu plate combined with calcium phosphate injection into the defect, in which the valgus was corrected, and with a 7-year follow-up in which successful survival was demonstrated in 82% of patients. of the population, indicating that it is an equivalent treatment option compared to other surgical techniques [11].

In 2004, Wagnera performed supracondylar osteotomy to correct valgus deformity in 31 patients (mean age 58 years (36-80)) treated with a 90 G lamino plate. After a 14-year follow-up, a clear improvement was observed. In 29 patients, total knee arthroplasty was necessary in the medium term [12].

Among the different surgical techniques used, medial subtractive or lateral additive osteotomy, there is no consensus in the literature regarding which technique yields better results. Medial osteotomy has the advantages of greater stability and a lower rate of nonunion. Lateral osteotomy requires a longer consolidation time, has less stability, and has the possibility of intraoperatively correcting the axis by modifying the size of the opening wedge [3, 13, 14].

Both procedures are technically demanding. Complications associated with this procedure include joint stiffness, nonunion, implant failure, and discomfort at the plate level, among others. The percentages of complications in the different published series are very varied due to the different techniques used and even the modifications that have occurred over time. Compared to our study in which lateral osteotomy was used, there were no complications or cases of complete consolidation at 18 months.

Studies have demonstrated the variety of treatments for the correction of valgus deformity. In all types of treatment, favorable results and improvements in functionality and stability in the affected knee were obtained. Similarly, in our study, favorable results were obtained at 18 months, which is the estimated time range for visualizing favorable results according to what has been reported in different publications. The usefulness of this technique for the correction of misalignment, its low complication rate, and its good clinical results make distal femoral opening varus osteotomy an effective treatment for patients with symptomatic genu valgus.

Conclusions

After performing varus osteotomy for valgus deformities, favorable results were obtained, and the functionality and stability of the affected knee improved. This procedure is an effective treatment for patients with symptomatic genu valgus.

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Statements

Ethics committee approval and consent to participate

Not required for observational studies.

Publication consent

Not required for not publishing images, X-rays, or patient figures.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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