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ORIGINAL ARTICLE

Treatment of moderate and severe hallux valgus by performing percutaneous double osteotomy of the first metatarsal bone[☆]



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KEYWORDS

Severe hallux valgus;
Percutaneous surgery;
Minimally invasive surgery;
Double osteotomy;
Reverdin-Isham osteotomy

Abstract

Objective: To evaluate the clinical and radiological results in the surgical treatment of moderate and severe hallux valgus by performing percutaneous double osteotomy.

Materials and methods: A retrospective study was conducted on 45 feet of 42 patients diagnosed with moderate–severe hallux valgus, operated on in a single center and by the same surgeon from May 2009 to March 2013. Two patients were lost to follow-up. Clinical and radiological results were recorded.

Results: An improvement from 48.14 ± 4.79 points to 91.28 ± 8.73 points was registered using the American Orthopedic Foot and Ankle Society (AOFAS) scale. A radiological decrease from 16.88 ± 2.01 to 8.18 ± 3.23 was observed in the intermetatarsal angle, and from 40.02 ± 6.50 to 10.51 ± 6.55 in hallux valgus angle. There was one case of hallux varus, one case of non-union, a regional pain syndrome type I, an infection that resolved with antibiotics, and a case of loosening of the osteosynthesis that required an open surgical refixation.

Discussion: Percutaneous distal osteotomy of the first metatarsal, when performed as an isolated procedure, shows limitations when dealing with cases of moderate and severe hallux valgus. The described technique adds the advantages of minimally invasive surgery by expanding applications to severe deformities.

Conclusions: Percutaneous double osteotomy is a reproducible technique for correcting severe deformities, with good clinical and radiological results with a complication rate similar to other techniques with the advantages of shorter surgical times and less soft tissue damage.

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PALABRAS CLAVE

Hallux valgus severo;
Cirugía percutánea;
Cirugía mínimamente
invasiva;
Doble osteotomía;
Osteotomía de
Reverdin-Isham

Tratamiento del hallux valgus moderado y severo mediante doble osteotomía percutánea del primer metatarsiano

Resumen

Objetivo: Evaluar los resultados clínicos y radiológicos en el tratamiento del hallux valgus moderado y grave mediante la realización de una doble osteotomía percutánea.

Material y métodos: Se presenta un estudio retrospectivo de 45 pies intervenidos en 42 pacientes diagnosticados de hallux valgus moderado-severo, operados en un solo centro y por el mismo cirujano entre mayo del 2009 y marzo del 2013. Dos pacientes no acudieron a los controles posquirúrgicos. Se registraron los resultados clínicos y radiológicos.

Resultados: Según la escala de la American Orthopedic Foot and Ankle Society (AOFAS) se obtuvo una mejoría de la puntuación de $48,14 \pm 4,79$ puntos a $91,28 \pm 8,73$ puntos. Radiográficamente se obtuvo una disminución en el AIM de $16,88 \pm 2,01$ a $8,18 \pm 3,23$ y en el AHV de $40,02 \pm 6,50$ a $10,51 \pm 6,55$. Hubo un caso de hallux varus, un caso de pseudoartrosis, un síndrome doloroso regional complejo tipo I, una infección que se resolvió con antibióticos y un caso de movilización de la osteosíntesis usada que requirió reintervención abierta.

Discusión: Las osteotomías percutáneas distales aisladas del primer metatarsiano muestran limitaciones a la hora de enfrentarse a casos de hallux valgus moderado y severo. La técnica descrita añade las ventajas de la cirugía mínimamente invasiva, ampliando las indicaciones a deformidades severas.

Conclusiones: La doble osteotomía percutánea es una técnica reproducible que permite la corrección de deformidades severas con buenos resultados clínicos y radiológicos y con una tasa de complicaciones similares a otras técnicas, con tiempos operatorios más cortos y menor daño de partes blandas.

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Introduction

Elective *hallux valgus* surgery is indicated in patients reporting pain due to deformity or difficulty to use normal footwear in specific cases. Among the scope of existing techniques to treat *hallux valgus*, are those considered as minimal-incision or percutaneous techniques.^{1–14} These techniques are increasingly demanded by patients themselves as their popularity increases, largely due to the esthetic advantage of smaller incisions compared to open techniques.⁴ However, in addition to the advantages associated with percutaneous surgery, we must also take into account the complications and limitations inherent to their use.^{15,16} The isolated use of distal osteotomies may not be enough for the treatment of moderate or severe *hallux valgus* associated to intermetatarsal angles over $16\text{--}18^\circ$ between the first and second metatarsals.^{3,17} Isolated proximal osteotomies can worsen the distal joint angle of the first metatarsal (distal metatarsal articular angle [DMAA] or proximal articular set angle [PASA]) and increase the risk of elevation and shortening of the first metatarsal.¹⁸ The use of combined percutaneous proximal and distal osteotomies increases the surgical indications, enabling their use to correct a large range of angulations.^{3,18} The advantages of percutaneous surgery would be: a shorter surgery time, reduced tissue dissection, no use of permanent fixation material and a shorter scarring period.⁴

The purpose of this study is to show that double percutaneous osteotomy can be a reproducible and effective

technique for the treatment of moderate to severe *hallux valgus*.

Materials and methods

We operated on 44 *hallux valgus* in 41 patients during the period between 1st May 2009 and 27th March 2013. We included deformities considered from moderate to severe, that is, with a *hallux valgus* angle (HVA) of 30° and an intermetatarsal angle (IMA) of 14° between the first and second metatarsals, according to the classification of Mann and Coughlin.¹⁹ The respective upper limit intervened recorded in this study was an IMA of 20° and an HVA of 58° . We lost 2 cases who did not attend follow-up controls.

We excluded from the study all those cases of *hallux valgus* considered as mild, which according to our algorithm were treated through isolated distal osteotomies, patients with previous Keller–Brandes type interventions, arthrosis of the first metatarsophalangeal joint, as well as the 2 patients mentioned who did not attend review in outpatient consultation.

The indication for surgery was only established in patients who reported pain and significant involvement for leisure and daily living activities.

We operated on a total of 36 females and 5 males, with a mean age of 61 years at the time of the intervention (range: 20–75 years). Of these, 3 patients underwent bilateral interventions in deferred procedures. Patients were referred to our unit after having received conservative treatment with modification of footwear, orthosis, etc., with

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