



# Revista Española de Podología

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## UPDATE

## The Weil osteotomy: A comprehensive review

Javier Pascual Huerta<sup>a,\*</sup>, Carlos Arcas Lorente<sup>b</sup>, Francisco Javier García Carmona<sup>c</sup>

<sup>a</sup> *Práctica Privada, Clínica del Pie Elcano, Barakaldo, Vizcaya, Spain*

<sup>b</sup> *Práctica Privada, Clínica del Pie Embajadores, Madrid, Spain*

<sup>c</sup> *Universidad Complutense de Madrid, Madrid, Spain*

Received 19 September 2017; accepted 10 October 2017

### KEYWORDS

Weil osteotomy;  
Three step Weil osteotomy;  
Forefoot surgery;  
Forefoot reconstruction;  
Metatarsalgia;  
Forefoot longitudinal decompression;  
Podiatric surgery

### PALABRAS CLAVE

Osteotomía de Weil;  
Osteotomía de Weil triple;  
Cirugía de antepié;  
Reconstrucción quirúrgica de antepié;  
Metatarsalgia;  
Descompresión longitudinal de antepié;  
Cirugía podológica

**Abstract** The Weil osteotomy is a common technique used in the treatment of lesser metatarsal deformities of the forefoot. In the last years a large amount of papers have been published showing its effectiveness and the complication rates of the Weil-type osteotomy. Although most of studies have shown an effectiveness in pain reduction close to 80–90%, complication rates are also relatively large in some reports. The present paper is intended to review clinical, radiological and cadaveric studies of the Weil osteotomy in an attempt to make a comprehensive review for the reader regarding all aspects of this common used technique.

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### La osteotomía de Weil: una revisión comprensiva

**Resumen** La osteotomía de Weil es una técnica quirúrgica comúnmente utilizada para el tratamiento de las alteraciones de los metatarsianos menores en el antepié. En los últimos años se han publicado una gran cantidad de artículos acerca de esta técnica valorando su efectividad y sus posibles complicaciones. Sin embargo, a pesar de que los estudios clínicos han mostrado una efectividad en la reducción del dolor en entre el 80-90% de los pacientes, el índice de complicaciones reportados es relativamente alto en algunas series. El presente artículo revisa los artículos clínicos, radiológicos y de laboratorio o cadavéricos que se han realizado sobre esta

DOI of original article: <http://dx.doi.org/10.1016/j.repod.2017.10.002>

\* Corresponding author.

E-mail address: [javier.pascual@hotmail.com](mailto:javier.pascual@hotmail.com) (J. Pascual Huerta).

<https://doi.org/10.1016/j.repod.2017.10.003>

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Please cite this article in press as: Pascual Huerta J, et al. The Weil osteotomy: A comprehensive review. Rev Esp Podol. 2017. <https://doi.org/10.1016/j.repod.2017.10.003>

técnica para que el lector pueda entender de forma coherente todos los aspectos relacionados con la osteotomía de Weil, especialmente sus indicaciones, efectos mecánicos, modificaciones, posibles complicaciones y resultados de los estudios clínicos.

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## Introduction and historic perspective

Surgical treatment of lesser metatarsals has been an ill-defined issue of foot and ankle surgery for decades. Historically, more than 25 different procedures have been described in the literature for the treatment of lesser metatarsals including so different procedures such as plantar condylectomies, osteoclasts, distal shortening osteotomies, distal dorsiflexory osteotomies, metatarsal enclavement ("peg in hole"), proximal dorsiflexory osteotomies, colectomies and, finally, partial or complete metatarsal head resections.<sup>1</sup> Lesser metatarsal surgery, by means of metatarsal osteotomies, was historically associated with poor results during years. Most of these techniques were based in the execution of one or more highly unstable metatarsal osteotomies without fixation followed by immediate weightbearing and whose results in the elevation or shortening of the metatarsal heads were often unpredictable.

However, the Weil osteotomy has achieved great popularity in the surgical treatment of the lesser rays during the last years. Although there are no formal publications in the literature about the beginning of the technique, it was Lowell Scott Weil, a podiatrist from Chicago, who first performed the technique in a real patient in 1985.<sup>2</sup> The osteotomy was initially thought as a cut in the lesser metatarsal, parallel to the weightbearing surface which allows an exact amount of shortening of the metatarsal (Fig. 1). Louis Samuel Barouk, a French orthopedic surgeon settled in Bourdeaux, met LS Weil in a congress in Chicago where they shared experiences and it was then when Weil talked to Barouk about this

technique. In 1992, LS Weil was invited by Barouk to a meeting in Bourdeaux about the Scarf osteotomy and in a live surgery case during the meeting, LS Weil performed the osteotomy in Europe for the first time.<sup>3</sup> Since then, Barouk hold this technique with enthusiasm and carried it out systematically in his patients. The first formal publication of the technique was published by Barouk in the German journal *Orthopade*.<sup>4</sup> From this publication and from the books written by Barouk about forefoot reconstruction,<sup>3,5</sup> the technique was popularized in Europe and nowadays, it is the technique with most papers published in this field, mainly in the orthopedic literature.

It is the opinion of the authors of this review that the technique has inherent advantages that have speed up its dissemination. On one hand, the osteotomy is technically easy to perform and do not have a long learning curve. Several of the metatarsal osteotomies described in the literature were technically complex and frequently the surgery failed because of technical problems of the technique. On the other hand, Weil osteotomy produces a predictable and programmed shortening of the metatarsal being at the same time so stable, that allow immediate weightbearing. This immediate weightbearing helps to compress of the osteotomy and do not distract it. For the first time, surgeons could apply a precise and predictable shortening of the metatarsal with immediate weightbearing avoiding associated problems of distraction of the osteotomy that could dorsiflex or shorten the metatarsal head in an uncontrolled fashion. This aspect avoided the main problem for foot and ankle surgeons in metatarsal correction which was the loss of control of the shortening or elevation of a metatarsal under immediate weightbearing.<sup>6</sup> Mainly for these reasons, the osteotomy is nowadays the most common technique applied for the treatment of lesser metatarsals around the world.

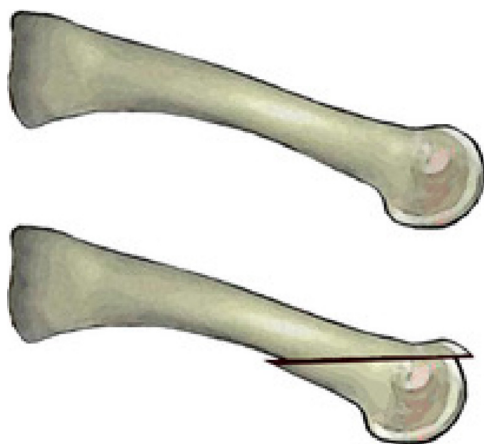


Figure 1 Weil osteotomy.

## The technique and its indications

Weil osteotomy is designed to make a controlled shortening of the length of the metatarsal in the transverse plane and its main indication is referred to an excessively long metatarsal with an abnormal metatarsal parabola.<sup>7</sup> However, in the last years the indications of the technique have been "expanded", being used for the treatment of digital deformities associated to metatarsophalangeal joint subluxation or luxation<sup>3,5</sup> and for transverse plane deformities of the digits.<sup>8,9</sup> These indications are associated to the indirect relaxation that the osteotomy produces in the soft tissues which improves the digital contracture. At the same time, Ernesto Maceira, a Spanish orthopedic surgeon, has used

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