Evans Osteotomy with
Wedge Locking Plates
for Stage II B Flatfoot

Daniel Villena, MD; Ana Cecilia Parise, MD; María Gala Santini Araujo, MD; Leonardo Conti, MD; Pablo Sotelano, MD; Marina Carrasco, MD.

Foot and Ankle Service
Orthopaedic Surgery Department
“Carlos E. Ottolenghi”

HOSPITAL ITALIANO
Buenos Aires - Argentina
Disclosure

Dr Marina Carrasco Arthrex Consultant
Dr Pablo Sotelano Arthrex Consultant

The other authors do not have any potential conflicts with these presentation
Evans Osteotomy with Wedge Locking Plates for Stage II B Flatfoot

Introduction

Lateral Column Lengthening is indicated in patients with a flexible deformity Stage 2B of Flatfoot.

Evans osteotomy is maintained by different kind of devices in different publications: bone graft, wedge locking plates (WLP) or PEEK devices.
Evans Osteotomy with Wedge Locking Plates for Stage II B Flatfoot

Introduction

The main purpose of this study is to evaluate the radiological results of patients with Evans osteotomy with wedge locking plate without bone graft at 1 year postoperative (PO).

We also evaluate the persistence of the correction obtained between the 3rd month and 1st year PO and functional outcomes with the AOFAS score.
Evans Osteotomy with Wedge Locking Plates for Stage II B Flatfoot

Methods

Retrospective study, case series

Between March 2011 and March 2014

One surgeon

Inclusion Criteria: patients with type 2B Flatfoot submitted to external column lengthening, with WLP (6-10 mm), without bone grafting, with a minimum follow-up of 1 year.

Exclusion Criteria: revision surgery or neurological sequelae.
Evans Osteotomy with Wedge Locking Plates for Stage II B Flatfoot

Methods

Data collection from clinical records and radiological measurements was performed.

Calcaneal Pitch Angle
Talar First Metatarsal Angle
Medial Column Height
Lateral Column Length

Talonavicular coverage Angle
Talar First Metatarsal Angle
Evans Osteotomy with Wedge Locking Plates for Stage II B Flatfoot

Results

<table>
<thead>
<tr>
<th>12 Patients, 14 Foot</th>
<th>n = 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD), years</td>
<td>50.8 (17.8)</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>11 (78.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONSOLIDATION</th>
<th>3 Months (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOFAS</td>
<td>PREOP</td>
</tr>
<tr>
<td>AOFAS</td>
<td>54 (SD: 1.85)</td>
</tr>
</tbody>
</table>

One Way Repeated Measures ANOVA Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Preoperative</th>
<th>3rd month</th>
<th>12th month</th>
<th>p Value</th>
<th>Post Hoc **</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcaneal Pitch Angle, mean (SD), grades</td>
<td>12.52 (2.9)</td>
<td>23 (6.8)</td>
<td>22.4 (5.4)</td>
<td>&lt;0.001</td>
<td>Preop &lt; 3m, 12m</td>
</tr>
<tr>
<td>Lateral Talar First Metatarsal Angle, median (IQR), grades</td>
<td>16.2 (12.1 - 21.2)</td>
<td>2.0 (0 - 8.6)</td>
<td>5.9 (0 - 7.7)</td>
<td>&lt;0.001 *</td>
<td>Preop &gt; 3m, 12m</td>
</tr>
<tr>
<td>AP Talar First Metatarsal Angle, mean (SD), grades</td>
<td>24.0 (10.3)</td>
<td>4.0 (2.9)</td>
<td>5.0 (4.2)</td>
<td>&lt;0.001</td>
<td>Preop &gt; 3m, 12m</td>
</tr>
<tr>
<td>Medial Column Height, mean (SD), cm</td>
<td>12.2 (4.1)</td>
<td>20.6 (4.0)</td>
<td>19.2 (4.0)</td>
<td>&lt;0.001</td>
<td>Preop &lt; 3m, 12m</td>
</tr>
<tr>
<td>Talonavicular Coverage Angle, median (IQR), grades</td>
<td>23.6 (15.9 - 41.4)</td>
<td>3.0 (1.9 - 7.5)</td>
<td>5.6 (2.2 - 9.3)</td>
<td>&lt;0.001 *</td>
<td>Preop &gt; 3m, 12m</td>
</tr>
<tr>
<td>Lateral Column Length, mean (SD), cm</td>
<td>162.3 (9.7)</td>
<td>164 (10.2)</td>
<td>162.4 (9.5)</td>
<td>0.63</td>
<td></td>
</tr>
</tbody>
</table>

Notes: (*) Friedman Test y Wilcoxon Test with Bonferroni correction. (**) p < 0.05 Bonferroni corrections for multiple comparisons.

<table>
<thead>
<tr>
<th>COMPLICACIONES</th>
<th>EARLY</th>
<th>LATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Superficial Infections</td>
<td>1 Wound Dehiscence</td>
<td>1 Asymptomatic Calcaneocuboid Joint Arthritis</td>
</tr>
</tbody>
</table>
Evans Osteotomy with Wedge Locking Plates for Stage II B Flatfoot

Results

![Graph showing the comparison of various angles and lengths before and after surgery.](image-url)

- **Angle**
  - Calcaneal Pitch Angle
  - Lateral Talar First Metatarsal Angle
  - AP Talar First Metatarsal Angle
  - Talonavicular Coverage Angle

- **Lateral Column Length**
  - Preop
  - 3rd Month
  - 12th Month

- **Medial Column Height**
  - Preop
  - 3rd Month
  - 12th Month
Evans Osteotomy with Wedge Locking Plates for Stage II B Flatfoot

Results

Preoperative
Evans Osteotomy with Wedge Locking Plates for Stage II B Flatfoot

Results

Postoperative
Evans osteotomy with Wedge Locking Plates for Stage II B Flatfoot

Conclusion

Evans osteotomy provides a reproducible and reliable method to restore the normal functional stability of the midfoot and hindfoot in Stage II B Flatfoot; in addition to other procedures: like medial slide calcaneal osteotomy or the transfer of the tendon of flexor digitorum longus.

According to our results, we can conclude that the WLP preserve the corrections obtained with Evans osteotomy in patients with type IIB flat foot without graft at 3rd month and at the 1st year PO. Although the lateral column length did not improve, the other measurements did.

We avoid the comorbidities by a second approach to the grafting, as well as, the complications that could happen with the use of allografts.

It is a small case series study. Further research is needed.
Evans Osteotomy with Wedge Locking Plates for Stage II B Flatfoot

References


8. Jiang Xia, PhD, Peng Zhang, MD2, Yun-Feng Yang, PhD, Jia-Qian Zhou, MD, Qian-Ming Li, MD, and Guang-Rong Yu, MD. Biomechanical Analysis of the Calcaneocuboid Joint Pressure After Sequential Lengthening of the Lateral Column. Foot & Ankle International 34(2) 261–266. 2013.


