Effect of distal lineal metatarsal osteotomy on the treatment to the severe hallux valgus

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My disclosure is in the Final AOFAS Mobile App.
I have no potential conflicts with this presentation.
Minimally Invasive Surgery (MIS) to hallux valgus

Satisfactory results were obtained in the patients with mild to moderate hallux valgus without medial capsular plication\(^1\)-\(^4\). Effect of MIS on the severe HV treatment has not been elucidated.
**DLMO** (Since 2002\(^5\) )

(Distal Lineal Metatarsal Osteotomy)

- Modified Bosch procedure
- With mini-incision
- 2.0 mm K-wire inserted before osteotomy
- Supra-periosteal osteotomy
- Ambulation (on the heel) permitted immediately after DLMO
- K-wire removed at 3-4 weeks postop.
- Normal walking at 6-8 weeks postop.

Without medial capsular plication

Postop. 0D 3M 1Y
Indication of DLMO

2002-

• Symptomatic hallux valgus
• Failed previous conservative treatment for at least 3mos
• Reducible mild to severe hallux valgus

2010-

• Severe hallux valgus with contracted lateral soft tissue accompanied by minimum lateral release, by manual or with a mini-incision (judged with Squeeze test; see below)

No medial capsular plication even in severe hallux valgus

Squeeze Test: When the 1st and 5th metatarsoal heads are compressed,

HV disappears
No Need
Lateral Release

HV remains
Need
Lateral Release

By manual or With a mini-incision
Purpose

• To clarify the effect of DLMO to severe HV
• To consider whether medial capsular plication is an essential procedure for HV treatment

Materials

• Patients with severe hallux valgus (HVA ≥ 40)
• DLMO was performed (2005-)
  – Follow-up: over 12 mos (12-36mos, mean 14.5)
  – 164 feet (37.1% of 442)
  – Sex: female; 161 feet, male; 3
  – Age at the surgery: 22-82 yrs (mean: 57)
  – Lateral release: with 68 feet (41.5%) without 96 (58.5)
Methods

- Radiological evaluation pre- and post-operatively through weight bearing AP view of the foot
  - Hallux valgus angle (HVA)
  - Intermetatarsal angle (IMA)
  - Type of shape of the lateral edge of the 1st metatarsal head
    (Postoperative *positive round sigh* is a risk factor for HV recurrence\(^6\))

- Postoperative complications
  - Nonunion
  - Infection
  - Recurrence of hallux valgus (HVA \(\geq 20\) degrees)
  - Malunion with dorsal angulation over 10 degrees
  - Collapse of the metatarsal head
  - Complete deviation of the distal fragment to the proximal
## Result-1

<table>
<thead>
<tr>
<th></th>
<th>Pre-operative</th>
<th>Post-operative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HVA</strong></td>
<td>45.4±5.3 (40-70)</td>
<td>11.5±10.2 (-22 to 37)</td>
</tr>
<tr>
<td><strong>IMA</strong></td>
<td>18.6±2.9 (13-27)</td>
<td>7.7±4.1 (-1 to 18)</td>
</tr>
<tr>
<td><strong>Type of shape of 1st metatarsal head</strong></td>
<td>Angular 3.0% Intermediate 16.5 Round 80.5</td>
<td>Angular 90.9% Intermediate 6.7 Round 2.4</td>
</tr>
</tbody>
</table>
## Result-2

### Summary of complications

<table>
<thead>
<tr>
<th>Complications</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=164</td>
<td></td>
</tr>
<tr>
<td>Nonunion</td>
<td>0</td>
</tr>
<tr>
<td>Deep infection</td>
<td>0</td>
</tr>
<tr>
<td>superficial infection</td>
<td>1.2</td>
</tr>
<tr>
<td>Recurrence (HVA ≥ 20)</td>
<td>18.9</td>
</tr>
<tr>
<td>Malunion with dorsal angulation (≥10)</td>
<td>7.3</td>
</tr>
<tr>
<td>Collapse of the head</td>
<td>3.0</td>
</tr>
<tr>
<td>Dislocation of the distal fragment</td>
<td>11.6</td>
</tr>
</tbody>
</table>
Recurrence of hallux valgus (HVA ≥ 20): 18.9%
(31 of 164 feet)

Preoperative HVA:
- 40-49: 17.6% (23 of 131 feet)
- 50-70: 24.2% (8 of 33 feet)

Insufficient correction of IMA
Collapse of the metatarsal head
3.0% (5 of 164 feet)

Lateral dislocation
of the distal fragment
11.6% (19 of 164 feet)

Medial edge collapse

No central collapse, even if lateral release was performed

Postop. 0D

1Y
Discussion

**DLMO to severe HV**

- HV recurrence: **18.9%** in severe HV without medial capsular plication but with minimum lateral release if necessary
- Superior to reduce rotational deformity of the big toe with *negative round sign*

With **MIS** technique, *medial capsular plication is not necessarily essential* even in the surgery to **severe** hallux valgus

*Cf. Ianno B et al 3)*
- Minimally invasive metatarsal distal osteotomy applied to mild to severe HV
- No lateral release
- Severe HV: 20% (17 of 85 feet)
- Recurrence HV: 18.8% in total, **52.9%** in severe HV
The results obtained in the present study indicate that the medial capsular plication is not necessarily essential even in the surgery to severe hallux valgus.

This effect of *DLMO* has to be reconsidered in the longer follow-up studies.

**References**


