Which surgical method is more effective in the fifth metatarsal base fracture?

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Disclosure

NO CONFLICT TO DISCLOSE

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Our disclosures are in the Final AOFAS Mobile App.
We have no potential conflicts with this presentation
Fifth metatarsal base fracture is the most common in the metatarsal fracture, and classified according to three anatomical zones.

Which surgical method is more effective in the fifth metatarsal base fracture?
Which surgical method is more effective in the fifth metatarsal base fracture?

# Current treatments

- Zone 1 and 2 fractures has serious risks of delayed union, non-union, and a long period of Rehabilitation

- **Surgical management**
  - Screw fixation
  - Tension band wiring
  - Kirchner wires and plating

To our knowledge, no comparison study of each technique.
Which surgical method is more effective in the fifth metatarsal base fracture?

# Our methods

- We`re used to two techniques, screw and plate, for operative treatment in 5th metatarsal base fracture, zone 1.

3.0mm Headless cannulated screw
(Osteomed, Addison, Tx, USA)

VS

Locking compression distal ulna hook plate
(Synthes, Oberdorf, Switzerland)
To evaluate and compare the clinical and radiological results of internal fixation with headless cannulated screw and locking compression distal ulna hook plate for the fracture at the base of fifth metatarsal bone, Zone 1.

# Purpose

Which surgical method is more effective in the fifth metatarsal base fracture?
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### Materials

- From April 2012 to April 2015
- 29 patients
- Zone 1 fracture, which were displaced ≥ 2mm or involved ≥ 30% of CM joint (1 operator)
- The mean follow-up period: 13 months (range, 12 to 15 months)

**Group A**

- (n=15; 6 males and 9 females; mean age, 47 years, 21 to 70)
- Headless cannulated screw

**Group B**

- (n=15; 5 males and 10 females; mean age, 50 years, 21 to 77)
- Locking compression distal ulna hook plate

- The displacement defined as the distance between the fracture margins seen on a standard oblique radiographic view of the foot
Which surgical method is more effective in the fifth metatarsal base fracture?

# Methods

✓ Evaluation clinically and radiographically
  
  (at 2, 4, and 6 weeks, and monthly thereafter)

✓ Assessment: time to union, functional outcome (AOFAS midfoot), complications

✓ Recording preop. displacement and postoperative reduction, immediately postoperative gap of the fracture in each group.

✓ Statistics analysis (SPSS 19.0, p <0.05)
Which surgical method is more effective in the fifth metatarsal base fracture?

# Results

- No complications (infection, wound problem, delayed union, nonunion)
- With increasing the gap of the fracture, the time to union decreased significantly

<table>
<thead>
<tr>
<th></th>
<th>Group A (n=15)</th>
<th>Group B (n=15)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (F:M)</td>
<td>9:6</td>
<td>10:5</td>
<td>0.61</td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>47 (21 to 70)</td>
<td>50 (21 to 77)</td>
<td>0.31</td>
</tr>
</tbody>
</table>

Distance between the fracture lines (mm) (oblique view)

<table>
<thead>
<tr>
<th></th>
<th>Group A (n=15)</th>
<th>Group B (n=15)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative</td>
<td>3.4±0.8</td>
<td>4.5±1.6</td>
<td>0.08</td>
</tr>
<tr>
<td>Postoperative</td>
<td>0.3±0.4</td>
<td>0.06±0.2</td>
<td>0.10</td>
</tr>
<tr>
<td>P#</td>
<td>&lt; 0.001</td>
<td>&lt; 0.001</td>
<td></td>
</tr>
</tbody>
</table>

Gap of the fracture $(mm)$

<table>
<thead>
<tr>
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<th>Group A (n=15)</th>
<th>Group B (n=15)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to union (days)</td>
<td>54.2±9.3</td>
<td>41.5±7.0</td>
<td>0.01</td>
</tr>
</tbody>
</table>

AOFAS midfoot score

<table>
<thead>
<tr>
<th></th>
<th>Group A (n=15)</th>
<th>Group B (n=15)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>97.7±3.4</td>
<td>98.2±3.2</td>
<td>0.75</td>
</tr>
</tbody>
</table>

- $p^*$: Mann–Whitney test (p-value <0.05) comparing group A and B.
- $p^#$: Paired t-test (p-value <0.05), comparing the preoperative and postoperative value in each group.
- Gap of the fracture$: the difference of the distance between preoperative and postoperative displacement.
Which surgical method is more effective in the fifth metatarsal base fracture?

# Limitations

- Small sample size
- Not varied fracture types
- No consideration of factors affecting healing (e.g., bone mineral density and medical morbidity (diabetes) and smoking)
- Short term follow up

(No analysis of long term complications; no late refracture and degenerative change in the joint)
Which surgical method is more effective in the fifth metatarsal base fracture?

# Conclusions

- Similar clinical outcomes in both group
- **Shorter time to union** and a significant gap of the fracture in the plate group
- **The locking compression distal ulna hook plate** for **the fixation of Zone 1 fracture** of the fifth metatarsal base is a reasonable and alternative method that can provide a shorter time to union without complications.
Which surgical method is more effective in the fifth metatarsal base fracture?

# References