Patient outcomes following Akin osteotomy using staple fixation

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Patient outcomes following Akin osteotomy using staple fixation

• Julie A Neumann, Kathleen D Reay, Kendall E Bradley
  - None of these authors have potential conflicts with this presentation.
• Selene G Parekh
  - His disclosures are in the Final AOFAS Mobile App.
  - He has potential conflict with this presentation because he is a paid consultant for Stryker, the manufacturer of the EasyClip® staple used in this study
Background

• Akin ostotomy described 1925
  – PP medial wedge closing osteotomy
    • Minimal fixation\textsuperscript{1,11}

• Correct hallux valgus interphalangeus angle (IPA)\textsuperscript{8,9}

• Used as adjunct to proximal metatarsal osteotomy\textsuperscript{1,3,7,8,11}
Advantages

• Avoids pin tract infection and stress risers ³
• May be technically easier to place
• May result in shortened operative time

Disadvantages

• Do not allow for uniform compression through osteotomy
• Not a uniform technique to apply staple to result in maximum stability of construct ⁴

Complications ➔ rare, not unique to staple fixation

• Hardware migration
• Soft tissue irritation
• Lateral cortex fracture
• Proximal phalanx shortening
• Prox phalanx articular surface breach ⁹
• Under/over correction of IPA
Purpose

- Short-term safety and efficacy staple fixation for Akin ostotomies
- 1st large case series of Akin osteotomy using metallic staple fixation in which patients are followed clinically and radiographically

**Indications:**
- Painful HV deformity
- IPA >10 ° AP radiographs
- Failed conservative tx
- Residual deformity following proximal metatarsal osteotomy

Source: Dr. Parekh’s personal files
Methods

• Retrospective review, April 1, 2009 – Nov. 30, 2012
• PI performed all surgeries
• All Akin osteotomies using single staple fixation done in conjunction w/more proximal procedures
• 44 patients (51 feet)
  – 39 F; 5 M
• Mean age 56.1 years (range, 19 to 82)
• Mean follow-up 40.4 weeks (range, 25.9 to 79.9)

Subjective, patient reported:
  - Preoperative and postoperative Visual Analog Score (VAS) (0 to 10, 0 = no pain)
  - Postoperative level of activity

Objective (preop & postop XR):
  - HVA, IMA, IPA
  - Union
Results

• All patients union 8 wks post-op
• No major post-op complications:
  – Infections, nonunions, hardware migration/fracture, osteolysis, or necrosis on final radiographs²
• 42/44 (95.5%): subjective data via telephone survey
  – 87.2% would undergo procedure again
  – 51.1% able to wear fashionable shoes

Preoperative radiograph demonstrating hallux valgus with an IMA of 11 degrees, HVA of 22 degrees, and IPA of 5.8 degrees.
Results

• Activity level:
  – Ambulate unlimited distance
    28/51 (54.9%)
  – Ambulate minimum of 6 blocks
    18/51 (35.3%)
  – Ambulate 1-4 blocks 2/51 (3.9%)
  – WBAT 3/51 (5.9%)

• 2 cases: lateral cortex breached w/o appreciable consequence or changes in technique

Postoperative radiographs showing surgical correction with chevron and Akin osteotomies. Angular correction improved to an IMA of 7 degrees, HVA of 15.1 degrees, and IPA of 2.6 degrees.
## Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Preoperative value</th>
<th>Postoperative value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+/- SD</td>
<td>+/- SD</td>
<td></td>
</tr>
<tr>
<td>VAS</td>
<td>4.4 +/- 2.6</td>
<td>1.0 +/- 1.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HVA</td>
<td>25.6 +/- 10.0</td>
<td>14.1 +/- 8.4</td>
<td>&lt;0.001</td>
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<tr>
<td>IMA</td>
<td>13.1 +/- 4.6</td>
<td>8.0 +/- 3.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>IPA</td>
<td>7.9 +/- 3.4</td>
<td>-3.1 +/- 6.4</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Standard Deviation (SD)
Visual Analog Score (VAS) (0 to 10, 0 = no pain)
Hallux valgus angles (HVA)
Intermetatarsal angles (IMA)
Hallux valgus interphalangeus angles (IPA)
Results

• 3/51 feet (5.9%) tenderness over great toe proximal phalanx at final f/u
  – ? incisional tenderness as not directly over staple hardware

• 1 patient - revision after Akin osteotomy with staple fixation for residual deformity (preop → postop)
  – HVA: 31.0° to 37.0°
  – IMA: 17.0° to 8.0°
  – IPA: 2.8° to 2.8°

• **Conclusion:** Akin ostoeotomy with staple fixation is safe & effective with minimal risk of complication to patient
Limitations

- Short-term, retrospective study
- Average f/u 40.4 ± 15.8 weeks
- Postoperative evaluation by PI, bias
- Tenderness and dissatisfaction
  - Akin or due to combination of other procedures
- Telephone survey to obtain some outcome data
- IPA to measure correction
  - Distal articular set angle (DASA), sesamoid position, first metatarsal length
References

4. Chacon, Y; Fallat, LM; Dau, N; Bir, C: Biomechanical comparison of internal fixation techniques for the Akin osteotomy of the proximal phalanx. J Foot Ankle Surg. 51(5):561-565, 2012. [http://dx.doi.org/10.1053/j.jfas.2012.05.001](http://dx.doi.org/10.1053/j.jfas.2012.05.001)