Medial soft-tissue release for a lateralizing calcaneal osteotomy: a cadaveric study

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The authors have no conflicts of interest
Lateralizing Calcaneal Osteotomy (LCO)

- One of the common surgical procedures for pes cavus.
- LCO in pes cavus is generally considered to be harder to shift as compared to MCO for pes planus.
- The lateral shift is restricted mainly by soft tissue and neuromuscular constraints.
- The exact identification of these limiting structures lacks confirmation.
Limitations of an LCO in pes cavus

- Volume of the tarsal tunnel is significantly reduced after an LCO and there are reports recommending routinely releasing the flexor retinaculum.

- Our hypothesis was that the flexor retinaculum was the main restraint to an adequate shift with an LCO.
Study aim

• Determine all the structures which restrain a lateral shift in lateralizing calcaneal osteotomies using a cadaveric study

Method

• 8 embalmed cadavers
• Below-knee specimens
First 4 cadavers

1. LCO performed using standard lateral approach
2. Lateral shift measured
3. Release flexor retinaculum, osteotomy shifted and measured.
# Results (first 4 cadavers)

## Average increase in shift: 3mm

<table>
<thead>
<tr>
<th></th>
<th>Lateral shift before retinaculum release</th>
<th>Lateral shift after retinaculum release</th>
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<tbody>
<tr>
<td>1</td>
<td>5 mm</td>
<td>8 mm</td>
</tr>
<tr>
<td>2</td>
<td>5 mm</td>
<td>9 mm</td>
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<tr>
<td>3</td>
<td>4 mm</td>
<td>8 mm</td>
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<tr>
<td>4</td>
<td>4 mm</td>
<td>5 mm</td>
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</tbody>
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Abductor Hallucis Muscle

- The increase in the lateral shift before and after the release of flexor retinaculum was very marginal
- We decided to explore and see whether there were any other restraining structures.
- The Abductor Hallucis muscle and its fascia was a major restraint
- In subsequent 4 cadavers we chose to release this fascia as well as the adjoining plantar fascia.
Subsequent 4 cadavers

1. LCO performed using standard lateral approach.

2. Lateral shift measured.

3. Release Abductor Hallucis fascia and Medial plantar fascia performed.

4. Osteotomy shifted and measured again.

Abductor Hallucis muscle fascia and plantar fascia release

Lateral shift measurement
## Results (subsequent 4 cadavers)

<table>
<thead>
<tr>
<th></th>
<th>Lateral shift before AbdH fascia and plantar fascia release</th>
<th>Lateral shift after Abd fascia and plantar fascia release</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>12</td>
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<tr>
<td>2</td>
<td>6</td>
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<tr>
<td>3</td>
<td>6</td>
<td>14</td>
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<tr>
<td>4</td>
<td>5</td>
<td>10</td>
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Average increase in shift: 7mm
Conclusion

- Abductor hallucis muscle was the main structure limiting lateral shift in LCO
- We recommend the release of the fascia over the abductor hallucis as well as the plantar fascia as a part of lateralizing calcaneal osteotomy
References


