Arthrodiastasis of the Lateral Column with Medial Column fusion:
A Retrospective Examination of the Medial Double, Lapidus & Talonavicular Arthrodeeses

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Coordinated Health
Disclosure

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Melissa Galli, DPM, MHA, AACFAS

Our disclosures are provided in the Final AOFAS Program Book.

I have no potential conflicts of interest with this presentation.
**Purpose:** To examine lateral arthrodiastasis post-medial column fusion.

**Hypothesis:** The extent of lateral column arthrodiastasis, as measured by joint volume at the calcaneocuboid joint (CCJ), is a function of the joint’s location; the more proximal the joint, the greater the degree of arthrodiastasis.

**Summary:** We quantified CCJ arthrodiastasis before and after medial double (talonavicular joint [TNJ] & subtalar joint [STJ]) and Lapidus (1st tarsometatarsal) fusions.

*Although included in study design, isolated TN fusions were excluded due to a small sample size (n=2).*
Protocol

- IRB approved
- Retrospective radiographic review
  - Data was collected by M.M.G. & statistical analyses performed by N.M.P.
- Pre-operative and the most recent post-operative digital x-rays were analyzed
  - Height & width of the CCJ was measured via a lateral & AP radiographs, respectively
  - These two post-op values were fixed given the overlap that is often noted pre-op in flatfoot deformities.
  - Joint depth was measured at the superior, mid, and inferior margins on pre-operative and post-operative AP and lateral radiographs to assess the trapezoidal joint
  - Joint volume (mm$^3$) and the percent change in joint volume (%) were calculated
  - Comparisons were then made pre- and post-medial column fusions and across fusion sites ($p < 0.05$)
Inclusion criteria:

- ≥ 18 years old
- Underwent a medial column fusion (Medial Double or Lapidus)
- Procedure performed by the principle investigator (S.A.B.)
- Minimum of three months follow-up, including radiographs
- Same technique used

Exclusion criteria:

- Charcot deformity
- History of CCJ trauma or surgery
- History of or concomitant medial column procedure (i.e. navicularcuneiform fusion)

Fixation

- **Medial Double**: single cannulated screws for STJ and included a 4.0 cannulated screw with staple and/or claw device for TNJ
- **Lapidus**: 2-crossed cannulated screws or a 4.0 screw & locking plate

Post-Operative

- Minimum of 2 weeks non-weight bearing
  - **Medial Double**: remained non-weight bearing to the 6th week & posterior weight bearing until the 8th week
  - **Lapidus**: Weight bearing as tolerated @ 2 weeks in CAM
- x-rays were obtained until bone trabeculation in all 3 views was noted
<table>
<thead>
<tr>
<th>Demographic</th>
<th>Overall</th>
<th>Medial Double</th>
<th>Lapidus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (no.)</td>
<td>32</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Age (years)</td>
<td>56.69 ± 12.65</td>
<td>60.6 ± 8.84</td>
<td>53.24 ± 14.49</td>
</tr>
<tr>
<td>Body mass index (kg/m$^2$)</td>
<td>29.01 ± 6.91</td>
<td>33.59 ± 6.93</td>
<td>24.97 ± 3.67*</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11 (34.38)</td>
<td>7 (46.67)</td>
<td>4 (23.53)</td>
</tr>
<tr>
<td>Female</td>
<td>21 (65.63)</td>
<td>8 (53.33)</td>
<td>13 (76.47)</td>
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<tr>
<td>Injury side (no.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>18 (56.25)</td>
<td>10 (66.67)</td>
<td>8 (47.06)</td>
</tr>
<tr>
<td>Left</td>
<td>14 (43.75)</td>
<td>5 (33.33)</td>
<td>9 (52.94)</td>
</tr>
<tr>
<td>Follow-up (months)</td>
<td>7.41 ± 4.49</td>
<td>7.13 ± 3.58</td>
<td>7.64 ± 5.27</td>
</tr>
</tbody>
</table>

*p ≤ 0.05, comparing Medial Double and Lapidus procedures
Results

The mean percent diastasis change was 32.05 ± 40.86%.

A statistically significant difference was observed between the Medial Double (61.90 ± 40.59%) & Lapidus (5.71 ± 14.84%) procedures ($U = 14.00, p < 0.001$)
All patients were noted to have radiographic union.

### Correlation Coefficients

<table>
<thead>
<tr>
<th>Age</th>
<th>Body Mass Index</th>
<th>Gender</th>
<th>Operative Side</th>
<th>Medial Column Procedure</th>
<th>Preoperative Diastasis</th>
<th>Postoperative Diastasis</th>
<th>Percent Change in Diastasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.00</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>0.41 *</td>
<td>1.00</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.03</td>
<td>0.12</td>
<td>1.00</td>
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<tr>
<td>Operative Side</td>
<td>0.02</td>
<td>-0.13</td>
<td>0.11</td>
<td>1.00</td>
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<td></td>
</tr>
<tr>
<td>Medial Column Procedure</td>
<td>0.30</td>
<td>0.63 *</td>
<td>0.24</td>
<td>0.20</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative Diastasis</td>
<td>-0.05</td>
<td>0.16</td>
<td>0.63 *</td>
<td>0.46 *</td>
<td>0.40 *</td>
<td>1.00</td>
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</tr>
<tr>
<td>Postoperative Diastasis</td>
<td>0.11</td>
<td>0.51 *</td>
<td>0.50 *</td>
<td>0.30</td>
<td>0.66 *</td>
<td>0.67 *</td>
<td>1.00</td>
</tr>
<tr>
<td>Percent Change in Diastasis</td>
<td>0.16</td>
<td>0.46 *</td>
<td>0.14</td>
<td>-0.05</td>
<td>0.70 *</td>
<td>0.21</td>
<td>0.81 *</td>
</tr>
</tbody>
</table>

\( * p \leq 0.05 \)
Conclusions

• Medial double arthrodesis increased average CCJ volume by 61.90% and the Lapidus increased average CCJ volume by 5.71%.

• Thus, we confirmed our hypothesis.

• Prospective lateral column arthrodiastasis research is warranted.
References

-girl 527 1923.