Comparison of outcomes in patients with generalized ligamentous laxity and without generalized laxity in the arthroscopic Modified Broström Operation for Chronic Lateral Ankle Instability

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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.
All-inside Arthroscopic Modified Broström Operation (MBO)

- **All-inside Arthroscopic MBO** vs **Open MBO**
  - Stiffness
  - Torque to failure
  - Degree to failure

No difference

All-inside Arthroscopic Modified Broström Operation (MBO)

- **All-inside Arthroscopic MBO** vs. **Open MBO**
  - The clinical outcome
  - The radiologic outcome

No difference

**Comparison of All-Inside Arthroscopic and Open Techniques for the Modified Broström Procedure for Ankle Instability**

<table>
<thead>
<tr>
<th>Variables</th>
<th>All-Inside Arthroscopic MBO, Mean (SEM)</th>
<th>P Value</th>
<th>Open MBO, Mean (SEM)</th>
<th>Δ Score, (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOFAS score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative</td>
<td>67.5 (2.0)</td>
<td>&lt;0.001</td>
<td>69.9 (2.1)</td>
<td>-2.4 (-8.1 to 3.2)</td>
<td>0.394</td>
</tr>
<tr>
<td>12 mo</td>
<td>90.3 (2.4)</td>
<td>&lt;0.001</td>
<td>89.2 (2.3)</td>
<td>1.1 (-5.5 to 7.7)</td>
<td>0.736</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Preoperative</th>
<th>Last Follow-up</th>
<th>P Value</th>
<th>Last – Preoperative</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talar tilt test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All-inside arthroscopic MBO</td>
<td>7.3 ± 4.3</td>
<td>3.9 ± 1.5</td>
<td>0.001</td>
<td>-3.5 ± 4.2</td>
<td>0.39</td>
</tr>
<tr>
<td>Open MBO</td>
<td>5.4 ± 4.2</td>
<td>3.8 ± 3.6</td>
<td>0.046</td>
<td>-1.7 ± 5.3</td>
<td></td>
</tr>
</tbody>
</table>

Lee at al, Foot & Ankle Int. 2016 37(10) 1037-1045
**Generalized Ligamentous Laxity (GLL)**

**GLL = Risk Factor**

- *Inferior outcomes* compared normal laxity after ligament surgery (repair or reconstruction)

- The patient with *failure after MBO* showed GLL.

**Purpose**

- **GLL** VS **No GLL**
  - in Chronic Ankle Instability

*All-inside Arthroscopic MBO*
### Methods: Patient Enrollment

- Jan 2013 ~ Nov 2015, 99 patients (99 ankles)

#### Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total (N=99)</th>
<th>Laxity (N=24)</th>
<th>No laxity (N=75)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>36.4 ± 14.5</td>
<td>37.8 ± 15.8</td>
<td>35.9 ± 14.1</td>
<td>0.644</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td>Male</td>
<td>49 (49.5%)</td>
<td>5 (20.8%)</td>
<td>44 (58.7%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>50 (50.5%)</td>
<td>19 (79.2%)</td>
<td>31 (41.3%)</td>
<td></td>
</tr>
</tbody>
</table>

MBO, modified Bromstrom operation.
Data were presented as mean ± standard deviation for continuous variables and frequency (percentage) for categorical variables.
P-values were calculated by Student’s t-test or Mann-Whitney U test for continuous variables and chi-square test for categorical variables.

### Inclusion criteria
- Giving way sensation
- Persistent pain
- Recurrent instability after conservative Tx.
- Failing return to normal activity (> 6 months)

### Exclusion criteria
- Genetic connective tissue disorders
- Fracture of the affected ankle
- Previous ankle surgery
- Deformity of the foot and ankle
Methods

- **Radiologic Evaluations**
  - Stress radiographs
    (150N, using Telometer equipment)
  - Measurement of the Talar tilt angle
    - by two orthopedic surgeons

- **Operative Techniques**
  - All procedures were performed by a single surgeon
  - All-Inside arthroscopic MBO
## Results: Clinical Outcomes

<table>
<thead>
<tr>
<th>Variables</th>
<th>Laxity (N=24)</th>
<th>No laxity (N=75)</th>
<th>Δ score (95%CI, p-value)†</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AOFAS score (/100 points)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>58.5 ± 18.3</td>
<td>64.2 ± 18.6</td>
<td>-5.8 (-12.4 to 0.8, p=0.087)</td>
</tr>
<tr>
<td>6 months</td>
<td>81.5 ± 7.5*</td>
<td>83.8 ± 8.8*</td>
<td>-2.2 (-8.7 to 4.3, p=0.499)</td>
</tr>
<tr>
<td>12 months</td>
<td>84.8 ± 12.9*</td>
<td>88.5 ± 9.9*</td>
<td>-3.4 (-10.2 to 3.4, p=0.328)</td>
</tr>
<tr>
<td><strong>VAS (/10 points)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>5.8 ± 2.5</td>
<td>5.2 ± 2.5</td>
<td>0.7 (-0.3 to 1.6, p=0.192)</td>
</tr>
<tr>
<td>6 months</td>
<td>3.4 ± 1.5*</td>
<td>3.0 ± 1.7*</td>
<td>0.5 (-0.5 to 1.5, p=0.32)</td>
</tr>
<tr>
<td>12 months</td>
<td>2.7 ± 1.7*</td>
<td>2.1 ± 1.6*</td>
<td>0.6 (-0.4 to 1.6, p=0.258)</td>
</tr>
</tbody>
</table>

### Graphs

#### AOFAS

- **Laxity**
  - Preop: 58.5
  - 6 months: 81.5
  - 12 months: 84.8
- **No Laxity**
  - Preop: 64.2
  - 6 months: 83.8
  - 12 months: 88.5

#### VAS

- **Laxity**
  - Preop: 5.2
  - 6 months: 3.4
  - 12 months: 2.7
- **No Laxity**
  - Preop: 5.4
  - 6 months: 3
  - 12 months: 2.1

#### Δ AOFAS

- **Laxity**
  - Baseline to 6 months: 23.2
  - Baseline to 12 months: 27.5
- **No Laxity**
  - Baseline to 6 months: 19.4
  - Baseline to 12 months: 24.1

#### Δ VAS

- **Laxity**
  - Baseline to 6 months: 2.4
  - Baseline to 12 months: 3
- **No Laxity**
  - Baseline to 6 months: 2.3
  - Baseline to 12 months: 3.1
# Results: Radiologic Outcomes

## Talar Tilt Angle

<table>
<thead>
<tr>
<th>Variables</th>
<th>Laxity (N=24)</th>
<th>No Laxity (N=75)</th>
<th>Δ score (95%CI, p-value)†</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Talar tilt test (°)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>12.4 ± 5.3</td>
<td>8.0 ± 4.2</td>
<td>4.4 (2.5 to 6.3, p&lt;0.001)</td>
</tr>
<tr>
<td>12 months</td>
<td>4.4 ± 3.3*</td>
<td>3.9 ± 3.5*</td>
<td>0.9 (-1.3 to 3.1, p=0.413)</td>
</tr>
</tbody>
</table>

## ΔTalar Tilt Angle

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total (N=99)</th>
<th>Laxity (N=24)</th>
<th>No Laxity (N=75)</th>
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<tbody>
<tr>
<td><strong>Talar tilt test (°)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ (Baseline to 12 months)</td>
<td>-4.9 ± 4.6</td>
<td>-6.9 ± 5.2</td>
<td>-4.2 ± 4.2</td>
<td>0.03</td>
</tr>
</tbody>
</table>

**Talar tilt angle**

- Laxity
- No Laxity

**ΔTalar tilt angle**

- Laxity
- No Laxity
Discussion: Subtalar Tightening

- **Subtalar motion should be limited if GLL is present.**
  
  Coville, Instr Course Lect. 1995

- **Over-tightening of the IER may cause stiffness in the posterior subtalar joint.**


We performed over-tightening and included more extensive arc of the IER for laxity group.
Conclusion: The suggestions of this study

- The key finding of this study
  No statistically significant difference
  Laxity Group vs No Laxity Group

- The suggestions of this study
  - GLL = No risk factor after the arthroscopic MBO
  - Arthroscopic MBO could be the primary surgery in the patients who have GLL
Reference


