Comparison of Postoperative Outcomes between Modified Mann Procedure and Modified Lapidus Procedure for Hallux Valgus

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Disclosure

No conflicts of interest to disclose

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Our disclosures are in the Final AOFAS Mobile App. We have no potential conflicts with this presentation.
Changes in hallux valgus (HV) surgery at our hospital

Moderate~Severe HV ⇒ Modified Mann Procedure

- HV angle (HVA) > 50°; severe HV cases with recurrence in severe deformity
- 1st metatarsophalangeal (MTP) joint with limited range of motion
- 1st MTP joint with osteoarthritis

For Severe HV cases

Modified Lapidus Procedure
1st metatarsal (MT) correction of inversion and varus deformity with shortening

- Lesser toe deformity with severe HV cases

Modified Lapidus procedure
+ Short oblique osteotomies of the metatarsal bases
Combination Metatarsal Osteotomies for Shortening (CMOS)
We compared the postoperative results of Modified Mann Procedure and Modified Lapidus Procedure according to the severity of HV and the lesser toe deformity of transfer metatarsalgia. We studied the adaptation in each operation.
Methods

Surgery for HV
A follow-up period of >1 year was observed in 58 patients (73 feet).

- **Modified Mann procedure (MG)**
  26 patients (31 feet), mean age at surgery of 56.4 years (27-83 years)

- **Modified Lapidus procedure (LG)**
  32 patients (42 feet), mean age at surgery of 63.4 years (24-82 years)

Combination surgery

**MG**
- Short oblique osteotomies of the metatarsal bases
  - 2nd MT only in 2 feet, 2nd + 3rd MT in 2 feet
- Bunionette Transverse medial slide osteotomy in 8 feet
- MTP joint dislocation reduction in 3 feet

**LG**
- CMOS in 38 feet
  - 2nd MT only in 5 feet, 2nd + 3rd MT in 15 feet, 2nd to 4th MT in 3 feet, 2nd to 5th MT in 16 feet
- Bunionette transverse medial slide osteotomy in 2 feet
- MTP joint dislocation reduction in 28 feet (39 joints)
Outcomes

- Radiological Measurements: Standing Anteroposterior (AP) Radiographs
  - HVA
  - 1st-2nd metatarsal angle (M1-M2A)
  - 1st-5th metatarsal angle (M1-M5A)
- Clinical outcomes: Japanese Society for Surgery of the Foot (JSSF) hallux scale
- Complications

Comparative study between MG and LG groups (unpaired t-test)

<table>
<thead>
<tr>
<th>Results</th>
<th>Radiographic examinations: AP weight-bearing radiographs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MG</td>
</tr>
<tr>
<td>Preoperative</td>
<td></td>
</tr>
<tr>
<td>HVA</td>
<td>38.2 ± 5.4</td>
</tr>
<tr>
<td>M1-M2A</td>
<td>14.5 ± 3.3</td>
</tr>
<tr>
<td>M1-M5A</td>
<td>35.7 ± 8.5</td>
</tr>
</tbody>
</table>
## JSSF hallux scores

<table>
<thead>
<tr>
<th></th>
<th>MG</th>
<th>LG</th>
<th>p</th>
<th>MG</th>
<th>LG</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preoperative</td>
<td>Most recent follow-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$53.3 \pm 9.2$</td>
<td>$47.7 \pm 7.7$</td>
<td>$0.009$</td>
<td>$89.6 \pm 16.5$</td>
<td>$94.7 \pm 7.4$</td>
<td>$0.120$</td>
</tr>
<tr>
<td><strong>-subscale-</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pain</strong></td>
<td>$18.1 \pm 4.0$</td>
<td>$19.5 \pm 4.4$</td>
<td>$0.152$</td>
<td>$36.1 \pm 8.9$</td>
<td>$37.5 \pm 4.8$</td>
<td>$0.44$</td>
</tr>
<tr>
<td><strong>Function</strong></td>
<td>$30.0 \pm 5.1$</td>
<td>$26.4 \pm 3.1$</td>
<td>$0.002$</td>
<td>$41.6 \pm 6.8$</td>
<td>$44.0 \pm 2.4$</td>
<td>$0.063$</td>
</tr>
<tr>
<td><strong>Alignment</strong></td>
<td>$5.1 \pm 3.3$</td>
<td>$1.2 \pm 2.8$</td>
<td>$&lt;0.0001$$\star$</td>
<td>$12.9 \pm 3.3$</td>
<td>$12.9 \pm 3.6$</td>
<td>$0.996$</td>
</tr>
</tbody>
</table>

### Complications

<table>
<thead>
<tr>
<th></th>
<th>MG</th>
<th>LG</th>
</tr>
</thead>
<tbody>
<tr>
<td>HV recurrence (HVA &gt; 25°)</td>
<td>4 feet</td>
<td>7 feet</td>
</tr>
<tr>
<td>Varus hallux</td>
<td>4 feet</td>
<td>2 feet</td>
</tr>
</tbody>
</table>
Problems in severe HV surgery

- Inadequate correction due to intraoperative and postoperative recurrence
- Selection of surgical procedure for lesser toe deformity

**Risk factors for HV recurrence**
- Lateral displacement of the sesamoids
- Round-shaped lateral edge of the 1st MT head

**Complications of the Modified Mann Procedure**
- Limitation of motion is a major complication
- Moderate shortening, stabilizing of the osteotomy, and robust internal fixation are required
Modified Lapidus Procedure

1st MT shortening added to supination and valgus

- MT inversion and varus deformation can be sufficiently corrected
- Relaxation of tension in the periarticular soft tissue of the MTP joint with metatarsal shortening
- Reduction in MTP joint load and acquiring of range of motion (ROM)

CMOS can be selected as the initial surgery for severe HV with the lesser toe deformity of transmetatarsalgia.

- Long-term stable results
- Retracted position can be maintained without soft tissue repair of the lesser toe MTP joint
- Acquisition of MTP joint ROM in the lesser toe
Selection of HV procedure

HVA < 30°–45°
- Painful plantar callosity
- Lesser toe deformity
- TM joint instability

HVA ≥ 45°

+ Modified Lapidus Procedure
- Painful plantar callosity
- Lesser toe deformity

- Modified Mann Procedure

CMOS
MTP Joint Dislocation Reduction
Limitations

- HV surgery is limited to Modified Mann Procedure and Modified Lapidus Procedure
- Evaluation of simple X-ray only
- Evaluation of only HV

Conclusion

- The procedure was modified based on the severity of HV and transfer metatarsalgia, with good outcomes in both groups.
- For HV surgery, it is necessary to select a procedure according to the disease condition, including severity and transmetatarsalgia.
- Modified Lapidus Procedure can be chosen as the initial surgery for severe HV.
- CMOS can be selected as the initial surgery for severe HV with transmetatarsalgia.