Long term effects of distal tibia deformity correction with supramalleolar osteotomy on subtalar joint

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DISTAL TIBIA DEFORMITY

- Frontal Plane
- Sagittal Plane
- Oblique Plane
- Complex Deformities
FRONTAL PLANE DEFORMITIES

- **LDTA 86-92**: NORMAL
- **LDTA >92**: VARUS
- **LDTA >86**: VALGUS
**DEFORMITY**

<table>
<thead>
<tr>
<th>VARUS</th>
<th>SUBTALAR EVERSION</th>
<th>15 degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORE-FOOT PRONATION</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>VALGUS</th>
<th>SUBTALAR INVERSION</th>
<th>30 degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORE-FOOT SUPINATION</td>
<td></td>
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</tbody>
</table>
VARUS DEFORMITIES

- Epiphyseal type
  - PEV
  - Burn sequela

- Metaphyseal type
  - Malunion of distal tibia
VALGUS DEFORMITIES

- **Epiphyseal Type**
  - Fibular hemimelia
  - AMC
  - Congenital vertical talus

- **Metaphyseal type**
  - Fibular hemimelia
  - Achondroplasia
  - Rickets
  - Renal osteodistrophy
The connection between deformity and ankle arthrosis is not clear. But is supported by clinical outcomes and basic science investigations.

- Asymmetric loading on ankle and subtalar joint
- Chondral lesion of ankle and subtalar joint
- Arthritis of ankle and subtalar joint

AIM

- To evaluate long term results of corrected distal tibia frontal plan deformities and adaptation of subtalar joint to new mechanical loads after supramalleolar osteotomy.

- Any remaining deformity after correction
  - Effect on subtalar joint?
PATIENTS & METHODS

- All patients had distal tibia metaphyseal deformity

- For corrections;
  - Circular Ex Fix
  - Hexapodal system

- All patient invited for control
- 11 patient (18 tibia)
- The mean age was 17.3 years (range; 14-23)
## PATIENTS & METHODS

<table>
<thead>
<tr>
<th>Etiology</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibular hemimelia</td>
<td>1</td>
</tr>
<tr>
<td>Posttraumatic deformity</td>
<td>4</td>
</tr>
<tr>
<td>Achondroplasia</td>
<td>2</td>
</tr>
<tr>
<td>Renal Osteodystrophy</td>
<td>2</td>
</tr>
<tr>
<td>Rickets</td>
<td>2</td>
</tr>
</tbody>
</table>
METHOD

- Clinical evaluation
  - ROM of subtalar joint
  - ROM of ankle joint
  - Bone & functional scores of Paley

- Radiological evaluation;
  - Tibio-calcaneal angle on Saltzman views
  - ADTA, LDTA angles at standard orthorontgen view
Case-1
23 y M R Postravmotic varus deformity

After 5 y
Case-2

19 y M Valgus Deformity seconder to the Renal Osteodistrophy

After 2 year
The mean follow-up was 47.1 month (range: 15-76).

The mean external fixator time; 45.4 day/cm.

Bone healing index 1.3 month/cm.

There was no fixed subtalar deformity after correction.

No arthritis on clinical and radiological examination at the last follow-up.
## RESULTS

### Comparison Preop & Last follow-up

<table>
<thead>
<tr>
<th></th>
<th>Preop</th>
<th>Postop</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTA(Absolute)</td>
<td>97.5</td>
<td>84</td>
</tr>
<tr>
<td>LDTA(Absolute)</td>
<td>80.2</td>
<td>87.8</td>
</tr>
<tr>
<td>Tibio-Calcaneal Angle</td>
<td>27.2</td>
<td>10.4</td>
</tr>
</tbody>
</table>
RESULTS

Comparison Preop & Last follow-up

<table>
<thead>
<tr>
<th></th>
<th>Preop</th>
<th>Postop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorsiflexion (mean)</td>
<td>13</td>
<td>16.3</td>
</tr>
<tr>
<td>Plantar Flexion (mean)</td>
<td>25</td>
<td>31.8</td>
</tr>
<tr>
<td>Subtalar Eversion-Inversion Arc (Mean)</td>
<td>27</td>
<td>34</td>
</tr>
</tbody>
</table>

- Subtalar eversion-inversion arc were increased but not statistically significant (T test P<0.05)
RESULTS

- Bone scores; 10 excellent, 1 good
- Functional scores; 10 excellent, 1 good
CONCLUSION

- Correction of distal tibia deformities maintain normal alignment of subtalar joint as like ankle joint and redistributes the joint forces to prevent the development of arthritis.

- Residual deformities after deformity correction were compensated without any clinical arthritis by subtalar joint.
THANKS FOR YOUR KIND