Does the surgical correction of tibial torsion with genu varum produce outcomes similar to those in varus correction alone?
As faculty I am committed to providing transparency in any/all external relationships prior to giving an academic presentation.

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Disclosure: I do have a financial relationship with the following commercial interests:

I receive royalties from SBI. I am a consultant for Smith & Nephew, NuVasive & Synthes
• IRB approved retrospective review with comparison of two groups.
• 2013-2014 Bilateral tibia osteoplasty 69 patients (138 limbs) for varus deformity.
• Simple Varus n=35
• Varus & Torsion n=34
  – 32 external tibial torsion
  – 2 internal torsion
  – Average torsion ? degrees
Varus (No Torsion)
Varus & Torsion

BEFORE

AFTER
Evaluation = Chart Review

Pre and Post Op
MAD, MPTA, TFA
MAD = Mechanical Axis Deviation
MPTA
Medial
Proximal
Tibial
Angle

92° (88°)

95° (85°)

83° (97°)

87° (93°)
Varus
N=69

Varus Alone
N=35

Monolateral Frame

Varus & Torsion
N=34

Hexapod Frame
### Demographics

<table>
<thead>
<tr>
<th></th>
<th>Varus (SD)</th>
<th>Varus &amp; Torsion (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age, mean (SD) P&lt;0.001</strong></td>
<td>37.5 (9.8)</td>
<td>29.8 (9.2)</td>
</tr>
<tr>
<td><strong>BMI, mean (SD) P&lt;0.001</strong></td>
<td>25.5 (4.0)</td>
<td>21.8 (3.8)</td>
</tr>
<tr>
<td><strong>Female P=0.027</strong></td>
<td>12 (34.3%)</td>
<td>18 (52.9%)</td>
</tr>
<tr>
<td>Smokers P=0.097</td>
<td>8 (11.4%)</td>
<td>2 (2.9%)</td>
</tr>
<tr>
<td>OA Knee P=0.366</td>
<td>8 (11.4%)</td>
<td>4 (5.8%)</td>
</tr>
</tbody>
</table>

*Note: P-values indicate statistical significance.*
Interpretation:

• 69 patients walk in the door c/o symptomatic varus
• 49% will have tibial torsion
  – More likely in females,
  – younger patients with symptomatic varus
  – Thinner patients
Outcomes

• PRIMARY
  • MAD
  • MPTA
  • TFA

• SECONDARY
  • KOOS post op
  • Post Op Questionnaire
# Primary Outcome

<table>
<thead>
<tr>
<th></th>
<th>Pre Op, mean (SD)</th>
<th>Post Op, mean (SD)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Var</td>
<td>Var Tor</td>
</tr>
<tr>
<td><strong>MPTA</strong></td>
<td>80.9 (8.1)</td>
<td>80.4 (8.6)</td>
</tr>
<tr>
<td><strong>MAD</strong></td>
<td>26.8 (10.1)</td>
<td>25.8 (13.6)</td>
</tr>
<tr>
<td><strong>TFA</strong></td>
<td>15.0 (4.6)</td>
<td>31.5 (1.9)</td>
</tr>
<tr>
<td>KOOS</td>
<td>Varus</td>
<td>Varus-Torsion</td>
</tr>
<tr>
<td>-----------</td>
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</tr>
<tr>
<td>Symptoms</td>
<td>93.5 (9.2)</td>
<td>90.8 (10.3)</td>
</tr>
<tr>
<td>Pain</td>
<td>95.2 (7.8)</td>
<td>93.5 (7.5)</td>
</tr>
<tr>
<td>ADL</td>
<td>98.4 (5.1)</td>
<td>97.1 (3.9)</td>
</tr>
<tr>
<td>Sport</td>
<td>93.3 (10.0)</td>
<td>81.9 (21.7)</td>
</tr>
<tr>
<td>QoL</td>
<td>90.5 (10.3)</td>
<td>74.0 (25.5)</td>
</tr>
</tbody>
</table>
Interpretation

• Patients in the Varus-Torsion group were more protective of the legs post op.
• Same return to sports and ADL’s
• Why?
  – TSF more traumatic experience psychologically?
  – More deconditioned from less mobility post op due to TSF?
  – Females more cautious or males more reckless?
<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Varus</th>
<th>Varus-Torsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confidence P=0.515</td>
<td>19 (82.6%)</td>
<td>17 (94.5%)</td>
</tr>
<tr>
<td>Knee pain P=0.878</td>
<td>23 (100%)</td>
<td>17 (94.5%)</td>
</tr>
<tr>
<td>Knee function P=0.999</td>
<td>22 (95.6%)</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>Fixator P=0.211</td>
<td>22 (95.7%)</td>
<td>14 (77.8%)</td>
</tr>
<tr>
<td>Worthwhile P=0.878</td>
<td>23 (100%)</td>
<td>17 (94.5%)</td>
</tr>
</tbody>
</table>
Complications

• **Compartment Syndrome (1)**
  – Varus & Torsion Group
  – Identified quickly and anterior-lateral compartments released
  – Peroneal nerve decompression- very tight
  – Uneventful correction and full recovery of function
  – Prophylactic nerve decompression and fasciotomy for other leg
Conclusions

• Patients with symptomatic varus have an almost 50% chance of having tibial torsion
  – More commonly are female, low BMI, younger

• Historically, patients perform very well after correction varus

• Patients perform just as well after correction of varus and torsion but are more cautious
Conclusions

• KOOS 4/5 and Questionnaire show both groups scored very highly

• Caution for compartment syndrome- can be devastating if missed

• Role for prophylactic fasciotomy?
• Role for prophylactic peroneal nerve release?