Distal Femoral Osteotomy to Treat Patellar Instability with Valgus Lower Extremity Alignment in Adolescents

Sheena R. Black, MD, Henry B. Ellis, MD, Philip L. Wilson, MD, David A. Podeszwa, MD

LLRS Annual Meeting
July 22, 2016
Charleston, S.C.
The authors have no significant disclosures
Introduction

Genu valgum is a risk factor for recurrent patellar instability
Introduction

• A varus producing distal femoral osteotomy (DFO) may be utilized for the treatment of symptomatic patellar instability in the skeletally mature adolescent.

• > 3 yr clinical and radiographic results and incidence of recurrent dislocation are reported
Methods

• Retrospectively review, IRB approved

• Consecutive patients who underwent an ISOLATED opening wedge DFO for recurrent patellar instability

• **Patients:**
  • < 18 years old
  • Skeletally mature
  • > 3 or more patellar dislocation episodes
  • Moderate to severe genu valgum
    (≥ Zone II mechanical axis or lateral distal femoral angle < 81°)
  • Failed non-operative treatment
Methods

• Exclusion criteria:
  • < 3 years follow-up
  • Any prior surgical treatment
  • Congenital patellar instability
  • Bi-planar osteotomies (including rotational)

• All osteotomies were performed by a senior author (DAP) using an opening wedge technique.
Methods

• **Data Analysis:**
  - Demographic
  - Clinical
  - Radiographic data measures

• **Outcomes measures:**
  - Kujala
  - Tegner Activity

• **Failures Defined:**
  - Documented recurrent patellar dislocation
  - Symptoms of patellar instability
Results

- 11 patients with Isolated DFO for PFI
- 10 with minimum of 3 year follow up
  - Avg age = 16 years (range 14-18 yrs)
  - 3 Males / 7 Females
  - Avg follow-up of 4.25 years (range 3.2-6.0 yrs)
Results

- All patients initially presented with post traumatic patellar instability
  - 9 from sports related injuries.
  - Avg # Dislocation Pre-op: 6.8 (2-30)

- BMI
  - Avg = 31.3 (range 19.7- 46.8)
  - All but 1 with BMI > 25
  - 5/10 (50%) with BMI > 30

- Avg Hip IR: 27.5° (20-45°)
Results

Pre-operative

• Avg Sulcus Angle: 134° (119 – 156°)
• Avg TTTG: 21 mm (18-23.5 mm)
• Trochlear dysplasia (Dejour grading)
  • grade A n = 1
  • grade B 4
  • grade C 1
  • grade D 2
## Results

### Patellar Height

<table>
<thead>
<tr>
<th></th>
<th>Pre - op</th>
<th>Post - op</th>
<th>Significance</th>
<th>Pre – op patella alta</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insall-Salvati</strong></td>
<td>1.33 (0.89 – 1.6)</td>
<td>1.16 (0.70 – 1.66)</td>
<td>p = 0.169</td>
<td>7 (64%)</td>
</tr>
<tr>
<td><strong>Caton - Deschamps</strong></td>
<td>1.46 (1.07 -1.75)</td>
<td>1.08 (0.86 – 1.3)</td>
<td>p &lt; 0.005</td>
<td>9 (82%)</td>
</tr>
</tbody>
</table>
Results

- **Valgus Correction:**
  - Avg pre-op lateral distal femoral angle was 75.7°
  - Avg correction = 10.4° (range 7-12 degrees)
Results

- **Valgus Correction:**
  - Avg pre-op LDFA 75.7° (72-79°)
  - Avg post-op LDFA 88.8° (86-91°)
  - Avg correction = 10.4° (7-12°)
Outcomes

- 8/10 (80%)
  - No further episodes of instability or subluxation.

- Post-operative Kujala score - Avg 83.6

- Post-operative Tegner score - Avg 5.5
  - All report fitness activity
  - 6/10 report jogging or running
Results - Failures

- 2/10 (20%)
  - Recurrent Patello-femoral subluxation symptoms
  - One underwent a TTT osteotomy with a MPFL reconstruction
  - One elected for no further surgery

- Non-PFI Re-Operations:
  - 3 patients
    - 2 HWR for symptomatic Implant
    - 1 lateral femoral OC Allograft to address index chondral injury
Genu valgum

- Risk factor for recurrent patellar instability
- Produces an increased Q angle and an increased lateral force placed on the patella


Correction of Valgus

- improve patellar tracking, allows for reduction in the Q angle
- relative medialization of the tibial tubercle

Discussion

- Report on the successful use of selective isolated hemiepiphyseodesis for children that present with patello-femoral instability in the presence of genu valgum

Summary

• 8/10 in our cohort of patients had resolution of their patellofemoral instability symptoms after surgery

• Only one patient had to undergo a recurrent operation to address their ongoing patellofemoral instability symptoms
Discussion

Cohort exhibited

- Moderate to Severe Valgus
- Lower Activity Demands
- High incidence of overweight and Obesity

- **DFO may provide utility in a specific, but not uncommon, population with valgus and lower activity demands**

- **Co-existing Valgus and BMI**
  - Alignment correction desirable for lateral compartment reduced arthrosis
  - Improved patellar tracking
Discussion

• Limitations
  • retrospective nature
  • small number of patients
Conclusion

• Isolated DFO for moderate to severe femoral valgus in the setting of patellofemoral instability may resolve patellar instability

• DFO seems to provide satisfactory functional outcomes in a specific cohort of skeletally mature adolescents
Thank You!
Thank You!