Adult Recurrent PF Instability

Jack Farr, MD
OrthoIndy Knee Care Institute
Indianapolis, IN USA
Financial Disclosures

• Design Surgeon for Tracker AMZ guide (DePuy/Mitek); past royalties
• Design Surgeon for T3 AMZ guide (Arthrex); current royalties
Treatment Directed to Pathology

• Patellar Alta (Neyrette)
• Trochlear Dysplasia (Dejour, Verdonk 2006)
• Coronal Plane Excessive Valgus Alignment
• Rotational Excesses of Femur/Tibia (Teitge)
• Disruption of MPFL
• Excessive Lateral Tuberosity Position
Focus on MPFL and Tuberosity

• No Longer a Proximal vs Distal Argument
• Direct attention at specific pathoanatomy
• Essential Lesion is MPFL patholaxity; therefore, this is always addressed
• TT –TG may be normalized, which does not prevent instability; overmedialization may prevent instability, but is NOT suggested as it causes DJD, e.g., Hauser
  (ref. Fithian; Andrish & Kuroda)
Define Pathoanatomy

• MPFL status
  stretched and healed with good bulk
  vs. attenuated

• Repair vs. Nonoperative vs. Recon Debate
  Level of Evidence 1,2: repair inconsistent
  Level of Evidence 3, 4: repair potentially effective
MPFL

- Thickened bandlike condensation of connective tissue extending from the medial 2/3 of the patella to the medial femur
- Between superficial fascia and capsule
- VMO may cover proximal portion

Courtesy Robert Burks, MD
Current Open MPFL Repairs recognize that multiple tear sites are possible.
Reconstruction Techniques

- All MPFL grafts stiffer and stronger than native
- Placement is anatomometric not isometric
- Patellar attachment site: Proximal 2/3 is directly assessed
- Femoral attachment site is variable patient to patient and is key to proper MPFL length changes during ROM (May begin with Schoettle radiographic points)
Attachment Techniques

• Femoral: Tenodesis most common (Fulkerson discussion in this ICL)
Continue to be critical of literature assigned femoral attachment sites

(Tunnel placement and Graft Orientation very important)

Are these the same femoral attachment site?

Courtesy Schoettle

Courtesy Burks
Femoral Attachment Sites: Patient Specific

- Schottle 2007 study Burks, 2009 AAOS ICL
- 8 cadavers, vary up to 5 mm
- Paper #107 Accuracy of Radiological Landmarks for Femoral Insertion of the MPFL. Van Der Merwe
- Eposter 1301 In Vivo Positioning Analysis of MPFL Servien

Courtesy Schoettle and Burks
Effect of Malposition or wrong Length of MPFL graft

• Technical Errors During Medial Patellofemoral Ligament Reconstruction Could Overload Medial Patellofemoral Cartilage

• A Computational Analysis

• John J. Elias, PhD*,† and

• Andrew J. Cosgarea, MD‡ AJSM 2006
Patellar Attachment Techniques

- Patella: One or two bundles attached in tunnels or trough

- Tunnels can lead to stress risers; that is, fractures may occur after tunnels (Erasmus)

Courtesy Erasmus
Access to the medial border of the patella
(direct suturing, tunnels or trough)

Suture anchor embedded in bony trough, which has been refitted with looped suture

Fine adjustments of graft length:
Prior to attachment through tunnels, directly to soft tissue or bone

Example of loop fixation in medial patellar bone trough

Graft courses back towards the femoral attachment and sutured to itself

Tibial Tuberosity Surgery
When NOT to move the TT

• Normal TT-TG
• Abnormality is excessive femoral anteversion (Teitge)
• Abnormality is excessive tibial external torsion (Paulos)
Rational for Tuberosity Surgery

• Medialize to normal range of TT-TG to improve the resultant quadriceps vector
• Medialize to improve central tracking of the patella with improved contact areas (decreasing cartilage stress)
• Anteriorization if unloading (transfer of loading) is desired
Tibial Tuberosity Osteotomy: TTM vs AMZ

AMZ adds Unloading: consider when chondrosis present
Piadoriano & Fulkerson Patellar Chondrosis Classification

A Type I is articular injury to the inferior pole
B Type II is articular injury to the lateral facet
C Type III is articular injury to the medial facet
D Type IV is articular injury to the proximal pole (Type IVa) or a panpatellar injury (Type IVb).

AMZ best for distal lateral
AMZ example:
Recurrent Instability + Static Chronic Patellar Subluxation (Adding AMZ to MPFLR)

DO NOT PULL Patella into Position; but rather, realign into position

MPFL checkreins the patella to prevent pathologic excursion; It does NOT over-constrain it into position
Step cut the superficial (obique) and deep (transverse) lateral retinaculum to allow lateral lengthening (Biedert)

Anterior compartment is reflected and the patellar tendon is released
AMZ example

AMZ cutting block with slope selector

Saw through cutting block and tibia exiting on retractor

Conflict of Interest Disclosure

Farr Designed the Tracker AMZ Jig System (DePuy Mitek)
Alternative AMZ Jig System

Conflict of Interest Disclosure: Design Surgeons Farr, Cole, Nawab; Arthrex
Saw using first cut as captured guide

Osteotomes connect posterior cut proximally
Steep osteotomy completed with free tuberosity pedicle
Tuberosity fixed with 2 interfragmentary screws
Anterized 15mm; medialized 9 mm
Post Op Radiographs
References
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Journal/Year</th>
<th>Article Type</th>
<th>Patient Details</th>
<th>Follow-Up</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fulkerson JP</td>
<td>AJSM 1990</td>
<td>AMZ</td>
<td>30 pts, 12 pts</td>
<td>&gt;2 y F/U</td>
<td>89-93% G/E Advance DJD subgroup: No E; 75% G</td>
</tr>
<tr>
<td>Pidoriano AJ</td>
<td>AJSM 1997</td>
<td>AMZ</td>
<td>23 pts</td>
<td>10 F/U</td>
<td>87% G/E distal/lateral chondrosis 55% G/E medial chondrosis poor results with trochlear chondrosis</td>
</tr>
<tr>
<td>Buuck D</td>
<td>Op Tech Spt Med</td>
<td>AMZ</td>
<td>42 knees in 36 pts</td>
<td>8.2 mean F/U</td>
<td>86% G/E</td>
</tr>
<tr>
<td>Bellemans J</td>
<td>AJSM 1997</td>
<td>AMZ</td>
<td>29 patients</td>
<td>32 mon mean (25-44 mon)</td>
<td>28 successful</td>
</tr>
<tr>
<td>Naranja RJ</td>
<td>Elmslie-Trillat Maquet</td>
<td>AJSM 1996</td>
<td>55 knees in 51 patients</td>
<td>74.2 mon (13 – 196 mon)</td>
<td>73-84% G/E</td>
</tr>
<tr>
<td>Study</td>
<td>Procedure</td>
<td>Journal</td>
<td>Year</td>
<td>Patients</td>
<td>Follow-up</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------</td>
<td>-------------</td>
<td>------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Carney JR (6)</td>
<td>Roux-Elmslie-Trillat</td>
<td>AJSM</td>
<td>2005</td>
<td>14 pts.</td>
<td>3 and 26 y mean F/U</td>
</tr>
<tr>
<td>Karataglis D (7)</td>
<td>Modified Elmslie-Trillat</td>
<td>Knee</td>
<td>2006</td>
<td>44 knees in 38 pts</td>
<td>40 mon mean; 18-130 mon F/U</td>
</tr>
<tr>
<td>Kumar A (8)</td>
<td>Elmslie-Trillat</td>
<td>Knee</td>
<td>2001</td>
<td>9 pts</td>
<td>3 y mean F/U</td>
</tr>
<tr>
<td>Nakagawa K (9)</td>
<td>Elmslie-Trillat</td>
<td>JBJS</td>
<td>2002</td>
<td>45 knees in 39 pts</td>
<td>13.5 y mean F/U</td>
</tr>
<tr>
<td>Shelbourne KD (10)</td>
<td>Modified Elmslie-Trillat</td>
<td>AJSM</td>
<td>1994</td>
<td>45 knees in 40 pts</td>
<td>2 yr mean F/U</td>
</tr>
</tbody>
</table>
Thank you

Jack Farr, M.D.