Arthroscopic Repair of a Complex Lateral Meniscus in a 17-Year-Old Female: *Inside-Out Sutures*

Peter R. Kurzweil, MD
Memorial Orthopaedic Surgical Group
Long Beach, CA
Disclosure

- Consultant
  - Ceterix
  - Cayenne Medical
  - Pierce Surgical
  - Orteq (Actifit)
  - Parcus Medical
  - Zimmer (Patient Specific)
- Other Support: Surgery Center Ownership
Technical Note

The Surgical Approach to Lateral Meniscal Repair

Bernard R. Bach, Jr., M.D. and Charles Bush-Joseph, M.D.
Outside-In Meniscus Repair

- Given a topic from the 1990’s
- Like discussing advantages of open rotator cuff repair
  - Emerging Technology
Suture repair of Lateral Meniscus Tear

→ Injury of the Peroneal Nerve


*Figure 2.* Three distinct patterns of division were encountered in the common peroneal nerve with respect to the deep and superficial branches.
Lateral Meniscus Tear at Popliteus

Contralateral portal

Deutch, AJSM No. 27, 1999
Dr. Sgaglione
New York, NY
Reasons to Use Sutures

1. Less Invasive
2. Versatility
3. NV Safety
4. Cost
5. Fixator Problems
6. Biomechanics
7. Success
Inside-out

Still the gold standard

Frank Noyes, MD
Less Invasive?

• Sutures are LESS INVASIVE where it counts – the meniscus
Large Fixator Diameter → Radial Tear

Fixator

Suture

Back STF-706
1 mm

Back STF-706
1 mm

Houghton & Shipman; SAMPE 2007
• Fixator creates large hole in normal meniscal tissue

• → 25% loss of mechanical pull-out strength
2. Versatility

- Fixators can’t be used for anterior third tears
- Sutures can get EVERYWHERE!
I-O sutures can repair many tear patterns
3. **NV Safety**

Fixators → blindly putting needle into back of knee
Posterior Horn Lateral Meniscus

Ipsi-lateral portal
≤ 3 mm from Popliteal artery in 43% specimens (PHLMT)

Miller (J Knee Surg. July 2007)
### 4. Cost

<table>
<thead>
<tr>
<th>Device</th>
<th>Price</th>
<th>Cost for 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FIXATORS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suture-based Fixator</td>
<td>$400</td>
<td>$1200</td>
</tr>
<tr>
<td>Disposable pusher/cutter</td>
<td>$100</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>$1300</strong></td>
</tr>
<tr>
<td><strong>SUTURES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suture</td>
<td>$30 each</td>
<td></td>
</tr>
<tr>
<td>Zone Specific</td>
<td>Instruments available</td>
<td><strong>$90</strong></td>
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</tbody>
</table>

- Are Fixators worth their cost?
- Is your surgery center paying for them?
- Sutures are inexpensive (and work)
5. Fixator Trouble

- Learning curve exists
- Deployment failure (25% in two studies)
- There’s another $
Nice compression superiorly
Difficult to get inferior portion
Can lead to puckering
Sucking in capsule
6. Biomechanics

- Sutures can fail at knot
- Fixators can fail at knot and either backstop
7. Success with Suture

- Shelbourne - BHM tears *repaired with suture* healed at a high rate

- Feng (2008) – Meniscal healing rate of 90% – BHMT undergoing I-O suture repair with concurrent ACLR
• Prospective study of meniscal repair
  – Inside-out suture
  – Fixator

• Success at 1 year follow-up:

<table>
<thead>
<tr>
<th></th>
<th>Inside-out</th>
<th>Fixator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healing Rate</td>
<td>95%</td>
<td>65%</td>
</tr>
<tr>
<td>Duration (min)</td>
<td>18</td>
<td>14</td>
</tr>
</tbody>
</table>

Hantes & Malizos (2006)
Sutures Better than Fixators in Animal Studies

• Repaired meniscus in 64 goats → euthanized at 6 months.

• Healing rate for Fixators significantly inferior to sutures

Hospodar & Miller (2009)
Blood Supply of Lateral Meniscus at Popliteus

And no capsular attachments
We just don’t have a good answer

• “Sorry, your meniscus repair has failed”
Thank You