Meniscal Injury and Rehabilitation

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Speaker’s Disclosure

• Book royalties
  – Springer
  – Wolters Kluwer Health - Lippincott Williams & Wilkins
The 1900’s:
A Century of Change

• 1887, Sutton: “The functionless remains of a leg muscle”
• 1940, McMurray: “The cause of failure of meniscal removal lies in the failure to remove the entire affected cartilage”
• 1948, Fairbanks: “Meniscectomy is not wholly innocuous”
Meniscal Vascularity

From Steve Arnosky
Biomechanics: Hoop Stresses

- **Circumferential fibers**
  - Convert compressive forces to tensile forces
  - Dependent on bony anchors
  - Loss of substance or disruption of hoop fibers leads to loss of function
Oblique
Longitudinal
Degenerative
Radial
Horizontal
Goals of Arthroscopic Menisectomy:

- Remove unstable torn portion
- Contour
- Preserve capsular rim
- Leave stable cleavage tears?
- Protect surrounding cartilage
Unstable flap resected
Rehab Post Meniscectomy

- Young, traumatic
- A no brainer for this audience
- Resolve effusion, maintain muscle tone, restore motion
- Rebuild muscle strength, restore proprioception and agility
- Retrain for sports/work activities
Rehab Post Meniscectomy

- Older and degenerative
- Often multiple areas of articular surface damage
- Swelling control is key
- Do not overload the patellofemoral joint
- Go slow and avoid lunges and squats
- They may only want to get back to golf
Meniscal Repair: Indications

• Repair any tear with biologic potential to heal

• Peripheral longitudinal: red-red or red-white, lateral radial to the periphery, root avulsions

• Hope to limit re-operations
Meniscal Repair: Indications

• Since any meniscal resection carries an increased likelihood for OA
• Repair any tear with biologic potential to heal
• Push the envelope on young pts & with ACL reconstruction
All Inside Meniscal Repair Implants

- 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} Generation
  - Suture based
  - Allow compression
  - Flexible

- Simplified and increased repairs
Brophy et al: Systematic Review
Re-Operation Rates

Bar chart showing re-operation rates for partial meniscectomy and meniscal repair over different follow-up periods. The chart indicates:
- 0-4 years: 1.4% partial meniscectomy, 4.7% meniscal repair
- 4-10 years: 16.5% partial meniscectomy, 30.1% meniscal repair
- >10 years: 3.9% partial meniscectomy, 20.7% meniscal repair

Average rates:
- Meniscal repair: 22.4%
- Partial meniscectomy: 4.0%
### TABLE 4. Lysholm Grades After More Than 10 Years’ Follow-up

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Studies (n)</th>
<th>Repairs (n)</th>
<th>Excellent</th>
<th>Good</th>
<th>Moderate</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meniscal repair(^{30})</td>
<td>1</td>
<td>8</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Partial meniscectomy(^{28,29})</td>
<td>2</td>
<td>142</td>
<td>54.2%</td>
<td>26.8%</td>
<td>3.5%</td>
<td>15.5%</td>
</tr>
</tbody>
</table>

### TABLE 5. Radiographic Changes After Minimum of 10 Years’ Follow-up

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Studies (n)</th>
<th>Repairs (n)</th>
<th>0</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meniscal repair(^{30,63,87})</td>
<td>3</td>
<td>109</td>
<td>78%</td>
<td>19%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Partial meniscectomy(^{19,122,124})</td>
<td>3</td>
<td>104</td>
<td>63%</td>
<td>24%</td>
<td>12%</td>
<td>1%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Meniscal Repair: Post-Op Rehabilitation

- Well fixed peripheral longitudinal tears
  - WBAT in extension with brace for 4 weeks
  - ROM 0° to 90° for 4 weeks
  - Progressive rehab avoiding deep squats and cutting sports until 4 mo. post-op
Meniscal Root Avulsion
Meniscal Root Avulsion Repair via Bone Tunnel
Meniscal Root Repair: Post-Op Rehabilitation

- Root and radial tear repairs
  - NWB for 4 weeks ROM 0° to 90°
  - 2 weeks PWB
  - Progressive rehab avoiding deep squats and cutting sports until 4 mo. post-op
  - Careful! Older have OA
Allograft Meniscal Transplantation

• Indications
  – Total (or near total meniscectomy)
  – Compartmental pain
• Final functioning of allograft 50% - 75% of normal meniscus
• “Salvage” procedure
• “Realistic” expectations of not resuming high impact activities
Results: Short Term

100% healing, with dramatic pain relief

6 mo. post implant

2 yr. post implant
Allograft Meniscal Transplantation

- Post-op care
  - NWB with ROM 0° - 90° for 4 weeks
  - PWB in brace additional 2 weeks
  - Avoid lunges
  - No squats indefinitely
  - No running for at least 6-12 months

8 year f/u lateral
Allograft Meniscal Transplantation

• “Salvage” procedure
• Advise your patients to have realistic demands
• Recommend low impact activities indefinitely

12 year follow-up
THANK YOU