The Other Autograft Option: Quad Tendon ACL Graft Harvest and Preparation
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1. Anatomy and Biomechanics
   • The vastus lateralis/medialis/intermedius and the rectus femoris all converging on the superior aspect of the patella,
     • Average length – 79 mm
     • Average width – 27mm
     • Average depth – 8 mm
   • Structural properties of the quad tendon close to the native ACL
     (Sträubli et al. AJSM 1999)
   • Similar tensile properties regardless of splitting plane when using quad tendons for DB ACL reconstruction
     (Miller, Musahl et al. KSSTA 2016)
   • SB ACL reconstruction using quad tendon biomechanically equivalent compared to ACL reconstruction with quadrupled hamstring tendon
     (Sasaki, Woo et al. 2014)

2. My Indications

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<th>Quad Tendon - Soft Tissue Graft</th>
<th>Quad Tendon - Bone Block</th>
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<td>• Sprinters, wrestlers, judo</td>
<td>• Revision ACL</td>
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<td>• Laborers, carpenters, etc.</td>
<td>• PCL</td>
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<td>• ACL with MCL injury</td>
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<td>• Large ACL footprint (&gt;16mm)</td>
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3. **Harvesting and Preparation**

Identification of vastus medialis (VM) and vastus lateralis (VL). Central 5 cm skin incision from the distal pole of the patella (P). Blunt preparation of the quadriceps tendon. Identification of length (max 7cm) and direction (endoscopic supported).

No special instruments needed:
- Size 10 blade
- Richardson retractor
- No.2 braided suture

Versatile in size: Partial vs. Full Thickness

- No.2 braided suture x4
- Measure tunnel length
- Free endobutton on femoral side
- Suture disk/ suture post on tibial side
- Tie suture with 15-20 mm graft in femoral tunnel

4. **Outcome Studies**

- Functional outcome scores comparable to **primary** DB ACL reconstruction using hamstring tendon at a minimum 24-month follow-up *(Lee JK, AJSM 2016)*

- Applicable in **revision** cases with clinical outcomes similar to the results using contralateral semitendinosus-gracilis graft at the 24-month follow-up *(Hänger M, Arthrocopy 2016)*

- Anatomical single-bundle ACL reconstruction using a quadriceps autograft resulted in equivalent level of muscle recovery and knee stability *(Iriuchishima T, Fu F, KSSTA 2016)*
5. Pros/Cons of Quad Tendon

<table>
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<th>Pro</th>
<th>Cons</th>
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<td>• Reliably robust – 2x cross-sectional area of patellar tendon</td>
<td>• Rectus femoris retraction with too proximal of a harvest</td>
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<td>- (Shani et al. Arthroscopy 2016)</td>
<td>• Bleeding</td>
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<td>• Less risk of infection compared to hamstrings</td>
<td>• Fluid extravasation during arthroscopy</td>
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<td>- (Maletis et al. AJSM 2013)</td>
<td>• Risk of fracture with bone block</td>
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<td>• Less risk of anterior knee pain than patellar tendon</td>
<td>• Initial rehab more difficult</td>
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<td>- (Mulford et al. KSSTA 2013)</td>
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<td>• Less risk of injury to infrasaphenous nerve branch Versatile -</td>
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<td>safe in adolescents</td>
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</table>

6. Pearls – if harvesting bone block

- Harvest from central & centromedial patella
- Harvest a fixed percentage of depth (<30%)
- Avoid lateral portion of patella

Summary

- Versatile, robust graft
- Relatively easy to harvest with simple instruments
- Less donor site morbidity
- Quad recovery the same!
- Comparable outcomes to other grafts
- No.1 for revisions
References


