



Acute Quadriceps Tendon Repair

Current Concept Review

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INTRODUCTION

- Incidence: 1.37/100,000/year in the UK alone, accounts for 3% of all tendon injuries.^{1,2}
- Ruptures occur as sequela of pre-existing tendon pathology from overuse.¹
- Risk factors: RA, SLE, gout, CKD, DM, hyperparathyroidism, and PVD. ^{1,4,5}
- Generally treated surgically; early repair or reconstruction is preferred to avoid tendon retraction and muscle atrophy.¹

QUADRICEPS TENDON ANATOMY

- The knee joint is a Type III lever allowing short contractions of quad to produce large displacements of leg. ^{9,10}
- The patella is a dynamic fulcrum that decreases force differential and gives extensor mechanism mechanical advantage, particularly in flexion. ^{4,9}

MECHANISM OF INJURY

- Injuries typically occur with eccentric contraction
- Rupture typically occur 1-2 cm from the upper patellar border in the avascular zone (zone 2) of the tendon (Fig 1).¹³
- Tendinitis or tendinosis of the quadriceps tendon is an overuse condition causing inflammation or degeneration at the tendon insertion site as a result of repetitive overloading of the extensor mechanism.⁴
- Overuse predisposes athletes to acute tendon rupture as the end stage outcome from repetitive microtrauma.¹⁴

CURRENT CONCEPTS

- Time to Operation:** operative repair should be performed within 2-3 weeks of injury for optimal results.¹⁶
- Techniques:** Transosseous bone tunnels vs. suture anchors (simple suture repair utilized for some mid-substance tears)
 - Biomechanics:** Suture anchors biomechanically superior to transosseous tunnels
 - Suture anchors exhibited smaller gap formation and greater load to failure (Fig 2). ²²
 - Suture characteristics:** Suture tape with Krackow configuration resulted in less elongation and greater load to failure compared to suture and whip-stitch. ²³
- Outcomes**
 - Few studies directly compare outcomes based on technique
 - Ipsilateral deficits often persist (e.g., muscle atrophy, weakness). ¹⁷
 - Evidence suggests little affect on patient satisfaction. ¹⁷
 - No difference in functional outcomes based on technique. ¹⁹⁻²¹

- Post-operative rehab:** Early motion protocols appear equivocal to traditional protocols with period of immobilization. ²
 - Early motion protocols did not lead to increased complications, re-rupture rates, or inferior IKDC scores with mean 4.5-year follow-up. ²

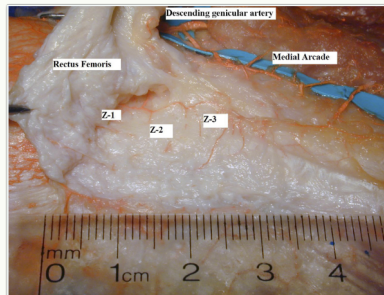


Fig 1: Anatomical dissection of the left knee, showing the medial arterial arcade. The rectus femoris tendon is reflected upward with a forceps. Z-1 = zone 1, Z-2 = zone 2, and Z-3 = zone 3. Courtesy of Yepes et al. JBJS 2008 ¹³

	Suture anchor	Transosseous
Gap formation	1.5-5.0 mm	3.1-33.3 mm
Load to failure	286-740 N	251-691 N

Fig 2: Biomechanical comparison quadriceps tendon repair using suture anchors versus transosseous patellar bone tunnels. Data courtesy of Onggo et al. Arthroscopy 2022

CONCLUSIONS

- No obvious superior surgical technique or post-operative rehab protocol
- Early operative repair within 2-3 weeks produces optimal results
- Higher level comparative studies warranted

REFERENCES/ DISCLOSURES



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