Comparing Clinical Outcomes Between Transosseous Patellar Suture Fixation Versus Suture Anchor Repair in the Treatment of Quadriceps Tendon Rupture

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Introduction

- Repair of quadriceps tendon ruptures (QTR) aims to restore strength and function to the extensor mechanism.
- The gold standard surgical treatment option remains transosseous suture repair through the patella. However, limited biomechanical literature and small case series have reported the use of suture anchor repair techniques.

Objectives

The objective of this study is to compare clinical and functional outcomes, in the largest series to date, of quadriceps tendon ruptures surgically treated with transosseous patellar suture or suture anchor repair.

Methods

- Retrospective review was performed for patients undergoing surgical repair of quadriceps tendon injuries between 2007-2018.
- Patients treated with transosseous patellar suture (TS) repair and suture anchor repair (SA) were identified.
- Surgical technique included 1,2, or 3 suture anchors or 2 or 3 transosseous suture patellar tunnels.
- Analyzed clinical and functional outcomes based on objective measurement of range of motion, graded strength testing, and follow-up duration. Infection, re-rupture, deep vein thrombosis, and patella fracture were investigated as complications.
- Chi-squared, Fisher's exact, and independent samples t-tests were used to compare the SA and TS groups, significance defined as $p < 0.05$.

Results

154 QTR	Patient characteristics			
	Average	Transosseous	Suture anchor	P Value
113 Transosseous repair 103 acute 10 chronic	Age (years)	60	54.2	0.02
	Gender (% male)	87.6	94.7	0.35
41 Suture anchor repair 30 acute 11 chronic	BMI	32.1	31.3	0.6
	Follow up months	7.9	8	0.92
	% Acute	89.6	79.1	0.08

Acute < 6 weeks to surgery, chronic > 6 weeks

- At final follow-up, mean extension (3.28° vs 1.71° , $p = 0.17$) and flexion (121° vs 116° , $p = 0.29$) were not statistically different between the SA and TS groups.
- Graded strength testing at final follow-up between SA and TS groups (4.35 vs. 4.61, $p = 0.03$) was functionally comparable.
- There were no significant differences in the rates of complications, including re-rupture.

	Transosseous	Suture anchor	P value
ROM arc (deg)	116	121.1	0.29
Extension (deg)	1.71	3.28	0.17
Strength	4.61	4.35	0.03
Infection (%)	4.7	2.6	>0.99
DVT (%)	1.9	7.9	0.11
Re rupture (%)	15	18.4	0.62

ROM range of motion, DVT deep vein thrombosis

Conclusion

- Suture anchor repair of acute or chronic quadriceps tendon ruptures may provide similar clinical results compared to the gold standard transosseous patellar suture repair technique.
- Range of motion and strength in this short-term follow-up study were comparable among both groups, with no significant difference in complication rates.

Reference

- Ian DI, Tejwani N, Keschner M, Leibman M. Quadriceps tendon rupture. J Am Acad Orthop Surg 2003;11:192–20032.
- Clayton RAE, Court-Brown CM. The epidemiology of musculoskeletal tendinous and ligamentous injuries. Injury. 2008 Dec; 39(12):1338–44. <https://doi.org/10.1016/j.injury.2008.06.021> PMID: 19036362
- P. Maniscalco, C. Bertone, F. Rivera, L. BocchiA new method of repair for quadriceps tendon ruptures. A case report Panminerva Med, 42 (3) (2000), pp. 223-225
- Petri M, Dratzidis A, Brand S, Calliess T, Hurschler C, et al. Suture anchor repair yields better biomechanical properties than transosseous sutures in ruptured quadriceps tendons. Knee Surg Sports Traumatol Arthrosc. 2015; 23(4):1039–45. <https://doi.org/10.1007/s00167-014-2854-3> PMID: 24474585
- R. M. Sellei; E. Bauer; M. Hofman; P. Kobbe; P, et al. Reconstruction of a quadriceps tendon tear using Polyvinylidene fluoride sutures and patellar screw fixation: A biomechanical study. The Knee, ISSN: 1873-5800, Vol: 22, Issue: 6, Page: 535-41
- Lighthart WA, Cohen DA, Levine RG, Parks BG, Boucher HR. Suture anchor versus suture through tunnel fixation for quadriceps tendon rupture: a biomechanical study. Orthopedics. 2008 May; 31(5):441. PMID: 19292325
- Plessner, S. Keilani, M. Veksler, G. Hasenoehrl, T. Palma, S. Reschl, M. Crevenna, R. Hajdu, S. Widhalm, H. K. Clinical outcomes after treatment of quadriceps tendon ruptures show equal results independent of suture anchor or transosseous repair technique used - A pilot study. 2018 PLoS One, Vol: 13, Issue: 3.
- Brossard P, Le Roux G, Vasse B. Acute quadriceps tendon rupture repaired by suture anchors: Outcomes at 7 years' follow-up in 25 cases. Orthop Traumatol Surg Res. 2017 Jun; 103(4):597±601.
- <https://doi.org/10.1016/j.otsr.2017.02.013> PMID: 28373140