



Review

Reconstruction techniques and clinical results of patellar tendon ruptures: Evidence today



Jack H. Gilmore^a, Zoë J. Clayton-Smith^a, Marc Aguilar^a, Spiros G. Pneumáticos^c, Peter V. Giannoudis^{a,b,*}

^a Academic Department of Trauma & Orthopaedics, Leeds General Infirmary, Clarendon wing, Level A, Great George Street, LS1 3EX Leeds, United Kingdom

^b NIHR Leeds Biomedical Research Unit, Chapel Allerton Hospital, Leeds West Yorkshire, Leeds LS7 4SA, UK

^c KAT Hospital, School of Medicine, University of Athens, Greece

ARTICLE INFO

Article history:

Received 16 February 2014

Received in revised form 25 October 2014

Accepted 29 October 2014

Keywords:

Patellar tendon

Operative

Rupture

Repair

ABSTRACT

Background: The analysis of the different operative reconstructions of patellar tendon ruptures has not been reported. A critical review of the existing literature was performed to identify the different operative techniques and the post-operative outcomes in acute, chronic and post-total knee arthroplasty (TKA) patellar tendon rupture repairs.

Methods: Using PRISMA guidelines, a review of the English-written literature published after 1947 was performed using the MEDLINE, PubMed and Cochrane libraries in November 2013 to retrieve case series with the keywords “Patellar tendon” AND “Rupture” AND “Repair” in their title or abstract.

Results: Forty-one manuscripts, reporting on 503 patients were analysed. Three-hundred-and-fifty-four acute repairs described eight different operative techniques. One-hundred-and-forty-nine chronic repairs described eight different operative techniques. Sixty-eight post-TKA repairs described nine different operative techniques. Six acute, four chronic and seven post-TKA repair operative techniques reported failures. In acute repair, using a primary repair method augmented with cerclage wire, Dall–Miles cable or non-absorbable sutures reported the best clinical results, with a 2% failure rate. Alternatively, for chronic and post-TKA repair, autogenous grafts were significantly better than primary repair ($p = 0.0252, 0.0038$ respectively).

Conclusion: Acute surgical repair of a patellar tendon rupture using augmented primary repair is associated with the best post-operative outcomes. In chronic and post-TKA repair, autogenous grafts produce best post-operative outcomes. Immediate post-operative mobilisation should be considered in all repairs. Future papers reporting on patellar operative repairs should have a standardised scoring method of functional outcome to allow more comprehensive comparison and evaluation.

© 2014 Elsevier B.V. All rights reserved.

Contents

1.	Introduction	149
2.	Methods	149
3.	Results	149
3.1.	Patient factors	149
3.2.	Injury type	149
3.3.	Operative techniques used	149
3.3.1.	Primary repair surgical technique	149
3.3.2.	Autogenous repair surgical technique	149
3.4.	Operative techniques used in relation to timing of repair	149
3.4.1.	Acute repair	149
3.4.2.	Chronic repair	150
3.4.3.	Post-TKA repair	150
3.5.	Functional outcomes	150
3.5.1.	Acute repair	150
3.5.2.	Chronic repair	150

* Corresponding author at: Academic Department of Trauma & Orthopaedic Surgery, School of Medicine, University of Leeds, UK. Tel.: +44 113 3922750; fax: +44 113 3923290.
E-mail address: pgiannoudis@aol.com (P.V. Giannoudis).

3.5.3.	Post-TKA repair	150
3.6.	Complications and failures	150
3.6.1.	Acute repair	150
3.6.2.	Chronic repair	152
3.6.3.	Post-TKA repair	152
3.7.	Post-operative immobilisation and rehabilitation regimes	152
4.	Discussion	152
5.	Limitations	152
6.	Conclusion	152
	Conflicts of interest	152
	Acknowledgements	152
	References	153
Appendix 1.	Summary of literature	154

1. Introduction

Patellar tendon rupture is an extremely disabling injury resulting in an inability to extend the knee. Its peak incidence is in the third and the fourth decade of life (1). Surgical intervention continues to be the gold standard of treatment, aiming to restore function of the extensor mechanism.

There are several different operative techniques used to repair patellar tendon ruptures, the choice of which appears to be influenced by the time between tendon rupture and repair. Cumulative analysis of the different repair techniques and their clinical outcomes has not been reported. This study therefore aims to compare the different surgical techniques employed relative to the timing of surgery, functional outcomes, complications and failure rates using a systematic review of the literature.

2. Methods

A review of the English literature was undertaken using the MEDLINE, PubMed and Cochrane libraries between January 1948 and November 2013 according to the PRISMA guidelines (2). The keywords “Patellar tendon” AND “Rupture” AND “Repair” were used. The authors reviewed abstracts and references in order to ascertain their relevance according to the inclusion criteria: a study reporting a case series written in English and published after 1947. Papers only describing a single case and/or reporting qualitative post-operative evaluations, as well as experimental studies, were excluded. Ambiguity towards a paper's inclusion resulted in the full article being retrieved and reviewed by the authors.

Data concerning patient demographics, rupture aetiology, preoperative risk factors, functional outcomes, complications and failures, duration of post-operative immobilisation and rehabilitation regimes were collated on an electronic spreadsheet (Microsoft Excel for Macintosh). Repairs were classified as acute, chronic or post-total knee arthroplasty (TKA), definitions of which are as follows:

- Acute repair*: adequate remnant tissue and/or repair within two weeks of injury
- Chronic repair*: inadequate remnant tissue and/or repair after two weeks of injury
- Post-TKA repair*: patients having recently undergone TKA. These ruptures could present either acute or chronically.

A complication was defined as an infection or hardware failure not requiring revision surgery. Operative failure was defined as a re-rupture within two months of repair, or a repair requiring revision surgery.

Both qualitative and quantitative statistics were applied to the data, the latter using StatsDirect. P values were calculated using the Fisher's exact test; a p value of less than 0.05 was considered a statistically significant value.

3. Results

Forty-one manuscripts reporting on 503 patients met the inclusion criteria (1,3–42) (Appendix 1).

3.1. Patient factors

The estimated mean age of the patient population was 39 years (range 11–90 years). Of the 378 patients whose sex was specified, 83% were male (3–16,18–22,24–30,32–34,37,41,42).

The most prevalent identified risk factors were previous knee surgery, (16%/79 patients) (1,3,5,7,8,13,15,18,20,21,26,28,29,31,35,37,41) and patellar tendinitis (5%/27 patients) (6,16,24,26,29,30).

3.2. Injury type

The inferior pole of the patellar (tendon rupture 1 cm or less from the inferior pole of the patella) was the most common site of tendon rupture (24%/120 patients) (3–10,14,25–27,30,32,40) followed by the mid-substance (2–3 cm from the pole) (8%/39 patients) (4,6–8,12,18,20,25,27–30,32,33) and the level of the tibial tuberosity (tendon rupture > 3 cm from the pole with or without bony avulsion) (4%/21 patients) (3,4,6–8,11,27,32,42). Seventeen patients (3%) presented with partial ruptures (3,6,35,36).

Three-hundred-and-thirteen cases made reference to laterality of injury. Of these, 96% were unilateral and the remainder bilateral (1,3–6,8–12,14,16,18–21,23–26,28–30,32–35,37–39,41,42).

3.3. Operative techniques used

3.3.1. Primary repair surgical technique

Three-hundred-and-eighty-three patellar tendon ruptures were repaired through primary repair, with or without augmentation (Fig. 1a) (1,3,4,6,9,11,12,16,19,22–30,32–34,36,38–40). In proximal and distal ruptures the tendon is brought back to its anatomical position, secured to either the inferior pole of the patella or the tibial tuberosity and the medial and lateral retinacular tears repaired. Midsubstance ruptures are repaired using sutures placed in proximal and distal bundles and secured through parallel vertical holes drilled in the patella with a transverse hole drilled in the tibial tuberosity.

After the repair has been completed it is assessed for augmentation to maintain the distance and correct tension of the tendon. Sixty-six percent (254 patients) were augmented with either cerclage wire, Dall–Miles cable or non-absorbable sutures (1,3,4,6,9,16,19,23,26,27,30,33,36,38–40). The augmentation material is passed around the proximal border of the patella and then through a tunnel in the tibia and tied, usually, with the knee at 60° of flexion.

A non-absorbable suture was the most popular material for repair, used in 74% of primary repairs (282 patients) (1,3,4,9,11,16,22–24,26–28,30,32,34,36,38,39), whilst only 8% used absorbable sutures (30 patients) (23,33).

The most popular suturing technique was the Krakow technique (20%/75 patients) (28,30,32,33,40), followed by the modified Kessler technique (5%/18 patients) (3,26), Bunnell technique (4%/15 patients) (1,16) and interrupted sutures (3%/10 patients) (34). Suture anchors were used in only 4% of patients (15 patients) (3,11).

3.3.2. Autogeneous repair surgical technique

Forty-one patellar tendon ruptures were repaired using autogeneous grafts (Fig. 1b) (8,10,14,20,21,35,41,42). Both the ipsilateral and contralateral tendons can be harvested. A circle graft configuration can be achieved and transosseous tunnels made through the inferior pole of the patella to accommodate the tendon. These grafts can then be brought distally through a transosseous tunnel in the tibial tubercle.

A semitendinosus and gracilis autograft was the most popular graft (41%/17 patients) (8,10,14,20,42), followed by vastus lateralis fascia (39%/16 patients) (41), gracilis (15%/6 patients) (21), and a graft consisting of the middle third of the quadriceps tendon/patella bone/patellar ligament (5%/2 patients) (35).

3.4. Operative techniques used in relation to timing of repair

3.4.1. Acute repair

Three-hundred-and-fifty-four acute repairs were made using eight different operative techniques (Table 1) (1,3–8,11–13,15,17–19,21–34,39–41). The most popular acute repair technique was a primary repair augmented with either cerclage wire, Dall–Miles cable or non-absorbable sutures (43%/151 patients) (1,3,4,6,19,23,26,27,33,39,40). This was

Download English Version:

<https://daneshyari.com/en/article/4077312>

Download Persian Version:

<https://daneshyari.com/article/4077312>

[Daneshyari.com](https://daneshyari.com)