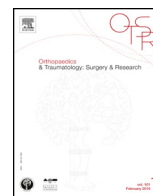




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Original article

# Acute traumatic patellar tendon rupture: Early and late results of surgical treatment of 38 cases



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## ABSTRACT

**Introduction:** Acute patellar tendon rupture is easy to diagnose but is still often overlooked. The aim of this study was to assess early and late results of surgical treatment of acute patellar tendon rupture. Our hypothesis was that functional outcome is satisfactory.

**Methods:** A retrospective study included 38 knees in 37 patients (4 female, 33 male). Mean age was  $42.6 \pm 9.9$  years (range, 23–81 years). Lesions comprised 15 tendon body ruptures, 20 avulsions from the tip of the patella and 3 avulsions from the anterior tibial tuberosity. Tendon repair was protected in more than 95% of cases by a reinforcement frame: hamstring (21 cases), synthetic ligament (12 cases) or metallic wire (3 cases). Results were evaluated in 2 steps: on patient files at a mean follow-up of 7.1 months (range, 3–24 months) to assess complications and early functional and radiological results; and by phone at a mean follow-up of 9.3 years (range, 19–229 months) in order to assess long-term functional outcome on Lysholm score and patient satisfaction.

**Results:** Thirty-one knees were assessed at a mean 7.1 months. Mean knee flexion was  $128.5^\circ \pm 7.5^\circ$  (range,  $85^\circ$ – $150^\circ$ ), extension  $-1^\circ$  (range,  $-15^\circ$  to  $0^\circ$ ) and Caton-Deschamps index 0.96 (range, 0.57–1.29). Twenty-three knees were further assessed at a mean 9.3 years. Mean Lysholm score was 93.7 points (range, 61–100). Ninety-six percent of patients were satisfied or very satisfied with the result. All had returned to their previous job, and 20 had returned to sports activities, including 8 at pretrauma level.

**Conclusion:** Patellar tendon rupture has good prognosis if diagnosis and surgical treatment is early.

**Level of evidence:** IV: retrospective study.

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## 1. Introduction

Patellar tendon rupture is rare and 6 times less frequent than patellar fracture [1]. Unlike quadriceps tendon rupture, patellar tendon rupture mainly occurs in active subjects of about 40 years of age, often following indirect trauma caused by sudden quadriceps contraction with the knee in moderate flexion: sudden impulsion, sprinting, avoiding a fall, etc. It is generally agreed that a healthy patellar tendon will not rupture: rupture usually affects a tendon that has degenerated [2] under iterative microtrauma [3] or local corticosteroid injection. Diagnosis should be straightforwardly suggested when active extension of the knee is impossible, but remains too often overlooked in emergency contexts.

Although management of acute patellar tendon rupture is now well-codified, there have been few assessments of the results of

surgery in this indication [1,4,5]. This is due to its rarity, and resultant lack of statistical power.

The present study sought to assess functional and radiological results of surgical repair of acute patellar tendon rupture, testing the hypothesis that outcome is satisfactory.

## 2. Patients and methods

### 2.1. Series

Forty-five of the 98 patients managed for patellar tendon lesions between 1991 and 2011 were immediately excluded from the study (Fig. 1): tendon sectioning by a ski edge ( $n = 17$ ), anterior tibial tuberosity (ATT) avulsion in children or adolescents ( $n = 16$ ), patellar lesions associated with knee dislocation ( $n = 1$ ) or ligament surgery or knee replacement ( $n = 11$ ) and patients not living locally ( $n = 16$ ). The series thus comprised 37 patients and 38 knees (1 bilateral case): 33 males (89.2%) and 4 females (10.8%), with a mean age of  $42.6 \pm 9.9$  years (range, 23–81 years) for a median 44 years. Mean body-mass index (BMI) was  $25.7 \pm 2.66$  kg/m<sup>2</sup> (range, 17.5–32.7);

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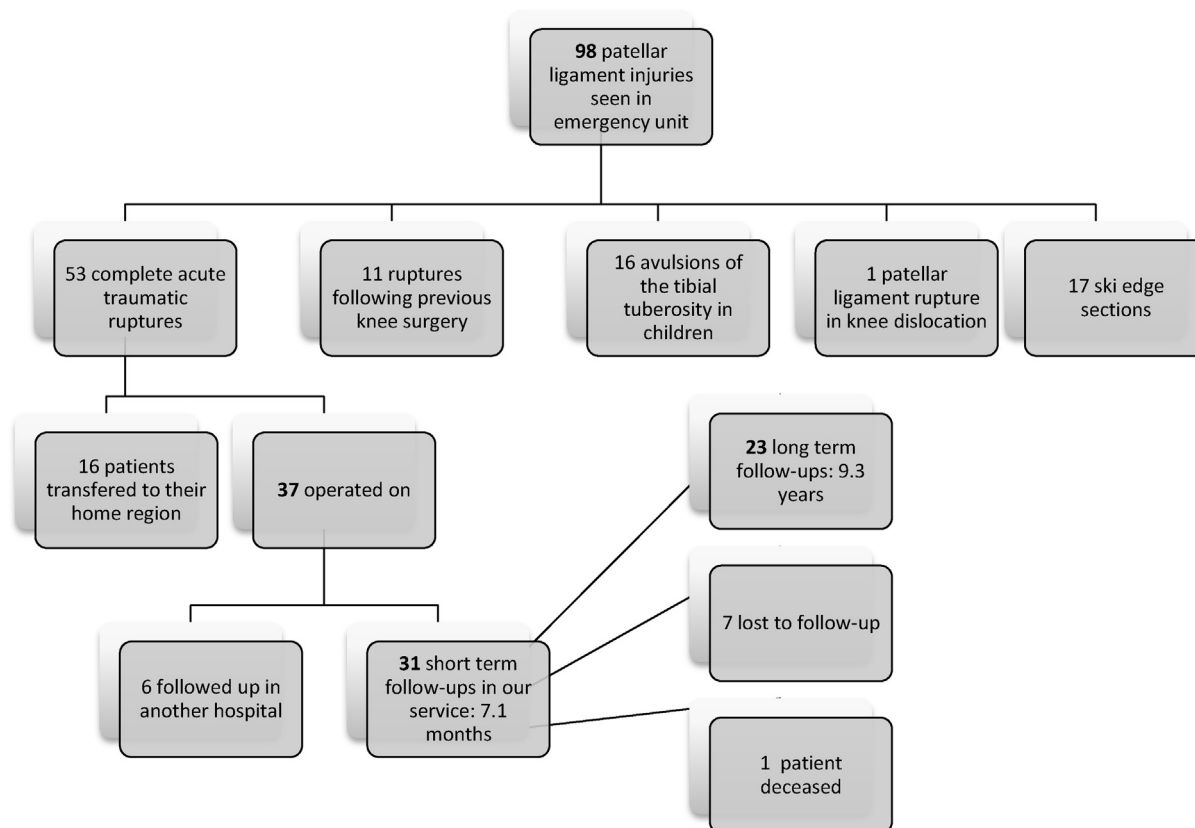


Fig. 1. Series flowchart.

**Table 1**  
Radiologic signs at admission.

	Number (%)
Patella Alta	34 (90)
Bone avulsion	14 (37)
Patellar tip	13
Tibial tuberosity	1
≥ 1 indirect radiologic sign	37 (97)
Mean Caton-Deschamps index	1.44 ± 0.19

21 patients were overweight or obese, including 7 with grade ≥ 1 obesity. Ten patients (27%) presented risk factors: 4 with pre-existing tendinopathy and 3 with injections during the previous months (1 case of gout, 1 of diabetes and 1 of long-course corticosteroids).

Trauma etiology was sports accident in 21 cases (57%), domestic accident in 8 (21%), road accident in 4 (11%) and work accident in 4 (11%). Mean trauma-to-surgery time was  $1.4 \pm 0.9$  days (range, 0–11 days); in longer intervals, the lesion was deemed chronic and not included in the present study.

Table 1 presents results for AP and lateral radiographs in 20–30° flexion at admission. Only 1 knee showed no indirect radiological signs of patellar tendon rupture. Caton-Deschamps index (CDI) [6] was normal in only 4 cases. Five patients showed radiological signs of preoperative osteoarthritis of the knee, including 2 with femoropatellar involvement.

## 2.2. Intraoperative findings and surgical techniques

The patient was in supine position, with a pneumatic tourniquet, and the knee in 45–90° flexion (Table 2). In 15 cases (39.5%),

a full-body rupture was repaired by end-to-end resorbable suture (Vicryl® No. 2, Ethicon®, Issy-Les-Moulineaux, France). In 20 cases (53%), there was avulsion from the tip of the patella; in 17 of these cases (85%), transosseous reinsertion was performed after tacking the tendon with two non-resorbable sutures (Ti-Cron® No. 4, Covidien®, Courbevoie, France) introduced via two 2.5-mm diameter vertical patellar tunnels; in the 3 most recent cases (15%), reinsertion used metal anchors. In the other 3 knees (8%), distal tendon avulsion from the ATT was repaired by transosseous reinsertion using either two thick resorbable sutures ( $n=2$ ) or metal anchors ( $n=1$ ).

Repair was protected by a reinforcement frame in 36 cases (95%), the other 2 cases being the earliest in the series. In the earliest 3 cases (8%), the reinforcement used metal wire; later, 12 (32%) used synthetic ligament; and the 21 most recent cases (55%) used hamstrings (gracilis or semitendinosus) [1,7].

Intraoperative lateral fluoroscopy in 30° flexion systematically checked patellar height versus the contralateral side. If no contralateral view was available, patellar height was adjusted to obtain CDI = 1.

## 2.3. Postoperative course

The limb was immobilized in a trochanter-malleolus walking cast, enabling immediate weight-bearing, for at least 6 weeks, followed by a removable brace until complete extension could be achieved without pain or deficit (a further 2 weeks to 1 month).

## 2.4. Assessment

Patients were systematically followed up at postoperative D15, D45 and 3 months and then according to progress. Early follow-up enabled clinical and radiological data to be collected along with

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