



Original article

Patellar tendinopathy: late-stage results from surgical treatment[☆]



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ABSTRACT

Objective: To evaluate the late-stage results from surgical treatment of patellar tendinopathy (PT), using the Visa score (Victorian Institute of Sport Tendon Study Group) and the Verheyden method.

Methods: This was a retrospective study in which the postoperative results from 12 patients (14 knees) who were operated between July 2002 and February 2011 were evaluated. The patients included in the study presented patellar tendinopathy that was refractory to conservative treatment, without any other concomitant lesions. Patients who were not properly followed up during the postoperative period were excluded.

Results: Using the Verheyden method, nine patients were considered to have very good results, two had good results and one had poor results. In relation to Visa, the mean was 92.4 points and only two patients had scores less than 70 points (66 and 55 points).

Conclusion: When surgical treatment for patellar tendinopathy is correctly indicated, it has good long-term results.

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Tendinopatia patelar: resultados tardios do tratamento cirúrgico

RESUMO

Objetivo: Avaliar os resultados tardios do tratamento cirúrgico na tendinopatia patelar (TP) com o uso do escore Visa (Victorian Institute of Sport Tendon Study Group) e o método de Verheyden.

Métodos: Estudo retrospectivo que avaliou os resultados pós-operatórios de 12 pacientes, ou 14 joelhos, entre julho de 2002 e fevereiro de 2011. Foram incluídos os pacientes com tendinopatia patelar refratários ao tratamento conservador e que não apresentavam outras

Palavras-chave:

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Estudos retrospectivos

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lesões cirúrgicas concomitantes. Pacientes que não foram devidamente acompanhados no período pós-operatório foram excluídos.

Resultados: Pelo método de Verheyden, nove pacientes foram considerados muito bons, dois bons e um ruim. Em relação ao Visa, a média foi de 92,4 pontos, com apenas dois pacientes abaixo de 70 pontos (66 e 55 pontos).

Conclusão: O tratamento cirúrgico da tendinopatia patelar, quando corretamente indicado, tem bons resultados em longo prazo.

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Introduction

Patellar tendinopathy is a common disorder among athletes, especially in activities that involve jumping and eccentric overloading on flexed knees.^{1,2} It was initially described as *jumper's knee* by Blazina et al.,³ and it also has synonyms relating to individuals' specific sports practices, such as: *high-jumper's knee* , *volley-ballers' knee* and *cross-country knee* .⁴

It generally affects individuals aged 20–40 years, with similar prevalence in men and women. It occurs most frequently at the lower pole of the patella (70%), followed by the upper pole (25%) and lastly the distal insertion of the tendon (5%).⁵

Patellar tendinopathy presents as well-localized anterior knee pain that relates to physical activity. The pain generally begins insidiously and gradually, relating to increasing quantity and intensity of training, or to activity that requires repetitive knee movements.⁶

In histological studies, the tendon presents degenerative and inflammatory alterations that may result in microtears, especially close to the lower pole of the patella.⁷

Blazina's classification was the first to be used in cases of patellar tendinopathy³ and it divided the pain into four grades: grade I –mild pain after physical activity; grade II –pain at the start of physical activity, with improvement after warming up and worsening at the end of the exercise, without any decrease in yield; grade III –pain during and after physical activity, with significant worsening of the athlete's yield; and grade IV –partial or total tearing of the tendon. Subsequently, it was modified by Roels et al.⁸

Among the intrinsic causes of patellar tendinopathy, the following can be highlighted: deficiency of the blood supply and lower elasticity of the proximal segment of the tendon⁴; and degeneration secondary to a chronic inflammatory process in the tissues adjacent to the tendon and bone impact during flexion, due to a prominent lower pole of the patella.⁹ The extrinsic factors are related to erroneous training, poorly guided physical activities and other overloads in a flexed position within day-to-day activities.

The diagnosis is based on the history and the clinical examination, and is complemented by radiographic, ultrasound and magnetic resonance imaging (MRI) examinations. Radiography shows the morphology of the inferior pole of the patella and may show calcifications in the tendon, while ultrasonography and MRI may show structural and inflammatory alterations of the tendon, such as thickening, degeneration and tears.^{10,11}

The initial treatment is conservative, with the aims of pain relief and functional recovery. It begins with institution of relative rest, modification of activities and control over predisposing factors, in association with use of medications and physiotherapy. This is effective in most cases, but with a risk of recurrence.^{12–15} Functional rehabilitation consists of analgesic and anti-inflammatory measures in association with mechanical therapy consisting of eccentric strengthening and specific stretching.^{16–18}

Other treatment options such as injection of corticosteroids are also used, although many authors present divergent opinions regarding their efficacy and safety.¹⁹ Application of platelet-rich plasma has been gaining more followers, but the results presented remain inconclusive.^{20,21}

Surgical treatment is indicated in cases that evolve with persistent pain and functional limitation after a minimum period of 6 months of well-executed conservative treatment.²² The presence of structural alterations of the tendon and impact with the lower pole of the patella are factors relating to failure of conservative treatment.²³

The surgical treatment consists of debridement of the degenerated tissue by means of longitudinal cuts in the tendon and abrasion of the inferior pole of the patella. It can be done in conformity with the technique described by Blazina et al.³ (open) or arthroscopically.^{24,25} The objective of the present study was to demonstrate the late-stage result from surgical treatment of patellar tendinitis in patients who evolved poorly with conservative treatment.

Materials and methods

This was a prospective study in which the late-stage post-operative results from 12 patients (14 knees) who underwent operations between July 2002 and February 2011 were evaluated.

Twenty-one patients with a diagnosis of patellar tendinopathy that was resistant to the initial treatment underwent surgical treatment performed by the same surgeon. These patients comprised 20 men and one woman.

All of these patients were amateur athletes and were doing at least one regular physical activity, such as running, tennis, soccer or basketball. In their clinical histories, they presented reports of chronic pain that had not improved through conservative treatment over a period of at least 6 months. The right knee was affected in seven patients, the left knee in 12 and both knees in two cases.



Fig. 1 – Radiograph showing alteration of the morphology of the patella, with the point in its lower pole (prominent patella).



Fig. 2 – Magnetic resonance imaging on one of the patients, showing the area of impact of the tendon with the lower pole of the patella, with thickening, edema and partial tearing of the patellar tendon.

Seven patients were excluded because they presented other concomitant surgical lesions (three with arthrosis, two with significant patellar chondropathy, one with a lesion of the medial meniscus and one with associated tendinopathy of the quadriceps). Two patients did not return for the late-stage reassessments. Twelve patients were duly followed up and underwent the assessment protocol.

The diagnosis of patellar tendinopathy was basically clinical, grounded in the anamnesis and physical examination. The main clinical finding was pain on palpation of the lower pole of the patella. Other findings from the physical examination were hypotrophy and diminished muscle strength of the quadriceps.

All the patients underwent imaging examinations (radiography and magnetic resonance), with a view to better preoperative planning. The surgical indication was based fundamentally on morphological alterations of the inferior pole of the patella (prominent patella), observed on radiographic examination (Fig. 1), and on degeneration of the patellar tendon (tendinosis) on magnetic resonance (Fig. 2).

Among the patients included in this study, 10 were operated arthroscopically, with conventional anteromedial and anterolateral portals and a central transtendinous accessory portal (Fig. 3). In all the cases, the following were performed: local synovectomy, partial resection of Hoffa's fat, partial resection of the lower pole of the patella using an abrasion shaver blade and longitudinal cuts in the proximal portion of the tendon through the central portal.

Two patients underwent surgery using Blazina's technique, by means of an infrapatellar longitudinal incision along the median line, with opening of the peritendon and resection of

a bone fragment from the lower pole of the patella and the central degenerated fragment of the tendon (in a v-shape), which did not interfere with its distal insertion.³ The indications for the open technique were due to the presence of calcification in one patient (Figs. 4 and 5) and partial tearing of the patellar tendon in another patient.

All the patients were evaluated by the same examiner.



Fig. 3 – Conventional arthroscopic portals and patellar transtendon accessory portal (central).



Fig. 4 – Radiological image of the calcification of the patellar tendon.

Results

The postoperative follow-up ranged in length from 2.3 to 10.9 years (mean of 6.8). The age group was from 16 to 48 years (mean of 29.7).

In the postoperative evaluation, the Visa score (Victorian Institute of Sport Tendon Study Group),²⁶⁻²⁸ which is specific for this pathological condition, and the Verheyden method²⁹ were used.

The evaluation method described by Verheyden et al.²⁹ includes a subjective part that takes into consideration whether the patient returned to sports activities at the same level as before, the patient's degree of satisfaction with the surgery and whether he would be willing to undergo the procedure again. In the objective part of this method, the presence of pain on palpation of the lower pole of the patella was observed, the apprehension test was used, the range of motion was measured and the presence of muscle atrophy was assessed by



Fig. 5 – Image of calcification of the patellar tendon after its resection via open surgery.

measuring the diameter of the thigh at 10 and 20 cm from the medial interline. The patients were then classified as follows:

- *Very good*: Patients without pain or limitation on their daily and sports activities, without muscle atrophy or pain on palpation of the lower pole of the patella, and also a negative apprehension test. When asked, they stated that they would undergo the surgery again.
- *Good*: Patients who presented mild to moderate pain during physical activities, but without any need to interrupt them; with mild pain on palpation of the lower pole or facets of the patella and muscle atrophy of less than 2 cm. When asked, they stated that they would undergo the surgery again.
- *Poor*: Patients who reported having moderate to severe pain after long periods seated and during sports practice; with limitation on their activities, pain in the lower pole or facets of the patella and major atrophy of the quadriceps (greater than 2 cm). They stated that they would not undergo the surgery again.

Nine patients were classified as very good, two as good and one as poor. In relation to Visa, 11 patients presented results greater than 66 points, with a range from 66 to 100 (mean of 92.4), and one patient had 55 points. This last patient was the one who was classified as poor according to the Verheyden protocol (Table 1).

None of the patients were reoperated.

Discussion

In the group of patients studied here, all of them were amateur athletes who did at least one regular physical activity, such as running, tennis, soccer or basketball. Basketball was practiced by seven patients, and this level of incidence can be explained by the surgeon's participation in an association of veterans of this sport. Blazina et al.³ observed injuries in several other types of sport, such as American football and volleyball. Stanish et al.³⁰ observed that the highest loads imposed on the ligament occurred during deceleration (eccentric overload), such as in the movements that occur in jumping and in sports.

The greater occurrence among men (91.6%) was not in line with the literature, which shows homogenous distribution between the sexes.

The treatment for patellar tendinopathy is generally conservative and the introduction of eccentric exercises for the quadriceps has significantly reduced the number of patients requiring surgery.^{17,18} The good results from conservative treatment in most patients explain the small number of published studies in the literature on surgical treatment for this pathological condition and the small number of cases operated.^{12,13} In turn, this explains the small sample size of our study. Panni et al.³¹ reported on nine patients who underwent operations; Griffiths and Selesnick,³² seven; Andrade et al.,³³ six; and Romeo and Larson,³⁴ only two.

The mean age of the patients in our study was 29.7 years, and this is in line with what can be seen in the literature, which is generally between 20 and 40 years of age.³³

Table 1 – Correlation of patients, age, length of follow-up and results according to the two evaluation methods.

Patient	Age (years)	Length of follow-up (months)	Occurrence	Surgical route	Visa score	Verheyden score
1	28	131	Unilateral	Arthroscopic	100	Very good
2	32	117	Unilateral	Arthroscopic	97	Very good
3	41	110	Unilateral	Arthroscopic	98	Very good
4	18	103	Unilateral	Arthroscopic	89	Very good
5	23	101	Unilateral	Arthroscopic	82	Good
6	16	47	Unilateral	Arthroscopic	94	Very good
7	18	106	Bilateral	Arthroscopic	66	Good
8	48	82	Bilateral	Arthr/Blazina	55	Poor
9	41	64	Unilateral	Arthroscopic	97	Very good
10	18	48	Unilateral	Arthroscopic	98	Very good
11	35	54	Unilateral	Blazina	98	Very good
12	37	28	Unilateral	Arthroscopic	98	Very good

The postoperative follow-up of our patients was long, which increases the reliability of the late-stage surgical results (minimum of 2 years and mean of more than 6 years).

Surgical treatment generally produces good results,^{22,24} independent of the techniques used. However, several studies have shown that despite the satisfactory results, most patients significantly reduce their level of physical activities. It is difficult to pinpoint whether this is due to the surgical result or to other unrelated factors.^{6,8} Andrade et al.³³ showed that with the exception of only one patient, all the others returned to their sports at the same level of activity as before the pathological condition.

The arthroscopic surgical technique was chosen for the majority of the cases because we considered this to be a minimally invasive method with a faster return to day-to-day and sports activities, as also observed by Lorbach et al.²⁵

The Visa score²⁶⁻²⁸ was chosen because of its specificity for evaluating patients with patella tendinopathy. The evaluation method proposed by Verheyden et al.²⁹ was chosen because we considered that it would be better to evaluate the patients both subjectively and objectively. The proportion of very good and good results (91.67% or 11 patients) was in line with the literature, which demonstrates high rates of good results from surgical treatment. Panni et al.³¹ reported that 100% of their results were excellent or good; Coleman et al.³⁵ showed that 96% benefited in relation to their symptoms; Verheyden et al.²⁹ found that 87% of their results were very good or good; Griffiths and Selesnick³² obtained good results in 86% of their cases; Fritschy and Wallensten³⁶ found that 81% of their patients were cured; and Benazzo et al.³⁷ found that 76% presented good results. In our study, there was a direct correlation between the two assessment means used, such that the lowest rate observed using Visa corresponded to the patient who was considered poor according to the Verheyden method.

Conclusion

Surgical treatment for patellar tendinitis by means of either an arthroscopic or an open technique showed satisfactory late-stage results both in our experience and in the literature. These results led to pain relief and made it possible for the patients to return to sports activities. Over the course of

the patients' evolution, we did not observe any recurrences or need for reoperation. However, surgery should only be indicated after a long period of adequate conservative treatment.

Conflicts of interest

The authors declare no conflicts of interest.

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