



Case report

Reconstruction of chronic patellar tendon rupture using graft from contralateral patella graft together with reinforcement from flexor tendons.

Case report[☆]

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ARTICLE INFO

Article history:

Received 27 May 2015

Accepted 2 July 2015

Available online 2 April 2016

Keywords:

Patellar ligament

Rupture

Reconstruction

ABSTRACT

Chronic patellar tendon rupture is a rare disabling injury that is technically difficult to repair. The true prevalence of this injury is unknown. Delayed reconstruction of chronic patellar tendon rupture has yielded suboptimal clinical and functional results. Many different surgical methods for reconstruction of chronic patellar tendon injury have been reported. In this report, we present a case with chronic patellar tendon injury that was addressed using a technique that had not previously been described in the literature, through combining procedures that had been described separately. The reconstruction method presented in this article has the advantages of being easy and reproducible, without a requirement of allografts.

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Reconstrução de ruptura crônica do tendão patelar com enxerto patelar contralateral associado a reforço com tendões flexores. Relato de caso

RESUMO

A ruptura crônica do tendão patelar é lesão rara e incapacitante e ainda tecnicamente difícil de abordar. A verdadeira prevalência dessa lesão é desconhecida. A reconstrução tardia das rupturas crônicas do tendão patelar apresenta resultados clínicos e funcionais abaixo do ideal. Muitos métodos cirúrgicos diferentes foram relatados para a reconstrução do tendão

Palavras-chave:

Ligamento patelar

Ruptura

Reconstrução

[☆] Study carried out at Knee Group, Service of Orthopedics and Traumatology, Hospital Madre Teresa, Belo Horizonte, MG, Brazil.

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<http://dx.doi.org/10.1016/j.rboe.2016.03.003>

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patelar em lesões crônicas. Neste relato apresentamos um caso com lesão crônica do tendão patelar abordado com técnica até então não descrita na literatura, que combina, todavia, técnicas previamente relatadas. O método de reconstrução presente neste artigo tem a vantagem de ser fácil e reprodutível, sem a necessidade de aloenxertos.

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Introduction

Chronic rupture of the patellar tendon is an uncommon, but disabling injury, of unknown prevalence.^{1,2} The impairment of the extensor mechanism results in great functional disability, making surgical treatment the gold standard therapy.¹⁻⁵ Diagnostic delay makes the treatment technically difficult and demanding, considering the proximal patellar migration due to quadriceps retraction, poor quality of the remaining tendon and knee stiffness.⁵ Complications such as knee flexion deficit, quadriceps atony, surgical wound problems and surgical failure associated with the previously described methods are described in the literature. Little is known about the functional outcomes of these patients.¹⁻⁹

As it is a rare condition with many described treatment techniques, there is no consensus on the optimal management. We present a case report with the use of autologous patellar graft reconstruction with contralateral bone-patellar tendon-bone (BPTB) associated with ipsilateral semitendinosus and gracilis tendons augmentation for a patient with chronic rupture of the patellar tendon. We did not find any similar procedures described in the literature to date.

Case report

A 36-year-old male patient, previously healthy, with a history of spontaneous traumatic rupture of the left knee patellar

tendon during a soccer match in 2009, underwent surgery 10 days after the incident at another institution with direct repair with transosseous fixation. According to the patient, during the postoperative period he used a knee brace that kept the knee extended by four weeks, followed by gradual mobilization after this period. He reported that months after the procedure he observed proximal migration of the patella with subsequent onset of limping, loss of quadriceps strength and instability.

He sought treatment at the Knee Group of the Orthopedics and Traumatology Service in August 2014, complaining of functional limitation and extension strength impairment of the affected knee. On physical examination he had: quadriceps hypotrophy (thigh circumferential measurement, 10 cm above the proximal pole of the patella - Right: 43.5 cm/Left: 40 cm), symmetrical range of motion (ROM) (0-130), decreased quadriceps strength (10 degrees deficit of active extension). Radiographs showed patella alta (Catton and Deschamps index: 2.2). By then, surgical treatment was offered for the chronic lesion. He had Tegner level of activity score of 1 and IKDC score of 33.3.

The procedure was carried out under spinal anesthesia, with the use of pneumatic tourniquet at the root of the thigh adjusted to 300 mmHg. First, the BPTB autograft was harvested from the contralateral knee with an anterior incision and removal of 25 mm-long and 10-mm wide bone blocks in the patella and anterior tibial tuberosity (ATT), similar to the one used for anterior cruciate ligament (ACL) reconstruction. Subsequently, an anterior incision was made in the affected knee

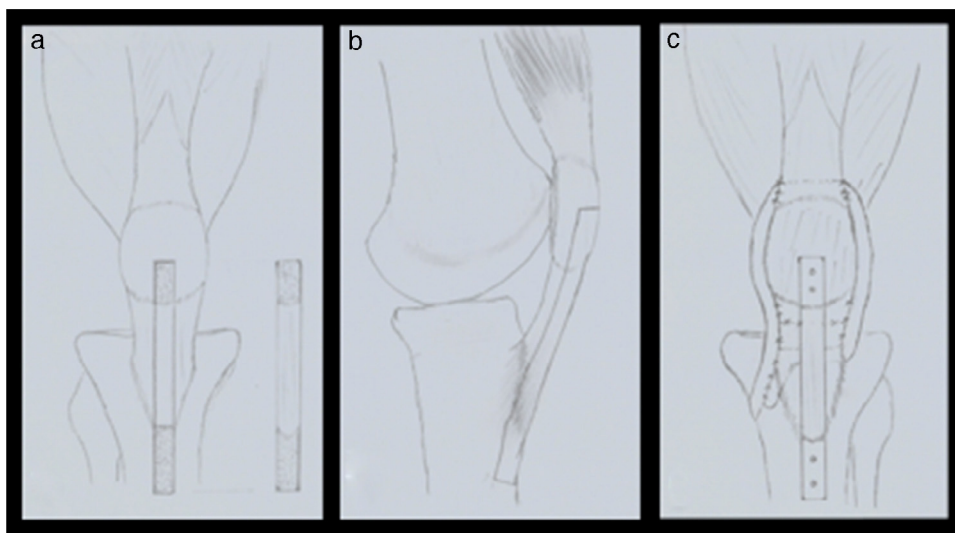


Fig. 1 – Schematic drawing showing contralateral patellar graft removal technique (a and b) with subsequent contralateral grafting, with hamstrings augmentation preserving tibial insertions (c).

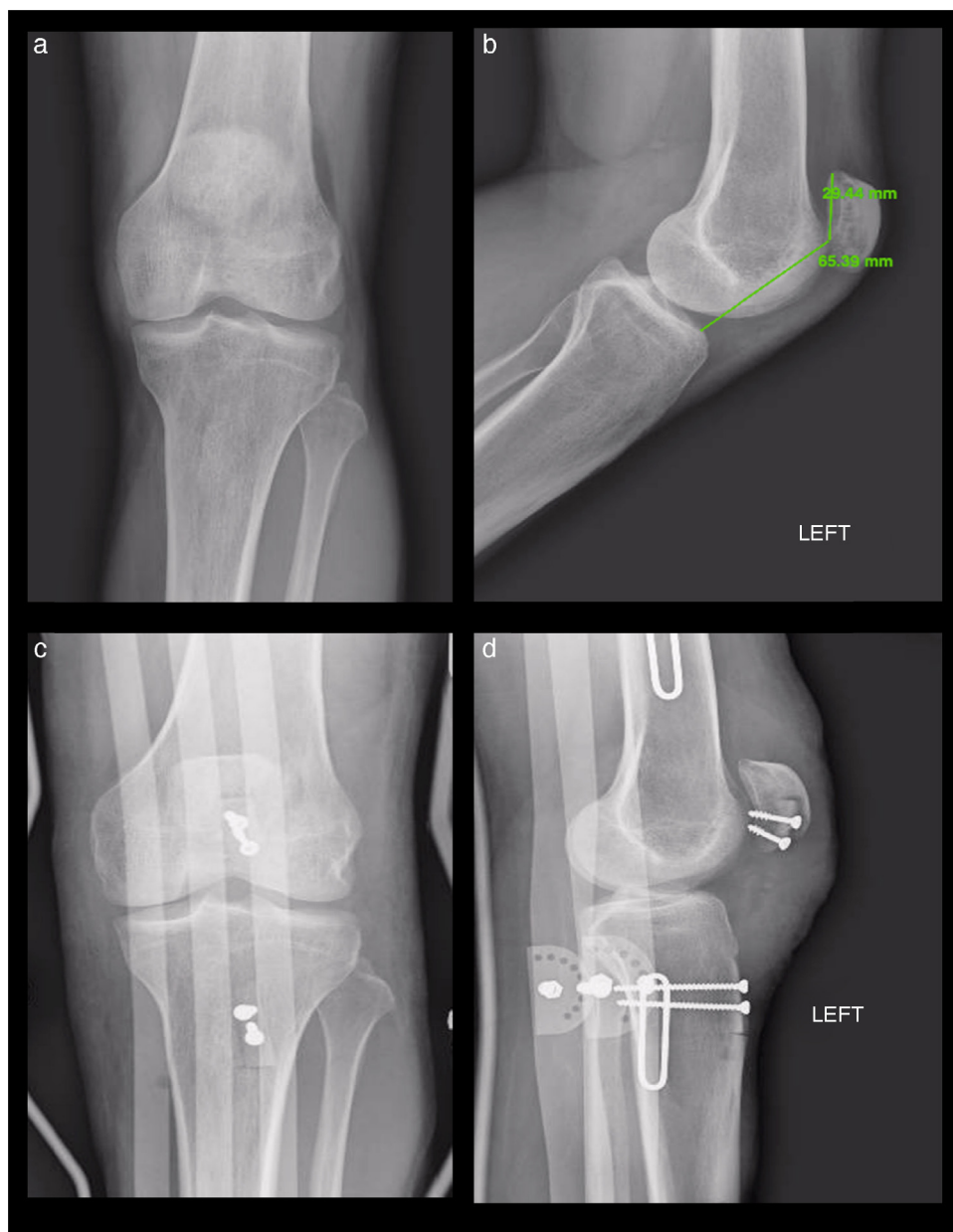


Fig. 2 – Pre and post-operative radiograph comparison: (a, b) AP and lateral views, demonstrating patella alta according to Catton-Deschamps index (2.2). (c, d) AP and lateral views demonstrating patellar and tibial fixation with two screws, with patellar distalization. AP, anteroposterior.

and after debridement of scar tissue, bone grooves were created on the patella and ATT, of sizes similar to the BPTB graft bone plugs (25 mm-long \times 10 mm-wide). The bone blocks were then adapted to the patella and ATT and fixed with intrafragmenary compression using two partially threaded cancellous screws and two small-fragment cortical screws in the patella and the tibia, respectively. The joint surface of the patella was visualized and palpated under direct view through a lateral mini-arthrotomy to avoid possible intra-articular positioning of synthesis material. The third step was harvesting ipsilateral semitendinosus and gracilis tendons autografts with an

open stripper, preserving the tibial insertion. The two tendon grafts were then passed through the quadriceps tendon at the proximal pole of the patella and along the patella borders in a circular form, tensioned and sutured matching the reconstructed patellar tendon length (Fig. 1). After the repair, adequate patellar height was clinically confirmed using the intercondylar roof and with fluoroscopy, using the normal side as reference.

Isometric quadriceps exercises began on the first postoperative day. A hinged knee brace was used, blocking flexion at 45 degrees for two weeks with 20-30 degree increases

every two weeks, until complete flexion was recovered. Partial weight bearing was initiated immediately with full progression at the end of six weeks. The patient resumed work after four months and at the moment (sixth month postoperatively) is recovering muscle mass (gym) as preparation for returning to high demand activities. Currently, radiographs disclose adequate patellar height (Catton and Deschamps Index: 1.1) (Fig. 2). His Tegner level of activity score is 5 and IKDC score 73.6.

Discussion

Rupture of the patellar tendon is the least common cause of knee extensor mechanism injury, with estimated force 17.5 times greater than the body weight being required for its rupture.^{1-3,5} The rupture mechanism is usually an eccentric overload of the extensor mechanism with the foot fixed on the ground and knee flexion. Repetitive microtraumas lead to tendon weakness and usually precede the rupture. Patellar tendon ruptures can be caused by trauma, associated to systemic diseases, after total knee arthroplasty or ACL reconstruction, and as a late complication following osteosynthesis with tibial intramedullary nail or the administration of local or systemic corticosteroids.^{4,5}

The first reported cases of delayed repair date back to 1927 and since then, several different techniques and grafts have been reported for this treatment.^{1,5,6,8-10} Direct repair, distraction, reinforcement with autograft (contralateral patellar tendon, semitendinosus tendon), allograft (extensor mechanism), Achilles tendon and synthetic materials are technique options that have been described.⁵

When using the contralateral BPTB autograft, we can reconstruct the extensor mechanism of the affected knee, accurately restore patellar height and ensure good stability and bone contact for the consolidation of bone blocks, in addition to being a simple and reproducible technique, without the use of allografts or the even complementary materials.^{3,8} The main disadvantage described for this technique is morbidity of the donor site, although Shelbourne and Urch have demonstrated that the removal of the contralateral graft from a healthy knee does not affect its function.⁷

Gilmore et al.⁵ reported that techniques using autografts led to no failures in the series assessed and had lower complication rates than any of the primary repair methods. In the same study, they detected that chronic rupture repair with autograft had a lower failure rate than any of the combined main methods. This suggests that the repair using this technique would be the method of choice for chronic ruptures.

The combination of the bone procedure with semitendinosus and gracilis tendon augmentation has some advantages: easy to remove autografts, no significant increase in surgical time, good mechanical strength and no requirement of synthetic implants or their removal in a second procedure. The tibial insertion preservation of the hamstrings seems to preserve viability and stability, in addition to providing blood supply at sufficient quantity to accelerate healing.⁶

All these principles allow early mobilization and reduce the risk of stiffness.^{5,6,10}

Jain et al.¹⁰ demonstrated improvement in all functional parameters with 80% recovery of quadriceps strength when the reconstruction was performed with flexor tendons in a 4.5-year follow-up. Our choice to combine both techniques aims to sum the positive points of each in a case of chronic rupture with aggressive rehabilitation.

The limitations of this study are the fact that this is a case report, with a relatively short-term follow-up. However, the results were significant, due to the rarity of the injury and the particularity of the implemented treatment. Due to the low incidence of this injury, most published studies present case reports with different forms of treatment. Comparative studies are necessary to define the best treatment option.

This article may be useful in daily clinical practice for helping orthopedic surgeons in their indications and treatment of this rare, but limiting, injury. It demonstrates a simple reproducible technique, which does not require supplementary material.

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgement

To Dr. Cláudio Beling, for his help creating the schematic drawing.

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