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Case Report

# Bilateral simultaneous quadriceps tendon rupture: A case report

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**Abstract**

**Objective:** Quadriceps tendon ruptures are rare injuries affecting the knee extensor mechanism, typically occurring in middle-aged patients with underlying pathologies. Bilateral simultaneous quadriceps tendon ruptures are even more uncommon, and almost all reported cases in the literature are associated with an underlying disease.

**Case Presentation:** A 62-year-old Caucasian male presented complaining of pain in the anterior-superior aspect of both knees following a fall while walking that same day, during which his knees were in a semi-flexed position. Physical examination revealed a loss of active knee extension in both limbs and a palpable gap between the superior pole of the patella and the quadriceps tendon. MRI of both knees was performed two days after the injury, confirming bilateral quadriceps tendon ruptures. Twelve days after the initial injury, the patient underwent surgical intervention, and both injuries were addressed simultaneously using a transosseous tunnel technique. The transosseous technique consisted of three longitudinal and parallel tunnels drilled into the patella, and a modified Kessler suture was used to secure and reattach the quadriceps tendon back to the superior pole of the patella. At the patient's eight-month follow-up, the patient was asymptomatic, ambulating normally, and had full knee extension with 120° flexion bilaterally. However, hypotrophy of the quadriceps muscle was noted bilaterally.

**Conclusion:** Proper evaluation and treatment of these injuries are crucial to achieving good outcomes, as they can lead to significant knee pain and disabilities.

**Keywords:** Quadriceps tendon, Case report, Tendon rupture

## Introduction

Unilateral quadriceps tendon rupture is an uncommon injury, affecting middle-aged patients at an annual rate of 1.37 per 100 000 (1). Bilateral ruptures are exceptionally rare and are often linked to underlying diseases or environmental factors, such as chronic renal failure (2), hyperparathyroidism (3), and certain medications (4). Despite the low incidence of this injury, bilateral quadriceps ruptures have also been documented in previously healthy individuals (5). The purpose of this case report is to present a rare case of simultaneous bilateral quadriceps rupture in an elderly patient.

## Case Presentation

A 62-year-old Caucasian male with a medical history of obesity and hypertension was admitted to the orthopedic emergency center. The patient complained of pain in the anterior-superior aspect of both knees following a fall while walking, during which his knees were in a semi-flexed position. Physical examination revealed loss of active knee extension in both limbs and a palpable gap between the superior pole of the patella and the quadriceps tendon. Magnetic resonance imaging (MRI) of both knees confirmed bilateral quadriceps tendon ruptures (Figure 1). The patient was provisionally secured with a long leg brace in both knees, with a slight flexion.

Due to overcrowding at our institution, surgical treatment was performed 12 days post-injury. Both injuries were addressed simultaneously using the same technique: a middle skin incision, reinsertion of the quadriceps tendon using Number 5 Ethibond Excel sutures (Ethicon, Somerville, NJ), and a modified Kessler suture, through three longitudinal transpatellar intraosseous tunnels (Figures 2 and 3). Quadriceps tendon integrity was evaluated during the surgery, and no significant degeneration was observed in the tendon. Postoperatively, the patient remained in long braces for four weeks. Physiotherapy commenced after the first month, with

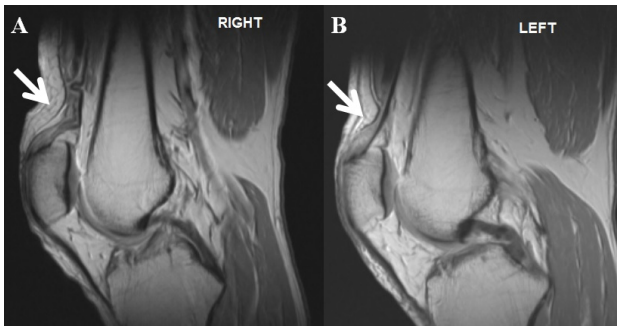


**Figure 1.** Magnetic resonance images showing the quadriceps rupture in both knees. The right (A) and left (B) knee demonstrated a large rupture of the quadriceps fibers (white arrows), with minimal joint effusion

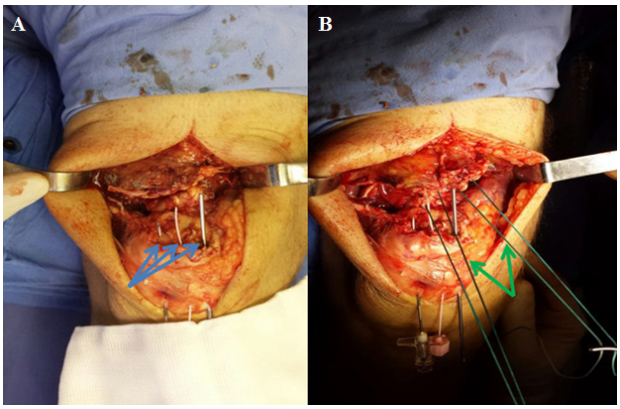


**Figure 2.** Intraoperative picture showing the large rupture of the quadriceps tendon fibers in a left knee adjacent to the proximal pole of the patella. Three tunnels were drilled longitudinally (blue arrow, A) in the patella and a Kessler suture was secured in the quadriceps tendon using two #5 Ethibond Excel sutures (Ethicon, Somerville, NJ) (green arrow, B). Following this, the sutures were passed through the tunnels and tied to the proximal pole of the patella with the knee flexed 30°

progressive loading. The first two weeks of physiotherapy consisted of knee passive range of motion exercises, with progression to active knee flexion at week six. At the eight-month follow-up, the patient was asymptomatic, ambulating normally, and had full knee extension with 120° flexion bilaterally. However, hypotrophy in the quadriceps muscles was noted bilaterally.

## Discussion

Unilateral quadriceps tendon ruptures are relatively uncommon, with an incidence rate of 1.37 per 100 000 patients annually. These injuries disproportionally affect middle-aged males (M:F = 4.2:1, mean age = 51.1 years). Non-simultaneous bilateral quadriceps ruptures are extremely rare and typically indicate the presence of an underlying risk factor (1,6). Simultaneous bilateral ruptures are rarer still, seldom reported in the literature, and more closely associated with predisposing conditions than their asynchronous counterparts. Conditions that predispose patients to bilateral ruptures through tendinous degenerative changes include chronic renal failure, hyperparathyroidism, rheumatoid arthritis, gout, systemic lupus erythematosus, pseudogout, local

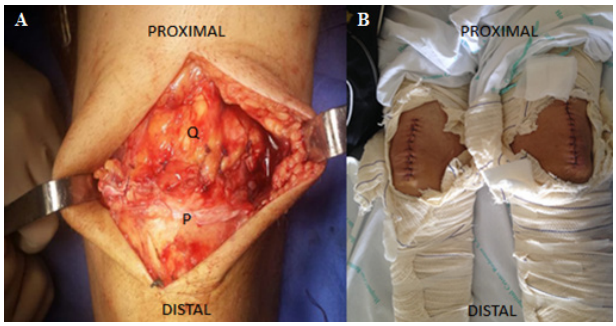


**Figure 3.** Intraoperative picture of the right knee after the repair of the quadriceps tendon using three tunnels made longitudinally in the patella and a Kessler suture in the quadriceps tendon using two #5 Ethibond Excel sutures (Ethicon, Somerville, NJ) (A). Picture of the first postoperative day after the procedure showing the final aspect and the incision (B). Q: quadriceps, P: patella

amyloidosis, and diabetes (7-13). Additionally, the use of drugs such as corticosteroids, anabolic steroids, quinolones, and stains has been associated with an increased incidence of tendon rupture as well (14,15).

Timely diagnosis and treatment of bilateral simultaneous quadriceps tendon ruptures are crucial for optimal functional outcomes (16). However, diagnosis can be challenging because the classic signs of painful swelling of the knee, a palpable suprapatellar gap, and the inability to extend the knee actively or raise straightened legs from the supine position are only present in roughly 50% of patients (17). While there is no definitive consensus on the impact of different treatment delay times, avoiding atrophy and scar tissue formation is generally advantageous whenever possible. Studies currently illustrate a significant drop-off in the full functional recovery rate, which is typically observed after a 2-week interval (16). Many cases describing bilateral simultaneous quadriceps ruptures found that recovery of the full range of motion was completely or almost complete during follow-up, with good outcomes (2,3,5,8). Postoperative protocols for these injuries often include a period of knee immobilization, but the time required is not well established (5).

Several surgical techniques are described to repair acute quadriceps ruptures, mainly including transosseous tunnels or suture anchors. A recent systematic review and meta-analysis of biomechanical studies compared these two techniques, including seven studies, and found that the two techniques were biomechanically similar (18). Additionally, Coladonato et al found similar clinical postoperative outcomes comparing these two techniques in their systematic review and meta-analyses, which evaluated 18 clinical studies with a total of 508 patients (19).

## Conclusion

In conclusion, bilateral simultaneous quadriceps tendon rupture is an extremely rare and disabling condition, usually affecting patients with severe comorbidities.

Comprehension and correctly treating the pathology and its underlying predispositions are key to decreasing the morbidity of these injuries.

## Authors' Contribution

**Conceptualization:** Marcus Vinícius Bianchi, Leonardo Comerlatto, Cristina Vicioli, and Márcio Balbinotti Ferrari
**Data curation:** All authors
**Methodology:** Marcus Vinícius Bianchi, Leonardo Comerlatto, Cristina Vicioli, and Márcio Balbinotti Ferrari.
**Project administration:** Marcus Vinícius Bianchi and Márcio Balbinotti Ferrari.
**Supervision:** Márcio Balbinotti Ferrari.
**Writing–original draft:** All authors.

## Competing Interests

None.

## Ethical Approval

Informed consent was obtained from the patient for publication of the study.

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