

Case Report

Quadriceps Tendon Repair Using Cadaveric Fascia Lata Allograft: A Novel Technique for Repair of Chronic Quadriceps Tendon Rupture

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ABSTRACT

Rupture of the quadriceps tendon, although rare, is associated with impaired stability of the knee joint and therefore requires surgical repair. Although several techniques provide excellent clinical results for acute ruptures, treatment of chronic ruptures remains clinically challenging. We describe a novel technique for reconstruction of a large quadriceps tendon rupture by transosseous repair with a cadaveric facia lata allograft as reinforcement in a 78-year-old man.

Keywords: Cadaveric, Fascia Lata Allograft, Novel quadriceps tendon repair, Quadriceps Tendon Rupture.

INTRODUCTION

The quadriceps tendon is a powerful structure arising from the muscular union of the rectus femoris, vastus lateralis, vastus medialis and the vastus intermedius at the anterosuperior pole of the patella, all of which contribute to the extensor mechanism of the knee that provides knee extension and stability of the patellofemoral joint.^{1,2} Any structural or functional alteration of this mechanism affects the stability of the knee joint.1 Ruptures of the Quadriceps tendon are three times more common than patellar tendon ruptures and occur more frequently in patients over 40 years of age.² Chronic quadriceps tendon ruptures are rare and, unlike acute quadriceps tendon ruptures, present many surgical challenges, including tendon retraction, fibrosis, and degenerative calcification.^{2,3} Quadriceps tendon ruptures may also be associated with systemic diseases such as diabetes, chronic renal insufficiency, hyperparathyroidism, uremia, inflammatory arthritis, chronic use of corticosteroids and fluoroquinolones, and repetitive tendinopathy.^{3,4} We describe a novel technique for repair of chronic quadriceps tendon rupture with significant retraction of the quadriceps using a cadaveric fascia Lata allograft reinforcement.

CASE REPORT

In September 2020, a 78-year-old man was walking down a grassy slope when he slipped forward and fell on both knees. He had immediate pain in his left knee and was unable to get up. He was taken to his primary care physician, no x-rays were taken, and a diagnosis of "soft tissue injury" was made. Since then, the patient complained of left knee instability, which led to further falls. Three months later, the patient presented to our emergency department complaining of a painful and swollen left knee after falling again. Clinical examination revealed marked swelling of the left knee with severe swelling and tenderness over the upper pole of the patella and inability to actively extend the knee. There was no palpable suprapatellar defect due to significant effusion. Radiographs of the knee showed knee joint effusion with a remarkable patella-Baja (Figure 1). An MRI was also performed, which showed an extensive and dehiscent quadriceps tendon rupture with significant muscular hemorrhages (Figure 2).

After obtaining informed consent, surgical repair of the quadriceps-patellar tendon rupture was performed using transosseous tunnel repair with a cadaveric fascia lata allograft reinforcement. Intraoperatively, the quadriceps tendon was retracted approximately 7 cm.



The base of the patella was exposed, and three parallel tracts were drilled longitudinally from the proximal patella to the distal pole with a 2.5-mm drill. Three ORTHOCORD[®] sutures were passed through the quadriceps tendon in a Krackow configuration and captured the middle, medial, and lateral thirds of the quadriceps tendon, respectively.⁵ The sutures were passed through the transosseous tunnels with a Houghston suture guide and free thread wire and knotted over a patella-bone bridge, securing the quadriceps tendon repair construct. The allogenous fascia Lata strip is then applied, and this is knotted in the patellar apex by means of the PDS* sutures and then sutured to the prepatellar fascia (Figure 3 and Figure 4). Postoperatively, the patient was in-structed to have protected weight bear¬ing in a knee immobilizer for 6 weeks. Continuous passive ROM was started 2 weeks postoperatively, beginning at 0° to 30° and increasing by 10° each week. After 6 weeks, full weight bearing as well as active mobilization of the knee was allowed. At the final follow-up examination after 1 year, the patient remained pain-free and had a satisfactory range of motion of the affected knee (Figure 5). The patient could resume his previous daily activities without restrictions.

Figure 1. Pre-operative radiography on the lateral view showed marked hematoma suprapatellar and a patella-baja.



Figure 2. Pre-operative MRI on the sagittal view showed a complete tear of the Quadriceps tendon with a suprapatellar edema and a significant muscular hemorrhage.







Figure 4. Allogenous fascia lata strip is sutured to the patellar apex by means of the PDS® sutures and then sutured to the prepatellar fascia.



Figure 5. Clinical status 12months after repair. The patient is free of complaints, performing all his activities without limitation.





DISCUSSION

Soft tissue injuries of the knee have always presented a challenge to the reconstructive surgeon.¹ Although rare, chronic ruptures of the quadriceps tendon are extremely disabling injuries.^{2,3} The patellofemoral joint can be loaded up to 5 to 8 times body weight, which translates to over 1 ton of force applied to the joint.^{6,7} Chronic quadriceps tendon ruptures are difficult to repair surgically due to tissue degeneration, retraction of the tendon and muscle atrophy, which makes it difficult to withstand the large forces transmitted through the patellofemoral joint; hence, a stable biological construct is needed to allow histologic in growth of the tendon into the bone.⁶ To date, several surgical techniques have been developed for chronic rupture of the quadriceps tendon, including the modified Pulvertaft weave technique, hamstring tendon auto grafts, gastrocnemius myotendinous flap, and synthetic mesh.^{3,6,9}

Facia Lata grafts exhibit high ultimate tensile strength and stiffness, making them useful for many purposes, including reconstruction of osteo-dural defects in neurosurgery, ptosis surgeries, urinary incontinence, reconstruct the anterior cruciate ligament, rotator cuff and the patellar tendon.¹⁰⁻¹³ Grafting of autologous fascia lata can lead to postoperative hematoma, wound infection, muscle herniation, hip flexor weakness, numbness, pain, superficial phlebitis, and cosmetic concerns due to scarring¹¹; therefore, the use of cadaveric fascia lata graft avoids complications at the donor site.

We have described a novel technique of quadriceps tendon repair using a cadaveric facia lata allograft reinforcement with an excellent outcome and high patient satisfaction. This procedure avoids morbidity and complications associated with the donor site and allows for a reduction in surgical time associated with the use of autologous tissue.¹¹

Our encouraging results may serve as a starting point to determine whether the use of cadaveric fascia lata allografts may be a promising therapeutic alternative for the treatment of chronic quadriceps tendon rupture. To the best of our knowledge, no cases of chronic quadriceps tendon rupture have been reconstructed using this technique.

CONCLUSION

This case report demonstrates that the use of a cadaveric facia lata allograft can be a valuable alternative for the treatment of chronic quadriceps tendon rupture and provides promising results. A larger number of cases is needed to validate this approach.

CONFLICT OF INTEREST

None.

AUTHOR DECLARE

The authors declare that this manuscript been original and not published elsewhere.

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