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Clinical case

Treatment of old patellar tendon lesions. Case report and literature review

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ABSTRACT. A patellar tendon tear needs a force equivalent to 15 times the weight to overcome the strength of the tendon. It usually occurs in patients from their twenties on, regardless of gender. The diagnosis is made based on the symptoms of pain, impaired ranges of motion, and limitation upon climbing stairs. Pain subsides at two weeks but the limitation of physical activity continues and patients learn to carry out their activities with that disability and therefore they do not get treatment, so the diagnosis is usually made late. Treatment is difficult, as the tendon shortens upon being torn and requires an external reinforcement or an autologous graft; various techniques for repair may be used. The case of a patient with patellar tendon tear is presented herein. She sought treatment 6 months later and was treated with the Ecker, Lotke and modified Glazer technique with a semitendinous and gracilis allograft. She underwent early rehabilitation and quadriceps strengthening. She currently has 110º of flexion, 0º of extension and can carry out activities of daily living and work activities, as she is a laborer.

Key words: tendon, rupture, knee, graft, reparation.

RESUMEN. La ruptura del tendón rotuliano requiere 15 veces el peso en fuerza para vencer la resistencia del tendón, ocurre generalmente en pacientes de a partir de la segunda década de la vida, no hay diferencia en sexo, el diagnóstico se lleva a cabo con la sintomatología de dolor, incapacidad para los arcos de movimiento, limitación de subir y bajar escaleras, el dolor desaparece a las dos semanas, pero continúa con la limitación de la actividad física, el paciente aprende a realizar sus actividades con esa incapacidad por lo que generalmente no acuden a su tratamiento, por lo que es común que se diagnostique en forma tardía. El tratamiento de éste es difícil ya que el tendón al romperse se acorta y requiere ayuda de un reforzamiento externo o toma de injerto autólogo, utilizando diversas técnicas para su reparación. Se presenta el caso de una paciente que presentó ruptura del tendón rotuliano que acude a su tratamiento después de 6 meses de evolución, aplicando una técnica de Ecker, Lotke y Glazer modificada con aloinjerto de semitendinoso y gracilis. Se inicia con rehabilitación temprana y fortalecimiento del cuadríceps, actualmente con flexión de 110º y extensión de 0º, realiza sus actividades diarias del hogar y laborales ya que es obrera.

Palabras clave: tendón, ruptura, rodilla, injerto, reparación.

Level of evidence: V (Act Ortop Mex, 2010)

Introduction

Since 1910 Coton and Wagner (1927) spoke about the patellar tendon tear. Although there is discussion on whether the latter should be considered as a tendon or a ligament, the mechanism of injury is severe trauma. A 1969 literature review reports that the ingestion of certain drugs as well as steroid injections in and around the tendon, and long-term use of steroids due to conditions like systemic lupus erythematosus may cause the tear.[1,2] Patel-

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lar tendon tear is most common in young patients who sustain contraction of the quadriceps under counter resistance. It is usually associated with rheumatoid arthritis, systemic lupus erythematosus, renal disease, generalized hyperlaxity,[3] and with athletes that lift weights and some patients who walk or work on their knees. The diagnosis is a clinical one and includes patella alta, decreased ranges of motion, and absence of knee extension. Treatment has included tendon suture with chromic catgut sutures, wire, semitendinous tendon, dacron, fascia lata, gracilis and semitendinous tendon.[1-3]

Ultrasound has been used since the 80's to diagnose the tear; however, it continues to be doubtful because it depends on the degree of observation and expertise of the operator.[4] Even with MRI the diagnosis is difficult, so it is recommended to perform it under 55° of tendon flexion with respect to the magnetic field of the device; this increases the short time signal during the echo time in T2 images.[5,6]

This lesion is usually unilateral, although there are reports of bilateral cases associated with various conditions like chronic renal failure, long-standing type-2 diabetes mellitus, and osteogenesis imperfecta.[7-12] Some authors say that the material used for the repair makes no difference. At the end a cast is applied, either a posterior splint or a circular cast; it is removed after six weeks and then physical therapy is started.[13-16]

Treatment depends on the timing when the patient is seen. In acute cases the recovery of the ranges of motion occurs sooner and the plasty does not require many maneuvers to make the patella recover the distance separating it from the femoral notch (considering the Insall-Salvati index). However, when the patient has an old tear the treatment has to be modified. Several plasties have been performed for these cases, ranging from an end-to-end repair (if the tendon length so allows), to the placement of a Leeds-Keio ligament –a polyester fiber band, like a mesh, that is very strong and leads to a quick recovery–, the use of semimembranous, semitendinous or, as a last resource, bone-tendon allografts (calcaneous with calcaneous tendon, tibial tuberosity with patellar tendon) and tendons like the semimembranous, semitendinous, tibial and fibular.[13-16] Even though there are no reports in the literature of the evolution after the use of these allografts, as they are only mentioned, we present herein the clinical case of a patient who sustained a patellar tendon tear 6 months before being diagnosed.

Figure 1. Clinical picture showing the solution of continuity of the patellar tendon and the proximal displacement of the patella.

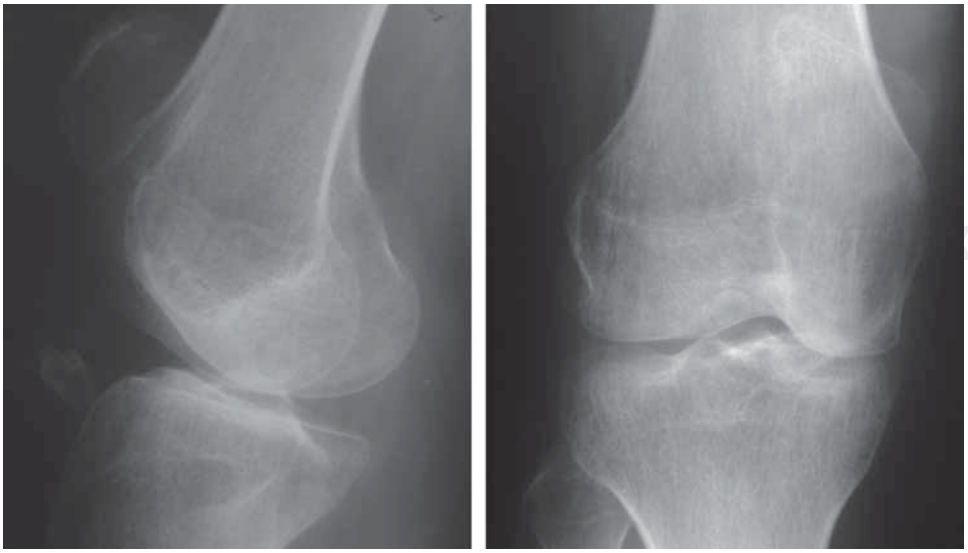

Figure 2. AP and lateral X-ray showing solution of continuity of the bone tissue with a small fragment of the distal pole of the patella, which is displaced. Patella alta with loss of the Insall-Salvati index.

Clinical case

Female, 20 year-old patient whose only relevant history includes playing soccer since 15 years of age. She reported that 6 months back, while playing she tried to kick the ball but a rival player blocked the ball so it did not move and she sustained hyperextension of the right knee. She heard a snap and could not continue playing due to knee pain. She reports that she could walk, weight bear, and go up and down the stairs. The knee swelling subsided at three days so she did not go to the follow-up visit. At six months she had increasing disability and went to the follow-up visit. Findings included loss of continuity of the patellar tendon, patella alta, hypotrophy of the quadriceps, 60° of passive flexion, 0° of extension, 45° of active flexion, 30° of extension *(Figure 1)*. Imaging studies revealed solution of continuity of the bone tissue in the distal end of the patella and patella alta *(Figure 2)*. Patellar tendon plasty with allografts was proposed with the modified Ecker, Lotke and Glazer technique *(Figure 3)*.

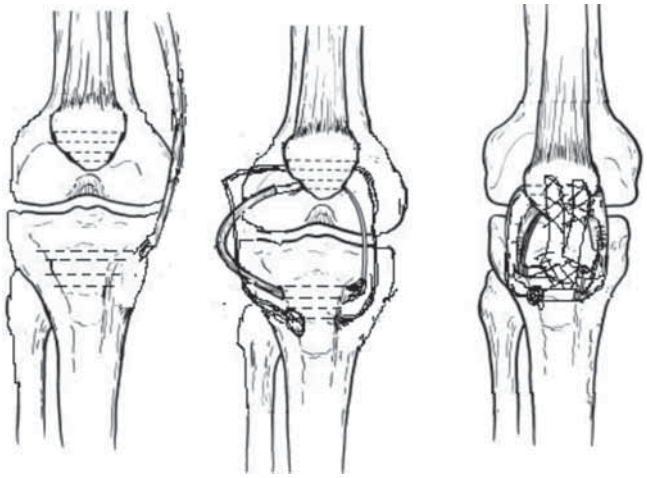

Figure 3. Preoperative planning of the plasty with both allografts.

Surgical technique

The patient is placed in dorsal decubitus position. After asepsis and antisepsis, and placement of sterile drapes and ischemia, a medial 5 cm S-shaped incision is made proximal to the proximal pole of the patella, up to 5 cm distal to the tibial tuberosity *(Figure 4)*. After dissection by planes, the proximal and distal portions of the patellar tendon tear are located *(Figure 5)*. Krackow sutures are used with #2 fireware in the distal plane. The distal pole and the distal fragment of the patella are then reamed and refreshed. Proper reduction should occur upon pulling them. Then two holes are drilled in the patella, from lateral to medial, with a 3.5 to 2.5 mm drill bit at 3.5 cm from the distal patellar pole *(Figure 6)*. A 1 mm wire is passed through the hole, traction is performed, and we then make sure that the patella is reduced by measuring the Insall-Salvati index, the wire is tied to the screw and the patella is kept reduced. Two holes are drilled from medial to lateral under the tibial tuberosity, 5 mm away from the anterior cortex. At the level where the tibial tuberosity begins, at

Figure 4. S-shaped incision in the anterior knee.

Figure 5. Central defect of the patellar tendon and distal fragment of the patella.

2.5 cm distally, using a 3.5 mm drill bit a semitendinous allograft is introduced in the tibial tunnel, and a 4.5 mm screw is introduced in the other one *(Figure 7)*. The other end is introduced in the patella, in the proximal hole *(Figure 8)*, then the wire is pulled and tied to the screw maintaining the distance where it was observed that the patella is reduced, according to the Insall-Salvati index. The ends are sutured to each other with Krackow sutures using #2

Figure 6. The fragments are reduced and a distal hole is made of the proximal patellar pole.

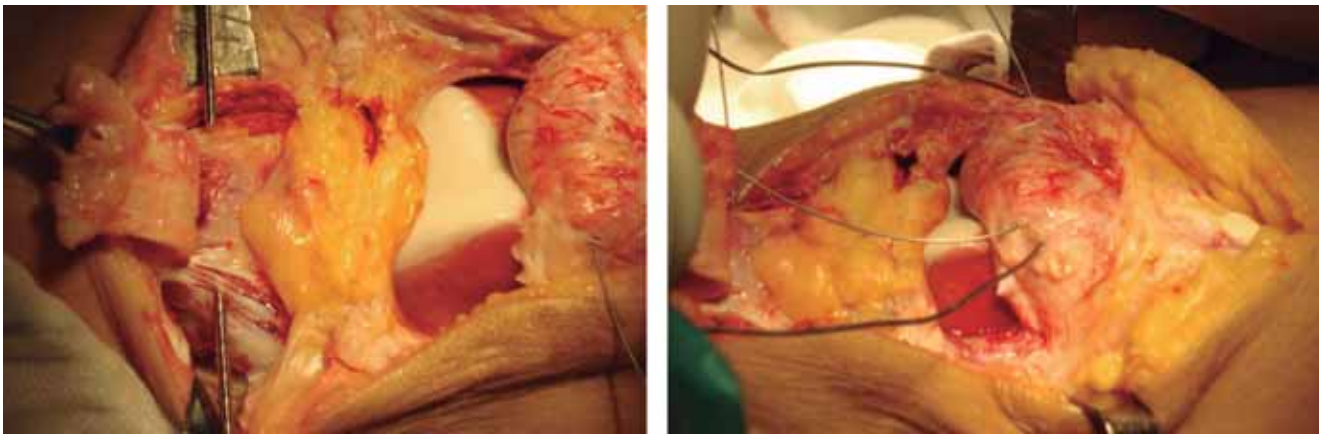

Figure 7. A hole is drilled in the tibia and the wire is passed through another hole in the proximal pole of the patella.

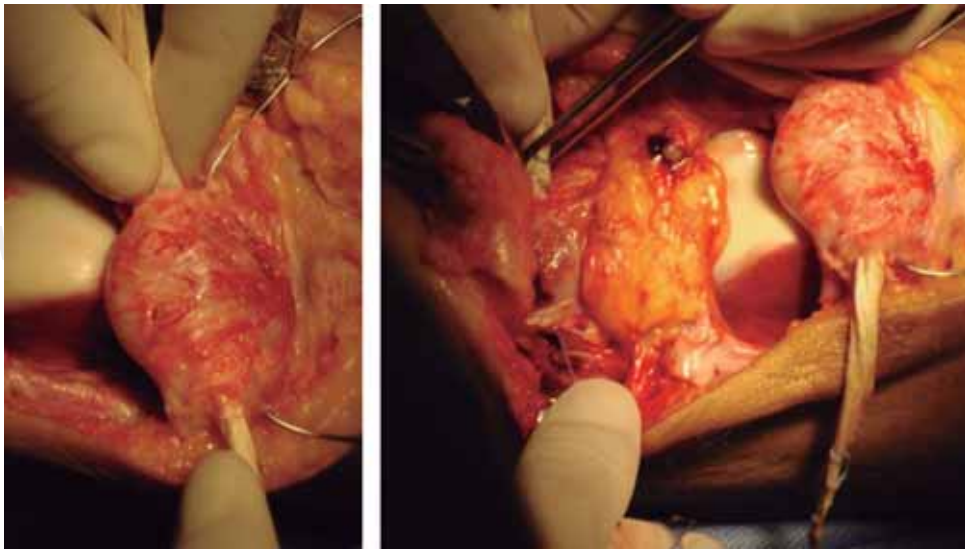

Figure 8. The graft is passed through the proximal hole of the patella and the proximal hole of the tibia.

fireware sutures and forming a proximal circle *(Figures 9 to 12)*. A perforation is made in the central part of the distal fragment of the patellar tendon, the gracilis graft is then passed, it is sutured with #2 fireware and it is pulled proximally and sutured to the quadriceps tendon *(Figures 13 to 16)*. It is then stretched trying to cover the defect located at the center of the patellar tendon. The displacement, the graft tension and the height of the patella are all checked using the Insall-Salvati index. Since everything is fine, suture by planes is performed with #2-0 vicryl and

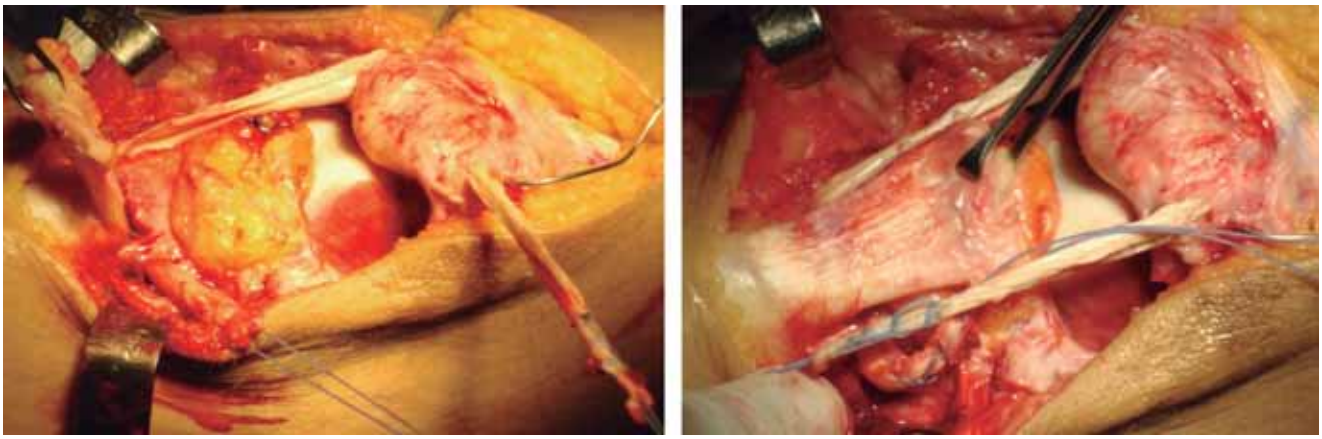

Figure 9. We make sure the reduction of the proximal and distal fragments of the patella is possible by tensing the graft and the wire.

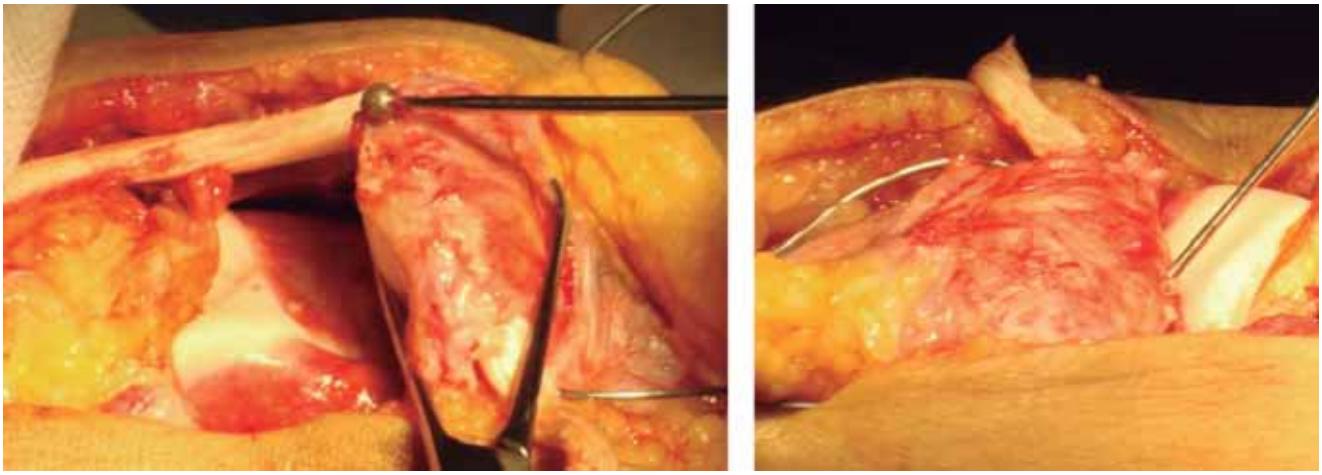

Figure 10. The distal pole of the patella is scarified and drillings are made to improve the blood flow in it.

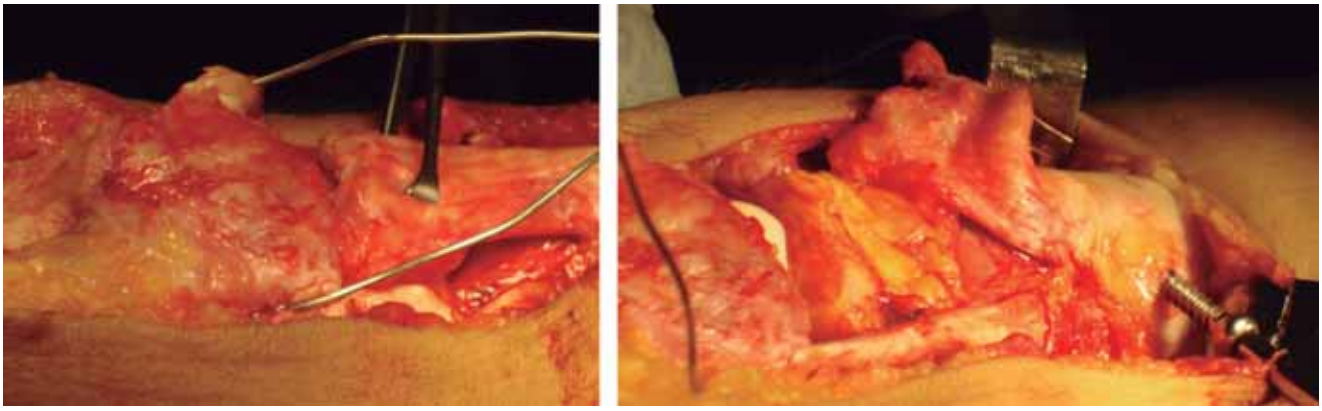

Figure 11. After placing a 4.5 mm screw, reduction is performed.

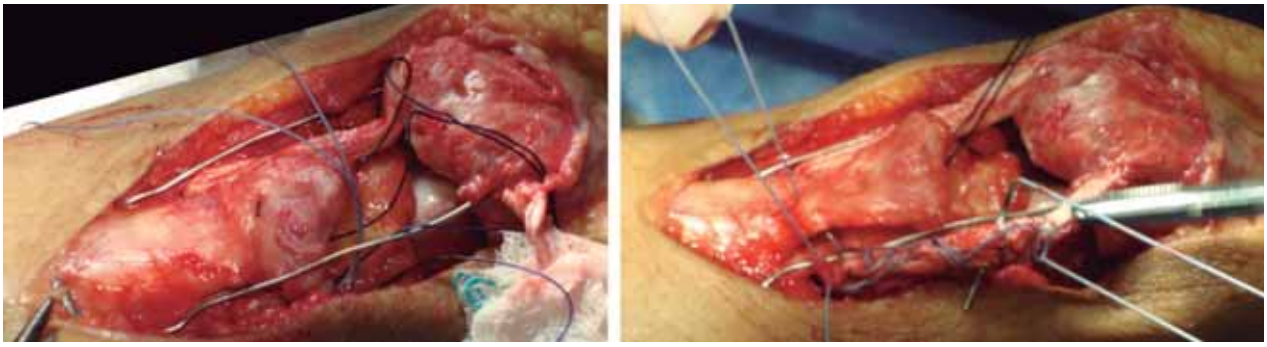

Figure 12. Once it has been reduced and once the wire is fixed to the screw, the free part of the grafts is sutured.

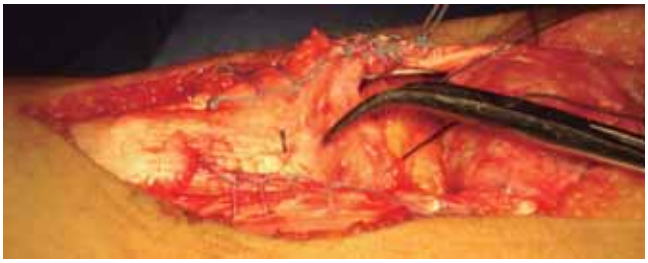

Figure 13. It is sutured with #2 fireware and Krackow sutures to the distal patellar tendon.

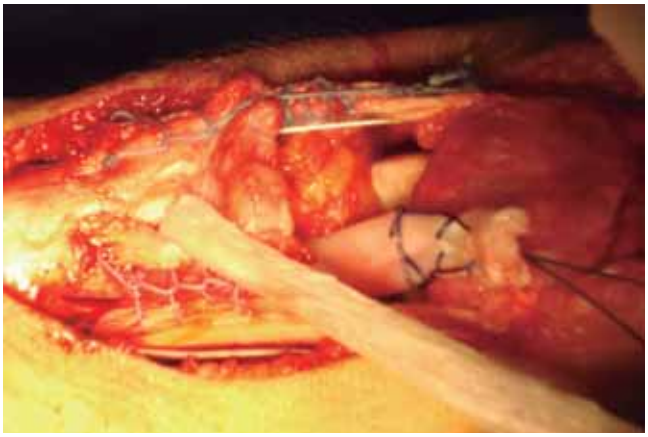

Figure 14. The medial aspect of the distal patellar tendon is drilled and the gracilis graft is passed through it.

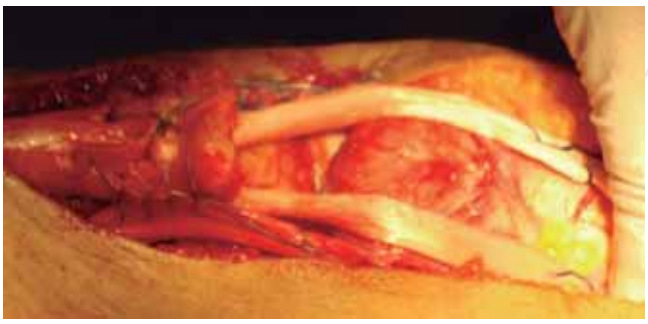

Figure 15. The graft is tensed and fixed to the quadriceps tendon with a #2 fireware suture.

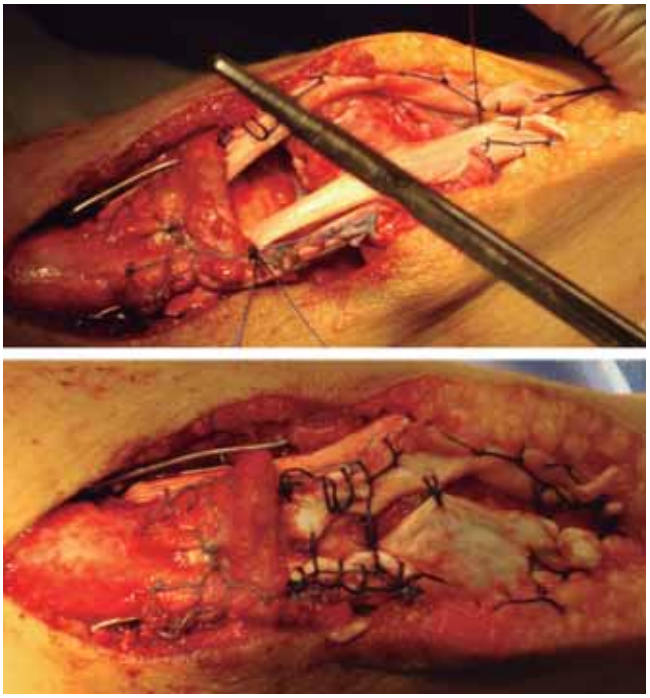

Figure 16. The tendon is deployed and sutured to close the defect located in the middle portion of the tendon.

Figure 17. Sutures are applied by planes with #2-0 vicryl, once the screw and the wire have been removed, and the reduction and the height of the patella observed during knee flexion-extension have been checked.

Figure 18. A Jones type of cotton bandage and a posterior wedge-like splint are placed.

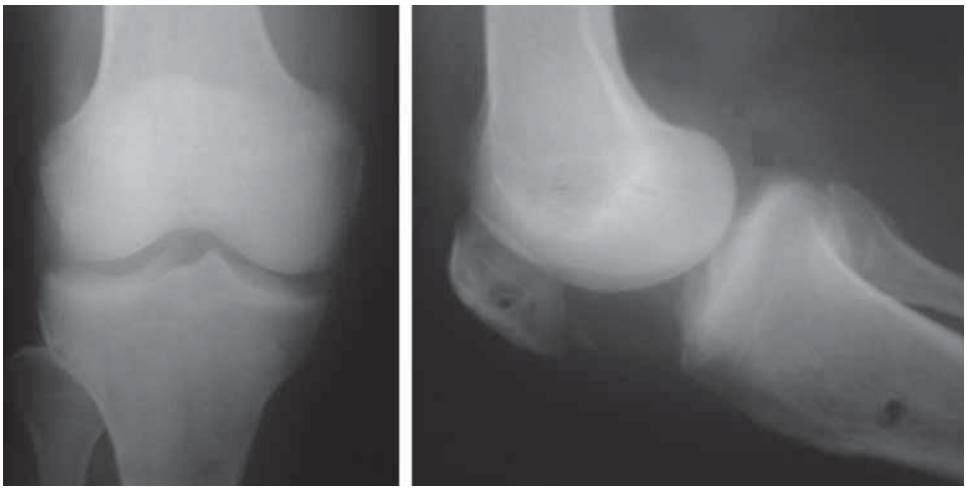

Figure 19. AP and lateral follow-up X-ray showing the drillings and the correct height of the patella.

#2-0 nylon *(Figure 17)*. The screw and the wire are removed, a Jones type of cotton bandage is placed as well as a posterior splint similar to a wedge *(Figure 18)* and the ischemia is removed.

The bandage and the splint are removed three days later *(Figure 19)*, and a control X-ray is taken *(Figure 18)*. Rehabilitation is started with flexion-extension as tolerated and isometric and isotonic exercises of the quadriceps. Currently, six months later, the patient has 110° of flexion, 0° of extension, and has resumed her daily and work activities, as she is a laborer.

Conclusion

Making the right diagnosis and choosing the appropriate treatment for each patient will bring good results. Therefore, patellar tendon tears should not be missed, and recovery should be prompt so that the quadriceps does not undergo hypotrophy and the patient can do well.

The advantage of using allografts is that one does not add any limitations or disabilities that prevent the patient from performing certain activities. If these grafts are harvested from the patient, an additional cause for complications and decrease of the thigh strength will be added, as the semimembranous and the semitendinous have to be removed. There have been no data of rejection or infection. Some authors say that allografts should be used with reservations because of these problems, but the latter have been overcome thanks to the graft sterilization and preservation methods.

We need to continue applying this technique in several patients to see how this kind of plasties evolve. We can say that we have another option to treat this kind of lesion.

Acknowledgements

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