Arquivos Médicos
DOS HOSPITAIS E DA FACULDADE DE CIÊNCIAS MÉDICAS DA SANTA CASA DE SÃO PAULO

CASE REPORT

Arq Med Hosp Fac Cienc Med Santa Casa São Paulo. 2021; 66:e022
https://doi.org/10.26432/1809-3019.2021.66.022

Surgical treatment of anterior cruciate ligament injury in a patient with skeletal immaturity by the Kocher technique, with a postoperative follow-up of 6 years: case report

Tratamento cirúrgico de lesão do ligamento cruzado anterior em paciente com imaturidade esquelética pela técnica de Kocher, com seguimento pós operatório de 6 anos: relato de caso

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Abstract

Introduction: *In the surgical treatment of anterior cruciate ligament (ACL) injury in pediatric patients, a balance between anatomical restoration and the risk of damage to the growth plate during the surgery is necessary.* ***Objective:*** *Report a case of a 9-year-old patient, pubertal development of Tanner I, underwent ACL reconstruction using the technique of Kocher et al., a physeal-sparing reconstruction technique with autologous iliotibial tract graft.*

Keywords*: Knee, Anterior cruciate ligament reconstruction, Sexual maturation*

Resumo

Introdução*: No tratamento cirúrgico da lesão do ligamento cruzado anterior (LCA) em pacientes pediá-tricos, é necessário o equilíbrio entre a restauração da anatomia, e o risco de dano à fise de crescimento durante o ato operatório.* ***Objetivo:*** *Relatar caso de paciente com 9 anos, de-senvolvimento puberal de Tanner I, submetido a reconstrução do LCA pela técnica de Ko-cher, técnica de reconstrução extra fisária com enxerto de trato iliotibial autólogo.*

Palavras chave*: Joelho, Reconstrução do ligamento cruzado anterior, Maturidade sexual*

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Conflict of Interest: *Non*

Introduction

In the surgical treatment of anterior cruciate ligament (ACL) injury in pediatric patients, a balance between anatomy restoration and the risk of damage to the growth plate during surgery is necessary, which can result in length discrepancy and/or angular deformities[(1)].

Several surgical techniques have been described for ACL reconstruction in this population. Kocher et al [(2)] described an ACL reconstruction using an autologous graft from the iliotibial tract, sparing the growth plate, with good results.

We report the case of a 9-year-old patient who suffered ACL injury and underwent reconstruction using the Kocher technique, with a 6-year postoperative follow-up.

Case Report

The report was duly submitted to the Ethics Committee with approval - CAAE: 34741720.8.0000.5479 - approval number 4.217.140 – Holy House of Mercy of São Paulo.

Pre-operative presentation

Male patient aged 9 years and 6 months at the time of injury, Tanner I, suffered torsional trauma to his left knee during sports practice (soccer). He evolved with pain and instability, which limited daily activities. On physical examination, he presented anterior knee instability (3+/3+ Lachman test, 2+/3+ pivot shift test, 2+/3+ anterior drawer test, roller with a difference

greater than 3mm compared to the contralateral side), and positive meniscal tests for medial meniscus injury. In the functional assessment, preoperative Lysholm was 53 (poor), objective IKDC as D (very abnormal), and preoperative Tegner was 3 (light work).

The patient underwent magnetic resonance imaging that showed a lesion in the ACL and a longitudinal lesion in the posterior horn of the medial meniscus (figure 1).

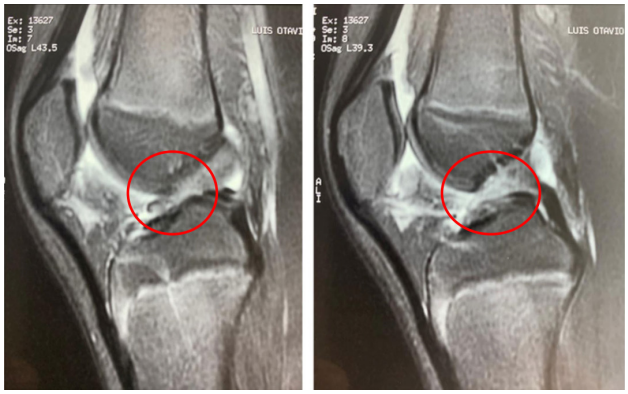

Figure 1 - Preoperative magnetic resonance image in sagittal section, showing complete damage to the anterior cruciate ligament.

Two months after the injury, he underwent ACL reconstruction using the technique of Kocher et al[2] in addition to suturing the medial meniscus (inside-out technique).

Surgical technique

In the technique of Kocher et al [2], an incision of approximately 6 cm in length is made starting from the lateral joint line of the knee. To remove the graft from the iliotibial tract, incisions are made along its upper and lower margins from Gerdy's tubercle up to 15 to 20 cm, proximal to the joint line. The iliotibial band is proximally detached and dissected from the lateral capsule, and sutured in running suture with Ethibond 5. The iliotibial tract graft is directed into the knee, passed through the top of the lateral femoral condyle, in an "over the top" position, and then it is taken towards the tibia, passing under the intermeniscal ligament. The graft is fixed to the femoral side through the lateral incision with the knee in 90º of flexion, and the tibial side is sutured in periosteum under tension.

Post operative presentation

After a six-month postoperative rehabilitation protocol, the patient had a good evolution, returning to his sports practices.

Five years after the operation, he complained of pain after sports activities, and a new medial meniscus injury was diagnosed. He underwent arthroscopy for partial meniscectomy, where a normal aspect of the anterior cruciate ligament graft was evidenced (figure 2).

Figure 2 - Intraoperative arthroscopy image for the treatment of meniscal injury, performed five years after the initial ligament reconstruction surgery, showing the integrity of the graft from the anterior cruciate ligament.

In a follow-up, with a 6-year postoperative follow-up after the first surgery, He denies complaints, but we observed a slight asymmetrical valgus on the left side. He has a negative Lachman test, a negative pivot shift test, a negative anterior drawer test, a rollimeter with a difference of 1 mm on the contralateral side, with no change in the range of motion (flexion 130 degrees and extension 0 degrees bilaterally).

Questionnaires for functional assessment of the knee were applied, which showed Lysholm as 100 (excellent), objective IKDC as A (normal), and Tegner as 9 (competitive sports).

In the evaluation of current imaging exams, we observed an intact ACL graft on magnetic resonance imaging (figure 3), and a deviation of 4.37° (Bonessetter Apps LLc built) in valgus on the left side,

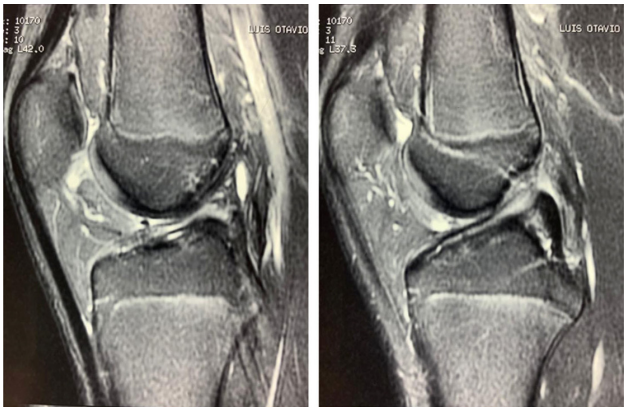

Figure 3 - Magnetic resonance image in sagittal section, taken 6 years after the operation, showing the integrity of the graft from the reconstruction of the anterior cruciate ligament.

asymmetrical in relation to the contralateral side, on panoramic radiographs with load on the lower limbs (figure 4).

Figure 4 - Panoramic radiography image of the lower limbs showing a mechanical axis to the right of 177, 13° and to the left of 181. 5°, deviation of 4.37° in valgus on the left side. Used Bonessetter Apps LLc built application.

Discussion

Historically, non-surgical treatment or waiting until skeletal maturity to perform ACL reconstruction using conventional techniques were the most used treatment strategies for this injury. Currently, the understanding of the risk of meniscal and chondral injuries resulting from instability motivates the indication of surgical treatment in case of ACL injury, even in patients with immature skeleton, in whom there is a greater risk of graft rupture, in addition to damage to the physis of growth in the surgical act [3-6].

There is no consensus in the literature, but the most used algorithm indicates that prepubertal patients (Tanner stage 1 or 2) should undergo extraphyseal or epiphyseal reconstruction, while adolescent patients (Tanner stage 3 or higher) would be indicated for transphyseal techniques partial or total, using soft tissue graft, with metaphyseal fixation [7].

Rerupture, angular deformities and lower limbs discrepancy are the most common complications. Wong et al[8], in a meta-analysis reviewed 1372 patients undergoing reconstruction with or without transphyseal techniques, with a mean 13 years of follow-up, they found 8.7% of rerupture, 3.7% developed angular deformities, more common in valgus, and 7.5% of discrepancy of the lower limbs, the last two being the most frequent complications in transphyseal techniques. The technique proposed by Kocher et al[9] proved effective in trying to avoid such complications. With a mean follow-up of 5.3 years, in 237 patients, the authors found no angular deformity or limb discrepancy in any of the patients evaluated, and a rerupture rate of 6.6%, with an IKDC of 93, Lysholm of 93.4 and tegner of 7.8 in the final evaluation. Despite the non-anatomical positioning of the tunnels, combined intra- and extra-articular reconstruction, similar to reconstruction of the anterolateral ligament, would help to explain the good results in terms of stability and low rate of rerupture, according to the authors.

Our patient, despite the slight deviation in valgus found in the final evaluation, had functional scores similar to Kocher's results[9], with Lysholm of 100 (excellent), objective IKDC as A (normal), and Tegner of 9, proving the effectiveness of the technique.

Conclusion

This case emphasizes the possibility of a good functional result in a patient Tanner 1 who underwent reconstruction of the anterior cruciate ligament using the Kocher technique, but also warns of the risk of angular deformity in the postoperative period, even using a physis-sparing technique.

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Article received: April 24, 2021
Article approved: June 12, 2021
Article published: August 2, 2021