



Case Report

Extra-articular and transcutaneous migration of the poly-L/D-lactide interference screw after popliteal tendon reconstruction[☆]



Camilo Partezani Helito*, Noel O. Foni, Marcelo Batista Bonadio, José Ricardo Pécora, Marco Kawamura Demange, Fabio Janson Angelini

Universidade de São Paulo (USP), Hospital das Clínicas, Instituto de Ortopedia e Traumatologia, São Paulo, SP, Brazil

ARTICLE INFO

Article history:

Received 27 April 2016

Accepted 30 May 2016

Available online 21 February 2017

Keywords:

Tendon injuries

Anterior cruciate ligament reconstruction

Bones screws

Minimally invasive surgical procedures

ABSTRACT

Knee ligament reconstructions are commonly performed orthopedic procedures. Graft fixation is generally performed with metallic or absorbable interference screws. In a recent study, only ten reports of screw migration were retrieved; of these, only one was not related to the anterior cruciate ligament, and the majority was related to the use of poly-L-lactic acid (PLLA) screws. Only one case retrieved in the literature reported screw migration in reconstructions of the posterolateral corner, and that was to the intra-articular region. In the present article, the authors report a case of extra-articular and transcutaneous migration of a poly-L/D-lactide (PDLA) interference screw following popliteal tendon reconstruction. Besides being the first case of popliteal tendon migration with extra-articular screw migration, no reports of PDLA screw migration were retrieved in the literature.

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Migração extra-articular e transcutânea de parafuso de interferência de poly L,D-lactide após reconstrução do tendão poplíteo

RESUMO

As reconstruções ligamentares do joelho são procedimentos ortopédicos frequentes. As fixações dos enxertos são mais comumente feitas com parafusos de interferência, metálicos ou absorvíveis. Em estudo recente, somente dez relatos sobre migração de parafusos foram encontrados; somente um deles não estava relacionado ao ligamento cruzado anterior (LCA) e a maioria estava relacionada a parafusos de poly-L-lactic acid (PLLA). Apenas um caso da literatura reportou migração de parafuso em reconstruções do canto posterolateral, essa para a região intra-articular. Neste artigo, os autores relatam um caso de migração

Palavras-chave:

Traumatismos dos tendões

Reconstrução do ligamento cruzado anterior

Parafusos ósseos

Procedimentos cirúrgicos minimamente invasivos

[☆] Study conducted at the Universidade de São Paulo, Hospital das Clínicas, Instituto de Ortopedia e Traumatologia, Divisão de Cirurgia de Joelho, São Paulo, SP, Brazil.

* Corresponding author.

E-mail: camilo_helito@yahoo.com.br (C.P. Helito).

<http://dx.doi.org/10.1016/j.rboe.2017.02.001>

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extra-articular e transcutânea de um parafuso de interferência de *poly L,D-lactide* (PDLA) após a reconstrução do tendão poplíteo. Além de ser o primeiro caso de reconstrução do tendão do poplíteo com migração extra-articular do parafuso, não foram encontrados na literatura relatos de migração de parafusos de PDLA.

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Introduction

Ligament reconstructions of the knee are fairly frequent orthopedic procedures. Among all reconstructions, surgery of the anterior cruciate ligament (ACL) is the most common,¹ but 16% of these lesions also involve the posterolateral ligament complex.²

Bone fixations of the grafts used can be made with numerous devices, but the most commonly used are interference screws, which may be metallic or absorbable. Recent comparative studies have found no functional differences between patients in whom metallic or absorbable screws were used.^{3,4}

As disadvantages, metallic screws present the risk of damaging the graft, especially in the case of soft tissue grafts, and making the reconstruction more fragile, as well as turning into artifacts on magnetic resonance imaging and often requiring removal in revision ligament reconstruction surgeries.^{3,5-7} In turn, absorbable screws have as disadvantages the possibility of breakage and migration, as well as inflammatory synovitis.

In a recent study by Pereira et al.,⁸ the authors found only ten case reports on migration of absorbable screws, and only one of them was not related to the ACL. Most common migration was to the intra-articular region; only two cases migrated to the extra-articular region, one in the femur and one in the tibia. Only one case in the literature reported the migration of part of a screw in reconstructions of the posterolateral corner (PC); this migration was into the intra-articular region.

The authors report a case of extra-articular and transcutaneous migration of an absorbable interference screw after reconstruction of the popliteus tendon in a condition of posterolateral ligament insufficiency.

Case report

In June 2011, a 33-year-old male patient was involved in a car accident that caused dislocation of his right knee. He was initially treated in a regional emergency service, in which a closed reduction of the dislocation and immobilization with an extension brace was performed. Patient did not present neurovascular lesions or other associated orthopedic lesions.

He was then transferred to a referral service for definitive treatment of the lesions. The posterior and anterior drawer test were positive, as well as posterolateral tibial rotation and varus stress; therefore, posterior cruciate ligament (PCL), PC, and ACL lesions were diagnosed.^{9,10}

In August 2011, two months after the initial injury and after a gain in range of motion (ROM), patient underwent inlay PCL reconstruction with Achilles tendon from tissue bank

with bone plug, and PC reconstruction with two posterior tibial grafts from a tissue bank. The lateral collateral ligament, popliteus tendon, and popliteal fibular ligament were reconstructed. No ACL reconstruction was performed. After the reconstructions, an articulated external fixator was installed for early ROM gain and protection of grafts. Fixations were made with absorbable interference screws made of poly-D,L-lactide (PDLA) except for the tibial inlay PCL fixation. Fixation was removed six weeks after surgery.¹¹⁻¹⁴

From a functional standpoint, patient is progressing well, with a return to pre-injury activities after eight months of rehabilitation. He did not present complaints until 15 months postoperatively, when he noticed a bulging appearance in the anterolateral region of the leg. Initially, he did not seek medical attention, but after four weeks of symptoms he noticed the protrusion of part of one of the screws and came to the hospital (Fig. 1).

Patient was taken to the operating room, whereupon screw was completely removed, associated with surgical cleaning and closure of the puncture. The screw was intact, with no signs of degradation at the time of its removal (Fig. 2). Cultures collected intraoperatively indicated the presence of *Staphylococcus aureus*. Patient was treated with oxacillin and rifampicin according to the protocol of the infection committee of this institution, with success. At the time of surgery he was examined under anesthesia, demonstrating no posterior or posterolateral instability.

In his last follow-up evaluation, four years after the reconstruction surgery, he presented complete clinical improvement, without complaints, with normal range of motion and no instability (Figs. 3 and 4).

Discussion

The case presented is unique since it shows extra-articular and transcutaneous migration of an absorbable interference screw after PCL reconstruction, more specifically the tunnel used for reconstruction of the popliteus tendon.

Migration of extra-articular and transcutaneous implants of the knee are not uncommon; there are reports of migration ranging from prosthetic components to interference screws.^{8,15,16} Screw migrations are more common after ACL reconstruction, albeit still low in number.

Among the reports retrieved in the literature, the most common material to present migration is poly-L-lactic acid (PLLA). This polymer is most often used in orthopedic materials and presented good results in published studies,^{17,18} but adverse effects of its degradation can be observed up to three years after surgery. The development of PDLA screws aimed



Fig. 1 – Anterolateral (A) and lateral (B) image of the right knee of the patient showing extra-articular and transcutaneous migration of a bioabsorbable poly D,L-lactide screw used for graft fixation of the tendon of the popliteus muscle.

to improve implants by lowering PLLA reactions, but complications from their use, such as formation of pre-tibial cysts, have been reported.¹⁹ Nonetheless, to the best of the authors' knowledge, there are no cases of screw migration with the use of this material to date.

The bioabsorbable material passes through the following steps after its implantation: hydration, depolymerization, mass loss, absorption, and elimination. During degradation, hydrolysis may occur and particles may be phagocytosed by

macrophages. Such process may be associated with formation of cysts.¹⁹⁻²¹ The authors postulate that screw migration can also be related to some complications in the process.

Due to the small number of reports in the literature, it is not possible to establish a causal relationship regarding the reason for this complication. It was hypothesized that there is a relationship between tunnel and screw size with its migration, which was discarded in previous articles.⁸



Fig. 2 – Intact poly-D,L-lactide interference screw removed after transcutaneous migration.



Fig. 3 – Four-year postoperative clinical picture of the lateral aspect of the patient's knee, showing healed operative wound.



Fig. 4 – Four-year postoperative knee range of motion, showing full extension (A) and 120-degree flexion (B).

It is always important to consider the differential diagnoses of screw migration, such as meniscal injury, periarticular fracture, and ACL rupture.²² Typically, this diagnosis is not easily made, since a small migration can be mistaken with other pathologies. This difficulty occurs only in cases of intra-articular migration of the implant. As the screw migration in the present patient was extra-articular and transcutaneous, visible outside the patient's knee, the diagnosis was made with no interferences. Imaging studies may be important to differentiate this migration from the formation of pre-tibial cysts in cases of diagnostic doubt.^{18,19}

As the migration occurred 15 months postoperatively, patient did not present any problems regarding knee instability, despite the reconstructions having been made with tissue grafts, which have slower bone integration than autologous grafts.²³

The authors reported a case of a patient undergoing posterolateral reconstruction who evolved with extra-articular and transcutaneous migration of the bioabsorbable screw. There are no similar studies in the literature with the type of polymer used in the reconstruction.

Conflicts of interest

The authors declare no conflicts of interest.

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