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Open posterior capsular release in stiff total knee arthroplasty: Surgical technique

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Abstract

Introduction: Total knee arthroplasty is the most efficient treatment for knee osteoarthritis. 4% to 16% of patients develop stiffness in the knee that impairs them to perform daily activities. There are multiple strategies to treat this condition, from non-operative as rehabilitation to complete replacement of the prosthesis. Open arthrolysis facilitates the posterior capsular release, and no surgical protocol has been described. We present a surgical tip to access this particular region.

Surgical technique and postoperative management: In both medial and lateral side, we perform an incision to access the joint capsule, and when the capsule is presented, we incise it in the posterior edge. Once we open the joint and with the knee at 60° of flexion, we use a Cobb elevator to carefully release the posterior adhesion from the bone. When the Cobb elevator can pass from medial to lateral side (or vice versa), the knee is extended and complete extension is accomplished.

We recommend an extension orthosis to keep the knee from accidental flexion. Total weight bearing can be made after two to three weeks of partial weight bearing.

Conclusion: Stiffness is a rare complication in TKA, but when it happens is a very unpleasant complication for the patient. Open arthrolysis is widely used, but there is not much literature on how to perform it. We present this surgical tip that can be helpful mostly in patients with a flexion contracture, with minimal side effects.

Keywords: Stiff knee, capsular release, tikka, arthrolysis

Introduction

Total knee arthroplasty (TKA) still is the most efficient and consistent treatment for advanced knee osteoarthritis^[1, 2]. However, it is not free of possible complications. Stiffness after a total knee replacement is present between 4% to 16%^[1]. The definition is not widely unified, and can be established as a limitation in the patient's range of motion (ROM) that limits the patient's daily activities^[4]: it is required approximately 67° of flexion for walking, 83° for climbing stairs, 84° for going down stairs and a minimum of 93° to get off a chair^[5]. Literature refers to it as a limit in flexion ranging from 75% to 90%, a flexion contracture greater than 10% or a combination of the previous^[1].

There have been described multiple strategies for a stiff TKA. The least aggressive such as physical therapy or rehabilitation have shown to only increase ROM by 5°^[4]. In increasing order of aggressivity we can find manipulation under anesthesia, arthroscopy or open arthrolysis and revision arthroplasty^[1, 2].

Arthroscopic arthrolysis does not provide adequate posterior release, therefore is less useful in correcting the flexion contracture. This posterior release can be well managed with open arthrolysis^[1].

To our concern, it is still not protocolized the management of the posterior capsular release. We present a surgical tip to easily release the posterior capsule in TKA with stiffness and a flexion contracture.

Surgical Technique

Under regional anesthesia, the patient is positioned in a supine position, with the knee at approximately at 60 degrees of flexion. We use the LegholderRx® (Wirz Ortho Mechanik, Switzerland) that allows different degrees of flexion to facilitate the surgery. The use of a tourniquet is helpful.

We perform an approximately 8-10cm long incision beginning at a point 2cm proximal to the adductor tubercle of the femur that lies on the posterior part of the medial femoral condyle.

The fascia is then exposed, which is incised along the anterior border of the sartorius. The sartorius muscle is retracted posteriorly together with the semitendinosus and gracilis muscles. Thereon, the posteromedial joint capsule and the medial head of the gastrocnemius are shown, and therefore we perform a capsulotomy posterior to the tibial collateral ligament, enabling us to access the posterior aspect of the joint (Figure 1).



Fig 1: Clinical appearance with the Cobb retractor from side to side releasing the posterior capsule

Similar to the medial approach, we perform another 8-10cm long incision along the lateral side of the knee. We use then iliotibial band as a reference that can be easily palpated lateral to the patellar ligament. Once the skin flaps are mobilized, the iliotibial band is shown and we incise it at the point where the two anterior thirds meet the posterior third. With electrical blade, hemostasia is performed and with blunt dissection we look for the end of the lateral vastus, where it meets the bone. Then, the posterolateral joint capsule is visible underneath. To avoid incising the meniscus, the arthrotomy is executed 2cm above the joint line. Afterwards we use a periosteal elevator to liberate the lateral femur side until the posterior edge of the lateral condyle (Figure 2).



Fig 2: Lateral side

It is important to keep the knee at 60° of flexion to separate the posterior structures in the popliteal fossa. We can begin either from medial or lateral side. We carefully release the most external capsule with the cauterizer pen, until the medium size Cobb elevator can start to separate all the fibrous material that is attached to the posterior cortical of the distal femur. With the Cobb elevator we protect the vital posterior structures such as the popliteal artery, the tibial nerve or the common peroneal nerve, as it is performed as a blunt dissection. We do not use the cauterizer pen more than at the beginning, and so we protect the area of the temperature rise. To prove that the extension is now complete, we perform a full knee extension with the Cobb elevator transversally in place (Figure 3).



Fig 3: Medial side

After the arthrolysis is finished, the iliotibial band and the medial fascia is closed with a strong absorbable suture. Subcutaneous tissue is also closed with absorbable suture and the skin is closed with staples. The operated leg is placed in a cast to avoid early retraction.

Postoperative Management

After 10 to 15 days staples are removed and the patient is given the consent to start flexing the knee, progressively. It is recommended to use a knee brace in extension certain periods of time to avoid retraction, especially at night. It is also recommended that the patient is regularly visited in the outpatient clinic to keep a close monitoring on the patient's progression.

Conclusion

Stiffness is a rare complication in TKA, but when it happens is a very unpleasant complication. Open arthrolysis is widely used, but there is not much literature on how to perform it. We present this surgical tip that can be helpful mostly in patients with a flexion contracture, with minimal side effects.

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