



The effect of percutaneous release of the medial collateral ligament in arthroscopic medial meniscectomy on functional outcome



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ABSTRACT

Background: Pie crusting (PC) of the medial collateral ligament (MCL) in the knee has been used empirically to achieve more space in the medial compartment during knee arthroscopy. However, there are no reported studies analyzing the functional results of the application of the PC technique to the MCL in patients undergoing arthroscopic meniscectomy of the medial meniscus, and to determine the rate of iatrogenic injury and associated morbidity.

Description of technique: The patient was in a supine position with a tourniquet and a side post. Percutaneous controlled release of the posterior part of the MCL was performed using an intramuscular needle, and a mild valgus force was applied while viewing with the arthroscope of the controlled progressive gain in medial compartment space.

Patients and methods: A retrospective clinical study of 140 patients undergoing arthroscopic meniscectomy with or without MCL PC was conducted. Tegner and Lysholm tests and visual analogue scales were used to assess pain and functional results.

Results: The patients in the group with meniscectomy and PC had higher scores on the Lysholm scale, less pain at rest after two months, and achieved significantly better pain control during physical activity at six months. No complication, residual instability, or iatrogenic injury to the cartilage were observed in the meniscectomy plus PC group.

Conclusion: The MCL PC technique for medial meniscectomy is a safe and effective way to reduce iatrogenic injury to the cartilage and does not affect knee stability. Decompression of the medial compartment results in better functional outcomes at two months and lesser pain during physical activity at six months.

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1. Introduction

Meniscal injury is a common clinical entity for orthopedic surgeons, with an annual incidence of 0.006 [18]. Arthroscopic treatment of the meniscus is one of the most common orthopedic service procedures [11]. In order to establish a diagnosis and to initiate a correct treatment procedure, it is crucial to have a full view of the area of the posterior horn of the medial meniscus. However, it is extremely difficult to obtain an adequate visualization, particularly in patients with genu varus and impingement in the internal compartment [15,19]. In fact, the posterior horn of the medial meniscus is one of the most difficult areas for knee arthroscopy to access. When the medial joint area is

difficult to open, manipulation using surgical instruments may cause iatrogenic injury to the cartilage [2,8,12,13], which may negatively influence outcome injuries may be nonrecoverable because of the nature of the cartilage, and finally may lead to arthritic degeneration of the joint [7]. Moreover, unstable meniscal fragments that are not diagnosed (and therefore not treated surgically) may result in the persistence of symptoms and require subsequent revision surgery [20]. Forced opening of the medial compartment may cause a complete rupture of the medial collateral ligament (MCL) or even a fractured femur [10].

In the early 2000s, Agneskirchner et al. [1] and Bosch et al. [6] proposed a minimally invasive technique for opening the medial compartment by repeated percutaneous puncture of the capsuloligamentous structures of the posteromedial area with an intramuscular needle. Other authors have also described similar methods more recently [16,19].

In this article, our results of an outside-in selective deep MCL piecrusting release technique applied with percutaneous punctures with controlled valgus force and constant arthroscopic display are presented.

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The procedure allows access to the posteromedial area of the medial meniscus through the standard anteromedial portal, providing a good view and a sufficient working space. The aims of this study are to: (1) assess the extent of potential morbidity (i.e., residual valgus instability) associated with the technique; (2) determine the efficiency (functionality) of and the levels of pain associated with this technique compared with meniscectomy alone; and (3) verify the lower rate of iatrogenic injury to the cartilage.

2. Surgical technique

The procedure is performed with the patient under general anesthesia in a supine position with both legs extended, and an external side restrainer acting as a support for the proximal part of the thigh undergoing surgery, where a tourniquet is applied. The surgeon acts as a foot stopper, blocking it with his hip. The stability and range of motion of the joint were assessed under anesthesia. Then, arthroscopic inspection was performed through the anteromedial and anterolateral portals.

The pie crust (PC) technique was performed to improve the access to the posterior horn in patients identified with a lesion of the medial meniscus together with a reduced medial compartment space. The joint space was viewed through the anterolateral portal using a 30° arthroscope, and the opening of the compartment was measured using the arthroscopic probe (five millimeters) as a reference. The junction point of the parameniscus and the posterior horn of the meniscus was then identified. A 20-gauge needle was inserted into the posterior and medial areas by a single cutaneous puncture, which reached the synovial–meniscus junction of the posterior horn. This ensured that the needle does not penetrate joint, and was used as a height reference for the punctures. A controlled force was applied from the valgus to the knee, guided by a direct view from an arthroscope, and repeated deep skin punctures are performed in the MCL to open the compartment,

beginning in the posterior and medial regions. The opening of the compartment was measured again with the probe; however, this may be twice the initial value. A good view of the entire posterior horn of the meniscus was ensured. The meniscal resection was performed quite easily with arthroscopic instruments, with minimal risk of iatrogenic injury to the articular cartilage of the knee. Finally, the fluid was aspirated, the portals were sutured with prolene 3-0, a mild-pressure bandage was applied, and the tourniquet was released (Fig. 1) (Video 1).

After recovery from anesthesia, patients in both groups were provided with analgesics and antithrombotic medication in accordance with our protocol for outpatient major surgery and were discharged the same day.

The rehabilitation protocol was identical in the two groups. During the first two weeks, the patients started full-weight bearing and motion, without any orthotic support, and were initiated muscle toning with isometric exercises to restore joint balance. The patients were progressed to riding a bicycle at three to four weeks, running at six weeks, and pivoting sports between eight and 10 weeks.

3. Patients and methods

Patients undergoing arthroscopic medial meniscectomy after discharge were retrospectively evaluated between December 2009 and June 2012. Data were collected from all patients. The patient population was divided into two groups: meniscectomy alone (group A) and meniscectomy associated with MCL PC (group B). When performing arthroscopy, if the medial compartment is higher than the arthroscopic hook and the whole of the medial meniscus is identified, no PC is performed on the patient and he/she is included in group A. On the contrary, if the medial compartment does not open >5 mm under valgus stress, then PC was performed and the patient is included in group B. All the adult patients with an incurable medial meniscus injury, confirmed

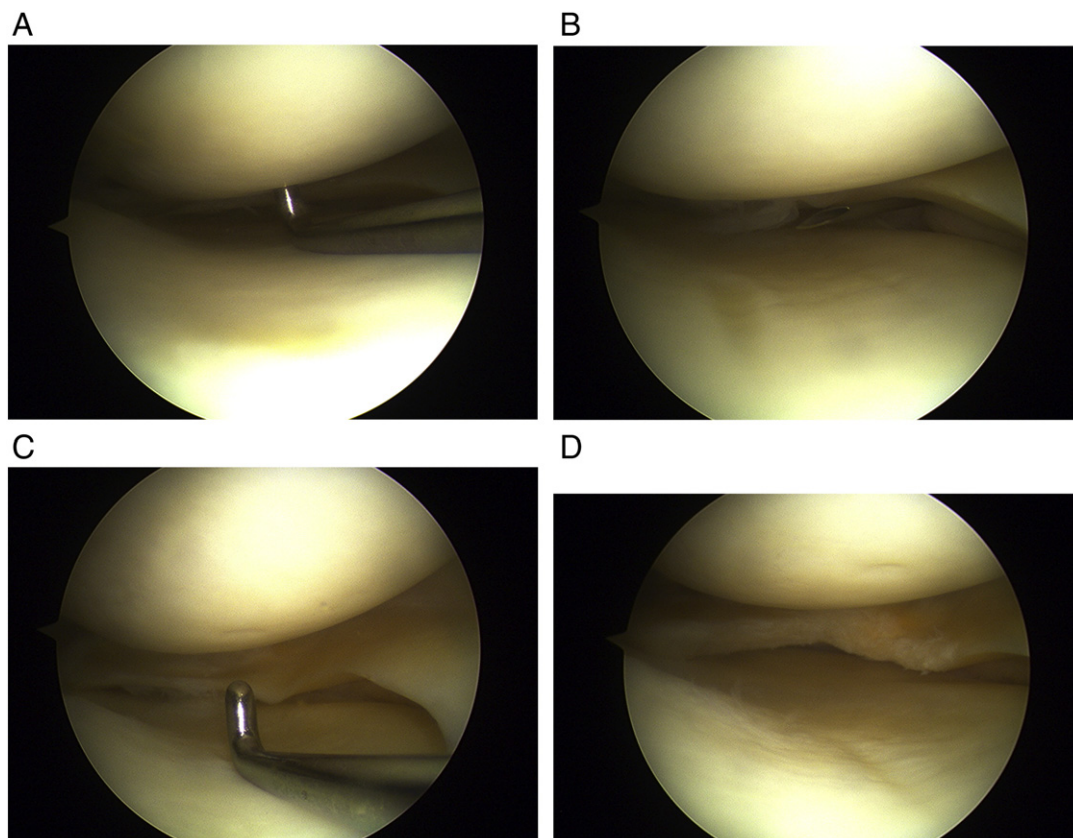


Fig. 1. Image sequence of widening of the internal compartment using the pie crust technique on the MCL. First, the probe depicts the original interior of the compartment. After localization of the MCL with the needle, controlled punctures of its posterior zone permit the surgeon to work comfortably without causing iatrogenic lesions to the cartilage.

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