

# A new arthroscopic technique for lateral parameniscal cyst decompression



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## ABSTRACT

**Background:** The purpose of this study was to describe an arthroscopic technique for lateral parameniscal cyst (LPC) decompression with preservation of meniscal substance and to report the short- to mid-term outcome of 20 patients.

**Methods:** All patients underwent a complete physical examination and magnetic resonance imaging (MRI) of the knee prior to surgery. After arthroscopic diagnosis of a LPC, partial lateral meniscectomy was performed via anterolateral (AL) and anteromedial (AM) portals. For LPC treatment, we used AL and superomedial (SM) portals. We describe a SM portal at the most proximal part of suprapatellar pouch, just medial to quadriceps tendon for the arthroscope. To decompress the cyst, an intra-articular (IA) portal was created with a shaver on the anterior synovial wall of the cyst from the AL portal. Decompression was performed via the AL portal and through the IA portal under the view of the arthroscope in the SM portal in SM portal. At the last follow-up, Lysholm score was used, and patients' clinical outcomes were classified into four categories: excellent, good, acceptable, and poor. Additionally, during the last control, patients underwent an MRI which was assessed for recurrence.

**Results:** Mean follow-up period was  $37.5 \pm 18.8$  months. Clinical outcomes were excellent in 15 patients, good in four, and fair in one. The mean Lysholm score was  $96.2 \pm 7.59$ . No recurrence of the cyst was seen on control MRIs.

**Conclusions:** Arthroscopic LPC decompression with superior and anterior portals is a novel, safe, and effective technique for experienced surgeons. It allows conservation of meniscal tissue, easier handling of instruments, and provides an excellent view of the cyst.

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## 1. Introduction

Meniscal cysts are thought to arise either from myxoid degeneration of menisci by increased mucopolysaccharide secretion [1,2] or through a tear in the menisci, providing a synovial fluid gateway to the menisci and periarticular soft tissues [1,3]. It is also possible that both mechanisms act together or consecutively for the final outcome [4–7].

The most widely accepted treatment alternatives are arthroscopic partial meniscectomy with intra-articular decompression of the meniscal cysts [4,8–13] or arthroscopic management of the meniscal lesion with an open cystectomy [7,10,13,14]. Although both techniques seem to yield satisfactory outcomes, they both have potential disadvantages. Open surgery is more invasive, extends surgery and postoperative recovery time, increases the risk of postoperative infection, and leads to unpleasant surgical scars. On the other hand, with the arthroscopic technique, because some meniscal cysts do not

communicate directly with a meniscal tear at the time of surgery, healthy meniscal tissue may be damaged in order to expose and decompress the cyst [5,7,10,13–16].

The purpose of this study was to describe an arthroscopic technique for lateral parameniscal cyst (LPC) decompression with preservation of meniscal substance and to report the short- to mid-term outcome of 20 patients. Considering the possible complications of open surgery and iatrogenic meniscal damage during intra-articular parameniscal cyst decompression with current surgical techniques, we developed a new parameniscal decompression procedure. Our hypothesis is that the technique will provide excellent clinical outcomes without recurrence during follow-up. In our technique, in addition to the universal anterolateral (AL) and anteromedial (AM) portals, we used a superomedial (SM) portal and sometimes an additional superolateral (SL) portal to decompress the meniscal cysts.

## 2. Patients and methods

This retrospective case series study was approved by the ethics committee. Inclusion criteria were being active in daily life, and having symptoms of pain in the knee joint line or catching, or both.

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Patients with previous knee surgery were excluded because that might affect the functional scores. Between September 2005 and August 2011, 22 knee arthroscopies were performed by the senior surgeon for LPC treatment. Two patients were lost to follow-up. There were 13 male and seven female patients. In total, 20 knees (12 right and 8 left) were operated on. All patients underwent a complete physical examination and magnetic resonance imaging (MRI) of the knee prior to surgery. There were mild chondromalacia (grade 1) in some of the patients and no other procedures were carried out during the surgery except the partial meniscectomy and the LPC treatment.

At the last follow-up, the Lysholm score was used, and the patients' clinical outcomes were classified into four categories: excellent, good, acceptable, and poor (Table 1). This classification was a modified version of the Dorfmann et al. classification [17]. Additionally, during the last control, patients underwent an MRI which was assessed both by the radiologist and the senior surgeon with regard to recurrence of the cyst.

### 2.1. Surgical technique

After arthroscopic diagnosis of lateral parameniscal cysts, partial lateral meniscectomy was performed via the AL and AM portals. For LPC treatment, we used the AL and SM portals. We describe a SM portal at the most proximal part of the suprapatellar pouch, just medial to the quadriceps tendon for the scope. To decompress the cyst, an intra-articular (IA) portal was created with a shaver on the anterior synovial wall of the cyst from the AL portal. Decompression was performed via the AL portal and through the IA portal under the view of the scope in the SM portal (Fig. 1). During decompression, we debrided the contents and linings of the septated cystic cavity. Moreover, for a better view of the cyst, we sometimes also used the SL portal. The SL portal was localized 2.5 cm distal to the SM portal and 2.5 cm lateral to the quadriceps tendon.

### 3. Results

The average duration of symptoms before the operation was 6 months (range, 2 months to 2 years). The mean age was  $41 \pm 11.1$  (range, 17–68) years. The mean duration of surgery was 45 minutes. The mean follow-up period was  $37.5 \pm 18.8$  (range, 12–70) months.

Postoperative treatment was the same as with an arthroscopic partial meniscectomy. A compressive dressing was used for 3 weeks. Immediate weight bearing was authorized after surgery and all patients performed isometric rehabilitation exercises of the quadriceps. Range-of-motion exercises were begun immediately after the operation. All patients were discharged the day after the operation. No complication was seen in the early postoperative period. The patients returned to sports activities postoperatively at 6–12 weeks.

At the last follow-up, the modified Dorfmann clinical outcomes were excellent in 15 patients, good in four, and fair in one. The mean Lysholm score was  $96.2 \pm 7.59$  (range, 69–100). No recurrence of the cyst was seen on control MRIs of the patients.

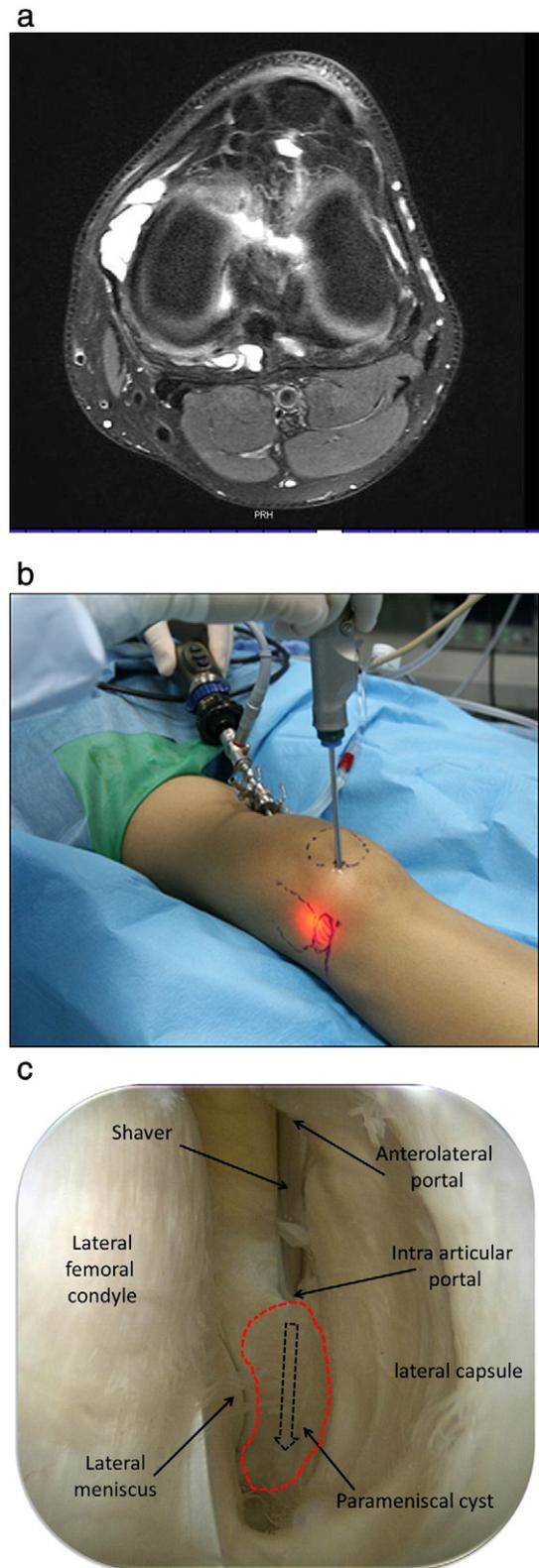
### 4. Discussion

The results of our new arthroscopic technique for LPC decompression are encouraging. The technique provided excellent clinical outcomes without recurrence during follow-up. This technique allows conservation of meniscal tissue, easier handling of instruments, and provides an excellent view of the cyst through the superior portals.

**Table 1**

The patients' clinical outcome classification (modified version of Dorfmann et al. classification [4]).

Excellent: full range of motion, no activity limitation, no pain, no swelling, and no recurrence of the cyst on MRI.
Good: full range of motion, no activity limitation, slight pain during severe exertion, no swelling, and no recurrence of the cyst on MRI.
Fair: athletic activity is limited, sometimes pain and swelling, and no recurrence of the cyst on MRI.
Poor: symptoms during daily activity, and recurrence of the cyst on MRI.



**Fig. 1.** Decompression of lateral parameniscal cyst through the intraarticular portal under the view of the scope in superomedial portal (right knee, supine position). a. Magnetic resonance imaging, b. outside view, and c. inside view.

The etiology, pathogenesis, and, thus, the treatment of meniscal cysts remain controversial [13]. Indeed, debate continues as to whether the cyst should be openly excised or treated arthroscopically. Healthy meniscal tissue may be damaged while decompressing the cyst arthroscopically, and open surgery also has potential disadvantages. In this

study, we describe a new arthroscopic technique for LPC decompression and report the short- to mid-term outcome of 20 patients.

Several theories on the etiology of meniscal cysts have been proposed, ranging from congenital nests of synovial cells to infection, myxoid degeneration, and trauma [1,2,18]. The current theory is that meniscal cysts are the result of synovial fluid that is absorbed through a tear in the articular surface of the meniscus by a one-way valve effect of the flap tear [1,3,11,12,19]. However, there are also numerous reports of meniscal cysts occurring without an associated tear [7,10,13–16]. An alternative theory is that meniscal cysts are the result of cystic degeneration of the meniscus [1,2]. It is considered that there are several stages in the development of meniscal cysts in which both mechanisms play a role [4–7]. Sarimo et al. [13] claimed that trauma or intrameniscal degeneration, or both in combination, could lead to delamination of the meniscus. This delamination could occur without a tear on the articular surface of the meniscus. Supporting this, in a recent study by radiologists [15], no articular surface meniscal tears were detected by MRI in 42.2% of meniscal cyst patients. They noted that an “intrasubstance tear” or “horizontal cleavage tear” that was not on the articular surface would not meet the criteria for a meniscal tear. We believe that delamination of menisci may be reflected in these MRI images.

In 1990, Parisien [11] was the first to advocate the now widely accepted arthroscopic treatment for meniscal cysts in a preliminary report. Then, Glasgow et al. [9] reported 89% good-to-excellent outcomes with the same method in 34 months of follow-up. These reports describe arthroscopic resection of the meniscal tear, and decompression of the cyst through the substance of the meniscus. We think that this technique has potential disadvantages. For example, for lateral parameniscal cysts treated using this technique, there are two points of contact for the shaver; the anteromedial portal and the meniscal substance. In our experience; this may cause tautness of the instrument and a decreased capacity to act. However, in our technique, with the close portal preference, there is one point of contact, adjacent to the cyst, which increases the action capacity of the instrument. Also, when the meniscal cysts do not directly connect to meniscal tears [5,7,10,13–16], arthroscopic cyst decompression may damage a substantial amount of healthy meniscal tissue. Thus, some authors have proposed that with a proven cyst on MRI and no meniscal tear at arthroscopy, an open decompression is preferable as it preserves the meniscus [10,14]. Although all of our cases had related meniscal tears, we think that our technique will be beneficial in cases without arthroscopically visible meniscal tears; moreover, the disadvantages of open surgery are avoided.

In 1993, Passler et al. [16] recommended evacuating the cyst into the joint by opening the joint capsule. They performed a partial meniscectomy for radial meniscal tears and then opened the joint capsule from the inside to allow the contents of the cyst to drain into the joint. More recently, Howe and Koh [3] described a technique for arthroscopic internal marsupialization of meniscal cysts. They arthroscopically created a 5-mm communication channel between the cystic and intraarticular compartments, away from the meniscal substance. In this way, they equalized the pressures of the compartments, and no more inflow of fluid to the cystic compartment through the meniscal tear occurred. Our technique is comparable, but we use superior portals for the camera and anterior portals for the instrument. From the superior portals, the visualization of the entire cyst

is useful, and from the anterior portals, handling of the instruments is much easier, due to the proximity to the cyst. We debride the whole cystic cavity because decompression alone may not be sufficient to discharge all of the cystic material from the septated meniscal cysts. Also, we always resect the intra-articular meniscal tear to abolish the possible valve mechanism.

A limitation of this study is its retrospective design. We did not compare outcomes between treatment modalities. We also report the experience of only a single surgeon, which may be seen as a limitation with regard to replicating the outcomes.

In conclusion, arthroscopic LPC decompression with superior and anterior portals is a novel, safe, and effective technique for experienced surgeons. It allows conservation of meniscal tissue, easier handling of instruments, and provides an excellent view of the cyst. Although we use this technique for all cases with LPC, we think that, this technique is especially useful for cases of meniscal cyst in the absence of an obvious intra-articular meniscal tear.

## 5. Conflict of interest statement

There was no support for the work in the form of grants, equipments, drugs, or any combination of these and no funds were received.

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