

Endoscopic Resection of Prepatellar Bursa

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Abstract: Prepatellar bursitis can be septic and aseptic. Treatment for prepatellar bursitis is determined primarily by the cause of bursitis and secondarily by the pathological change in the bursa. Nonoperative treatment is the mainstay of treatment, and bursectomy is indicated for intractable bursitis resistant to conservative treatment. Open bursectomy has significant risk of surgical site morbidity. In this Technical Note, the technical details of endoscopic resection of prepatellar bursa are presented. This minimally invasive technique has the advantage of better cosmetic results and fewer wound complications.

Most knees have a trilaminar arrangement of fibrous soft-tissue structures anterior to the patella.¹ Those structures from superficial to deep include a transversely oriented fascia, an obliquely oriented aponeurosis, and the longitudinally oriented fibers of the rectus femoris tendon.¹ Between the soft-tissue fibrous layers, there are a prepatellar subcutaneous bursa, a prepatellar subfascial bursa, and a prepatellar subaponeurotic bursa.¹ There is no potential bursal space between the rectus femoris tendon and the anterior patellar bone.¹ The prepatellar bursa typically does not communicate with the knee joint.²

Prepatellar bursitis can be septic or aseptic. Prepatellar aseptic bursitis can occur after repetitive minor trauma, so-called “housemaid’s knee,” in those whose occupations require a kneeling posture, such as carpet layers and house cleaners.³ The other causes of prepatellar aseptic bursitis include acute trauma or low-grade inflammatory conditions, such as gout, syphilis,

tuberculosis, rheumatoid arthritis, sarcoid, idiopathic calcification, and calcinosis, Raynaud phenomenon, esophageal dysmotility, sclerodactyly, and telangiectasia syndrome, or even in polio cases.^{2,4} In prepatellar septic bursitis, the mechanism of infection is believed to be direct inoculation, not hematogenous seeding, likely because of the poor blood supply to the bursa.^{2,3}

Treatment for prepatellar aseptic bursitis is determined primarily by the cause of bursitis and secondarily by the pathological change in the bursa. Nonoperative treatment is the mainstay of treatment and includes initial aspiration, applying compressive dressings, prescribing nonsteroidal anti-inflammatory drugs, and treating underlying causes.^{2,4} Surgery is not required in most instances; but, if needed, the surgical procedures involved are (1) aspiration and intrabursal injection of an appropriate drug (corticosteroid, autologous blood, caustic chemical, such as sodium morrhuate) and placement of a short-term indwelling drainage catheter; (2) incision and drainage in cases of acute suppurative bursitis; and (3) excision of chronically inflamed and thickened bursa.^{2,4} Open bursectomy has significant risk of surgical site morbidity including poor healing of the incision, decreased sensation of scar, contracted scar, atrophic skin changes, subcutaneous hematoma collection, and severe painful and tender scar. This is related to the tenuous nature of the blood supply to the prepatellar skin and the richly anastomosing network of the vertically descending branches of the anterior divisions of the medial and lateral cutaneous nerves of the thigh, divisions of the intermediate cutaneous nerve and the infrapatellar branch of the saphenous nerve.^{2,4-7} To reduce the risk of wound complications, the open procedure is modified by excision of only the posterior half of the prepatellar bursa and leaving

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Table 1. Indications and Contraindications of Endoscopic Resection of Prepatellar Bursa

Indications	Contraindications
1. Intractable bursitis resistant to conservative treatment.	1. Operative site cellulitis
	2. Recurrence after previous endoscopic bursectomy.
	3. Septic bursitis is considered to be a relative contraindication

the anterior wall adherent to the subcutaneous tissue, which is supposed to help in preventing damage to the overlying skin.⁸ Endoscopic bursectomy has also been proposed and has the advantages of better cosmetic result and fewer wound complications.^{4-6,9-12}

Patients with prepatellar septic bursitis are typically successfully managed nonoperatively with rest, compression, immobilization, aspiration, and antibiotics.¹³ Rarely, bursectomy may be required for recalcitrant cases.¹³ Although endoscopic bursectomy has also been proposed to reduce the risk of wound complications, there is risk of inadequate debridement to prevent recurrence and risk of spreading of the bacteria to the fascias leading to necrotizing fasciitis.^{5,14}

The purpose of this Technical Note is to describe the details of endoscopic resection of prepatellar bursa. It is indicated for intractable bursitis resistant to conservative treatment and contraindicated if there is operative site cellulitis or recurrence after previous endoscopic bursectomy. Septic bursitis is considered to be a relative contraindication (Table 1).

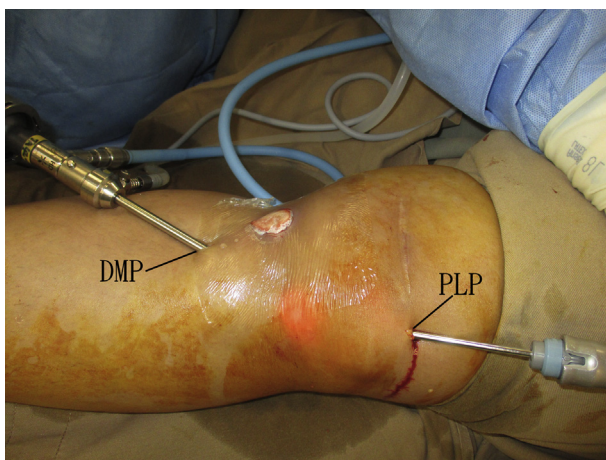


Fig 1. Endoscopic resection of prepatellar bursa of the left knee. The patient is in supine position with the legs spread. The procedure is performed with the proximal lateral and distal medial portals at the proximal lateral and distal medial ends of the bursa respectively. (DMP, distal medial portal; PLP, proximal lateral portal.)

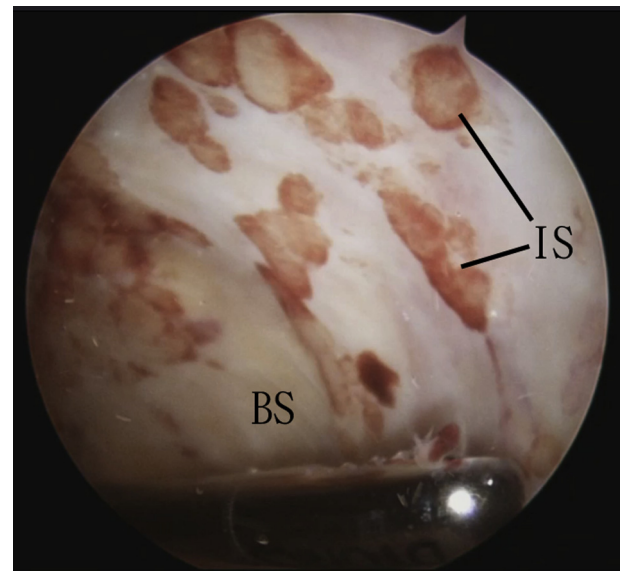


Fig 2. Endoscopic resection of prepatellar bursa of the left knee. The patient is in supine position with the legs spread. The distal medial portal is the viewing portal and the proximal lateral portal is the working portal. The proximal half of the bursa is resected with an arthroscopic shaver. (BS, bursal sac; IS, inflamed synovium.)

Technique

Preoperative Planning and Patient Positioning

The diagnosis of prepatellar bursitis is made on clinical grounds and confirmed with magnetic resonance imaging or ultrasound study. Any sign of infection should

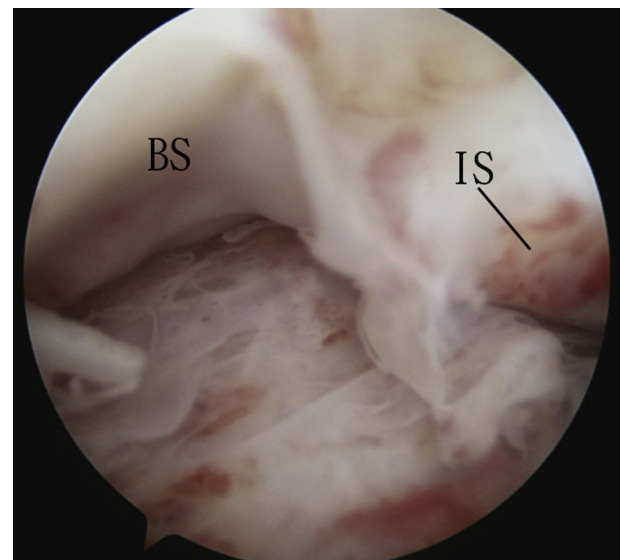
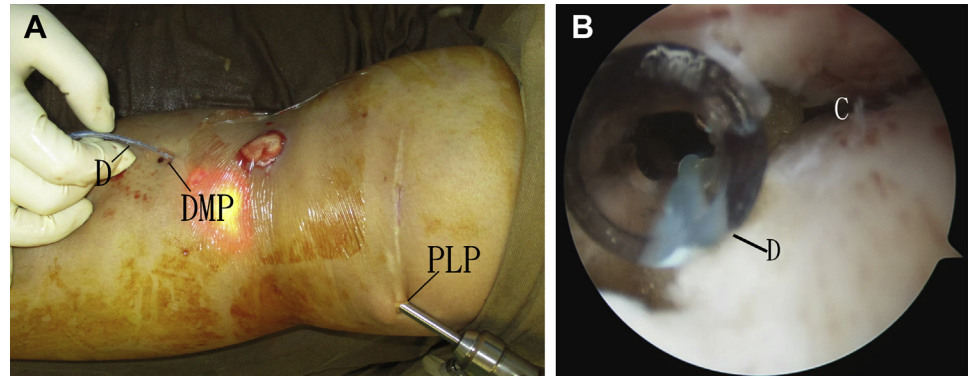


Fig 3. Endoscopic resection of prepatellar bursa of the left knee. The patient is in supine position with the legs spread. The proximal lateral portal is the viewing portal and the distal medial portal is the working portal. The distal half of the bursa is resected with the arthroscopic shaver via the distal medial portal. (BS, bursal sac; IS, inflamed synovium.)

Fig 4. Endoscopic resection of prepatellar bursa of the left knee. The patient is in supine position with the legs spread. (A) The proximal lateral insertion is the viewing portal. (B) A drain is inserted into the cavity via the distal medial portal under endoscopic guidance. (C, cavity of the previous bursal sac; D, drain; DMP, distal medial portal; PLP, proximal lateral portal.)



be noted and the knee joint and patellar tendon should be examined for any pathology. Pain with knee joint range of motion is atypical except for discomfort at extreme flexion, which compresses the inflamed bursa.²

The patient is in supine position with the legs spread. An ipsilateral thigh tourniquet is used to provide a bloodless surgical field. Fluid inflow is driven by gravity, an Arthro-pump is not used, and a 4.0-mm, 30° arthroscope (Dyonics; Smith and Nephew, Andover, MA) is used.

Portal Placement

The procedure is performed with the proximal lateral and distal medial portals at the proximal lateral and distal medial ends of the bursa respectively (Fig 1). A 5-mm incision is made at the distal medial portal and the bursal fluid is drained. The position of the proximal lateral portal is marked with a needle and confirmed by endoscopy. Another 5-mm incision is made at the proximal lateral portal site. The 2 portals are interchangeable as the viewing and working portals.

Prepatellar Bursoscopy

The distal medial portal is the viewing portal and the proximal lateral portal is the working portal. The proximal half of the bursa is resected with an arthroscopic shaver (Dyonics) and arthroscopic punch forceps (Arthrex, Naples, FL). Both the deep and superficial walls of the bursa are resected (Fig 2).

After that, the arthroscope is switched to the proximal lateral portal and the distal half of the bursa is resected with the arthroscopic shaver via the distal medial portal (Fig 3). Because part of bursa is already resected, the bursa may not be distended well with gravity-driven fluid inflow. However, an Arthro-pump should not be used to avoid excessive fluid extravasation. Complete resection of the bursa is not necessary for subsequent seal off the cavity.

Drain insertion

The proximal lateral insertion is the viewing portal. A drain is inserted into the cavity via the distal medial portal (Fig 4, Video 1, Table 2).

Postoperative care

Compression dressing is applied for 2 weeks to facilitate seal off of the cavity. The patient can start free mobilization of the knee after the compression dressing is taken off. Full weightbearing is allowed immediately after the operation.

Discussion

Theoretically, portals can be made along the circumference of the bursa. The portals used in this technique are coaxial that can allow freedom of instrumentation and avoid blind spots during endoscopy. The portals are made away from the axis of the thigh and leg in order to avoid hindrance of motion of the instruments by the thigh and legs. If knee arthroscopy, patellar tendoscopy, or endoscopy of the Hoffa fat pad is needed, the standard anterolateral and anteromedial portals can be used for the bursoscopy, arthroscopy, tendoscopy, and endoscopy.¹⁵⁻¹⁷

We consider septic bursitis as a relative contraindication of the endoscopic bursectomy. If one wants to perform endoscopic resection of an infected prepatellar bursa, precautions should be taken to prevent spreading

Table 2. Pearls and Pitfalls of Endoscopic Resection of Prepatellar Bursa

Pearls	Pitfalls
1. The knee is extended to facilitate resection of the bursa.	1. Fluid extravasation may lead to spreading of bacteria in case of prepatellar septic bursitis.
2. To minimize extravasation, fluid inflow is by gravity and no Arthro-pump is used.	2. Aggressive resection of the superficial bursal wall may jeopardize the blood superficial wall.
3. Complete resection is not needed to seal off the cavity.	

Table 3. Advantages and Risks of Endoscopic Resection of Prepatellar Bursa

Advantages	Risks
1. Less soft-tissue trauma	1. Recurrence of the bursitis
2. Better cosmetic results	2. Nerve injury
3. Fewer wound complications	3. Skin problems of the operated site (e.g., patchy skin necrosis)
4. Lower risk of nerve injury	4. Delayed patella tendon rupture

of bacteria, such as avoidance of use of an Arthro-pump, adequate antibiotic cover, and insertion of a suction drain.

This minimally invasive technique has the advantage of less soft-tissue trauma, better cosmetic results, fewer wound complications, and lower risk of nerve injury. The potential risks of this technique include recurrence of the bursitis, nerve injury, skin problems of the operated site (e.g., patchy skin necrosis) and delayed patella tendon rupture (Table 3).¹⁸ This is not technically demanding and attempted by averaged knee arthroscopists.

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