

# Ultrasound Guided Arthroscopic Popliteal Cyst Excision

# 23

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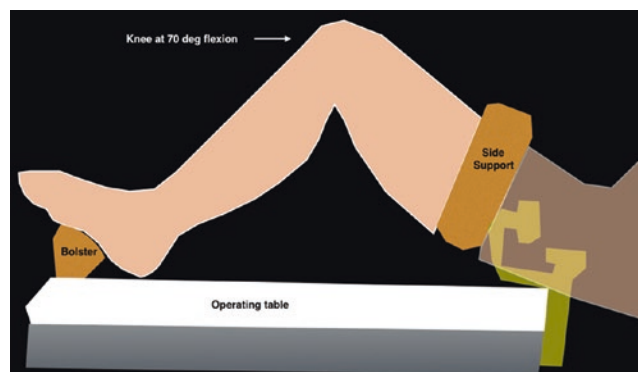
## 23.1 Introduction

Popliteal cysts may present with pain or an inability to flex the knee completely. They may be just incidental findings on an MRI or ultrasound and in these cases can be left alone. However, those that cause symptoms need to be removed. Arthroscopic removal has the advantage of being minimally invasive but is technically demanding. Using intra-operative ultrasound helps in confirming the location of the lesion and whether it has been removed completely [1]. We describe our technique of decompressing a popliteal cyst arthroscopically using ultrasound guidance.

## 23.2 Specialised Equipment

1. Arthroscopic punch (Acufex, Smith & Nephew, Watford, UK).
2. 18G LP needle (Becton, Dickinson & Company, Franklin Lakes, NJ)
3. Ultrasound machine (Sonosite, Bothell, Washington, USA).
4. Sterilised arthroscope cover and tape (Karl Storz, Tuttlingen, Germany).
5. Betadine solution (Avrio Health, NY, USA).
6. Arthroscopic punch (Acufex, Smith & Nephew, Watford, UK).
7. Shaver with tip (Stryker, Kalamazoo, MI).
8. Radiofrequency device (Stryker, Kalamazoo, MI).

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**Fig. 23.1** Positioning of the limb at 70 degrees flexion on an operating table with a side support and bolster at the end of the table

## 23.3 Positioning (Fig. 23.1)

Knee flexed at 70 degrees on the operating table with a bolster at the end of the table and a side support on the lateral aspect of the thigh.

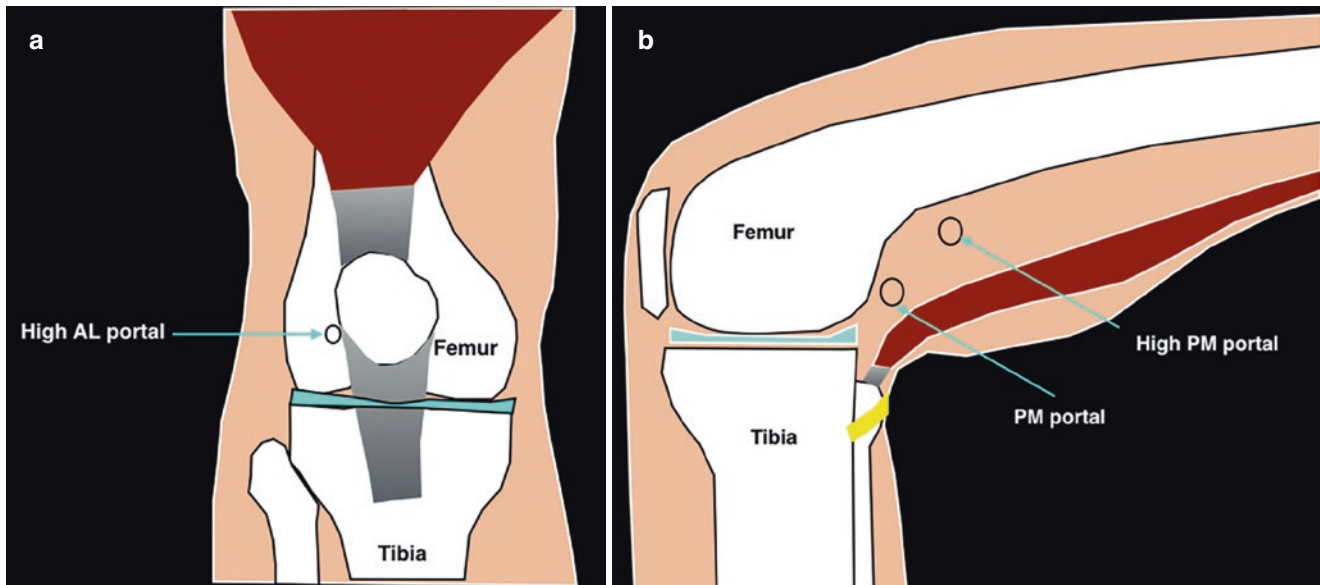
The ultrasound machine is on the same side as the surgeon stands and the arthroscopic trolley on the opposite side.

## 23.4 Portals (Fig. 23.2a, b)

Portal A: Standard anterolateral (AL) viewing portal made just lateral to the patellar tendon just below the inferior pole of the patella in the soft spot.

Portal B: Made under vision by introducing an 18G LP needle just above the posteromedial (PM) soft tissue fold in the PM compartment.

Portal C: High posteromedial (High PM) portal made above the PM portal about 5 cm proximal to it under vision using an 18 G LP needle.



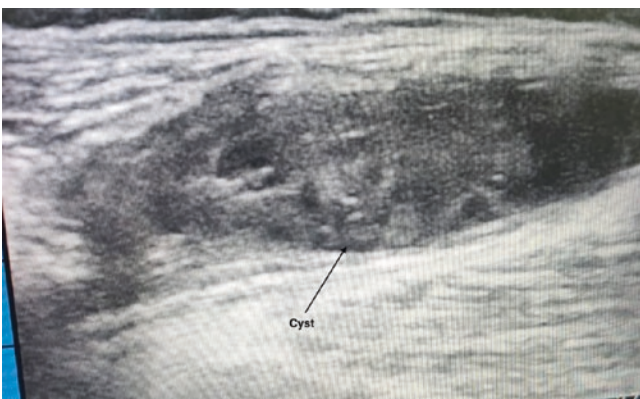
**Fig. 23.2** (a) Illustration showing Portal A made just lateral to the patellar tendon at the inferior pole of the patella. (b) Illustration showing postero-medial and high postero-medial portal

## 23.5 Surgical Steps

Step 1: The ultrasound probe is introduced into the arthroscope cover and the secured with a sterile sticky tape at the base of the probe. The whole probe and wire connecting it to the monitor are covered with the arthroscope cover (Fig. 23.3).



**Fig. 23.3** Picture showing the ultrasound probe covered in a sterile cover with a sticky tape applied to the bottom of the probe



Step 2: The probe is applied to the PM aspect of the knee after dipping it in the Betadine solution to visualise the cyst and the point is marked with a marking pen (Fig. 23.4).

Step 3: The arthroscope is introduced through Portal A between the medial femoral condyle (MFC) and PCL to the PM compartment of the knee (Fig. 23.5).

Step 4: An 18G LP needle is introduced from the skin in the PM aspect of the thigh just above the PM capsular fold by trans illumination and Portal B is made (Fig. 23.6).

Step 5: An arthroscopic punch is then introduced through this portal and the PM capsular fold is cut using the punch, which communicates the popliteal cyst with the knee joint, and the cyst fluid can be seen which the shaver sucks (Fig. 23.7).

Step 6: The shaver is then introduced through Portal A and the fluid sucked out (Fig. 23.8).

Step 7: A higher PM portal is made about 5 cm proximal to Portal B by transillumination and the shaver is introduced through it (Fig. 23.9).

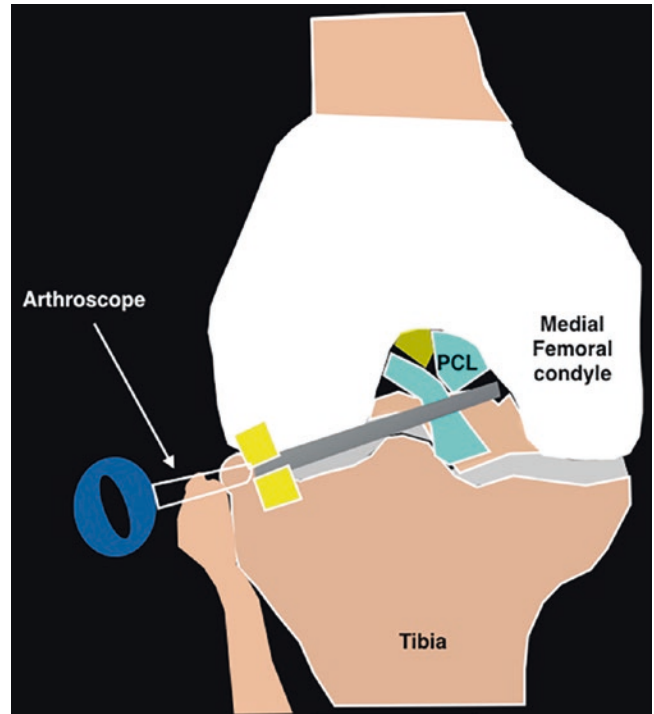
Step 8: The arthroscope is then introduced through Portal B and the shaver through Portal C (Fig. 23.10).

Step 9: Now the cyst is visualised from within and the rest of the septae can be shaved off (Fig. 23.11).

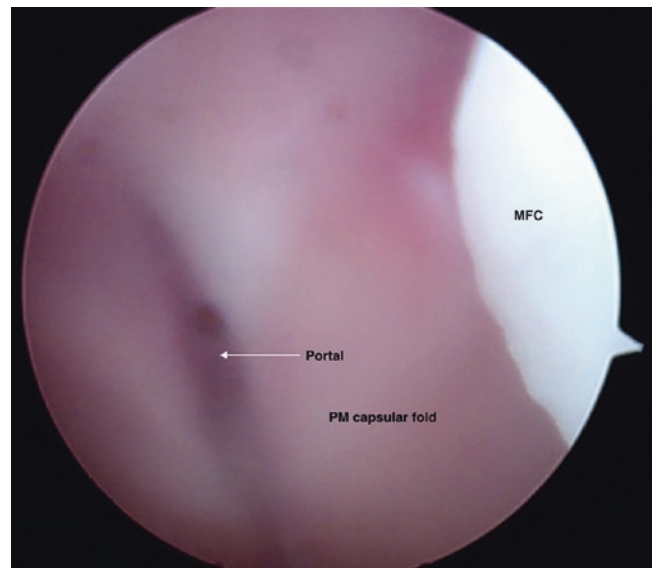
Step 10: The ultrasound is used to confirm if the cyst has been decompressed adequately (Fig. 23.12).



**Fig. 23.4** Picture showing the ultrasound probe covered in a sterile arthroscopic sheath applied to the posteromedial aspect of the knee to visualise the cyst on the monitor

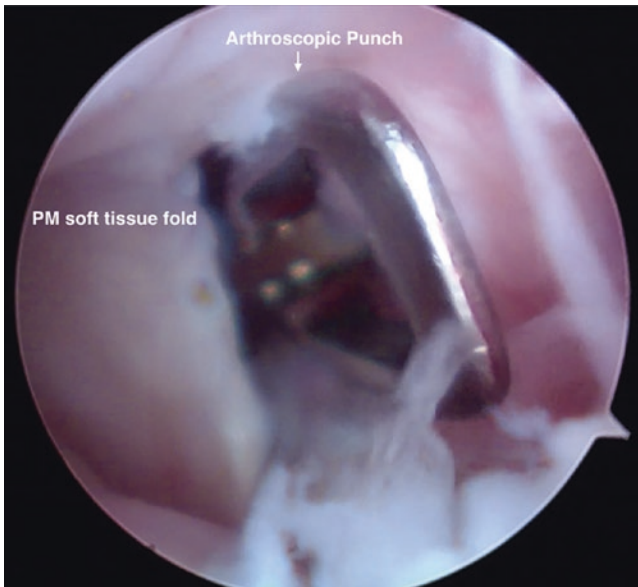


**Fig. 23.5** Illustration showing the arthroscope introduced between the PCL and medial femoral condyle into the posteromedial aspect of the knee

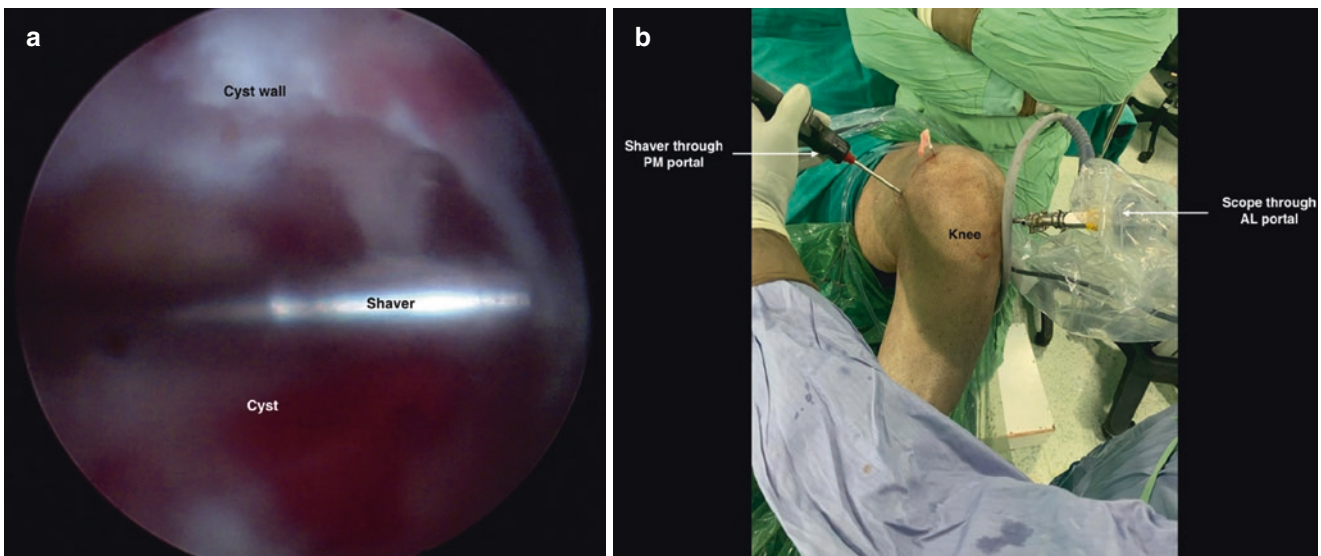


**Fig. 23.6** Arthroscopic image showing the high PM portal made above the PM capsular fold

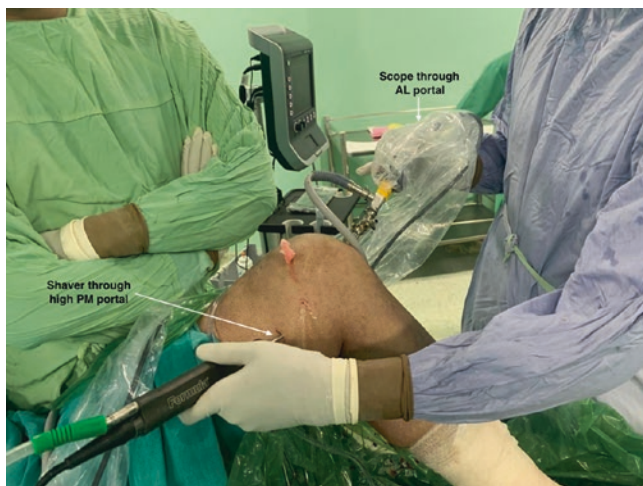




**Fig. 23.7** Arthroscopic image showing the arthroscopic punch through the PM portal cutting the PM synovial fold



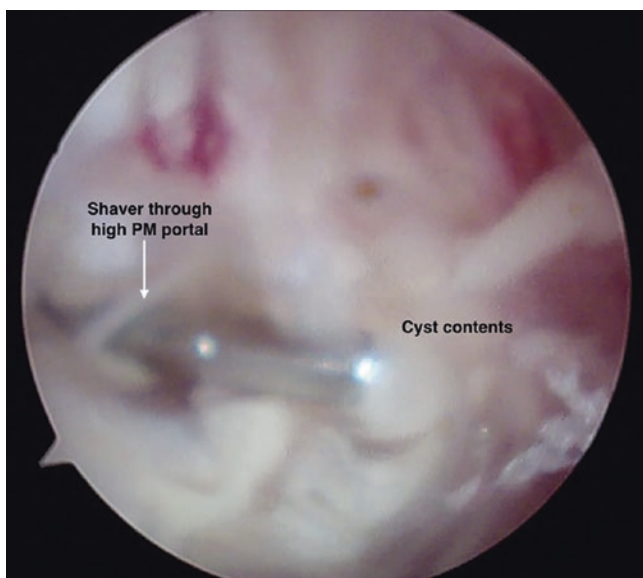
**Fig. 23.8** (a) Arthroscopic image showing the shaver introduced through the PM portal and sucking the cyst fluid debriding it while viewing through the AL portal. (b) External Image showing the shaver through Portal B (PM portal) while viewing through Portal A (AL portal) with the knee in 70 degrees flexion on the operating table



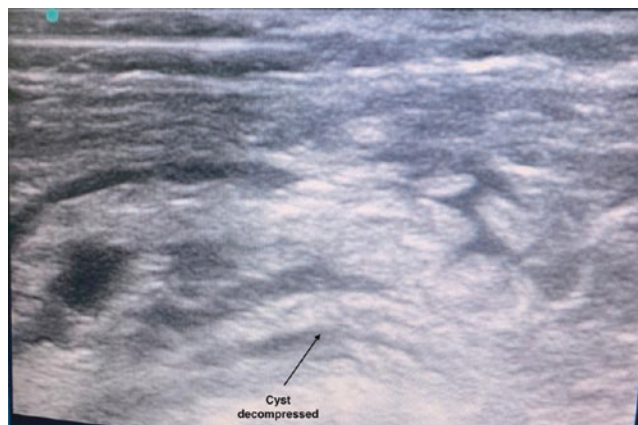
**Fig. 23.9** Shaver through Portal C the high PM portal sucking the cystic fluid while viewing through Portal A (AL portal)



**Fig. 23.10** External image showing the scope through Portal B (PM portal) while the shaver is in Portal A (High PM portal)



**Fig. 23.11** Arthroscopic image showing the Shaver through Portal C (High PM portal) while viewing through Portal B (PM portal)



**Fig. 23.12** Ultrasound showing the decompressed cyst intra-operatively

## 23.6 Tips and Tricks

1. The arthroscope cover should be tightly wound around the probe and fixed with a sticky tape at its base but the surface of the probe applied to the skin should have no folds of plastic over it for better visualisation.
2. The high PM Portal C should be made such that the instrumentation does not collide with the arthroscope.

## 23.7 Advantages and Disadvantages

### 23.7.1 Advantages

1. Purely arthroscopic technique with advantages of arthroscopic surgery.
2. Ultrasound helps localise the cyst and confirm its evacuation.

### 23.7.2 Disadvantages

1. Technically demanding.
2. Potential injury to neurovascular structures.
3. Knowledge of interpreting the ultrasound and holding the probe appropriately as at times if not held properly could lead to anisotropy.

## Reference

1. Mhaskar VA, Agrahari H, Maheshwari J. Ultrasound guided arthroscopic meniscus surgery. *J Ultrasound*. 2022;26:1–5.