Technical Note

Basics of Shoulder Arthroscopy Part IV: Diagnostic Arthroscopy in the Lateral Decubitus Position

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Abstract: Shoulder arthroscopy is a versatile method for treating a variety of shoulder pathologies in a minimally invasive manner. Typically, it is performed with the patient positioned in a beach-chair or lateral decubitus position with the latter being conventionally preferred for shoulder instability work given the use of traction and creation of a distracted joint. This allows ideal visualization and accessibility of the anterior, inferior, and posterior aspects of the glenoid, labrum, and axillary pouch. Despite the apparent advantages, the lateral decubitus position comes with its own technical challenges. Many of these may stem from surgeon training, experience, and level of familiarity with the positioning and arthroscopic view. This Technical Note demonstrates a reproducible and teachable method for efficient and effective diagnostic shoulder arthroscopy in the lateral decubitus position, along with presenting its associated advantages and disadvantages.

Shoulder arthroscopy is a versatile method for treating a variety of shoulder pathologies in a minimally invasive manner. Innovations in technology have created opportunities for advancements in diagnosis, positioning, surgical technique, and postoperative rehabilitation following arthroscopic shoulder surgery. Understanding techniques that create efficiency and enhance effectiveness can make shoulder arthroscopy a useful tool in any orthopaedic surgeon's armamentarium.

Typically, shoulder arthroscopy is performed in a beach-chair or lateral decubitus position. Both positions have been demonstrated to be safe and effective for a variety of arthroscopic procedures.[1-3] Each has their benefits and drawbacks. Lateral decubitus is conventionally preferred for shoulder instability work given the use of traction creating a distracted joint that provides easier circumferential labral and capsular access. Despite the apparent advantages, the lateral decubitus position comes with its own technical challenges. Many of these may stem from surgeon training, experience, and level of familiarity with the positioning and arthroscopic view. The purpose of this Technical Note is to present and demonstrate a reproducible and teachable method for efficient and effective diagnostic shoulder arthroscopy in the lateral decubitus position, along with presenting its associated advantages and disadvantages (Video 1).

Surgical Technique

The patient is positioned lateral on a beanbag or pegboard for support. Bony prominences are padded. The affected shoulder is prepped and draped in a sterile manner. A proprietary limb positioner (Spider2 Limb Positioner; Smith & Nephew) with traction capabilities, and a lateral jack is set up and applied to the upper extremity (Fig 1). The total time under traction is recorded. The landmarks for the shoulder are marked (acromion, coracoid process, clavicle, scapular spine, etc.). A posterior portal is created approximately 2 cm distal and 1 cm medial from the posterolateral corner of the acromion (Fig 2). Shucking of the glenohumeral joint in the anterior and posterior direction along with palpation of the joint line can help localize this posterior portal. A 30° arthroscope is introduced in an atraumatic fashion using tactile feedback of bony structures (humeral head, posterior glenoid, intra-articular space). Appropriate trajectory can be facilitated by aiming at

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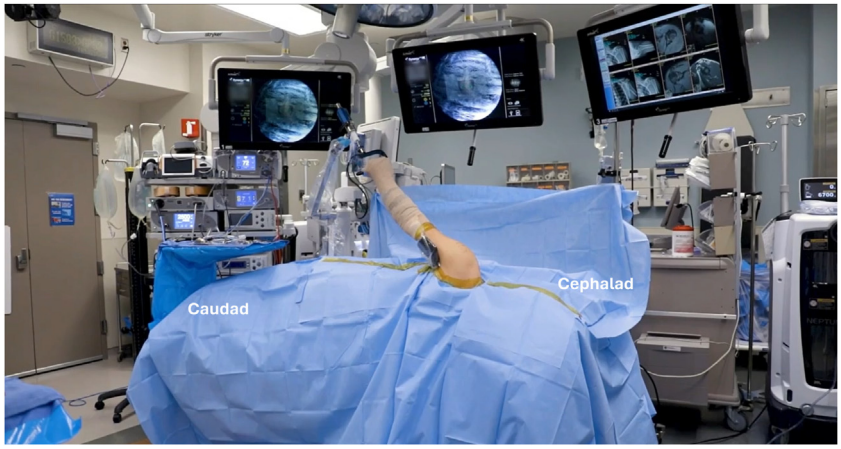

Fig 1. Patient positioning and preparation of the surgical field. Asterisk denotes posterior aspect of the left shoulder.

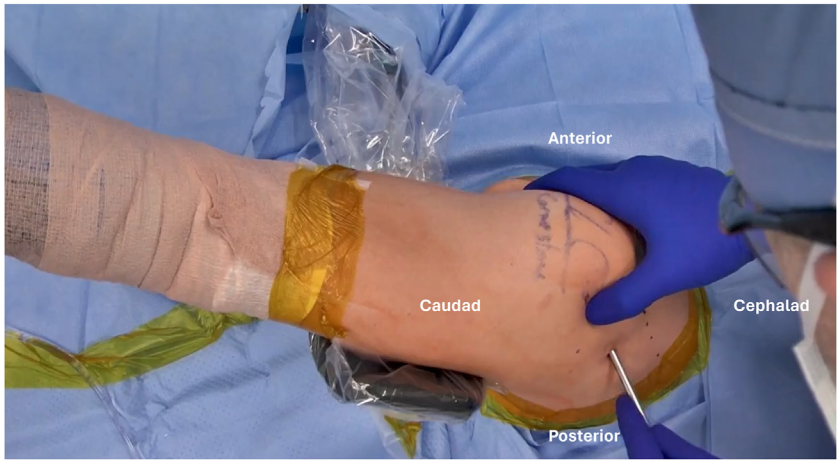

Fig 2. Left shoulder. Arthroscopic access via the posterior portal. Palpation of the anterior glenohumeral joint line provides tactile feedback to optimize trajectory and access the joint in an atraumatic fashion.

the anterior glenohumeral joint space that is localized with simultaneous palpation. Alternatively, aiming for the coracoid process can also assist in appropriate trajectory.

Once access is established, the arthroscope is oriented with the glenoid on the inferior aspect of the screen and the humeral head superiorly (Fig 3). The camera is focused and white balanced for optimal viewing and

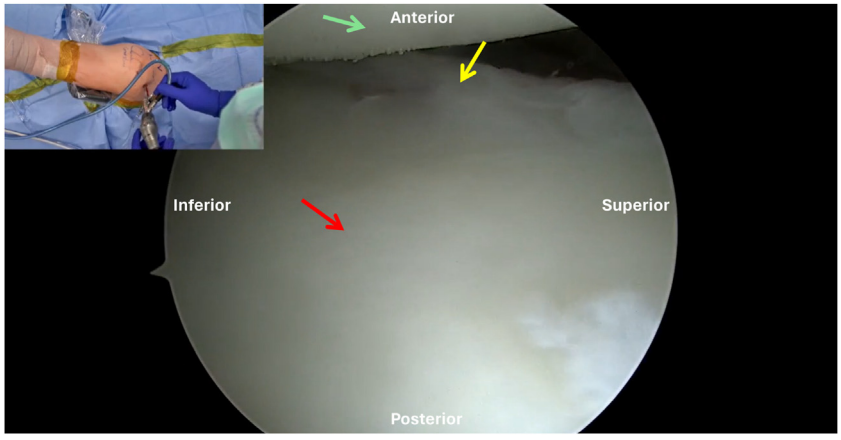

Fig 3. Left shoulder. Initial arthroscopic view of the glenohumeral view from the posterior portal with viewing horizon aligned to put the glenoid (red arrow) on the lower aspect of the screen and humeral head (green arrow) on the upper aspect of the screen. Anterior labrum (yellow arrow) is visible.

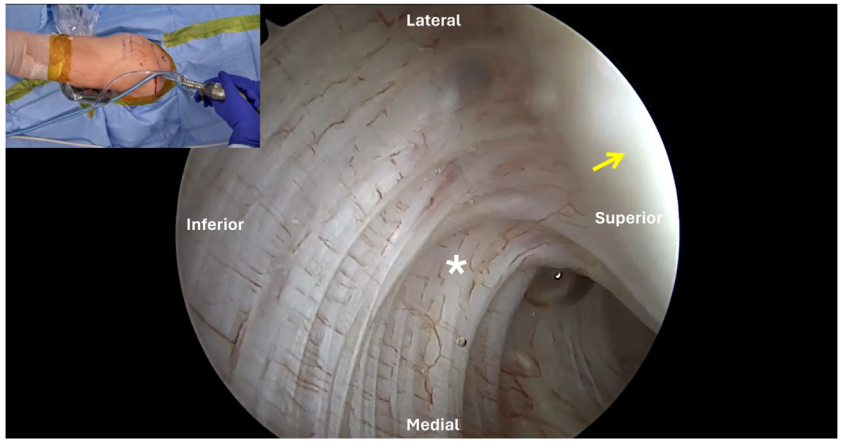

Fig 4. Left shoulder. View from the posterior portal. Angling the scope inferiorly (inset) allows the surgeon to visualize the inferior axillary pouch where the inferior glenohumeral ligament (IGHL) (asterisk) can be seen to insert on the inferior humeral head (yellow). Loose bodies or avulsion injuries of the IGHL can be visualized here.

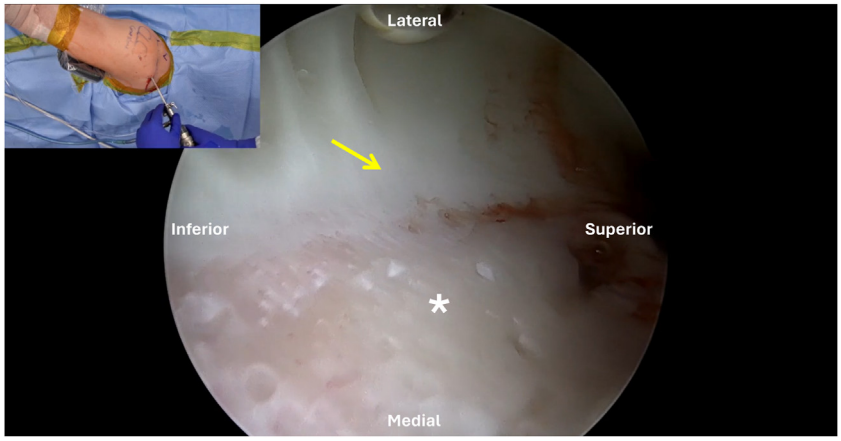

Fig 5. Left shoulder. View from the posterior portal. The insertional footprint of the infraspinatus (yellow arrow) is visualized to be intact and recessed from the articular margin, creating the bare area (asterisk) of the posterior humeral head.

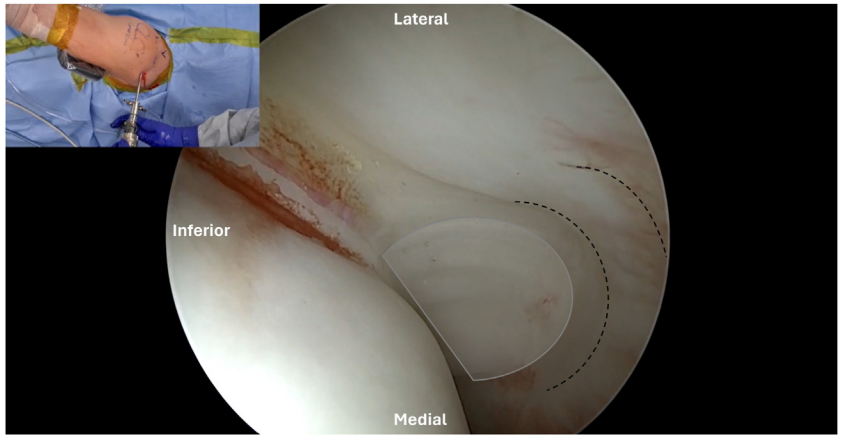

Fig 6. Left shoulder. View from the posterior portal demonstrating the supraspinatus with visualization of the cable (dashed lines) and crescent (gray semi-circle) construct.

contrast. Once a clear view of the glenohumeral joint is established, a systematic diagnostic arthroscopy is performed. The senior author (C.L.C.) prefers to initially inspect the glenohumeral joint for any chondrosis or traumatic defects. Next the arthroscope is advanced to the anterior and anterior-inferior labrum and inspected for fraying or tearing. The axillary pouch and inferior glenohumeral ligament are then visualized for any tears or loose bodies (Fig 4). The bevel of the camera is positioned to focus on the humerus as the posterior

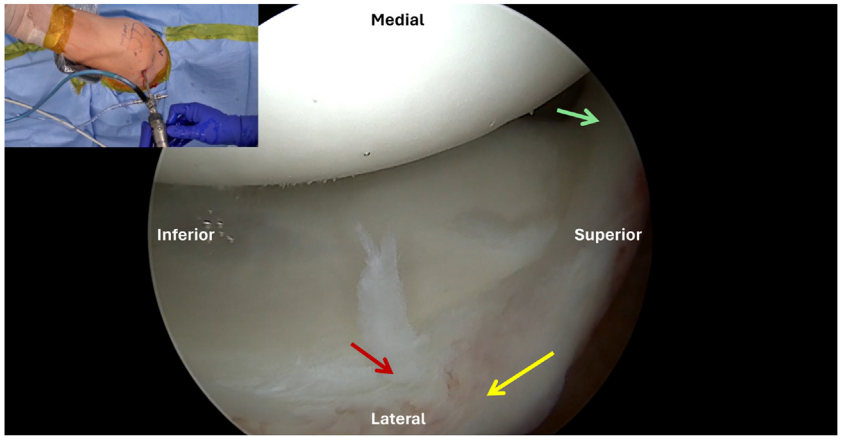

Fig 7. Left shoulder. View from the posterior portal demonstrating a tear (red arrow) of the posterior labrum (yellow arrow). From this view, the anchor of the tendon of the long head of the biceps can also be visualized (green arrow).

aspect is traced systematically from inferior to superior with visualization of the teres minor and infraspinatus footprints adjacent to the bare area of the humerus (Fig 5). This is followed by inspection of the supraspinatus and its associated cable and crescent architecture (Fig 6). The bevel of the arthroscope is then turned medially toward the glenoid. Progression of the camera toward the posterior-inferior and posterior labrum allows for visualization of any posterior labral tears (Fig 7). The labrum is then traced toward the biceps anchor and tendon of the long head. Then, the camera is advanced anteriorly toward the rotator interval to view the subscapularis (Fig 8). The footprint of the upper border is optimally viewed with the arm in slight internal rotation and a posteriorly directed force on the humerus to place the tendon on tension.

Once visual inspection is completed, an anterior portal is made within the rotator interval. The portal is localized using an 18-gauge spinal needle under direct visualization (Fig 9). This portal is typically localized on the skin about 1 cm lateral to the palpable tip of the coracoid process. The intra-articular location of the portal is customized per case needs. For example, a portal placed just superior to the upper border of the subscapularis is typically employed for instability work in conjunction with a more superior and lateral anterosuperior accessory portal. Once the portal is incised, a cannula is introduced for fluid management and easy intra-articular access. An arthroscopic probe is introduced, and the following structures are probed for stability and lesions: articular cartilage, labrum, biceps tendon, and rotator cuff tendons. A shaver or cautery/ablation device can also be introduced from the anterior portal(s) for debridement. Brief debridement is recommended to enhance visualization of the joint. The arthroscope can next be placed in the anterior portal while maintaining the position of the posterior portal with a Wissinger rod. Viewing from the anterior portal or anterosuperior portal allows for closer inspection and probing of posterior and inferior structures, namely, the labrum and articular cartilage (Fig 10). An understanding of the intra-articular anatomy coupled with a systematic approach to visualization is critical for a thorough diagnostic arthroscopy.

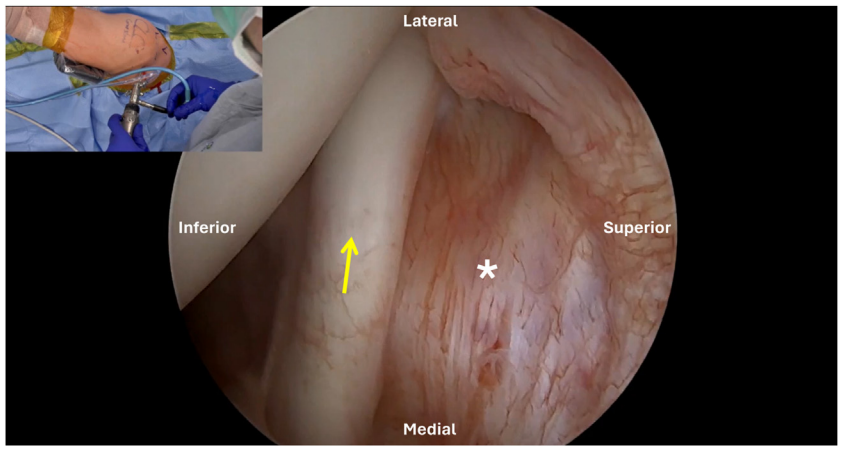

Fig 8. Left shoulder. View from the posterior portal demonstrating the subscapularis tendon (yellow arrow) inserting on the humeral head. Rotator interval/anterior capsule (asterisk) can also be visualized here. Anterior portal is usually made in this interval.

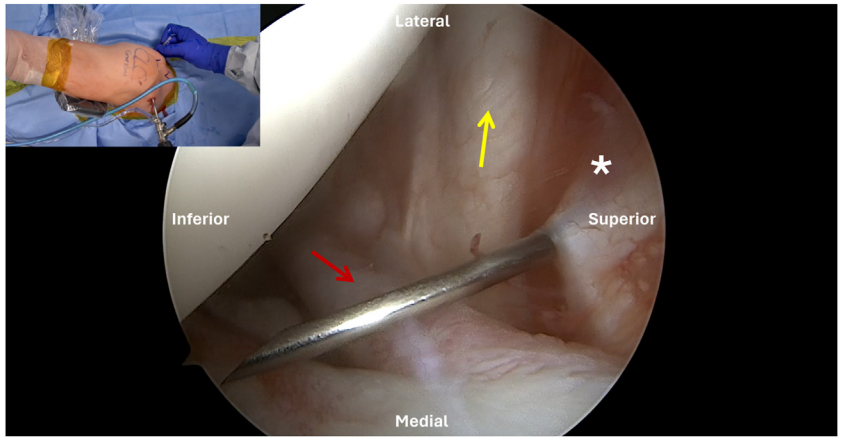

Fig 9. Left shoulder. View from the posterior portal. The anterior portal can be localized using a spinal needle, which is typically placed in the rotator interval (asterisk) just superior to the subscapularis tendon (yellow arrow) and adjacent to the middle glenohumeral ligament (red arrow).

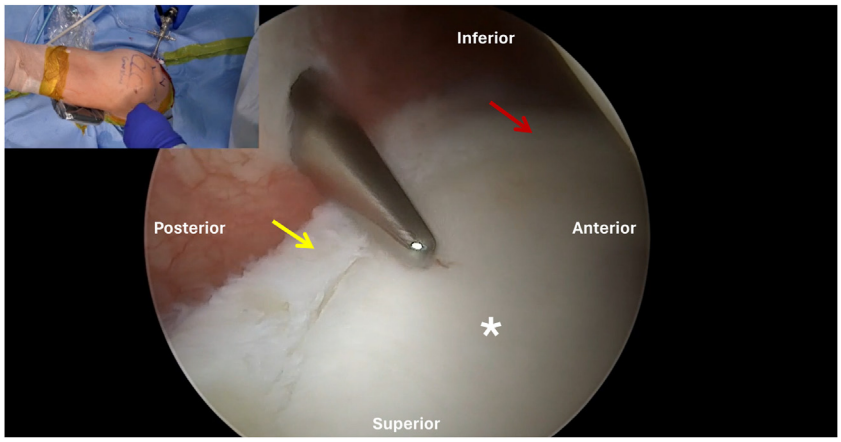

Fig 10. Left shoulder. View from the anterior portal. The previous posterior portal can be seen with the switching stick in the portal and can be used as a working portal. The posterior (yellow arrow) and inferior (red arrow) labrum can easily be accessed as well as the glenoid articular surface (asterisk).

Discussion

Shoulder arthroscopy in the lateral decubitus position offers several advantages and disadvantages (Table 1). Namely, visualization and accessibility of the anterior, inferior, and posterior aspects of the glenoid, labrum, and axillary pouch is greatly enhanced due to the ability to distract the joint.[4] Furthermore, arthroscopic shoulder stabilization requiring bone block augmentation can be facilitated more easily.[5] Meanwhile, the lateral decubitus position can make it difficult to transition to an open procedure such as a proximal subpectoral biceps tenodesis. However, the authors find airplane rotation of the bed or placing the patient in slight sloppy lateral helps facilitate an easier anterior-based incision. There is also an increased theoretical risk to the musculocutaneous and axillary nerves when a 5-o'clock

Table 1. Advantages and Disadvantages, Including Risks and Limitations, of Shoulder Arthroscopy in the Lateral Decubitus Position

Advantages	Disadvantages, Risks, and Limitations
Joint distraction allows for increased working space and enhanced visualization of the anterior, inferior, and posterior aspects of the glenoid, labrum, and axillary pouch.	There is increased risk of traction-related neurovascular injury compared to beach-chair positioning.
Gravity can help large soft tissue envelopes fall away from the shoulder.	Decreased range of motion may make it challenging to manipulate the shoulder intraoperatively.
Complete access to the anterior and posterior shoulder provides less obstruction for glenoid reconstruction with allograft bone blocks.	Conversion to open surgery for extensile approaches may require repositioning.
Lateral decubitus can be more cost-effective with simple arm suspension configurations.	Challenging access to the patient/airway for anesthesia colleagues due to the lateral decubitus position.

Table 2. Pearls and Pitfalls of Shoulder Arthroscopy in the Lateral Decubitus Position

Pearls	Pitfalls
Lateral humeral jack or bump can help translate traction vectors to optimize joint distraction.	Orienting visualization with the glenohumeral joint in an anatomic "up-and-down" position can make hand-eye coordination more challenging.
Placing hand/fingers on the anterior joint line can help orient trajectory for initial posterior arthroscopic access.	Time under traction must be tracked to avoid traction injuries such as brachial plexus neuropraxia.
Systematic approach to visualizing key structures ensures thorough diagnostic evaluation.	

transubscapular or anteroinferior portal is created.[6] Also, the risk of traction injury to the brachial plexus exists.[4,7] Lastly, limitations in range of motion and a nonanatomic view make arthroscopic procedures such as rotator cuff repair more challenging in the lateral decubitus position.

Certain technical considerations can make arthroscopy with the patient in the lateral position more efficient and reproducible (Table 2). The systematic approach of diagnostic arthroscopy presented in this Technical Note will help surgeons-in-training and early career surgeons ensure thorough intra-articular evaluations to enhance intraoperative decision-making and patient outcomes. In conjunction, all of these steps can help mitigate the growing pains of even the most substantial learning curves associated with complex pathologies and arthroscopic procedures such as glenoid reconstructions.[8]

Disclosures

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: J.D.B. has received IP royalties and is a paid consultant for Stryker. K.R.O. is a paid consultant for Arthrex and Smith & Nephew. C.L.C. is a paid consultant for Arthrex, receives research support from Major League Baseball, and receives publishing royalties or financial or material support from Springer. All other authors (F.M., M.N.U., S.C.C.) declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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