

The 2-Scope Technique for Rotator Cuff Surgery: Are 2 Scopes Better Than 1?



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Abstract: The arthroscopic treatment of rotator cuff tear involves 2 distinct phases: intra-articular and subacromial. We present the 2-scope technique with the aim to simultaneously perform these phases, entrusting them to 2 experienced surgeons, and to obtain possible benefits compared with the classic 1-scope technique. Better nosology of the lesion and a more accurate evaluation of suture passer action (equidistance of the sutures and avoidance of degenerated articular-side tendon areas) represent benefits of this technique. In contrast, the 2-scope technique needs an additional lateral portal and could give rise to an erroneous distribution of costs and surgeons.

The arthroscopic treatment of repairable rotator cuff tear (RCT) involves 2 phases: the intra-articular phase, which is intended to verify the articular surface, labrum, and capsuloligamentous unit conditions, and the bursal phase, which allows tendon repair, bursectomy, and eventually, acromioplasty to be performed. Because the 2 phases are distinct and paradoxically autonomous, we introduce the 2-scope technique with the aim to simultaneously perform the intra-articular and subacromial procedures and to obtain additional information regarding RCT morphology and tendon quality.

Surgical Technique

All arthroscopic treatments are performed with the patient under general anesthesia and an interscalene block in the beach-chair position (Fig 1). A double

instrumentation set is prepared (Fig 2). Diagnostic intra-articular arthroscopy using the first arthroscope (30° arthroscope connected to Shoulder Cross Flow pump; Stryker IT, Formello, Italy) is performed to assess the health status of both the long head of the biceps and the subscapularis tendon. Meanwhile, the second arthroscope (also a 30° arthroscope) is inserted through a lateral portal in the subacromial space, leaving the first arthroscope in the glenohumeral joint. The second arthroscope is connected to a second pump but in off mode to avoid excessive joint imbibition. However, it remains ready to be used as the only active pump when the attention of the surgeons moves mainly to the subacromial space (bursectomy). The first surgeon uses posterior and mid-glenoid portals (for synovectomy, evaluation of the subscapularis tendon, and eventual tenotomy of the long head of the biceps tendon); the second surgeon uses posterolateral and anterolateral portals (for bursectomy, tendon edge debridement, rotator cuff repair, and acromioplasty).

A clear view of the RCT is obtained after the simultaneous removal of subacromial bursa from the subacromial space and synovitis from the intra-articular side; tear dimension and shape, as well as tendon quality of both the bursal and articular sides, are visualized with precision by the 2 scopes. A single-row repair with titanium anchors (5.5-mm Intraline; Stryker IT) and 2 preloaded high-strength No. 2 sutures is performed while both arthroscopes are turned on. Sutures are passed into the lateral edge of the tendon. A 10- to 15-mm bite of tissue is sutured using an ante-grade suture passer (Champions; Stryker IT) with

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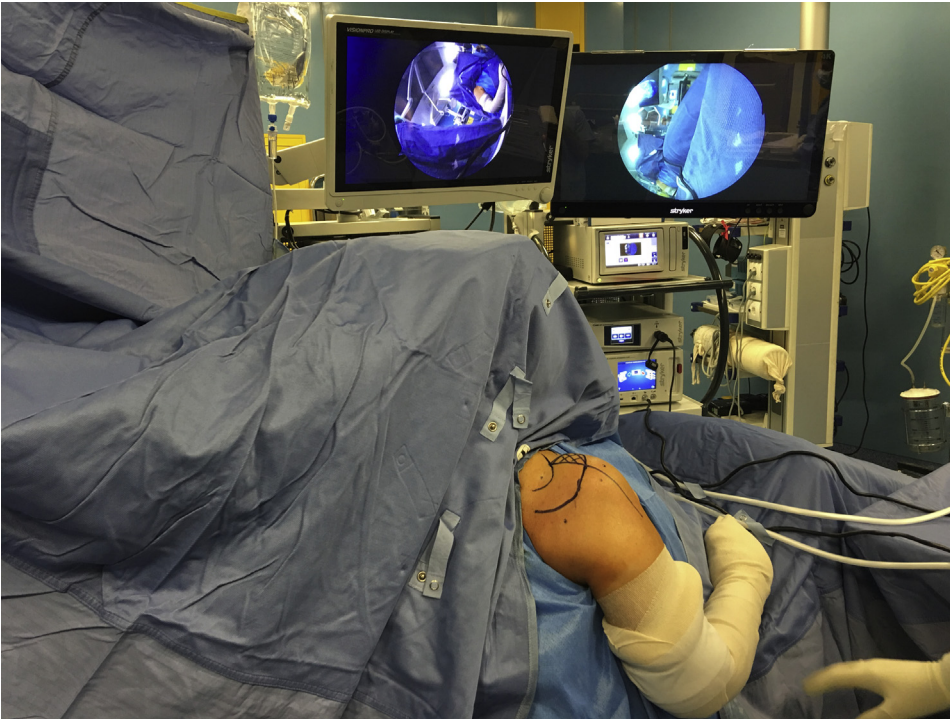


Fig 1. Right shoulder with patient placed in beach-chair position.



Fig 2. A double instrumentation set is prepared for the 2-scope technique.

double intra-articular and subacromial visualization. Once placed, all the sutures are tied with a locking, sliding knot (SMC knot). Acromioplasty is finally performed (Figs 3-7). Video 1 summarizes the 2-scope technique.

Discussion

The use of 2 scopes during arthroscopic repair of a full-thickness RCT may seem excessive and perhaps unnecessary. However, before a newly described surgical procedure is deemed unusual, it is necessary to judge it after a reasonable number of consecutive cases, especially if this procedure does not entail an additional operative risk for the patient.

Considering that arthroscopic RCT repair is composed of 2 distinct and independent phases, our aim was to verify the feasibility of simultaneously performing these phases, entrusting them separately to 2 experienced surgeons. Our experience has shown that the 2-scope technique is possible. Furthermore, we found that the 2 surgeons did not interfere with each other during the procedure.

Once the feasibility of the procedure had been verified, we analyzed the potential advantages and disadvantages (Table 1): The first advantage is better

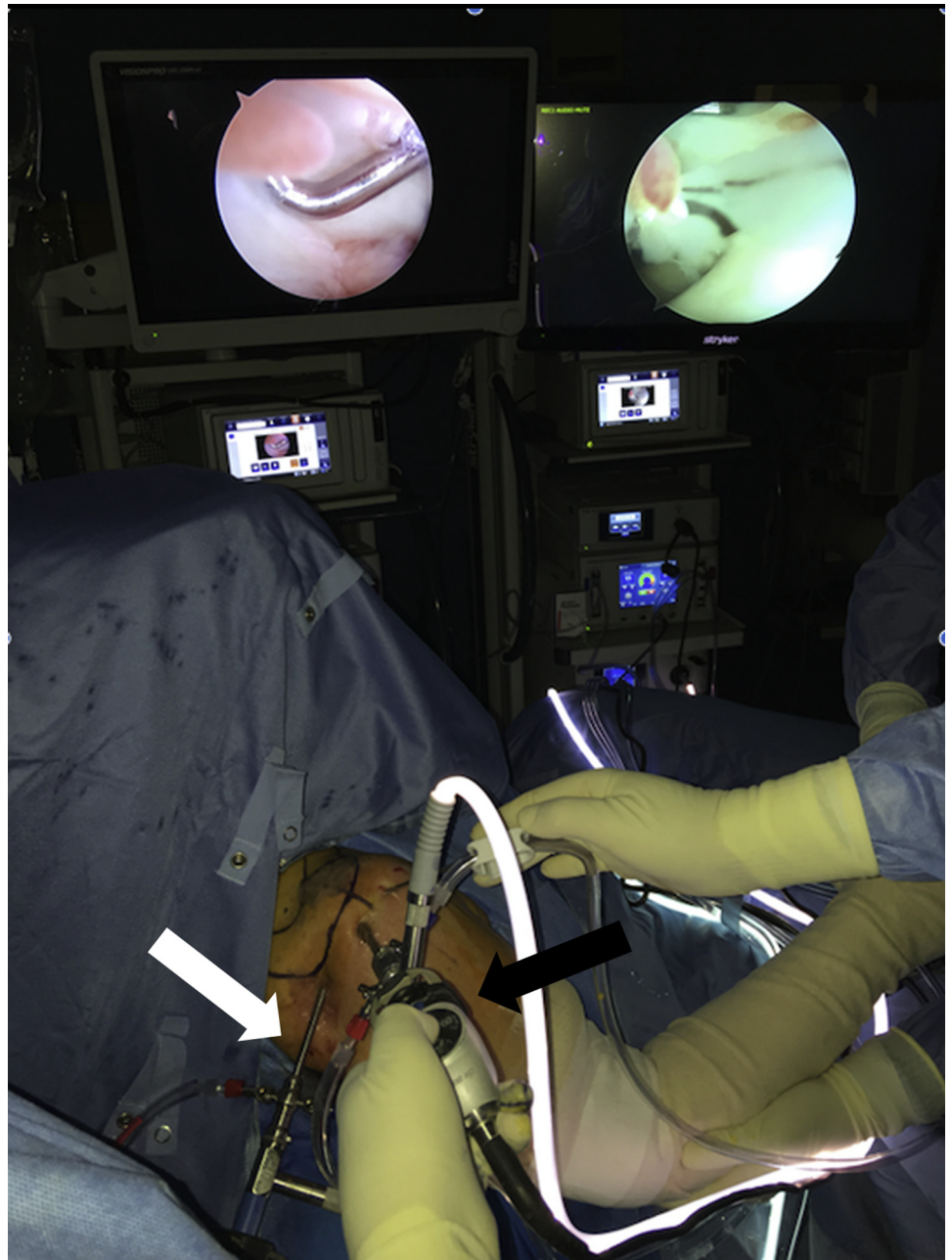


Fig 3. Two surgeons are simultaneously performing an arthroscopic rotator cuff repair with the 2-scope technique in a right shoulder. The first arthroscope (white arrow) is intra-articular through a posterior portal; the second arthroscope (black arrow) is in the subacromial space through a lateral portal.

nosology of the lesion. RCTs are commonly classified according to location, shape, and size. Tear margins are usually defined as regular, frayed, or double layered.¹⁻⁵ Classification parameters emerge intraoperatively from a separate view of the lesion from the articular side, at the beginning of the procedure, and then from the subacromial space. In our hands, the 2-scope technique has provided

further information on tear delamination and appearance, in particular in the case of a flute-beak margin that is often constituted only by the bursal layer.

The second advantage is possible reduction of the operating time. In our experience, the operating time was superimposable with that necessary for the execution of a standard intervention. However,

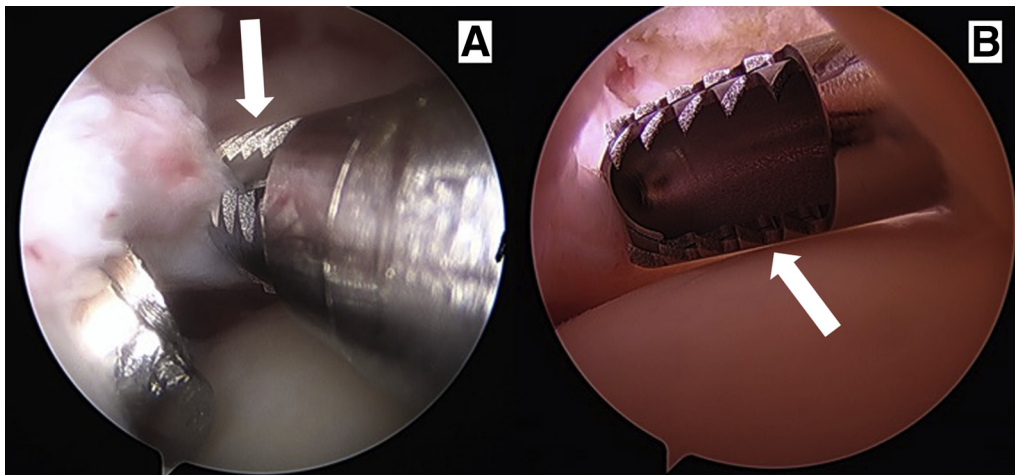


Fig 4. Simultaneous view of shaver action (arrows) from subacromial space (A) and intra-articular joint (B) in right shoulder. Only the subacromial lighting is turned on.

this might be shortened when the method is standardized; in this case, the savings obtained from the operating room occupation time would

compensate for the accessory costs for the double irrigation system.

The third advantage relates to suture accuracy. The dual vision and lighting allow a more accurate evaluation of the equidistance of the sutures; as such, suturing of macroscopically degenerated areas on the articular side is avoided. This could reduce the possibility of repair failure, in particular in the case of a double-layered RCT.

The disadvantages are as follows: It is not possible to obtain further information on tendon thickness and on the tendon capillary network of the articular side through a possible translucency mechanism induced by bursal-side lighting. An additional anterolateral portal is needed to perform bursectomy, RCT repair, and acromioplasty (if necessary). In a hospital mainly devoted to arthroscopic surgery, the use of the double arthroscopy column, as well as 2 experienced surgeons, could represent an erroneous distribution of means and personnel.

The 2-scope technique for rotator cuff surgery is possible. Better nosology of the lesion and a more accurate evaluation of suture passer action (equidistance of the sutures and avoidance of degenerated articular-side tendon areas) represent benefits of this technique. In contrast, the 2-scope technique needs

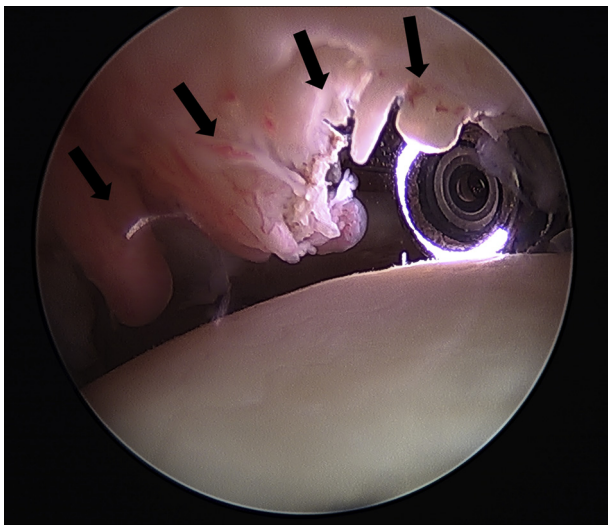


Fig 5. View of large rotator cuff tear (arrows) in right shoulder from first intra-articular arthroscope. The second arthroscope is in the subacromial space; only the subacromial lighting is turned on.

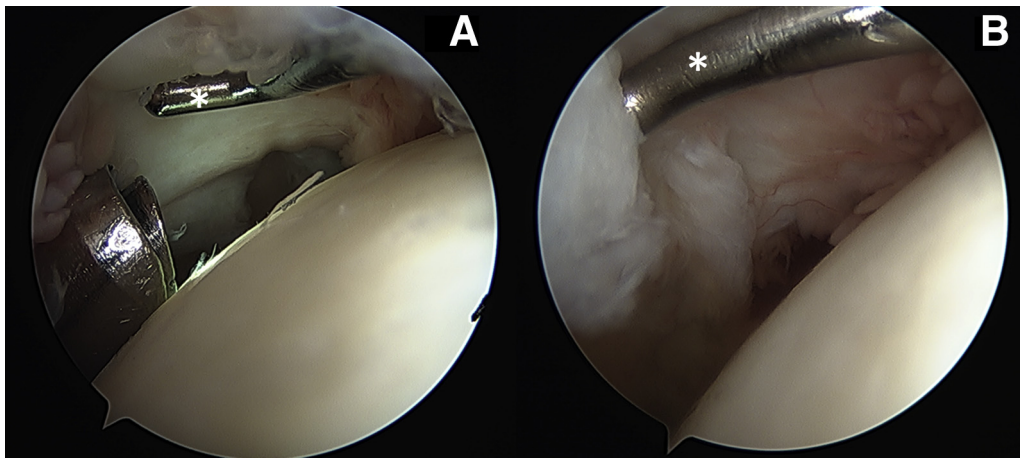


Fig 6. Intra-articular view of large rotator cuff tear in right shoulder from lateral portal (second arthroscope) (A) and posterior portal (first arthroscope) (B). In both images, tendon quality is assessed while the rotator cuff is raised by a probe (asterisks).

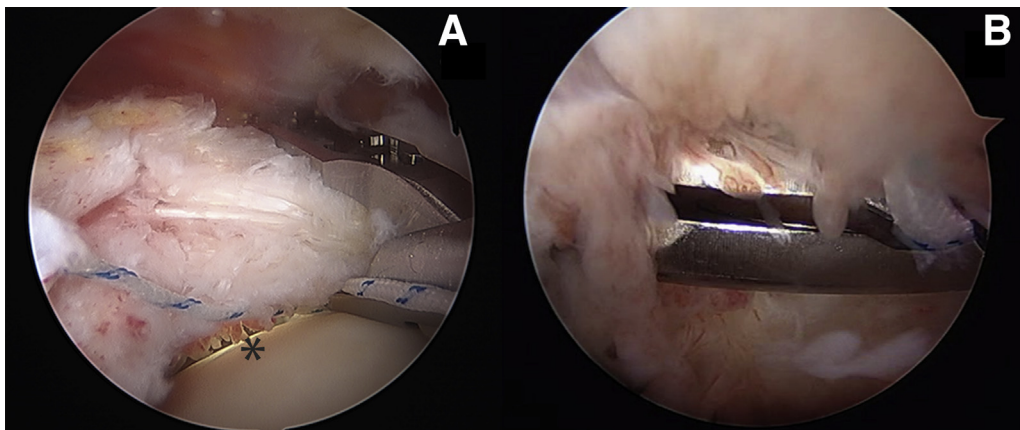


Fig 7. Right shoulder. (A) Suture passer action: view from subacromial space through second arthroscope. The asterisk indicates the intra-articular lighting from the first arthroscope. (B) The accuracy of suture passer action and the quality of the articular-side tendon are assessed by the first arthroscope (posterior portal).

Table 1. Advantages and Disadvantages of 2-Scope Technique for Rotator Cuff Surgery

Advantages
Better nosology of lesion
Further information on tear delamination and appearance
Hypothetical reduction in operating time
Suture accuracy verification
Accurate evaluation of equidistance of sutures
Avoidance of suturing macroscopically degenerated areas on articular side
Disadvantages
No further information regarding tendon thickness or tendon capillary network
Additional arthroscopic lateral portal
Additional cost and surgeon

an additional lateral portal and could give rise to an erroneous distribution of means and personnel.

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