

The Greek way to Arthroscopic Subscapularis Augmentation (ASA) for augmenting the classic Bankart repair in cases of recurrent anterior shoulder instability: A technical note

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Recurrent anterior shoulder instability with capsulolabral insufficiency and subcritical glenoid bone loss remains challenging. Arthroscopic Bankart repair alone may be inadequate in selected patients, with an unacceptable long-term recurrence rate, whereas bone-block procedures can be unnecessary when glenoid or humeral bone loss is limited. This Technical Note describes a reproducible all-arthroscopic subscapularis augmentation (ASA) technique performed with a soft anchor and using the Nice knot to reinforce the anterior soft-tissue wall. The procedure is mainly used as an augmentation to the classic arthroscopic Bankart repair and, in specific cases, as an augmentation of arthroscopic bone-grafting procedures when the anterior capsulolabral tissue is deficient. The anterior portal is positioned just above the subscapularis; the tendon is penetrated approximately 5 mm below its superior border at the glenoid level, and tenodesis is completed with the arm in 0° abduction and maximal external rotation to prevent overtightening. Key indications, contraindications, technical tips, pitfalls, and postoperative rehabilitation are outlined. ASA offers an easy-to-perform, low-morbidity procedure that improves the recurrence rate of the classic arthroscopic Bankart repair in patients with subcritical glenoid bone loss.

Keywords: Recurrent anterior shoulder instability; ASA; subscapularis augmentation; Nice knot; Bankart repair; subcritical glenoid bone loss; tenodesis; augmentation technique

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Introduction

Restoring anterior soft-tissue restraint remains the primary goal of surgery for recurrent anterior shoulder instability. Arthroscopic Bankart repair is commonly performed, but recurrence is still a concern when capsulolabral insufficiency, hyperlaxity, and glenoid bone loss are present in cases of subcritical glenoid bone loss, when bony reconstruction is indicated [1][2]. Additionally, bone-block procedures like the Latarjet are highly effective in cases of severe bone loss but are non-anatomic, technically complex when performed in an all-arthroscopic way, and carry specific procedure-related risks and complications [3][4].

Arthroscopic subscapularis augmentation (ASA) has been proposed to reinforce the anterior capsulolabral wall,

augmenting the classic arthroscopic Bankart repair [5][6]. The technique uses the superior articular portion of the subscapularis tendon, fixed to the anterior glenoid rim, to re-centre the humeral head during abduction-external rotation and protect the Bankart repair in a dynamic way. Published mid-term series suggest low recurrence rates when ASA is used as an adjunct to the classic arthroscopic Bankart repair in patients with capsular deficiency and limited glenoid bone loss [5][7][8][9].

This Technical Note combines and refines prior descriptions of ASA and presents a practical, easy-to-perform arthroscopic technique using an all-suture anchor and the Nice knot for robust subscapularis fixation (**Figure 1**).

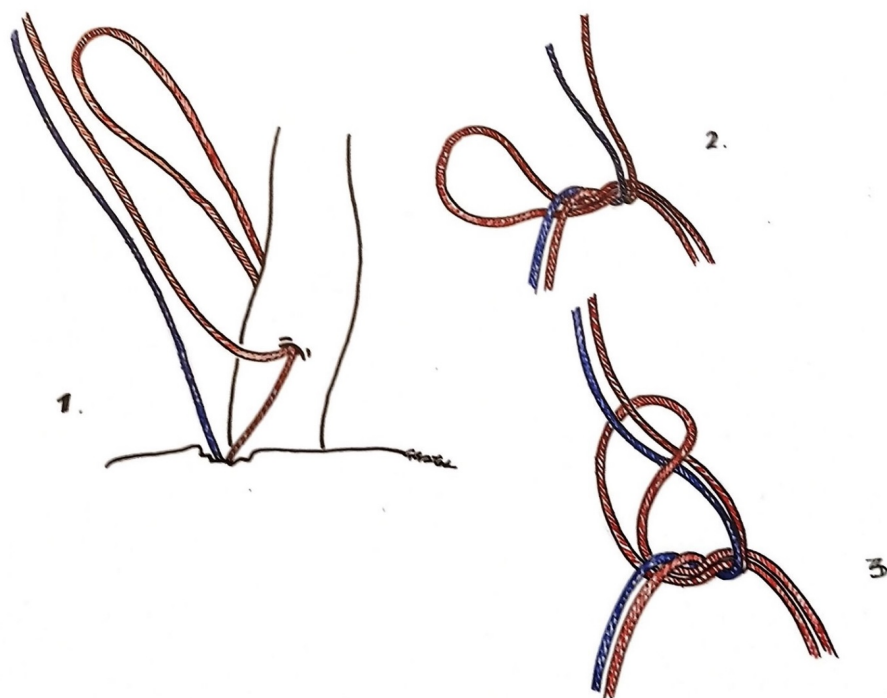


Figure 1. Sketch of the Arthroscopic Subscapularis Augmentation using the Nice knot in 3 steps.

Indications and contraindications

ASA is not a stand-alone stabilisation procedure but is used primarily as an adjunctive procedure to the classic arthroscopic Bankart repair. It may also be used for augmenting a bone-block procedure in selected cases. The main indication is recurrent anterior shoulder instability with anterior capsulolabral deficiency (chronic cases) and subcritical glenoid bone loss, particularly in patients with hyperlaxity or poor-quality anterior soft tissue [2][5][7][9]. In our practice, soft-tissue stabilisation is favoured when glenoid bone loss is below the subcritical threshold; when bone loss is larger, bone-grafting procedures are preferred,

and ASA may be added to augment the anterior soft-tissue wall in cases of insufficiency [10][11].

Additional indications include contact or collision athletes with hyperlaxity and limited bone loss, and selected patients without a discrete Bankart lesion but with symptomatic anterior soft-tissue insufficiency [8][9]. Contraindications include significant structural insufficiency of the subscapularis tendon, chronic anterior instability after multiple failed operations with severe anterior soft-tissue destruction, and glenoid bone loss that warrants a primary bony reconstruction [5][10][11]. **Table 1** summarises the indications and contraindications of this technique.

Table 1. Main indications and contraindications for ASA

Indications	Contraindications
Recurrent anterior instability with capsulolabral deficiency and subcritical glenoid bone loss	Significant glenoid bone loss requiring a bony procedure. In selected cases, ASA can be performed in addition to a bony procedure.
Hyperlax contact or collision athletes with limited bone loss	Irreparable or structurally insufficient subscapularis tendon
Augmentation of arthroscopic bone-grafting procedures when the anterior soft-tissue wall is deficient	Severe anterior soft-tissue destruction after multiple failed stabilization surgeries
Selected patients with anterior soft-tissue insufficiency without a clear Bankart lesion	Unsuitable patient-specific factors precluding arthroscopic soft-tissue reconstruction

Preoperative assessment

Clinical evaluation includes the patient's medical record, the dislocation mechanism and recurrence pattern, the patient's sports participation and level of participation, and whether prior surgeries have been performed. An assessment of generalised laxity, commonly using the Beighton score, should be considered. Imaging should comprise plain radiographs, magnetic resonance imaging or magnetic resonance arthrography for soft tissue assessment, and three-dimensional computed tomography to quantify glenoid bone loss and characterise Hill-Sachs lesions. Dynamic intraoperative assessment remains essential to confirm tissue quality and the engagement of the Hill-Sachs lesion with the Bankart lesion.

Surgical technique

The procedure is performed under general anaesthesia, with or without regional block, in either lateral decubitus or beach-chair position according to the surgeon's preference. The authors' preferred position is traditional lateral decubitus, with 3 kg of arm traction. Standard posterior, anterior, and anterosuperior portals are utilised. The anterior portal is placed just above the superior border of the subscapularis tendon to create a direct trajectory for the passage through the tendon.

The procedure is completed in eight steps (**Table 2**). A diagnostic arthroscopy confirms the pattern of instability, tissue quality, and associated lesions. With traction released, the assistant brings the arm into abduction and external rotation to assess Hill-Sachs engagement. The primary stabilisation procedure is then completed according to the indications. In most cases, this involves a standard

arthroscopic Bankart repair after mobilisation of the anteroinferior capsulolabral complex; in cases of greater bone loss, treated with arthroscopic Eden-Hybinette or other bone-block procedure (except for Latarjet), ASA can be added after the bone graft has been fixated.

For the augmentation step, viewing from the posterior portal, one all-suture anchor is inserted at the anterior glenoid rim between 2 and 3 o'clock in the right shoulder (9 to 10 o'clock in the left shoulder). In patients with significant hyperlaxity, a more superior position (2 o'clock on the right and 10 o'clock on the left shoulders) may be preferred. Arm traction is released, and the assistant maintains the shoulder at 0° abduction and maximal external rotation. The superior articular portion of the subscapularis tendon is penetrated approximately 5 mm inferior to its superior border at the level of the glenoid. One suture limb is retrieved as a loop through the anterior portal. The free suture limb and the limb of the looped suture are then pulled out through the same posterior portal, and a Nice knot is tied to fix the tendon to the anterior glenoid [12]. Alternative techniques include passing a simple suture or tape construct fixed with a knotless anchor or passing the limbs of a knotted soft anchor in a standard way. Our preference is to use the Nice knot because it provides a strong, low-profile, sliding double-suture fixation of the subscapularis on the anterior glenoid. The shoulder is then dynamically assessed arthroscopically from the anterosuperior portal with the arm in 90° abduction and maximum external rotation. In this position, the surgeon evaluates the humeral-head centralisation on the glenoid, the stability of the construct, and ensures there is no overtightening (**Figure 2**). Any loss of motion, knot loosening, or anchor disengagement must be ruled out at this step before closure.

Table 2. Key operative steps for arthroscopic subscapularis augmentation.

Step	Technical detail
1	Establish standard posterior, anterior, and anterosuperior portals.
2	Place the anterior portal just superior to the subscapularis tendon for a direct working trajectory.
3	Complete the primary stabilisation procedure (usually Bankart repair; bone grafting when indicated).
4	Insert one all-suture anchor at the anterior glenoid rim at 2-3 o'clock (right shoulder) or 9-10 o'clock (left shoulder).
5	Release traction and position the arm in 0° abduction and maximal external rotation.
6	Penetrate the superior articular portion of the subscapularis about 5 mm inferior to its superior border at glenoid level.
7	Retrieve a loop and construct a Nice knot to fix the tendon to the glenoid.
8	Check range of motion, humeral-head centralisation, knot security, and anchor fixation.

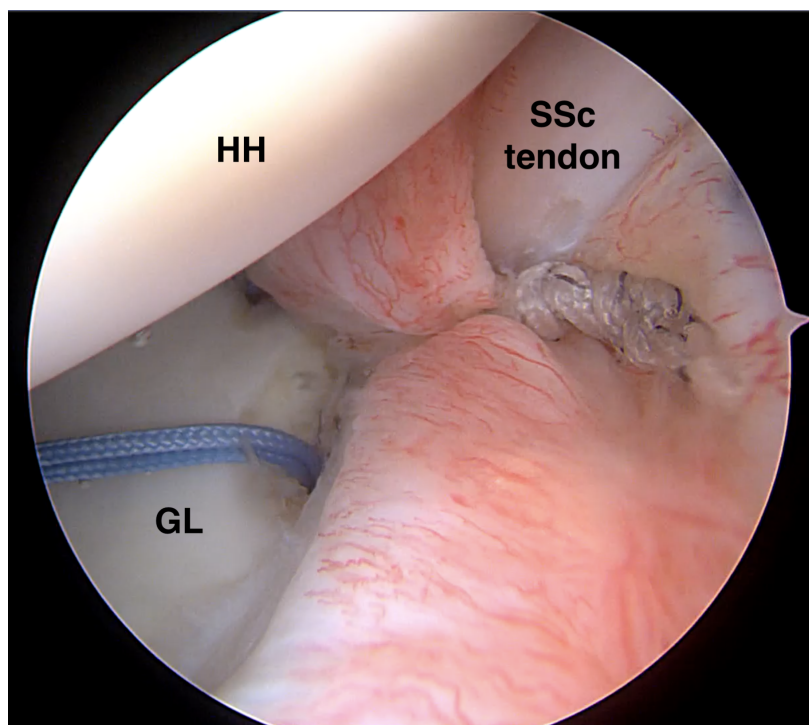


Figure 2. The outcome of the tenodesis of the subscapularis on the anterior glenoid rim. GL: Glenoid, SSC tendon: Subscapularis tendon, HH: Humeral head

Postoperative rehabilitation

The patient is advised to wear a simple sling for six weeks to maintain a comfortable position without shrugging the shoulder. During the initial postoperative period, movement is limited to the front plane of the body, generally up to 45° of forward flexion, internal rotation towards the abdomen, and around 10° of external rotation. Passive exercises are introduced no earlier than two weeks, depending on the patient's ability to move the arm passively without pain. If

pain occurs, this stage is delayed. Active-assisted exercises usually begin around the fourth postoperative week, followed by active exercises once the patient can move the arm without discomfort. Progressive strengthening exercises are initiated once the functional range of motion has been regained. Return to overhead and contact sports is typically permitted between six and nine months, depending on rehabilitation progress and recovery of strength, range of motion, and scapula control.

Table 3. Technical pearls and pitfalls.

Pearls	Pitfalls
Create the anterior portal directly over the superior border of the subscapularis.	Tenodesis placed too superior on the glenoid can restrict external rotation.
Penetrate the tendon at glenoid level and about 5 mm inferior to the superior border.	Passing the suture too laterally through the tendon may overtighten the construct.
Release traction and maintain maximal external rotation during fixation.	Failure to check dynamic motion may miss overtightening or anchor disengagement.
Use a Nice knot or equivalent robust doubled-suture construct.	Inadequate tissue quality can compromise fixation strength.

Table 4. Advantages and Disadvantages of Arthroscopic Subscapularis Augmentation.

Advantages	Disadvantages
Easily reproducible technique. Low learning curve, with technical demands similar to arthroscopic Bankart repair.	Mild postoperative loss of external rotation may occur, even if it is usually not clinically significant.
Low-risk technique.	External rotation limitation depends on the point of subscapularis penetration and the glenoid level of tenodesis.
Performable using only standard portals.	Overtightening or overly superior/lateral tendon capture may increase stiffness or external rotation loss.
No modification of the coracoacromial arch.	Long-term outcomes remain limited compared with those of more established procedures.
May reduce recurrence compared with isolated Bankart repair in appropriately selected patients.	
Can be combined with other stabilising procedures such as Bankart repair, Remplissage, or Eden-Hybinette in selected cases.	
Revision remains relatively feasible because the procedure does not substantially alter bony anatomy.	

Discussion

ASA aims to enhance the stability of an arthroscopic Bankart repair when the anterior capsule is deficient, in cases without significant glenoid bone loss requiring a primary bony procedure [4][5][6][7][8][9]. Its theoretical benefit is reinforcing the anterior soft-tissue wall while preserving the coracoacromial arch and avoiding the morbidity associated with coracoid transfer [3][13]. It may provide dynamic protection of the Bankart repair by tensioning the tenodesed superior portion of the subscapularis during abduction and external rotation, thereby reinforcing the anterior soft-tissue restraint and potentially contributing to centring of the humeral head in the glenoid. This mechanism may be considered similar to the sling effect described for the Latarjet procedure, but it should not be considered equivalent. In the Latarjet procedure, the conjoint tendon creates a dynamic restraint with a different anatomical course, line of action, and force vector [13][14]. Therefore, ASA is more appropriately regarded as a distinct subscapularis-mediated dynamic augmentation of the repaired capsulolabral complex. Further biomechanical studies are required to define its precise contribution to glenohumeral stability.

Dynamic Anterior Stabilisation (DAS) is another soft-tissue procedure described for similar indications. This technique uses the long head of the biceps tendon, via the subscapularis, to augment the classic arthroscopic Bankart repair [15][16].

Clinical series have shown promising mid-term results. Maiotti and colleagues reported recurrence rates of about 2.7% to 3.3% following Bankart repair with subscapularis augmentation in patients with minimal bone loss and capsular deficiency, with notable functional improvements [5][7]. Positive outcomes have been observed in hyper-lax athletes and in cases involving bone grafting combined with ASA for more challenging instability patterns [8][10]. The authors have published the mid-term results of this technique, concluding that arthroscopic subscapularis augmentation combined with classic Bankart repair provided satisfactory stability, function, and patient satisfaction in cases of recurrent anterior shoulder instability with glenoid bone loss below the subcritical threshold. At a mean follow-up of 42.4 months, 31 of 34 patients (91.1%) reported a stable shoulder. The re-dislocation rate was 5.8%, and the overall failure rate was 8.8%. Functional outcomes improved significantly, with almost 85% of patients returning to the same level of sporting activity and almost 88% satisfied with the outcome [9]. The most common trade-off is a slight reduction in external rotation, which is typically not clinically relevant when the tenodesis is performed at the glenoid level with the arm in maximal external rotation and appropriate rehabilitation is followed [5][7][8][9].

Healing after Arthroscopic Subscapularis Augmentation appears to be both reliable and biologically robust, as shown by a second-look arthroscopy study. At 6 months post-surgery, all 21 evaluated patients exhibited secure healing of the subscapularis tendon to the anterior glenoid, confirmed by direct visualisation and probe testing, with no signs of failure [17]. These findings suggest that ASA provides reliable

tendon-to-bone integration and supports its role as a biologically sound adjunct to the classic arthroscopic Bankart repair for treating recurrent anterior shoulder instability, especially in indicated cases. Although longer-term follow-up and imaging correlation are still needed, this study offers the first direct arthroscopic evidence that the subscapularis can heal firmly to the glenoid after ASA.

This technique offers several practical advantages: it utilises standard portals, requires instrumentation familiar to arthroscopic shoulder surgeons, and can be incorporated into a Bankart repair without significant additional morbidity. The main limitations include the lack of long-term results, reliance on preserved subscapularis tissue, and the potential for postoperative external rotation loss if the fixation is placed too high or the tendon is penetrated too laterally. The advantages and disadvantages of this technique are summarised in **Table 4**.

Conclusion

Arthroscopic subscapularis augmentation of the classic arthroscopic Bankart repair using the Nice knot is a reproducible adjunctive stabilisation technique for recurrent anterior shoulder instability with capsulolabral insufficiency and subcritical glenoid bone loss. When patient selection is appropriate and meticulous attention is paid to portal placement, level of tendon penetration, and arm position during tenodesis, the technique can reinforce anterior stability with low morbidity and limited motion loss, reducing recurrence rate while preserving good shoulder function.

Supplementing material

Video with step-by-step description of the surgical technique.

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Conflict of Interest Statement

All authors declare no conflict of interest related to this work.

Ethical Approval

This manuscript is a Technical Note describing a surgical technique and does not report a prospective study involving human participants or animals. Ethical committee approval was therefore not required.

Author contributions

All authors contributed to the conception of the manuscript, drafting and critical revision of the text, and approval of the final version.

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