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A Simple Technique to Restore Tension of a Loose Suture Bridge During Rotator Cuff Repair: Save the Repair



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Abstract: The transosseous equivalent suture bridge technique has been widely used for rotator cuff repair, especially for large tears. During the fixation of the second lateral anchor, the first group of sutures may become loose due to anchor malposition or manual overtensioning of the second group of sutures. To restore the suture's tension, a spare suture from the second lateral anchor may be passed beneath the loose suture to tighten it with a simple knot. This technique has been shown to be easy and fast to perform and does not require extra material.

Arthroscopic rotator cuff repair is considered the gold standard treatment for this type of lesion, and there are several techniques and materials available. The transosseous equivalent technique is a double-row repair that has been shown to produce excellent long-term results¹ and better outcomes compared with the single-row technique.^{2,3} It restores the natural tendon footprint and allows for better contact between tendon and bone,⁴ providing a high healing rate⁵ and a strong fixation.^{6,7}

The technique consists basically of 2 anchors on a medial row loaded with sutures to be fixed on a lateral row by another 2 anchors, after passing through the ruptured tendon. The system is manually tensioned

during the lateral row fixation, which can lead to loosening of the sutures, thus weakening the repair. This may be due to overtightening of the second group of sutures after fixation of the first group, which becomes loose.⁸ Recovery of the suture's tension is important for the strength and healing property of this technique. The technique that will be presented helps to restore tension in a simple way and with no need for extra material.

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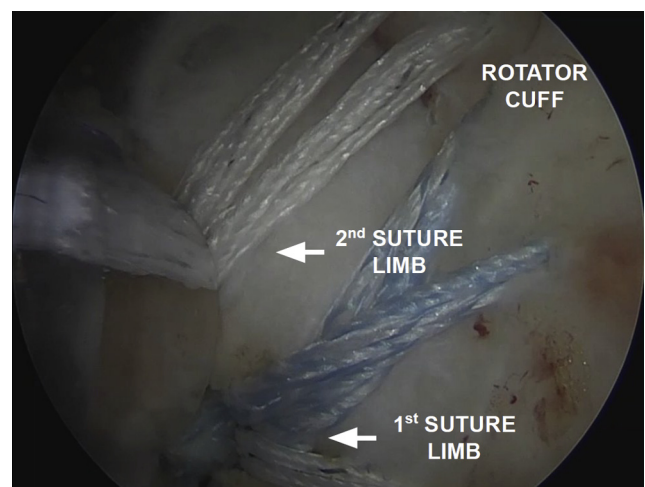


Fig 1. Arthroscopic view from the posterior portal of a left shoulder with the scope located in the subacromial space and the patient in a beach chair position. Preparation to introduce the second lateral anchor. The first lateral anchor has already been introduced and its sutures are adequately tensioned.

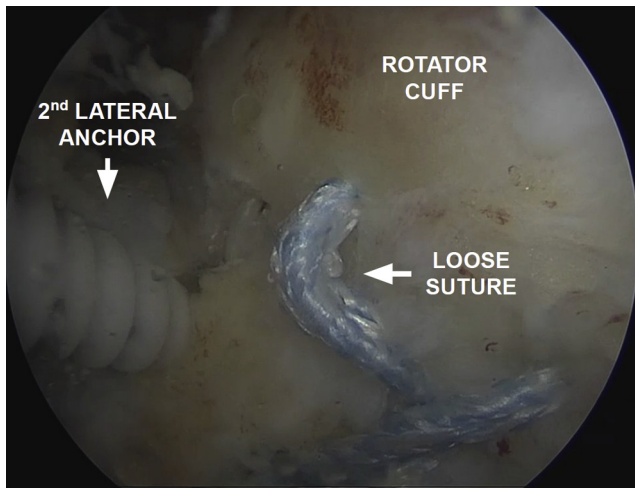


Fig 2. The first group of sutures becomes loose during fixation of the second lateral anchor.

Surgical Technique (With Video Illustration)

Video 1 presents 2 similar cases of arthroscopic rotator cuff repair using the transosseous-equivalent suture bridge (TOESB) technique, the first on a left shoulder and the second on a right shoulder. The patient is placed in a beach-chair position and the posterior portal is established for routine articular and subacromial examination. The subacromial space is cleared with a shaver and the supraspinatus tendon lesion is identified. Through a lateral portal, tendon mobility is tested with a grasper and the footprint is decorticated with the shaver.

Two double-loaded bioabsorbable screws (Bio-Composite SutureTak Suture Anchor; Arthrex, Naples, FL) are placed on the medial row near the edge of the articular cartilage. The anterior and posterior half of the tendon are repaired, each with 4 sutures from the anterior and the posterior medial screws, respectively.

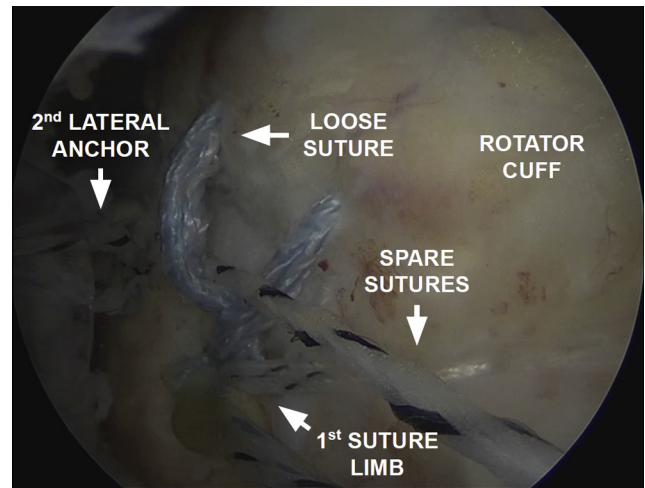


Fig 4. The spare suture is passed beneath the loose suture.

Two sutures from the posterior half and 2 sutures from the anterior half are inserted into the lateral aspect of the greater tuberosity with another 2 anchors in the same coronal plane from the posterior medial screw. At this moment, the sutures are manually tensioned to pull and bring down the tendon to the bone. The same procedure is done for placing the second lateral anchor, just anterior to the first one (Fig 1). If this anchor is placed wrong (outside the ideal rectangular formation) and/or if the sutures are over tensioned, the first group of sutures may become loose (Fig 2).

In this case, the spare sutures coming out of the second lateral anchor may be used to tighten the loose suture (Fig 3). This suture is passed beneath the loose suture (Figs 4 and 5) and a simple knot is made, retensioning the suture and restoring the fixation (Fig 6). Thus, it is important not to remove these spare sutures before confirming that the whole fixation is satisfactory.

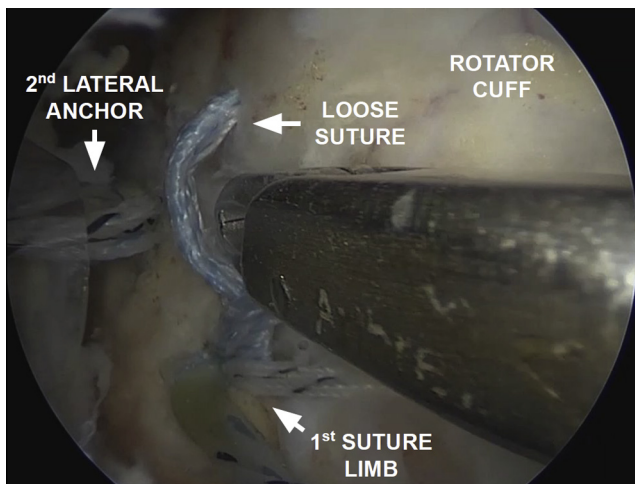


Fig 3. A retriever is used to grab the spare suture of the second lateral anchor passing beneath the loose suture.

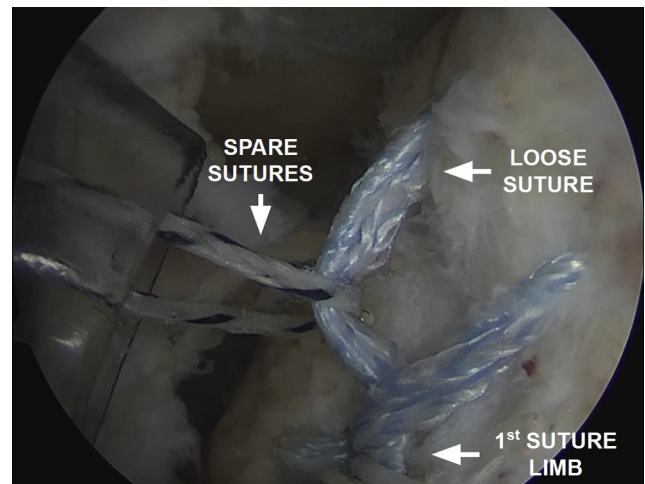


Fig 5. The spare suture has been passed beneath the loose suture and is prepared for the knot to be made.

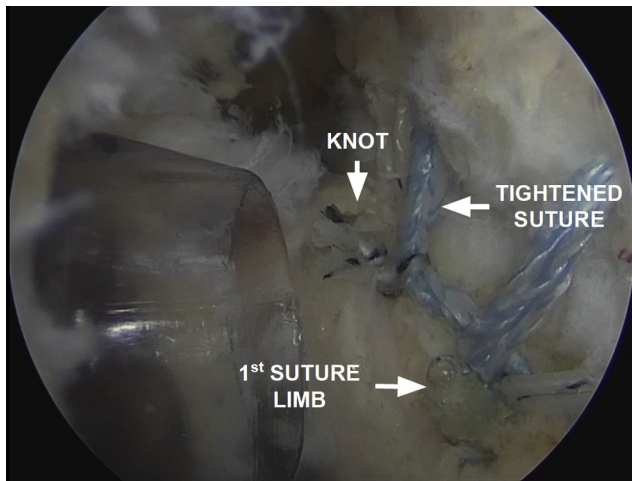


Fig 6. Final configuration of the construct after the simple knot has been made to tighten the loose suture.

Advantages and disadvantages and pearls and pitfalls of this technique are described in [Table 1](#).

Discussion

In both cases presented in [Video 1](#), a rotator cuff tear was treated with a knotless TOESB technique. Today, there are many different techniques to treat rotator cuff lesions, but their relative superiority is still a matter of debate. Nevertheless, several studies have shown that TOESB provides better outcomes when compared with single-row techniques, offering a high healing rate and a strong repair, especially for large lesions.²⁻⁷

Both knot and knotless techniques seem to have similar mid- to long-term results and no difference in retear incidence.^{9,10} However, the knotless technique requires less operative time.¹¹ In a knotless technique, the tension of the suture limbs are essential for the final result, since there are no knots securing the tendon fixation and

compressing it against its footprint.¹² Therefore, checking the suture tension during the repair is important.

It is recommended to always check if the first group of sutures is loosening during the fixation of the second group of sutures. If this happens, readjusting the tension of the second group must be done before fixation. If the sutures remain loose, the simple technique described in this article will help restore the tension quickly and with no need for extra material.

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Table 1. Advantages and Disadvantages and Pearls and Pitfalls of the Technique

Advantages	Restores the tension of the suture if it becomes loose after second lateral anchor fixation. Easy and fast to perform. No need for extra material.
Disadvantages	Slightly increases operative time. The repair is no longer completely knotless, since the loose suture is retensioned with a simple knot.
Pearls	The first group of sutures should be checked during the second group fixation to ensure it is not loosening. If loosening is identified, the tension of the second group of sutures should be readjusted before fixation. Do not remove the spare sutures loaded on the lateral anchors until the tension of all sutures are checked and satisfactory.
Pitfalls	Removing the spare sutures from the lateral anchors renders this technique unfeasible.