

Technical Note

The Simple Cow Hitch Stitch Technique for Arthroscopic Rotator Cuff Repair and Stabilization Using Knotless Suture Anchors

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Abstract: The tissue-suture interface is the most vulnerable and challenging part of adequate restoration and fixation in rotator cuff repair. We describe a simple stitch technique for arthroscopic rotator cuff repair using knotless suture anchors based on the cow hitch. The simple cow hitch stitch technique is easy to perform, especially under difficult conditions, and provides excellent initial fixation strength as required for integration of the reinserted cuff and for shoulder stabilization.

Rotator cuff repairs still present a surgical challenge. In addition to proper mobilization of the rotator cuff, adequate reinsertion is one of the most important factors for successful healing of the tendon. Thus the tissue-suture interface is described as the most vulnerable and susceptible area in this muscle-tendon-bone construction. Several techniques have been described to enhance fixation and stability, but many are not always practicable or possible and are somehow complicated. In addition, regular application of these techniques requires some experience, and they are not always arthroscopically practicable.

Another important factor for the outcome is the quality of the vascular supply to the affected area. Therefore strangulation of the affected rotator cuff should be as limited as possible.

We developed a simple cow hitch stitch technique combined with knotless suture anchors for arthroscopic rotator cuff reconstruction, arthroscopic stabilization, and biceps tenodesis. This technique is easy

to perform and provides stability for the reattached tendon.

Surgical Technique

The simple cow hitch stitch technique can be performed with all currently available knotless suture anchors and is an arthroscopic technique. After adequate mobilization of the tendon and bony preparation of the insertion area, the tendon is placed in the desired position using a conventional rotator cuff grasper.

To perform the stitch, we use a conventional-loading suture passer device in combination with No. 2 nonabsorbable braided ultrahigh-molecular weight polyethylene and polyester suture (FiberWire;



Fig 1. In the first step, the doubled suture is passed from the intra-articular to the subacromial space through a simple stitch.

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Fig 2. In the second step, the loop is pulled out and both suture strands are passed through the loop.

Arthrex, Naples, FL). The suture is halved and the middle of the suture placed in the slot of the loading device; then, both suture strands with similar length are pulled back.

Step 1

First, a simple stitch is performed with the suture passing from the intra-articular to the subacromial space (Fig 1). The stitch is placed approximately 8 mm from the tendon edge (Scorpion, BirdBeak, or SutureLasso; Arthrex). After removal of the loading device, a loop is located subacromially and both suture strands run intra-articularly out of the joint through the arthroscopic portal.

Step 2

By use of a grasper (KingFisher; Arthrex), the subacromial loop is pulled out of the same arthroscopic portal (outside the body) and both suture strands are passed through the loop (Fig 2). This procedure is performed outside the body.

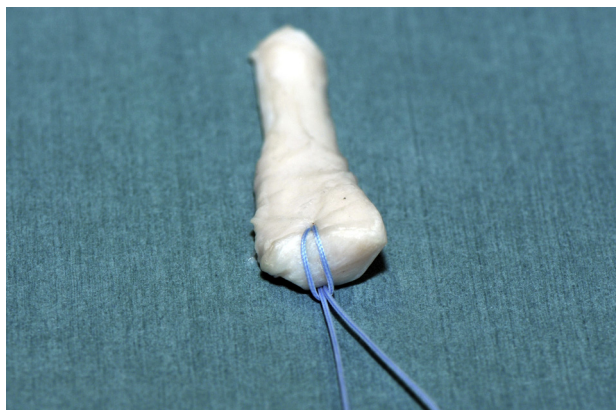


Fig 3. In the third step, both suture strands are tightened and the tendon can be mobilized and positioned in the required position.

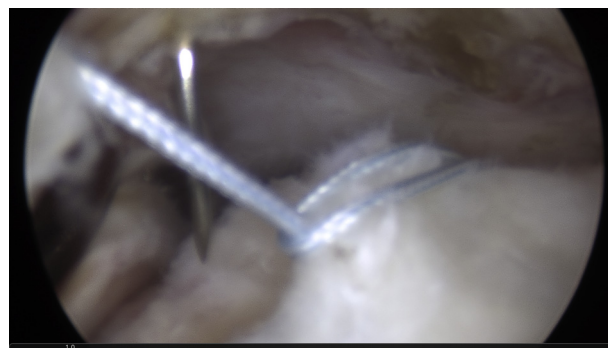


Fig 4. The double suture is passed from the intra-articular to the subacromial space, and both strands are pulled through the loop and tightened (step 1).

Step 3

Both suture strands are tightened, and the tendon can be mobilized and positioned in the required position by pulling the strands (Fig 3).

Step 4

Finally, both suture strands are secured to the bone using a conventional knotless anchor (SwiveLock; Arthrex). Figures 4-6 describe arthroscopic rotator cuff repair. Figure 7 and Video 1 describe the procedure and the result of arthroscopic stabilization. Figure 8 provides a schema of the procedure.

Discussion

The outcome of successful arthroscopic repair of rotator cuff tears compared with failed repairs shows the importance of tissue healing.¹ The key interface for maintaining mechanical stability is the tissue-suture interface.^{2,3} Many different stitch techniques have been described to improve the strength of this interface to improve healing rates.⁴⁻⁶ Some stitches are associated with additional steps and a complicated suture course, which is difficult or almost impossible to perform arthroscopically in some cases. As the stitching becomes

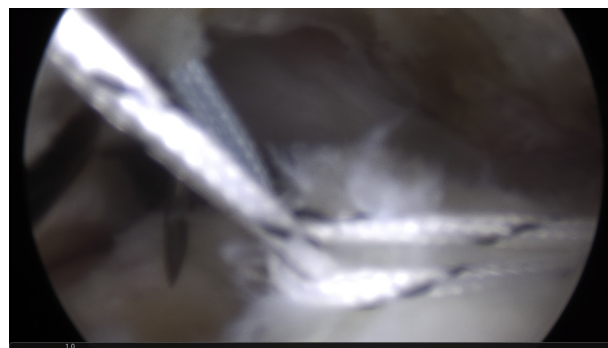


Fig 5. The same procedure as in Figure 4 is performed at a different location of the rotator cuff (step 1).

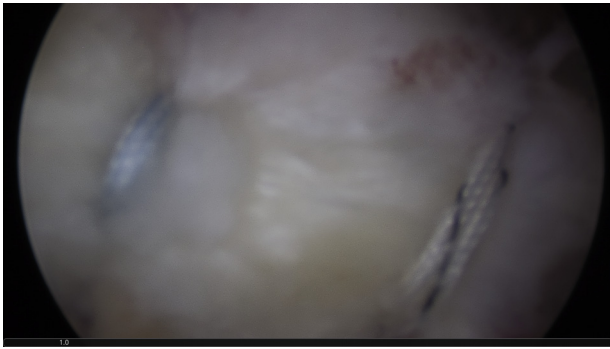


Fig 6. The result after tightening both double sutures and after fixation by a conventional knotless anchor in the required position.

more sophisticated, the learning curve for the surgeon becomes larger. The cow hitch, which is known by a variety of different names, has been known since the first century and was described by the Greek physician Heraklas.⁷

The self-cinching simple cow hitch stitch technique for knotless suture anchors applies constant and balanced contact pressure. The double-guided suture at the end of the tendon prevents the single stitch from pulling through the tendon. The simple cow hitch stitch is a self-cinching stitch like the lasso-loop, lasso-mattress, or double-cinch technique. The major difference is that, like a simple stitch, the suture passes the tendon only one time. In contrast to the racking hitch, no additional loop is created at the doubled guided end of the suture through which the free ends are passed. The existing loop above the tendon, through the double-guided suture, is used to perform a cow hitch. No additional knot is required to ensure the safety of the suture-tendon construct.

This simple and flexible technique can be used in arthroscopic stabilization, biceps tenodesis, or rotator cuff repair. Ponce et al.⁸ analyzed different self-cinching stitches and concluded that improved strength occurs

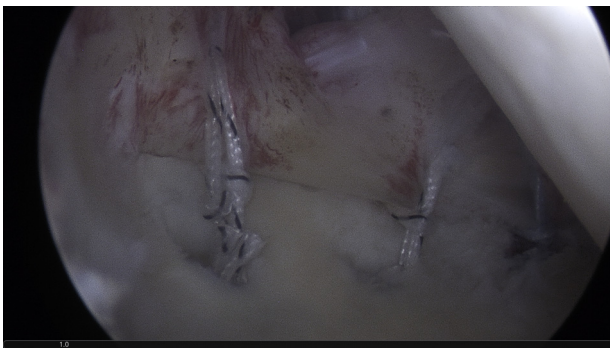


Fig 7. Result after arthroscopic stabilization using the simple cow hitch stitch. The whole procedure is shown in [Video 1](#).

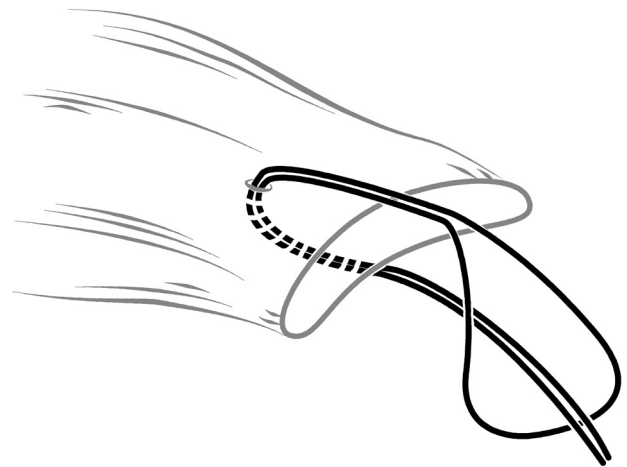


Fig 8. Simple cow hitch stitch procedure.

with no requirement of a further suture or material. In addition, they reported greater elongation for self-cinching stitches. This method has been used for years without any aseptic tendon necrosis.

In conclusion, this method allows excellent initial fixation strength and maintains adequate mechanical stability as a basis for optimal healing. In addition, the method is easy to perform with a fast learning curve.

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