

A Safe Technique to Ensure Not to Unload a Suture Anchor: Suture Dyeing



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Abstract: Suture anchors are frequently used in shoulder arthroscopy. After suture anchors are inserted into bone, the suture transfer between portals should be performed carefully. Sometimes, as a result of the transfer of the wrong suture limb, the suture anchor may be unloaded. The suture dyeing technique provides secure suture retrieval between portals.

Shoulder arthroscopy is a surgical procedure performed to treat many shoulder pathologies. Arthroscopic rotator cuff repair, instability surgery, tendon transfer, and reconstructive surgery are the main arthroscopic surgical procedures. In these procedures, suture anchors made of different materials are used.¹⁻³ The only purpose is to perform the repair process safely with the sutures loaded on the anchor. For the success of the procedure, the anchor must be applied at the appropriate angle, the sutures must be retrieved correctly, and firm knots must be applied. Care should be taken when retrieving the sutures between portals during shoulder arthroscopy. In case of retrieval of the wrong suture limb, the suture may unload from the anchor.⁴ Although the anchor is properly fixed to the bone, if the suture retrieving is not performed properly, the suture loaded on the anchor may be off-loaded. Thus, the anchor loses its function. The anchor is wasted. Unfortunately, it is not uncommon for the suture to unload from the anchor as a result of incorrect suture limb retrieval during

arthroscopic procedures. In this Technical Note, we present our approach to avoid suture unloading from an anchor while retrieving suture limbs between different portals.

Technique

Our technique can be performed in all arthroscopic shoulder surgical procedures in which suture anchors are used (Video 1). First, the suture anchor is inserted into bone. One limb of the suture loaded on the anchor is pulled out of the cannula (Fig 1). It should be ensured that the other limb of the suture remains outside the cannula. Thus, 2 sutures are obtained as short and long limbs (Fig 2). The long suture limb outside the cannula should not be pulled excessively. Thus, the shortened limb does not accidentally pass into the cannula or into the joint. The 2-cm part of the long limb that is planned to come out next to the eyelet of the anchor is dyed with a surgical pen. Then, the end of the long suture limb is dyed, and the short suture limb is pulled until

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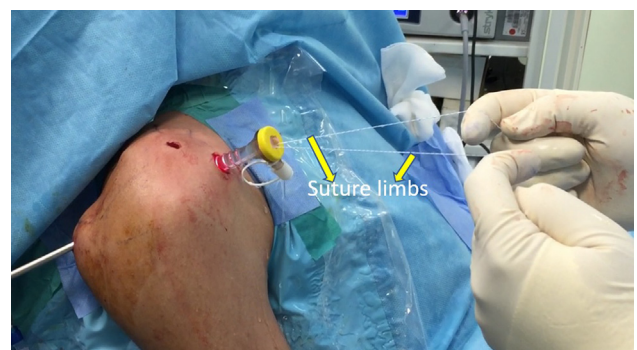


Fig 1. With the patient in the beach-chair position, the suture limbs of the inserted anchor can be seen in the anterior portal in a right shoulder.

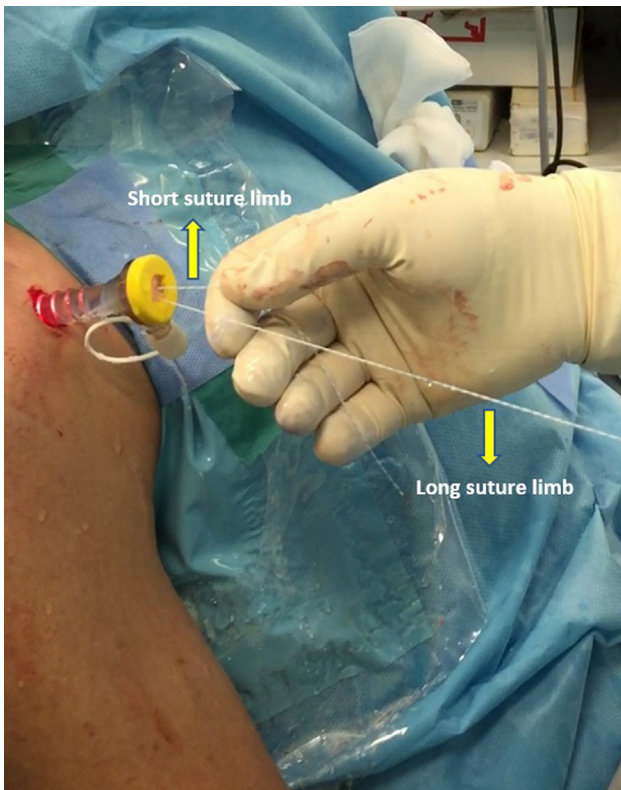


Fig 2. Short and long suture limbs are obtained by pulling one of the suture limbs through the anterior portal.

the first dyed area is moved right next to the eyelet (**Fig 3**). Thus, 2 dyed areas are obtained on the same suture limbs from the eyelet.

The dyed areas are taken into account when retrieving one of the suture limbs through a different portal (**Fig 4**). The end of the suture outside the cannula, which will be retrieved to a different portal,

should be free. The dyed area makes it easy for us to distinguish which end is to be retrieved. If the dyed suture limb is to be retrieved through a different portal, the dyed suture end outside the cannula should be free. Otherwise, if the dyed suture end is held by an assistant or with a clamp, the suture may be unloaded from the suture anchor during the retrieval. Pearls and pitfalls of our technique are presented in **Table 1**, and advantages and disadvantages are listed in **Table 2**.

Discussion

Retrieving the wrong suture limbs between portals can cause the suture to be completely unloaded from the anchor. This situation reduces the success of arthroscopic surgery and requires the use of a new anchor. Various methods can be used to prevent retrieval of the wrong suture limb. The most commonly used method is to view the movements of the suture limbs from the area where the anchor is inserted.⁵ While retrieving one limb of the suture through another portal, one should carefully observe the area where the anchor is inserted into bone. During the retrieval procedure, the sutures in the eyelet part of the anchor must be immobile. However, owing to the soft tissue and intra-articular bleeding, the part of the anchor that corresponds to the eyelet may not always be observed to be of the desired quality. Clamping the end of one of the suture limbs or holding it by an assistant is another preferred method.⁴ Thus, the end of the suture limb that is desired to be retrieved through the other portal is released, and the suture limb is transferred safely. In the suture dyeing method, the dyed part is easily seen both inside and outside the joint. Thus, the movements of the suture limbs in the joint can be easily followed with the dyeing method; the suture limb passing through the tissue (post) can always be easily

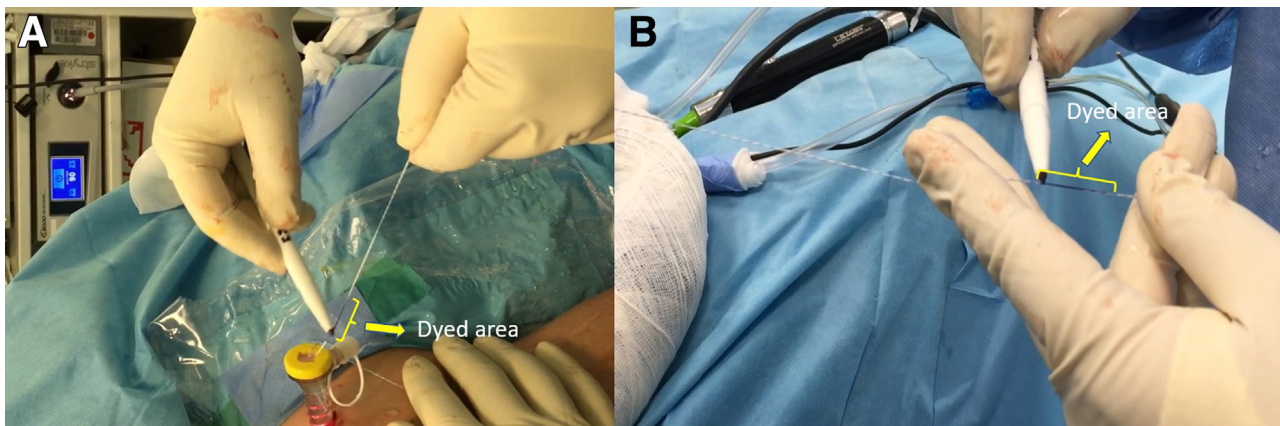


Fig 3. The long limb of the suture anchor is dyed with a surgical pen. (A) Area that is planned to come out next to eyelet. (B) End of suture limb.

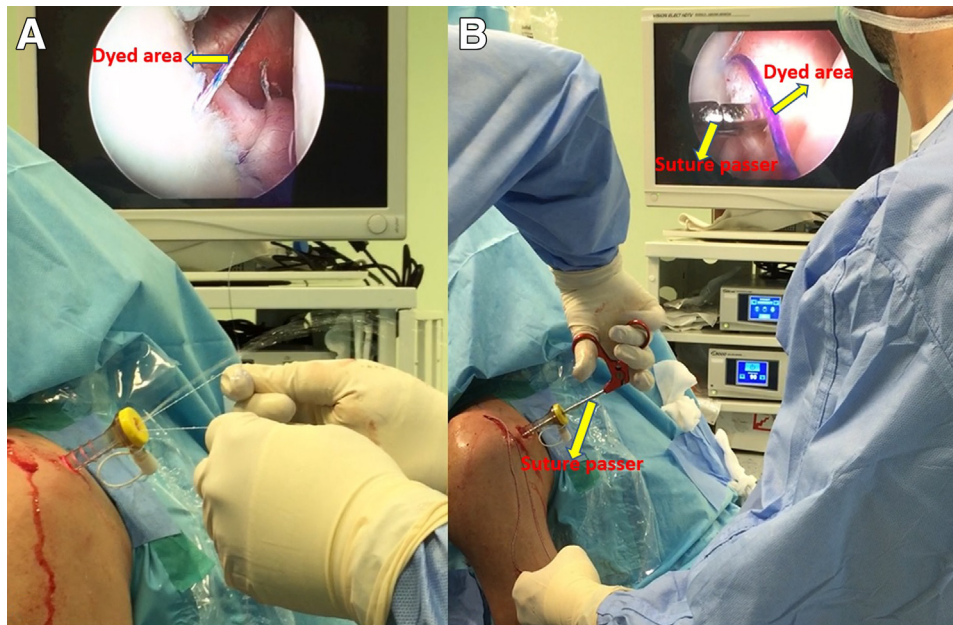


Fig 4. (A, B) View of dyed area through posterior portal in right shoulder joint. The dyed area of the long suture limb is retrieved with a suture passer while the dyed end of the suture limb is free.

Table 1. Pearls and Pitfalls

The suture limb should not be pulled out of the cannula excessively. The dyed areas of the suture should remain on the same limb. While the dyed suture limb viewed in the joint is retrieved through a different cannula, the other end of the dyed suture should be free.

Table 2. Advantages and Disadvantages

Advantages

Less likelihood of suture unloading from anchor
Easy to transfer suture limb
Short surgery time
Easy to apply

Disadvantages

None

identified. Especially in large tears in which more than 1 anchor is used, the suture limbs to be retrieved can be distinguished more easily by use of the dyeing method. In cases in which the suture limbs are entangled, the dyed suture limb can be easily distinguished from the

other limbs. We recommend the application of this easy dyeing method by surgeons interested in shoulder arthroscopy.

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