



A Modified “One-Stitch” Hamstring Tendon Suture Fixation Technique for Anterior Cruciate Ligament Graft Preparation

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Hamstring tendon autografts are very often used for anterior cruciate ligament (ACL) reconstruction. After harvesting of the tendons, each end is most commonly fixed with a running whipstitch suture technique, which permits adequate handling and tensioning of the graft. This conventional technique, which uses multiple locking stitches running up and down the ends of both tendons, is time consuming and carries a risk for tendon damage and needle stick injuries. As a result of the conventional whipstitch technique, suture material is left behind within the tendon inside the tibial canal, which may lead to a local inflammatory response during resorption of the sutures. This article introduces a new technique involving a modified “one-stitch” hamstring tendon suture fixation technique. (Journal of Surgical Orthopaedic Advances 28(1):1–3, 2019)

Key words: ACL graft, anterior cruciate ligament graft, hamstring tendon suture fixation technique, one-stitch hamstring tendon suture fixation technique, orthopedic surgery, surgical technique

This article reports a modified “one-stitch” hamstring tendon suture fixation technique that is quick and cost-effective and does not leave any suture material behind within the tendon inside the tibial canal.

Technique

This modified technique uses a Vicryl No. 2 braided suture with a needle attached. The Vicryl suture is folded in half and looped twice around the distal end of the hamstring tendon (Fig. 1), after which both loose suture

ends are passed through the loop (Fig. 2). This knot construct is tightened by pulling both loose suture ends firmly (Fig. 3). For final fixation, the suture end with the needle is passed once from the proximal part of this construct in the tendon through the knot, after which the needle comes out of the tendon in the most distal part (Fig. 4). For confirmation of a strong fixation, the sutures can be pulled firmly, thereby demonstrating that a secure tendon fixation has been achieved.

Discussion

Several hamstring graft preparation techniques have been published as alternatives to conventional whipstitching (1). Some needleless “loop-the-loop” or “finger-trap” techniques have been published (2–5), which often require to be applied slightly proximal to the most distal part of the tendon to prevent slippage and failure of the graft fixation. However, sacrificing tendon length can make tripling of a hamstring tendon graft impossible in case the diameter of a doubled graft is too small. This

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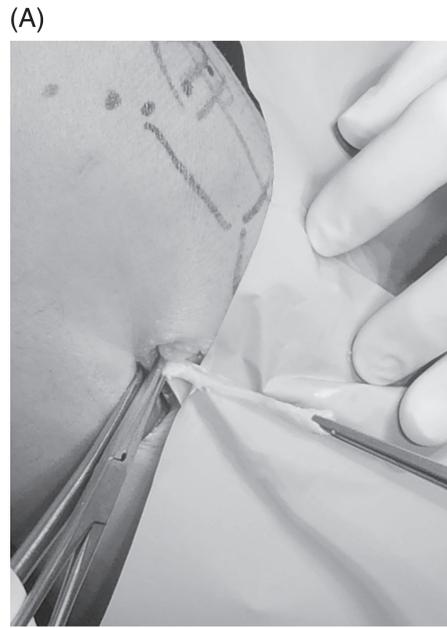


FIGURE 1 The suture is folded in half and looped around the distal end of the hamstring tendon that has been released from the attachment on the proximal tibia.



FIGURE 2 Both loose suture ends are passed through the double suture loop around the hamstring tendon.

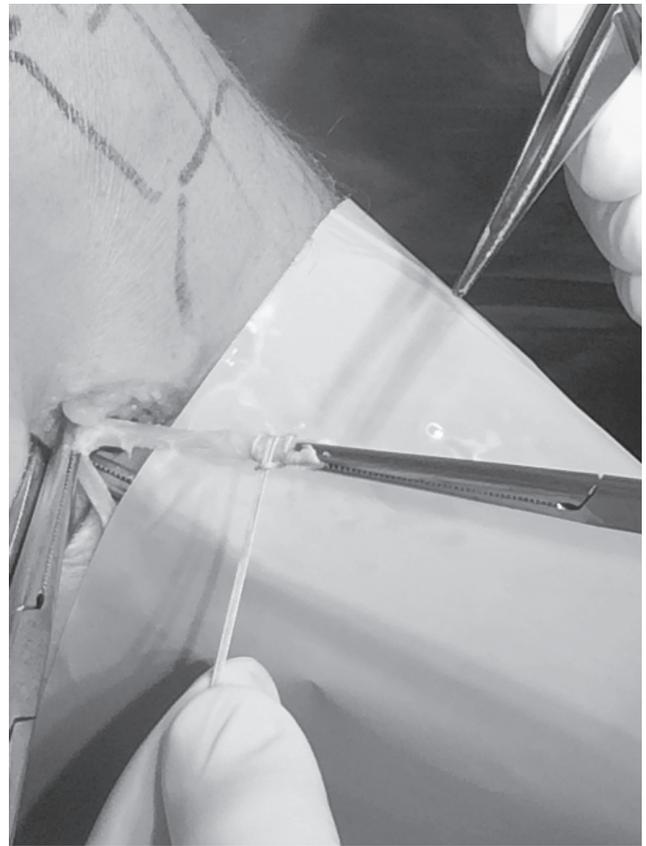


FIGURE 3 The knot construct is tightened by pulling both suture ends firmly.

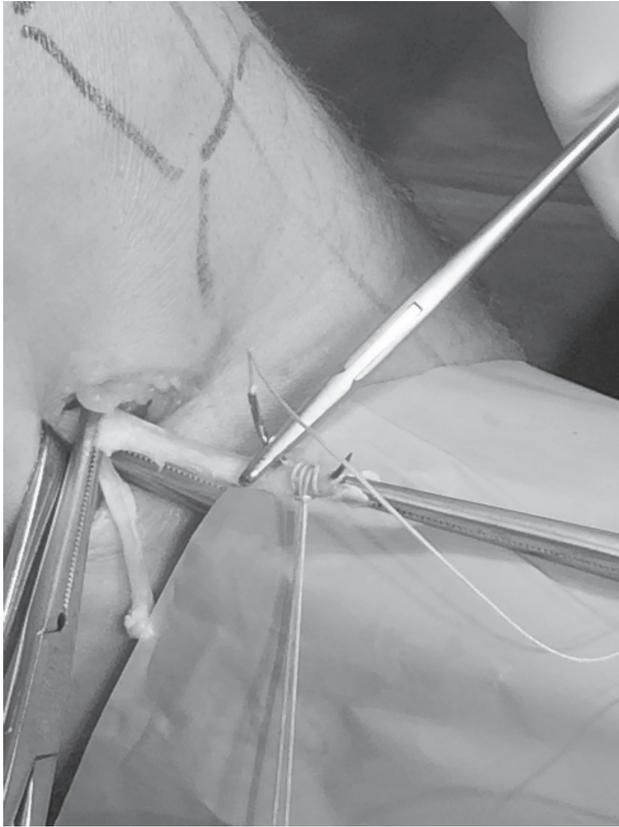


FIGURE 4 For final fixation, the suture is passed from the proximal part of the construct with the needle once through the knot coming out of the tendon distally.

current modified technique retains the longest possible tendon length by additional one-stitch fixation through the double-looped construct, which allows firm placement of the knot on the very distal end of the tendon without risking slippage. Also, premanufactured suture constructs are commercially available, although at higher cost than standard available suture material (6).

The effect of retained suture material on the bone–tendon interface in the tibial tunnel is not known (7). A higher amount of suture material left within the graft after preparation by the conventional whipstitch technique will invariably lead to an inflammatory response. Although the clinical relevance is unknown, an excess of retained suture material may possibly lead to impaired tendon ingrowth in some cases. This modified one-stitch hamstring tendon graft preparation technique is a quick, safe, and cost-effective alternative to conventional whipstitching. This modified technique does not leave any suture material behind in the hamstring tendon graft within tibial tunnel. Further study is needed to determine whether improved tendon ingrowth is achieved on the bone–tendon interface.

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