

## Technical Note

# Arthroscopic Meniscal Suture With the “Double-Loop Technique”

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**Summary:** A new personal technique of arthroscopic meniscal suture in which the knots are all inside the knees, fixed only in the meniscus is presented. Using a new tool, a flexible double-loop allows the suture in the posterior horn of the meniscus to pass the suture from the anterior portal to the posterior portal without the necessity of large posterior incision to protect the vascular-nervous plexus. This paper presents the indication and the technique, as well as a variety of possible knots and their advantages. **Key Words:** All-inside—Meniscal suture—Flexible Double-Loop.

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**W**e have performed arthroscopic meniscal sutures since 1984. Initially, because of technical drawbacks and being severely limited in its indications due to lack of specific instruments, we performed meniscal sutures in peripheral longitudinal ruptures at the level of the anterior horn of the meniscus.

In 1986, we studied the techniques described by Henning,<sup>1</sup> with the needles passing from inside to outside, and by Warren<sup>2</sup> from outside to inside. We decided on the outside-in technique with instruments developed by Lanny Johnson<sup>3</sup> which, from our point of view, offered less risk of neurovascular complications. This was confirmed in practice since in 45 sutures performed between 1986 and 1992 we did not come across any such complications.<sup>4</sup> However, there were some difficulties in using the meniscal suture at the posterior horn level because the access is more difficult and the area contains important neurovascular structures. Another factor was that the articular capsule was more redundant in this zone in order to allow the flexion extension movements of the articulation. The

fixation of the meniscus together with the capsule restricted movement and caused pain during post-rehabilitation. We searched for alternatives that did not include the articular capsule in the meniscus suture.

In 1992 we used sutures of the posterior horn with the “all-inside” technique described by Morgan.<sup>5</sup> There were some difficulties including greater loss of fluid through the 8 mm cannula which caused deficient articular distention and restriction concerning the meniscus area available to suture, consisting approximately of only 3 mm of the meniscocapsular junction.

Recently we evaluated the T-Fix technique of Hayhurst<sup>6</sup> which seemed very practical, although it presented two negative aspects: the rigid implant and the knot in the articular surface of the meniscus.

In order to solve the difficulties related to the techniques just mentioned, we have developed a personal meniscal suture technique for the posterior horn injuries of the meniscus. A flexible double-loop composed of a braided ace cable covered by nylon with a loop in each extremity allows the passage of suture thread through a number 16 needle with 15 cm of length and perform the stitch intra-articularly with the knot located in the posterior region of the meniscus. Through this procedure we eliminate the possibility of neurovascular complications and are able to perform the suture with the most appropriate thread (absorbable or not, two or three 0). The relative simplicity of the

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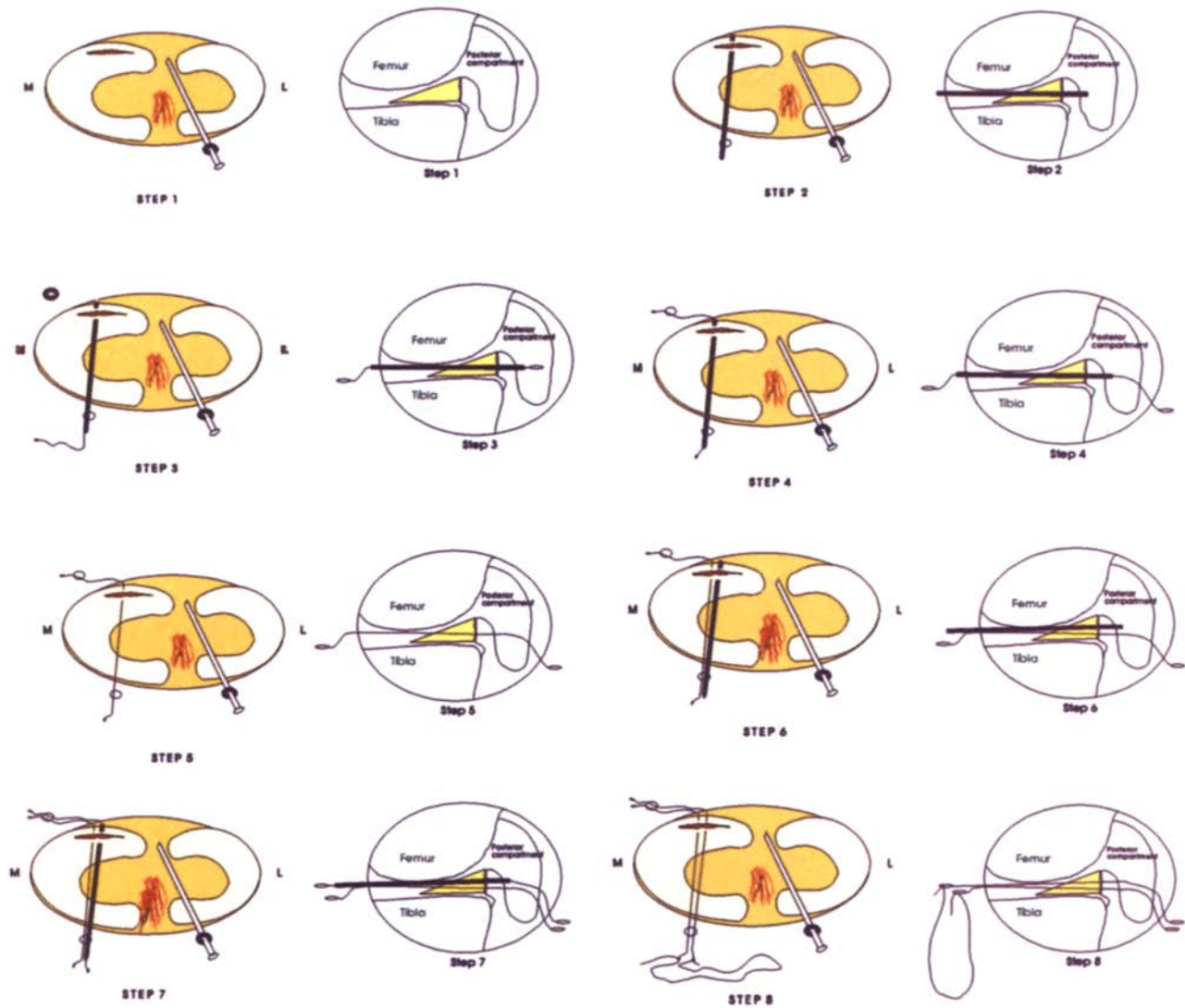


FIG 1. Step-by-step arthroscopic meniscal suture: Double-loop technique.

instruments make this a technique that is easily executed by trained arthroscopists. The best indication for the “double-loop technique” is the longitudinal rupture of the posterior horn of the meniscus jointly repaired with the reconstruction of the ACL in cases of anterior knee instability.

### OPERATIVE TECHNIQUE

We used optics of 30° and 70° for better visualization of the posterior compartment of the knee. The following equipment is needed: 1) Two needles number 16 or 18 with 15 cm of length; 2) Two flexible double loops for capture and passage of the suture threads; 3) One support ring for fixing the meniscus during its

transfixation by needles; 4) A guide for making the stitch, pushing and tightening the knot (knot pushers); 5) A nipper or hook for the thread capture; 6) A 5 mm cannula with diaphragm for passage of the instruments by posterior approach.

We used the following approaches: For the medial meniscus: anteromedial, anterolateral, and posterior-medial portals; for the lateral meniscus: anteromedial, anterolateral and posterior-lateral portals.

The arthroscope with a 70° optic is positioned through the anterior approach, passing through the intercondylar notch for visualization of the injury (Fig 1, step 1). A 5 mm cannula with diaphragm positioned by posterior approach allows the passage of the instruments. With a motorized instrument introduced

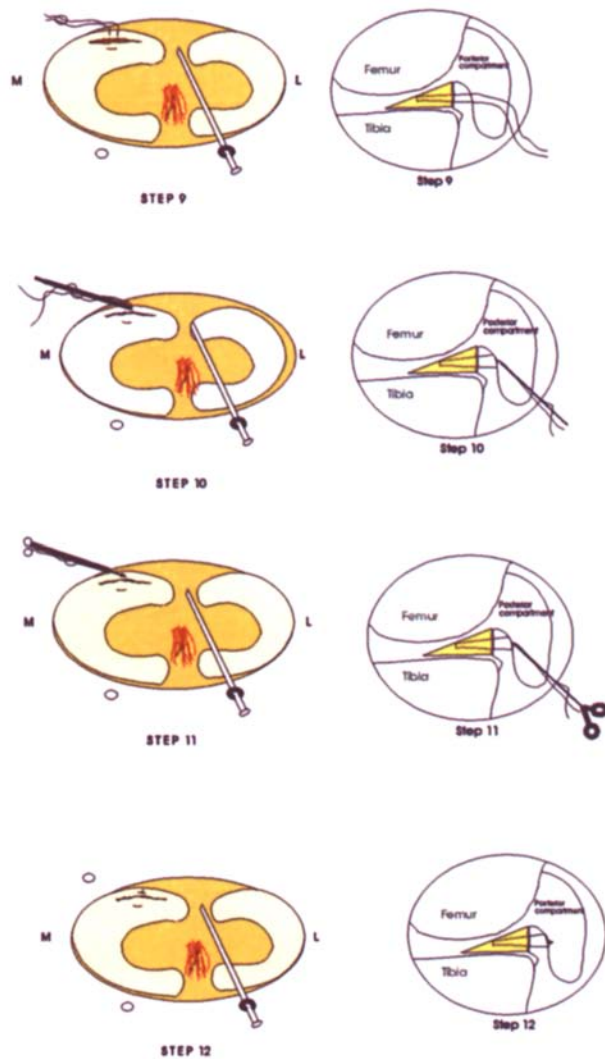


FIG 1.—Continued.

through the cannula we executed the abrasion and re-  
vival of the lesion borders.

We fix the meniscus with the support ring through the cannula. We pass a needle from the anterior to posterior transfixing the meniscus in the area of the longitudinal rupture (step 2). We introduce a flexible double-loop through the needle in this same direction (step 3). We capture the loop, through the cannula, with a hook or a nipper (step 4). We remove the needle (step 5), pass the needle through the meniscal lesion again (step 6) and repeat the movement with a new double-loop (step 7). We position one extremity of the suture thread inside each loop in the anterior zone (step 8) and pull the loops by the posterior zone (step 9), bringing together the two extremities of the suture. We make a knot and push it with the help of a guide (knot

pusher), tightening the knot which will be located at the posterior zone of the meniscus (step 10), without any contact with the articular surface. We make another two or three knots, fixing the stitch at the desired tension. We cut the threads with arthroscopic scissors or even with a nipper close to the stitch (step 11).

We make as many stitches as necessary for stabilizing the meniscal lesion (step 12). With this technique we may also perform continuous stitches using the same thread before making and cutting the knot. We return with one extremity of the suture to the anterior region through a new loop and then return again with this same extremity of the suture to the posterior through another loop. We may still perform the stitches in several ways, vertical, horizontal, and longitudinal depending on the place where we introduced the needles when transfixing the meniscus. With such procedures we are able to completely stabilize the meniscal lesion.

## CONCLUSIONS

This procedure consists of an arthroscopic technique with the stitches located “all-inside” fixing exclusively the meniscal tissue with no contact with the articular surface. It is particularly indicated for lesions located at the posterior zone of the meniscus in cases of anterior knee instability, where the suture is better indicated so as to preserve the meniscus<sup>7-9</sup> and its important functions.<sup>10-20</sup>

The procedure can be performed in ruptures occurring more than 3 mm away from the synovial meniscus junction with no limitation concerning the distance as in the “all-inside” described by Morgan<sup>5</sup> and Maruyama.<sup>21</sup>

The suture thread may be chosen by the surgeon with no implication with the technique. Furthermore, there are no risks of affecting neurovascular structures by the suture. It neither involves nor fixes the posterior articular capsule not compromising the articulation mobility.

The stitches may be separate or continuous, vertical, horizontal or longitudinal, allowing a stable fixation of the meniscal lesion without using any rigid implant. The flexible double-loop, a new device, facilitates the passage of the threads with no risk of damage to the articular structures.

The “double-loop” may also be used in the lesions in the area of the body and anterior horn, passing the needles from outside to inside (“outside-inside” technique), making the technique easily applicable because it dispenses the suture passer. It requires relatively simple instruments of accessible costs. Finally, it is a technique that can be reproduced and be used successfully by a trained arthroscopist.

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