Arthroscopic repair of the triangular fibrocartilage complex using a hypodermic needle: a technical note

Ravindra H Mahajan, Sung-Jae Kim, Dae-Heup Song, Young-Hoon Kang, Kwang-Yeoul Park
Department of Orthopedic Surgery, Yonsei University College of Medicine, Seoul, Korea

ABSTRACT

Tears of the triangular fibrocartilage complex (TFCC) often lead to chronic wrist pain. The commonly used 2-needle outside-in and inside-out suturing techniques require an extra incision to tie the sutures subcutaneously. We use a practical and cost-effective arthroscopic technique for treatment of peripheral Palmer type 1B TFCC tears using a hypodermic needle. This obviates the need for an additional skin incision, thus lowering the risk of neurovascular damage, reducing postoperative pain, and enabling faster rehabilitation and better cosmesis.

Key words: arthroscopy; needles; triangular fibrocartilage; wrist joint

INTRODUCTION

Two-needle outside-in and inside-out techniques are commonly used for arthroscopic suturing of Palmer 1B tears of the triangular fibrocartilage complex (TFCC).1-3 Another popular method is use of a Tuohy needle to insert 2 stitches as a mattress suture into the TFCC.4 Both techniques require an extra incision to tie the sutures subcutaneously.5 We use a fully arthroscopic technique for repair of Palmer 1B tears of the TFCC using a hypodermic needle. This obviates the need for an extra incision to place the subcutaneous sutures.

TECHNIQUE

The patient is put in a supine position under anaesthesia with a tourniquet in place. The wrist is put under traction, with a vertical traction (of 4.5 kg) applied to the fingers and counter traction applied to the arm with the elbow in 90° flexion. Landmarks including the radial styloid process, ulnar styloid process, Lister’s tubercle, and extensor tendons are marked. A 3-4 portal is used for arthroscope placement and 6R and 6U portals are used for the

Address correspondence and reprint requests to: Dr Ravindra H Mahajan, Department of Orthopedic Surgery, Yonsei University College of Medicine, CPO Box 8044, 134, Shinchon-Dong, Seodaemun-Ku, 120-752, Seoul, Korea. E-mail: drtanu_mhas@hotmail.com
instruments. The joint space is palpated about 1 cm distal to Lister’s tubercle and marked between the third and fourth extensor compartment. An ordinary hypodermic needle, with an attached syringe, is inserted in a direction 5º to 10º downward from the horizontal plane and along the volar slope of the radial articular surface. The joint is slowly distended with irrigating fluid after intra-articular placement of the needle. A 2 to 3 mm skin incision is made, and the subcutaneous tissue is separated from the joint capsule using sharp mosquito forceps. The capsule is perforated with the mosquito forceps. The 3-mm diameter sheath with blunt obturator is inserted through the 3-4 portal along the slope of the radial articular surface. The joint is inspected using a 30º arthroscope.

A point just radial to the extensor carpi ulnaris tendon is used as an instrument (6R) portal. Under vision, the needle is inserted and the portal is created in the same fashion. Similarly, a 6U portal is created on the ulnar side of the extensor carpi ulnaris tendon. A probe may be placed in the 6R or 6U portal to assess the TFCC. The peripheral tear in the TFCC on the dorsal and ulnar sides is identified (Fig. 1a) and the synovium and the edges of the tear are debrided using an oscillating shaver.

An outside-in suturing technique is used. A 19G needle is inserted upward from 5 mm proximal to the level of the 6R portal through the 2 mm inner side of the detached area of the TFCC, while stabilising it with the probe through the 6U portal. Hypodermic needles with a 20º curve or bent tips may be used to facilitate piercing of the TFCC. A 2-0 polydioxanone-PDS suture is passed through the needle (Fig. 1b, 2a) and caught by the grasper placed in the 6R portal. The needle is withdrawn and the suture retrieved from the joint through the 6R portal. The procedure is repeated as needed for suturing the dorsal part of the peripheral tear, with one limb of the stitches exiting the joint through the portal and the other limb entering the joint percutaneously (Fig. 1c). A small mosquito forceps is passed through the 6R portal undermining the subcutaneous area and the percutaneously passed suture limbs are withdrawn through the portal (Fig. 2c). The ulnar part of the peripheral tear is sutured in a similar fashion. The knots are tied and are slid beneath the subcutaneous tissue using the sliding knot technique (Fig. 2d). The torn part of the TFCC is thus sutured to the capsule (Fig. 2e). The skin incisions are sutured and a compression dressing applied along with a sugar-tong splint.

**DISCUSSION**

The TFCC consists of several anatomic structures working together as a functional unit. It is a major distal radioulnar joint stabiliser and a buffer for compressive forces, thus preservation of this structure is very important. Debridement or resection of an unstable articular disc may cause a certain degree of instability of the distal radioulnar joint. Adequate

![Figure 1](image1.png)

**Figure 1** Arthroscopic views showing (a) tear of the triangular fibrocartilage complex, (b) the suture entering into the joint, and (c) multiple sutures.

![Figure 2](image2.png)

**Figure 2** Schematic diagrams showing (a) the suture entering into the joint, (b) the needle being removed and suture retrieved through the 6R portal, (c) the suture entering and exiting through the 6R portal, (d) the knot sliding subcutaneously, and (e) multiple sutures being tied.
vascularity is present in the ulnar periphery of the TFCC.\textsuperscript{11–13} Treatment outcomes for repairs of Palmer 1B tears of the TFCC have been satisfactory.\textsuperscript{11–14}

Both open\textsuperscript{14,15} and arthroscopic methods have been used for the reattachment of the TFCC to its ulnar insertion (class 1B). Although open repair requires a wide approach, access through an arthrotomy may be difficult.\textsuperscript{16} Immobilisation is prolonged and the loss of wrist motion is greater after arthrotomy than arthroscopy.\textsuperscript{4,17} Arthroscopy is the diagnostic tool of choice for TFCC tears.\textsuperscript{4,17} It improves visualisation and preserves the surrounding tissue and thus creates less morbidity.\textsuperscript{18,19} The 2-needle outside-in and inside-out techniques are the ones most commonly used, but they require an additional skin incision to tie the knot and thus cannot be considered fully arthroscopic techniques.\textsuperscript{4,20–24} Our arthroscopic technique using a hypodermic needle obviates the need for an additional skin incision, and thus lowers the risk of neurovascular damage, reduces postoperative pain, and enables faster rehabilitation and better cosmesis.\textsuperscript{25}

**REFERENCES**