

A Simple Device in Shoulder Arthroscopy: The Suture Assistant

Daniel K. H. Yip, F.R.C.S.(Edin), F.R.C.S.E.(Ortho), F.H.K.A.M.(Ortho Surgery), and
Jimmy W. K. Wong, F.R.C.S.(Edin), F.H.K.A.M.(Ortho Surgery)

Abstract: Arthroscopic reconstructive surgery in the shoulder is an extremely demanding. The advent of suture anchors, arthroscopic knot-tying techniques, and new arthroscopic instruments has greatly facilitated its development. Knowledge of the anatomy and surgical principles alone are not enough. Good visualization is critical. We describe a simple home-made device that can be very useful in improving visualization and in helping to retrieve sutures during the knot-tying stage, especially in smaller shoulders. We introduce the concept of “bringing the suture” to the instrument rather than “taking the instrument to the suture.” **Key Words:** Shoulder arthroscopy—Suture—Suture assistant—Device—Suture anchor—Visualization—Visualization aids.

Visualization during reconstructive shoulder arthroscopy is difficult to achieve. Proper patient positioning,¹ hypotensive anesthesia,² regional nerve block,³ and surgical techniques⁴ all play a part in allowing the surgery to proceed successfully. Ultimately, the arthroscopic procedure may have to be abandoned if the visual field is obstructed. Repeated obstruction of the visual field will also prolong the surgery time, increase fluid extravasations, and make the surgery increasingly more difficult.

The posterior portal is the most common diagnostic portal to use and the shoulder arthroscopist usually perceives the shoulder with a few key structures in

mind. This virtual-like 360° bird’s eye view is short lived in real surgical practice because as the arthroscope is introduced from the posterior portal toward the front, the field of vision is automatically narrowed, and the objects are in turn magnified. In reality, during most of the surgical time, only a small area of the glenohumeral joint comes into view. As the surgical procedure continues into the reconstructive phase, other instruments are introduced as are suture anchors and their sutures. Meticulous suture management and having a dedicated portal for suture management are important. Nevertheless, the sutures can still get in the way and obscure the visual field.

THE SUTURE ASSISTANT DEVICE

Our device is made from a Kirschner wire. A small closed loop is made at the end and must be sufficiently wide to feed 2 strands of sutures through easily (Figs 1 and 2). At a point about 2 cm from the loop, an angular bend is created. The K-wire device must be able to pass through whatever brand and size of cannula that you use. The flexibility of the K-wire means that even if the angular bend is a little over, the wire can spring out as it exits the cannula and can be coerced into the cannula when being pulled out.

If we consider, for example, the arthroscopic Ban-

From the Division of Sports and Arthroscopic Surgery, Department of Orthopaedics and Traumatology, The University of Hong Kong, Queen Mary Hospital, Hong Kong.

Address correspondence and reprint requests to Daniel K. H. Yip, F.R.C.S.(Edin), F.R.C.S.E.(Ortho), F.H.K.A.M.(Ortho Surgery), Division of Sports and Arthroscopic Surgery, Department of Orthopaedics and Traumatology, The University of Hong Kong, Queen Mary Hospital, 102 Pokfulam Rd, Hong Kong. E-mail: dkhyip@hku.hk

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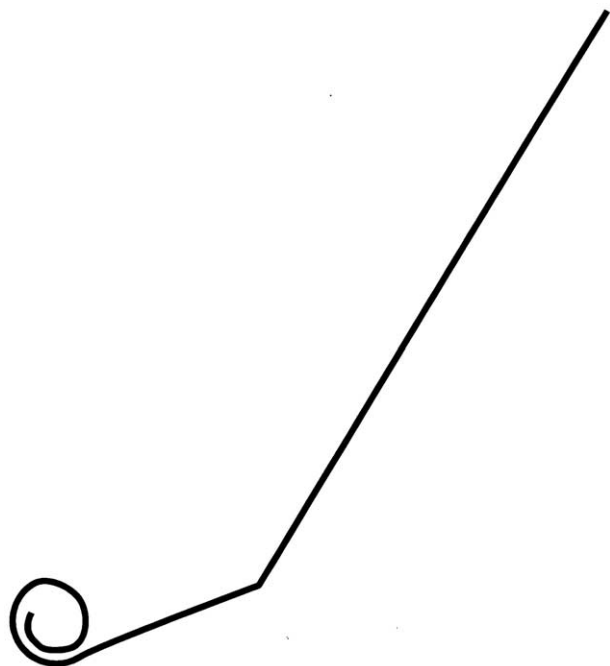


FIGURE 1. Schematic diagram of the suture assistant device.

joint repair procedure, the placement of the lowest anchor is the most difficult technically and must be done under constant visualization. Once the anchor is inserted into bone, the 2 strands of suture are usually transferred to the suture portal to keep them out of the way. Unfortunately, the natural tension in the 2 strands means that they will be more or less obstruct the visual field. We have tried relaxing the tension and moving the sutures with hooks and suture graspers. However, the confined working space means that the working instrument (e.g., for placating soft tissue) will invariably touch the 2 strands and cause them to tent up again across the visual field. External movements

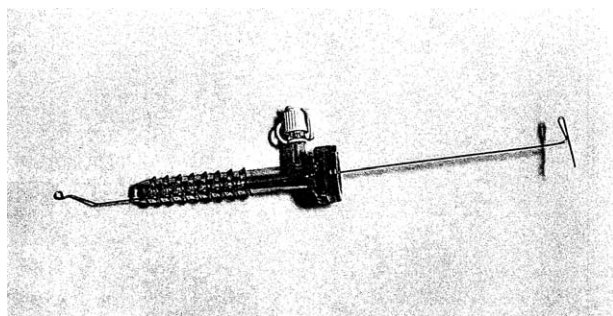


FIGURE 2. Photograph of the actual device inside a 8.25-mm transparent cannula. A handle has been added for better handling.

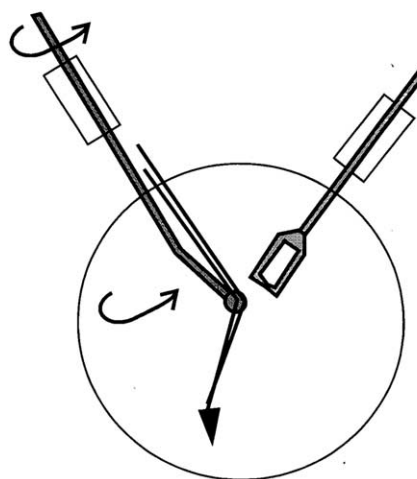
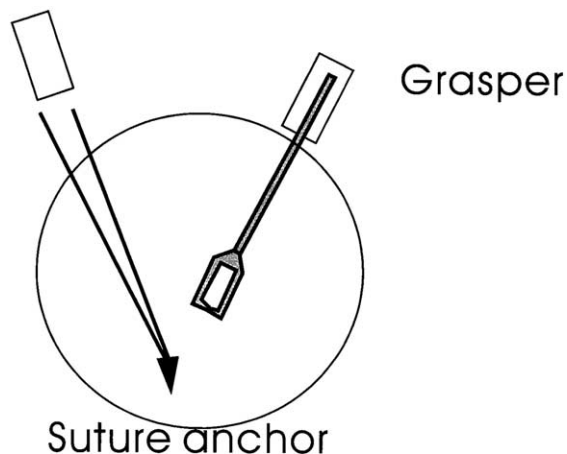


FIGURE 3. Suture retrieval and management: Rather than “taking the instrument to the suture,” it is much easier to “bring the suture to the instrument.” This is done by rotating the suture assistant. The built-in angle will help the suture traverse the distance to the grasper.

and fluid turbulence will also cause the sutures to obstruct the view from time to time. Therefore, we have invented this device.

Our suture assistant K-wire device is then threaded with 1 or 2 sutures, as necessary. The device is inserted through the suture cannula and the loop is pushed down to a few centimeters from the suture anchor. The weight of the wire will keep the sutures out of the way and can then be placed in whatever area of the joint is desired. The working instrument can then proceed.

A second use of the device is as follows. It is frequently necessary to retrieve sutures and many

devices are available on the commercial market for this purpose (hooks or jaw devices). These devices usually have a straight tip to enable them to pass through the narrowest cannula. When inserted into the cannula, it may not be possible to reach the desired suture even with levering the cannula. This is the common practice of "taking the instrument to the suture." The angular bend in our device means that if threaded (suture portal) with the desired suture, rotation and leverage of the K-wire will instead "bring the suture to the instrument" (Fig 3). It is much easier to use the suture graspers this way and to pick up the suture near to the cannula opening rather than having to force them into far corners to pick up sutures. This is a much easier method and thus 2 such suture assistant devices on standby can be very useful. It may also reduce the need to keep an extensive collection of tissue penetrators of varying angles.

DISCUSSION

We believe the suture assistant device is very useful, especially in small shoulders (e.g., women and

Asians). Because the shoulder cavity is smaller, the arthroscope is closer to the anatomic structures and every structure is magnified. Even the sutures, once magnified, can take up valuable visual field. The idea is similar to that used in fishing where a lead shot is added to the line so that the bait is floated at a desired depth to attract mid-stream feeders. Furthermore, the device when used in conjunction with existing instruments will help suture retrieval throughout the surgical procedure. It is a simple device and cheap to make.

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