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Case report

Using a modified J-shaped Y-knot all-suture anchor to pass a suture under the coracoid process in coracoclavicular stabilization

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ABSTRACT

Introduction: The distal clavicle fracture is a common shoulder injury. There are several treatment methods which can achieve good outcomes, of which coracoclavicular (CC) stabilization is one of the most popular surgical options. In CC stabilization, the step of passing a suture under the coracoid base is the most difficult step because the standard surgical tool is not designed for passing a suture under the coracoid process. To solve this problem, there are commercial tools for use in this step but all of them are expensive, and thus of limited availability in developing or low-resource settings. We propose a modified J-shaped Y-knot all-suture anchor for use in passing a suture under the coracoid process.

Case presentation: A 45-year-old Thai male who had a left distal clavicle fracture was scheduled for CC stabilization. We modified a sterile Y-knot all-suture anchor to loop underneath the coracoid base which was easy to use and can design individually.

Discussion: In CC stabilization, there are many specialized commercial tools specially designed to easily pass the suture under the coracoid base but they are very expensive. The surgeon can use this technique to modify J-shaped Y-knot all-suture anchor for use in CC stabilization, recycling a Y-knot all-suture anchor normally discarded after use.

Conclusion: A modified J-shaped Y-knot all-suture anchor can use in passing a suture under the coracoid process.

1. Introduction

The distal clavicle fracture is a common shoulder injury. [1,2] There are several treatment methods which can achieve good outcomes, of which coracoclavicular (CC) stabilization is one of the most popular surgical options. [1,3–5] In CC stabilization, the step of passing a suture under the coracoid base is the most difficult step because the standard surgical tool is not designed for passing a suture under the coracoid process. To solve this problem, there are commercial tools for use in this step but all of them are expensive, and thus of limited availability in developing or low-resource settings. We propose a modified J-shaped Y-knot all-suture anchor for use in passing a suture under the coracoid process. This case was reported following the Surgical Case Report (SCARE) guidelines. [6]

2. Case presentation

We reported the case of a 45-year-old Thai male who had a left distal clavicle fracture was scheduled for CC stabilization. Pre-operative radiographs of both clavicle in anteroposterior view and left shoulder in lateral view were done (Fig. 1A and B). In this case, an orthopedist (C.C.) modified a Y-knot all-suture anchor (CONMED, Largo, FL) to loop underneath the coracoid base. Normally, after the Y-knot all-suture anchor is used in a case of rotator cuff repair, it is discarded. However, in our study, we saved used Y-knot all-suture anchors and sterilized them for re-use. A sterile Y-knot all-suture anchor (Fig. 2) was modified by creating a 90-degree J-shape. The bifurcated tip of the Y-knot all-suture anchor was forced together into a single unit by a needle holder as shown in Fig. 3. The distal part of the slot suture device was bent into a J-shape using a needle holder (Fig. 4A, B). Then, the section next to the J-shape of the slot suture device was bent 90 degrees using two needle holders (Fig. 5). The resulting 90-degree J-shape was designed to pass easily under the actual coracoid process (Fig. 6A, B).

Abbreviations: CC, coracoclavicular; K-wire, Kirschner wire.

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[1] Classifications: Level 1: Shoulder, Level 2: Distal Clavicle Fracture.

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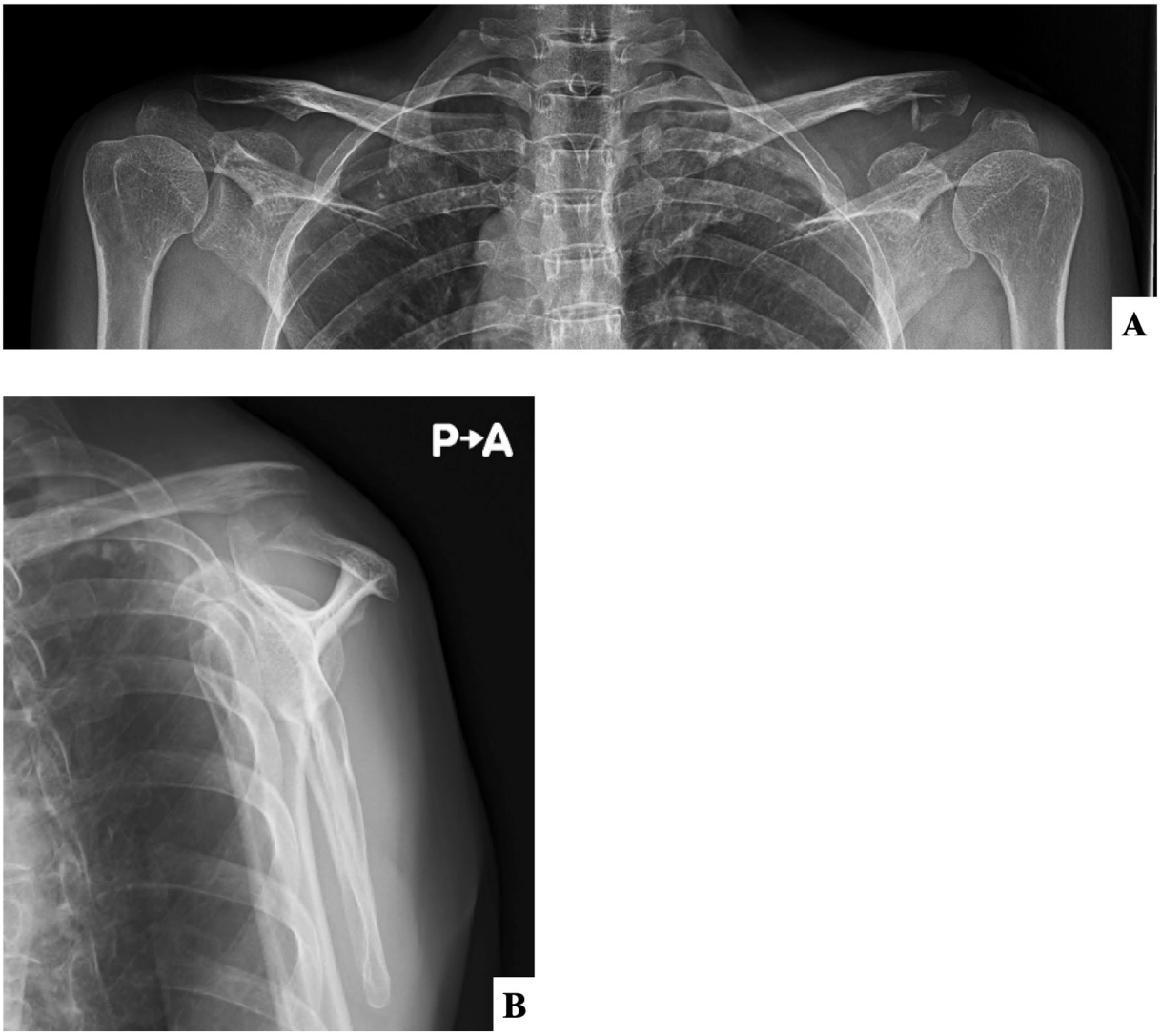

Fig. 1. Pre-operative radiographs of (A) both clavicle in anteroposterior view and (B) left shoulder in lateral view.

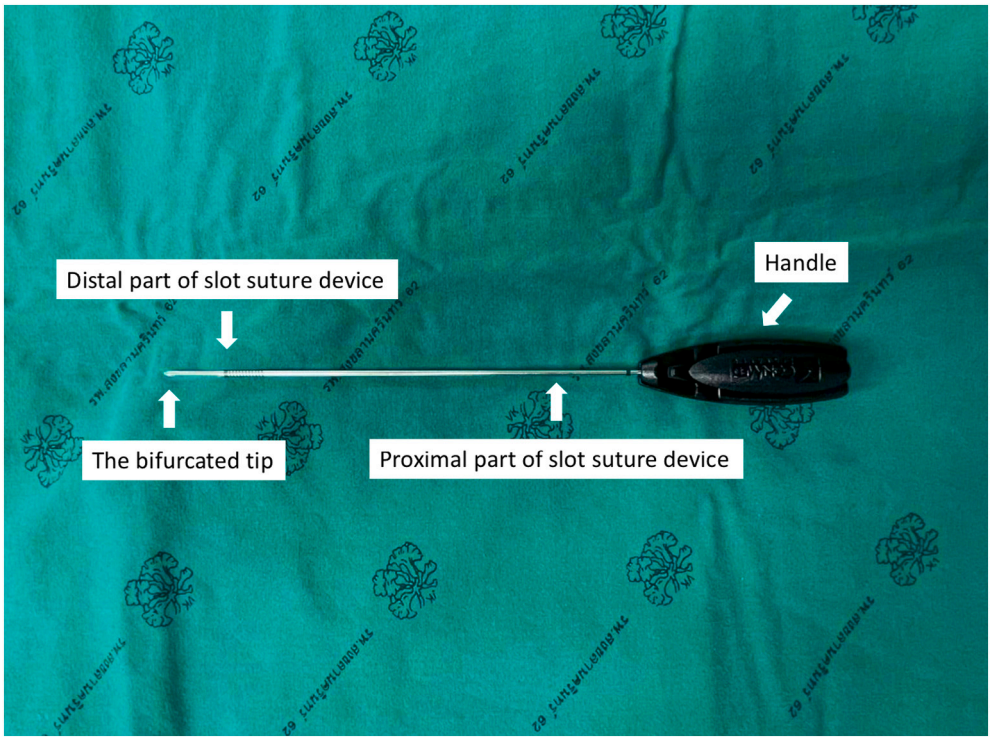

Fig. 2. A used Y-knot all-suture anchor.

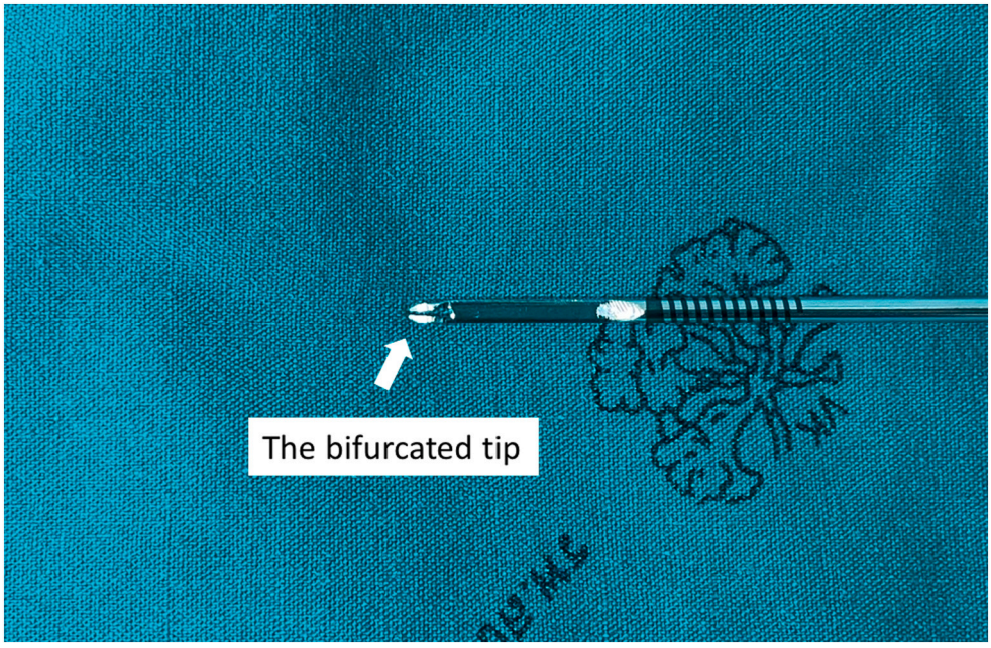

Fig. 3. The bifurcated tip of a Y-knot all-suture anchor.

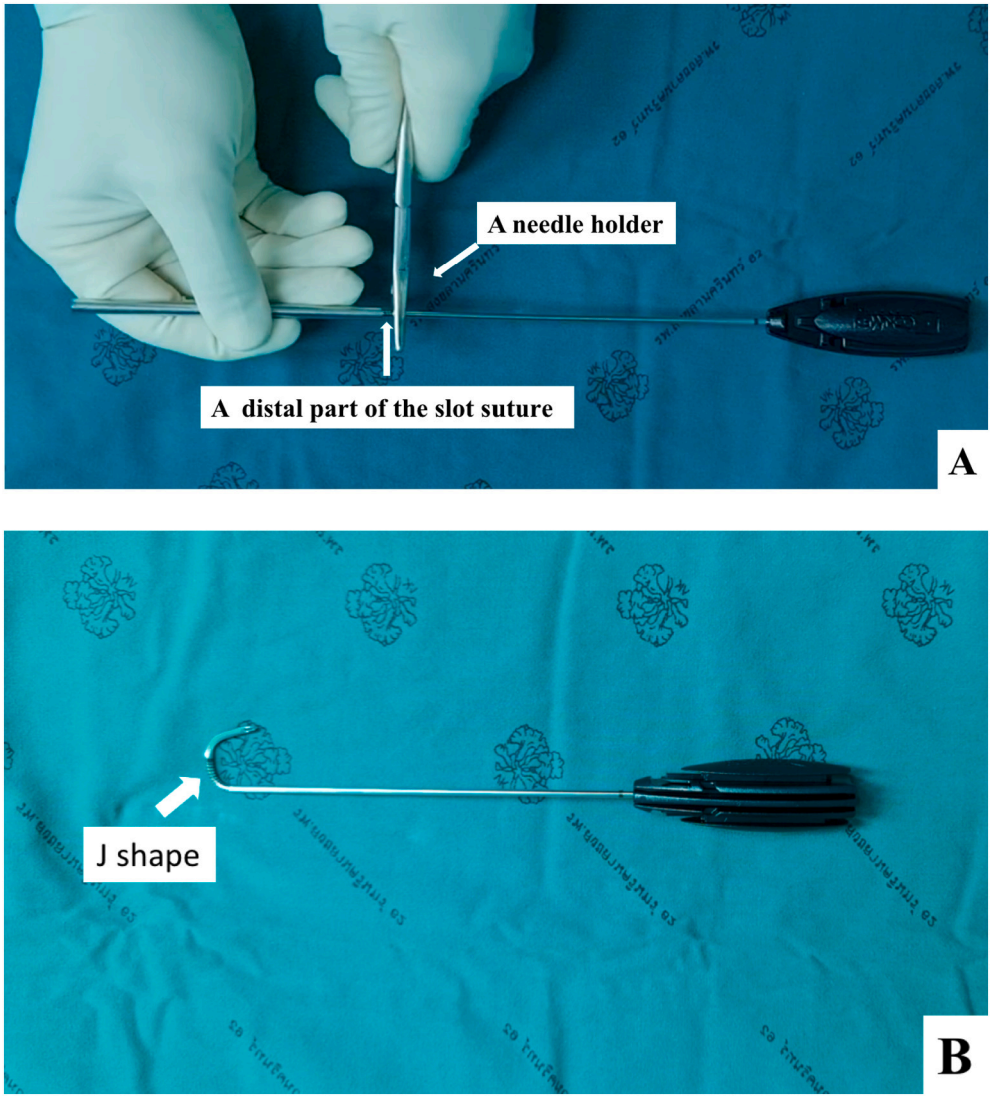

Fig. 4. First, the distal part of the slot suture device was (A) bent into (B) a J-shape using a needle holder.

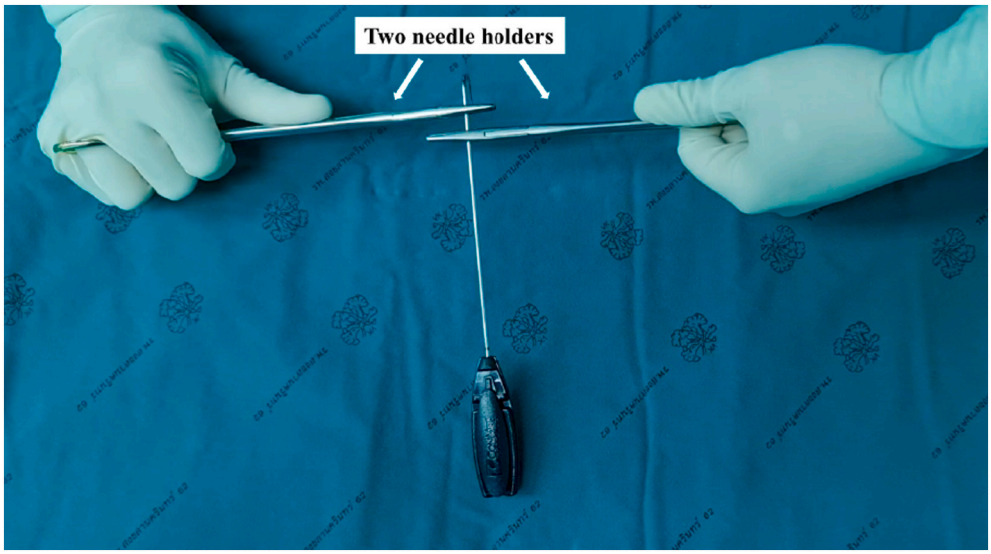

Fig. 5. Then, the section next to the J-shape was bent 90 degrees using two needle holders.

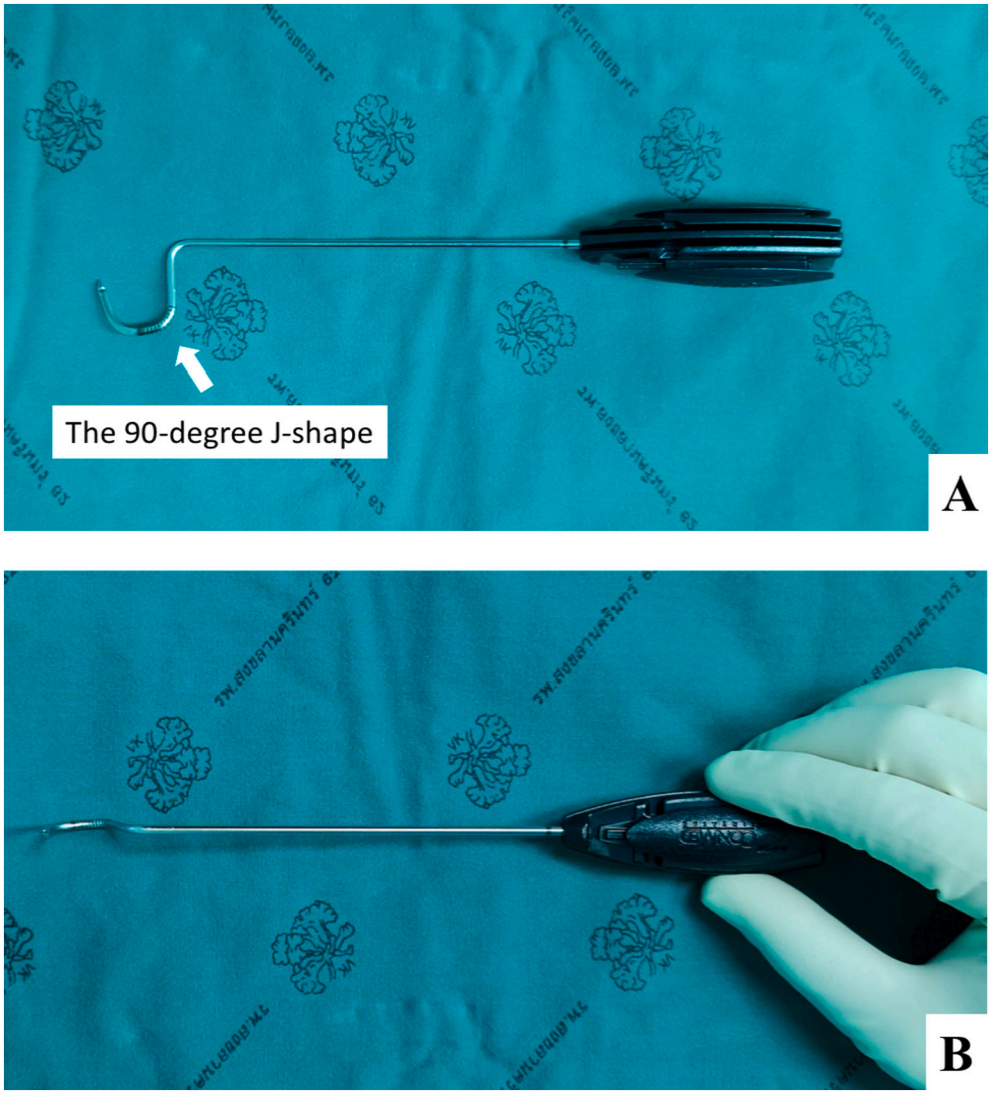

Fig. 6. The 90-degree J-shape was designed to loop under the actual coracoid process; (A) lateral view and (B) top view.

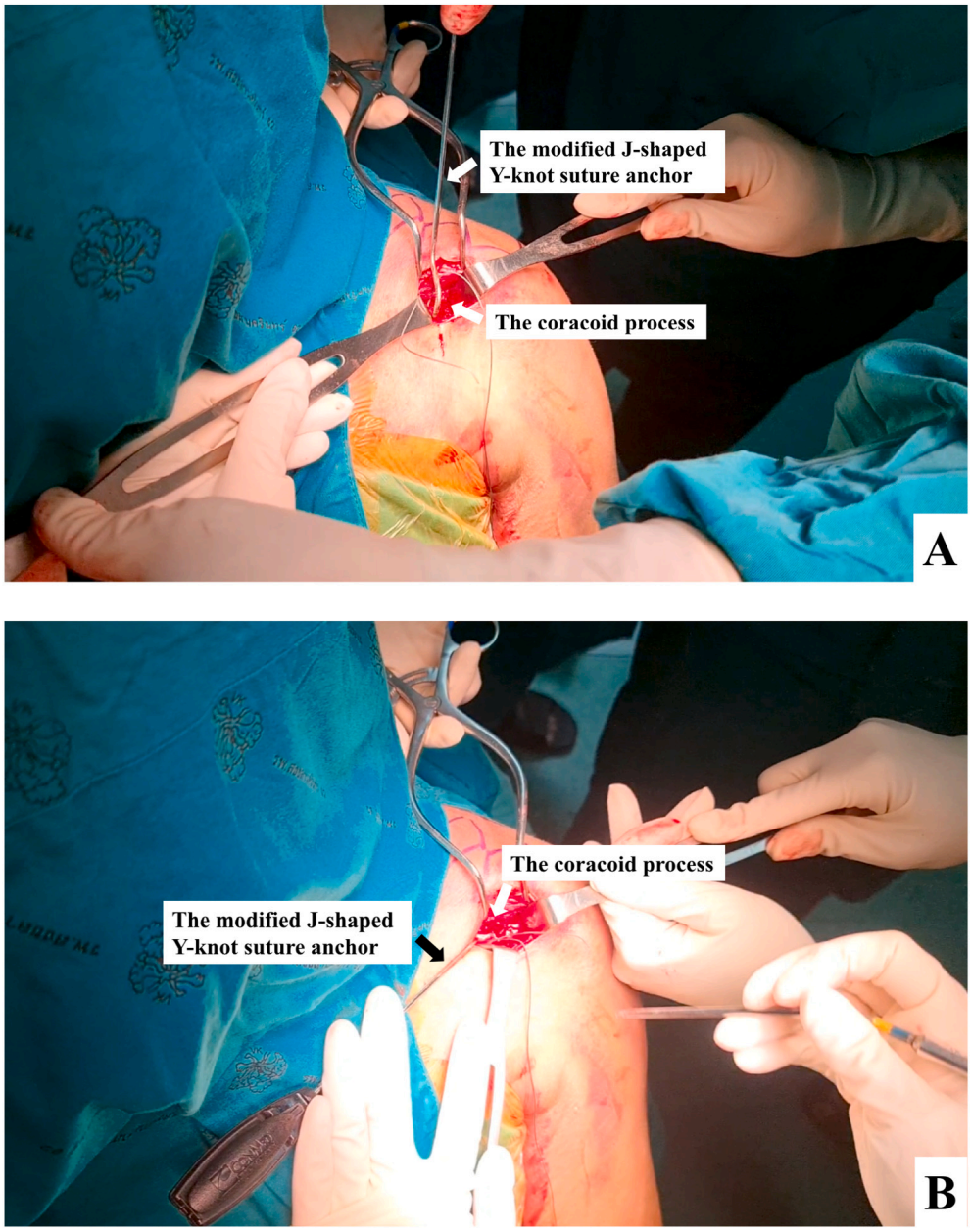

Fig. 7. The modified J-shaped Y-knot all-suture anchor with a No.2 Ethibond suture is used to pass the suture under the coracoid process from (A) the medial to (B) the lateral sides of the coracoid process.

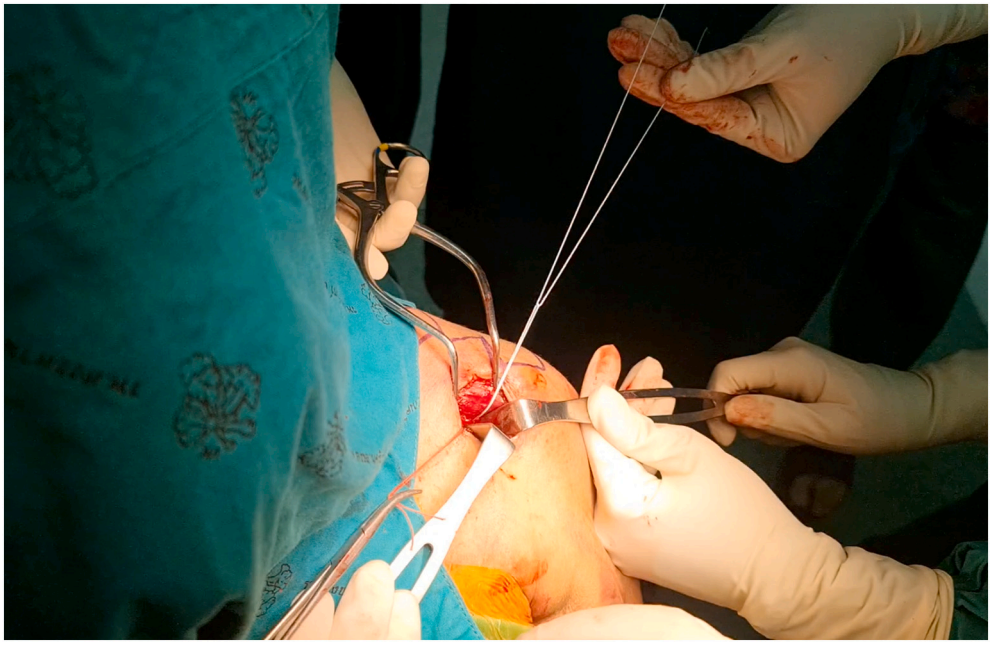

Fig. 8. The No.2 Ethibond is replaced with a shuttle loop.

Fig. 9. Post-operative radiograph of (A) both clavicles in anteroposterior view and (B) left shoulder in lateral view.

In the surgical technique, after the coracoid process is identified, the soft tissue at the medial and lateral borders of the coracoid process are cleared using electrocautery. The modified J-shaped Y-knot all-suture anchor with a No.2 Ethibond suture (Ethibond, Somerville, NJ) is used to pass the suture under the coracoid process from the medial to the lateral sides to avoid the risk of iatrogenic neurovascular injury [7] (Fig. 7A, B). The No.2 Ethibond is replaced with a shuttle loop (Fig. 8). After this step, the surgeon can do the CC stabilization following a standard procedure, in which we use the double O loop technique. [8] After the surgery, the patient was sent for both clavicles radiograph in anteroposterior view and left shoulder in lateral view which are shown in Fig. 9A and B.

Post-operative protocol, a shoulder abduction brace is used for 6 weeks. The patient was allowed to start controlled passive mobilization on post-operative day 2 and active assisted exercise on post-operative week 6. The patient can achieve full range of motion of the shoulder at 3 months post-operatively.

3. Discussion

The distal clavicle fracture is one of the most common injuries around the shoulder joint. There are many surgical techniques to fix the distal clavicle fracture, most commonly CC stabilization, fracture fixation with a hook plate [9–11] or distal clavicle locking plate [12–14] or tension band wiring [15]. CC stabilization is one of the most popular options. [1,3–5] The most important step in this technique is passing the suture under the coracoid base, which is difficult as there are no standard surgical tools that match the curve of the coracoid base. There are many specialized commercial tools specially designed to easily pass the suture under the coracoid base but they are very expensive (The average cost is $1400–1500 per piece). There have been some attempts to modify a Kirschner wire (K-wire) to pass a suture under the coracoid base. [16] The K-wire is cheap and available in most operative rooms. Our original technique was based on bending the K-wire into a J-shape. In our modified technique, we create a modified J-shaped Y-knot all-suture anchor for use in CC stabilization, recycling a Y-knot all-suture anchor which are normally discarded after use.

4. Conclusion

There are commercial tools for passing a suture under the coracoid process but all of them are expensive, and thus of limited availability in developing or low-resource settings. The surgeon can use a modified J-shaped Y-knot all-suture anchor for assistance in passing a suture under the coracoid process.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Sources of funding

No funding was involved regarding this case report.

Ethical approval

The present study was approved by our university (IRB number REC 64-205-11-1).

Consent

Written informed consent was obtained from the patient for publication.

Research registration (for case reports detailing a new surgical technique or new equipment/technology)

N/A.

Guarantor

Chaiwat Chuacyhoosakoon, MD

Declaration of competing interest

No conflicts of interest.

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