

Reply to the Letter to the Editor

Advantages of Arthroscopic Transosseous Suture Repair of the Rotator Cuff without the Use of Anchors

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To the editor,

We appreciate the valuable comments of Bicanic and colleagues, which describe previously reported transosseous suture methods, limitations, costs, possible pullout of the sutures, and complexities of the suturing in the procedure we reported.

The hybrid technique of anchor and transosseous sutures reported by Cicak et al. [2], and the transosseous suture technique using a hollow needle reported by Matis et al. [5], differ from our technique. We make a long straight bone tunnel from the lower margin of the greater tuberosity

to the footprint. With our procedure, large tears where the stump of the torn rotator cuff does not emerge across the top of the humeral head under traction can be repaired by expanding decortication of the footprint to the inner side. However, there is a high retear rate.

The extra cost of prolonged operation time is generally attributable to personnel expenses. Our technique requires two surgeons, one anesthesiologist, and three nurses. In our hospital, doctors and nurses are paid ¥ 12,500/hour and ¥ 3200/hour, respectively. Therefore, the total personnel costs are ¥ 47,100/hour (¥ 12,500 × 3 + ¥ 3200 × 3). The anchor method uses an average of 2.3 anchors [3]. These cost ¥34,300 each in Japan. The total cost of the anchors is ¥ 78,890 (¥ 34,300 × 2.3 anchors). The polyester threads used in our procedure cost ¥840. Therefore, the anchors cost ¥ 78,050 more (¥ 78,890 – ¥ 840) than the polyester threads. This is equivalent to personnel expenses for 99 minutes (¥ 78,050 ÷ ¥ 47,100 × 60).

The anchor method is cheaper only if the procedure is 99 minutes shorter than our approach. The overall average operating time for our procedure is approximately 105 minutes in 384 cases [4]. In order for a procedure using anchors to be less expensive, it would have to be 99 minutes shorter than that, or about 6 minutes in length (105 minutes – 99 minutes = 6 minutes), which seems quite unrealistic.

In our procedure, knot tying is performed at the lower margin of the greater tuberosity where the bone cortex is solid. Additionally, the knots are not sliding, but static. Therefore, no rupture of sutures due to friction in the bone tunnel occurred in our cases. Breakage of (or pullout from) the bone tunnel occurred only in one osteoporotic patient (0.3%). In comparison, the frequency of anchor pullout is reportedly 2.4% [1]. Our procedure is more suitable for osteoporotic patients.

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Each author certifies that his or her institution approved the reporting of this case report that all investigations were conducted in conformity with ethical principles of research, and that informed consent for participation in the study was obtained.

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Although suture management looks complicated in our figures, the knot tying required in this procedure is easier than tying sliding knots. For any operation, some experience is required to master the technique. It is generally understood that physicians should experience at least 30 cases in order to reach a plateau in the learning curve for this procedure. Our procedure is by no means more difficult than the anchor method, and can be performed by any surgeon who is skilled in arthroscopic technique.

The K-wires, which are inserted targeting the medial edge of the footprint from the inferior margin of the greater tuberosity, appear on the skin behind the AC joint. We do not aim for a specific part of the skin. Although the K-wires penetrate the acromion on the way, this does not seem to cause any problems.

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