

Technical Note

Transarticular Approach for Elbow Arthroscopy

Sung-Jae Kim, M.D., and Jae-Hoon Jeong, M.D.

Abstract: Arthroscopy of the stiff elbow joint is a technically difficult procedure because of the decreased joint space of the elbow joint, even to experienced surgeons. Problems encountered include limited access of instrument to the intra-articular space and an increased risk of cartilage injury in the contracted elbow joint. This study describes a novel transarticular approach for elbow arthroscopy that allows the safe and effective creation of the proximal medial and lateral portals. **Key Words:** Elbow—Portal—Arthroscopy.

Arthroscopic assessment and treatment for elbow lesions offer significant advantages over an open procedure, including limited soft-tissue dissection and increased visualization of both the anterior and posterior compartments. Despite the development of arthroscopic instruments and techniques, elbow arthroscopy demands precise knowledge of anatomy because of the structural complexity of the joint and the fact that it is closely surrounded by important neurovascular structures. Moreover, in decreased joint space, the extensive scar tissue and hypertrophic synovium make the stiff elbow or degenerative elbow especially difficult to visualize. We present a novel approach for elbow arthroscopy and describe a surgical technique for treating stiff elbow that uses this portal.

TECHNIQUE

The patient may be positioned in the supine, prone, or lateral decubitus position depending on possible

conversion to open surgery and the experiences and preference of the surgeon. At this medical center, elbow arthroscopy is generally performed with the patient under general anesthesia and in the prone position. Using a pneumatic tourniquet, the involved arm is brought to the edge of the operating table, with the forearm hanging freely and the elbow flexed to 90°. The locations of the olecranon, lateral epicondyle, and radial head are marked with a marking pen.

The transarticular approach is established for initial entry of the arthroscope. The entry point for the transarticular approach is at the intersection of a horizontal line drawn from the radiocapitellar joint to the olecranon, with a sagittal line drawn just lateral to the olecranon (Fig 1). After establishment of the portal, the blunt trochar and sheath with an outer diameter of 3 mm are inserted. The radioulnocapitellar space is widened using gentle distal traction on the forearm to avoid cartilage damage while inserting the blunt trochar with sheath. Through the space, the arthroscope can be used to assess the anterior compartment.

Poehling et al.¹ described a proximal medial portal located 2 cm proximal to the medial epicondyle and just anterior to the medial intermuscular septum. The creation of the proximal medial portal is facilitated through the transarticular approach, because the proximal medial portal of the anterior capsule can be visualized. By inspecting the anterior chamber with the arthroscope through the transarticular approach, the proximal medial portal site can be identified by

From the Department of Orthopaedic Surgery, Yonsei University College of Medicine, Seoul, Korea.

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Address correspondence and reprint requests to Sung-Jae Kim, M.D., Department of Orthopaedic Surgery, Yonsei University College of Medicine, C.P.O. Box 8044, 134, Shinchon-Dong, Seodaemun-Ku, 120-752, Seoul, Korea. E-mail: os@yuonc.yonsei.ac.kr

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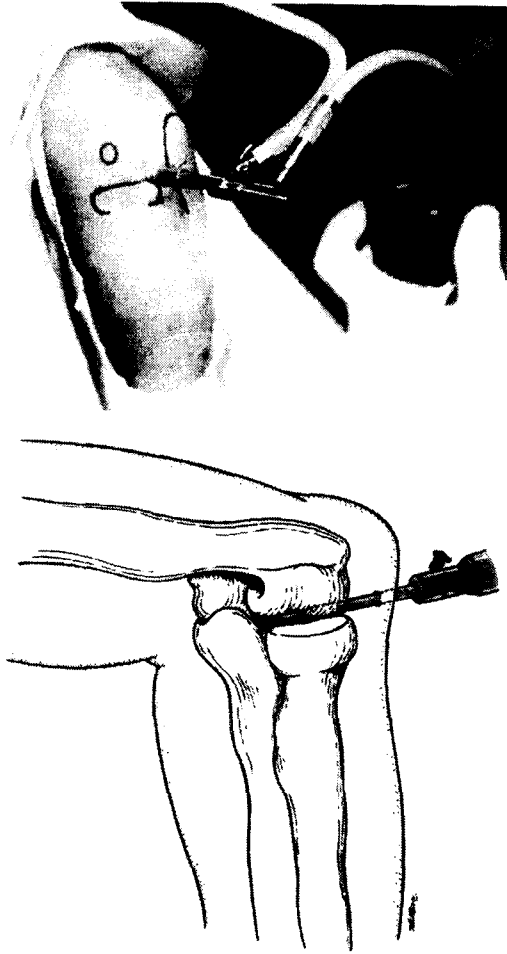


FIGURE 1. Transarticular portal is made cross section from the horizontal line of the radiocapitellar joint to the just lateral side of the olecranon.

palpation and confirmed by inserting a needle into the joint. After creation of the proximal medial portal (Fig 2), the trochar inside the sheath is removed.

Using an inside to outside technique, we pass a Wassinger rod from the proximal medial portal to the lateral joint capsule (Fig 3). The Wassinger rod causes the skin to become tented at the lateral portal site, where a small skin incision is made and the sheath is inserted on the rod. In the usual manner, the rod protrudes out of the skin. The anterior compartment can be also debrided with a full radius resector during

inspection of the anterior compartment through the proximal anterolateral portal (Fig 4). Procedures such as debridement or removal of loose bodies can then be performed by switching instruments among the 3 portals.

DISCUSSION

Since Burman^{2,3} described elbow arthroscopy based on his arthroscopic evaluation of 10 cadaveric elbows

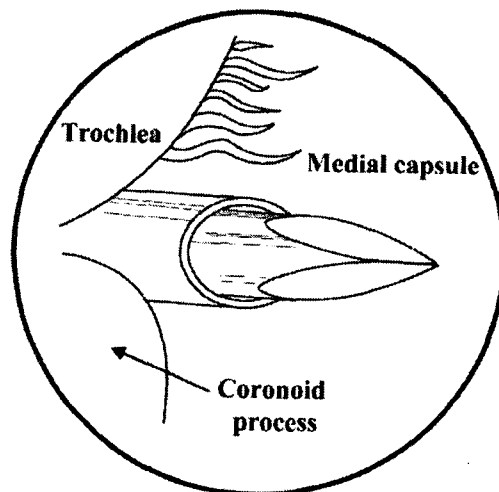


FIGURE 2. Proximal anteromedial portal can be made for viewing the anteromedial compartment through transarticular portal.



FIGURE 3. Anterolateral portal is created from the anteromedial portal using the inside-out technique with a Wassinger rod.

the arthroscope is pierced into the anterior compartment of the elbow by passing it through the radioulnocapitellar space, the joint can be visualized and the proximal medial portals can be created easily.

In the degenerative elbow, safe access is complicated by anatomic changes within the joint and the distortion of landmarks. The transarticular approach described here makes access to the anterior compartment of the elbow joint more feasible. Though the removal of loose bodies from the anterior compartment is difficult using this approach, it serves as a valuable initial viewing portal in the treatment of the

in 1932 and the experiences of Guhl⁴ in 1974 and Parisien⁵ in 1978, Andrew and Carson⁶ described the commonly used medial, lateral, and posterior portals. In 1986, Lynch et al.⁷ published their report on the neurovascular anatomy of the elbow and the risks involved in elbow arthroscopy. For example, case reports have been published describing injury to the radial nerve during arthroscopy.⁸⁻¹²

The difficulty encountered in arthroscopic insertion and visualization of the stiff elbow joint occurs secondary to the decreased joint space and extensive scarring. Galley et al.¹³ studied the intra-articular capacity of stiff and normal joints and found that the mean capacity of the stiff elbow joint was reduced to 6 mL compared with 14 mL in the normal joint. The factors that make it difficult to access the joint space during arthroscopy are capsule thickening and contractures.¹⁴ Neurovascular structures are also more vulnerable to injury during arthroscopy. Complications involving the radial nerve, ulnar nerve, median nerve, and brachial artery have been widely reported,⁸⁻¹² with a nerve injury complication rate of approximately 4%.¹²

Using the transarticular approach as described, the surgeon can assess the anterior compartment of the elbow relatively easily, with manual distraction as described by O'Driscoll and Morrey.¹⁵ Takahashi et al.¹⁶ suggested a simple, new method of distraction to enlarge the articular space, and they reported that the radiohumeral joint could be distracted up to 4.1 mm. If

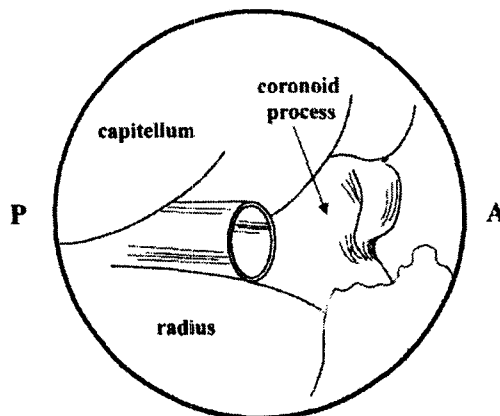
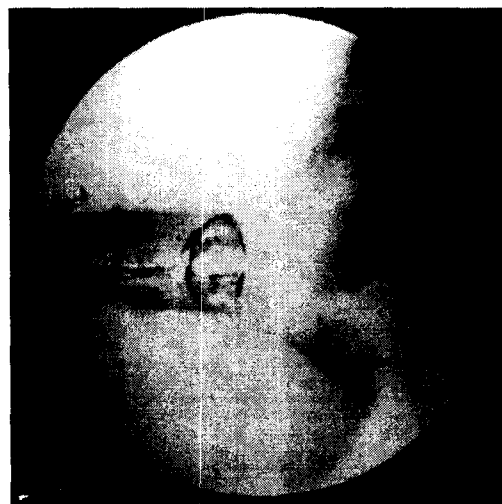


FIGURE 4. Arthroscopic view from anterolateral portal showing the arthroscopic sheath through transarticular portal.

stiff or degenerative elbow. In conclusion, the trans-articular approach may be adopted for initial arthroscopic access to the elbow joint, especially in the treatment of the stiff joint or degenerative arthritis.

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