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An extensive posterior approach of the elbow with osteotomy of the medial epicondyle

Maarten J. de Vos, MD[a,*], Marc L. Wagener, MD[b], Nico Verdonschot, PhD[c], Denise Eygendaal, MD, PhD[d]

[a]*Department of Orthopaedics, Tergooi Hospital, Hilversum, The Netherlands*
[b]*Department of Orthopaedics, Rijnstate Hospital, Arnhem, The Netherlands*
[c]*Department of Orthopaedics, Radboud University Hospital, Nijmegen, The Netherlands*
[d]*Department of Orthopaedics, Upper Limb Unit, Amphia Hospital, Breda, The Netherlands*

Background: This study describes a posterior approach to the elbow for placement of a total elbow prosthesis.
Methods: Release of the medial collateral ligament is achieved by performing an osteotomy of the medial epicondyle. This allows anatomic refixation of the origin of the medial collateral ligament. A description of the posterior approach is given. Standard radiographs were used to analyze the bone-to-bone refixation of the osteotomy of the medial epicondyle in 13 elbows.
Results: Radiographs showed proper bone healing in all elbows, with restoration of the anatomic origin of the medial collateral ligament.
Discussion: The described approach provides a good exposure of the elbow necessary for the placement of modern total elbow prostheses, without compromising the stability of the elbow. Refixation of stabilizing structures is relatively easy and results in an anatomic position of the ligaments.
Level of evidence: Anatomic Study, In Vivo.

Keywords: Elbow; approach; surgical exposure; prosthesis; osteotomy

For optimal placement of a total elbow prosthesis, adequate exposure of all bony landmarks of the distal humerus, the proximal ulna, and radius is essential. Many different approaches to the elbow have been described: medial, lateral, posterior, posterior transolecranon, and posterolateral. Optimal exposure of the elbow joint for placement of a total elbow prosthesis can be challenging. The approach should provide optimal exposure, with complete dislocation of the elbow joint, but should also respect the surrounding stabilizing structures and the extensor mechanism. For the placement of a total elbow prosthesis, the posterior approach is most commonly used.

There are 3 options for management of the extensor mechanism. In the first option, the triceps remains attached to the olecranon; in the second, the triceps is reflected together with the soft tissues; in the third, the triceps is split in the midline.[9] Release of the medial collateral ligament (MCL) and lateral collateral ligament (LCL) is mandatory to allow dislocation of the elbow joint. In all of the above-mentioned surgical approaches, the MCL and LCL are

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*Reprint requests: Maarten J. de Vos, MD, Department of Orthopaedics, Tergooi Hospital, P.O. Box 10016, 1201DA, Hilversum, The Netherlands.
E-mail address: mdevos@tergooiziekenhuizen.nl (M.J. de Vos).

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released subperiosteally or midsubstance. Refixation of these ligamentous structures in an anatomic position is essential to restore stability.

Persistent valgus instability is a well-known phenomenon, especially in unlinked total elbow prosthesis such as the Kudo and Souter-Strathclyde[1] (Biomet Merck Ltd., Bridgend, UK; Fig. 1). One possible explanation for this valgus instability can be a nonanatomic, nonisometric repair of the MCL. Identification of the MCL during surgery can be a challenge because the MCL is just 3 cm long and 5 to 6 mm wide.[6] In elbows with rheumatoid arthritis or post-traumatic deformities, the MCL complex is even more difficult to identify.

In addition, proper ligament-to-bone refixation, after sharp release of the MCL, can be difficult in relation to stability and in relation to isometry. A nonanatomic refixation results in a nonisometric position of the MCL, which theoretically results in instability. We have modified the sharp release of MCL to an osteotomy of the epicondyle to overcome these problems.

In the modified approach, we perform an osteotomy of the medial epicondyle instead of a sharp release of the MCL from the medial epicondyle. The osteotomy of the medial epicondyle to provide access to the elbow joint was first described by Campbell[2] in 1932. Campbell had discovered a new approach to the elbow joint "by mere accident." During operative refixation of a fracture of the medial epicondyle, he noticed that the radius and ulna could be easily dislocated. The modification to the traditionally described technique was also made because we believe that bone-to-bone refixation after an osteotomy heals better than a ligament-to-bone refixation after sharp release of the MCL. To our knowledge, no biomechanical or histologic study has been published to support this, although other studies suggest the same.[4]

The aim of this study is to describe a new surgical technique of the posterior approach to the elbow joint using an osteotomy of the medial epicondyle.

Materials and methods

Surgical technique

The patient is placed in the lateral decubitus position with the arm supported as shown in Figure 2. The elbow should be able to move freely. A straight posterior incision is made longitudinally from approximately 8 cm proximal to the tip of the olecranon and 8 cm distal to the tip, along the ulna. The ulnar nerve is identified on the medial side of the elbow and mobilized.

Management of the triceps is achieved using a triceps-tongue technique, as described by Wadsworth[11] and van Gorder.[7] The triceps tongue is approximately 6 cm long and approximately 1.5 to 2.0 cm wide, depending on the size of the elbow. The lateral part of the triceps tendon is kept intact, including the insertion on the intermuscular septum. The approach is extended laterally along the ulna as in the lateral J approach.[5,8] The incision is extended approximately 4 cm along the lateral aspect of the olecranon (Fig. 3). The anconeus muscle is reflected from the ulna just enough to obtain a good view of the capitellum. Access to the radiohumeral joint is provided through an osteotomy of the supinator tuberosity.[10] A step-cut incision is made on the medial side to allow easy and proper closure of the thicker, medial part of the triceps (Fig. 3).

Figure 1 Valgus instability of the Kudo total elbow prosthesis (Biomet Merck Ltd., Bridgend, UK).

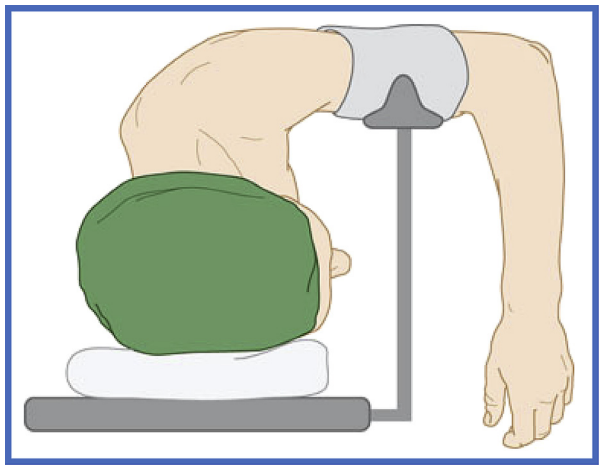

Figure 2 The patient is placed in the lateral decubitus position.