Anatomical Cadaver Study of the Hotchkiss Over-the-Top Approach for Exposing the Anteromedial Facet of the Ulnar Coronoid Process: Critical Measurements and Implications for Protecting the Median Nerve

Koji Sukegawa, MD, PhD,* Takane Suzuki, MD, PhD,† Yasufumi Ogawa, MD, PhD,* Tomoko Kobayashi, MD, PhD,* Yusuke Matsuura, MD, PhD,* Kazuki Kuniyoshi, MD, PhD*

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Editors

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Authors

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Learning Objectives

Upon completion of this CME activity, the learner should achieve an understanding of:

- The role of the anteromedial facet of the coronoid in stability and congruity of the ulnohumeral joint
- The advantages and disadvantages of the medial over-the-top approach to the elbow joint
- The course of the median nerve in relation to the anteromedial facet and elbow joint

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*From the *Department of Orthopedic Surgery; and the †Department of Bioenvironmental Medicine, Graduate School of Medicine, Chiba University, Chiba, Japan.*

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Corresponding author: Koji Sukegawa, MD, PhD, Department of Orthopedic Surgery, Graduate School of Medicine, Chiba University, 1-8-1 Inohana, Chuo-ku, Chiba 260-8677, Japan; e-mail: helpandriver502@gmail.com.

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Purpose To measure distances from anatomical landmarks to the median nerve, and estimate the length of the flexor-pronator/flexor carpi ulnaris (FCU) detachment necessary to expose the anteromedial facet of the ulnar coronoid process (UCP) using the Hotchkiss over-the-top approach.

Methods Dissections were made of 20 fresh-frozen cadaveric upper limbs. Measurements were made of the shortest distance from the medial epicondyle to the median nerve, the distance from the medial epicondyle to the median nerve in line with the flexor-pronator/FCU interval, the shortest distance from the apex of the UCP to the median nerve, and the length of the flexor-pronator/FCU detachment necessary to expose the anteromedial facet of the UCP. Measurements were also made of the length of the ulnar insertion of the brachialis muscle and the shortest distances from the proximal and distal insertions of the brachialis muscle to the median nerve.

Results The distances and lengths were as follows: medial epicondyle to median nerve, 31 ± 3 mm; in line with the flexor-pronator/FCU interval, 43 ± 5 mm; from the apex of the UCP to the median nerve, 7 ± 2 mm; the detachment necessary to expose the UCP, 47 ± 6 mm; the ulnar insertion of the brachialis muscle, 27 ± 4 mm; and the proximal and distal insertions of the brachialis muscle to the median nerve, 14 ± 2 mm and 5 ± 1 mm, respectively.

Conclusions The length of the flexor-pronator/FCU detachment necessary to expose the anteromedial facet of the UCP was similar to the distance from the medial epicondyle to the median nerve in line with the flexor-pronator/FCU interval. The distance from the distal insertion of the brachialis muscle to the median nerve was 5 mm.

Clinical relevance The results of our study provide information on important points for surgeons to consider when performing distal exposure using the Hotchkiss over-the-top approach. *(J Hand Surg Am. 2016;41(8):819–823. Copyright © 2016 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Anteromedial facet fracture, cadaver study, Hotchkiss over-the-top approach, median nerve, ulnar coronoid process.

IT HAS BEEN RECENTLY RECOGNIZED THAT the anteromedial facet fracture of the ulnar coronoid process (UCP) is a distinct type of coronoid fracture resulting from a varus, posteromedial rotational force. Left untreated, these fractures result in an incongruent articulation of the ulnohumeral joint under gravitational varus stress and a predisposition toward rapid posttraumatic arthritis.[1,2] Although the best surgical approach depends on the presence of concomitant ligamentous and bony injury,[3,4] a medial approach to the anteromedial facet of the UCP is usually required for reducing and repairing these fractures.[5] The majority of anteromedial facet fractures are relatively large, shearing-type fragments that are well suited to buttress plating. Adequate plate positioning is important and largely dependent on adequate exposure of the fracture site.

One medial approach for reaching the anteromedial facet of the UCP is the over-the-top approach by Hotchkiss and Kasparyan (Hotchkiss over-the-top approach),[6] which provides a favorable field of view of the anteromedial elbow joint through the internervous plane between the flexor-pronator mass (median nerve) and the flexor carpi ulnaris (FCU) (ulnar nerve). This approach is well suited to, and often used during, a medial approach for a stiff elbow and excision of heterotopic ossification, but it is also very useful for treating anteromedial facet fractures of the UCP. However, although the Hotchkiss over-the-top approach is useful for exposure of the elbow joint proximally, because the median nerve is directly below the ulnar head of the pronator teres in the distal portion, exposure of the elbow joint distally may be limited.[7] It has been emphasized that, when the Hotchkiss over-the-top approach is extended in the distal direction, precise anatomical knowledge of the ulnar head of the pronator teres and the course of the median nerve are required.[7] Whether or not the course of the median nerve interferes with the Hotchkiss over-the-top approach is unclear because the length of the muscle requiring detachment for the purpose of gaining adequate exposure may be unknown.

The aims of the present study were to measure the distances from anatomical landmarks, the medial epicondyle of the humerus and the ulnar insertion of the brachialis muscle, to the median nerve, and estimate