

An anatomical study of medial epicondyle in relation with nerves

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Abstract

Background: Cubital tunnel syndrome, or ulnar nerve compression at the elbow, is the second most common compression neuropathy after carpal tunnel syndrome. **Aims and Objectives:** To study anatomy of the medial epicondyle in relation with nerves. **Methodology:** This was a cadaveric study in the 36 cadaveric hand dissected in the department of anatomy of V D Government Medical College, Latur during the two year duration i.e. January 2019 to January 2021, in the 2 years duration all the cadavers are dissected carefully and the observations were noted in the excel sheet. Data was entered in the Microsoft excel for windows 10 software and calculated Mean and Standard deviation. **Result:** In our study, Arm length (cm) was 28.12 ± 2.34 ; Length of Arcade of Struthers (AS) (cm) was 4.12 ± 1.65 Distance between AS and Medial epicondyle was 8.62 ± 0.98 . Average branching pattern of nerve related to medial epicondyle i.e. for Median nerve branching (Mean \pm SD) - 3.1 ± 0.94 ; Radial nerve branching (Mean \pm SD) - 2.28 ± 1.02 ; Ulnar nerve branching (Mean \pm SD) - 2.91 ± 0.59 respectively. **Conclusion:** An anatomical study of medial epicondyle in relation with nerves not only important for the prevention of pathologies of elbow but also helpful in the treatment of the fractures of lower end of humerus and medial epicondyle.

Key word: Medial epicondyle, Arcade of Struthers, ulnar nerve compression.

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INTRODUCTION

Cubital tunnel syndrome, or ulnar nerve compression at the elbow, is the second most common compression neuropathy after carpal tunnel syndrome¹. Whatever causes the cubital tunnel to shorten or the pressure on the ulnar nerve to rise, the blood supply to the ulnar nerve can be reduced directly or indirectly, resulting in peripheral nerve entrapment syndrome. Patients with cubital tunnel syndrome frequently experience secondary symptoms such as ulnar nerve paresthesia and weakening or atrophy

of the hand's intrinsic musculature^{2,3}. Cubital tunnel syndrome is difficult to diagnose because there is no gold standard. When conservative treatments for cubital tunnel syndrome have failed, surgical therapy is recommended.⁴ In situ decompression, subcutaneous transposition, intramuscular transposition, medial epicondylectomy, and anterior transposition are all common surgical procedures.³ Decompression and anterior transposition of the ulnar nerve are the most often used surgical methods among these treatments.⁵ When conducting anterior transposition of the vascularized ulnar nerve, however, protecting the ulnar nerve's blood supply and limiting the appropriate distance that the ulnar nerve is transposed anteriorly are crucial⁷. Many published research in the literature are now divided on how to best protect the ulnar nerve's blood supply and how far the nerve should be anteriorly transferred. The goal of this study was to monitor and measure the ulnar nerve and its blood vessels at the elbow, as well as to simulate anterior transposition of the vascularized ulnar nerve, in order to establish the most optimal distance that the ulnar nerve should be transposed.

METHODOLOGY

This was a cadaveric study in the 36 cadaveric hand dissected in the department of anatomy of V D Government Medical College, Latur during the two year duration i.e. January 2019 to January 2021, in the 2 years duration all the cadavers dissected carefully and the observations were noted in the excel sheet. All the observations were measured by vernier caliper. In our study we have focused on the anatomical study of medial epicondyle and its associated important anatomical structures like Arm length (cm) Length of Arcade of Struthers, Distance between AS and Medial epicondyle, branching pattern of nerve related to medial epicondyle, Median nerve branching, Radial nerve branching, Ulnar nerve branching. Data was entered in the Microsoft excel for windows 10 software and calculated Mean and Standard deviation.



Figure 1: Median nerve dissected near medial epicondyle



Figure 2: Ulnar nerve dissected near medial epicondyle

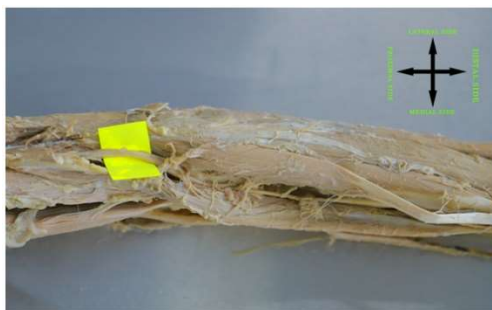


Figure 3: Radial nerve dissected near medial epicondyle

Table 1: Distribution of the parameters related to medial epicondyle (n=36)

Parameter	Mean \pm SD
Arm length (cm)	28.12 \pm 2.34
Length of Arcade of Struthers (AS) (cm)	4.12 \pm 1.65
Distance between AS and Medial epicondyle	8.62 \pm 0.98

Arm length (cm) was: 28.12 \pm 2.34; Length of Arcade of Struthers (AS) (cm) was: 4.12 \pm 1.65; Distance between AS and Medial epicondyle was: 8.62 \pm 0.98.

Table 2: Distribution of branching pattern of nerve related to medial epicondyle (n=36)

Median nerve branching (Mean \pm SD)	Radial nerve branching (Mean \pm SD)	Ulnar nerve branching (Mean \pm SD)
3.1 \pm 0.94	2.28 \pm 1.02	2.91 \pm 0.59

Average branching pattern of nerve related to medial epicondyle i.e. for Median nerve branching (Mean \pm SD) - 3.1 \pm 0.94; Radial nerve branching (Mean \pm SD) - 2.28 \pm 1.02; Ulnar nerve branching (Mean \pm SD) - 2.91 \pm 0.59 respectively.

DISCUSSION

Kane was the first to characterise the "arcade of Struthers" as the thickening of the distal arm's deep investing fascia and superficial triceps muscle fibres that extend to the medial intermuscular septum in 1973. The roof was characterised as the thickening deep fascia of the distal region of the arm, which extended to the medial intermuscular septum and was related to the internal brachial ligament. The medial intermuscular septum formed the anterior wall. The deep fibres of the medial head of the triceps muscle served as the floor.¹⁰ However, the prevalence of this structure has been shown to range from 1% to 100% in numerous studies.^{9,10,11} A secondary compression of the ulnar nerve after anterior transposition surgeries has been described in various investigations, causing ulnar nerve compression symptoms in patients.¹²⁻¹³ The medial intermuscular septum and the arcade of Struthers were two common compression sites.^{8,12-13} In our study we have seen Arm length (cm) was 28.12 \pm 2.34; Length of Arcade of Struthers (AS) (cm) was 4.12 \pm 1.65 Distance between AS and Medial epicondyle was 8.62 \pm 0.98. Average branching pattern of nerve related to medial epicondyle i.e. for Median nerve branching (Mean \pm SD) - 3.1 \pm 0.94; Radial nerve branching (Mean \pm SD) - 2.28 \pm 1.02; Ulnar nerve branching (Mean \pm SD) - 2.91 \pm 0.59 respectively which was similar to Piyapong Tiyaworanan¹⁴ *et al.* they found The distance between the greater tuberosity and the lateral epicondyle was designated as the arm length. The arcades of Struthers were identified in 85.4%. The mean arm length was 27.85 \pm 1.3 cm. The mean of the distance between proximal border of the arcade of Struthers and the medial humeral epicondyle was 8.24 \pm 2.06 cm.

CONCLUSION

An anatomical study of medial epicondyle in relation with nerves not only important for the prevention of pathologies of elbow but also helpful in the treatment of the fractures of lower end of humerus and medial epicondyle.

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