



MORPHOMETRIC AND MORPHOLOGICAL STUDY OF DRIED HUMAN CAPITATE BONE IN TELANGANA REGION AND ITS SURGICAL IMPLICATIONS

Anatomy

Dr. Aparna Vedapriya K	In charge Professor and HOD, Dept of Anatomy, Osmania Medical College, Hyderabad, Telangana.
Dr. Rubina*	Post Graduate, Dept of Anatomy, Osmania Medical College, Hyderabad.*Corresponding Author
Dr. Zainab Fatima	Post Graduate, Dept of Anatomy, Osmania Medical College, Hyderabad.
Dr. Swapna	Post Graduate, Dept of Anatomy, Osmania Medical College, Hyderabad.

ABSTRACT

INTRODUCTION: Wrist injuries are common in any sport because of the complexity of the joint. Among all Carpal bone capitate is more prone for injuries because of its structure. The capitate is the largest carpal bone found within the hand. The capitate is found within the distal row of carpal bones. The capitate lies directly adjacent to the metacarpal of the ring finger on its distal surface, has the hamate on its ulnar surface and trapezoid on its radial surface, and attaches to the lunate and scaphoid proximally. The present morphometric study on capitate bone has anatomical and clinical importance. **AIM AND OBJECTIVE:** To assess the gross morphological features with special emphasis on the dimensions and Nutrient foramens of capitate bone. **MATERIALS AND METHODS:** This study was done on 100 capitate bones (50 left side and 50 right side) in Department of Anatomy of Osmania medical college and other medical colleges of Telangana region. The capitate bone with visible trauma, pathology and fractures were excluded from study. During this study the parameters of capitate which were measured are the circumference of head, width and length of facet of medial surface were measured, vascular foramens on medial, lateral, dorsal and palmar surfaces were observed results were analysed and compared to previous studies. **RESULTS:** The mean circumference of head of right side is 37.3 and of left side is 42.6, the mean width of facet on medial surface on right side is 6.53 and on left side is 6.92, the mean length of facet on medial surface on right side is 17.12 and on left side is 17.14. The mean vascular foramen on medial surface is 5, lateral surface is 2, palmar surface is 2 and on dorsal surface is 3. **CONCLUSION:** Subluxation of capitate bone is more common among wrist injuries in Athletes, due to its anatomical structure, position and its articulation with other carpal bone. The present morphological and morphometric study will be helpful for orthopaedic surgeons in reduction of the bone in original position.

KEYWORDS

Carpal Bone, Capitate, Nutrient Foramen And Palmar Surface And Dorsal Surface

INTRODUCTION:

Wrist injuries are common in any sport because of the complexity of the joint. Among all Carpal bone capitate is more prone for injuries because of its structure. The capitate is the largest carpal bone found within the hand. The capitate is found within the distal row of carpal bones. The capitate lies directly adjacent to the metacarpal of the ring finger on its distal surface, has the hamate on its ulnar surface and trapezoid on its radial surface, and attaches to the lunate and scaphoid proximally. It has five surfaces, the superior surface is round, smooth and articulates with the lunate bone. The inferior surface is divided by two ridges into three facets, is divided by two ridges into three facets, for articulation with the second, third, and fourth metacarpals, that for the third being the largest.

The dorsal surface is broad and rough.

The palmar surface is narrow, rounded, and rough, for the attachment of ligaments and a part of the adductor pollicis longus.

The lateral surface articulates by a small facet at its anterior inferior angle, behind which is a rough depression for the attachment of an interosseous ligament. Above this is a deep, rough groove, forming part of the neck, and serving for the attachment of ligaments; it is bounded superiorly by a smooth, convex surface, for articulation with the scaphoid bone.

The medial surface articulates with the hamate bone by a smooth, concave, oblong facet, which occupies its posterior and superior parts; it is rough in front, for the attachment of an interosseous ligament.

MATERIALS AND METHODS:

This study was done on 100 capitate bones (50 left side and 50 right side) in Department of Anatomy of Osmania medical college and other medical colleges of Telangana region. The capitate bone with visible trauma, pathology and fractures were excluded from study. During this study the parameters of capitate which were measured were circumference of head, width and length of facet of medial surface, nutrient foramen on lateral, medial, dorsal and palmar surfaces.

DISCUSSION:

Circumference of capitate head:

It was measured by winding a thread around the head of the capitate bone. A point was marked on the thread using the permanent marker, this thread was then placed on plain paper and circumference was measured using a digital vernier calliper.



Fig-1

Fig-2

Measurement Of Length And Width Of Facet On Medial Surface (fig-1) and Circumference Of Head Of Capitate (fig-2)



Fig-3

Nutrient Foramens On Lateral, Dorsal, Palmar And Medial Surfaces In Fig-3

RESULTS:

The mean circumference of head of right side is 37.3 and of left side is 42.6, the mean width of facet on medial surface on right side is 6.53 and on left side is 6.92, the mean length of facet on medial surface on right side 17.12 and on left side 17.14. The mean vascular foramen on medial surface is 5, lateral surface is 2, palmar surface is 2 and on dorsal surface is 3.

CONCLUSION:

In human anatomy, the main role of the wrist is to facilitate the effective positioning of the hand. Subluxation of capitate bone is more common among wrist injuries in Athletes, due to its anatomical structure, position and its articulation with other carpal bone. The present morphological and morphometric study will be helpful for orthopaedic surgeons in reducing the subluxated bone in original position.

REFERENCES:

1. Arsic S, Vitkovic N, Manic M, Stojanovic M. Morphological Properties of the Hand Bones Important for their 3D Geometrical Modelling. ICT Forum 2014;130.
2. Prabhu L, Murlimanju B, Jiji P, Pai M. Vascular Foramina of the Capitate Bone of the Hand – an Anatomical Study World Academy of Science, Engineering and Technology International Journal of Medical and Health Sciences 2015;2:8
3. De Lange A, Kauer JM, and Huijskes R. Kinematic Behavior of the Human Wrist Joint: A Roentgen-Stereophotogrammetric Analysis. J. Orthop. Res. 1985; 3(1):56–64.
4. Ruby LK, Cooney WP et al. Relative Motion of Selected Carpal Bones: A kinematic analysis of the normal wrist. J. Hand Surg. 1988;13(1):1–10.
5. Farago D and Kiss R M. Geometric and mechanical characterization of human carpal bones - A preliminary study. Periodica Polytechnica Civil Engineering. 2020;64(1):138-43.
6. Goss BC, Agee J M. Dynamics of Intracarpal Tunnel Pressure in Patients with carpal tunnel syndrome. J. Hand Surg. Am. 2010;35(2):197–206.
7. Xiu KH, Kim JH, and Li ZM. Biomechanics of the transverse carpal arch under carpal Bone loading Clin. Biomech. 2010; 25(8): 776–80.
8. Garcia-Elias M, Sanchez-Freijo JM, Salo JM, and LluchA L. Dynamic changes of the transverse carpal arch during flexion/extension of the wrist: Effects of Sectioning the Transverse Carpal Ligament. J. Hand Surg. 1992;17(6):1017–9.
9. Kuhlmann N, Tubiana R, and Lisfranc R. Contribution of Anatomy to the understanding of carpal tunnel compression syndromes and sequelae of decompression operations. Rev. Chir. Orthop. Reparatrice Appar. Mot. 1978;64(1): 59–70.
10. Flores LP, Cavalcante TF, Neto OR, and Alcantara FS. Quantitative analysis of the variation in angles of the carpal arch after open and endoscopic carpal tunnel release. Clinical Article. J. Neurosurg. 2009;111(2): 311–6.
11. Gartsman GM, Kovach JC, Crouch CC, Noble PC, and Bennett JB. Carpal arch alteration after carpal tunnel release. J. Hand Surg. 1986;11(3):372–4.
12. Ripujit Randhawa, Ravikant Sharma, JS Kullar, Gaurav Agnihotri. The Distal Row Carpal Bones - A Morphometric Treatise.