

## GROSS ANATOMY OF SKELETON ANTEBRACHII OF A TIGER (*PANTHERA TIGRIS*)

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### ABSTRACT

**Gross anatomical features of the skeleton of forearm of an adult tiger revealed that the ulna was longer and more massive than the radius and was the longest bone of the forelimb. The oval caput radii showed concave fovea capitis radii for humerus and a convex articular circumference for ulna. Radial tuberosity was situated ventrolateral to the caput. A transverse crest extended obliquely from the radial tuberosity ventromedially along the caudal surface of the radius. The olecranon tuberosity of ulna was grooved and presented three prominences of which the caudal one was large and rounded. The shaft of ulna presented a rough, elevated marginter osseus along the cranial surface. The spatium interosseum was wide. The radius and ulna were not fused allowing pronation and supination movements to clutch the prey with the powerful forelimbs.**

**Key words:** Anatomy, Radius, Tiger, Ulna.

In felines, the strongly built forelimbs are heavily muscled and the manus can be supinated. These features allow them to clutch and grapple with the prey with the forelimbs. Literature on the anatomical aspects of tiger is limited. Current study has been aimed to elucidate the macroscopic features of the skeleton antebrachii of an adult tiger.

Carcass of an adult male tiger was received after postmortem from the Zoo, Thrissur. The bones were macerated and processed (Young, 1980) and prepared for the study.

Skeleton antebrachii consisted of two long bones, the radius and ulna. They were relatively longer and unlike in the case of herbivores, not fused, allowing pronation and supination (Pasquini and Spurgeon, 1989). Radius was 27 cm long and flattened cranio-caudally. Proximally, radius formed articulation with the capitulum of the humerus, crossed medially cranial to the ulna and articulated distally with the radial carpal bone. Mid-shaft circumference was 8 cm.

Proximal extremity of radius was small with an expanded caput radii and a distinct neck (Fig. 1). Caput radii was ovoid with a circumference

of 11.5 cm. It showed a concave *fovea capitis radii* (2.5 cm in diameter) for humerus. There was a convex marginal area on the caudomedial aspect of the head for articulation with the ulna which has been termed as the articular circumference in cat (Mc Clure *et al.*, 1973) and dog (Sisson, 1975 and Smith, 1999). On the ventro-lateral aspect of the head of the radius, there was a roughened, 2.5 cm long prominence, the radial tuberosity for the insertion of biceps brachii muscle, as reported in cat by Mc Clure *et al.* (1973) and Senning (1977). The area between the radial tuberosity and the head was the neck of the radius.

Flattened shaft of the radius had cranial and caudal surfaces and medial and lateral borders. The caudal surface and the lateral border were concave and the cranial surface and medial border were convex. A nutrient foramen was located on the caudal surface, approximately 3 cm distal to the radial tuberosity (Fig. 2) as reported in dog by Sisson (1975). A transverse crest (6 cm long) extended obliquely from the radial tuberosity downwards and medially along this surface (Fig. 2). Lateral border was roughened in its middle for the attachment of interosseous ligament. Cranial surface was smooth

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FIG. 1: Radius and ulna of tiger (Medial view)

- |                              |                                 |
|------------------------------|---------------------------------|
| 1. Head of radius            | 2. Shaft of radius              |
| 3. Styloid process of radius | 4. Olecranon tuberosity of ulna |
| 5. Trochlear notch           | 6. Styloid process of ulna      |
| 7. Marginterosseous          |                                 |



FIG. 2: Caudal view of radius of tiger

- |                              |                     |
|------------------------------|---------------------|
| 1. Articular facet for ulna  | 2. Transverse crest |
| 3. Medial border             | 4. Lateral border   |
| 5. Styloid process of radius | 6. Nutrient foramen |

and showed a rough prominence on its upper part near the radial tuberosity.

The distal extremity was flat and much wider than the proximal one with a circumference of 16 cm. Distally it showed an irregular articular surface medially for articulation with radial carpal bone. The lateral facet for articulation with ulna, the ulnar notch, was 1.5 cm wide for articulation with the distal extremity of ulna. The styloid process of the radius projected 1 cm distally from the medial aspect of the distal extremity (Fig. 2).

Ulna was located medio-laterally on the caudal surface of the radius. It was longer (34 cm) and more massive than the radius and was the longest bone in the forelimb as reported in the cat by Shively and Beaver (1985). Proximally ulna was extended 7.5 cm above the level of the radius and distally it projected 0.5 cm beyond the distal end of the radius.

The enlarged proximal end was the olecranon (Fig. 3) with a circumference of 12.5 cm. Olecranon tuberosity was grooved and presented three prominences of which the caudal one was large and rounded (Fig. 3) as in the case of the dog (Sisson, 1975). The semilunar notch was 5 cm wide and articulated with the trochlea of humerus as in dogs and cats (Sisson, 1975 and Shively and Beaver, 1985). The anconeal process lay immediately proximal to the trochlear notch (Fig. 3). The radial notch was a transversely elongated notch, 3.5 cm wide, placed distal to the trochlear notch for articulation with the radius. Medial and lateral projections on either side of this notch were the medial and lateral coronoid processes of the ulna (Fig. 3).

The shaft of the ulna was flattened mediolaterally and diminished in size distally. Mid-shaft circumference was 9.5 cm. It was triangular



FIG. 3: Caudolateral view of ulna of tiger

- |                                    |                                       |
|------------------------------------|---------------------------------------|
| 1. Rounded prominence of olecranon | 2. Anconeal process                   |
| 3. Semilunar notch                 | 4. Lateral coronoid processes of ulna |
| 5. Styloid process of ulna         |                                       |

towards the distal half. The cranial surface or the surface facing the radius presented a rough, elongated and elevated margointerosseous (Fig. 1) as in cat (Mc Clure *et al.*, 1973). The caudal margin was almost straight, thick and smooth and became the lateral margin towards the distal end. A nutrient foramen was located in the proximal third of the medial border, towards the cranial surface. The caudo-lateral surface was smooth and slightly concave in the middle. Caudomedial surface was narrow and rough. The spatium interosseum antebrachii measured 1 cm wide in the middle of

the shaft, 1.7 cm below the middle and 1.3 cm distally.

The circumference of the distal extremity of the ulna was 8 cm. It presented a thick downward projection (2 cm long) from the lateral margin, the styloid process of the ulna (Fig. 3) as in other domestic animals (Dyce *et al.*, 1996) and vertebrates (Saxena and Saxena, 2008). It articulated with the ulnar carpal bone. The distal extremity also presented a convex facet on the dorsomedial aspect for meeting the radius.

### REFERENCES

- Dyce, K.M., Sack, W.O. and Wensing, C.J.G. (1996). Textbook of Veterinary Anatomy. 2<sup>nd</sup> ed. W.B. Saunders Company, Philadelphia, p. 856.
- Mc Clure, R. C., Dellmann, M. J. and Garret, P. G. (1973). Cat Anatomy, an Atlas, Text and Dissection Guide. Lea and Febiger, Philadelphia. p. 125.
- Pasquini, C and Spurgeon, T. (1989). Anatomy of Domestic Animals – Systemic and Regional Approach. 4<sup>th</sup> Ed. Sudz Publishing, La Porte. p: 580.
- Saxena, R. K. and Saxena, S. (2008). Comparative Anatomy of Vertebrates. 1<sup>st</sup> ed. Viva Books, New Delhi. p: 172.
- Senning, W. C. (1977). Laboratory studies in Comparative Anatomy. Mc Graw Hill Book Company, Inc., New York. p. 66.
- Shively, M. J. and Beaver, B. G. (1985). Dissection of the Dog and Cat. 1<sup>st</sup> Ed. Iowa State University Press, Ames. pp. 137.
- Sisson, S. (1975). Carnivore Osteology. Sisson and Grossman's The Anatomy of the Domestic Animals. 5<sup>th</sup> ed. (ed. Getty, R.). W.B. Saunders Company, Philadelphia, pp:1437-1441.
- Smith, J.B. (1999). Canine Anatomy. Lippincott Williams and Wilkins, Philadelphia. pp. 280.
- Young, J. H. (1980). Preparation of a skeletal specimen. *Equine Pract.* **2**: 29-32.