

A STUDY ON THE COMPARATIVE ANATOMY OF PECTORAL BONES IN PIGEON (*COLUMBA LIVIA*) AND CONURE (*PYRRHURA MOLINAE*)

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ABSTRACT

The present study was aimed to study the comparative anatomy of Pectoral bones in pigeon and conure bird. In both the birds Pectoral bones were composed of Humerus, Radius and ulna, carpals, Carpometacarpus and Digits. Humerus of conure on its medial tuberosity well marked facet was noticed. Bones of forearm in both pigeon and conure were composed of thicker ulna and slender Radius. Carpometacarpus was composed of three bony elements. Digits of both the birds were three in number. Pigeons have strong well developed Pectoral bones and are strongest flyer when compared to that of conure. The anatomical feature of Pectoral bones in pigeon was similar to that of conure but had few variations.

Key words: Pectoral bone, Pigeon, Conure and comparison

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INTRODUCTION

Nearly all species of modern birds are capable of flight, therefore mechanical competency of appendages and the rigidity of their skeletal system should be optimized. Birds have developed extremely lightweight

skeletal system that help aid in the generation of lift and thrust forces as well as helping them maintain flight over, in many cases, extended periods of time (Nickle *et al.*, 1977). Anatomical structure of bird shows many unique adaptations and these anatomical features classify the birds into different family. Pigeon belongs to Columbidae family whereas Conure belongs to Psittacinae family. Pigeons are flying birds; they are known both as domesticated and wild forms (McLelland 1990). The pigeons are seen both in tropical and temperate zones whereas Conures are

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found in Western Hemisphere and Conures are the large parakeets or small parrots and they live in flocks of more number of birds. About 10 species of pigeon and 40 conure species were found in India. The pigeons fly in flocks and roost together.

MATERIALS AND METHODS

Pectoral limbs were collected from both the Pigeon and Conure carcasses, which were brought to the department of Veterinary Pathology, Madras Veterinary College, Chennai for postmortem examination. Pectoral limbs from both the bird carcass were collected after revealing that there were no pathological conditions in Pectoral limbs. Collected Pectoral limbs were kept in fresh water for natural maceration by the anaerobic microorganisms (Raghavan, 1964). Later the bones were collected after maceration, washed in fresh water and air dried than used for the study of gross anatomy.

RESULTS AND DISCUSSION

HUMERUS

Proximal extremity had oval shaped head in both the birds (Fig 1) as it was described in other domestic birds (Nickel *et al.*, 1977) head of Humerus was large and rounded in yellow billed blabber (Supriya *et al.*, 2019). Dorsolateral to the head had a lateral tuberosity and ventromedially had well-developed medial tuberosity separated from head by a deep groove (Fig 1) as reported in other domestic birds (Nickel *et al.*, 1977). Crest of Humerus was thin sharp and projects laterally in pigeon and conure as it was reported

in small Indian Kite (Sharma and Dubal, 2016) and in Common Hawk cuckoo (Supriya *et al.*, 2019) crest of humerus was thick, blunt and tuberos in Emu (Rajalakshmi *et al.*, 2020). Pneumatic fossa of pigeon was deeply seated whereas in conure the pneumatic fossa was shallow (Fig 1). The Pneumatic foramen was noticed on distal part of medial tuberosity in both the birds as in domestic birds (Nickel *et al.*, 1977) whereas the pneumatic foramen was located distal to the lateral tuberosity in Emu (Rajalakshmi *et al.*, 2020). On the distal part of the shaft at the posterior face a small tubercle was noticed in pigeon (Fig 1) and not in Conure. At the distal extremity above the trochlea a shallow depression, olecranon fossa was well marked on the ventromedial aspect in pigeon where as in Conure the olecranon fossa was not prominent (Fig 1). Distal extremity in both the birds had a larger medial and smaller lateral condyle as in other domestic birds as in other domestic birds (Nickel *et al.*, 1977).

RADIUS AND ULNA

Bones of forearm in both Pigeon and Conure was composed of thicker Ulna and thinner Radius as in other domestic birds (Nickel *et al.*, 1977). Two bones of forearm were separated by a wide interosseous space in Pigeon than in Conure where it has a narrow interosseous space (Fig 2). In both the birds Radius and Ulna was the largest wing bone as in common hawk cuckoo (Supriya *et al.*, 2019) where as in domestic birds (Nickel *et al.*, 1977) and in yellow billed blabber (Supriya *et al.*, 2019). Radius and Ulna were shorter than Humerus. Ulna of pigeon on its lateral border has processes for the attachment of

flight feathers where as in conure no processes were observed (Fig 2). Proximal extremity of Radius presents a concave articular area and the distal extremity was compressed from side to side in both the birds (Fig 2).

CARPALS

Carpals were arranged in two rows as proximal and distal row in both the birds as in all many birds species (Shabir *et al.*, 2013) as in domestic Geese. Proximal row carpals, the radial and ulnar were the separable carpals in both Pigeon and Conure (Nickle *et al.*, 1977) whereas the distal row carpals were fused with metacarpal bones to form carpometacarpus.

CARPOMETACARPUS

Carpometacarpus in both the birds were composed of three bony elements. First metacarpal bone was on the medial aspect and it was in the form of a small nodule and the second metacarpal bone was the largest of the three and the third metacarpal bone was a thin bony element as it was reported in all other domestic birds (Nickel *et al.*, 1977) between the second and third metacarpal bone was the intermetacarpal space which was wider in pigeon and narrow in conure (Fig 3)

DIGITS

Digits of both the birds were three (Shabir *et al.*, 2013). First digit was smaller and was on the medial aspect, the first digit and the third digit had only one phalanx where as the second digit had two phalanges in both the birds (Fig 4) in case of fowl, duck and goose first digit had two phalanx (Nickel *et al.*, 1977).

REFERENCES

- McLelland, J. (1990). A color of atlas of avian anatomy” Wolfe Publishing Ltd.
- Nickel, R., Schummer, A. and Seiferle, E. (1977). Anatomy of the Domestic Birds, chapter (skeleton of the head), Verlag Paul Parey, Berlin and Hamburg, 20 - 25.
- Raghavan, D. (1964). Anatomy of Ox. Indian Council of Agricultural Research, New Delhi.
- Rajalakshmi, K., Sridevi, P. and Siva Kumar, M. (2020). Gross anatomical studies on the pectoral girdle and wings of Emu (*Dromaius novaehollandiae*). *The Pharma Innovation Journal*, **9**(1): 216 - 219.
- Shabir, M., Hamadani, H., Khan, M., Baba, M.A. and Khan, A.A. (2013). Gross Morphometry of pectoral girdle of domestic geese (*Anser anser domesticus*). *Indian Journal of Poultry Science*, **48**(2): 273-275;
- Sharma, A. and Dubal, S.C. (2016). Gross Anatomical Study of Pectoral limb of Small Indian Kite (*Milvus migrans govinda*). *Indian Journal of Veterinary Anatomy*, **28**(2): 57- 60.
- Supriya, B., Manjunatha, K. and Jamuna, K.V. (2019). Comparative Morphological Study of Pectoral Limb Bones of Common Hawk Cukoo (*Hierococcyx varius*) and Yellow Billed Babbler (*Argya affinis*). *International Journal of Current Microbiology Applied Sciences*, **8**(12): 1780 - 1784.

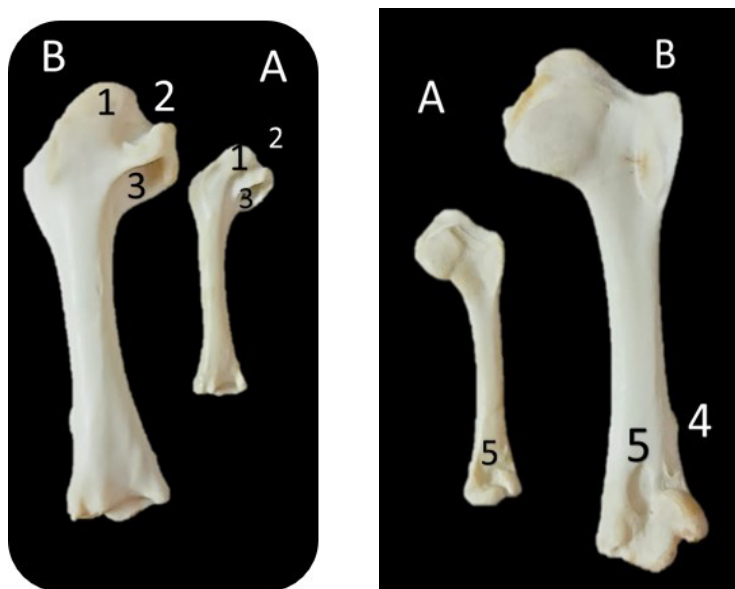


Fig. 1. Humerus lateral aspect and medial aspect A- Conure, B- Pigeon
1-Head, 2- deep groove, 3- pneumatic fossa, 4- small tubercle and 5- Olecranon fossa

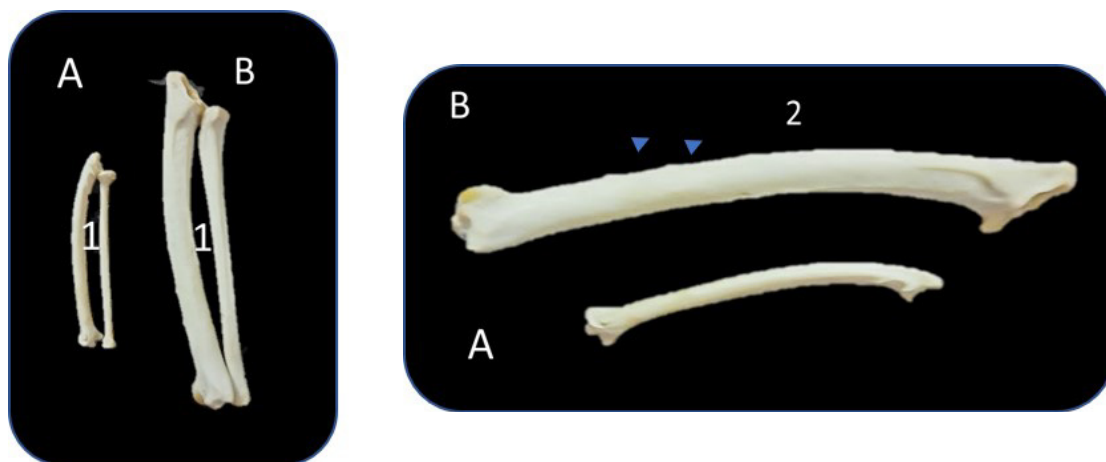


Fig. 2. Radius and ulna A- Conure, B- Pigeon
Interosseous space, 2- Processes for flight feathers



Fig. 3. Carpometacarpus, A- Conure, B- Pigeon
1-Intermetacarpal space



Fig. 4. Pectoral limb, A- Conure, B- Pigeon
1-First digit, 2- Second digit and 3- Third digit