

Morphological and Biometrical Features of the Maxilla in Mongrel Dogs (*Canis Lupus Familiaris*)

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ABSTRACT

This study examines the morphology and biometry of the maxilla bone in Mongrel dogs based on analyses of 14 specimens. The maxilla, the largest facial bone, is paired and located laterally, forming parts of the nasal cavity, hard palate, and orbital region. It features an irregularly triangular body with concave rostral and convex caudal facial surfaces, a frontal process fitting between nasal and frontal bones, a short zygomatic process, and a palatine process contributing 64.6±0.67% to the hard palate alongside the premaxilla. The alveolar process holds the canine teeth, four premolars, and two molars. An infraorbital foramen is located 1 cm above the third cheek tooth. The Present findings align, provides a baseline for comparative studies and clinical applications in dental and maxillofacial procedures.

Keywords: Maxilla Bone, Mongrel Dog, Facial Anatomy, Biometry

INTRODUCTION

The maxilla bone is a key component of the canine facial skeleton, forming the upper jaw and supporting the cheek teeth while contributing to the nasal and oral cavities (Evans & Miller, 2013; Sisson, 1953). In Mongrel dogs, as non-descript breeds, it serves as a model for understanding variations in domestic canines. This paper details its morphology and biometry and aims to provide insights for veterinary diagnostics and surgical planning (Getty, 1975).

MATERIALS AND METHODS

The present study was conducted on maxilla of 7 adult Mongrel Dogs (*Canis lupus familiaris*) of either sex. Heads of mongrel dogs were procured from the clinics of veterinary college DUVASU Mathura. Each head was macerated, cleaned, and prepared for the study and One skull was disarticulated for individual bone study.

All the measurements were recorded with the help of metric scale, Vernier calliper and thread. The data were collected on each skull separately and then tabulated. Statistical analysis of data was carried out as per standard procedures (Snedecor and Cochran,

1994).

This morphometrical study was designed to provide information on some clinically important parameters of the maxillary bone of the Mongrel Dog.

RESULTS

The maxilla was the largest paired bone of the face, paired, situated on the lateral aspect, and carrying the upper cheek teeth (Fig. 1.1). It formed part of the roof of the mouth cavity and the floor and lateral wall of the nasal cavity.

It articulated with the incisive bone rostrally, palatine bone caudoventrally, nasal bone dorsally, and frontal, lacrimal, and malar bones caudo-dorsolaterally (Evans & Miller, 2013).

The body was irregularly triangular with the base facing caudally, narrow rostrally but wide caudally. The external (facial) surface was concave rostrally and slightly convex or almost straight caudally, with greater convexity in females.

The facial crest was absent, but a prominent juga alveolaria of the canine tooth was observed on the rostral part of the lateral surface (Sisson, 1953). A single large infraorbital foramen was present about 1 cm above the alveolus for the third cheek tooth (Fig. 1.1).

The medial (nasal) surface was concave and rough,

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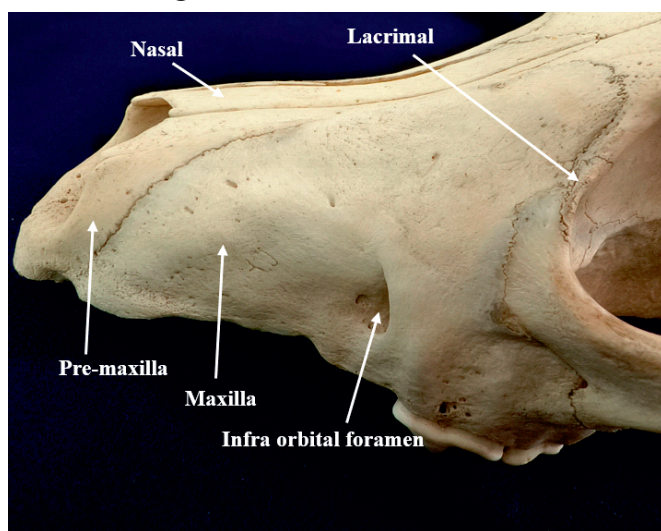
Table 1: Showing Biometrical Parameters Related to Maxilla Bone of mongrel dog

S.No.	PARAMETERS	MEAN \pm SE
1.	Total Length of Hard Palate	9.31 \pm 0.21 cm
2.	Premaxilla + Maxilla Contribution	64.6 \pm 0.67 %
3.	Palatine Bone Contribution	34.69 \pm 0.58 %
4.	Infraorbital Foramen Position	1 cm above 3 rd cheek tooth

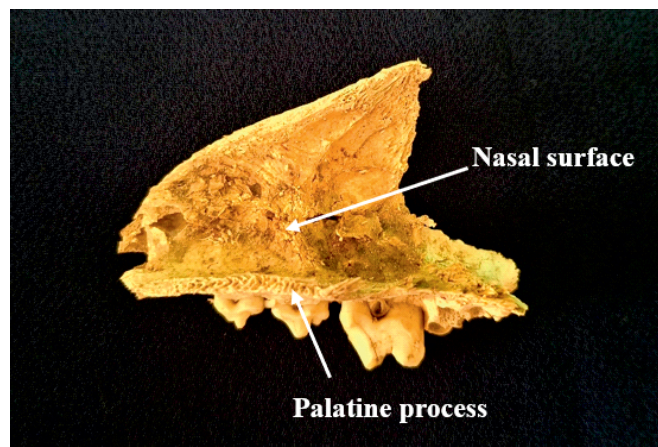
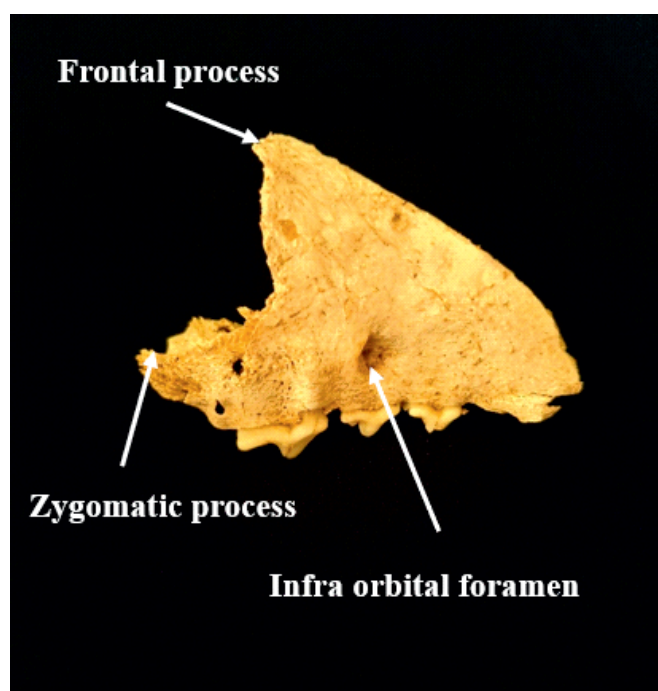
forming the lateral wall of the nasal cavity with a crest for turbinate in its anterior part (Fig. 1.2). The frontal process extended caudally and fits between the nasal, orbital part of the frontal, and lacrimal bones. The zygomatic process was short and thin, extending toward the zygomatic bone and perforated by several small foramina. No maxillary tuberosity was observed as also reported by (Getty, 1975).

The alveolar process contained the alveoli for the upper cheek teeth, holding the canine, four premolars, and two molars, with each alveolus separated by interalveolar septa (Evans & Miller, 2013).

The palatine process projected like a shelf from the ventral part of the medial surface, constituting part of the bony palate. It was narrow rostrally, widest at the fourth cheek teeth, then narrow caudally. The palatine surface was smooth, nasal concave, with a shallow groove for the vomer near the medial border. The total length of palatum osseum was 9.31 \pm 0.21 cm with a range of 8.7-10.2.

**Fig. 1.1:** Facial region of the skull of Mongrel Dog

The pre-maxilla and maxilla collectively contributed 64.6 \pm 0.67% of the total length of palate whereas palatine bone contributed 34.69 \pm 0.58%.

**Fig. 1.2:** Maxilla Bone (medial surface)**Fig. 1.3:** Maxilla Bone (lateral surface)

DISCUSSION

The structure of maxilla in Mongrel dogs aligned with general canine descriptions, serving as the primary bone of the upper jaw and supporting mastication through its alveolar process (Evans & Miller, 2013; Sisson, 1953). The irregularly triangular body and absence of the facial crest, with a prominent juga alveolaria, facilitate tooth support without additional crests as also seen in other species (Getty, 1975). The position of infraorbital foramen's was 1 cm above the third cheek tooth aided in nerve location for clinical procedures (Monfared, 2013).

The palatine process contributed significantly to the hard palate, with a total length of 9.31 cm where premaxilla and maxilla formed 64.6%, consistent

with measurements in similar breeds (Ahani *et al.*, 2024). Articulations with surrounding bones ensured structural integrity for the nasal and oral cavities (Evans & Miller, 2013). Variations, such as greater caudal convexity in females, suggested subtle sexual dimorphism, though not extensively documented.

CONCLUSION

In conclusion, the maxilla in Mongrel dogs was a multifaceted bone essential for facial structure, with an irregularly triangular body, key processes for articulation and support, and biometrical contributions to the hard palate.

REFERENCES

- Ahani, S., Alizadeh, S., & Hosseinchi, M. R. 2024. Radiological and anatomical features of the skull bones of adult Husky dogs. *Iranian Journal of Veterinary Science and Technology*. 16: 33-44.
- Evans, H. E., and Lahunta, A. 2013. *The digestive apparatus and abdomen*. In: *Miller's Anatomy of the Dog*. 4th edn. Eds H.E. Evans and A. Lahunta. Elsevier. Saunders, St. Louis, MO, USA. pp 303-304.
- Getty, R. 1975. Equine, Ruminant Osteology. In: Sisson and Grossman's. *The Anatomy of the Domestic Animals* (R. Getty edn.) Vol. I, 5th edn. W.B. Saunders Company, Philadelphia. pp. 273-317, 318-348, 1231-1252.
- Monfared, A. L. 2013. Microanatomical investigation of the skull of Golden Jackal (*Canis aureus*) and its clinical Application during Regional anaesthesia. *Global Veterinaria*, 10, 547-550.
- Sisson, S. 1953. *The anatomy of the domestic animals*. 4th edition 131-145. W.B. Saunders Co. Philadelphia USA.
- Snedecor, G. W. & Cochran, W.G. 1994. *W. G. Statistical Methods*. 8th edn Ames, Iowa State University Press, Singh.