

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

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ABSTRACT

This study examined the anatomy of the temporal bone in Mongrel dogs (*Canis lupus familiaris*) based on morphological and biometrical analyses. The temporal bone, a paired structure, formed the ventro-lateral cranial wall and composed of squamous and petrous parts. The squamous part included a zygomatic process forming the zygomatic arch, while the petrous part housed ear components with petrous and tympanic subdivisions. Sexual dimorphism was evident, with males showing more prominent retroarticular process and wider zygomatic arches. Findings align with general canine anatomy and aid in diagnostics for ear conditions.

Keywords: Temporal Bone, Mongrel Dog, Cranial Anatomy, Sexual Dimorphism.

The dog is a pet animal which provides a sense of emotional well-being and unconditional love. Dogs are the first animal domesticated by humans. The domestic dog is a member of the Family Canidae. It is a widely terrestrial abundant carnivore sharing the human beings their environments (Mc Connell and Rani, 2022).

The temporal bone plays a crucial role in the canine skull, forming part of the lateral cranial wall and housing auditory and vestibular structures (Evans & Miller, 2013; Sisson, 1953). In Mongrel dogs, as non-descript breeds, it provides a baseline for comparative anatomy. This study, derived from detailed anatomical investigations on Mongrel dogs, aims to describe the temporal bone's morphology, variations, and biometric features-, providing insights for clinical applications such as otitis diagnosis and surgical planning (Miller et al., 1964). Mongrel dogs offer a model for understanding variations in non-pedigree canines, with potential implications for breed-specific differences.

The present study was conducted on seven skulls of adult Mongrel Dogs (*Canis lupus familiaris*) of either sex. Heads of mongrel dogs were procured from the clinics of veterinary college DUVASU Mathura. Skulls were macerated and manual cleaning was done. One skull was disarticulated for detailed study of individual bone. Measurements included skull length, width, and specific temporal features using Vernier

calipers. Data analysis involved means, standard errors, and regression equations for correlations. Statistical analysis of data was carried out as per standard procedures (Snedecor and Cochran, 1994).

The temporal bone was paired, situated laterally in the cranium, bounded by occipital (caudally), parietal and frontal (dorsally), and sphenoid (ventrally) bones. It consisted of squamous and petrous parts (Fig. 1).

The squamous part was plate-like, with cerebral and temporal surfaces. The cerebral surface formed the internal wall of cranial cavity of the temporal surface, divided by a crest, was convex anteriorly and concave posteriorly, ending in a tubercle over the external auditory meatus. It articulated with parietal (temporoparietal suture), wing of basisphenoid, tympanic bulla, and mastoid process. The zygomatic process was curved and pointed, formed the zygomatic arch with the malar bone (Fig. 1). The ventral base of Zyomatic process was expanded into a mandibular fossa for temporomandibular articulation, bounded by a rostral retroarticular process (more developed in males).

The petrous part was located caudoventrolaterally, comprised of petrous (hard, rectangular with petrosal crest; contained internal auditory meatus, temporal canal, mastoid foramen, facial canal) and tympanic components (hemispherical tympanic bulla). The petrous bone formed the caudoventral cranial wall of housing ear cavities. It was pyramidal in shape, composed of dense bone, with a sharp petrosal crest extending downward and forward. Its caudomedial surface featured the cerebellar fossa and internal

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acoustic meatus for cranial nerves VII and VIII.

Sexual differences: Males had a stouter paramastoid process extending beyond the tympanic bulla whereas females had a curved plate at bulla level.

The morphology of temporal bone in Mongrel dogs aligned with descriptions in domestic canines, where it supports auditory functions and cranial integrity (Evans & Miller, 2013). Paired temporal bones formed the ventrolateral wall of the cranial cavity comprised of squamous & petrous parts (Sisson, 1953; Getty, 1975; Evans & Miller, 2013). Squamous part was plate like divided by a temporal crest in-to anterior and posterior parts (Evans & Miller, 2013). The zygomatic process sprang off from the squamous part, as a wide curved plate, turned latero rostrally and articulated with the corresponding process of malar bone (Sisson, 1953). Mandibular fossa was present as a transversally elongated smooth articular area at the ventral surface of the base of zygomatic process as described (Sisson, 1953; Evans & Miller, 2013) in dog. However, Ahani *et al.* (2024) did not observe articular area in adult Husky Dogs. Caudal to this, a spade like retro-articular process was present which was more developed in male Mongrel Dogs than females. Petrous and tympanic parts of bone resembled in general form and position as described by Sisson (1953); Getty (1975),

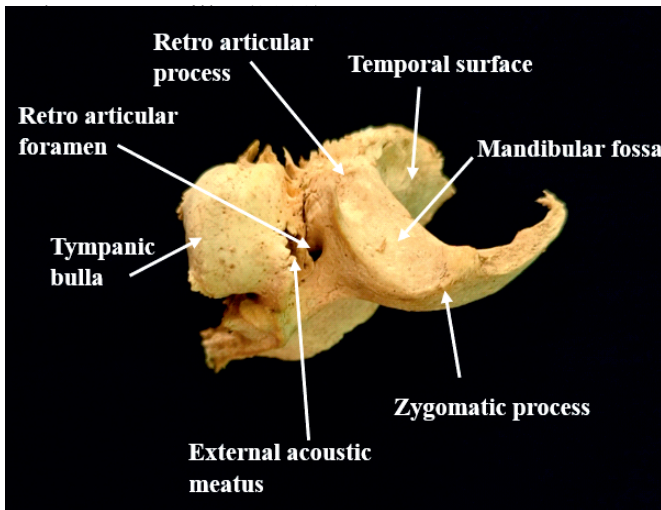


Fig. 1: Temporal Bone (rostral view)

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

S.No.	PARAMETERS	MEAN ± SE
1.	Skull Width	12.15 ± 0.17 cm
2.	Cranial Width	8.45 ± 0.15 cm
3.	Masseteric Fossa Depth	0.67 ± 0.04 cm

The squamous part's zygomatic process aids mastication, wider in males for stronger muscle attachment. Petrous features, including the tympanic bulla, are crucial for ear protection.

Variations from other breeds include smoother temporal fossae in Mongrels, highlighting adaptations in non-descript dogs. Sexual dimorphism, with prominent male processes, supports broader canine studies.

In conclusion, the temporal bone in Mongrel dogs exhibited distinct morphological features, including a plate-like squamous part with a zygomatic process and a petrous part housing auditory structures, with notable sexual dimorphism in Zygomatic process development. These findings underscore the importance of breed-specific anatomical knowledge for clinical applications, such as ear surgery and pathology identification, while aligning with established canine anatomy descriptions (Evans & Miller, 2013; Sisson, 1953).

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