

Anatomical Studies on the Mandible of Mongrel Dog

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ABSTRACT

The present study was carried out on the mandible of the Mongrel dog. It was the largest bone of the skull and made up of two halves, which were united anteriorly forming mandibular symphysis. The lingual surface was smooth and concave. Its symphyseal surface was rough and irregular. The most prominent curve of the ramus formed the angle of the jaw; the part of the ramus between the body and the angle formed horizontal part and carries the lower cheek teeth. The part of the ramus above the angle formed the vertical part, which was non-tooth bearing expanded part of the mandible.

Key Words: Dog, mandible, ramus.

INTRODUCTION

The dog is a companion animal, which provides a sense of emotional well-being and unconditional love and is the first animal domesticated by humans. The dog has been selectively bred over millennia for its various behaviors, sensory capabilities, and physical attributes. Dog breeds vary widely in shape, size, and color. They perform many roles for humans, such as hunting, herding, protection, assisting police and the military, companionship, therapy and aiding disabled people. The scientific studies on the morphometrics of dogs are very limited particularly on the mongrel dogs. In many vetro-legal cases one fails to identify the bones of the dog and confuse them with those of some other carnivores. The aim of this study is to investigate mandible of Mongrel dog, thereby making a contribution in filling the gap of knowledge in this field.

MATERIALS METHODS

The present study was conducted on mandibles of 7 adult Mongrel dogs 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. Then mandibles were disarticulated safely from each head of the dog. Morphology of both the mandibles were recorded.

All the measurements were recorded with the help of metric scale, Vernier calliper and thread.

The data were collected on each skull of mandible separately and then tabulated. Statistical analysis of data was carried out as per standard procedures (Snedecor and Cochran, 1989).

This morphometrical study was designed to provide information on some clinically important parameters in the mandible of Mongrel dog.

Mandibular Parameters:

A. Mandibular length: distance from the caudal border of the vertical ramus to the rostral margin of the body of mandible

B. Mandibular height

B.(i) Up to condyle: distance between the highest point of the mandibular condyle and the angle of jaw.

B.(ii) Up to coronoid process: distance between the highest point of the coronoid process of the mandible and the angle of jaw.

C. Mental foramen: Distance of mental foramen from the rostral extremity of the mandible.

D. Length of Symphyseal border : Distance from the anterior border of the body of mandible to the caudal part of symphyseal surface.

E.Width of Symphyseal border : Distance between the dorsal and ventral border of the body of mandible at the symphyseal surface.

F. Mandibular foramen: Distance of Mandibular foramen from the ventral border and the posterior border.

RESULTS AND DISCUSSION

Mandible was the largest bone of the skull

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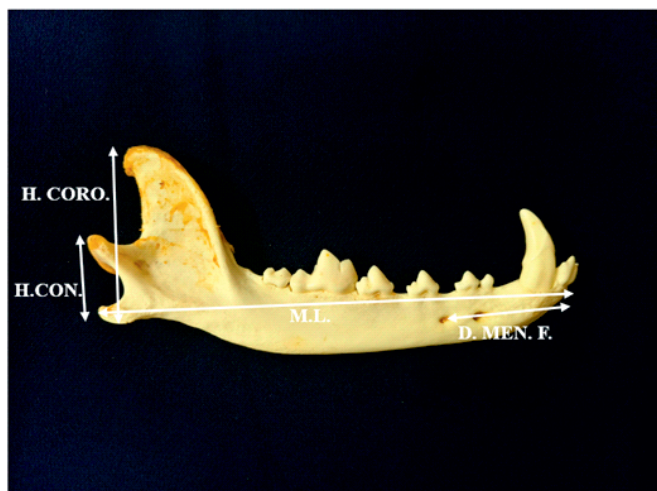


Fig. 1

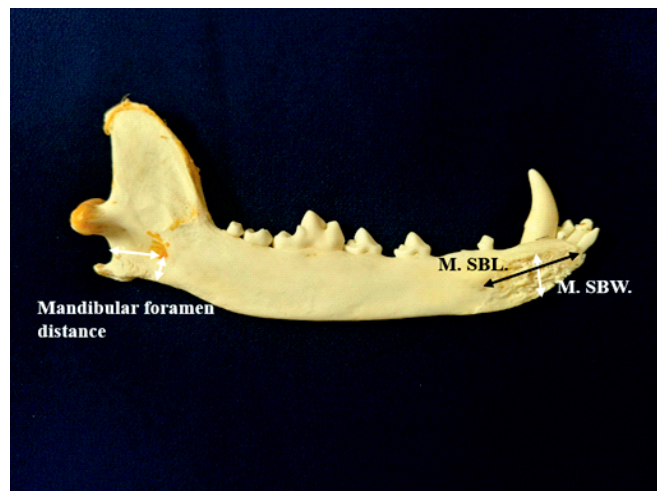


Fig. 2

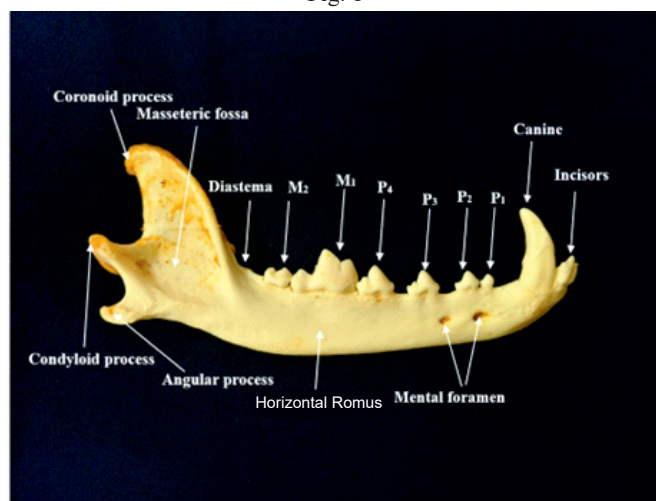


Fig. 3

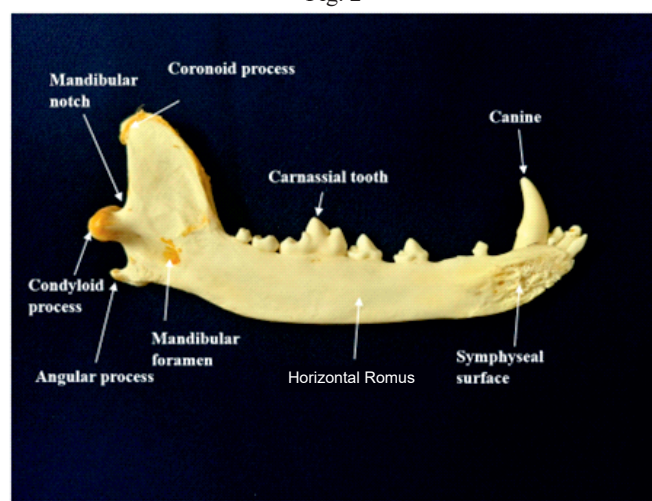


Fig. 4

Fig. 1. Mandible of Mongrel dog (lateral view) showing measuring points for length and height of mandible and distance of mental foramen. **Fig. 2.** Mandible of Mongrel dog (medial view) showing measuring points for length and width of symphyseal border and distance of mandibular foramen. **Fig. 3.** Right half of mandible of Mongrel dog (lateral view). **Fig. 4.** Right half of mandible of Mongrel dog (medial view).

and comprised of two halves which did not fuse even in the adult animals, therefore, symphysis is present. Sisson (1953), Getty (1975), Evans and Miller (2013), Ahani et al. (2024) had also described it as the largest facial bone. It had two parts, viz., the body and the ramus. In present study it was found that the mandibular symphysis remained unossified in adult Mongrel dog. Symphyseal surfaces were rough, irregular and fixed up with similar surfaces of the opposite bone. Its average length was 2.62 ± 0.11 and the width was 1.47 ± 0.08 cms whereas, in Ghanaian local non-descript dog and husky dog the symphyseal length was 3.2 cm (Opoku et al. 2020; Ahani et al. 2024).

The body was short dorsoventrally flattened and had six alveoli for incisor teeth and two alveoli on each corner for canine teeth (Evans and Miller, 2013; Ahani et al. 2024). The size of alveoli

increased from medial to lateral. The alveoli for the canine was deep and extended downward and obliquely backward presented juga alveolaris on the lateral surface (Sisson, 1953; Getty, 1975).

The two ramus of the mandible diverged posteriorly and enclosed a 'V' shaped intermandibular space. The ventral border of horizontal ramus was convex, thick and rounded. The alveolar border was having alveoli for cheek teeth (Sisson, 1975; Ahani et al. 2024; Evans and Miller, 2013).

Usually one, occasionally two mental foramina were present about 3.04 ± 0.07 cm from the rostral extremity of mandible on its lateral surface behind the canine tooth. In Iranian mix breed dog, it was 2.3 cm (Monfared, 2013).

About 1 cm from the ventral border and 2 cm

Table 1: Biometry of mandible of Mongrel dog

S.NO.	PARAMETERS	LEFT MANDIBLE			RIGHT MANDIBLE			OVERALL		
		Mean (cm)	Range (cm)	CV %	Mean	Range (cm)	CV %	Mean (cm)	Range (cm)	CV %
1	Length of Mandible	13.97	12.6-15	6.47	13.95	12.6-15	6.36	13.96	12.6-15	6.17%
2	Height of Mandible									
(a)	Up To Condyle	2.65	2-3.2	16.09	2.65	2-3.2	16.81	2.65	2-3.2	15.81%
(b)	Up To Coronoid Process	5.35	4.6-6.2	9.57	5.4	4.6-6.2	9.62	5.37	4.6-6.2	9.22%
3	Depth of Masseteric Fossa	0.67	0.5-0.8	20.55	0.67	0.5-0.8	20.55	0.67	0.5-0.8	19.74%
4	Distance of Mental Foramen	3.04	2.86-3.5	9.64	3.04	2.86-3.5	9.64	3.04	2.8-3.5	9.26%
5	Length of Condyle	2.65	2.3-3	9.68	2.64	2.3-3	9.97	2.65	2.3-3	9.44%
6	Thickness of Condyle	0.52	0.43-0.59	12.65	0.51	0.42-0.59	13.42	0.51	0.42-0.59	12.54%
7	Length of Symphyseal Border	2.68	2.4-3.3	11.05	2.62	2.3-3.2	11.13	2.65	2.3-3.3	10.71%
8	Width of Symphysial Border	1.47	1.1-1.8	15.05	1.44	1.1-1.8	15.42	1.45	1.1-1.8	14.67%

from the posterior border a large mandibular foramen was present almost in the center of the medial surface of the vertical ramus of the mandible in mongrel dog. The same parameters measured were 0.97 cm and 0.93 cm respectively in Iranian mix breed dog (Monfared, 2013).

The part of ramus which was expanded vertically is the vertical part of the mandible. It was non-tooth bearing part. On the lateral surface of the ramus a deep triangular masseteric fossa was present as described by Sisson, (1953); Getty, (1975) and Ahani et al. (2024). The depth of deep triangular masseteric fossa was 0.67 ± 0.03 cm (Table 1). The most dorsal part of the mandible formed coronoid process which was extended dorsally, laterally and backward. It was a large, thin plate-like bone with a wide and thin rostral border.

Articular extremity of mandible was formed by transversally elongated condyles, coronoid process and mandibular notch (Sisson, 1953; Evans and Miller, 2013 and Ahani et al. 2024). The condyles were transversally elongated, sagittally convex articular process which articulated with mandibular fossa of the temporal bone and formed temporo-mandibular articulation. The length and thickness of the condyle were 2.65 ± 0.06 cm and 0.51 ± 0.01 cm, respectively. Between the condyles and coronoid process mandibular notch was present as a deep depression. The angle of the mandible was the caudoventral part of the bone which presented a hook like caudally directed process called as angular process (Evans and Miller, 2013 and Ahani et al. 2024). The base of this process was wide and thick.

The mandible has several important anatomical features—such as its length, height, depth of the masseteric fossa, and the positions of the mandibular and mental foramina—that are critical for clinical procedures.

These measurements are especially useful as landmarks for performing mandibular and mental nerve blocks, which are commonly used in dental and surgical treatments of the lower jaw (Hall et al., 2000). A mandibular nerve block is used for procedures such as tooth extractions, treatment of dental pain, management of facial injuries, and surgeries involving the lower jaw. Mental nerve blocks are helpful for suturing the lower lip and for minor procedures on the lower incisors and the first one or two premolars.

We believe that recording these measurements in mongrel dogs provides valuable baseline data. This information can support future research and improve anatomical comparisons across species. As global efforts continue to enhance livestock production and veterinary care, having accurate and compatible anatomical data becomes increasingly important for advancing the livestock sector internationally.

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