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Gross anatomical studies on the turbinate bone of blue bull (*Boselaphus tragocamelus*)

Vikas Kumar, Sanjeev Joshi, Subha Ganguly, Kavita Rohlan and Nikhil Shringi

Abstract

The turbinates (*Ossa turbinata*) are delicate, scroll-like bones, two on either side, which are attached to the lateral walls of the nasal cavity. Each is composed of a very thin lamina, cribriform in many places, and covered on both sides with mucous membrane in the fresh state. They are arranged in two pairs, superior and inferior. The superior or Nasoturbinal (*Concha dorsalis*) is somewhat cylindrical in form, small at its anterior part, and flattened transversely. It is attached to the turbinal crest of the nasal bone and the nasal plate of the frontal bone. The inferior or maxilloturbinal bone (*Concha ventralis*) is shorter and smaller posteriorly than the upper one. It is attached to the inferior turbinal crest.

Keywords: turbinates, cribriform, blue bull

Introduction

The Blue bull (*Boselaphus tragocamelus*) sometimes also called as *nilgai* is the largest Asian Antelope. It is one of the most commonly seen wild mammal of central and northern India, often seen in farmland or scrub forest, arid areas, dry deciduous forests and agricultural areas, but avoid dense forest and deserts. The Blue bull is categorized as of "Least Concern" by the International Union for the Conservation of Nature and Natural resources (IUCN) and protected under Schedule "III" of the Indian Wildlife Protection Act, 1972.

The nasal cavity plays an important role in preparation of the inspired air, olfaction, phonation, and thermo-regulation of body and removal of foreign dust particles^[1]. The turbinates help animals warm and moisten the air that they are breathing in before it reaches their lungs. These turbinates also help to conserve water by absorbing some of the moisture in the breath that an animal is about to exhale. Otters live a great deal of their life in water, where body heat loss is high, and so it makes sense that they need complex turbinates. The second function of nasal turbinates is for olfaction. The increased surface area that the turbinates provide allow for greater reception of smells.

Materials and Methods

The present study was conducted on skull of six adult Blue bulls (*Boselaphus tragocamelus*) either sex. The skeletons were collected from graveyard located in the premises of Bikaner zoo after official approvals from Additional Principal Chief Conservator of Forest (APCCF), Rajasthan, vide approval letter No. F3 (04) TECH-II/CCF/2013, Dated 6th May 2016 with dispatch No.566 from Additional Principal Chief Conservator of Forest, Jaipur (Rajasthan). The skulls were macerated using the hot water maceration technique of Choudhary and Singh^[2]. The gross study was carried out at Bikaner zoo under supervision of the zoo personals.

Results and Discussion

Turbinate bones (Figures 1 and 2) were delicate, scroll-like, complex bony plates, placed vertically in the nasal cavity, attached to the lateral walls. There were two dorsal and two ventral turbinates present on each side of the nasal cavity which was similar to the observations of Raghavan^[3] and Sisson^[4] in ox, Ramswarup^[5] in chital, Choudhary and Singh^[2] in blackbuck and Parkash *et al.*^[6] in young pigs; whereas in Dinosaurs turbinates were little, delicate spiral bones^[7]. The common nasal meatus extended from the vestibule to the choana It was bound dorsally by roof of the nasal cavity, ventrally by floor of nasal cavity where it became wider; laterally by the nasal turbinates and meatuses and medially by median nasalseptum.

The dorsal nasal turbinate (Fig.1) was the largest turbinate bone among all the turbinates as reported in buffalo [8], sheep [9] and buffalo calf [10], where as in dog had three portions i.e. rostral shelf like, middle scroll like and caudal elongated swellings, which released secondary unciniate process [11].

The ventral or maxilloturbinal bone (*Concha ventralis*) (Fig.1) was shorter and smaller posteriorly than the upper one and it is attached to the inferior turbinal crest, and consists, like the upper one, of an anterior coiled and a posterior uncoiled portion which was similar to the observations of Raghavan [3] in ox, horse and dog and that of Sisson [4] in ox.



Fig 1: Dorsal turbinate bone (A) and ventral turbinate bone (B)



Fig 2: Turbinate bone

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