

Anatomical study of nasal cartilage in buffalo (*Bubalus bubalus*)

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Abstract

This study used ten heads of adult buffalo taken from slaughterhouse. After transferring the samples to the anatomy hall, a split was carefully created on skin of muzzle and the skin was slowly separated from muscles and hypodermal connective tissue. Place of connection of cartilages to bone, cartilages to each other and shape of the cartilages were specified. In buffalo, nose apex has two nostrils fixed by bone and cartilage. After identifying and separating the cartilages, it was found that nasal cartilages in buffalo consisted of: 1) septum nasal located between two nostrils and reinforces it from inside. 2) dorso-lateral nasal cartilage constituting dorsal and lateral parts of the nostril. 3) ventro-lateral nasal cartilage constituting ventral and lateral parts of the nostril. 4) lateral accessory cartilage constituting lateral and ventral parts of the nostril. 5) medial accessory nasal cartilage located at Alar fold and connected to ventro-lateral nasal cartilage.

Key words: Nasal, Cartilage, Buffalo, *Bubalus*

Introduction

In animals, apex of the nose is covered with stratified squamous epithelium and has two nostrils which form the nose (Bressou, 1946). Nasal cavity is divided by septum into two parts with bone and cartilage structure. Medial part of nasal cavity is the widest area and includes concha and meatus (Ashdown and Done, 1978). Medial part and internal septum has been covered with pseudo-stratified columnar epithelium, goblet cell and exocrine glands. Apex of the nose is covered with stratified squamous epithelium and has two nostrils which form the nose (De lahunta and Habel, 1956). Form of nostrils is varied in different animals. In all species, dorsal part of nostril is reinforced by dorso-lateral nasal cartilage which is narrow and small in horses (Sisson and Grossman, 1975).

In all species, except to horses, ventral and lateral parts of nostril are maintained by lateral accessory cartilage. This cartilage has an anchor-like form in dogs, cats and ruminants and is regarded as extension of ventro lateral nasal cartilage. Medial accessory nasal cartilage located at Alar fold and connected to ventral nasal concha and ventro lateral nasal cartilage. In horses, medial accessory nasal cartilage is large and S-form but it is small in other animals (Nickel et al., 1986).

Nostrils are in comma shape in horses, cows, cats and dogs while it is seen as a split in goats and sheep

(May, 1970). Thick and narrow ends of this comma-form part have a medial and dorso lateral position, respectively. The area located between dorso-lateral nasal cartilages covered with mucus of nose and lateral accessory cartilage is called Alar groove. In dogs, cats, sheep and goats, the skin located around nostrils-known as planum nasal- are bright and shining. In cows and buffalos, this skin unifies with upper lip and is called planum nasolabials. This part is hairless and has glands with serous excretions to moisturize this region (Negus, 1958). Considering differences found in shape, size and anatomical structure of nostrils in different animals, it is necessary to study shape and size of cartilages constituting nostrils in buffalos.

Materials and Methods

This study used ten heads of adult buffalo taken from slaughter house. The samples were transferred to the anatomy hall where a split was carefully created on skin of muzzle and the skin was slowly separated from muscles and the connective tissue in order to separate and withdraw nasal cartilages and study them topographically. Then, these cartilages were cleaned. Achieving the cartilages, place of connection of cartilages to each other was specified and then, each of the cartilages was carefully separated. Left and right cartilages of the nose were separated and prepared for measuring such that length of each left and right cartilages and 1/3 width of cranial, middle and caudal

of each cartilage were measured. Ruler, caliber and thread are used to measure the cartilage. A 20-centimeter thread was selected and a knot was tied in its one end. Then, it was well steeped and the knotted end of the thread was put on one edge of cartilage and was extended, without any bend, to another edge of the cartilage while the thread was completely touching tissue and its roughness levels. After marking the thread, its knotted end was put on zero of a scaled ruler and the obtained size was registered while it is in tangent with ruler edge without stretching the thread. To measure 1/3 width of cranial, middle and caudal, the widest section of each part was regarded as criterion and caliber along with scaled ruler was used to measure. To do this, two points of caliber were put at the wide section and setscrew was turned such that point of caliber arms touched the cartilage. Then, the caliber was withdrawn from cartilage body and distance of two arms was determined in centimeter on the scaled ruler. The resulted measures were inserted in tables and pictures taken from the cartilages.

Results and Discussion

Different cartilages located at left and right of the nose was studied considering their anatomical position and adjacency. Cartilages constituting buffalos' nose are: Dorso-lateral nasal cartilage constituting and reinforcing dorsal part of nostril (Fig 1) Ventro-lateral nasal cartilage constituting ventral part of nostril (fig. 2) There is a small cavity in cranial part of this cartilage connecting nasal cavity with mouth. Ventral and lateral parts of nostril are maintained and reinforced by anchor-like lateral accessory cartilage. This cartilage is regarded as extension of Dorso-lateral nasal cartilage.

Medial accessory nasal cartilage connected to ventral nasal concha and vetro-lateral nasal cartilage (Fig. 3) the four above-mentioned cartilages are seen at both left and right sides of nostril.



Fig1: Dorso-lateral nasal cartilage

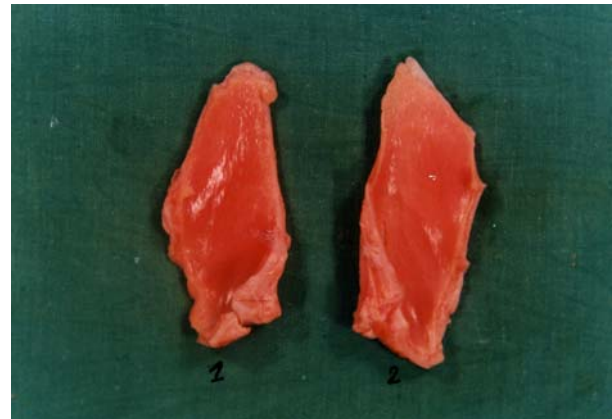


Fig: 2: Ventro-lateral nasal cartilage, left and right side of nostril

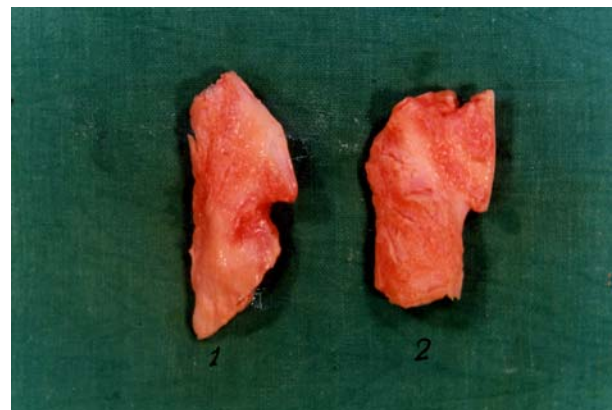


Fig3: Medial accessory nasal cartilage, left & right side



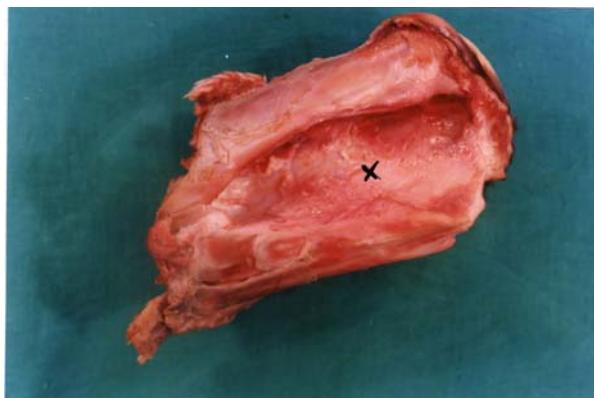
Fig4: Lateral accessory nasal cartilage; c: Rostral portion which was part of ventro-lateral nasal cartilage moved toward cranial and ventral, left & right sides

Septum vassal separating two nostrils and reinforces them from inside (Fig. 4). Septum nasal (Fig. 5) Results

of anatomical and topological studies suggest that nose cartilages are the same in buffalos and cattle and include:

- 1- Dorso-lateral nasal cartilage
- 2- Ventro-lateral nasal cartilage
- 3- Medial accessory nasal cartilage
- 4- Lateral accessory nasal cartilage
- 5- Septum nasal

These cartilages located at left and right sides lead to formation and maintaining of nostrils in buffalos. As a result, conducting portion is created. This portion is responsible to transfer respiratory air to lungs and send out the expiratory air from the lungs.



Septum nasal

Cartilage (cm)	Right				Left			
	Length	Cranial 1/3	Middle 1/3	Caudal 1/3	Length	Cranial 1/3	Middle 1/3	Caudal 1/3
Dorso-lateral nasal cartilage	8	1.2	2.5	2	8	1.2	2.5	2
Ventro-lateral nasal cartilage	9	1.5	3	1.7	9	1.5	3	1.7
Lateral accessory nasal cartilage	4	0.7	1.8	0.5	4	0.7	1.8	0.5
Medial accessory nasal cartilage	9	2.5	2	1.5	9	2.5	2	1.5
Septum nasal	11	3.2	5.1	7	11	3.2	5.1	7

Sizes of one of the studied samples (septum nasal was measured from both left and right sides)

Acknowledgements

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