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CERTAIN GROSS DEVELOPMENTAL CHANGES IN THE SKULL OF PRENATAL BUFFALO (*Bubalus bubalis*)

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Abstract: The cranial component of the skull was greater than the facial component throughout prenatal development. The frontals and parietals showed a dome like appearance in all prenatal stages. The vomer was in contact with the floor of the nasal cavity. The orbital rim between supraorbital process of frontal and frontal process of malar was membranous up to 200 days.
Keywords: Gross changes, skull, prenatal buffalo.

Materials and Methods

The study was made on 509 embryos and foetuses belonging to 112 age groups starting from 26 days to 310 days. Four to eight specimens of each age group were studied. The prenatal embryos and fetuses of unknown age irrespective of the sex were collected irrespective of age, nutritional status and breed of the mother. The CVRL (Curved Crown Rump Length) was measured in cms by using thread and scale. The CVRL of the specimens studied was ranged from 2.1 cm (38 days) to 105 cm (310 days). The age of the specimens was calculated by adopting Soliman's (1975) formula coined for buffalo i.e Y=28.66 + 4.496x if CVRL is < 20cm and Y=73.544 + 2.256x if CVRL is ≥ 20 Cms where Y is the age in days and X is the curved crown rump length in Cms. The heads of the specimens from the age of 90 days (13.7 cm CVRL) to 310 days (105cm CVRL) were preserved in 10% formaline. Various cross, longitudinal and transverse sectional profiles of skulls were made to study changes in gross aspects of skulls after dissection.

Results and Discussion

The vomer was in contact with the floor of the nasal cavity throughout and separated two posterior nares completely (Fig.1), which is a characterestic feature unlike in ox. Vomer was extending upto the level of basilar tubercles dividing the nasopharynx completely into two parts. The above features were not reported earlier in buffalo as per literature available. According to Latshaw (1987) the posterior nares of ruminants were not completely separated.

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The cranial component of the skull was greater than the facial component throughout the prenatal life (Fig.2) as stated in human by Arey (1965), though facial component increased as the age of foetus advanced. The frontals and parietals showed a dome like appearance in prenatal stages (Fig.2). From 98 days to 171 days a step was observed between frontal and nasal bones, which later disappeared making the face dish faced. This dishing of face was attributed to the development of frontal sinus in domestic animals (Latshaw, 1987), which does not seem to be appropriate factor as frontal sinus in this study was found to be limited in extent in prenatal skull. Impressions of gyri on cranial surface of skull were evident at 200 days and well marked at 295 days, which may be attributed to the development gyri of cerebral hemispheres. From 98 days to 193 days the skull with mandible when placed on flat surface rested on the exoccipital and angle of mandible, while from 197 days onwards the skull rested only on the mandible. This may be attributed to increase in facial component of skull thereby increasing weight of facial component and lifting up cranial component as the age of the foetus advanced. The palate was more concave lengthwise and became less concave from 200 days onwards. Such features were not reported earlier in buffalo.

Tympanic bulla was compressed initially and it became convex from 144 days. The tympanic bulla attained the characterestic features of adult at 225 days. The rami of mandible were obliquely bent outwards from 66 days and became least curved beyond the age of 170 days. The angle of mandible was more prominent from 93 days to 159 days. In skulls of 98 days to 164 days mandibular space was evident only between caudal parts of two halves of mandible near the angles, while anteriorly the two halves were touching each other. The mandibular space was evident throughout from 164 days onwards. From 125 days to 229 days elevations and two to six round to oval unossified membranous areas were seen on the molar part of body of mandible above the ventral border (Fig. 1). The lingual groove was evident on mandible at 128 days.

The orbital rim between supraorbital process of frontal and frontal process of malar was membranous up to 200 days (Fig.3). It was completely formed and ossified at 225 days (Fig.4). Such a feature was not reported earlier in the available literature. During the process of development in human the orbit was reported to move from the lateral aspect of the face to occupy a more central position (Greer Walker, 1961). No change in the position of the orbit was observed in present study as it was always positioned on lateral aspect of skull.

References

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PHOTOGRAPHS

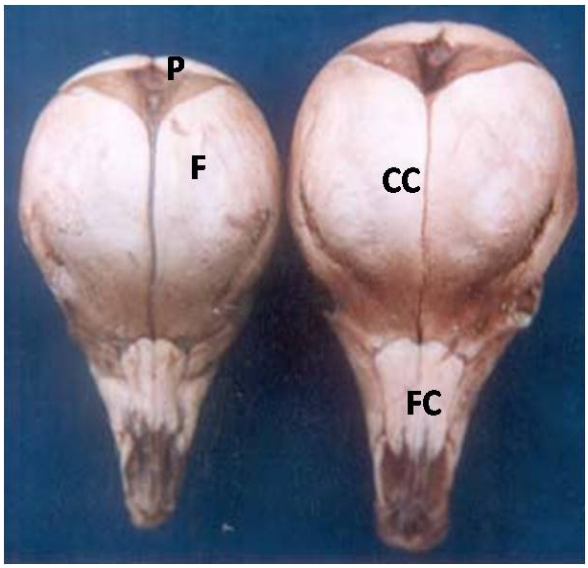

Fig.1. Photograph of dorsal view of foetal skull showing greater cranial component (CC) than facial component (FC) and dome like appearance of frontals (F) and parietals (P)

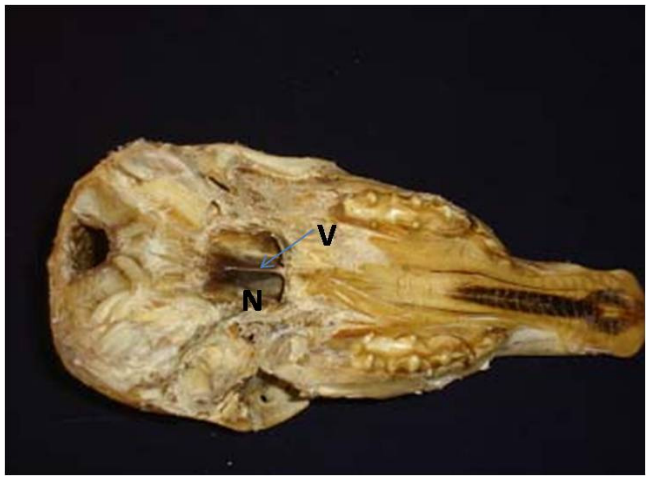

Fig.2. Photograph of ventral view of 5 month foetal skull showing vomer (V) in contact with floor of nasal cavity throughout separating two posterior nares completely

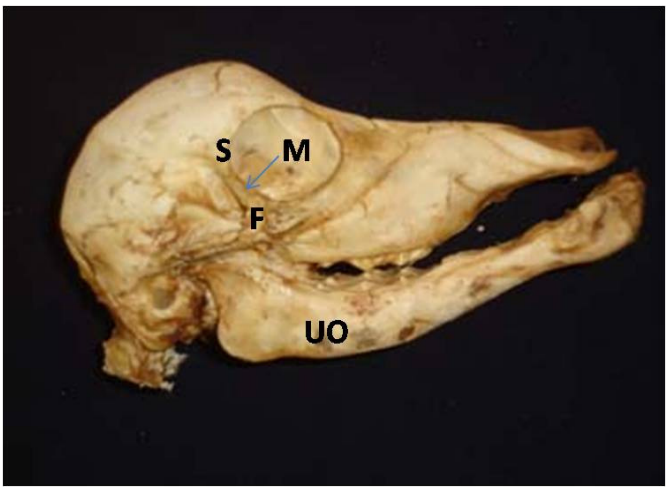

Fig.3. Photograph of lateral view of 123 day foetal skull showing membranous orbital rim (M) between supraorbital process of frontal (S) and frontal process of malar (F)

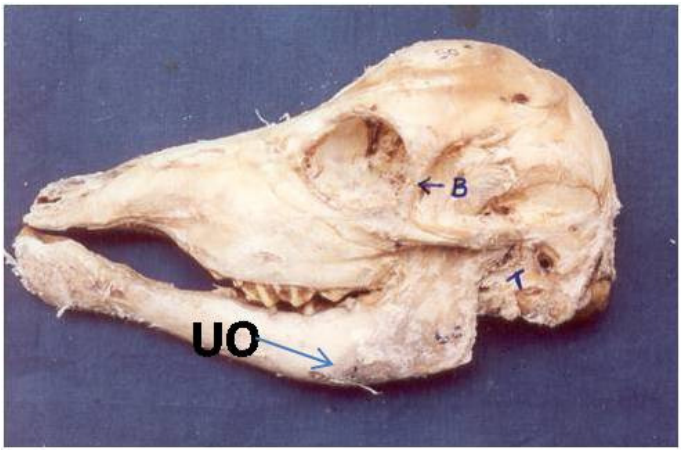

Fig. 4. Photograph of lateral view of 225 day foetal skull showing complete bony orbital rim (B) and tympanic bulla (T)