Gross Anatomical Studies on the OS Coxae of Leopard (*Panthera pardus*)

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The pelvic girdle serves as a connection between the pelvic limb and the trunk. The pelvic girdle consisted of the ossa coxarum and each os coxae comprised of three bones, viz. the cranio dorsal ilium, cranio ventral pubis and the caudo ventral ischium. These three bones met at the acetabulum. In view of the little information on os coxae of leopard, the present study was envisaged.

Materials and Methods

The os coxae were collected from two adult leopards died of natural causes and brought to the Department of Pathology, College of Veterinary and Animal Sciences, Pookot, Wayanad, for postmortem examination. Bones were processed as described by Raghavan (1964) for studying the morphological observations.

Results and Discussion

The os-coxae comprised of ilium, ischium and pubis. The ischium and pubis united ventrally to form the pelvic symphysis.

Ilium was the largest and most cranial of the bones of the os coxae. It comprised of a wing and a body. The cranially located wing was oblong, sagittal, laterally concave and diverged slightly as in cats so that the pelvic inlet was funnel shaped (Dyce et al, 1996) and it was different from that of dogs (Nickel et al, 1986). The expanded caudal part of the body united with the ischium caudally and pubis medially and formed the acetabulum at the acetabular angle. Ilium presented two surfaces, three borders and three angles.

Gluteal surface of ilium was facing slightly upward and laterally. This surface presented a shallow sagittal fossa which divided the gluteal surface into an upper thick and a lower thin ridge. However in dogs, the fossa is deep as recorded by Miller (1965). This fossa possessed a thin and indistinct sagittal ridge at about its middle for the attachment of gluteus medius muscle. The medial surface or the sacro pelvic surface articulated with the wing of sacrum at the elevated articular surface a little posterior to its middle. The articular surface of ilium was smooth as in cat (Nickel et al, loc.cit.). The iliac tuberosity located cranio-dorsal to the articular surface was indistinct unlike in dogs (Miller, loc. cit.). The smooth, flat quadrilateral area located cranio dorsal to the articular surface formed the iliac surface for the muscle, iliacus. Extending from the articular surface to the iliopectineal eminence was the iliopectineal line or terminal line or arcuate line.

The cranial border or iliac crest was arc like with thin ventral and thick dorsal part and everted laterally as in heavy muscled breeds of dogs. Dorsal border was thick and its caudal half was concave forming the greater ischiatic notch as in dogs. Caudal to greater ischiatic notch the dorsal border of ilium united with that of ischium and formed the ischiatic spine. Dorsal to iliosacral joint, this border presented a slight elevation, the caudal dorsal iliac spine. The angle formed by the cranial and dorsal borders constituted the cranial dorsal iliac spine. These two spines with the intermediate border formed the tuber sacrale as in dogs (Miller, loc.cit.). Tuber sacrale was thick and rounded as in dogs. The ventral border was in the form of a thin ridge and showed a concavity at the level of greater ischiatic notch and represented the arcuate line.

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The psoas tubercle noticed at about the middle of the arcuate line was absent in leopards and hence it resembled more to that of the dog. The caudal limit of this border presented a small protuberance, the iliopubic eminence for the insertion of prepubic tendon. The angle formed by the cranial and ventral borders was the cranial ventral iliac spine.

Ischium formed the caudal part of os coxae and consisted of a body, ramus, table and a tuberosity. It was irregularly quadrilateral in shape and presented two surfaces, four borders and four angles as quoted by Getty (1975) in dogs. The body was placed lateral to the obturator foramen and its cranial lateral angle participated in the formation of acetabulum together with the ilium and pubis. The narrow rod like part of ischium was the ramus. This was located medial to the obturator foramen and joined with the caudal ramus of the pubis. The irregularly quadrilateral flattened portion of ischium caudal to the body formed the ischiatic table. The table united with the body of ischium laterally at an obtuse angle giving a twisted appearance. The caudolateral angle of the ischium constituted the ischiatic tuberosity or the tuber ischii. It was rough and hemispherical and increased in thickness from medial to lateral side as in the dog (Miller, loc. cit). Dorsal part of the tuber gave attachment to the sacrotuberal ligament and its ventral part to the powerful hamstring muscles, viz. the biceps femoris, semitendinosus and semimembranosus. The nodular thickening at the lateral aspect of ischiatic tuberosity as reported by Nickel et al. (loc. cit) in dogs was absent in leopards. The dorsal surface or the pelvic surface was smooth and slightly concave from side to side. The cranial border formed the caudal margin of obturator foramen. The caudal border was thick and rough and sloped medially and cranially and met the similar border of the other side and formed the ischiatic arch. The arch was deep unlike in dogs where it is shallow (Getty, loc. cit). The medial border or the symphyseal border was rough and met the opposite bone at the ischiatic symphysis. The lateral border was thick and rounded and formed the ischiatic spine and continued with the ilium cranially. Caudal to the spine, the border was flat and smooth and formed the lesser ischiatic notch for the passage of caudal gluteal vessels. However, the grooves at this area as reported by Miller (loc. cit) in dogs were not observed in leopards. The cranial lateral angle of ischium joined the ilium and pubis at the acetabulum. The cranial medial angle met the pubis and formed the medial boundary of the obturator foramen. Caudomedial angle joined its fellow at the ischial symphysis. Caudolateral angle constituted the ischiatic tuberosity.

Pubis constituted the smallest component of os coxae and occupied the cranial part of the pelvic floor. It was inclined caudally in relation to the vertebral column as reported in other carnivores (Nickel et al, loc. cit). It consisted of a body, two surfaces and three borders. Body was thick and met the ilium and ischium at the acetabulum. The cranial border of the body at its junction with the ilium presented the iliopsectineal eminence for the attachment of prepubic tendon as in dogs (Miller, loc. cit.). The medial border of the medial ramus united with its counterpart of the opposite side to form the pubic symphysis and was continued caudally with the ischiatic symphysis. The ventral surface of pubic symphysis presented the prominent pubic tubercle as in dogs. The ilia converged anteriorly as in dog so that the pelvic inlet was narrower than the outlet (Nickel et al, loc. cit).

Ilium, ischium and pubis formed a cotyloid cavity, the acetabulum for articulation with the head of femur. It was directed ventrolaterally and consisted of an articular and non-articular part. The articular part was called facies lunata and it was smooth and crescent shaped. This part enclosed a circular, non-articular depression viz. the acetabular fossa. The facies lunata was narrowest mid-laterally as in dogs (Miller, loc. cit). The acetabular margin showed an indentation medially, the acetabular notch which was more distinct than in dogs (Nickel et al, loc. cit). The acetabular notch presented a fissure which continued caudally into the ischium as in dogs (Nickel et al loc. cit). The obturator foramen was located between the pubis and ischium and was oval with the long axis directed cranio-laterally unlike the findings of Getty (loc. cit) in dogs. Its cranial margin presented an obturator tubercle.
and was grooved laterally for the passage of obturator nerves and blood vessels. However, in dogs the obturator tubercle is insignificant and the groove is shallow (Nickel et al., loc. cit).

Pelvic inlet was very oblique as the pubic brim was placed in level with the caudal limit of the sacrum. The pelvic outlet was wider than the pelvic inlet in leopards. The axis of the short pelvic canal of the leopard was straight.

Summary
The os coxae in leopard comprised of ilium, ischium and pubis. The ischium and pubis united ventrally to form the pelvic symphysis. The ilia converged anteriorly so that the pelvic inlet was narrower than the outlet. Pelvic inlet was oblique as the pubic brim was placed in level with the caudal limit of the sacrum and was narrower than the outlet. Cranial border of the ilium was arc like. The ischiatic tuberosity was placed caudally in relation to the vertebral column. The pubis was the smallest component of os coxae and occupied the cranial part of pelvic floor. The three bones of the os coxae formed the acetabulum for lodging the head of femur. The obturator foramen was oval with its long axis directed cranio-laterally.

References

Detection of Coliforms in Milk by Conventional and Rapid Techniques

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Abstract
The present study was conducted to assess the coliform and fecal coliform load of market milk using conventional MPN technique and to compare the conventional MPN technique with a rapid method to detect coliforms. Out of 10 raw milk samples tested all the samples had high coliform count. However, coliforms were not detected in 10 sterilized flavoured milk samples. Further, rapid coliform test showed good correlation with conventional MPN technique making it a suitable technique for rapid estimation of coliforms in milk.

Keywords: Raw milk, flavoured milk, coliform, MPN, rapid test

Milk is rich in nutrients and consumed by people of all age groups. Since milk is rich in nutrients and has near neutral pH, it provides ideal conditions for bacterial growth, (Lejeune and Rajala-Schultz, 2009). Although India is the largest milk producer in the world, the quality of milk and milk products is always a matter of concern since, milk production and marketing