

**Structure.**—The sacrum consists of cancellous tissue enveloped by a thin layer of compact bone.

**Articulations.**—The sacrum articulates with *four* bones; the last lumbar vertebra above, the coccyx below, and the hip bone on either side.

**Differences in the Sacrum of the Male and Female.**—In the female the sacrum is shorter and wider than in the male; the lower half forms a greater angle with the upper; the upper half is nearly straight, the lower half presenting the greatest amount of curvature. The bone is also directed more obliquely backward; this increases the size of the pelvic cavity and renders the sacrovertebral angle more prominent. In the male the curvature is more evenly distributed over the whole length of the bone, and is altogether greater than in the female.

**Variations.**—The sacrum, in some cases, consists of six pieces; occasionally the number is reduced to four. The bodies of the first and second vertebræ may fail to unite. Sometimes the uppermost transverse tubercles are not joined to the rest of the ala on one or both sides, or the sacral canal may be open throughout a considerable part of its length, in consequence of the imperfect development of the laminae and spinous processes. The sacrum, also, varies considerably with respect to its degree of curvature.

**The Coccyx** (*os coccygis*).—The coccyx (Fig. 100) is usually formed of four rudimentary vertebræ; the number may however be increased to five or diminished to three. In each of the first three segments may be traced a rudimentary body and articular and transverse processes; the last piece (sometimes the third) is a mere nodule of bone. All the segments are destitute of pedicles, laminae, and spinous processes. The first is the largest; it resembles the lowest sacral vertebra, and often exists as a separate piece; the last three diminish in size from above downward, and are usually fused with one another.

**Surfaces.**—The **anterior surface** is slightly concave, and marked with three transverse grooves which indicate the junctions of the different segments. It gives attachment to the anterior sacrococcygeal ligament and the Levatores ani, and supports part of the rectum. The **posterior surface** is convex, marked by transverse grooves similar to those on the anterior surface, and presents on either side a linear row of tubercles, the rudimentary articular processes of the coccygeal vertebræ. Of these, the superior pair are large, and are called the **coccygeal cornua**; they project upward, and articulate with the cornua of the sacrum, and on either side complete the foramen for the transmission of the posterior division of the fifth sacral nerve.

**Borders.**—The **lateral borders** are thin, and exhibit a series of small eminences, which represent the transverse processes of the coccygeal vertebræ. Of these, the first is the largest; it is flattened from before backward, and often ascends to join the lower part of the thin lateral edge of the sacrum, thus completing the foramen for the transmission of the anterior division of the fifth sacral nerve; the others diminish in size from above downward, and are often wanting. The borders of the coccyx are narrow, and give attachment on either side to the sacrotuberous and sacrospinous ligaments, to the Coccygeus in front of the ligaments, and to the Glutæus maximus behind them.

**Base.**—The base presents an oval surface for articulation with the sacrum.

**Apex.**—The apex is rounded, and has attached to it the tendon of the Sphincter ani externus. It may be bifid, and is sometimes deflected to one or other side.

**Ossification of the Vertebral Column.**—Each cartilaginous vertebra is ossified from three primary centers (Fig. 101), two for the vertebral arch and one for the body.<sup>1</sup> Ossification of the vertebral arches begins in the upper cervical vertebræ about the seventh or eighth week of fetal life, and gradually extends down the column. The ossific granules first appear in the situations where the transverse processes afterward project, and spread backward to the spinous process forward into the pedicles, and lateralward into the transverse and articular processes. Ossification of the bodies begins about the eighth week in the lower thoracic region, and subsequently extends upward and downward along the column. The center for the body does not give rise to the whole of the body of the adult vertebra, the postero-lateral portions of which are ossified by extensions from the vertebral arch centers. The body of the vertebra during the first few years of life shows, therefore,

<sup>1</sup> A vertebra is occasionally found in which the body consists of two lateral portions—a condition which proves that the body is sometimes ossified from *two* primary centers, one on either side of the middle line.