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Evolution of the sacrum in hominoids.

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Author information

Abstract

In order to study the formation of the sacrum during the primate evolution, a new way of numbering mammalian vertebrae is presented; this demonstrates that the thoracolumbosacral complex is fixed at 22 vertebrae in 80% and at 22 +/- 1 in 100% of the cases. The shift of a vertebra from one type to another occurs either at the thoracolumbar or at the lumbosacral junction and not at the cervicothoracic junction. Rarely does the shift take place at the sacrococcygeal junction. Data from 318 primates reveal that the seven original lumbar vertebrae of the Old World monkeys are reduced in the great apes by a caudad "thoracization" of one to two lumbar vertebrae and a cephalad sacralization of one to four lumbar vertebrae. In the apes, sacralization is not total and different stages that are intermediate between lumbar and sacral are described. In Homo sapiens there is a total sacralization of the last two original lumbar vertebrae. In addition, development of the sacral wings (alae) is minimal in apes and reaches its maximum in hominids. The tendency of the hominoid sacrum to incorporate the last lumbar vertebrae and to widen markedly provides for an enhanced articulation of the sacrum with the ilium and offers a firm base of support for the trunk during erect posture. This is necessary for the support of the weight of the trunk above the sacrum and for the stabilization of the body during bipedal posture and locomotion. Encephalization did not play any major role in the widening of the sacrum since the former by far preceded the latter.

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