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Abstract

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Evolution of the ischial spine and of the pelvic floor in the Hominoidea.

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Abstract

Study of the pelvis in 143 different mammals reveals that in quadrupeds the **ischial** spines are barely noticeable and are located posteriorly near the sacrum. In humans, the **ischial** spines are prominent and more anteriorly located. As a consequence of their position and size, the **ischial** spines in humans become an obstacle to parturition. Herein a theory is proposed to account for what appears to be an incongruous development and orientation of the **ischial** spines in humans. The **pelvic** diaphragm is a vertical **pelvic** "wall" in tailed mammals and is composed of muscles involved mostly with the motion of the tail. In humans, the muscles of the **pelvic** diaphragm have a very different anatomical orientation. They form a horizontal **pelvic** "**floor**," and their functions are first to support the abdominopelvic organs and resist intra-abdominal pressure that is exerted from above, and second, as levator ani, to control the anal sphincter. In humans the muscles and fascias of the **pelvic** diaphragm are inserted on the **ischial** spines either directly or indirectly through the sacrospinous ligament and the tendinous arch of the **pelvic** fascia. The result is a medial pull on the **ischial** spines to produce a more rigid and narrower **pelvic floor**. An inconstant ossification center for the **ischial** spines make them more prominent. The backward tilt of the sacrum placed the bispinal line in a diameter position. Pongids and even fossil hominids occupy an intermediate position between tailed mammals and Homo sapiens. The present form of the pelvis in Homo sapiens may be determined by a significant genetic component but may also be partly acquired during childhood and adolescence.

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