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Evolution of the lumbosacral angle.

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Abstract

The lumbosacral angle (LSA) was studied in 131 children ranging in age from birth to 5 years. This angle increases from an average of 20 degrees at birth to an average of 70 degrees at the age of 5 years; it remains at that level thereafter. This study demonstrates that the formation of the LSA is not related to increasing age, height, or weight. Nor do obstetrical requirements seem to play any major role in the formation of the lumbosacral angle. Rather, it appears that the development of the LSA is related to the progressive acquisition of erect posture and the ontogeny of bipedal locomotion. This angle is almost nil in the nonprimate mammals (who only infrequently stand erect). It is minimal in monkeys who occasionally assume bipedal postures and increases somewhat in living apes who engage in facultative bipedal positional behavior. In the early australopithecines, the LSA is increased over that in apes, and it reaches its maximum in *Homo sapiens*. Deviations from normal and healthy erect posture in *Homo sapiens* result in corresponding changes in the lumbosacral angle. Lumbar and sacral angles (both forming the lumbosacral angle) are almost equal in all mammalian species. Since the sacral angle of *Australopithecus afarensis* is approximately 15 degrees, it can be implied that its lumbosacral angle was small, thus attesting to its "imperfect" erect posture and "primitive" form of bipedal locomotion.

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