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An assessment of developmental anomalies in the thoraco-lumbosacral region of South Africans

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Abstract

Developmental anomalies, typically caused by epigenetic interactions, are very common in the human vertebral column. Many studies have been conducted to assess their prevalence in different populations. Several studies have shown differences in the prevalence and expression of vertebral anomalies among populations and between the sexes. These differences may be related to different geographical areas and the environmental conditions posed by these, socio-economic status, diets, lifestyles and/or gender roles, to name a few. Therefore, this study aimed at assessing the prevalence and pattern of six developmental anomalies in the thoraco-lumbosacral regions and their possible associations with vertebral pathologies in South Africans.

The study comprised skeletal remains of 902 individuals. The remains were procured from the Raymond A. Dart Collection of Modern Human Skeletons, the Pretoria Bone Collection and the Kirsten Bone Collection. The sample included South African Blacks (SAB) (*n*=325), South African Coloureds (SAC) (*n*=286) and South African Whites (SAW) (*n*=291). The most common vertebral developmental anomaly observed in this study was sacralisation (5.7%), followed by spina bifida occulta (4.5%), spondylolysis (4.5%), L6 (3.1%), and T13 (2.2%). The lowest prevalence was seen for lumbarisation at 1.9%. Overall, developmental anomalies were most prevalent in the SAB sample compared to the SAC or SAW. These anomalies were generally more prevalent in males of the total sample and within the three populations groups of the study. The high prevalence of most developmental anomalies in the SAB sample may be mostly related to the low socio-economic status associated with Black South Africans under the apartheid era.

The presence of multiple anomalies was more prevalent in Blacks (44.4%). Blacks also had a higher prevalence for multiple anomalies accompanied by some form of spinal pathology (50%). Whites, on the other hand, had a higher prevalence of a single developmental anomaly accompanied by some form of spinal pathology (50%). In general, males were more prone to developing multiple anomalies accompanied by some form of spinal pathology.

There was substantial variation observed with regards to the presentation of the six developmental anomalies in and between the samples under study. Therefore, inter- and intra-population differences, as well as sex differences, should be considered when dealing with the above developmental anomalies in biological anthropological and clinical settings.