

The Correlation between Body Composition and Spinal Alignment in Healthy Young Adults

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Abstract : Although it is thought that abdominal adiposity is one of the risk factor for postural deviation, such as increased lumbar lordosis, the body mass index is not sufficient to indicate effects of abdominal adiposity on spinal alignment and postural changes. The aim of this study was to investigate the correlation with detailed body composition and spine alignment in healthy young adults. This cross-sectional study was conducted with sixty seven healthy volunteers (37 men and 30 women) whose ages ranged between 19 and 27 years. All participants' sagittal spinal curvatures of lumbar and thoracic region were measured via Spinal mouse® (Idiag, Fehraltorf, Switzerland). Also, body composition analysis (whole body fat ratio, whole body muscle ratio, abdominal fat ratio, and trunk muscle ratio) estimation by means of bioelectrical impedance was evaluated via Tanita Bc 418 Ma Segmental Body Composition Analyser (Tanita, Japan). Pearson's correlation was used to analysis among the variables. The mean lumbar lordosis and thoracic kyphosis angles were $21.02^{\circ} \pm 9.39$, $41.50^{\circ} \pm 7.97$, respectively. Statistically analysis showed a significant positive correlation between whole body fat ratio and lumbar lordosis angle ($r=0.28$, $p=0.02$). Similarly, there was a positive correlation between abdominal fat ratio and lumbar lordosis angle ($r=0.27$, $p=0.03$). The thoracic kyphosis angle showed also positive correlation with whole body fat ratio ($r=0.33$, $p=0.00$) and abdominal fat ratio ($r=0.40$, $p=0.01$). The whole body muscle ratio showed negative correlation between lumbar lordosis ($r=-0.28$, $p=0.02$) and thoracic kyphosis angles ($r=-0.33$, $p=0.00$), although there was no statistically correlation between trunk muscle ratio, lumbar and thoracic curvatures ($p>0.05$). The study demonstrated that an increase of fat ratio and decrease of muscle ratio in abdominal region or whole body shifts the spinal alignment which may adversely affect the spinal loading. Therefore, whole body composition should be taken into account in spine rehabilitation.

Keywords : body composition, lumbar lordosis, spinal alignment, thoracic kyphosis

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