Dual-energy X-ray absorptiometry assessment of bone and body composition in youth: An anthropomorphic phantom to normalize results

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Dual-energy X-ray Absorptiometry (DXA) is a valuable technique to assess the Bone Mineral Content (BMC) and body composition in Lean Tissue Mass (LTM) and Fat Mass (FM). However, measured values for each of these body components are depending on the DXA system used even from the same brand. Therefore DXA results can be difficult to compare and this can be confusing, especially in multicenter studies. The aim of this work was to develop an anthropomorphic phantom to make data corrections from one system to another. This phantom had the size of a 12 year-old child and was made from synthetic resins with absorption for the X-ray energies used equivalent to that of bone and soft tissues, respectively. It was composed of 14 pieces (head, trunk, pelvis, arms and legs (both in 2 pieces) and 3 abdominal supplemental pieces to mimic fat in overweight and obese youths). With this phantom, it is then possible to obtain a set of data from 4 measurements, each of them performed with different body composition. With this kind of phantom it was found that values for BMC of the entire skeleton, LTM and FM showed differences of 12.5%, 4.5% and 23.0%, respectively for measurements performed with three DXA systems from different brands. These large differences illustrate how important it is to make data corrections when the results of measurements for bone and body composition obtained on different DXA systems should be compared.

Biography

P M Braillon obtained his PhD in Solid State Physics and was teaching “Materials and Biomaterials”. He completed his MD and specialized in Pediatric Radiology with most of his activity in bone and body composition assessment in neonates, children, adolescents and young adults, since the beginning of dual photon absorptiometry and dual-energy X-ray absorptiometry.

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