

# Nouvelle Publication Internationale - Costa et al., 2022

Publié le 7 juin 2022 – Mis à jour le 7 juin 2022



Date(s)

du 22 mai 2022 au 4 février 2023

Growth, body composition and bone mineral density among pubertal male athletes: intra-individual 12-month changes and comparisons between soccer players and swimmers Daniela C Costa, João Valente-Dos-Santos, Paulo Sousa-E-Silva, Diogo V Martinho, João P Duarte, Oscar M Tavares, Joaquim M Castanheira, Tomás G

**Background:** Puberty is a period of intense changes in human body and, additionally, participation in sports is viewed as prominent form of physical activity among male adolescent athletes. The current study was aimed to examine the intra-individual changes in body composition and bone tissue during

Oliveira, Sandra Abreu, Neiva Leite, Ricardo R Agostinete, Rômulo A Fernandes, Daniel Courteix, Manuel J Coelho-E-Silva BMC Pediatrics volume 22,

Article number: 275 (2022) New international publication from Daniela Costa's PhD co-supervised by the Professor Courteix Daniel (AME2P, UCA) and the Professor Coelho-Silva Manuel J (Coimbra University, Portugal).

years of maximal growth and the effect of 12-month participation in sports contrasting in mechanical impact.

**Methods:** The sample included 40 male adolescent athletes (soccer: n = 20; swimming: n = 20) aged  $12.57 \pm 0.37$  years who were followed for 12 months. Stature and body mass were measured, bone

mineral content (BMC), areal bone mineral density (aBMD), lean soft and fat tissues assessed using DXA. Food intake was estimated using a questionnaires and training sessions individually monitored. Repeated measures ANOVA tested the differences between sports and 12-month intra-individual variation (time moments: TM1, TM2). The analyses on aBMD for total body and total body less head were repeated controlling for variation in stature at baseline.

**Results:** Soccer players completed  $63 \pm 31$  sessions ( $95 \pm 47$  h). Respective values for swimmers were  $248 \pm 28$  sessions and  $390 \pm 56$  h. In general, the analysis of aBMD as dependent variable evidenced significant effect of sport-associated variation ( $F = 5.254$ ,  $p < 0.01$ ;  $^2 = 0.35$ ) and 12-month increments, particularly at lower limbs ( $F = 97.238$ ,  $p < 0.01$ ;  $^2 = 0.85$ ). Respective mean values for aBMD were  $SCC_{TM1} = 0.885 \text{ g.cm}^{-2}$ ,  $SWM_{TM1} = 0.847 \text{ g.cm}^{-2}$ ,  $SCC_{TM2} = 0.939 \text{ g.cm}^{-2}$ ,  $SWM_{TM2} = 0.880$ . Regarding the lean soft tissue, the magnitude of effects was very large for intra-individual variation ( $F = 223.043$ ,  $p < 0.01$ ;  $^2 = 0.92$ ) and moderate between sports ( $F = 7.850$ ,  $p < 0.01$ ;  $^2 = 0.41$ ):  $SCC_{TM1} = 30.6 \text{ kg}$ ,  $SWM_{TM1} = 34.9 \text{ kg}$ ,  $SCC_{TM2} = 35.8 \text{ kg}$ ,  $SWM_{TM2} = 40.5 \text{ kg}$ . Finally, d-cohen values reporting percentage of intra-individual changes in aBMD between soccer players ad swimmers were large for the trochanter ( $d = 1.2$ ; annual increments:  $SCC = 8.1\%$ ,  $SWM = 3.6\%$ ).

**Conclusion:** Puberty appeared as a period of significant intra-individual changes in lean soft tissue and bone mineral density. With increasing accumulated training experience, mean difference between sports contrasting in mechanical impact tended to me more pronounced in particular at the lower limbs.

**Keywords:** Body composition; Bone health; DXA; Mechanical loading; Youth sport.

<https://bmcpediatr.biomedcentral.com/articles/10.1186/s12887-022-03321-2>(<https://bmcpediatr.biomedcentral.com/articles/10.1186/s12887-022-03321-2>)

<https://ame2p.uca.fr/actualites/focus/nouvelle-publication-internationale-costa-et-al-2022>(<https://ame2p.uca.fr/actualites/focus/nouvelle-publication-internationale-costa-et-al-2022>)