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## Using Social Network Analysis to Study Relationships Between Young Soccer Players' Bone Age, Body Size, and the Centrality of Their Pass Interactions

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### Abstract

Prior research has suggested relevance to anthropometric variance of youth athletes at various stages of their maturation, and prior studies of youth players' soccer skills have failed to consider their interdependent interactions during play. Accordingly, to address both of these separate research omissions, we aimed in this study to analyze the relationships between young (U-13 and U-15 groups) soccer players' bone age and body size indicators and centrality measures of their pass interactions during small sided games. We included young 81 athletes ( $M$  age = 14.4,  $SD$  = 1.1 years) from whom we took anthropometric measurements of body mass, height, and trunk-cephalic height and obtained their bone age using the Tanner-Whitehouse 3 classification method. We also filmed small-sided games in the goal keeper/three player (GK3-3GK) format to analyze the centrality of their passing actions on the following measures: degree of centrality, closeness of centrality, degree of prestige, and proximity of prestige. There were no group differences in the prominence of passing actions across these three measures ( $t_{\text{mean}} = -3.13$ ;  $p > .05$ ). Canonical correlations of these relationships were significant only in the U-13 group, in which centrality in passing actions was related to body size ( $r = 0.71$ ;  $R^2 = 0.21$ ;  $\lambda = 0.28$ ;  $p = .03$ ). U-13 players who were physically larger and who presented higher bone age showed centralized main passing actions.

**Keywords:** maturation; small-sided soccer; soccer; sports performance; youth.

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