

ULTRASOUND-BASED SKELETAL AGE AND ITS ASSOCIATION WITH PHYSICAL PERFORMANCE IN SLOVAK YOUTH ICE HOCKEY PLAYERS: A PRELIMINARY STUDY

*Petra Svabova^{1,2}, Lucia Bundova^{1,2,3}, Michal Sotak¹, Matej Thomka² and
Radoslav Benus¹*

¹Comenius University, Faculty of Natural Sciences, Department of Anthropology, Bratislava, Slovakia; ²National Sports Centre, Bratislava, Slovakia; ³Comenius University, Faculty of Education, Department of Pre-Primary and Primary Education, Bratislava, Slovakia

Background: Biological maturation is an important factor influencing physical performance in youth athletes. Differences between chronological and skeletal age may contribute to variability in strength, speed, and overall athletic performance. Assessing skeletal age using non-invasive methods may provide valuable insights for sports practice.

Objective: This preliminary study aimed to evaluate differences between chronological and skeletal age and examine the relationship between skeletal age and physical performance in youth ice hockey players.

Subjects and methods: A total of 48 male youth ice hockey players were assessed. Chronological age ranged from 8.23 to 12.47 years (mean 9.86 ± 0.95 years). Skeletal age was determined using the BAUSport ultrasound device and players were classified as early, on-time, or late maturers. Physical performance was evaluated using a 20 m sprint test (0–10 m, 10–20 m, 0–20 m), a 2 kg medicine ball throw, and an agility test (5–0–5). Correlation analysis and non-parametric Kruskal–Wallis tests with post hoc comparisons were used.

Results: The distribution of maturation timing showed that 46% of players were early maturers, 50% on-time, and 4% late maturers. A strong positive correlation was found between skeletal age and upper limb strength ($r=0.696$, $p<0.001$). No significant correlations were observed between skeletal age and sprint performance. Significant differences between maturation groups were found for the medicine ball throw ($p=0.022$), with early maturers outperforming on-time peers ($p=0.036$). No significant differences were observed for sprint or agility performance.

Conclusions: Skeletal age appears to significantly influence upper limb strength but not speed or agility in youth ice hockey players. Early maturers demonstrate performance advantages, which may contribute to selection bias. These findings highlight the importance of considering skeletal age in talent identification and may provide practical guidance for coaches in optimizing training and athlete evaluation.

Keywords: Skeletal age; Ultrasound assessment; Youth athletes; Ice hockey; Physical performance.