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**AGE-RELATED DIFFERENCES IN MUSCLE
CONTRACTILE PROPERTIES OF YOUNG SOCCER
PLAYERS**

ČECH Pavol¹, BAKALÁR Peter¹, SUČKA Jaroslav¹,
RUŽBARSKÝ Pavel¹, POLAN Peter^{2,3}, RUŽBARSKÁ
Beáta¹, VAŠKOVÁ Monika¹

¹University of Presov, Faculty of Sports

²Department of Musculoskeletal and Sports Medicine, AGEL
Hospital Košice-Šaca

³Pavol Jozef Šafárik University in Košice, Faculty of Medicine

BACKGROUND: Soccer is a sport that consists of intermittent high-intensity exercises including sprinting, jumping and multiple changes of direction. The contractility of muscles, among other aspects, is a determinant for these activities. It is the underlying contractile properties of the lower limb muscles that are related to physical performance and the percentage decline in performing repetitive high-intensity activities that are characteristic for soccer. Research studies claim that muscle fibres are highly adaptable as a result of habitual patterns of physical activity and ageing. **PURPOSE:** The aim of this study is to describe changes in muscle fibre properties of young

soccer players as influenced by age. **MATERIALS and METHODS:** The presented data are a part of the ongoing research project ERASMUS+ Sport: Collaborative Partnerships no. 622594-EPP-1-2020-1-SK-SPO-SCP "Physical activity-related injuries prevention in adolescents (PARIPRE)". The study group consisted of a total of 267 male soccer players (members of talented youth teams) aged 12-15 years. In order to meet the objective, players were divided according to their calendar age at the time of measurement into the following subgroups: S12 (n=88, (mean±SD) age 12.6±0.3 y., height 155.5±7.8 cm, weight 46.6±9.1 kg), S13 (n= 56, age 13.4±0.3 y., height 160.7±8.9 cm, weight 50.4±9.5 kg), S14 (n= 79, age 14.6±0.3 y., height 172.9±7.6 cm, weight 58.1±10.3 kg) and S15 (n= 44, age 15.2±0.2 y., height 174.9±6.7 cm, weight 59.0±9.4 kg). Contractile properties of the biceps femoris (BF), gastrocnemius medialis (GcM), gluteus maximus (GM), vastus lateralis (VL) and vastus medialis (VM) on the right and left leg were assessed using tensiomyography methods (TMG-BMC Ltd, Slovenia). Evaluated parameters were contraction time (Tc), maximal amplitude (Dm) of the muscle belly and radial velocity (Vc). The Shapiro-Wilk test showed a non-normal distribution of the data; therefore, the Kruskal-Wallis H test (K-W Anova) with multiple pairwise comparisons was used for evaluation of the age factor. **RESULTS:** The results of K-W Anova analyses showed significant differences in contraction time (Tc) only for GcM contraction both for the right and left leg ($H_{(3,267)}=17.522$, $p=0.001$; $H_{(3,267)}=13.872$, $p=0.003$). In the stiffness characteristics (Dm), age-related differences for GM were as follows: ($H_{(3,267)}=16.335$, $p=0.001$; $H_{(3,267)}=15.259$, $p=0.002$ for the right and left side, respectively) and for VL ($H_{(3,267)}=8.847$, $p=0.031$ for the left side only). In the Vc indicator, significant age differences were found in the same muscles: GM ($H_{(3,267)}=14.356$, $p=0.002$; $H_{(3,267)}=12.261$, $p=0.007$ for the right and left side, respectively) and VL ($H_{(3,267)}=9.625$, $p=0.022$; $H_{(3,267)}=12.210$, $p=0.007$ for the right and left side, respectively). **CONCLUSIONS:** The results of the analyses are inconclusive, showing no trend in year-to-year changes in the contractile properties of the diagnosed muscles of soccer players aged 12-15 years. As significant in terms of the influence of age, with the assumed transfer of the training load effect, the evaluation of the characteristics of the gluteus maximus and vastus lateralis muscles in particular appears to be significant. For the evaluation of the contraction rate, from the perspective of age, the control of the gastrocnemius medialis is essential.

Keywords: Ageing. Tensiomyography. Muscle belly characteristics. Contraction time. Velocity of contraction.

pavol.cech@unipo.sk

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