DYNAMIC OF SPRINT RUNNING

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Introduction
The velocity curve of top-level sprinters running over 100m course are already well known but no one has yet evaluated sprinting activity of athletes who have not been selected nor trained for sprinting event in track-and-field. In modern sport there is a lot of sporting activities which are based upon high levels of motor abilities which are best expressed in 100m running – speed, speed endurance, power. Therefore, the issues related to the quality and development of these abilities are becoming ever more interesting for training practice in all sporting events.

Methods
The research was conducted on the sample of 133 male PE students, aged 19-24 years (average age 21.7 ± 1.08 yrs; body height 180.8 ± 6.98 cm; body weight 76.6 ± 7.62 kg). Measurement was conducted by means of an electronic measurement device consisting of Omega start block, photocells and the special software. In this research the dynamics of sprinting over 100m was observed across ten segments of ten metres each; latent reaction time were registered. The hierarchical cluster analysis (Ward, 1963) was used to determine relatively homogeneous groups of students of different characteristics of sprinting (A 11.85 s ± 0.22; B 12.62 ± 0.13; C 13.07 ± 0.14; D 13.71 ± 0.23). The segment of maximum sprinting speed was determined for each analysed group. The values of maximum sprinting speed were reduced by the standard deviation typical for each group.

Results and discussion
According to the accessible literature, the following segments of sprinting dynamics over 100m course are known: starting acceleration, maximum sprinting speed and deceleration. In this investigation more segments were found: six in group A, seven in group D and eight in groups B and C. Length of particular segments varied. In starting acceleration, which is a very dynamic part of sprinting, three segments were obtained in all observed groups. The segment of achieving maximum sprinting speed (according to literature, 30-60 m) is in group D 20 m long (30-50 m), in group B and C it is 30 m long (30-60 m), whereas in group A it is 50 m long (30-80 m). From the obtained results it is feasible to conclude that length of the segment of maximum sprinting speed is directly proportional to the progression of running quality, which also imposes higher demands on specific sprinting speed endurance. According to the length of the segment of maximum sprinting speed, the period of deceleration also varied across the groups and their length also differ from the ones reported in literature: the better the running times, the shorter the segment of deceleration (in group D between 50-100 m, in groups B and C between 60-100 m, and in group A between 80-100 m). One must not forget that the latter length depends primarily on speed endurance of running.

Conclusion
In comparison to the already reported results in previous studies, the present study is the first one in which the obtained and presented results indicate quite different structure of running dynamics. Although, to be fair enough, certain researchers have pointed to different velocity curve during the course of 100m sprint event, but only in case studies observing world-class sprinters. We assumed that the determination of running dynamics over 100m, performed by the track-and-field’s criteria, in non-sprinting examinees would contribute to establishing certain sprinting regularities. In other words, we tried to indicate the facts that might limit the progress in learning how to sprint over short courses.

Keywords: Track and Field, Motion Analysis, Sprint