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## The Effects of Different Surfaces on Running Kinematics in Collegiate Athletes

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The use of surfaces other than grass for sporting activities (e.g., football, soccer, running) has increased in recent years. The influence of different surfaces on the kinematics of running is an important area of research. A thorough understanding of the biomechanical effects of the surfaces on running may lead to better performances. **PURPOSE:** The purpose of this study was to determine the effects of different surfaces on the kinematics of running performance of collegiate student athletes. **METHODS:** Nine males (age 20 ± 1 yrs) completed the study. Each participant performed a 20-yard trial run on each surface for acclimatization purposes. After a 2-minute rest period, participants completed three 20 yard sprints separated by a 2 minute rest period. Four surfaces were tested (artificial turf, natural grass, asphalt, sand). Each surface was tested on a different day to allow for optimal performance. Stopwatches were used to record run times and a high-speed camera was used to record video of each performance. Kinematic data (sprint time, step length, & step frequency) were obtained from the video recordings, and ANOVA tests and pairwise comparisons were used to assess for statistical differences. **RESULTS:** Significant differences ($p < 0.05$) in step frequency were found between grass (4.18 ± 0.26 steps/second) and asphalt (3.82 ± 0.27 steps/second), and grass and sand (3.82 ± 0.22 steps/second). No significant differences were found in running times between surfaces (range 2.98 to 3.15 seconds) nor in step lengths between surfaces (range 1.63 to 1.73 meters). **CONCLUSION:** The results of this investigation revealed differences in step frequencies between some of the surface types, while no significant differences were found for sprint times or step lengths. **SIGNIFICANCE/NOVELTY:** The step frequencies obtained in the current investigation (3.82 to 4.18 steps/s) are smaller than those of elite sprinters such as Usain Bolt (4.28 steps/s) but larger than the 3 steps/s rate used by elite distance runners. Moreover, the step length used by Bolt (2.44 m) is larger than those found in the present study (~1.7 m). The differences in step frequency and step length between collegiate athletes and elite sprinters help to explain the gap in running times between athletes of different competitive levels.