Sprint characteristics and proportion of the horizontal performance of the lower extremities of a one man push start in bobsledding through field testing

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Bobsleigh requires a fast force and speed to be able to reach a satisfying performance. This occurs mainly at the push-start of the track together with the entire bobsled team. Authors clarified that the push-start defines 1/3 of the ending time of the run. However, there is not much literature of how the condition level of the lower limbs should be for a bobsled runner when pushing the sled. The purpose of this study was to clarify and compare suitable sprint characteristics in male and female bobsled athletes and to ascertain how high the proportion of the horizontal power in resisted sprinting with light (3 kg) and heavy (21 kg) weight could be in a one-man bobsled push. Fourteen Swiss National bobsled athletes (n = 9 men; age = 24.1 ± 2.6 years; mass = 99.7 ± 7.8 kg; height = 184.4 ± 4.6 cm; and n= 5 women; age = 24.5 ± 4.5 years; mass = 74.9 ± 2.9 kg; height = 174.0 ± 3.7 cm) participated in this study. Athletes ran four trials on a 30 m track with a tensile rope attached around their hips and towed four different external loads (3, 9, 15 and 21 kg). The step patterns were measured in three different sprint distances (0-10, 10-20 and 20-30 m). Whereas, in the horizontal performance test the athletes' power was measured and correlated with a one-man roll bob push test (heavy sled; 45 kg women, 50 kg men) performed on a 30 m track (plus 10 m fly-zone). The sprinting kinematics and maximum forces, correlations, significances, explained variances and the test for differences were statistically calculated with the statistical program SPSS depending on the question. Results showed that when external loads are added to a sprint, the step patterns are affected, in particularly when their weight increases. Stride length, stride frequency and velocity decrease while ground contact time increases and the percentage average difference get's larger compared to the unloaded sprint as the external loads get greater. However, they reverse as the athlete increases the own velocity. The horizontal performance with heavy load (21 kg) has a significantly relationship of 88 % with the one-man roll bob push (heavy sled), whereas the lighter weight (3 kg) not. Females reached their peak performance with 12 % of external load according to their body mass, whereas by males was set at 21 %. The difference between female and male athletes already begins in the constitution in their muscles. Women can produce less force than men and consequently get tired more easily and have a greater counterweight to the load due to their lighter body mass. Towing a resistant external weight could be a very practical training for bobsled athletes, in which they can improve their acceleration and fast velocity so that they can start efficiently at their push-start.

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