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Does shooting performance influence pacing strategies in sprint and individual biathlon competition?

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INTRODUCTION:

The importance of effective pacing strategies within biathlon competition is well documented (1), as is the fact that shooting performance is a key determinant of competitive success (2). Despite pacing and shooting being important performance indicators within biathlon, the interaction between these two performance factors is yet to be investigated. As such, the purpose of the present study was to examine the influence of shooting performance on pacing within sprint and individual biathlon

METHODS:

Eight female biathletes (age 27 ± 2 years, International Biathlon Union points 45 ± 18) competing at the 2019 IBU World Championships gave their written informed consent to participate in the study. Global navigation satellite system, shooting accuracy and range time data were collected during the sprint and individual competitions. Shooting bouts within each race and lap were classified as “accurate” or “inaccurate” and “fast” or “slow”. For accuracy quartiles 1 and 2 = accurate, quartiles 3 and 4 = inaccurate (sprint <80% prone <80%, standing; individual prone <90%, standing <90%). For shooting speed quartiles 1 and 2 = fast, quartiles 3 and 4 = slow (sprint >24.6 s prone >23.3 s, standing; individual prone >29.3 s, standing >25.9 s). Data were analysed to examine pacing strategies and determine if skiing speed differed following accurate or inaccurate and fast or slow shooting bouts.

RESULTS:

Terrain differed across the courses for both sprint and individual competitions ($p < 0.001$). In both cases courses were primarily comprised of mixed terrain (~63%), with the remaining ~20%, ~15% and ~2% of the courses being comprised of downhill, incline and severe incline. Effects of terrain were observed for skiing speed (both $p < 0.001$), with biathletes skiing fastest downhill and slowest across terrain classified as severe incline. Biathletes skied fastest in the first and final laps of both sprint and individual competitions (all $p < 0.05$). No differences in shooting accuracy were observed between laps within sprint and individual competitions. Within the sprint competition biathletes took significantly longer ($p = 0.034$) to complete all 5 shots in lap 1 than lap 2. Within the individual competition biathletes took significantly longer to complete all 5 shots in lap 3 than laps 2 ($p = 0.041$) and 4 ($p < 0.001$). Skiing speed was not different in either event following fast, slow, accurate or inaccurate shooting bouts.

CONCLUSION:

Within this small sample of elite biathletes shooting performance did not impact on pacing strategies in sprint and individual competitions. This preliminary data indicates that pacing across laps and within races is independent of shooting performance. Future research should seek to examine this in a larger sample across differing competition formats.

¹ Laaksonen et al. (2018), ² Luchsinger et al. (2019)

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