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Aishwarya R

Manipal College of Health Professions

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Time-of-day variation on performance measures related to anaerobic power and capacity: A systematic review.

Numerous functional measures related to anaerobic performance display daily variation. The diversity of tests and protocols used to assess anaerobic performance related to diurnal effects and the lack of a standardized approach have hindered agreement in the literature. Therefore, the aim of the present study was to investigate and systematically review the evidence relating to time-of-day differences in anaerobic performance measures. The entire content of PubMed (MEDLINE), Scopus, SPORTDiscus® (via EBSCOhost) and Web of Science, and multiple electronic libraries were searched. Only experimental research studies conducted in male adult participants aged ≥ 18 yrs before May 2021 were included. Studies assessing tests related to anaerobic capacity or anaerobic power between a minimum of two time-points during the day (morning vs evening) were deemed eligible. The primary search revealed that a total of 55 out of 145 articles were considered eligible and subsequently included. Thirty-nine studies assessed anaerobic power and twenty-five anaerobic capacity using different modes of exercise and test protocols. Forty-eight studies found several of their performance variables to display time-of-day effects, with higher values in the evening than the morning, while seven studies did not find any time-of-day significance in any variables which were assessed. The magnitude of the difference is dependent on the modality and the exercise protocol used. Performance measures for anaerobic power found jump tests displayed 2.7 to 12.3% differences, force-velocity tests ~8% differences, sprint tests 2.7 to 11.3% differences and 5-m multiple shuttles run tests 3.7 to 13.1% differences in favour of the evening. Performance measures for anaerobic capacity found Wingate test to display 1.8 to 11.7% differences and repeated sprint tests to display 3.4 to 10.2% differences. The only test not to display time-of-day differences was the running based anaerobic sprint test (RAST). Time-of-day variations in anaerobic performance have previously been partially explained by higher core-body and/or muscle temperature and better muscle contractile properties in the afternoon, although recent findings suggest that differences in methodology, motivation/arousal, habitual training times, and chronotypes could provide additional explanations. There is a clear demand for a rigorous, standardized approach to be adopted by future investigations which control factors that specifically relate to investigations of time-of-day.