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Custom-made badminton-specific fitness test discriminates competitive level of players

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INTRODUCTION:
Badminton is an intensive sport and demands both aerobic and anaerobic capacities (Phomsoupha and Laffaye, 2015). Many lunge steps are performed with unequal loads on each side of the legs in the game. Therefore, conventional tests consisted of cyclic and symmetrical exercises (e.g., running, pedalling) may not evaluate the physical fitness of badminton players. We have found that the anaerobic power test on a bike or the lactate curve test by running could not discriminate the physical fitness between international and national levels (unpublished data). Therefore, we developed a novel badminton-specific fitness test and examined if that could discriminate the competitive level of players.
METHODS:
Ten collegiate women competitive badminton players participated in the study. Five of them earned a podium of the Japanese intercollegiate tournament (highly-trained), while the others were unable to participate (trained). The participants performed the badminton-specific test on a court. They reacted quickly with badminton-specific movements to sensors located at four corners of the court from the center. The direction was pseudo-randomly selected by software and displayed on a monitor located on the opposite court. They reacted eight times at specific intervals (depending on the stage, described below), which were repeated six sets with a rest of 20 seconds in each stage. There were three stages in the test and exercise intensity was increased by shortening the intervals between each reaction, such as 1.2, 1.0, and 0.8 seconds for stage 1, stage 2, and stage 3, respectively. The time from the displayed direction to reaching the sensors (reach time) were averaged in each stage. Blood lactate accumulation (BLa) was measured from finger tips between stages (rest of 75 seconds). The effect size (r) was calculated to compare averaged reach time and BLa between competitive levels. The value of r was interpreted as $0.10 < r \leq 0.30$ for small effect, $0.30 < r \leq 0.50$ for medium effect, and $0.50 < r$ for large effect.
RESULTS:
Reach times were shorter in highly-trained than in trained with medium or large effect sizes (stage 1: 1.56 ± 0.03 s vs 1.62 ± 0.03 s, r = 0.50; stage 2: 1.56 ± 0.03 s vs 1.63 ± 0.08 s, r = 0.36; stage 3: 1.55 ± 0.03 s vs 1.63 ± 0.06 s, r = 0.69). BLa were lower in highly-trained than in trained with medium effect size (stage 1: 2.9 ± 0.2 mM vs 5.1 ± 2.5 mM, r = 0.50; stage 2: 3.8 ± 0.7 mM vs 6.0 ± 3.3 mM, r = 0.46; stage 3: 5.8 ± 2.0 mM vs 7.6 ± 3.5 mM, r = 0.33).
CONCLUSION:
As there were no differences in the lactate curve test by running between highly-trained and trained in the present study (unpublished data), it is suggested that the badminton-specific fitness test can discriminate the competitive level of players. It is possible that elite players move quickly and economically in badminton-specific steps.

References
Phomsoupha M, Laffaye G. (2015). Sports Med, 45(4): 473–495

Topic: Training and Testing

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