



# Comparison of the physiological responses to matches differing in scoring system in badminton professional players



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## BACKGROUND

Badminton is one of the most popular sports in the world. It is characterized by high-intensity intermittent actions and different performance factors, such as technical, tactical, conditional aspects. The actual scoring system consists of 3 games up to 21 points (3x21). Recently, the Badminton World Federation is planning to introduce a new scoring system with 5 games up to 11 points (5x11). Therefore, the aim of the study was to compare the physiological commitment during badminton matches played with the two different scoring systems.



## METHODS

Seven male professional players (age 20.4±3.8 yrs; body mass 67.3±5.5 kg; height 1.79±0.03 m; BMI 20.9±0.8 kg·m<sup>-2</sup>) participated in this study. Players performed a maximum ramp test on a treadmill to determine peak oxygen uptake and, on different days, one match with the actual (3x21) and one with the new scoring system (5x11), in random order. During test and matches, the cardiorespiratory and metabolic data (oxygen uptake,  $\dot{V}O_2$ ; expiratory ventilation,  $\dot{V}E$ ; heart rate, HR) were collected breath-by-breath by a metabolimeter, together with blood lactate concentration ([La<sup>-</sup>]). From  $\dot{V}O_2$  and respiratory quotient data, total energy expenditure (EE) were calculated off-line.

## RESULTS

$\dot{V}O_2$ ,  $\dot{V}E$ , HR and [La<sup>-</sup>] values at peak exercise are shown in Table 1. Total EE was significantly higher (2012±125 vs 1791±59kJ;  $P<0.05$ ) in 3x21 compared to 5x11. No significant differences were found between the two types of match in average  $\dot{V}E$ , HR, [La<sup>-</sup>], and EE per minute.  $\dot{V}E$  during matches reached, on average, 53±2% and 60±10% in 3x21 and 5x11, respectively, of that achieved during maximal treadmill exercise. HR reached 86±2% and 85±2% of maximum in 3x21 and 5x11, respectively.

Ramp Test (mean ± SD)	
$\dot{V}O_{2\text{ peak}}$ (ml·min <sup>-1</sup> )	3661 ± 328
$\dot{V}O_{2\text{ peak}}$ (mlO <sub>2</sub> ·min <sup>-1</sup> ·kg <sup>-1</sup> )	54.8 ± 6.7
$\dot{V}E_{\text{ peak}}$ (l·min <sup>-1</sup> )	152 ± 14
HR <sub>peak</sub> (bpm)	196 ± 7
$v_{\text{ peak}}$ (m·min <sup>-1</sup> )	324 ± 19
[La <sup>-</sup> ] <sub>peak</sub> (mM)	9.0 ± 1.9

Table 1 Values at peak exercise (mean + SD).

Fig 1  $\dot{V}O_2$  during two kind of match in a representative subject

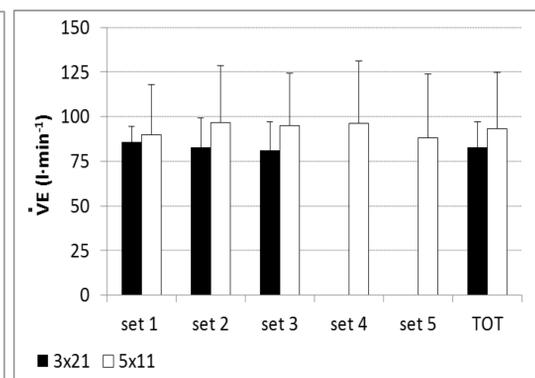
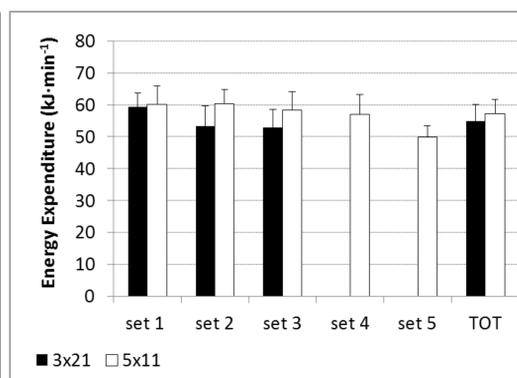
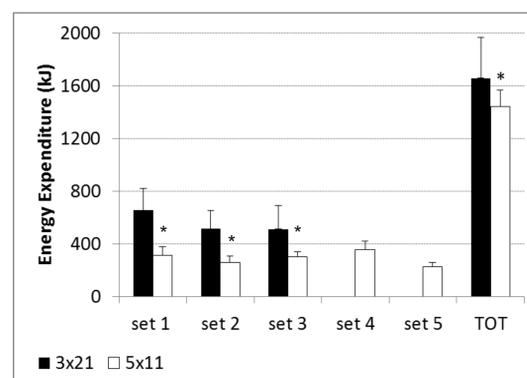
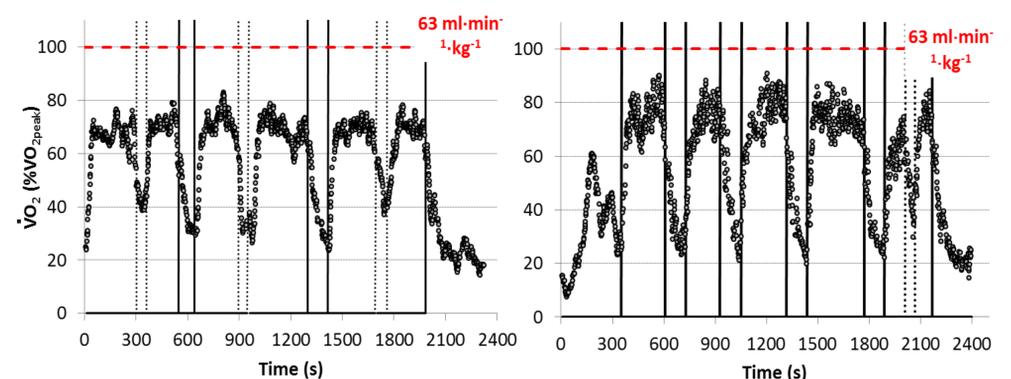


Fig.2-4 Energy expenditure and ventilation during 3x21 (black bars) and 5x11 games (white bars) (mean + SD). \* $P<0.05$  between the two kind of match.

## CONCLUSIONS

The new scoring system (5x11) proposed by the Badminton World Federation, despite a similar physiological commitment with respect to the actual system (3x21), requires a lower total EE. Therefore, according to the present findings, this new scoring system should be adopted, some changes in training modalities need to be introduced.

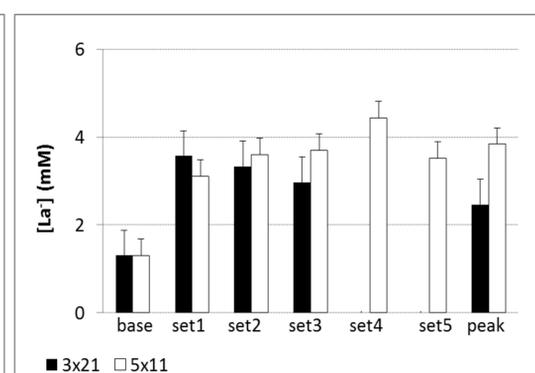
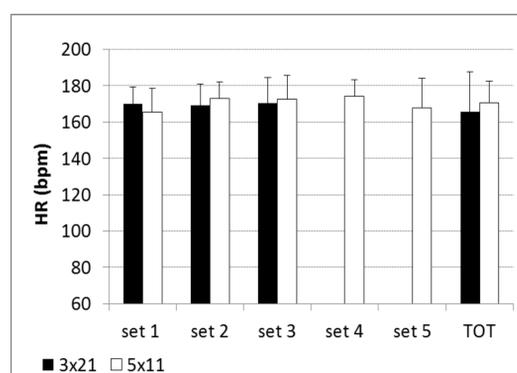


Fig.5-6 Heart rate and lactate concentration during 3x21 (black bars) and 5x11 games (white bars) (mean + SD).