

The 30-15 intermittent fitness test: relevance for interval training of intermittent sport players

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Introduction

With the exception of track and field endurance activities, the nature of most sport exercise is intermittent. High intensity endurance training in such sports is then usually exercised through intermittent runs, with running speeds set according to individual velocity associated with the $VO_2\max$ (maximal aerobic speed, MAS) of each athlete. So as to introduce accelerations, decelerations and changes of direction, which are specific to intermittent sports, exercises are mainly composed of shuttle runs. Except for one soccer-specific test¹, the popular field tests described in the literature are based on continuous linear runs² or continuous shuttle runs.³ MAS obtained with these continuous tests are then reached through an effort which is much different from a game activity, and they do not objectively appear adapted for shuttle interval training sessions of intermittent sport players. We propose here the 30-15 intermittent fitness test (30-15_{IFT}) as an alternative to continuous field tests^{2,3} for the determination of an appropriate MAS in intermittent sport players. It is a progressive running multistage field test, which consists of 30-sec 40 m shuttle runs interspersed with 15-sec passive recovery periods (velocity first set at 8 km.h⁻¹, increased by 0.5 km.h⁻¹ every 45-sec stage thereafter). The purpose of the present work is to examine its pertinence and reproducibility.

Methods

60 young intermittent sport players (age 16.2 ± 2.3 yr) took part in the study. We first compare MAS obtained with 30-15_{IFT} to MAS measured with two popular continuous tests, the University of Montreal track test (UM-TT)¹ and the 20 m shuttle run test (20mSRT)². We compare the associations among the three MAS obtained and intermittent sport-specific physiological capacities, such as maximal oxygen uptake ($VO_2\max$), explosive power of lower limbs (estimated from a 10 m sprinting time (10 m) and countermovement jumping (CMJ) tests), and cardiorespiratory recovery ability evaluated through short-term heart rate (HR) recovery during exercise (HR_{RE}). Secondly, we compare the rate of perceived exertion (RPE) characterizing the 30-15_{IFT} and the two popular field tests. In a separate series of experiments, tests and retests were performed to look at the reproducibility of the 30-15_{IFT}.

Results

Relative to the two continuous tests, MAS_{30-15IFT} was significantly higher ($p < 0.001$) and RPE during the 30-15_{IFT} significantly lower ($p < 0.001$). MAS_{30-15IFT} was significantly correlated with all intermittent sport-specific physiological capacities ($p < 0.05$). The relationships between MAS and explosive power indexes were stronger for the 30-15_{IFT} than for the UM-TT, which were both weaker than with the 20mSRT. Test-retest values for MAS_{30-15IFT} were similar, with a low coefficient of variation (4.3%).

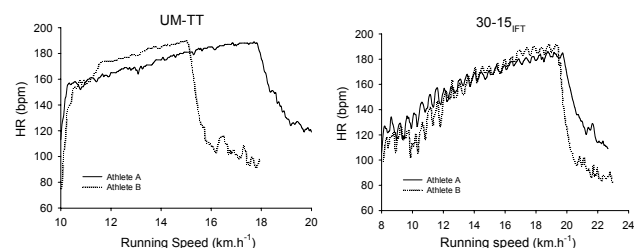


Fig. 2: Individual HR profiles as a function of running speed for two subjects presenting different MAS determined with the UM-TT (MAS_{UM-TT} of 15 vs 18 km.h⁻¹) but quite similar MAS obtained with the 30-15_{IFT} (MAS_{30-15IFT} of 19.5 vs 20 km.h⁻¹). Athlete B presents lower $VO_2\max$ than Athlete A but greatly higher explosive strength and HR recovery index.

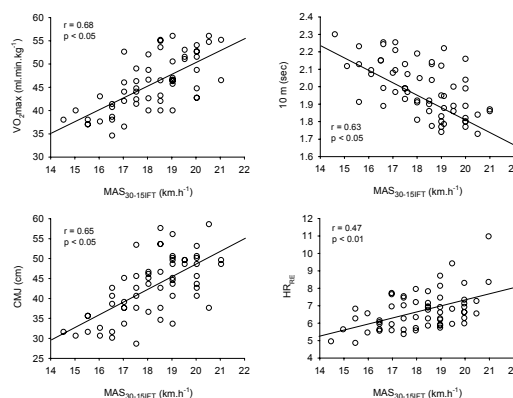


Fig. 1: Relationship between MAS_{30-15IFT} and intermittent sport-specific physiological capacities

Discussion/Conclusion

Compared to both continuous tests, the inclusion of recovery periods could be responsible of the increase in maximal running speed (from 2 to 5.5 km.h⁻¹) during the 30-15_{IFT}. The closer association between MAS_{30-15IFT} and explosive strength indexes compared to the MAS_{UM-TT} could be related to the higher muscular demands of the repeated starts and stops at the beginning and end of each stage, and to the large number of changes of direction inherent in shuttle runs during the 30-15_{IFT}. Although the 20mSRT is better correlated with power of lower limbs than the 30-15_{IFT}, it does not involve recovery abilities. The 30-15_{IFT} is then the only field test that takes into account all intermittent sport-specific physiological capacities together. Since the 30-15_{IFT} is also reproducible and poorly painful, it appears to be a relevant tool for fitness evaluation and training prescription for intermittent sport players.

References

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