Effects of sprint training using a surgical mask on repeated-sprint ability in ultimate frisbee players

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Purpose: Ultimate frisbee is a high-intensity intermittent sport, in which both aerobic and anaerobic capacities are important to optimize the performance (Palmer et al. 2020). Therefore, it may be useful for players to train under hypoxic conditions. An easy and low-priced way to induce hypoxia appears to be the use of surgical masks during training (Egger et al. 2021). The purpose of this study was to analyse the effects of a 6-week sprint training program, performed with or without wearing a surgical mask during the sprinting bouts, on repeated-sprint ability (RSA) in competitive female ultimate frisbee players.
Methods: 9 elite (1st italian league) female ultimate frisbee players were involved (age: 19.8 ± 3.0 years; height: 166.8 ± 6.8 cm; weight: 58.2 ± 6 kg). All athletes were tested 1) before (T_0) and after (T_1) a 6-week period of normal sprint training, constituted by short and long sprints performed without wearing any mask, and 2) before (T_2) and after (T_3) 6 weeks of sprint training, where training volume and exercises were identical to the previous program and the athletes wore a surgical mask during the sprinting bouts, but not during the recovery phases between sprints. A 6 x 20+20m sprinting test was performed at any time point. Velocity of the fastest sprint (RSA_{BEST}), average velocity (RSA_{MEAN}), and percentage decrement (RSA_{DEC}) across sprints, were examined. Between T_1 and T_2, there was a 6-week detraining period for all athletes.
Results: At T_1, as compared with T_0, RSA_{BEST} showed a significant ($p<0.05$) increase of +0.43km/h (+2.43%, ES= 0.74), while RSA_{DEC} showed an almost significant ($p= 0.06$) increase of 1.01% (ES= 0.76). RSA_{MEAN} showed no significant ($p>0.05$) increase 0.23km/h (+1,35%, ES= 0.42). At T_3, as compared with T_2, RSA_{BEST} and RSA_{MEAN} showed significant ($p<0.05$) increases of respectively +0.36km/h (+2%) and +0.54 (+3,17%), with effect sizes of 0.72 and 1.09, while RSA_{DEC} showed no significant ($p>0.05$) decrease -1.1%, ES= 0.56. Between the two training periods, there was a significant ($p<0.05$) difference in the variation of RSA_{DEC} (ES= 1.86), while no significant ($p>0.05$) differences were observed in the improvement of RSA_{BEST} and RSA_{MEAN} (ES= 0.24 and 0.77, respectively).
Conclusions: The results suggest that wearing a surgical mask during sprint bouts, and not during the recovery phase, can be an effective way to train ultimate frisbee players because, compared to standard sprint training, this methodology is able to improve RSA_{DEC} without impairing the improvement in RSA_{BEST}, and to improve RSA_{MEAN} by a greater extent than standard sprint training. This could probably be due to a state of hypoxia induced by the surgical mask, that stimulates the anaerobic metabolism during sprints, while generating a great oxygen deficit that stimulates the aerobic metabolism during the recovery phase. It must be noted though that all athletes perceived higher exertion after training with mask as compared

to the standard sprint training, so the use of surgical masks during training must be planned accordingly.

KEY WORDS: ultimate frisbee, surgical mask, face mask, hypoxia, repeated-sprint ability, sprint training, team-sports, anaerobic, aerobic metabolism, competitive players

Reference:

1. Palmer JA et al. (2020) Physical demands of elite women's ultimate frisbee between halves and across matches in an international tournament. J Strength Cond Res
2. Egger F et al. (2021) Effects of face masks on performance and cardiorespiratory response in well-trained athletes. Clin Res Cardiol