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Title: Inhalation of terbutaline increases anaerobic performance and muscle strength in well-trained endurance athletes

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Body: Background: The World Anti-doping Agency (WADA) recently loosened their restrictions towards inhaled beta2-agonists. Although, terbutaline still require athletes to provide evidence of asthma to get a dispensation (i.e. TUE) for inhaled use, WADA may in the coming years loosen their restrictions towards terbutaline as well. Before such an action is realized, more studies are needed investigating any performance-enhancing effect of terbutaline. The purpose of this study was to investigate if inhaled terbutaline in supratherapeutic doses is performance-enhancing in athletes. Methods: Ten well-trained endurance athletes, all males and non-asthmatics, aged 24.4±3.3 yrs (Mean±SD), VO2max 67.4±4.9 ml/min/kg, were included in a randomized, double-blinded and placebo-controlled crossover study with inhaled terbutaline (40x0.5 mg) and placebo. At separate visits, isometric muscle strength of m.quadriceps, Wingate performance, VO2 kinetics at 70-75% of VO2max, and endurance at 110% of VO2max were measured. Results: Terbutaline increased ($p<0.05$) isometric muscle strength (679±138 vs. 640±150 N) and peak power and mean power during the Wingate test. With terbutaline the peak power and mean power were 921±124 and 704±103 W, and higher ($p<0.05$) than placebo with 868±96 and 673±77 W, respectively. Time to exhaustion at 110% of VO2max tended to be shorter ($p=0.06$) with terbutaline with 124±32 versus 147±29 s with placebo. No differences were observed in VO2 kinetics at 70-75% of VO2max. Conclusion: Supratherapeutic inhalation of terbutaline provides an ergogenic effect on muscle strength and anaerobic performance, but decrease endurance due to side-effects.