ON-ICE AEROBIC MAXIMAL MULTISTAGE SHUTTLE SKATE TEST FOR ELITE ADOLESCENT AND PROFESSIONAL HOCKEY PLAYERS

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Introduction: Maximal aerobic power (VO2 max) is an important factor that contributes to the overall performance of ice hockey players. In the last two decades, many efforts have been realized to develop sport-specific field tests to predict the maximal O2 uptake in different sports. In addition to being as valid and reliable as laboratory settings, prediction field tests are inexpensive and allow the investigators to test many subjects at once. Purpose: Thus, the aim of this study was to design a practical on-ice test, the skating multistage aerobic test (SMAT), to predict the maximal aerobic power (VO2 max) in ice hockey players. The concept used is based on the relationship between skating velocity (m/s) and oxygen uptake (ml/kg/min) as measured by retroextrapolation of the recovery curve of O2 at time zero for the age-group players, or directly by a portable metabolic analyzer (Cosmed K4b2) for professional hockey players.

Methods: 30 age-group elite (age 14.7 ± 1.5 years) and 37 NHL hockey players (24.8 ± 4.3 years) participated in this study. The oxygen uptake was assessed at submaximal and maximal velocities during an on-ice intermittent maximal multistage shuttle skate test. The procedure consisted of skating back and forth on a distance of 45 m (stop and go) while following the pace fixed by an audible signal: initial velocity of 3.5 m/s with increments of 0.2 m/s every 1.5 minute (one minute of continuous skating followed by a 30 s rest period in order to allow the players to recover from muscular fatigue at each stage completed). Results: The SMAT enabled the prediction of the VO2 max from the maximal velocity by means of the following regression equation: VO2 max = 18.070 x (maximal velocity) – 35.956 (r = 0.968, SEE = 3.01 ml O2/kg/min) for age-group players and VO2 max = 16.151 x (maximal velocity) – 29.375 (r = 0.969 and SEE = 2.06 ml O2/kg/min) for professional players. The test-retest correlation was 0.922 and SEE = 0.56 stage (n = 23). As shown by the predicted VO2 from the 2 regression equations, the higher energy cost of skating in elite group-age hockey players could be explained mainly by a lower mechanical efficiency. Conclusion: The results suggest that the SMAT is highly specific, valid and reliable for the prediction of VO2 max of hockey players.

Keywords: Aerobic Power, Energy Expenditure, Icehockey