

## CLASSIFICATION OF ATHLETES INTO SPORTS BASED ON PHYSICAL AND PHYSIOLOGICAL VARIABLES

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The purpose of the present study was to evaluate the multivariate differences among three sports (Soccer, Tennis, and Table Tennis) and select the physical and physiological variables that best classify elite athletes into their sports. Sixty elite athletes participated in the study. The athletes were classified into three groups based on their sports, Soccer (Saudi National Team:  $n = 24$ , age =  $15.9 \pm .28$ ), Tennis (Top 20 players:  $n = 20$ , age =  $16.1 \pm 1.5$ ) and Table Tennis (Top 16 players:  $n = 16$ , age =  $16.1 \pm .96$ ). Age was not significantly different among the groups ( $p = .85$ ). All athletes were measured for body mass (WT), height (HT), subscapular (SF-SUB), triceps (SF-TRI), thigh (SF-THI), and calf (SF-CALF) skinfolds. Body mass index (BMI) was calculated. All the athletes underwent a vertical jump (VJ), a pushup (PU), a 5 m (SP5) and 10 m (SP10) speed tests and a shuttle run test to estimate maximal oxygen consumption ( $Vo_{2max}$ ). All tests were preceded by a proper warm-up and procedures familiarization. All wt, ht, BMI, SF-SUB, SF-TRI, SF-THI, SF-CALF, VJ, PU, SP5, SP10, and  $Vo_{2max}$  were entered into a discriminant analysis procedure, using the stepwise method for selecting the best set of predictors, with the grouping variable being sport type (Soccer, Tennis and Table Tennis). Results of the discriminant analysis revealed a set of four variables that best classified the athletes correctly into their sports. These predictors are BMI, SF-THI, SP5 and  $Vo_{2max}$ . The first Canonical discriminant function accounted for 85.7 % and the second one accounted for 14.3% of the total dispersion. The means (centroids) of the two functions were not equal (Wilks' Lambda = .165, Chi-square = 95.6 and  $p = .00$ ), indicating that the centroids of the two functions do differ significantly across the three groups. Pairwise group comparisons indicated that the Soccer group differ the most from Tennis ( $F = 36.5$ ) and Table Tennis ( $F = 21.1$ ) groups. On the other hand, Tennis and Table Tennis groups appeared to differ the least even though the centroids of these two groups were significantly different. The overall success of this four variable model for correctly classifying athletes into their sport groups was 86.2%. The classification worked best for the Soccer (95.8% of the Soccer players were correctly classified into their group) and for the Tennis (95% of the Tennis players were correctly classified into their group) whilst the Table Tennis had the highest misclassification rate (42.9% were misclassified into other groups). In conclusion, some physical and physiological variables could describe differences and classify groups of sports. This could have a practical implication in selecting youths to different sports and/or directing the effort of training towards more important variables to the sport being practiced. Further research effort that might include more predictor variables, especially related to body composition, is needed in this area.

*Keywords: Soccer, Elite Sport, Tennis*