




The Application of Artificial Neural Networks in Predicting Blood Pressure Levels of Youth Archers by Means of Anthropometric Indexes

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Abstract. The present investigation aims at measuring as well as predicting blood pressure (BP) levels using anthropometric indexes. A standardised systolic blood pressure, (STBP) and diastolic blood pressure (DSBP) coupled with anthropometric evaluations of Body Mass Index waist to hip ratio, waist to height ratio, body fat percentage, and calf circumference was carried out on 50 youth archers. A Backward Regression Analysis (BRA) was used to determine the anthropometrics indexes that could predict both the STBP and DSBP whilst two models, namely Multiple Linear Regression (MLR) and Artificial Neural Networks (ANN) were developed based on the most correlated anthropometry. The BRA identified calf circumference (CC) as the highest correlated predictor for both STBP and DSBP. The ANN model developed demonstrated a better prediction efficacy against the MLR with an R^2 as well as the mean absolute percentage error values of 0.95, 0.95, 0.050 and 0.06 as compared to MLR 0.26, 0.25, 8.46, 6.56 in the prediction of both the STBP and DSBP, respectively. It is evident from the present study that the BP levels of youth archers could be reliably measured using only their CC index.

Keywords: Blood pressure · Archery · Artificial Neural Networks · Anthropometrics indexes · Youth archers

1 Introduction

Blood pressure (BP) is a vital physiological marker that often explains the state of the cardiovascular system. BP has become increasingly popular in clinical assessment and has been frequently used as a means for early detection as well as the diagnosis of various types of diseases [1]. Research has demonstrated that BP is a key contributor to