

Comparisons of Age-predicted Maximum Heart Rate Equations in College Kinesiology Students

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ABSTRACT

Maximal heart rate values are used frequently in clinical medicine and physiology in order to establish a basis for exercise intensity for rehabilitation, wellness, and disease prevention programs. The accuracy of maximal heart rate prediction equations needs further examination for use within exercise physiology, sports medicine, and fitness fields. **Purpose:** To compare accuracy of age-predicted maximum heart rate equations in college kinesiology students. **Methods:** Participants who achieved an RER_{max} of < 1.1 and/or an RPE at max < 17 were not included. Forty-one participants (25 males and 16 females, age=26.4±6.7 yrs, ht=167.4±9.2 cm, wt=80.8±23.3 kg, BMI= 28.4±6.2) performed the Bruce protocol in which VO₂, RER, RPE (Borg's 6-20 scale) and HR were recorded. Two heart rate max equations were used: 220-age (EQ1) and 208-0.7*age (EQ2). Repeated measures ANOVA was used to determine the differences between the two equations and the criterion, with alpha set at .05. Error was calculated as [(EQ1-HR_{max})/HR_{max}]*100 and Bland Altman plots were used to illustrate level of agreement. **Results:** There were significant differences between HR_{max} and both prediction equations $F(2,39)=88.867, p=.001$. Pairwise comparison indicated that EQ1 (194.0 ± 1.0 b/min) was significantly higher than HR_{max} (189.2 ± 1.6 b/min), $p=.025$. Predictions from EQ2 (189.8 ± 0.7 b/min) were not significantly different than HR_{max}. EQ1 resulted in most error (2.5%) with EQ2 less than 1% error. While EQ2 was closer to actual HR_{max}, Bland Altman plots indicated both prediction equations had similar levels of agreement. **Conclusion:** EQ2 demonstrated a more accurate estimated HR_{max} among a college kinesiology population. While the equations have similar agreement, future research should explore their validity among specific populations, such as body composition, level of fitness, age, as well as exercise mode performed.

