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Development And Validation Of A Pacer Prediction Equation For Vo2peak In 10-15 Year Old Youth

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The PACER, a component of the FITNESSGRAM (FG), is a 20-m shuttle run used to predict peak oxygen consumption (VO2peak) in youth. Previous PACER equations were developed using VO2peak assessments during treadmill running; no equation has been developed using VO2peak assessed during the PACER.
PURPOSE: To develop and validate a prediction equation to estimate VO2peak from the PACER in 10-15 year-old youth.
METHODS: A sample of 101 youth (56 boys; 12.4+1.6 y) were recruited to develop a prediction equation. A separate validation sample was composed of 63 youth (41 boys; 12.1+2.0 y). VO2peak was measured on all youth using a portable metabolic unit during the PACER for both parts of the study. Regression analysis yielded a prediction equation that used total laps achieved during the PACER, body mass index (BMI), and the interaction between gender and age. Correlations and pairwise comparisons between the estimated VO2peak from the new prediction equation and the commonly used FG equation [VO2peak = 41.77 + 0.49*(laps) - 0.0029*(laps)2 - 0.62*(BMI) + 0.35(gender*age); 0=female, 1=male] were analyzed. Gender comparisons were also analyzed.
RESULTS: The following prediction equation was generated: [Scott Equation VO2peak=52.934 +.256*(laps) -.924*(BMI) +.468*(age*sex); R2=0.752]. The correlation between measured and predicted VO2peak using the Scott equation was r=0.716 (p<0.001) and r=0.711 (p<0.001) for the FG equation. The standard error of estimates (SEE) were 4.60 ml·kg-1·min-1(Scott) and 4.53 ml·kg-1·min-1 (FG). Predicted VO2peak from the Scott equation differed significantly from the FG estimates (p<0.001) although neither differed from measured VO2peak; Scott equation 95% CI (-1.879, 3.236), p=1.000 and FG equation 95% CI (-4.915, 0.288), p=0.097. The FG equation tended to overestimate VO2peak in males (55.6+1.6 vs. 51.6+1.0 ml·kg-1·min-1; p=0.001) but worked relatively well for females (39.8+1.3 vs. 40.1+2.2 ml·kg-1·min-1; p=0.824). The Scott equation revealed no significant differences (p=0.70) between the males (50.6+1.6 vs. 51.6+0.9 ml·kg-1·min-1) and females (39.8+2.3 vs. 39.9+1.3 ml·kg-1·min-1).
CONCLUSIONS: The Scott equation resulted in a more accurate estimate of VO2peak. Additionally, it appears that the Scott equation performed equally well in males and females for our sample.

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Relationships between Fitness Assessments, Fitness Levels and Coronary Heart Disease Risk Markers in Police Officers

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PURPOSE: To examine correlations between several markers of cardiovascular (CV) and muscular fitness among police officers.
METHODS: Sixty-five local police officers were recruited (8 female, average age 35.6 ± 9.0 yrs, height 70.5 ± 2.8 in, weight 91.8 ± 18.7 kg, VO2 33.0 ± 5.3 mL/kg/min). Data was taken from their annual health screening, which included a graded exercise test (GXT; Bruce protocol), pushups completed in 1 minute, situps completed in 1 minute, handgrip strength, DEXA scan, and bloodwork. Maximal oxygen uptake (VO2max) was estimated using the Foster equation. Coronary heart disease risk (CHD risk) was calculated using the online NIH 10-year heart attack risk calculator. Significance was determined using an alpha level of 0.05.
RESULTS: There was no significant correlation between VO2max and CHD risk (r = -0.166). Apart from risk markers included in the risk calculation, CHD risk was significantly correlated with waist-hip ratio (r = 0.247), and LDL cholesterol (r = 0.391). VO2max was significantly negatively correlated with fat mass (r = -0.518), body fat percentage (%BF; r = -0.643), total cholesterol (TC; r = -0.337), and LDL cholesterol (r = -0.267). Positive correlations were found between VO2max and other measures of fitness such as pushups (r = 0.543), situps (r = 0.328), and handgrip strength (r = 0.320). Percent body fat was significantly positively correlated with TC (r = 0.302), systolic blood pressure (r = 0.288), LDL cholesterol (r = 0.265), and fasting glucose (r = 0.265), but negatively correlated with fitness markers such as pushups (r = -0.586), situps (r = -0.436), and handgrip strength (r = -0.324). Lean mass was significantly correlated with handgrip strength (r = 0.718), though not pushups, situps or VO2max. Waist circumference was significantly negatively correlated with HDL cholesterol (r = -0.392). Additionally, 62 of the participants (7 female) completed both a 1.5 mile run and GXT, allowing for a comparison of two commonly used assessments of CV fitness. Time to complete 1.5 miles was significantly correlated to GXT VO2max, with a Pearson correlation coefficient of -0.796.
CONCLUSION: Relationships found between health markers and fitness variables in this sample were generally in line with previous research on CHD risk factors and the assessment of CV and muscular fitness.

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Vertical Jumping And Leg Power Normative Data For Colombian Schoolchildren Aged 9-17.9 Years: The Fuprecol Study

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PURPOSE: The Vertical Jump Test became of the most convenient tests used to evaluate anaerobic capacity and the effectiveness of anaerobic training programs for a variety of power sports. However, its use and interpretation as an evaluative measurement into physical activity tests are limited because there are few published reference values derived for children and adolescents. Therefore, the aims of the present study were to generate normative vertical jump height and predicted peak power (Ppeak) data for 10- to 17.9-year-olds and to investigate between-sex and age group differences in these measures.
METHODS: The sample comprised 7614 healthy Colombian schoolchildren [boys n=3258 and girls n=4356, mean (standard deviation) age 12.8 (2.3) years old]. Each participant performed two countermovement jumps, and jump height was calculated using a Takei 5414 Jump-DF Digital Vertical®, Japan. The highest jump was used for analysis and in the calculation of predicted Ppeak. Centile smoothed curves, percentile and tables for the 3rd, 10th, 25th, 50th, 75th, 90th and 97th percentile were calculated using Cole's LMS method.
RESULTS: The one-way ANOVA tests showed that maximum jump height (cm) and predicted Ppeak (W) was higher in boys than in girls (p<.01). Post hoc analyses within sexes showed yearly increases in jump height and Ppeak in all ages. In boys, the maximum jump height and predicted Ppeak 50th percentile ranged from 24.0 to 38.0 cm and 845.5 to 3061.6 W, respectively. In girls, the 50th percentile ranged from jump height was 22.3 to 27.0 cm and predicted Ppeak was 710.1 to 2036.4 W. For girls, jump height increased yearly from 9 to 12.9 years before reaching a plateau aged 13 to 16.9 years old.
CONCLUSIONS: Our results provide, for the first time, sex- and age-specific vertical jump height and predicted Ppeak reference standards for Colombian schoolchildren aged 9-17.9 years.
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