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The Influence of Different Walking Conditions on Walking Parameters

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(No relevant relationships reported)

PURPOSE: This study investigated the relationship between characteristics of walking parameters and walking parameters of different walking conditions.
METHODS: The participants were 54 university students who had the habit of exercising (32 men and 22 women, 19.6 ± 0.7 years). Participants were asked to walk on flat and sloped ground. On the flat ground, they were asked to walk freely with a subjective intensity of "Light (ratings of perceived exertion (RPE) 11)" and "Somewhat hard (RPE 13)." The average slope was 4% for both upward and downward conditions and participants walked freely on both. Participants wore a wearable device attached to the left wrist that measured their walking speed, cadence, stride, and heart rate.
RESULTS: On the flat ground, in all walking parameters, RPE 13 showed significantly higher values compared to RPE 11 (walking speed: 5.35 ± 0.49 versus 4.48 ± 0.43 km/h, cadence: 121.9 ± 8.8 versus 113.0 ± 7.3 steps/min, stride: 73.2 ± 6.8 versus 65.8 ± 6.8 cm, respectively; $P < 0.05$). On the sloped ground, walking speed on the upward slope showed significantly lower values compared to that on the downward slope and the free-walking speed on flat ground(upward slope: 4.85 ± 0.27 km/h, downward slope: 5.27 ± 0.38 km/h, flat ground: 5.25 ± 0.30 km/h). However, heart rate was significantly higher on the upward slope than in other conditions(118.8 ± 16.9 beats/min, 103.5 ± 14.0 beats/min, 107.8 ± 18.2 beats/min, respectively). Multiple regression analysis was performed with walking speed as the dependent variable and cadence and stride as independent variables. Results showed that for walking on the flat ground, the standardized coefficient for stride was higher than that for the cadence under all conditions. Although the same trend was found for walking on downward slopes, for walking on upward slopes, the standardized coefficient for cadence was higher than that for the stride.
CONCLUSIONS: Walking parameters tended to be similar for walking on flat ground even when conditions changed; however, it became clear that characteristics of walking parameters on upward slopes varied from those of other conditions.

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Physiological Performance Predictions Based on Simple Assessments

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(No relevant relationships reported)

Muscular strength and cardiovascular capacity are important determinants of athletic performance. Fundamental assessments include lower body strength (e.g., squat max), upper body strength (e.g., bench press max), and aerobic capacity (VO_2 max). For coaches who lack equipment to measure these parameters, it is important to know if there are feasible alternatives to accurately evaluate their athletes.
PURPOSE: To determine if simple strength and aerobic assessments can be used in the place of equipment- intensive testing to evaluate college athletes.
METHODS: Fourteen collegiate male rugby players were recruited and tested. Independent variables were age, height, weight, vertical jump, and 10-yard dash. Dependent variables were body fat percent (BF%) via hydrostatic weighing, bench press max, squat max, and VO_2 max. Data were collected twice during the competitive season, one month apart. Multiple linear regression tested how well the simple assessments predicted the traditional performance measurements.
RESULTS: On average, athletes were 19.6 years of age with a BMI of 25.2 kg/m^2, 13.4% body fat, VO_2 max of 45.5 ml/kg/min, bench press of 186.7lb, squat max of 269.5lb, 10-yard dash of 1.7 seconds, and vertical jump of 22.2 inches. At baseline, BMI (p<0.001) and 10-yard dash (p=0.023) predicted BF% (R^2=0.881; p<0.001). Significance was preserved at follow-up (R^2=0.751; p<0.001). At baseline, holding age constant, 10-yard dash predicted VO_2 max (β=-31.4; p=0.002); the model was significant (R^2=0.714; p=0.004) and was strengthened at follow-up (R^2=0.780; p<0.001). Holding age and BMI constant, 10-yard dash predicted bench press (β=-222.7; p=0.023); the model was significant (R^2=0.732; p=0.011) and retained at follow-up (R^2=0.750; p=0.009). At baseline, holding BMI constant, squat max was predicted by vertical jump (β=8.9; p=0.005) and 10-yard dash (β=-263.5; p=0.013). The model was significant (R^2=0.923; p<0.001) and retained at follow-up (R^2=0.913; p<0.001). **CONCLUSIONS:** In a sample of college rugby athletes, age, height/weight, vertical jump, and 10-yard dash were sufficient predictors of BF%, bench press, squat, and VO_2 max. Our
results indicate that it may be reasonable for comprehensive athletic evaluation to be simplified to accommodate a lack of equipment.

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Relationship Between Clock Gene Expression, MEQ Score, and Exercise Performance

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(No relevant relationships reported)

PURPOSE: To examine the relationship between human clock gene expression, chronotype, and morning/evening exercise performance.
METHODS: Fifteen healthy young males were recruited for this study. The peak time of *Period 3 (PER3)* expression in hair follicle cells was evaluated as an indicator of the biological circadian rhythm and the Morningness-Eveningness Questionnaire (MEQ) score was used to determine the chronotype (morning, intermediate, or evening). Hair follicle cells were collected over a 24-h period at 4-h intervals from 06:00 hours by firmly holding and pulling the facial hair root. Morning and evening exercise performance was evaluated using a bleep test. The tests were performed at least one week apart using a cross-over design at 10:00 and 18:00 hours. As a physiological index, oral temperature was measured before exercise, and heart rate was measured before and during exercise. Partial correlation was used to examine the relationship between MEQ score and the peak time of *PER3* expression, exercise performance, and oral temperature. Paired *t*-tests were used to compare physiological variables between morning and evening performances.
RESULTS: There was a moderate positive correlation between the peak time of *PER3* expression and evening performance (r = 0.700, P = 0.053). A significant correlation was found between the oral temperature at 10:00 and improvement in performance at 18:00 (evening performance) compared to that at 10:00 (r = 0.735, $P < 0.05$). There was no relationship between the MEQ score and performance. There was no significant correlation between the peak time of *PER3* expression and the MEQ score.
CONCLUSIONS: The present study suggested that the internal clock time evaluated based on gene expression may affect exercise performance. When the peak time of *PER3* expression is late, performance may be higher at 18:00 compared to that at 10:00. Higher body temperature at 10:00 may be a good marker for higher performance at 18:00. Further research is required to investigate the relationships among circadian rhythm of clock genes expression, chronotype, and performance in competing athletes.

3221 Board #90 June 2 8:00 AM - 9:30 AM

Changes in Blood pH and Ammonia Following Repeat Sprint Performance

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(No relevant relationships reported)

The relationship between relative intensity and changes in blood pH and ammonia are not well characterized.
PURPOSE: The primary aim of the study was to determine how changes in relative exercise intensity following repeat sprint performance affect changes in blood pH and blood ammonia concentrations.
METHODS: Healthy college- age males (n = 12) completed completed one 30 second Wingate cycle sprint test as a familiarization trial. A minimum of 48 hours after the familiarization trial, participants returned to the lab. Resting venous and capillary blood samples were obtained to determine blood ammonia, pH, and lactate levels. Participants then completed 3 Wingate sprint tests, separated by 5 minutes each. Finger capillary blood was immediately obtained after each test to determine lactate and pH values. After the final test, an additional venous blood sample was obtained to determine blood ammonia values.