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The Role of Aerobic Physical Fitness in Overweight Adolescents

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Background

Obesity is low-grade inflammatory state that negatively influences health status. Physical fitness may influence health status independent of body composition. This study compares body composition, health status, quality of life, and inflammatory levels in fit and unfit overweight adolescents.

Methods

29 overweight adolescents (12 male, 17 female; 14.59 +/- 1.77 years) completed 3 sessions: familiarization and 2 counterbalanced experimental [treadmill (TM) and DEXA]. BMI was calculated and subjects completed the Physical Activity Questionnaire (PAQ-C/A) and Pediatric Quality of Life Inventory (PedsQL 4.0). The TM session determined physical fitness status (Fit or Unfit) through a VO2 Max test using FitnessGram norms. Fasting labs were obtained for health status (glucose, insulin, HA1C, total cholesterol, HDL, LDL, triglycerides) and inflammation (CRP). The DEXA scan measured total, android, and gynoid body fat percentage. Additionally, strength and flexibility testing was performed.

Results

15 subjects were Fit and 14 were Unfit. Both the PedsQL total score and physical health summary score were significantly higher in the Fit group. The Fit group had a higher BMI z score, W:H ratio, total body fat %, android fat %, push-up strength, and self-reported physical activity (PAQ-C/A) than the Unfit group. The Unfit group had greater insulin resistance based on the HOMA-IR & QUICKI results. Across the entire sample, C-reactive protein (CRP) was positively correlated with BMI z score and A:G ratio but negatively correlated with VO2 Max.

Conclusions

Fit overweight adolescents have better body composition, lower inflammation, increased insulin sensitivity, and report better quality of life than Unfit. Overall, the increase in inflammation with overweight status is associated with more central adiposity and lower aerobic physical fitness levels.