The Impact of Pre-exercise Snacks on Exercise Intensity, Stress, and Fatigue in Children

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PURPOSE: Few studies have examined how the composition of snacks affects athletic performance in children. We investigated whether the macronutrient and flavonoid content of 3 pre-exercise snacks differentially affected exercise intensity, stress, and post-game fatigue in young soccer players.

METHODS: At 1 h prior to a 50-min soccer game, 115 children (9.1 ± 0.9 y) were randomly assigned to consume 1 of 3 isocaloric snacks: 1) nutrient dense/high flavonoid (HF) raisin/nut bar; 2) low flavonoid (LF) peanut butter graham bar; or 3) low flavonoid/high sugar (LF/HS) rice cereal bar. Blood glucose and salivary cortisol and IgA were measured before consuming the snack and immediately following the game. Game exercise intensity was measured by accelerometry. Self-administered questionnaires were used to assess diet quality and physical and mental fatigue after the game.

RESULTS: The children spent approximately 33% of the game in moderate to vigorous activity and 49% of the game in sedentary activity. The snack consumed was not related to exercise intensity. Mean post-exercise blood glucose ($P<0.001$) and cortisol ($P<0.05$) increased and IgA levels decreased ($P<0.001$) from pre-game values. The pre-exercise snack did not predict the post-exercise outcome for any of these parameters after controlling for pre-exercise values of the biomarkers, age, gender, BMI, exercise intensity, game-time water consumption, and diet quality. Children who reported symptoms of fatigue were more likely to have consumed the LF/HS snack ($P<0.05$).

CONCLUSIONS: The pre-exercise snacks formulated for this study did not affect blood sugar or salivary biomarkers of stress following a soccer game in young children. The nutrient content of the single snack did not differentially influence these biomarkers or the exercise intensity; however subjective feelings of fatigue may be associated with low flavonoid/high sugar snacks. Future investigations are warranted to further explore the effects of pre-exercise snacks on exercise, performance, stress and fatigue in children.