Physical activity, perceived stress and cortisol in UK adolescents

Key Words : Physical activity, stress, type 2 diabetes
Lead : Ashley Cooper, Catherine Falconer

Abstract

There is emerging evidence to suggest a link between stress, obesity and type 2 diabetes which is partly mediated through the stress-related release of the glucocorticoid cortisol. Cortisol causes increased hepatic glucose production and hypothysised to also stimulate fat accumulation. Prolonged or chronic stress can cause overstimulation of the stress system, prolonged released of cortisol and potential hyperglycaemia and insulin resistance.

Reduction of stress and the stress-related cortisol release is therefore a priority for the prevention of obesity and type 2 diabetes. Regular physical activity and exercise may help to reduce both overall stress and the physiological response to a stressor. Exercise itself is a stressor and therefore in an acute sense, exercise increases cortisol. However, the 'cross-stressor adaptation hypothesis' suggests that repeated exposure to a familiar challenge (i.e. exercise) may benefit the stress system and reduce the stress response.

A previous study in children found that while overall physical activity had no effect on total cortisol, the most active children had a reduced cortisol response to stress than the least active children. However, the children were 8 years old and there is evidence that adolescents experience greater stress than children. This study will therefore examine the associations between objectively measured physical activity, obesity and perceived and measured stress in a large cohort of UK adolescents (PEACH study).