ABSTRACT

INFLAMMATORY MARKERS, PHYSICAL FITNESS, AND PAIN IN CHILDREN

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The current pediatric obesity epidemic translates to a significant public health concern with co-morbidities of alarming medical and societal costs. With the rise in obesity, pain issues reported to health care providers are significantly increasing as 50% of obese children regularly experience pain; yet, the relation between pain and obesity is not clear.

One potential mechanism for the increase in pain that parallels obesity is inflammation. It is well documented that obesity is a chronic pro-inflammatory state associated with risk for diabetes and heart disease. Furthermore, inflammatory markers contribute to the development and modulation of pain; inflammation is likely an important mechanism between obesity and pain.

Exercise is a hallmark of obesity interventions and is often prescribed to relieve pain. Pain relief experienced after exercise, exercise induced hypoalgesia (EIH), may be a critical pain management strategy for overweight/obese adolescents, but it is unknown if EIH exists in adolescents. Moreover, mechanisms for EIH are not well established; the concept of conditioned pain modulation (CPM), 'pain inhibits pain,' is a possible central component of pain relief after exercise through endogenous pain inhibition.

In an adolescent sample across weight status, experimental pain (pressure pain thresholds) was assessed at baseline, in a CPM protocol, and pre/post maximal aerobic exercise (EIH). Additionally, clinical pain, psychosocial parameters from the adolescent and parent perspective, physical fitness, physical activity levels, body composition, and health status (risk for diabetes, heart disease, inflammation, and hormones) were measured across three sessions.

In this community sample, normal weight and overweight/obese adolescents did not report any clinically significant differences in current clinical or experimental pain. Adolescents with higher BMI and central adiposity demonstrated elevated inflammation and pain catastrophizing but decreased quality of life. Higher physical fitness levels were associated with lower inflammation and pain catastrophizing but higher quality of life.

Adolescents experienced EIH regardless of weight status, physical activity, clinical pain and physical fitness; EIH was positively associated with lean mass. CPM was similar between weight status and sex; lean mass uniquely predicted the magnitude of CPM. CPM and EIH are mildly associated but further research is warranted in adolescents.