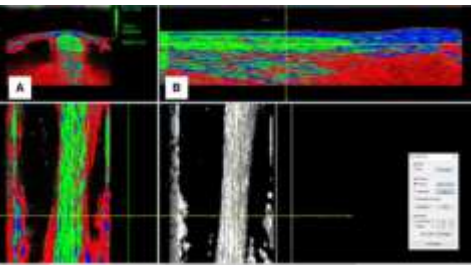


INTRODUCTION

In adults, obesity was found to have a profound effect on tendon structures; yet, there is no data concerning that issue in over-weight/obese children. As alternated tendon structure, may raise stresses to the tendon and may increase the potential for overuse injury, analyzing the tendons structure of over-weight/obese children are essential.



UTC output showing the tomographic and 3D visualization of Achilles tendon (type I, colored green; type II, colored blue; type III, colored red; and, type IV, colored black)

OBJECTIVES

To investigate differences in Achilles tendon structure between over-weight/obese children and normal-weight children.

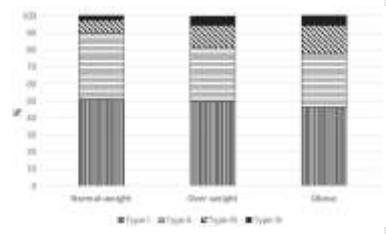
METHOD

Twenty-two children with obesity, 10 children with overweight, and 44 children with normal weight participated in the study. BMI% was calculated. The Achilles tendon was examined using ultrasound tissue characterization (UTC) imaging to capture a three-dimensional structure of four echo-type fibers and a cross-sectional area.

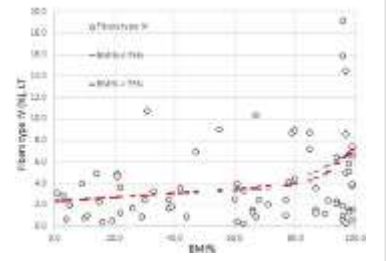
RESULTS

A significantly higher percentile of echo-types II, a lower percentile of echo-types III and IV, and a lower cross-sectional area were found for children with normal weight compared with children with overweight/obesity ($p < .05$). Following a piecewise linear regression model according to tendon structure, a BMI percentile of 75% was found to be the most accurate cut-off point of the children into the 'unaffected' (BMI% < 75%) and 'affected' tendon structure groups (BMI% \geq 75%), as the children with BMI% \geq 75% already had an Achilles tendon structure similar to that of the children with overweight/obesity.

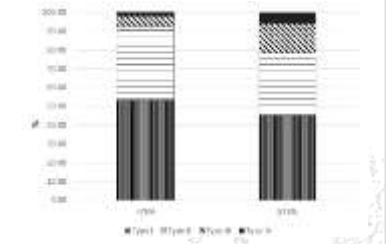
The relative fiber type frequency (%) (right leg) in children with normal-weight, children with over-weight and children with obesity.



Fibers type IV, by BMI%. A difference in echo type IV was observed from a BMI %ile of \leq 75.



The relative fiber type frequency (%) (right leg) in children with "unaffected" tendon structure (BMI% < 75%) and in children with "affected" tendon structure (BMI% \geq 75%). Significant differences between echo-type I, echo-type III, and Echo-type IV ($p < .05$).



CONCLUSIONS

Tendon integrity as examined with UTC differs between children with obesity and children with normal weight. Children with a BMI percentile of \geq 75 already demonstrate a different tendon structure pattern compared with children with BMI percentile of < 75. This may put children with obesity at a greater risk of injury, and should be addressed when applying an exercise program for children with overweight/obesity.