Fitness is not associated with carotid intima media thickness in children

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Introduction
Carotid intima media thickness (cIMT) and cardiorespiratory fitness (CRF) are independently used as predictors of cardiovascular health. We combined these measures in a pediatric population to examine if fitness is associated with vascular status. Furthermore, we calculated cIMT reference values for children aged 7-17 years.

Methods
1017 children, aged 7-17, from Bavaria, Germany, were prospectively studied. cIMT was assessed by B-mode ultrasonography (Hitachi Aloka prosound α6) in 736 children (330 boys/ 406 girls) and calculated as average of two measurements of the left and right common carotid artery according to the Mannheim cIMT consensus [1]. Measurements were performed by two examiners (coefficient of variation: 8.51%). CRF was determined by estimation of VO2max with the PACER test [2]. Further measures consisted of blood pressure, body weight and height, hip and waist circumference. Age- and height-normalized cIMT reference values were calculated for 690 non-obese children (310 boys/ 380 girls) applying the LMS method [3]. The study was funded by “Sternstunden e.V. and Landratsamt Berchtesgadener Land”.

Results
cIMT increased with height, weight, hip circumference, systolic blood pressure, body mass index and age (p<.001). There was no significant correlation between cIMT and VO2max. Multiple regression analysis associated a small waist circumference with low cIMT (standardized β = -.666), the heavier and taller children were, the thicker cIMT. Boys within the youngest and oldest age categories (8-9.99 and 16-17.99 years) had significantly higher cIMT values than girls (p<.05). No sex differences occurred in children from 10-15.99 years.

Conclusions
In this study, CRF is not significantly associated with cIMT. Nevertheless, it would be wrong to conclude that fitness doesn’t affect cardiovascular health. As structural changes in IMT develop over a long time, the same might be for positive effects due to good CRF. Parameters of arterial stiffness (pulse wave velocity, augmentation or stiffness index β) may respond faster and will therefore be analyzed in further studies.