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Athlete heart in children population: echocardiografic findings

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Introduction and objectives
Adult athlete heart is defined as the changes developed by routine, systematic and sustained sports training.
We aimed to describe children's athlete heart and to analyze these changes in young hearts through echocardiography.

Methods
331 children (6 to <18yo, mean 11,92yo, 74% male) under federated sports (football, swimming, tennis, athletism, basketball) were recruited. They performed at least 3hr training/week during more than 1 year long.
Left ventricle (LV) and right ventricle (RV) diastolic diameters and wall thickness were recorded by echocardiography (M-mode) plus left atrium diameter (LA) in apical view. All measurements were indexed by body surface area and analyzed according to type of sport, training time/week and sport practicing exposure.

Results
118 (33,62%) were football players, 99 (28,21%) swimmers, 58 children (16,52%) were federated in tennis, 40 (11,4%) athletes and 16 (4,56%) basketball players.
Mean training time/week was 7,2h, higher for swimmers and tennis players (>8h/week).
Mean LV interventricular septum Z-score (IVSd) was 1,18. For 20,2% of children, IVSd mean Z-score was >2, particularly those with a higher training rate.
Mean LV posterior wall thickness Z-score (LVPWd) was 0,06. 3% of children had LVPWd Z-score >2, specially the elder ones (14,2 vs 11,9 yo).
Mean LV diastolic diameter Z-score (LVEDd) was 0,26. 3% had LVEDd Z-score >2.
Mean left atrium diameter Z-score (LAD) was 0,51.
Mean right ventricle diastolic diameter Z-score (RVd) was 0,63, increased up to 0,92 in swimmers.

Measurement	Mean Z-score	Z-score >2
IVSd	1,18	20,2%
LVPWd	0,06	3%
LVEDd	0,26	3%
LAD	0,51	9,8%
RVd	0,63	14,3%

Conclusions
We describe cardiac remodeling in young athletes, more relevant in LV interventricular septum and RV diameter.
These changes are probably in relationship with the type of sport and training time.
We suggest follow-up of these young athletes by professionals.