# Can right ventricular speckle tracking imaging be used in arrhytmogenic cardiomyopathy screening? A study of healthy paediatric athletes with and without echocardiographic modified task force criteria

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**Background:** Arrhytmogenic cardiomyopathy (ACM) is a major cause of sudden cardiac death among young athletes. Screening these individuals can be challenging due to right ventricular (RV) exercise-related remodelling, particularly right ventricular outflow tract (RVOT) dilation. Recent studies have also shown that peak RV longitudinal strain (SI) measured by speckle tracking echocardiography (STE) is reduced in adolescents with definite and borderline ACM. The prevalence of RV changes meeting ACM criteria in healthy paediatric athletes, and whether these changes are associated with abnormal RV strain values is not known.

**Purpose:** The aim of this study is to evaluate the prevalence of healthy paediatric athletes meeting the ACM echocardiographic modified Task Force Criteria (mTFC) for RVOT dilation, and how this relates to RV longitudinal systolic function.

**Methods:** Athletes under 18 years old undergoing comprehensive pre-participation screening (2014-2017) at two sports academies were included. Global (RV-SI) and free wall peak systolic strain (FW-SI) were calculated using STE. Three groups were defined: meeting the major mTFC for RVOT size (M-mTFC), meeting the minor mTFC (m-mTFC) and not meeting the mTFC (no-mTFC). RV-SI and FW-SI were compared using the Kruskall Wallis test.

**Results:** A total of 247 boys (11.1-18 years, median 14.6 years) were included, with diverse ethnicity (53.1% Arab, 27.6% Black, 17.6% White, and 1.7% other) and sports background (50.6% football, 27.9% athletics, 21.5% other).

Of these n = 22 were in the M-mTFC group (8.9%), n = 93 in the m-mTFC group (37.7%) and n = 132 in the no-mTFC group (53.4%). No regional RV wall motion abnormalities were observed. There were no differences in RV-SI or FW-SI by mTFC Group (Table 1).

**Conclusions:** In healthy paediatric athletes, 9% met the major mTFC, and 38% met the minor mTFC for RVOT size. RV longitudinal strain was found to be similar between those who met the mTFC and those who did not. This highlights the probable non-pathological adaptations reflected by RVOT dilation in these individuals, as opposed to those seen in ACM. The results of this study suggest that STE can be a valuable tool in ACM screening in paediatric athletes, especially in cases where RV remodelling is present.

RV peak longitudinal strain by mTFC

| | All | M-mTFC n = 22 | m-mTFC n = 93 | no-mTFC n = 132 | p value for between group comparison |
|---|---|---|---|---|---|
| Global RV $S_I$ (median, IQR) | -23.3% (-25.2;-21.7) | -23.3% (-25.5;-21.7) | -23.4% (-25;-21.7) | -23.3% (-25.5;-21.7) | p = 0.8 |
| Free wall RV $S_I$ (median, IQR) | 27.7% (-30;-25.2) | -27.6% (-29.3;-25.2%) | -28.1% (-29.7;-25) | -27.5 (-30.5;-25.4) | p = 0.9 |