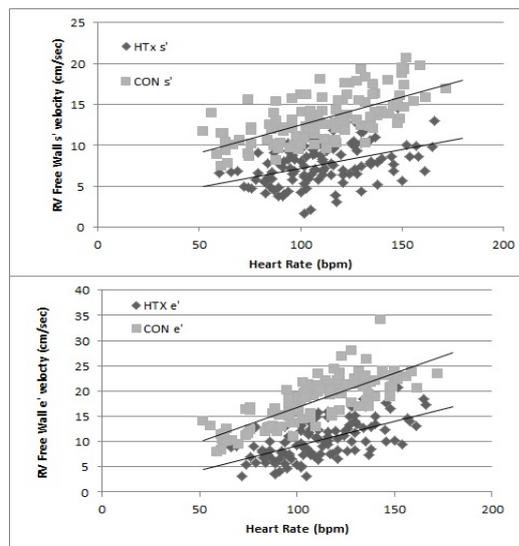


## Right ventricular systolic and diastolic response to exercise in children after heart transplant - a bicycle exercise study

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**Introduction:** Right ventricular (RV) dysfunction is a common problem after heart transplant (HTx). The mechanism of RV dysfunction after HTx is multifactorial, including donor and recipient factors. Several studies reported decreased RV function at rest in pediatric HTx recipients without acute rejection compared to healthy controls as studied by Tissue Doppler Imaging (TDI). However, information about RV function during exercise has not been well described in pediatric HTx recipients. The aim of the current study was to evaluate RV systolic and diastolic response to exercise in children after HTx using TDI during semi-supine cycle ergometry stress echocardiography (SSCE).

**Methods:** Twenty-five children after HTx and 23 controls were included. Median age at transplantation was 9 years (birth to 15 years) and median time since transplant was 4.9 years (0.5 to 15.4 years). A stepwise SSCE stress echocardiography protocol was used. TDI peak systolic and early diastolic velocities were measured in the RV free wall in all subjects at rest and at incremental heart rates (HR).  
**Results:** Resting HR (mean  $\pm$  SD) was higher in the HTx recipients than in controls ( $88 \pm 12$  vs  $70 \pm 12$  bpm,  $p < 0.001$ ) but controls reached higher HR at peak exercise ( $142 \pm 20$  bpm vs  $153 \pm 11$  bpm,  $p = 0.02$ ). Systolic and diastolic RV free wall  $s'$  and  $e'$  velocities absolute values were significantly lower at rest and peak exercise in the HTx recipients compared to controls (Rest  $s'$ :  $5.4 \pm 1.7$  cm/s vs.  $10.4 \pm 1.8$  cm/s,  $p < 0.001$ ; rest  $e'$ :  $6.4 \pm 2.2$  cm/s vs.  $12 \pm 2.4$  cm/s,  $p < 0.001$ ), (Peak  $s'$ :  $11.7 \pm 9.3$  cm/s vs.  $16.2 \pm 2.4$  cm/s,  $p < 0.001$ ; peak  $e'$ :  $13.3 \pm 3.4$  cm/s vs.  $22.3 \pm 3.3$  cm/s,  $p < 0.001$ ). When plotted versus HR the increase in TDI velocities showed a preserved response in children after HTx compared with controls (see figure).



**Conclusions:** Our data suggest that paediatric HTx recipients have preserved systolic and diastolic cardiac reserve during exercise compared with controls, despite lower systolic and diastolic RV TDI velocities at rest. Evaluation of cardiac function during exercise provides interesting additional information about cardiac function in these patients. The clinical implications of our findings need further investigation.