

## MP1-12

### **Reduced handgrip strength is associated with lower health related physical fitness in children with congenital heart disease**

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**Introduction:** Technical development in surgery and an enhancement in cardiology care have led to a decrease of the mortality rate in children with congenital heart disease (CHD). At the same time, functional outcomes like health-related physical fitness (HRPF) did not improve as well. Handgrip strength as a simple and effective method to identify adults at higher risk of cardiovascular mortality could be a useful tool to identify young CHD patients at risk for reduced HRPF.

This study aimed to assess handgrip strength and HRPF in CHD and compare their results to a healthy control group (CG).

**Methods:** Starting in May 2014 until October 2018 handgrip strength and HRPF were assessed in 304 patients ( $12.5 \pm 3.4$  years; 117 girls) with various CHD (69 simple; 89 moderate and 146 complex severity). Results were compared to 1560 children from a CG ( $11.5 \pm 2.7$  years; 925 girls) recruited in a school project in 2016. Handgrip strength was calculated for the dominant hand (maximum value from 3 repetitions of the right and 3 of the left hand). HRPF was tested by five FITNESSGRAM® motor tasks of the and converted into standard deviation scores (SDS) according to the values of CG.

**Results:** After adjusting for sex and age patients with CHD showed significantly lower handgrip strength in comparison to the CG (CHD:  $19.6 \pm 5.6$  kg; CG:  $24.4 \pm 5.6$  kg;  $p < .001$ ) and significant lower HRPF (SDS:  $-0.56 \pm 0.82$ ;  $p < .001$ ). Children with complex CHD had lower values in handgrip strength compared to children with moderate (complex:  $17.7 \pm 5.7$  kg; moderate:  $19.0 \pm 5.6$  kg;  $p < .001$ ) and simple (complex:  $17.7 \pm 5.7$  kg;  $23.7 \pm 5.6$  kg;  $p < .001$ ) severity. Patients with total cavopulmonary connection had the lowest values ( $16.6 \pm 5.6$  kg). There was a significant relationship between handgrip strength and HRPF ( $r = .316$ ;  $p < .001$ ).

**Conclusions:** Children with CHD have considerable lower handgrip strength and HRPF compared to healthy children. The positive relation between both parameters highlight the potential of the handgrip measurement as a useful screening tool in the clinical context.