

Benefits of high-intensity interval training in a young and in an older *de novo* heart transplant recipient- cases from the HITTS study

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Purpose:

High-intensity interval training (HIT) is an effective method to increase exercise capacity in *de novo* heart transplant recipients, as shown in the recently published HITTS study (High-intensity Interval Training in *de novo* Heart Transplant recipients in Scandinavia) [1] and Figure 1. We were interested to scrutinize the potential effect of HIT in different age categories

Methods:

The HITTS study was a randomized controlled study comparing HIT versus moderate intensity continuous training (MICT) in *de novo* heart transplant recipients (mean 11 weeks after heart transplantation). Eighty-one participants were randomized (1:1) to 9 months of HIT or MICT. The primary endpoint was the change in VO_{2peak} . Secondary endpoints included: Heart rate response, muscle strength and self-reported physical function measured by the Short-Form-36v2. One of the youngest and one of the oldest participants with the highest changes in VO_{2peak} in the HIT intervention group were selected for this case report.

Results:

The youngest male (< 25 years old) increased his VO_{2peak} with 15.3 mL/kg/min from baseline to follow up (from 23.5 to 38.8 mL/kg/min), while the older male (> 55 years old) increased his VO_{2peak} with 12.6 mL/kg/min (from 15.6 to 28.3 mL/kg/min). Muscle strength, heart rate response, O_2 pulse and self-reported physical function also increased substantially (Table 1). The young heart transplant recipient completed 51 exercise sessions whereas the older heart transplant recipient completed 72 sessions.

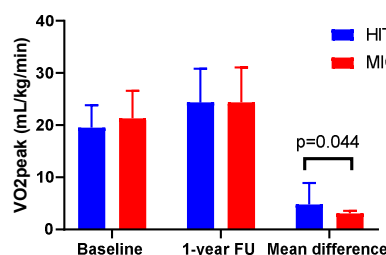


Figure 1. Total population. VO_{2peak} at baseline and 1-yr follow-up in the HIT group and the MICT group and the mean difference at 1-yr follow-up.

Conclusion:

Both the young and the older *de novo* heart transplant recipient increased their VO_{2peak} with at least 4 METS (>12 mL/kg/min) after a 9-month long HIT intervention. The results show that both young and older individuals can derive substantial benefit from HIT soon after heart transplantation.

Table 1	Young heart transplant recipient		Older heart transplant recipient	
	Baseline	1-yr follow-up	Baseline	1-yr follow-up
Weeks after heart transplantation	12		12	
Age category (years)	< 25		> 55	
Body mass index	17.7	19.36	20.3	24.1
VO_{2peak} (mL/kg/min)	23.5	38.8	15.6	28.3
VO_{2peak} (L/min)	1.549	2.798	1.080	2.333
% expected VO_{2peak}	54	88	42	76
Respiratory exchange ratio	1.15	1.29	1.01	1.25
Maximal heart rate (beats /min)	146	173	115	169
Chronotropic response index	0.504	0.786	0.329	1.01
Heart rate recovery at 2 min (beats/min)	2	-7	-7	-18
O_2 pulse (mL/beat)	10.3	16.1	9.4	14.0
Extensor muscle maximal strength (Newton meter)	276	350	171	234
Extensor muscular exercise capacity (Joule)	3988	5673	2191	3565
Self-reported physical function (SF-36v2)	44	53	51	57

References:

1. Nytrøen K, Rolid K et al. Effect of High-Intensity Interval Training in De Novo Heart Transplant Recipients in Scandinavia: 1-Year Follow-Up of the HITTS Randomized, Controlled Study. Circulation. 2019;139(19):2198-2211.