



FONDAZIONE SALVATORE MAUGERI
CLINICA DEL LAVORO E DELLA RIABILITAZIONE
D.P.R. 991 DEL 5.6.1965
I.R.C.C.S.

8.30-9.30

SALA PASQUALE SOLINAS

SESSIONE DI COMUNICAZIONI

ERGOMETRIA, ELETTROCARDIOGRAFIA E RIABILITAZIONE

Moderatori: **M. Anselmi** (San Bonifacio), **G. Slavich** (Udine)

Use of the POSTHORAX vest in patients who underwent heart surgery during cardiac rehabilitation and its impact on functional recovery and respiration function.

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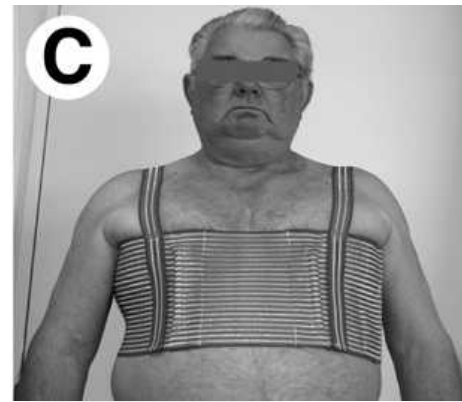
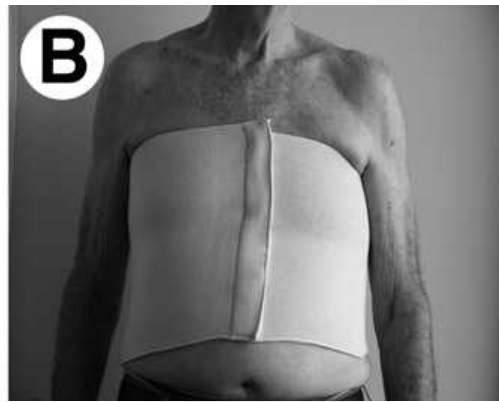
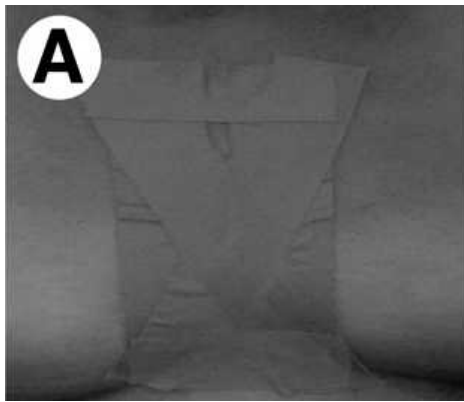
**Cardiac Rehabilitation Unit
Scientific Institute of Rehabilitation - IRCCS
Salvatore Maugeri Foundation
1 Milano - 2 Tradate**



1. Introduction



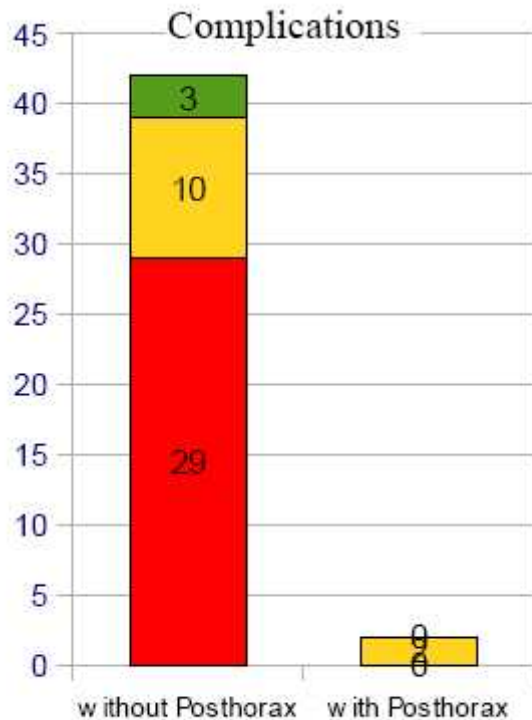
- **Median sternotomy** remains the best surgical approach for cardiac surgery. It can be complicated by the appearance of skin **infections** and mediastinitis, dehiscence, and instability of bone surfaces.
- **Sternal vests** are devices created in order to prevent sternal dehiscence and instability; their use may result in the limitation of thoracic excursion that might worsen temporary restrictive lung disease in patients undergoing cardiac surgery.



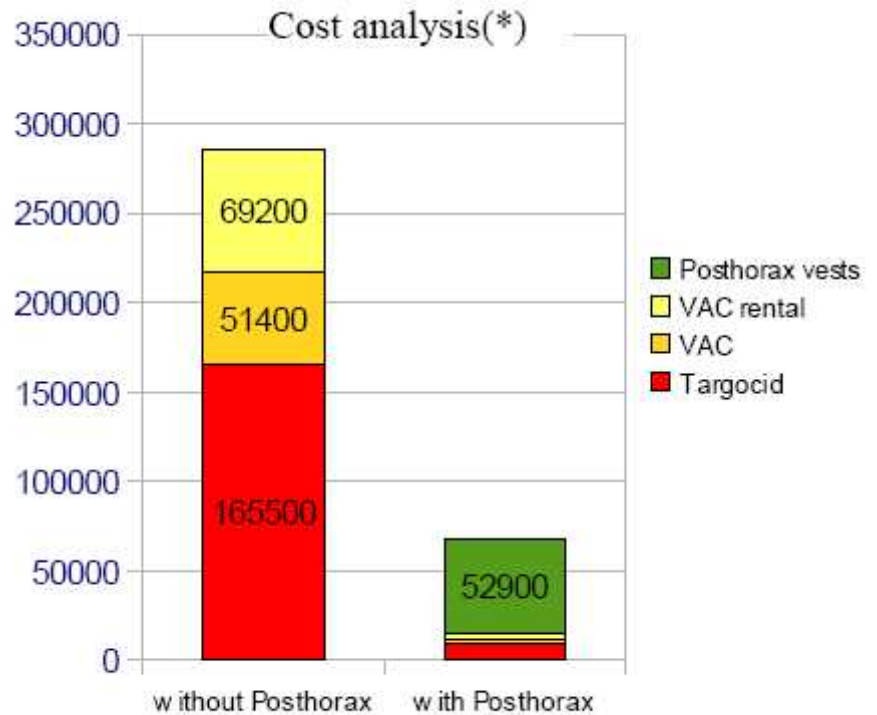
A sternal stabiliser must:

- be **active** on the sternotomy without compromising the ventilatory function
- be **easy** to use
- reduce **pain** and **discomfort** without restrictions of physical activity
- improve patients' **quality of life.**

Sternal instability leads to an infection of the sternal wound!



■ Dehiscence
■ Superficial infection
■ Deep infection



■ Posthorax vests
■ VAC rental
■ VAC
■ Targocid

After 1009 patients and 90 post operative days, in the non-Posthorax group, we had 29 deep sternal wound infections, 10 superficial wound infections and 3 dehiscences. In the Posthorax group we observed only 2 superficial wound infections. 25% of complications occurred after hospital discharge.

2. Aim of the study



The objective of this study is to evaluate the impact of the use of the PosThorax[®] vest on functional recovery and respiratory function during the cardiac rehabilitation programme following heart surgery.

3. Population



All the patients admitted to our Department of Rehabilitation from Cardiac Surgery Centres, on day five to seven after cardiac surgery via median sternotomy, were the subject of the present study.

INCLUSION criteria:

- all subjects aged ≤ 80 years who underwent cardiac surgery via medial sternotomy
- mobilised
- able to ambulate
- able to undergo the usual physiotherapy programme
- and perform exercises on the exercise bike

EXCLUSION criteria:

- > 80 years of age, medical history of clinically significant bronchopulmonary disease and/or use of bronchodilator therapy
- $FE < 30\%$
- recent myocardial infarction (< 30 days), aortic replacement surgery because of thoracic aortic aneurysm
- sternal wound **complications** which would require the elective use of the corset from the early days after surgery.



4. Methods

ENROLMENT

Spirometry using plethysmograph

DLCO

Walk test (6MWT)

EuroQol

RANDOMISATION

Randomisation

Patients are randomly assigned to two groups:

- Group 1: 40 patients will be encouraged to wear the PosThorax[®] vest continuously (24 hours/day);
- Group 2: 40 patients will not use the vest.

Plethysmograph

DLCO

6 MWT

EuroQol

Cardiopulmonary exercise testing (CPET) with vest

CPET without vest

Plethysmograph

DLCO

6MWT

EuroQol

CPET

Patients enrolled from the outset of the study: 56

Patients currently completed: 33



Causes of exit from the study		
	Group 1	Group 2
Intolerance to the vest	4	-
Sternal wound complications	0	2
Other complications	5	4
Inability to perform plethysmograph and/or DLCO	4	4

	Group 1	Group 2	p
No. of subjects	17	16	
M/F	14/3	11/5	NS
age	65 ± 11	66 ± 8	NS
BMI	27 ± 3	23 ± 7	NS

	Group 1					Group 2			
	I	II	Δ II-I	IIc	Δ II _c -I	I	II	Δ II-I	p Δ Gr1-Gr2
Hb (g/dL)	10.5 ± 1.5	10.7 ± 0.9	0.4 ± 0.9			10.3 ± 1.2	10.9 ± 1.3	0.6 ± 1.0	NS
TLC	4.8 ± 0.8	5.4 ± 1.2	0.5 ± 0.6	5.2 ± 1.2	0.3 ± 0.8	5.0 ± 1.3	5.5 ± 1.8	0.5 ± 1.9	NS
TLC %	79 ± 13	88 ± 14	8 ± 10	85 ± 15	5 ± 18	89 ± 20	103 ± 17	14 ± 23	NS
FEV1	1.8 ± 0.5	2.0 ± 0.7	0.2 ± 0.4	2.2 ± 0.6	0.4 ± 0.3	1.8 ± 0.5	2.1 ± 0.6	0.3 ± 0.3	NS
FEV1 %	66 ± 16	74 ± 20	9 ± 11	78 ± 16	13 ± 11	72 ± 21	85 ± 26	14 ± 16	NS
FEV1/FVC	82 ± 9	80 ± 6	-2 ± 9	77 ± 4	-4 ± 9	79 ± 9	78 ± 9	-1 ± 10	NS
DLCO	4.2 ± 0.8	4.6 ± 1.1	0.5 ± 0.6	4.6 ± 1.1	0.5 ± 0.5	4.5 ± 2.1	4.8 ± 1.4	0.7 ± 0.4	NS
DLCO %	51 ± 8	57 ± 11	6 ± 6	56 ± 10	5 ± 7	51 ± 11	64 ± 18	10 ± 6	NS
KCO	1.0 ± 0.1	1.1 ± 0.2	0.0 ± 0.1	1.0 ± 0.2	-0.0 ± 0.2	1.0 ± 0.2	1.0 ± 0.2	-0.0 ± 0.1	NS
KCO %	78 ± 11	78 ± 14	1 ± 8	75 ± 19	-2 ± 12	73 ± 15	74 ± 15	-1 ± 10	NS
6MWT	290 ± 100	426 ± 69	134 ± 59			351 ± 85	440 ± 84	105 ± 46	NS
6MWT %	56 ± 19	83 ± 15	27 ± 13			70 ± 19	88 ± 18	21 ± 10	NS

Results of cardiopulmonary exercise testing





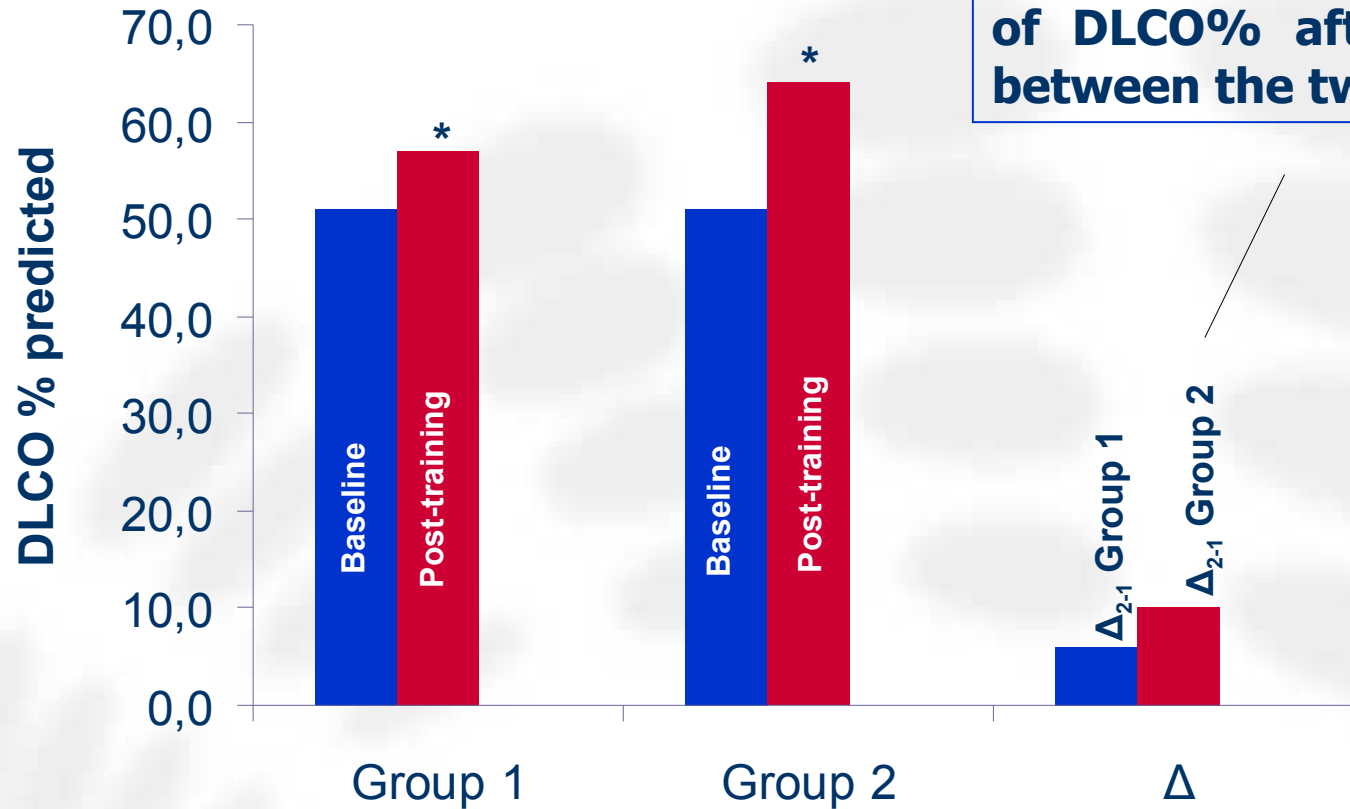
Plethysmograph results



* $p < 0.05$ vs baseline

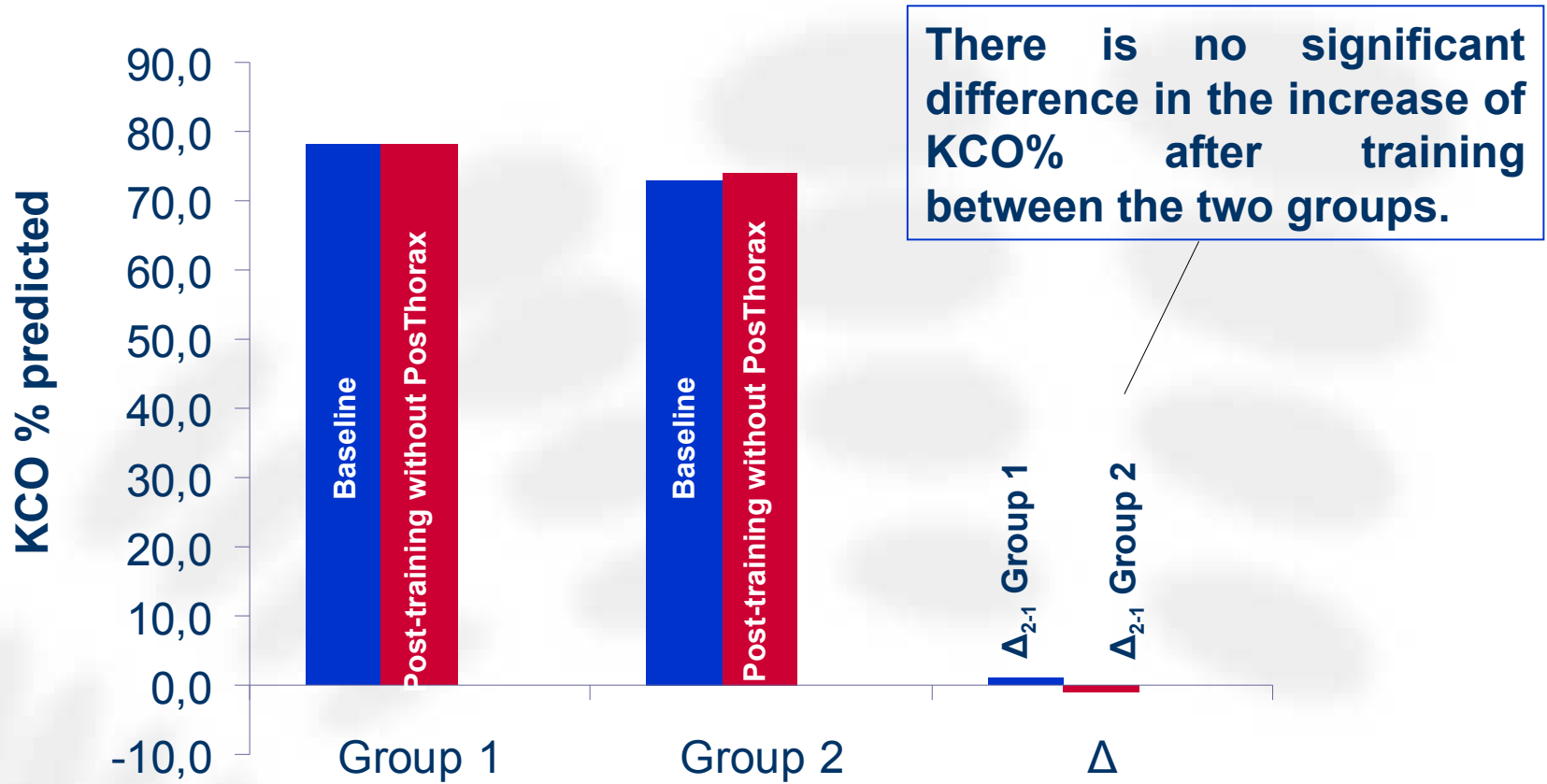
§ $p < 0.05$ vs analogue Group 1

DLCO results



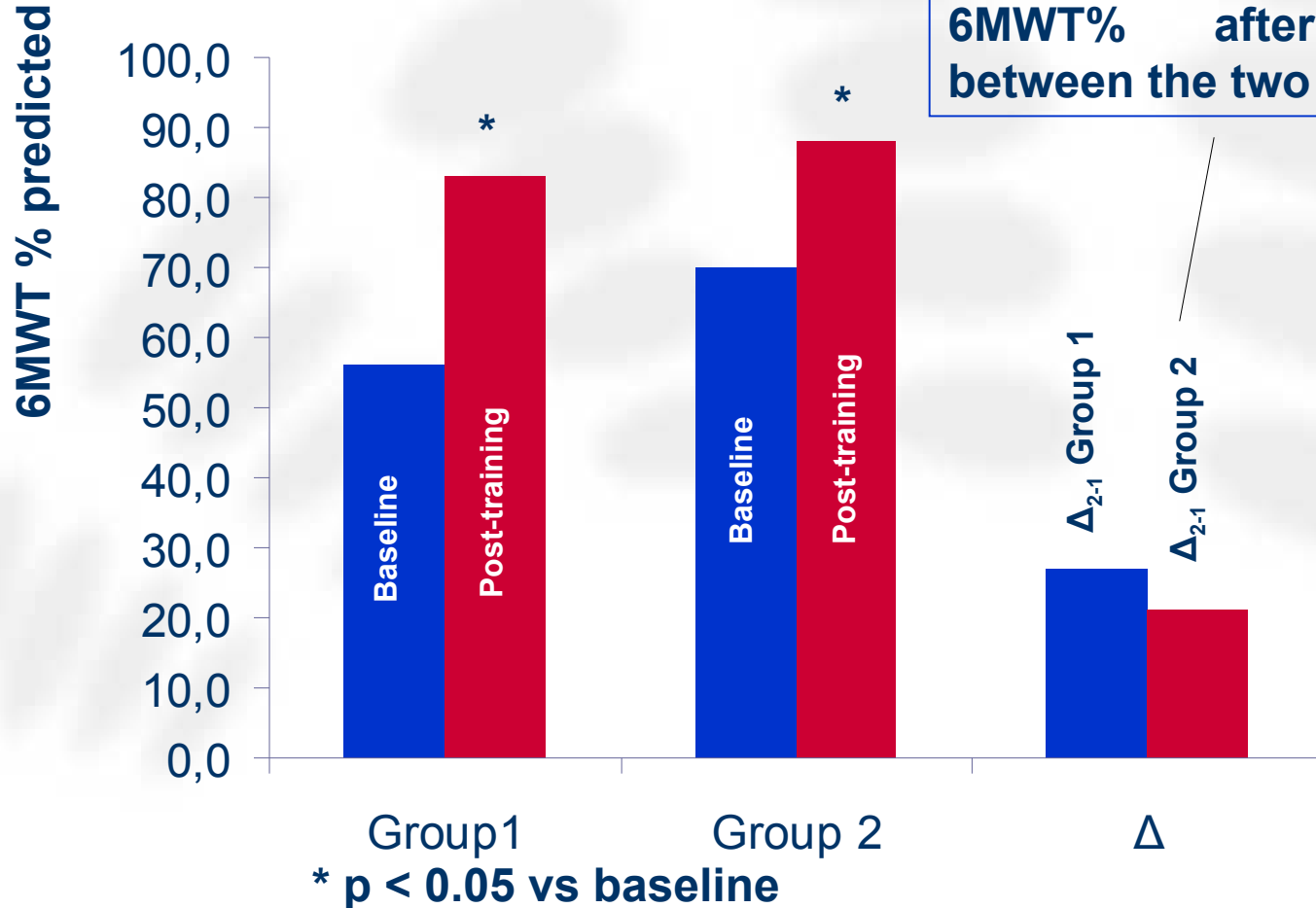
* $p < 0.05$ vs baseline

KCO results



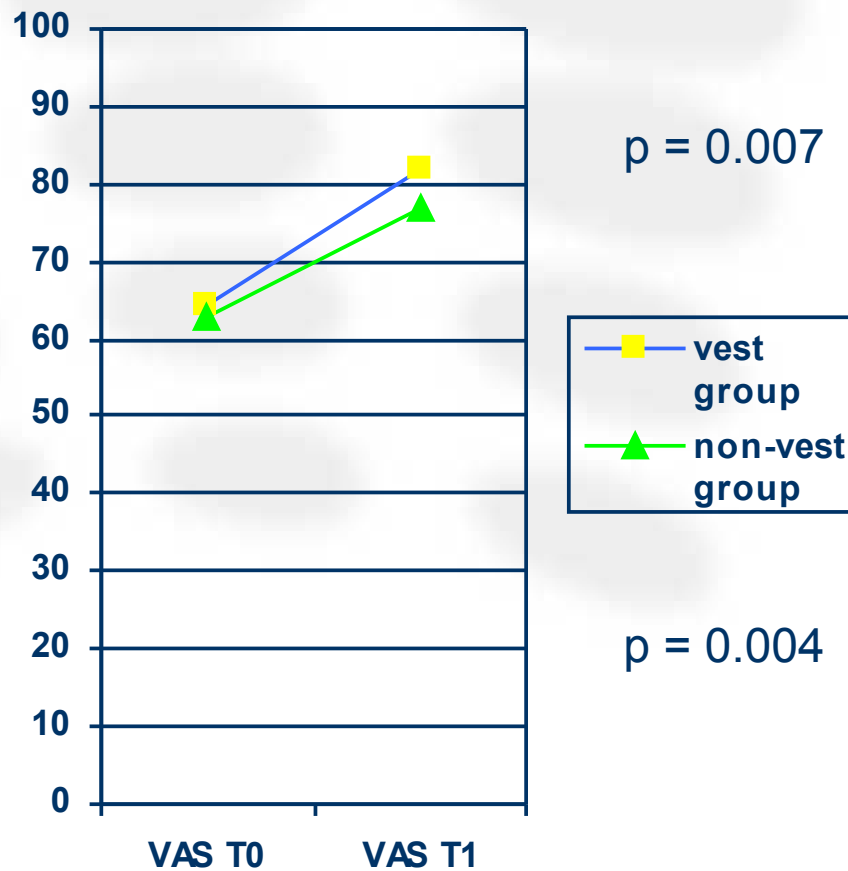
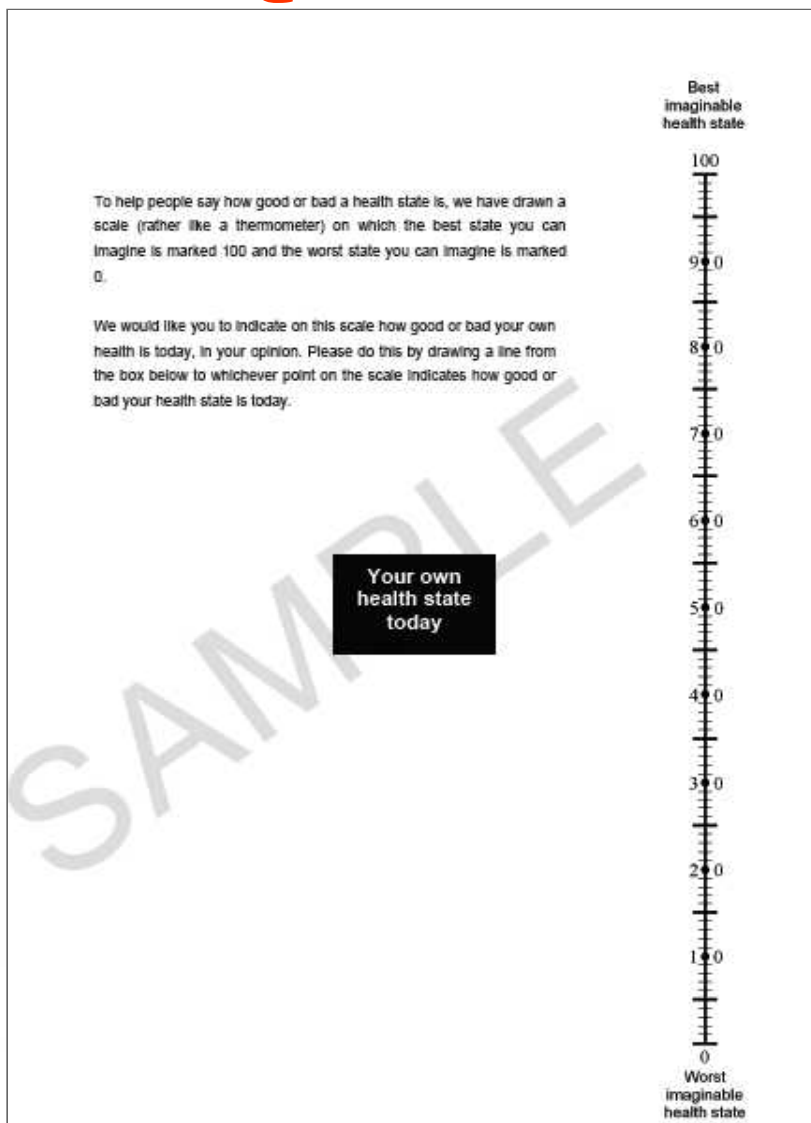


Results of 6 Minute Walking Test



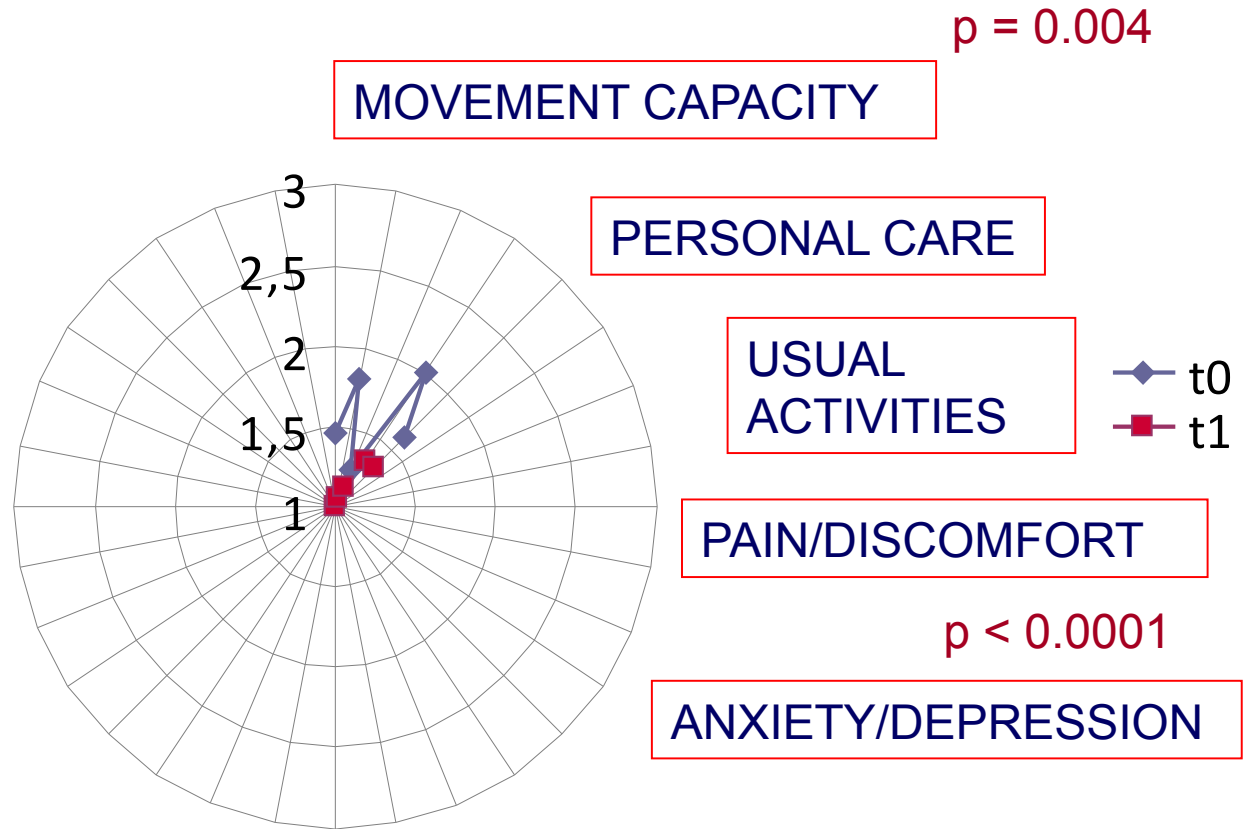
There is no significant difference in the increase of 6MWT% after training between the two groups.

EuroQoL 5D-3L results



EURO QoL 5D 3 L

vest group 1 no problems, 2 some problems, 3 extreme problems.



6. Conclusion



•The study demonstrates the full effect of a rehabilitation cycle on the recovery of respiratory function and submaximal functional capacity.

•The absence of differences in the improvement of various ventilatory parameters and the distance walked in the 6MWT between the two groups shows that the use of the POSTHORAX[©] vest does not have a negative impact on the recovery of these parameters.

•These results suggest that devices such as Posthorax[©] should be more extensively used after sternotomy in cardiac surgery.



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Gratie