REGIONE LAZIO

Con il patrocinio del
Ministero della Salute

AISC
Associazione Italiana Scompensati Cardiaci

How to overcome barriers to implement cardiac rehabilitation in heart failure patients

AISC 29.09.2017. Roma

Ewa Piotrowicz MD, PhD
Telecardiology Center
Institute of Cardiology
Warsaw

2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

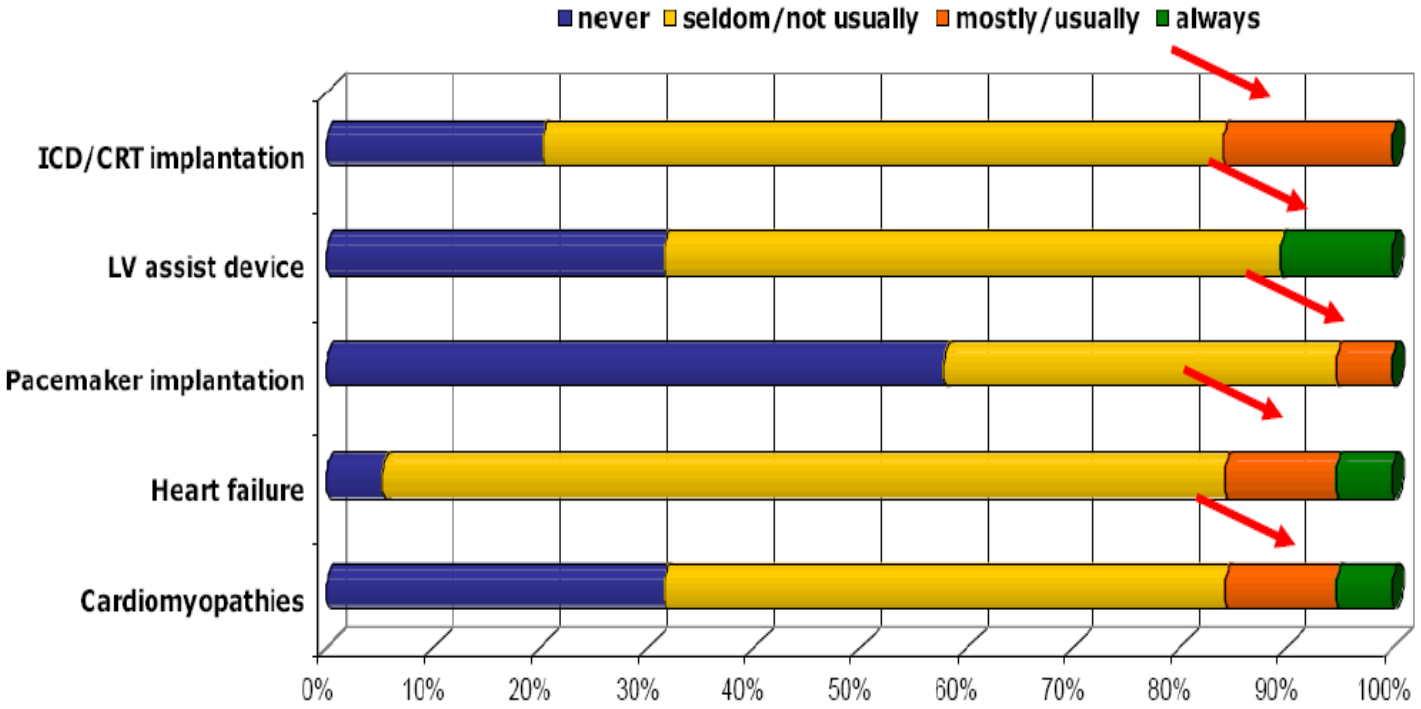
The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC)

Recommendations for exercise, multidisciplinary management and monitoring of patients with heart failure

Recommendations	Class [a]	Level [b]	Ref [c]
It is recommended that regular aerobic exercise is encouraged in patients with HF to improve functional capacity and symptoms.	I	A	321, 618–621
It is recommended that regular aerobic exercise is encouraged in stable patients with HFrEF to reduce the risk of HF hospitalization.	I	A	618, 619
It is recommended that patients with HF are enrolled in a multidisciplinary care management programme to reduce the risk of HF hospitalization and mortality.	I	A	622–625

Which patients take part in phase II cardiac rehabilitation?

Guidelines are still poorly implemented in every day clinical practice



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J Am Coll Cardiol. 2009 September 29; 54(14): 1336–1363. doi:10.1016/j.jacc.2009.05.019.

ACCF/AHA/ACP 2009 Competence and Training Statement: A Curriculum on Prevention of Cardiovascular Disease:

9. Adherence and Disease Outcome Interdisciplinary Programs

- **Only 50% of patients adhere to recommendations in long term follow-up**

F Osterberg L et al. N Engl J Med 2005;353:487–97.


European Journal of Heart Failure (2012) 14, 451–458
doi:10.1093/eurjhf/hfs048

POSITION STATEMENT

Adherence of heart failure patients to exercise: barriers and possible solutions

A position statement of the Study Group on Exercise Training in Heart Failure of the Heart Failure Association of the European Society of Cardiology

Viviane M. Conraads[1]*, Christi Deaton[2], Ewa Piotrowicz[3], Nuria Santaularia[4], Stephanie Tierney[5], Massimo F. Piepoli[6], Burkert Pieske[7], Jean-Paul Schmid[8], Kenneth Dickstein[9], Piotr P. Ponikowski[10], and Tiny Jaarsma[11]

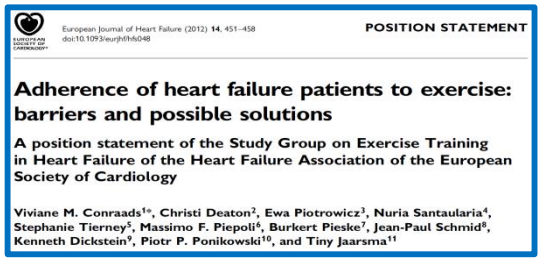
Barriers for exercise in heart failure reported in literature

	Barriers
Healthcare team/system	Lack of expertise with heart failure Lack of capacity Lack of referral Lack of education on the importance of exercise
Social and economic	Lack of resources and support Lack of reimbursement Transportation issues

Barriers for exercise in heart failure reported in literature

	Barriers
Patient related	Older age Low level of education Low socio-economic status Logistical problems Lack of motivation Lack of insight into benefits Lack of time
Condition related	Severity of symptoms Level of disability Rate of disease progression Impact of co-morbidities, including depressive symptoms/cognitive problems
Therapy related	Lack of relevance of some exercise activities for daily life Difficulty to incorporate exercise into daily life

Recommendations for clinicians to help patients to overcome barriers to exercise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Give information on:

- ✓ Safety of exercise
- ✓ How exercise relates to improvements in symptoms and activity tolerance
- ✓ The importance of exercise as a component of heart failure therapy


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Recommendations for clinicians to help patients to overcome barriers to exercise

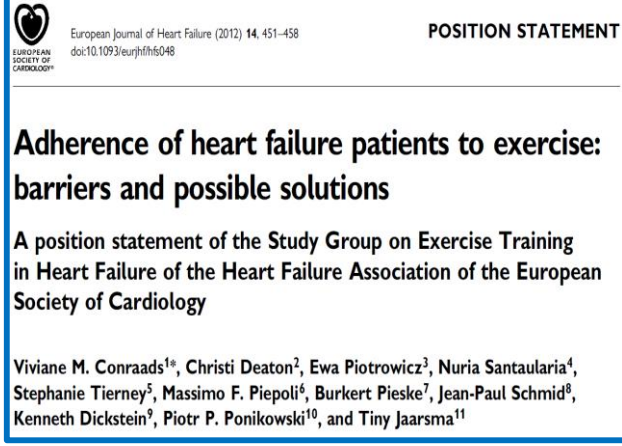
Overcoming therapy related barriers:

- ✓ Support patients: to identify intentions to exercise during hospitalization, to translate intentions into specific plans (how, where, and when to perform an action), and detailed planning of how to implement the desired behaviour

- ✓ Teach patients:
  - breathing exercises to reduce dyspnoea;
  - to rate subjectively perceived exertion as a guide for exercise intensity (Borg scale);
  - warning signs for stopping activity (e.g. chest pain, severe dyspnoea, dizziness, etc.)

- ✓ Encourage activities that the patient prefers, e.g. gardening, dancing, water gymnastics, etc.

- ✓ Involve family and friends if possible and enlist their support in encouraging activity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Definition

Adherence is defined by the World Health Organization as the extent to which a person's behaviour — taking medication, following a diet, and/or executing lifestyle changes—corresponds to the recommendations of a healthcare provider.

Adherence of heart failure patients to exercise: barriers and possible solutions
VM Conraads et al. Eur J Heart Fail 2012

Patients can be divided into three categories in terms of their adherence to exercise:

- ✓ **Adherent patients, i.e. patients who adhere both to the number of training sessions prescribed and to the duration of the prescribed cycle by at least 80%.**
- ✓ **Non-adherent patients, who adhere, 20% to the prescribed number of training sessions and their duration.**
- ✓ **Partially adherent patients who carry out the prescribed exercises, yet tend to omit some of them or do not carry them out for the prescribed duration.**

How to assess adherence to exercise?

FITT

F - frequency - the number of physical training sessions during a specific time period

I - intensity - the physiological effort associated with participation in a special type of exercise training

T - time - refers to the duration of execution of a single exercise training session

T - type - indicates the exercise modality:
- aerobic endurance (continuous and interval)
- strength/resistance training
- respiratory muscle training

Assessment of adherence should include all the above-mentioned components


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How to assess adherence to exercise?

Subjective methods: - physical activity questionnaires
- diaries filled in by patients

Objective methods: the recording of data from: - pedometers,
- accelerometers,
- pulsometers (heart rate monitoring),
- electrocardiogram (ECG) telemonitoring

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Objective methods of exercise training assessment

Assessment method	Advantages	Limitations
Pedometers, i.e. walking training assessment	Inexpensive, easy to wear.	Not appropriate for monitoring complex movements, cycling, or movements on graded terrain. No recording of horizontal or upper-body movements.
Accelerometers, i.e. monitoring the intensity of the movement	Possibility of measuring a specific activity. Inexpensive, easy to wear.	No recording of horizontal or upper-body movements.
Pulsometers, i.e. monitoring training HR	Inexpensive, easy to wear.	Not reliable for sedentary or very light-intensity training.
ECG telemonitoring, i.e. monitoring training HR, arrhythmias,conduction disturbances, ST-T	Useful for monitoring ExT below ischaemic threshold, detection of arrhythmias, and precise recording of training HR.	Expensive. Need special device, monitoring staff, monitoring centre.

Physical activity in patients with heart failure: barriers and motivations with special focus on sex differences

Klompstra L, Jaarsma T and Strömberg A, Patient Preference and Adherence 2015

The aim of this study was to evaluate physical activity in HF patients, to describe the factors related to physical activity, and to examine potential barriers and motivations to physical activity with special focus on sex differences.

Methods

HF patients living at home received a questionnaire, with questions on physical activity (from the Short Form-International Physical Activity Questionnaire), and potential barriers and motivations to physical activity.

Physical activity in patients with HF: barriers and motivations with special focus on sex differences

Klompstra L, Jaarsma T and Strömberg A, Patient Preference and Adherence 2015

Potential barriers to exercise in HF, patients and sex differences in potential barriers to exercise training

Potential barriers to exercise	Total group, N=154	Women, N=49	Men, N=105	Significance
Total self-efficacy	3.6 (±2.2)	3.6 (±2.0)	3.5 (±2.4)	0.76
Suffering from minor injuries	115 (85%)	35 (71%)	80 (76%)	0.49
Need to spend time on other things	114 (83%)	37 (76%)	77 (73%)	0.85
Need to spend time on family responsibilities	112 (82%)	39 (80%)	73 (70%)	0.19
Feeling physically tired	115 (82%)	35 (71%)	80 (76%)	0.68
Experience symptoms	109 (81%)	35 (71%)	74 (71%)	0.90
Working long hours	104 (80%)	33 (67%)	71 (68%)	0.39
Feeling bored with exercising	106 (76%)	29 (59%)	77 (73%)	0.07
Experience side effects of the medication	98 (75%)	35 (71%)	63 (60%)	0.27
The weather is bad	96 (73%)	25 (51%)	71 (68%)	0.07
Hard to get to the gym	95 (71%)	31 (63%)	64 (61%)	0.68
Exercise is expensive	91 (70%)	29 (59%)	62 (59%)	0.09
Family is not interested in exercise	93 (69%)	27 (55%)	66 (63%)	0.30
Afraid of getting hurt through exercise	86 (68%)	23 (47%)	63 (60%)	0.09

Motivations to exercise	Total, N=154	Women, N=49	Men, N=105	Significance
Total motivation	1.8 (±1.0)	2.1 (±2.4)	1.7 (±2.0)	<0.01
Physical motivation	1.4 (±1.2)	1.7 (1.0)	1.2 (±0.9)	0.02
I want to be healthier and perhaps live longer	97 (66%)	35 (71%)	56 (53%)	0.05
I want to develop stamina and feel strong	62 (42%)	23 (47%)	39 (37%)	0.20
I want to be in good shape and for my clothes to fit better	57 (39%)	22 (45%)	35 (33%)	0.11
I want to look good	23 (16%)	10 (20%)	13 (12%)	0.19
Social motivation	2.2 (±1.0)	2.5 (±1.0)	2.1 (±1.0)	0.04
I want to be as active as my friends and family	37 (25%)	25 (31%)	22 (21%)	0.18
I want to belong to groups of fit people	35 (24%)	12 (25%)	23 (22%)	0.61
It is fun to exercise in a group or with other people	31 (21%)	14 (29%)	17 (16%)	0.05
Everyone else exercises, I want to do that too	25 (17%)	6 (12%)	19 (18%)	0.39
Psychological motivation	2.9 (±1.1)	2.2 (±1.0)	1.8 (±1.1)	0.02
I want a slower aging process and feel younger	84 (57%)	28 (57%)	19 (40%)	0.64
Exercise increases my general feeling of well-being	64 (44%)	25 (51%)	39 (37%)	0.08
I am proud of myself when I take regular exercise	58 (39%)	26 (53%)	32 (31%)	<0.01
I feel more in control of my life when I exercise	52 (36%)	18 (37%)	34 (32%)	0.46
I want to feel less physically exposed	49 (33%)	20 (41%)	29 (28%)	0.10
I feel more successful when I am in good shape	44 (30%)	19 (39%)	25 (24%)	<0.05
People who are fit are admired, I want to be admired	19 (13%)	7 (14%)	12 (11%)	0.61

How to encourage patients to exercise training?

- ✓ Improved accessibility to cardiac rehabilitation
- ✓ Adequate personalized motivation
- ✓ Attractive and tialored form of exercise training

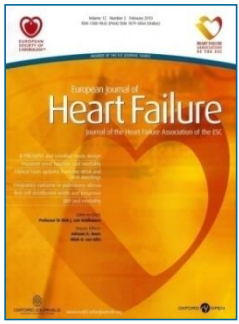
Improved accessibility to cardiac rehabilitation

EXERCISE TRAINING IN HEART FAILURE: FROM THEORY TO PRACTICE.
A CONSENSUS DOCUMENT OF THE HEART FAILURE ASSOCIATION AND THE EUROPEAN ASSOCIATION OF CARDIOVASCULAR PREVENTION AND REHABILITATION
APPENDIX

Massimo F Piepoli,[1] Viviane Conraads,[2] Ugo Corrà,[3] Kenneth Dickstein,[4] Darrel P Francis,[5] Tiny Jaarsma,[6] John McMurray,[7] Burkert Pieske,[8] Ewa Piotrowicz,[9] Jean-Paul Schmid,[10] Stefan D Anker, [16] Alain Cohen Solal,[13] Gerasimos S. Filippatos,[15] Arno W. Hoes,[14] Stefan Gielen,[12] Pantaleo Giannuzzi,[3] Piotr P Ponikowski.[11]
Study Group on Exercise Training in Heart Failure

Remote monitoring and telemedicine. A novel perspective

Home-based cardiac rehabilitation, using telemedicine, may help overcome some of barriers.



Telerehabilitation

European Heart Journal Advance Access published May 23, 2016

European Heart Journal
doi:10.1093/eurheartj/ehw106

JOINT ESC GUIDELINES

2016 European Guidelines on cardiovascular disease prevention in clinical practice

The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts)

Developed with the special contribution of the European As for Cardiovascular Prevention & Rehabilitation (EACPR)

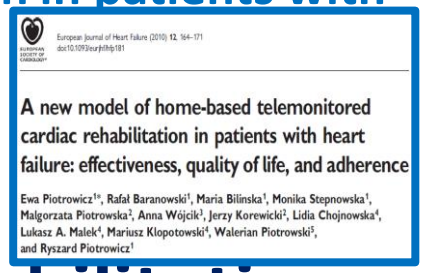
Authors/Task Force Members: Massimo F. Piepoli* (Chairperson) (Italy),

4a.1.4.1 Telerehabilitation

Telerehabilitation, i.e. the use of electronic communication and information technologies to provide and support remote clinical care after an acute event, has been found to be more effective than usual care in achieving behavioural change, and equally effective as a CR programme.[557,567] Simple telemonitoring, including ECG transmission by telephone in patients with CVD, has been found to be safe and acceptable to patients and results in improvements in physical capacity.[568] Recent studies are also using smartphone applications for monitoring and delivery of content and support, with improvements in uptake, adherence and completion of rehabilitation in younger patients.[569]

Thus telerehabilitation could further widen participation to more patients and provide monitoring and greater individualized behavioural support, but large-scale randomized trials are needed.

A new model of home-based telemonitored cardiac rehabilitation in patients with heart failure: effectiveness, quality of life, and adherence
Piotrowicz E et.al. European Journal of Heart Failure 2010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Telerehabilitation

n=77

On-site rehabilitation

n=75

2 months ExT

dropout 0%

n=56 **drop out 20%**

TELEREHABILITATION MONITORING SYSTEM

- Special remote equipment for monitor and supervised exercise training can consist of: device for ECG monitoring, blood pressure measuring and weighing machine

- Data transmission set via a mobile phone or internet
- Monitoring centre capable of receiving and storing patients' medical data (specialized hardware and software are necessary).

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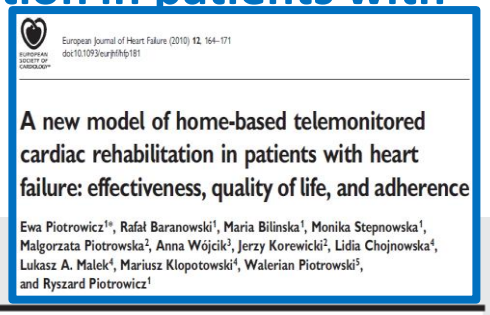
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Table 3 Comparison of outcomes before and after cardiac rehabilitation

	HTCR group (Telerehabilitation)		SCR group (On –site rehabilitation)		P_1-value	P_2-value
	Before	After	Before	After		
NYHA class	2.5 ± 0.5	2.1 ± 0.5	2.5 ± 0.5	2.3 ± 0.5	0.0001	0.0070
Six-minute walking test						
Distance (m)	418 ± 92	462 ± 91	399 ± 91	462 ± 92	0.0001	0.0469
Borg RPE post-test	11.2 ± 2.5	10.6 ± 2.2	10.7 ± 3.1	10.3 ± 2.5	0.0028	ns
Cardiopulmonary exercise test						
Exercise time (s)	411 ± 140	479 ± 161	424 ± 136	477 ± 136	0.0001	ns
Peak VO_2 (mL/kg/min)	17.8 ± 4.1	19.7 ± 5.2	17.9 ± 4.4	19.0 ± 4.6	0.0001	ns
% predicted peak VO_2	60.0 ± 12.8	67.1 ± 17.0	61.9 ± 17.5	66.3 ± 17.2	0.0001	ns
Peak RER	1.00 ± 0.07	0.99 ± 0.06	1.02 ± 0.07	1.02 ± 0.07	ns	ns
Health-related quality of life						
SF-36 (score)	79.3 ± 25.6	70.5 ± 25.4	81.6 ± 27.3	69.2 ± 26.4	0.0001	ns

Data are presented as mean values ± SD; P_1—significance level for the hypothesis of no time effect; P_2—significance level for the hypothesis of no time × group effect (between group differences in improvement of outcomes). HTCR, home-based telemonitored cardiac rehabilitation; SCR, standard cardiac rehabilitation; ns, non-significant; NYHA, New York Heart Association; RPE, rating of perceived exertion; VO_2, oxygen consumption; RER, respiratory exchange ratio; SF-36, Medical Outcome Survey Short Form 36 questionnaire.

Applying telemedicine technologies in a novel model of organizing and implementing comprehensive cardiac rehabilitation in heart failure patients - TELEREH-HF

TELEREH-HF – multicenter, randomized, open-label, parallel, controlled study in heart failure patients. The study is ongoing in 5 centers in Poland.

N=850 pts
NYHA I-III; LVEF ≤ 40% 6mc after hospitalization

N=425 pts
Telemanagement Group

N=425 pts
Usual care Group

ClinicalTrials.gov Identifier:
NCT02523560

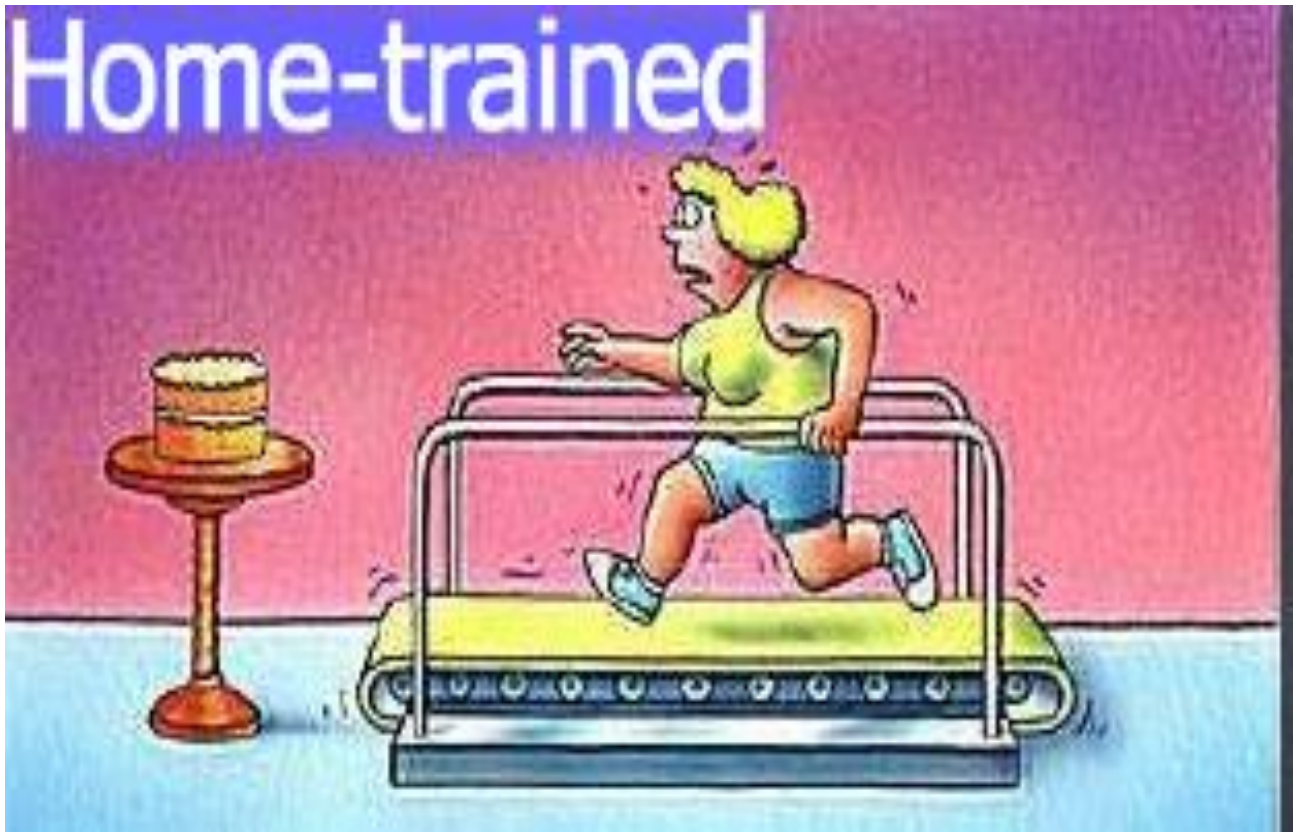
***Primary end-point*: days alive and out of hospital**
***Secondary end-points*: all cause deaths, cardiovascular deaths, all cause hospitalizations, cardiovascular hospitalizations, heart failure hospitalizations, composite end-point of cardiovascular death and HF hospitalizations.**

Data will be avalable in 2019

How to encourage patients to exercise training?

- ✓ Improved accessibility to cardiac rehabilitation
- ✓ Adequate personalized motivation
- ✓ Attractive and tialored form of exercise training

Motivation



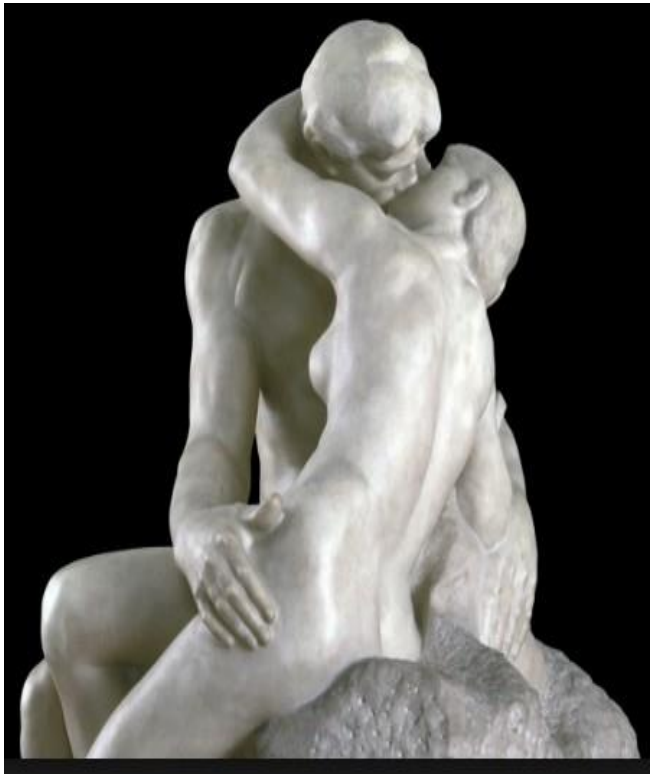
Motivation

You will be healthier,
more beautiful,
more efficient,
more clever,
more attractive,
more happy

You will have better physical fitness, better coordination,

Motivation

You will feel younger no matter how old you are



Rodin

You will enjoy sex and your intimate life will be more satisfying

Attractive, acceptable, fashionable and tialored form of exercise training

European Journal of Heart Failure (2011) 13, 347–357
doi:10.1093/eurjhf/hfr017

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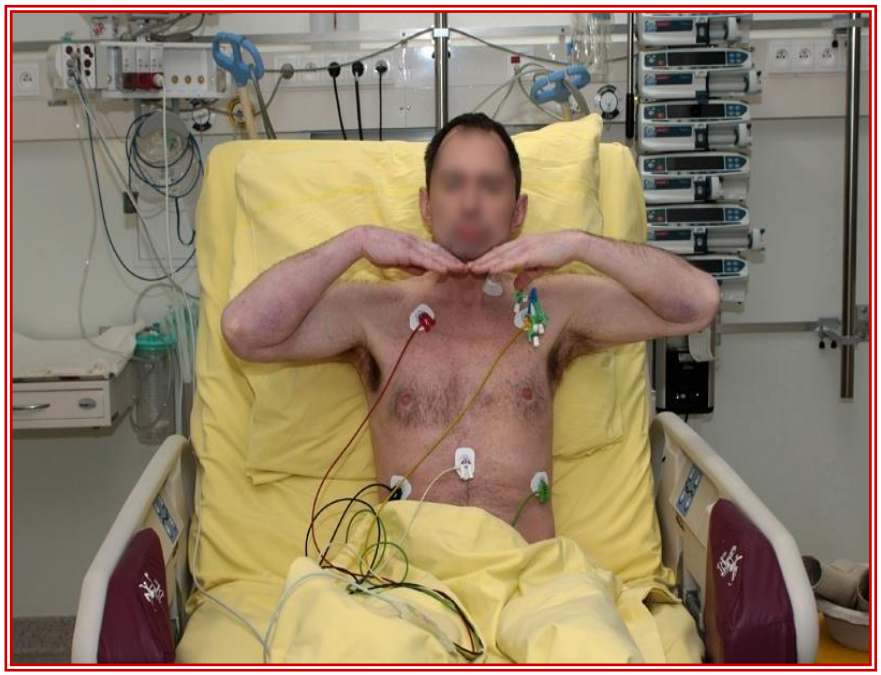
How to initiate physical activity in heart failure patients?



The patient should get used to physical activity after his state stabilised..

Attractive, acceptable, fashionable and tialored form of exercise training

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How to initiate physical activity in heart failure patients?

How to ensure patients safety?

…and than the patient gradually perform exercise training in sitting and standing position

How to encourage patients to exercise training?

- ✓ Improved accessibility to cardiac rehabilitation
- ✓ Adequate personalized motivation
- ✓ Attractive and tialored form of exercise training

Attractive, acceptable, fashionable and tialored form of exercise training

- ✓ Nordic walking
- ✓ Dance
- ✓ Gaming systems
- ✓ Yoga

Home-based telemonitored Nordic walking training is well accepted, safe, effective and has high adherence among heart failure patients, including those with cardiovascular implantable electronic devices: a randomised controlled study

Piotrowicz E et al. European Journal of Preventive Cardiology 2015

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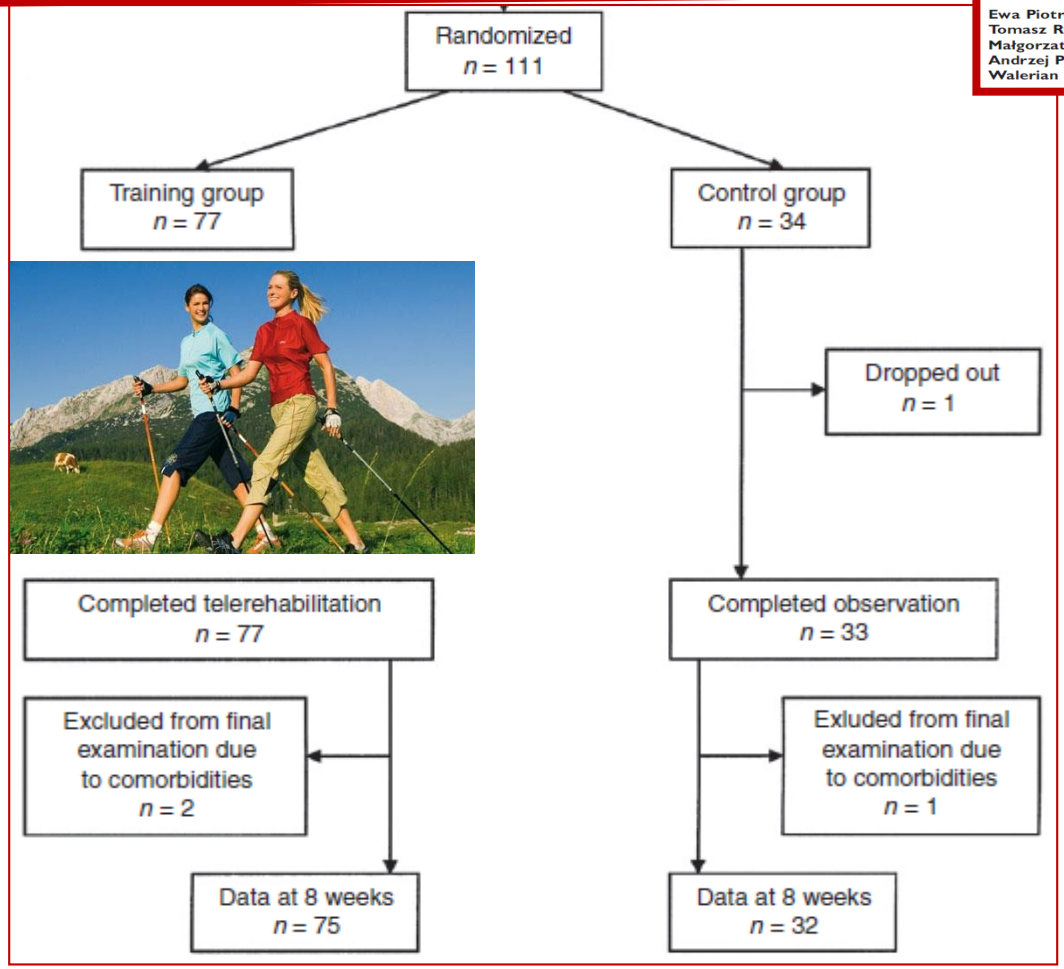

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	Training group			Control group			
	Before	After	p^1	Before	After	p^2	p^3
Cardiopulmonary exercise test							
Workload duration (s)	471 ± 141	577 ± 158	0.0001	540 ± 126	541 ± 136	ns	0.0031
VO_2 peak (ml/kg/min)	16.1 ± 4.0	18.4 ± 4.1	0.0001	17.4 ± 3.3	17.2 ± 3.4	ns	0.0004
RER	1.03 ± 0.08	1.07 ± 0.09	0.0001	1.01 ± 0.07	1.01 ± 0.06	ns	ns
HRrest (bpm)	67 ± 11	67 ± 10	ns	67 ± 10	68 ± 10	ns	ns
HRmax (bpm)	113 ± 16	122 ± 18	0.0001	120 ± 19	117 ± 14	ns	0.0088
Six-minute walking test							
Distance (m)	428 ± 93	480 ± 87	0.0001	439 ± 76	465 ± 91	ns	0.0483
Borg RPE post test	2.9 ± 1.1	2.7 ± 1.2	ns	2.7 ± 1.2	2.7 ± 0.7	ns	ns
Quality of life							
SF-36 score	79.0 ± 31.3	70.8 ± 30.3	0.001	73.6 ± 25.6	67.4 ± 25.9	ns	ns

HR: heart rate; ns: non-significant; NYHA: New York Heart Association; RER: respiratory exchange ratio; RPE: rating of perceived exertion; SF-36: Medical Outcome Survey Short Form 36 questionnaire; VO_2 peak: peak oxygen consumption.; Data presented are mean values ± standard deviation. Statistical significance: $p < 0.05$.

Attractive, acceptable, fashionable and tialored form of exercise training

- ✓ Nordic walking
- ✓ Dance
- ✓ Gaming
- ✓ Yoga

Waltz Dancing in Patients with Chronic Heart Failure

New form of exercise training

Belardinelli R. et al. Circulation Heart Failure 2008

Circulation: Heart Failure

ORIGINAL ARTICLES

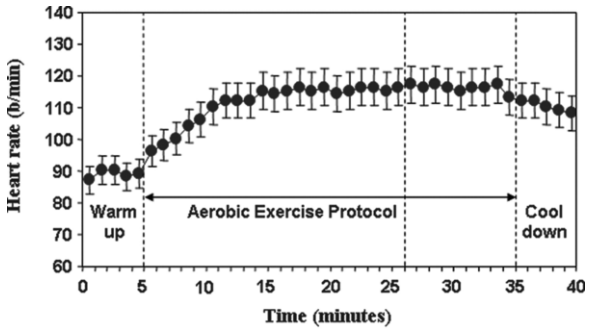
Waltz Dancing in Patients With Chronic Heart Failure

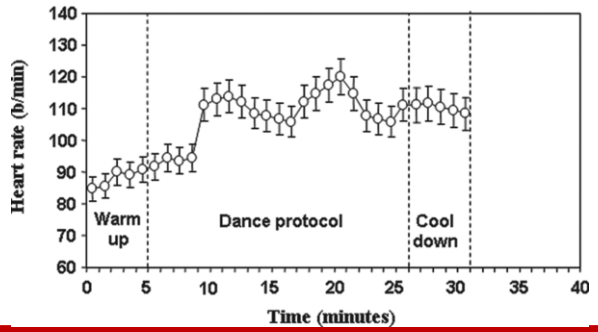
New Form of Exercise Training

Romualdo Belardinelli, Francesca Lacalaprice, Chiara Ventrella, Loretta Volpe, Ernesto Faccenda

The primary end point of the study was to determine whether dance improves functional capacity and quality of life as exercise training in patients with CHF and whether the compliance is acceptable.

Secondary end points were the effect of dance on indices of cardiovascular efficiency assessed by cardiopulmonary exercise testing and on the endothelium-dependent vasorelaxation.





	Exercise	Dance	Control
N (M/F)	44 (38/6)	44 (36/8)	42 (35/7)
Mean age, y	59±10	60±11	58±10
Previous cardiac disease, n			
MI	24	25	21
PTCA/stenting	15	14	12
CABG	34	36	29
NYHA II/III, %	70/30	70/30	70/30
LV ejection fraction, %	35±8	36±7	37±8
Medication, n			
Digitalis	5	6	4
Diuretics	34	32	29
ACE inhibitors	34	35	37
β-Blockers	36	35	37
Nitrates	11	8	9
Statins	26	25	22

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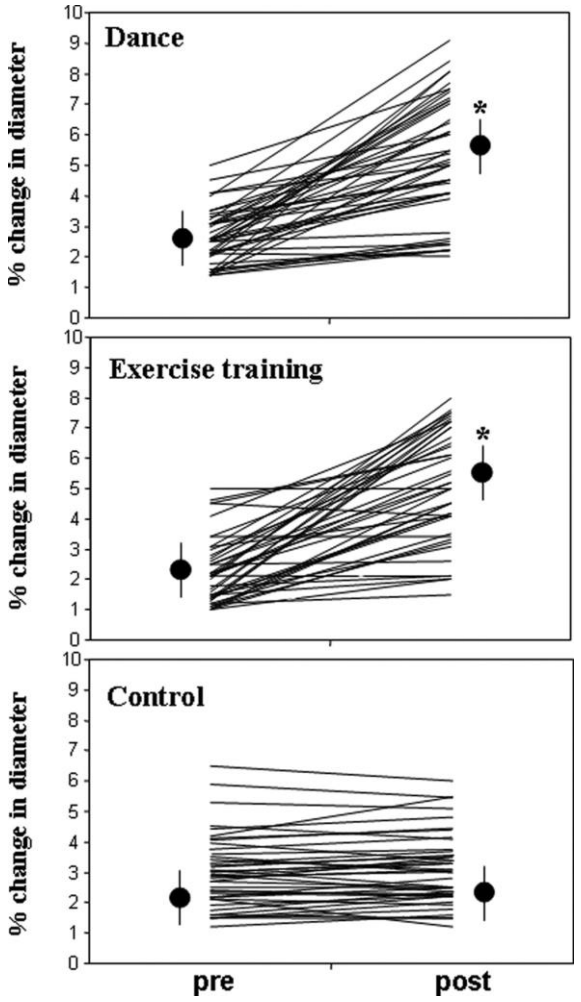
Cardiopulmonary Exercise Testing Results

	Exercise Training		Dance		Control	
	Entry	8wk	Entry	8wk	Entry	8wk
Peak $\dot{V}o_2$, mL/(kg·min)	16.5±4.5	19.6±4.5*	16.8±5.0	19.5±5.0*	16.1±4.5	15.8±4.5
$\dot{V}o_2$AT, mL/(kg·min)	9.8±3.2	11.9±3.0*	9.9±3.4	11.6±3.3*	9.6±3.0	9.4±3.0
$\dot{V}e/\dot{V}co_2$ slope	39.5±11	31.8±12*	38.8±12	32.5±12*	39.1±13	38.9±11
$\dot{V}o_2$/W slope	8.3±1.5	9.5±1.3*	8.1±1.3	9.4±1.1*	8.4±1.1	8.3±1.1
Peak O_2 pulse, mL beat	10.5±1.8	12.3±1.8*	10.7±1.7	12.6±1.7*	10.2±1.6	10.5±1.6
RER	1.18±0.9	1.20±1.0	1.17±0.8	1.20±0.9*	1.16±1.0	1.17±1.0
Peak HR, bpm	129±15	135±16*	131±14	138±16*	132±13	131±14
Systolic BP mmHg	155±18	168±16*	150±20	165±20*	148±18	150±20

Pre-post values of endothelium-dependent relaxation in each subject of the 3 groups.



American Heart Association.

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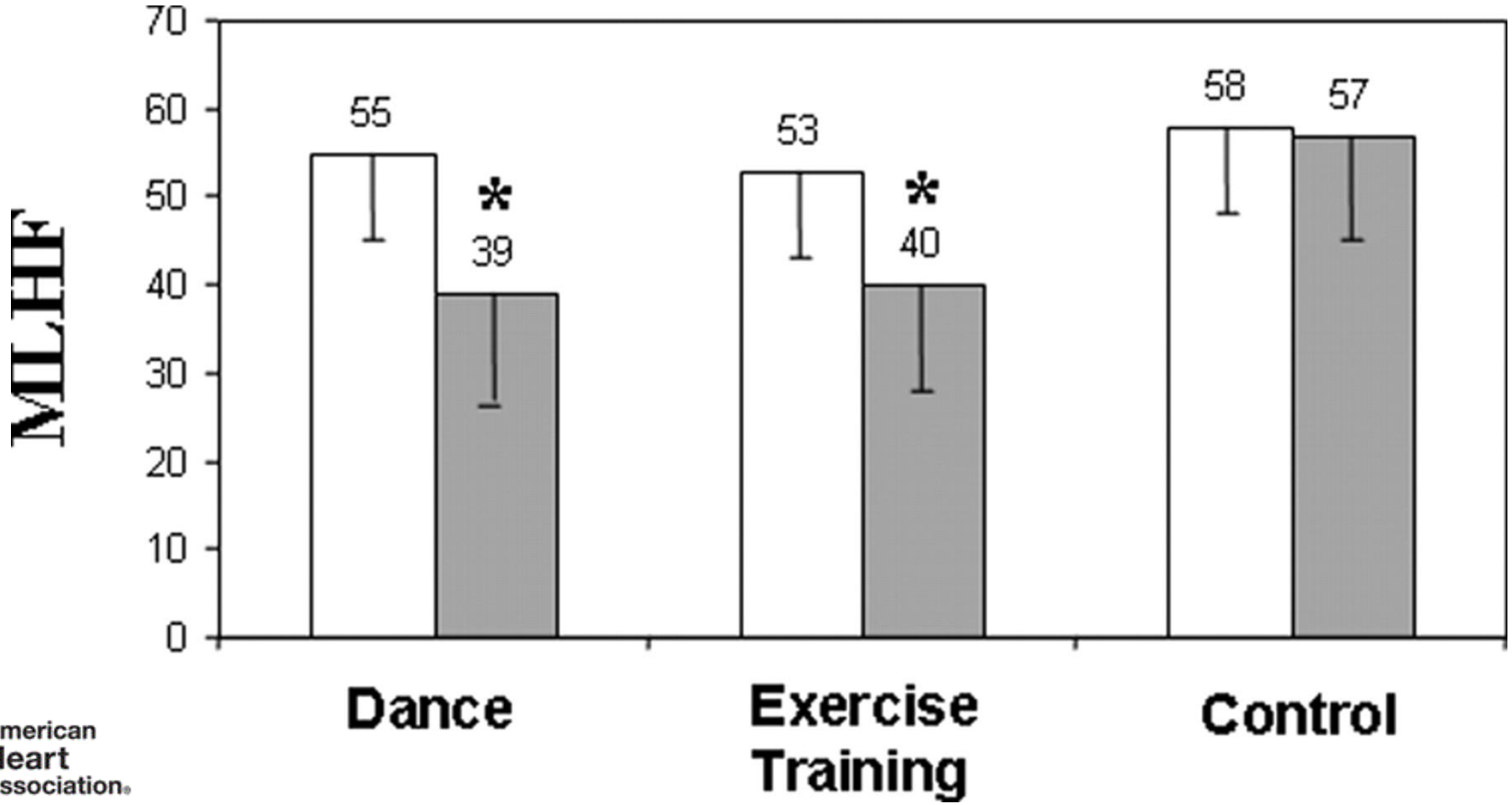
Quality of life assessed by Minnesota Living with Heart Failure Questionnaire sum score in the dance,. exercise training, and control groups at baseline (empty bars) and at the end of protocol (filled bars). *P<0.001 vs control



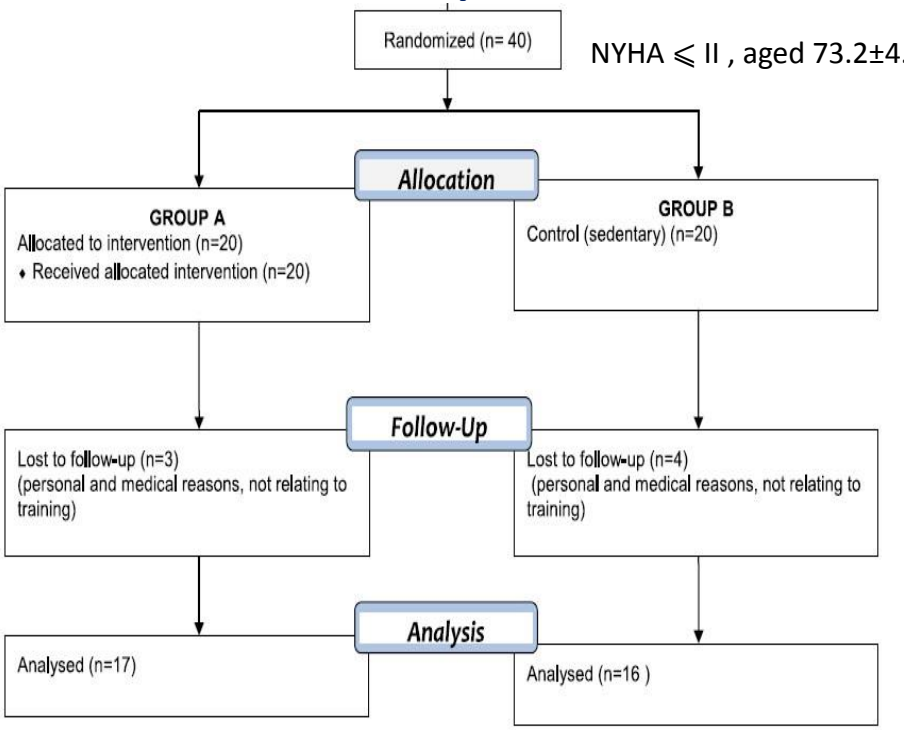
American Heart Association.

Romualdo Belardinelli et al. Circ Heart Fail. 2008;1:107-114

Impact of traditional Greek dancing on jumping ability, muscular strength and lower limb endurance in cardiac rehabilitation programmes
Vordos Z. et al. European Journal of Cardiovascular Nursing 2017

The objective of this study was to evaluate the effect of a training programme based on traditional Greek dance on the jumping ability, muscle strength and lower limb endurance in patients with CHF.

At baseline and follow-up the exercise capacity of the patients was evaluated by the six-minute walking test, their lower extremity muscle strength was evaluated by an isokinetic dynamometer and their jumping ability by the Myotest-Pro test, which includes three types of jumps (plyometric, countermovement and squat jumps).



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Impact of traditional Greek dancing on jumping ability, muscular strength and lower limb endurance in cardiac rehabilitation programmes

Zacharias Vordos[1], Evangelia Kouidi[1], Fotios Mavrovouniotis[1], Thomas Metaxas[2], Eleftherios Dimitros[1], Antonia Kaltsatou[1] and Asterios Deligiannis[1]

Table 2. Results of measurements of strength, endurance and jumping ability at the beginning and end of the study.

Parameter	Group A (*n*=17)		Group B (*n*=16)	
	Baseline	Follow-up	Baseline	Follow-up
Distance (m)	500±48.7	548±48.2*#	464±50.6	467±55.2
Strength (kg)	88.4±30.1	97.5±32.5*	79.5±30.0	79.2±28.3
Jump height (cm)				
PJ	10.7±2.7	12.2±2.6*	9.9±2.4	9.9±2.3
CMJ	13.2±3.0	14.7±3.1*#	12.1±2.9	11.8±2.5
SJ	12.8±3.1	14.3±3.0*#	11.3±2.8	11.4±2.4
Contact time (PJ) (ms)	211±54.5	191±35.4*#	218±46.7	240±48.6
Force (CMJ) (N/kg)	19.5±2.6	21.4±3.0*#	18.9±2.5	18.4±2.1
Speed (cm/s)				
CMJ	139.0±19.1	148.6±19.5*#	116.9±21.6	116.1±20.2
SJ	138.8±18.8	146.2±20.3*#	118.6±22.4	121.0±20.6

All data are presented as mean±SD values.
*p<0.05 between baseline-follow-up; #p<0.05 between groups A and B.
CMJ: countermovement jump; PJ: plyometry jump; SJ: squat jump.

Grek Zorba film Alexis Zorbas, Mihalis Kakogiannis

Conclusion: **The design and implementation of CR programmes using Greek traditional dances in patients with CHF are both safe and effective in improving lower limb function.**

Attractive, acceptable, fashionable and tialored form of exercise training

- ✓ Nordic walking
- ✓ Dance
- ✓ Gaming systems
- ✓ Yoga

Exergaming to increase the exercise capacity and daily physical activity in heart failure patients: a pilot study.

Klompstra A. et al. BMC Geriatr. 2014

The aims of the study were to assess the influence of the exergame platform Nintendo Wii on exercise capacity and daily physical activity in heart failure patients, to study factors related to exercise capacity and daily physical activity, and to assess patients' adherence to exergaming.

Results

More than half of the patients (53%) significantly increased their exercise capacity after 12 weeks.

Conclusion

Exergaming has the potential to increase exercise capacity in elderly, chronically ill cardiac patients. Although the daily physical activity did not change over time, exergaming was feasible for heart failure patients and might be a rehabilitation option for patients with heart failure.

Attractive, acceptable, fashionable and tialored form of exercise training

- ✓ Nordic walking
- ✓ Dance
- ✓ Gaming systems
- ✓ Yoga

Effects of yoga versus hydrotherapy training on health-related quality of life and exercise capacity in patients with heart failure: A randomized controlled study.

Hagglund E. et al. European Journal of Cardiovascular Nursing 2017

The aims of this study were to determine whether yoga and hydrotherapy training had an equal effect on QoL, exercise capacity, and symptoms of anxiety and depression in patients with HF.

Methods

40 HF patients were randomized to an intervention of 12 weeks, either performing yoga or training with hydrotherapy for 45-60' twice a week.

Conclusion:

Yoga and hydrotherapy had an equal impact on QoL, exercise capacity, and symptoms of anxiety and depression.

Conclusion

Exercise is a crucial component of therapy for HF patients, but unfortunately still poorly implemented.

Patients who are enrolled in a supervised ExT or multidisciplinary CR programme show low adherence.

Multiple are the barriers and the reasons for nonadherence to physical activity and exercise, the most important are:
- **patient-related factors**
- **social and economic factors**
- **factors-related to the healthcare team/system**
- **condition-related factors**
- **therapy-related factors**

Minimalisation of these barriers lead to improvement of adherence.

The most important issues in overcoming these barriers are :
- **improved accessibility to CR**
- **adequate personalized motivation**
- **attractive, acceptable, fashionable and tialored form of ExT (Nordic walking, dance, exergaming, yoga)**

Thank you for your attention!

The future is being a senior without disabilities