reachHF
Rehabilitation Enablement in Chronic Heart Failure

Physical activity and exercise intervention: facilitators course

Session developed and delivered by
Prof Patrick Doherty
One of the REACH-HF investigators and
lead for chair based exercise programme (CBE)

1

Aims of the REACH-HF facilitator course are to:

- clarify the principles of:
  - Exercise training and exercise prescription in patient with HF
  - Fitness testing using the incremental shuttle walk test (ISWT)
  - Promoting interventions to improve physical activity status
- Understand the difference between:
  - exercise intensity (aerobic demand) and
  - haemodynamic load (heart demand)
- Work through the exercise and physical activity approach in REACH-HF specifically including:
  - Chair Based Exercise (CBE) seven levels
  - Walking Exercise Programme (WEP) three levels
  - How to use walking fitness reference values to benchmark fitness and set goals as part of HF rehab.

2

REACH-HF exercise training

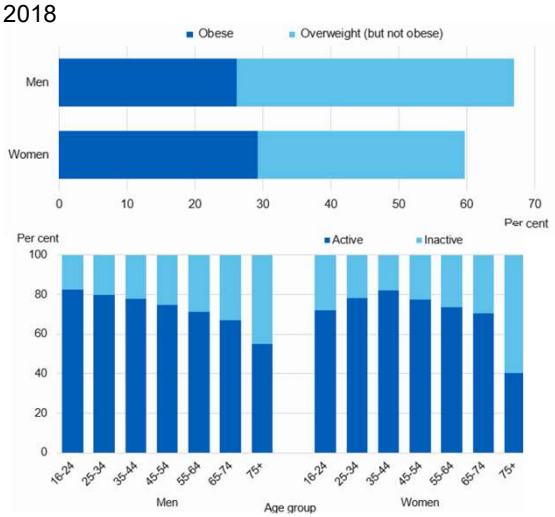
- Aim: To help facilitators to understand the principles of safe and effective exercise as part of the REACH-HF approach.
- The REACH-HF exercise training programme will offer a choice of two forms of incremental exercise training as part of the Heart Failure Manual (1) chair based exercise (CBE) (2) a walking exercise programme (WEP) or a combination of both.
- The aim of REACH-HF exercise training is to:
  - Improve the level of fitness through exercise training
  - Improve physical activity status and reduce sedentary behaviour through targeted lifestyle interventions

3

Health survey of England (HSE) 2018

Prevalence of overweight & obesity in adults
63% of adults were classified as overweight or obese
67% of men and 60% of women.

Adult physical activity
27% of adults reported less than 30 minutes of moderate or vigorous physical activity (MVPA) per week and were classified as 'Inactive'



In the 2016 HSE 32% of men and 60% of women were not fit enough to sustain walking at 3 mph on a 5% incline (5 METs)
Some people can be fit (historically) but relatively inactive (now)

If improvement in physical activity status is an aim then health interventions should include activities to promote greater physical activity alongside fitness training.

4

Global Recommendations on Physical Activity for Health

World Health Organization

65 years and above

1. Older adults should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity.

2. Aerobic activity should be performed in bouts of at least 10 minutes duration.

3. For additional health benefits, older adults should increase their moderate-intensity aerobic physical activity to 300 minutes per week, or engage in 150 minutes of vigorous-intensity aerobic physical activity per week, or an equivalent combination of moderate-and vigorous-intensity activity.

4. Older adults, with poor mobility, should perform physical activity to enhance balance and prevent falls on 3 or more days per week.

5. Muscle-strengthening activities, involving major muscle groups, should be done on 2 or more days a week.

6. When older adults cannot do the recommended amounts of physical activity due to health conditions, they should be as physically active as their abilities and conditions allow.

https://www.who.int/dietphysicalactivity/publications/recommendations65yearsold/en/

5

UK CMO guidance 2019 (Adults)

https://www.gov.uk/government/publications/physical-activity-guidelines-uk-chief-medical-officers-report

Question: What is moderate or vigorous activity?

6

Exercise capacity (fitness) & physical activity status: Metabolic equivalents (METs)

1 MET ~ an oxygen consumption (FC) of 3.5 ml/kg/min and represents the metabolic cost during seated rest

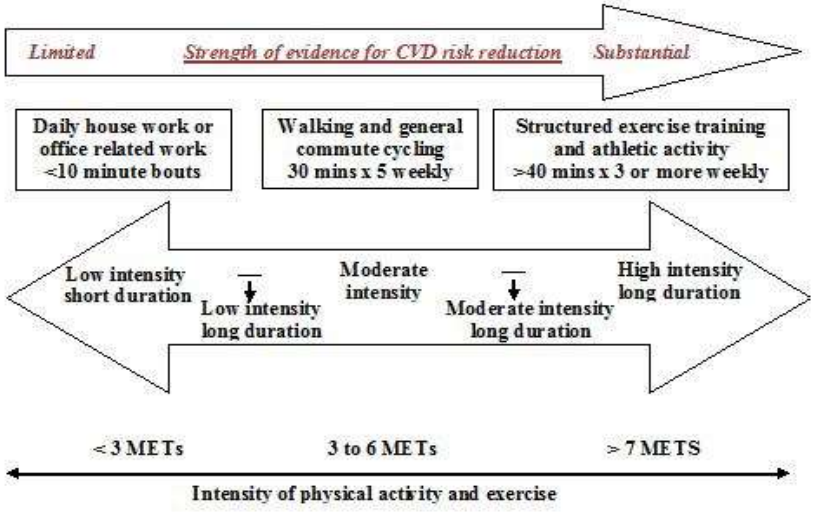
Exercise is graded by multiples of METs e.g. Brisk walking on the flat demands appropriately 4.0 METs

Moderate intensity is now 6METS (absolute term)

7

7

Evidence base for CVD risk reduction associated with physical activity and exercise training



Developed by Prof Doherty University of York (JBS3 Heart 2013)

8

Total mortality after changes in leisure time physical activity in 50 year old men: 35 year follow-up of population based cohort

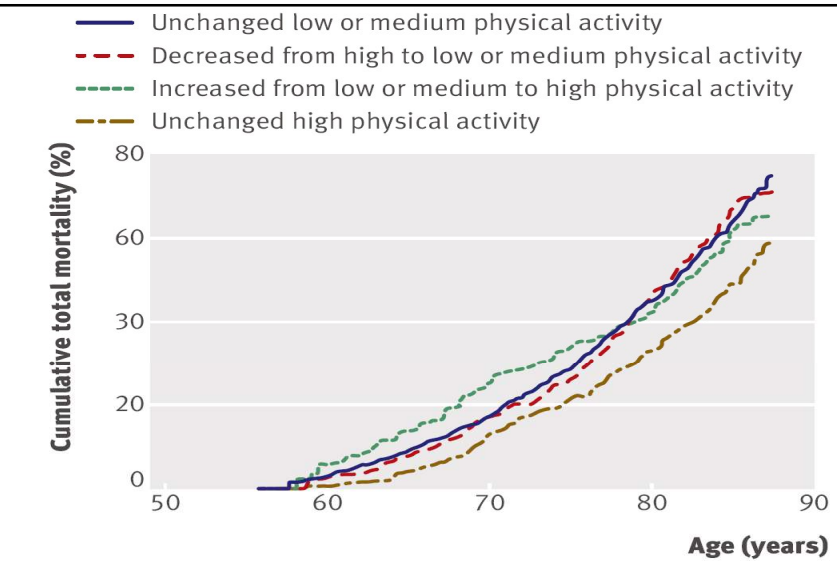
Byberg et al. BMJ 2009; 338: b688, DOI 10.1136/bmj.b688

Objective: To examine how change in level of physical activity after middle age influences mortality and to compare it with the effect of smoking cessation.
Design Population based cohort study with follow-up over 35 years.
Setting Municipality of Uppsala, Sweden.

Participants: 2205 men aged 50 in 1970-3 who were re-examined at ages 60, 70, 77, and 82 years. Main outcome measure Total (all cause) mortality

Conclusions: Increased physical activity in middle age is eventually followed by a reduction in mortality to the same level as seen among men with constantly high physical activity. This reduction is comparable with that associated with smoking cessation.

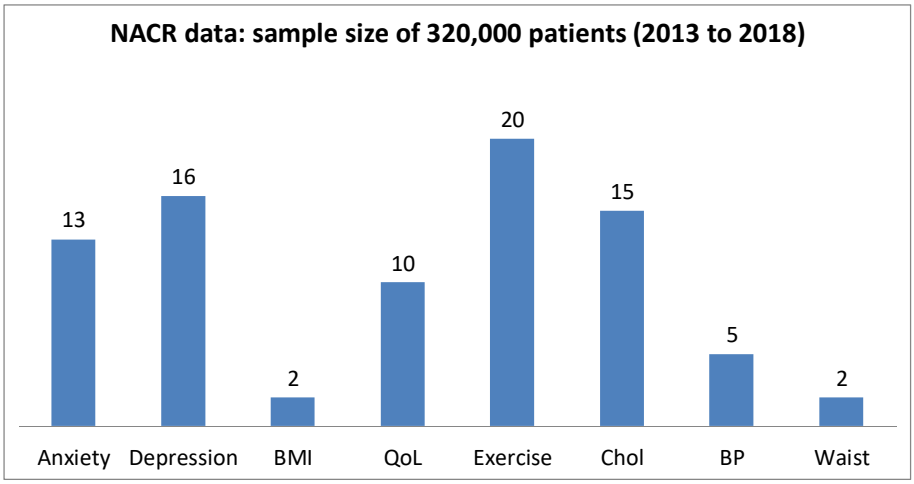
9



Age	60	70	77	82	End of study
Men at risk	1759	1261	996	816	761

10

Percentage change (improvement) in CR outcomes at 8 to 12 weeks (all patient types)



11

CR programmes managed 17,753 patients with **co-morbidities** in 2006 increasing to over 67,000 in 2018.

Morbidity	%
Angina	15.9
Arthritis	13.3
Cancer	7.2
Diabetes	24.5
Rheumatism	2.1
Stroke	5.3
Osteoporosis	1.8
Hypertension	49.9
Chronic bronchitis (COPD)	4.0
Emphysema	3.1
Asthma	8.2
Claudication	2.0
Chronic Back Problems	7.7
Anxiety	5.6
Depression	6.2
Family History of CVD	26.3
Erectile Dysfunction	2.4
Hyperchol/Dislipidaemia	31.7
Other comorbid	31.6
N=67,659	

Marzolini et al (2010) have shown that exercise modification in respect of co-morbidity leads to better health outcomes without affecting compliance to the CR programme. There is growing evidence that managing associated co-morbidities as part of a MDT approach leads to a better prognosis (Zoghbi et al 2004)

12

Multi-morbidity profile for CR by age & gender (NACR April 2016 to March 2018)

		Started CR 2 or more Comorbidities			
		Count	Mean (yrs)	SD	Proportion of Total
Age	Male	34606	**66**	11	**51.4%**
	Female	14025	**68**	11	**55.8%**

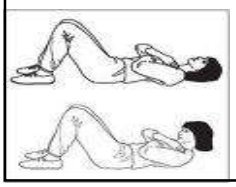
13

Exercise training and delivery: Where and what type of exercise

- Hospital, local community and home based
- It's all about assessment within the MDT
  - Risk assessment (low, mod and high)
  - Baseline fitness assessment
  - Monitoring and supervision
- Moderate intensity (=<6 METs) with high volume is safe and effective for most patients
- Moderate Haemodynamic challenge (RPP =< 250)
- Strength is important and can be maintained or even improved
- Efficiency of movement (same work for less effort!) for low capacity heart failure patients

14

We know what works: Good exercise if done this way!



60+ Tai Chi

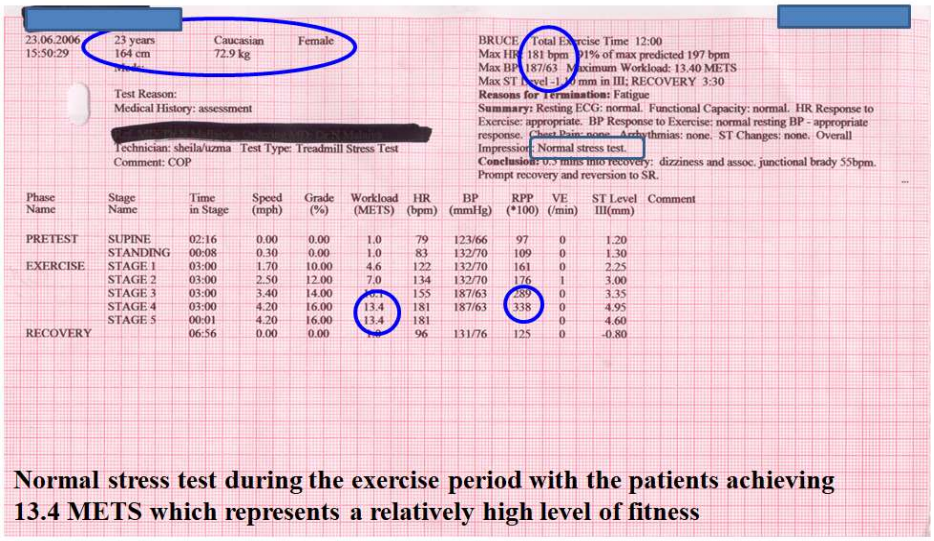
15

Is CR exercise safe? YES!

Study authors	Rate of incidence in general population
Malinow et al (1984)	During sports activities: one death per 2 897 057 person-hours
Vander et al (1982)	During physical recreation activities: one non-fatal event per 1 124 200 hours and one fatal event per 887 526 hours
Gibbons et al (1980)	Per 10 000 person-hours: 0.3 to 2.7 events (male) and 0.6 to 6.0 events (female)
Franklin et al (2000)	Fitness centre exercise: one death per 2.57 million 'work-outs' (~50% in non-regular exercisers)
Fletcher et al (2001)	During exercise: one death per 565 000 person-hours
	Rate of incidence in cardiac patient populations
Haskell (1978)	Cardiac rehabilitation exercise: one non-fatal event per 34 673 hours and one fatal event per 116 402 hours
Franklin et al (1998)	Supervised cardiac rehabilitation: One cardiac arrest per 116 906 patient-hours One acute MI per 219 970 patient-hours One fatal event per 752 365 patient-hours One major complication per 81 670 patient-hours

On average one cardiac event for every 116,000 hours of CR exercise

16



23.06.2006 15:50:29 | 23 years | 164 cm | Caucasian | 72.9 kg | Female

Test Reason:
Medical History: assessment

Technician: sheila/uzma Test Type: Treadmill Stress Test
Comment: COP

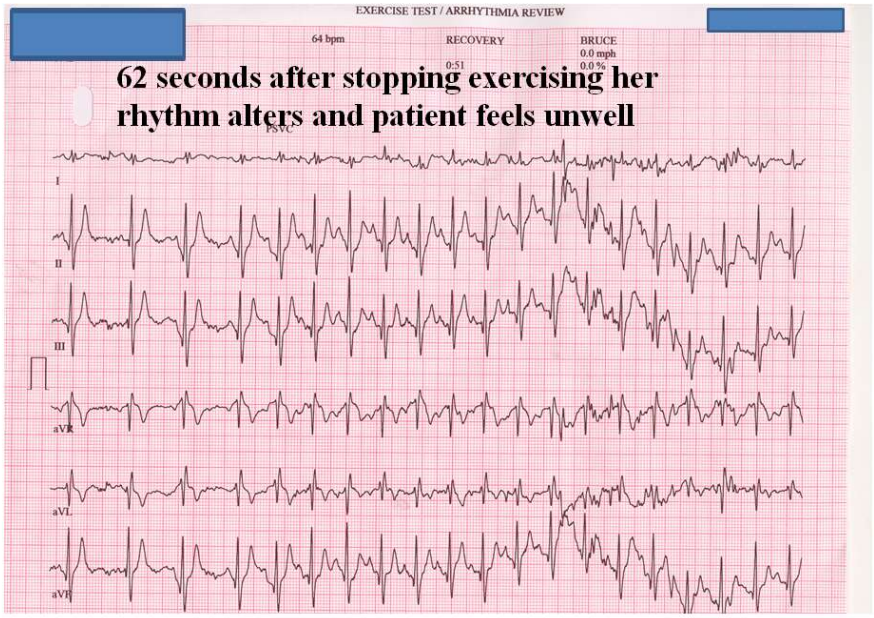
BRUCE Total Exercise Time 12:00
Max HR 181 bpm 91% of max predicted 197 bpm
Max BP 187/63 Maximum Workload: 13.40 METS
Max ST Level -1.10 mm in III; RECOVERY 3:30
Reasons for Termination: Fatigue
Summary: Resting ECG: normal. Functional Capacity: normal. HR Response to Exercise: appropriate. BP Response to Exercise: normal resting BP - appropriate response. Chest Pain: none. Arrhythmias: none. ST Changes: none. Overall Impression: Normal stress test.
Conclusion: 0.5 mins into recovery: dizziness and assoc. junctional brady 55bpm. Prompt recovery and reversion to SR.

Phase Name	Stage Name	Time in Stage	Speed (mph)	Grade (%)	Workload (METS)	HR (bpm)	BP (mmHg)	RPP (*100)	VE (/min)	ST Level III(mm)	Comment
PRETEST	SUPINE	02:16	0.00	0.00	1.0	79	123/66	97	0	1.20	
	STANDING	00:08	0.30	0.00	1.0	83	132/70	109	0	1.30	
EXERCISE	STAGE 1	03:00	1.70	10.00	4.6	122	132/70	161	0	2.25	
	STAGE 2	03:00	2.50	12.00	7.0	134	132/70	176	1	3.00	
	STAGE 3	03:00	3.40	14.00	[illegible]	155	187/63	289	0	3.35	
	STAGE 4	03:00	4.20	16.00	13.4	181	187/63	338	0	4.95	
	STAGE 5	00:01	4.20	16.00	13.4	181			0	4.60	
RECOVERY		06:56	0.00	0.00	[illegible]	96	131/76	125	0	-0.80	

Normal stress test during the exercise period with the patients achieving 13.4 METS which represents a relatively high level of fitness

What happens next to our 23 year old patient after immediate cessation of exercise whilst standing still on the treadmill? In essence no cool down!

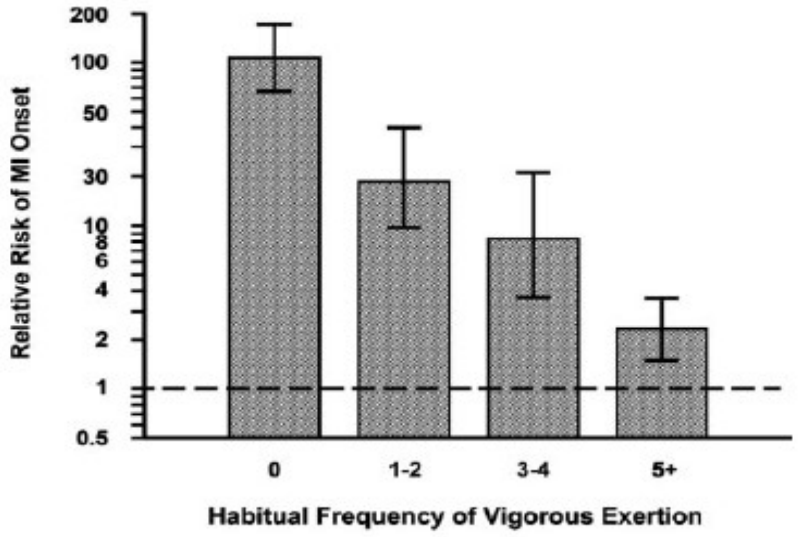
17



A cool down period of exercise for just a few minutes helps the heart to optimise cardiac output and reduces the likelihood of cardiac events after exercise

18

Strenuous activity and risk of heart attack



19

Ensuring safe and effective exercise training thresholds

- The aim is to prescribe exercise at a level that allows for sustained exercise without bringing on premature fatigue or harm
  - 50 – 70% VO2max, HRRmax (as low as 40% in class III/IV heart failure
  - Ventilatory threshold
  - Lactate threshold
  - RPE 12 – 14 (5 to 8 CR Scale)
  - 65 – 85% HRmax

20

Exercise prescription (FITT) (EE)

Frequency e.g. 3 x Weekly

Intensity e.g. 40% to 75%

Type ▪ e.g. CV endurance or **strength training**

Timing (duration of session) e.g. >30 minutes

Enjoyment (essential for compliance)

Efficiency (same work for less effort)

21

Atrophy (muscle weakness)

Summary of longitudinal and cross sectional studies

- ❑ Atrophy is strongly related with inactivity
- ❑ The greatest atrophy was found in the muscles that control the weight bearing limbs and that minimal atrophy occurred in the biceps brachii muscle
- ❑ Increased physical activity status such as callisthenics and aerobic classes reverses the process compared to non-active peers
- ❑ The type of muscle action is pivotal with weight bearing and eccentric exercise being very important
- ❑ Shoulder flexion muscles are prone to atrophy

McCartney (1998), Lawlor et al. (2003). Geilen et al (2005), ACSM Fletcher et al (2011)

22

Prescription of seated exercise for heart failure patients

Designed to:

- avoid breathlessness during exercise
- delay or prevent muscle atrophy and weakness
- maintain aerobic fitness
- prevent muscle shortening
- reduce the likelihood of harm from exercise
- enable a greater volume of exercise for less effort
- carryover into daily activity

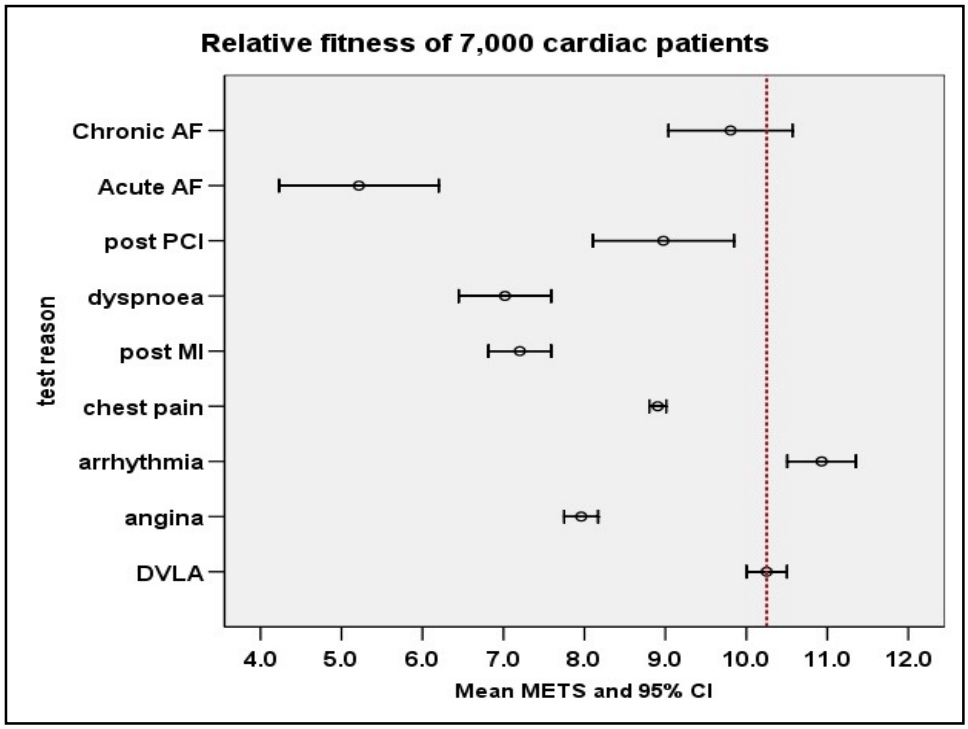
23

Physiological response during arm and leg exercise in 30 HF patients (mean; age 69, LVEF 35%,) at 70% of arm and leg maximum

Physiological measure	LEG exercise	ARM exercise
	Mean and SD	*Mean and SD*
HR	98.57±19.72	92.27±16.20
SBP	149.37±30.75	148.27±32.27
RPP	147.52±44.62	140.00 ±33.12
VO_2	15.12±5.09	11.81±3.67
METs	3.34±1.08	2.59±0.83
RPE	5.87±1.57	5.82 ±1.77
Power (Watts)	**83.33±49.57**	**30.00±17.81**
HR:Power	**Approx. 1 heart beat per Watt**	**Approx. 4 heart beats per Watt**
BP: Power	**2mmHg pressure per Watt**	**5mmHg pressure per Watt**

HR= heart rate (beats/min), SBP= systolic blood pressure (mmHg), RPP= rate pressure product, METs= metabolic equivalent, VO_2= oxygen consumption in ml-kg^{-1}min^{-1}, RPE= rate perceived exertion, SD= standard deviation, LEGI= leg incremental testing, ARMI= arm incremental testing , ratio derived from individual cases

24



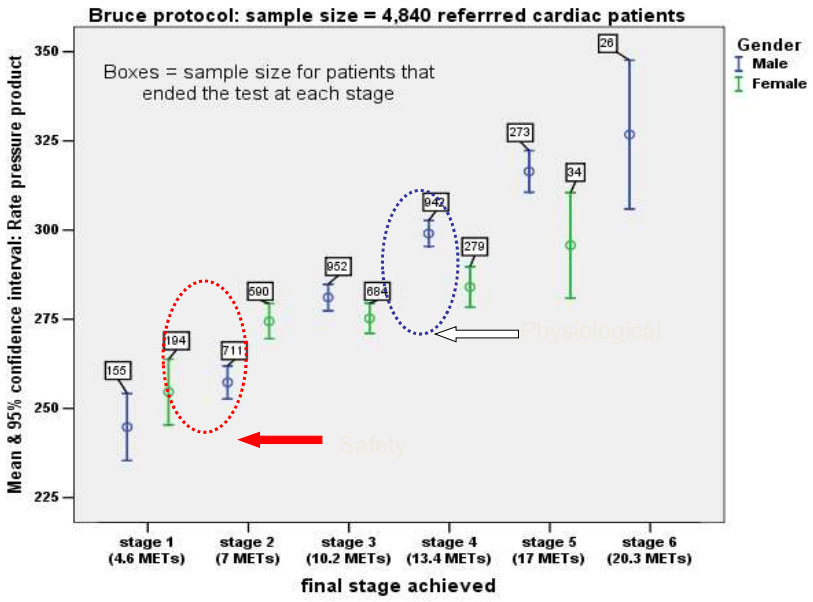
25

Relative expression of exercise intensity

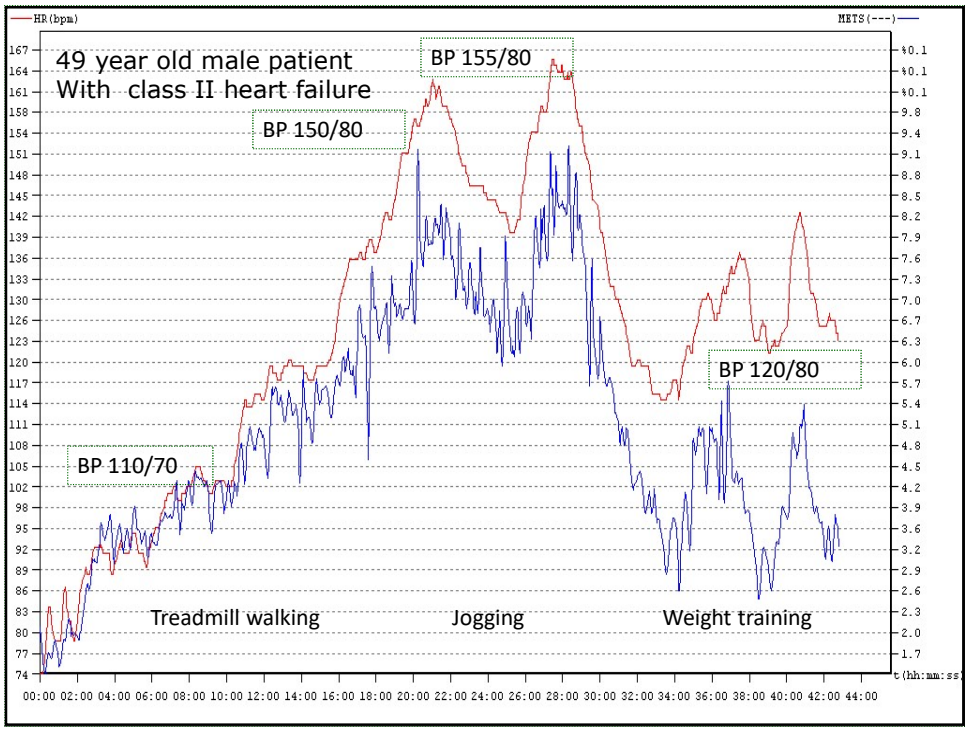
Category	% HRR	%AAMHR	RPE	Effort scale
Very light	< 20	<35	<10	0 to 2
Light	20 to 39	35 to 54	10 to 11	3
Moderate	40 to 59	55 to 69	12 to 13	4 to 6
Hard	60 to 84	70 to 89	14 to 16	7 to 8
Very hard	>84	>89	17 to 19	9 to 10

26

VO_2 and Rate pressure product (RPP)

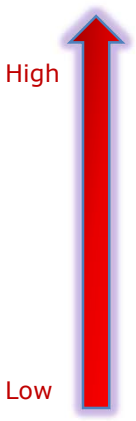


27



28

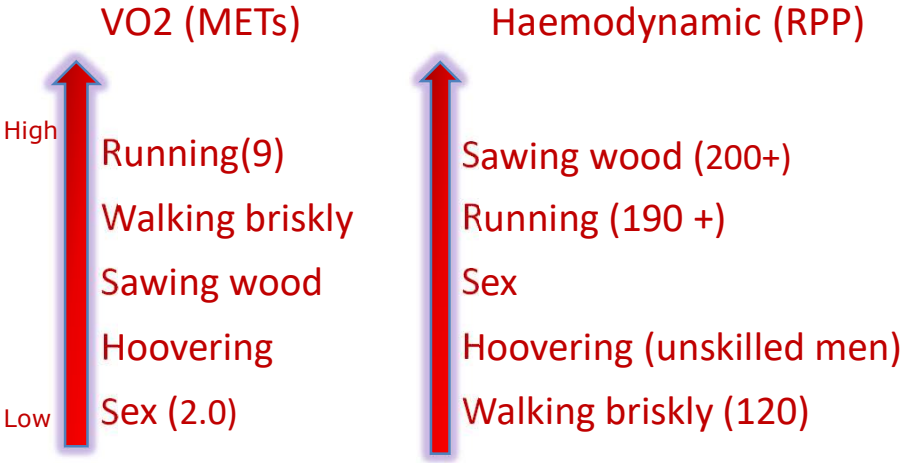
Physiological effort (METs) versus haemodynamic challenge (RPP)



Rank these activities in terms of VO2 and also haemodynamic demand

29

Physiological demand versus haemodynamic challenge



30

The context for greater risk during exercise: be alert to these points!

1. Least physically active people (sedentary)
2. Those with lower levels of fitness (<5 METs)
3. Highly emotive activities (overly competitive)
4. Intense start to exercise (no warm up!)
5. Unaccustomed mode of physical activity (novices)
6. Activities that require people to hold their breath or involves substantial isometric (static) muscle work
7. High relative exercise intensity **(defined by: VO2, RPE, BP, HR or RPP)**
8. Sudden cessation of exercise (no cool down!)

31

REACH-HF exercise training

- Aim: understand the principles of safe and effective exercise as part of the REACH-HF approach.
- The REACH-HF exercise training offers two forms of incremental exercise training as part of the Heart Failure Manual:
  - Chair based exercise (CBE)
  - Walking exercise programme (WEP) or
  - A combination of both.
- The aim of REACH-HF exercise training is to help improve the level of fitness (e.g. work at a higher intensity) and or to improve efficiency (e.g. same work for less effort) over a 10-12 week duration.

32

Characteristics of HF patients taking up REACH-HF

Reach HF patient baseline demographics by gender

Gender		Age (years)	BMI	Ejection Fraction %	NYHA classification
Male	Mean	70.24	29.81	30.99	2.01
	SD	10.80	6.84	8.34	.67
	N	169	168	118	169
Female	Mean	68.23	28.27	32.11	2.06
	SD	11.26	5.49	8.21	.60
	N	47	47	38	47
Total	Mean	69.81	29.47	31.26	2.02
	SD	10.91	6.59	8.30	.66
	N	216	215	156	216

33

Using the incremental shuttle walk test (ISWT) to inform the initial level of exercise

- The best exercise programmes start with an initial fitness assessment which in this study will be the ISWT.
- The ISWT is a routinely used, sub-maximal, test in patients taking part in rehabilitation.
- In REACH-HF the ISWT will be used at baseline and at follow up to assess changes in fitness.
- The baseline test will be used to show the level achieved & final heart rate which is there to reassure patients that the burden is within normal limits
- The ISWT level is used to allocate the appropriate starting level for their exercise training programme (CBE or WEP).
- CBE programme has seven levels (ranging from 1.3 to 4 METs) and the WEP has three levels (ranging from 2.5 to 6 METs).

34

Watch the online video of the ISWT

- Consider the space required
- Kit requirements (DVD player or laptop)
- After watching the ISWT please test yourself or try it with a colleague *but remember to gain their consent first and don't ask them to do a maximum effort test as all tests carry a slight risk*
- When doing the test with patients try not to use motivational cues (e.g. keep going, you're doing great) as it's a test based on their level of motivation not yours!
- If on two occasions the patient can't make the ISWT 10 metre cone marker, at the point the bleep sound occurs, then the test is stopped.
- ***The test should stop immediately if the patient decides they have done enough.***

35

CBE level allocation in relation to ISWT stages and METs

Incremental Shuttle Walk Test (ISWT) levels & MET values						Chair based exercise (CBE)	
ISWT stage	Metres walked	Shuttles 1-102	Speed (mph)	(kph)	METs average	Proposed CBE level *	CBE mean & (peak) METS **
1	10-30	3	1.12	1.8	1.75	One (half)	1.3 (1.5)
2	40-70	4	1.50	2.4	2.15	One (full)	
3	80-120	5	1.88	3.0	2.4	Two	1.6 (1.9)
4	130-180	6	2.26	3.6	2.75	Two	
5	190-250	7	2.64	4.3	3.05	Three	1.8 (2.2)
6	260-330	8	3.02	4.9	3.35	Three	
7	340-420	9	3.40	5.5	3.8	Four	2.5 (3.0)
8	430-520	10	3.78	6.1	4.1	Four	
9	530-630	11	4.16	6.7	4.3	Five	3.2 (3.8)
10	640-750	12	4.54	7.3	4.4	Five	
11	760-880	13	4.92	7.9	4.7	Six	3.5 (4.1)
12	890-1020	14	5.30	8.5	5.0	Six	
						Seven	3.9 (4.5)

**The proposed CBE level would start patients at around 65 to 70% of their ISWT Metabolic Equivalents (METs) score which is an expression of physical fitness.*
*** MET values in this table were derived from direct measurement (Vo2 analysis) of 30 patients with heart failure. MET values in the higher range () were around 10% higher in fitter participants who were able to carry out the CBE movements with greater intensity.*

36

Use the 6MWT distances(below) to estimate METs and apply to CBE

6 Minute Walk Test Distance Conversion Table
Standard estimates from 6MWD (feet walked) to METs
Based on ACSM metabolic prediction equation formula for horizontal walking.*

Distance in feet	Distance in meters	MPH	Meters·min⁻¹	VO2(ml·kg⁻¹·min⁻¹)	METs	CBE level
500	152	.94	25	6.04	1.73	
510	155	.96	26	6.09	1.74	
520	159	.98	26	6.14	1.75	
530	162	1.00	27	6.19	1.77	L 1
540	165	1.02	27	6.24	1.78	
550	168	1.04	28	6.29	1.80	
560	171	1.06	28	6.35	1.81	
570	174	1.08	29	6.39	1.83	
580	177	1.10	29	6.45	1.84	
590	180	1.11	30	6.50	1.86	
600	183	1.13	30	6.55	1.87	
610	186	1.15	31	6.59	1.89	
620	189	1.17	32	6.65	1.90	
630	192	1.19	32	6.70	1.91	
640	195	1.21	33	6.75	1.93	
650	198	1.23	33	6.80	1.94	
660	201	1.25	34	6.85	1.96	
670	204	1.27	34	6.90	1.97	
680	207	1.28	35	6.95	1.99	
690	210	1.30	35	7.00	2.00	
700	213	1.32	36	7.06	2.02	
710	216	1.34	36	7.11	2.03	
720	219	1.36	37	7.16	2.05	
730	223	1.38	37	7.21	2.06	
740	226	1.40	38	7.26	2.07	L2
750	229	1.42	38	7.31	2.09	

Formula estimating MET levels for horizontal walking speeds between 1.9-3.7 mph (50-100 m·min-1).
*VO2 (METs) = [0.1 x _____speed (m·min-1) + 3.5mLO2·kg·min-1] ÷ 3.5mLO2·kg·min-1
ACSM's Guidelines for Exercise Testing and Prescription, 9th ed. Philadelphia, PA: Wolters Kluwer Lippincott Williams & Wilkins. 2014, p 173 (full table available in REACH-HF handouts)
https://iacpr.net/resources/Documents/6MWT%20Distance%20Conversion%20Table%20.pdf

37

Exercise Programme

- CBE and WEP aims are to:
- Ensure that the participant works at a therapeutic intensity – ***i.e. at a level that delivers a progressive training effect.*** It is recognised that intensity will need to increase over time to achieve this.
- Increase the duration of exercise over time
- Ensure safety
- Build confidence about being able to exercise independently
- Build exercise capacity in a way that is observable by and perceived to be beneficial to the participants

38

Exercise programme

- ***Warm up and cool-down:*** each session of exercise training will include a warm-up and cool-down, for 5 minutes, which allows the heart and skeletal muscles time to adjust. This should not cause breathlessness!
- The aim is to start exercise at 50% to 70% of a patient's exercise capacity (ISWT result) for 20 to 30 minutes and progress the intensity incrementally to improve fitness.
- This can be done continuously or as shorter intervals of 10 minutes. Initially the duration may be less (10 to 20 minutes) but will, with training, improve steadily to allow for longer periods of exercise.

39

Main exercise session

- How often: the exercise should be completed three times weekly ideally with a rest day in-between each training session
- **Monitoring exercise intensity:** As described above the starting level of exercise is based on the ISWT results which are helpful but thereafter participants will be supported, by facilitators, to use their own perceptions of effort to grade and progress the exercises. The 'effort scale' uses a 0 to 10 scale which, with practice, has been shown to help monitor intensity of exercise in people with cardiac disease.
- If patients become breathless during the main exercise session they should be encouraged to use active recovery (i.e. keeping active at a lower intensity) which is known to resolve breathlessness and avoid fatigue. *Note: this relies on having the skills to monitor breathing rate and physical effort which is one of the key objectives of the exercise programme.*

40

Check the level of effort during exercise.

- One of the key points in heart failure exercise is to avoid premature and or extremes of breathlessness during exercise.
- Being short of breath (SOB) due to the exercise is fine and appropriate but there's a point for some patients when the rate and style of breathing becomes dysfunctional and is associated with excessive respiratory muscle activity.
- At this point a patient's heart rate may appear within range which is why we encourage the use of the effort scale (0 to 10 visual scale).
- Understanding the amount of effort required is an integral part of the exercising safely and effectively.

41

Using HF ISWT or 6MWR values to set realistic rehab goals

Option 1 (preferred):

- Using the distance covered during their actual ISWT or 6MWR relate this to the typical expectations (reference value table 4) seen in patients with HF of a similar age, gender and comorbidity
- Use this information to acknowledge their performance following the ISWT or 6MWT *(knowledge of results is important to help patients appreciate their physical ability)*
- Use the percentiles to show how their performance relates to other HF patients.

42

Option 1 cont…

- Use the reference values to help set a realistic rehab goal for their exercise intervention (table 4)
- Examples from table 4 ISWT distances:
  - If their ISWT distance is in the lowest percentile (5th or 5%) they could set a goal to try and achieve a walking distance around the 25th percentile.
  - It would be unrealistic to set the average (mean) or 75th percentile as a goal
  - Regarding CBE intensity please use the ISWT/MET values to select the appropriate level of seated exercise

43

DP1

Heart failure ISWT reference values

Table 4 Incremental shuttle walk test reference values for patients with heart failure (HF) split by age, gender and presence of chronic obstructive pulmonary disease (COPD) and depression

		Incremental shuttle walk test (ISWT)						
Heart failure (HF)+comorbidity category	Age and gender	Mean distance (m)	SD	Percentile 05	Percentile 25	Percentile 75	Percentile 95	Count
HF only	<67 years							
	Male	338	180	70	200	460	630	443
	Female	285	145	70	190	350	520	190
	67+ years							
	Male	243	138	60	140	330	480	434
	Female	184	109	40	100	250	390	211
HF+COPD	<67 years	237	133	40	120	330	430	51
	67+ years	197	120	40	90	270	470	59
HF+Depression	<67 years	261	143	30	150	340	520	95
	67+ years	223	107	70	155	295	420	52

Of the 211 female patients 67+ the average distance walked was 184 metres

5% did 40 metres

5% did 390 metres

Doherty P, *et al. Open Heart* 2019;**6**:e000866. doi:10.1136/openhrt-2018-000866

44

Slide 44

DP1 Doherty, P., 05/01/2021

Using HF ISWT reference values Option 2:

- Use reference values to estimate their ISWT distance for their age, gender and comorbidity profile
- Use this information to acknowledge their estimated level of walking fitness
- Use the percentiles to show how their estimated performance relates to other HF patients and help set a realistic rehab goal for their exercise intervention
- Example:
  - If distance is in the lowest percentile (5th) set a goal to try and achieve a walking distance around the 25th percentile.
  - It would be unrealistic to set the average (mean) or 75th percentile as a goal
  - Regarding CBE intensity please use the estimated ISWT/MET values to select the appropriate level of seated exercise

45

Walking programme goals and progression

- With exercise training most HF patients are more likely to increase the volume of work they can do rather than the intensity
- The ability to walk to the shops more often is often more important than walking t the shops quicker
- Use the walking distances from either the ISWT or 6MWT as a baseline and set realistic goals (in part guided by the previous table) for how to increase waking distance
- If distance improves and meets the previously agreed goal in agreement with the patient either increase distance (e.g. 30 m more) or speed (10 seconds quicker)

46

Progression

- Over time, the patient will be encouraged to increase the duration and intensity of exercise by:
- Increasing the duration of CBE or WEP first and then if ‘effort scores’ are low and stable the intensity of exercise can be increased by either moving up a level of the CBE programme or by increasing the speed of walking (steps per minute) in the WEP.
- In the case of the WEP adding an variety to the training component, for instance steps per minute or speed interspersed with natural cadence is often well tolerated

47

Maintenance

- Once participants have achieved a progression in the levels of CBE or WEP and are able to exercise for 20 to 30 minutes, three times per week, they are ready to commence a maintenance programme.
- This will involve either continuing with the CBE or walking programme, or planning of other forms of ‘lifestyle based’ physical activity that are likely to fit into daily life.
- Participants should be encouraged to reflect on how their fitness has improved and consider what they can do to maintain these benefits over time.

48

Practical

- Course work following the session should focus on gaining experience of the:
  - Chair based exercise (CBE) programme
  - Walking programme
  - Exercise prescription
  - Using ISWT reference values to gauge patient fitness and set realistic exercise and physical activity goals
  - 6MWT
  - Monitoring and progressing exercise intensity

49

reachHF
Rehabilitation Enablement in Chronic Heart Failure

Thank you for taking part.
Happy to take any questions

Prof Patrick Doherty
REACH-HF investigator
University of York
patrick.doherty@york.ac.uk

50