Relevance of Exercise in the Prevention and Management of CHD.

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The Evidence For Physical Activity In Reducing CVD Risk.

- ***Physical inactivity is associated with an increased risk for CVD and physical activity has been shown to reduce the risk*** (Leon et al., 1987; Paffenbarger et al., 1993; Hu et al., 2000; Pate et al., 1995; Thompson et al., 2003).

The Evidence For Physical Activity In Reducing CVD Risk.

- Meta-analyses of randomised controlled studies post myocardial infarction showed **a reduction in overall mortality of at least 20% over a three-year follow-up period** (Oldridge et al., 1988; O'Connor et al., 1989; Jolliffe et al., 2000).

Other reported benefits of exercise are:

- Improved fibrinolysis.
- Enhanced coronary blood flow.
- Reduced arrhythmias.
- Improved peripheral muscle metabolism efficiency.
- Decreased prevalence/improved control of diabetes.
- Reduction in obesity.

(ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription – Fifth Edition [pages 104-105]).

Cardiac Rehabilitation.

The Background.

The Need For Cardiac Rehabilitation.

- Coronary Heart Disease CHD kills about 340 people every day -equivalent to a jumbo-jet full of people (British Heart Foundation, 2000).
- 2002 BHF survey indicates that the number of deaths due to CHD in the UK continues to fall although it is still amongst the highest in the world.

The History of Cardiac Rehabilitation.

- Pre 1950 – 6 weeks of bed rest recommended.

- USA early 1950's – Patients were allowed to recuperate in an armchair for seven days providing a major breakthrough towards activity based convalescence (Levine & Lown, 1952).

The History of Cardiac Rehabilitation.

- In the USA, Kellerman (1967) realised that exercising after a heart attack was, in fact, an extremely safe activity which usually resulted in a speedier recovery and an improved quality of life.
- In the UK, post-MI patients were still being treated with six weeks bed-rest.

- 1960's USA

- 1960's UK

The History of Cardiac Rehabilitation.

- By 1970, several randomised controlled trials had provided evidence that **cardiac patients fared equally well if they were encouraged to start gentle mobility exercises** as soon as possible, and thereafter, a more active approach to rehabilitation was adopted in the UK.

Cardiac Rehabilitation in the UK.

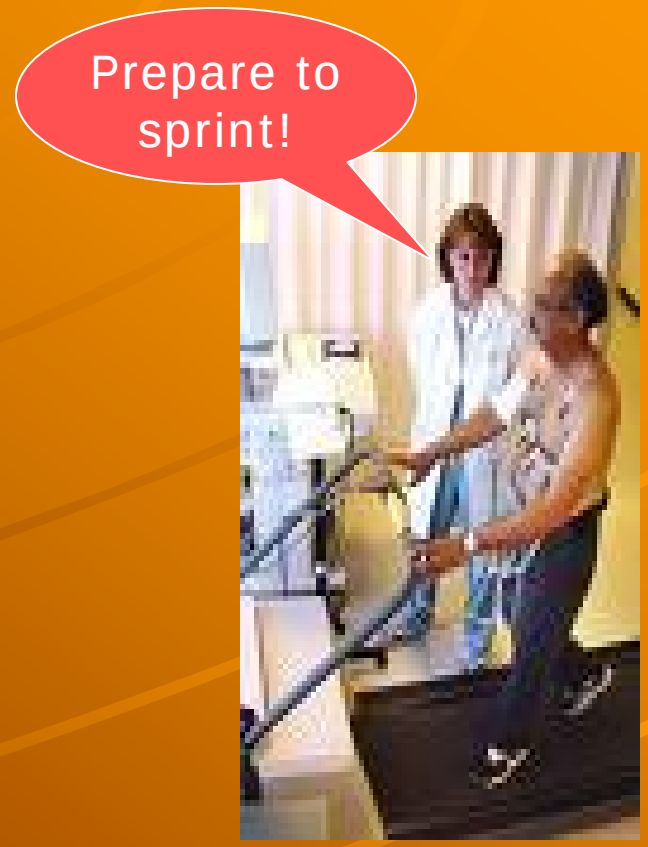
- **1970 – 9** Cardiac Rehabilitation Programmes.
- **1992 – 90** registered programmes.
- **1995 – 199** registered programmes.
- **2000 – 300** registered programmes.

The Evidence For Exercise-Based Cardiac Rehabilitation.

- Despite a **spontaneous improvement in functional capacity of about 10% after MI as a result of a gradual return to activities of daily living** (Haskell & De Busk, 1979), **prescribed exercise after a heart attack has been shown to increase this figure to 25-30%** (Carson et al., 1982; Froelicher et al., 1984; Bethell & Mullee, 1990).

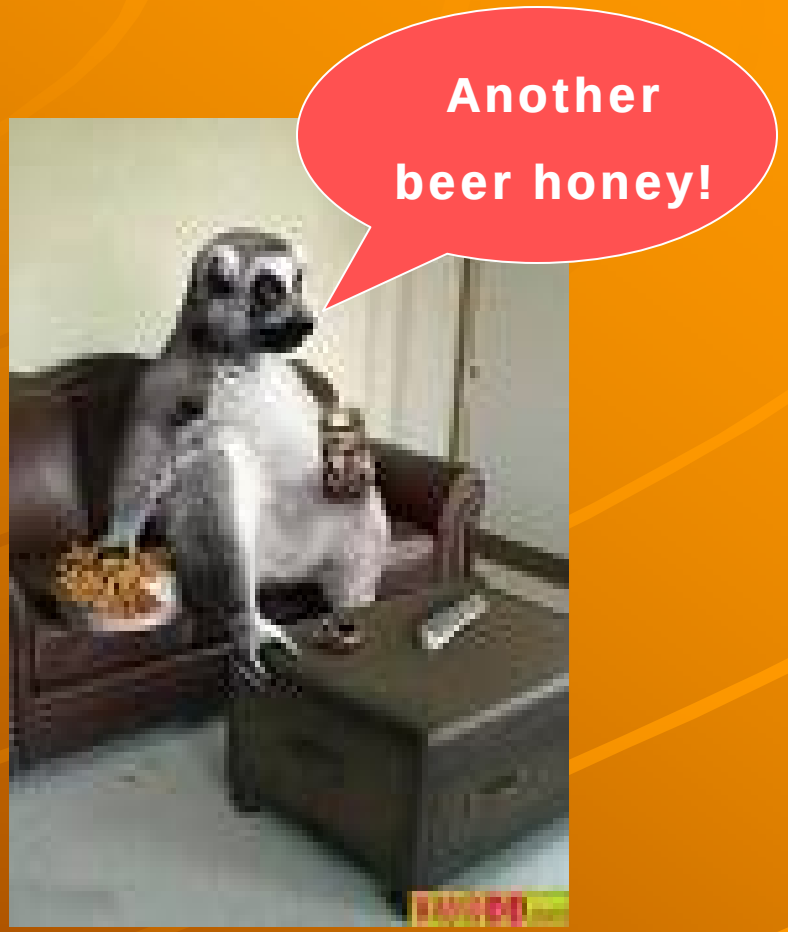
Is Cardiac Rehabilitation Exercise Safe?

- One non-fatal cardiac complication per 35,000 patient hours of exercise participation (Haskell 1978).
- One fatal event for every 116,000 patient hours of exercise participation.
- How does it compare to cardiology exercise testing: Four non-fatal complications per 10,000 (Fletcher et al 2001).
- Why such a difference?



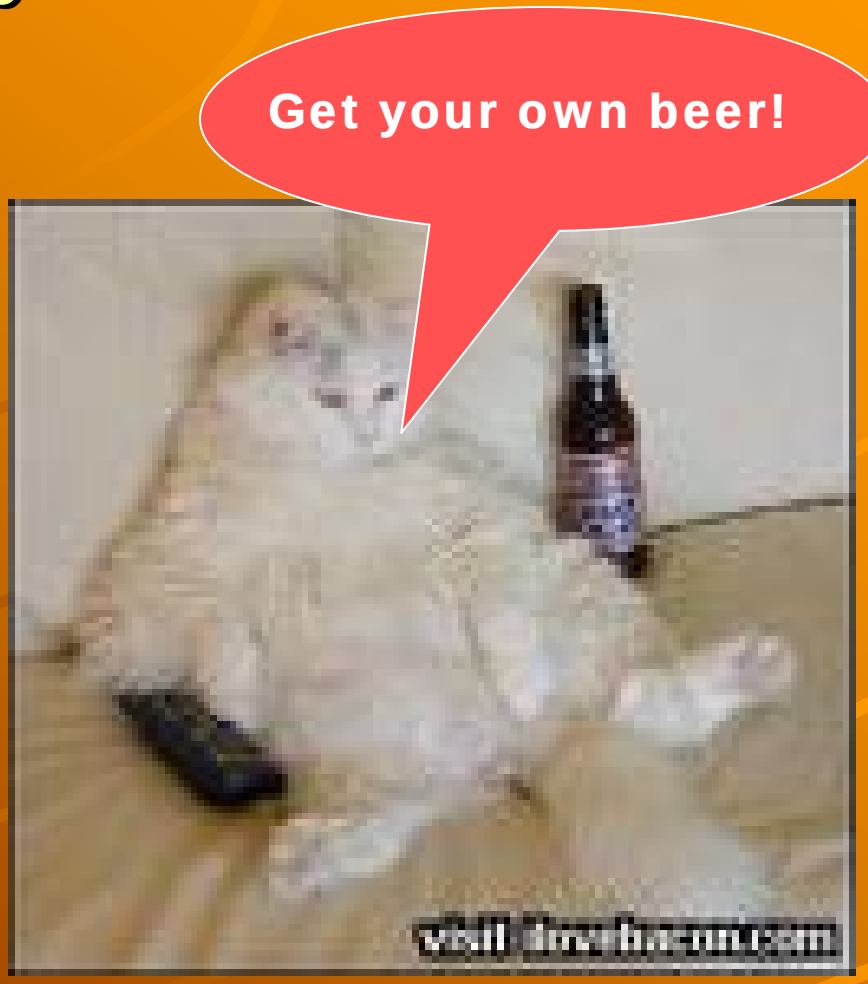
Physical Inactivity and CHD Risk.

- Risk of CHD among sedentary people is nearly two-fold.
- 60% of men and 70% of women can be classed as sedentary (NSF for CHD, Chapter 1, Appendix C).



Physical Inactivity and CHD Risk.

- Physical inactivity is a major contributing risk factor for heart disease, with an overall risk that is similar to elevated blood cholesterol, cigarette smoking, and hypertension. (Fletcher et al., 1996).



Cardiac Rehabilitation
The Four Phases.

- **Phase I** – Before discharge from hospital.
- **Phase II** – Early post-discharge period.
- **Phase III** – 4-6 weeks after an acute cardiac event.
- **Phase IV** – Long-term maintenance of changed behaviour.

Cardiac Rehabilitation
The Four Phases.

- **Phase I – covers acute phase in hospital. Emphasis on mobilizing.**
- Before discharge, patient should be able to walk short distances, and climb a flight of stairs without adverse symptoms.

Cardiac Rehabilitation
The Four Phases.

- **Phase II – period after hospitalisation, lasts for 2-6 weeks.**
- Patient returns home and is under care of GP.
- Hospital medical team decide when patient is fit enough to attend out-patient rehabilitation exercise.

Cardiac Rehabilitation
The Four Phases.

- **Phase III – usually 4-6 weeks post cardiac event and lasts approx. 6-12 weeks.**
- Some phase III programmes will be hospital based while others will be community based.
- Prior to starting the programme, patients will be risk stratified, screened, and assessed.

Cardiac Rehabilitation
The Four Phases.

- **Phase IV – community based exercise lasting 12 weeks.**
- Provide regular supervised cardiovascular training sessions.
- Establishes individualised exercise prescription for additional unsupervised exercise.
- Encourage independence, self-help, self-motivation.

Assessment Prior to Enrolment on Phase III Exercise

- The assessment usually takes the form of a sub-maximal functional capacity test.

1. **6-minute walk test.**
2. **12-minute shuttle walk test.**
3. **step test.**

Assessment Prior to Enrolment on Phase III Exercise

- Duration and rate of work achieved.
- Heart rate and blood pressure response.
- Heart rate and exercise response at peak exercise.
- Rating of perceived exertion (RPE).

Shuttle Walk Test Sheet.

Termination Points:

Phase III = 75% MHR: _____ 13 Somewhat hard (6-20 scale)
Phase IV = 80% MHR: _____ 15 Hard (6-20 scale)

STAGE	TIME	SHUTTLES COMPLETED	RPE 6-20 scale	HEART RATE	METS
1	1 min				1.9
2	1 min				2.1
3	1 min				2.4
4	1 min				2.7
5	1 min				3.0
6	1 min				3.3
7	1 min				3.6
8	1 min				3.9
9	1 min				4.2
10	1 min				8.0
11	1 min				8.6
12	1 min				9.1

Task	METS (min)	METS (max)
Walking 2mph	2	3
Ironing	2	4
Bed Making	2	6
Walking 3mph	3	3.5
Sexual Intercourse	3	5
Walking Upstairs	4	7
Washing Car	6	7
Cycling 5mph	2	3
Housework General	3	4
Ballroom Dancing	4	5
Golf (carrying clubs)	4	5
Swimming (slow)	4	5
Swimming (crawl)	9	10
Dressing	2	3
Bathing	2	3

Phase III Exercise Programming.

- **F** – Frequency: 2-3 weekly.
- **I** – Intensity: 60%-75% of Maximal Heart Rate (12-13 RPE Borg Scale).
- **T** – Time: 20-30 minutes conditioning period (not inclusive of warm-up or cool-down).
- **T**- Type: Aerobic, endurance training.

Warm-up & Cool-down

- **<u>Warm-up:</u> A gradual and progressive warm-up of at least 15 minutes in duration, incorporating pulse raising, mobility and preparatory stretching.**
- *'Strenuous exertion without previous warm-up produces ischaemic ST segment changes and arrhythmias, even in healthy individuals, as well as a reduction in left ventricular ejection fraction'* (BACR, 1995, p.84).

Warm-up & Cool-down

- **<u>Cool-down:</u> A period of at least 10 minutes is recommended.**

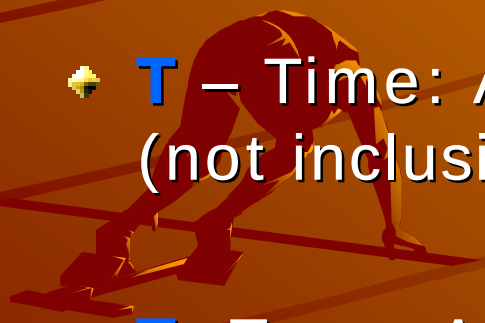
1. Increased risk of hypotension due to side effects of medication and age related slowing of baroreceptor responsiveness increases risk of venous pooling.
2. Heart rates take longer in older adults to return to pre-exercise levels.
3. Raised sympathetic activity during exercise increases the risk of arrhythmias during the immediate period following cessation of exercise.

Phase IV Exercise Programming.

- **F** – Frequency: At least 3 times weekly.
- **I** – Intensity: 60%-80% of Maximal Heart Rate (13-15 RPE Borg Scale).
- **T** – Time: 30+ minutes conditioning period (not inclusive of warm-up or cool-down).
- **T**- Type: Aerobic, endurance training.

Chief Medical Officer's Recommendation For Physical Activity (2004 DoH).

- **F** – Frequency: 5 or more days of the week .
- **I** – Intensity: Moderate intensity physical activity.
- **T** – Time: Accumulation of >30 minutes per day (not inclusive of warm-up or cool-down).
- **T**- Type: Aerobic, endurance training. Lifestyle activity or structured exercise or sport.



THE END.

Any Questions Please?