Home exercise program

Sukajan Pongprapai M.D.
Vichaiyut Hospital
June 19, 2012

Medical evaluation
General medical evaluation
Risk stratification
Functional evaluation

Risk modification
DM, HT, DLP, obesity, inactivity

Exercise prescription
Aerobic exercise
Resistive exercise

Dietary management
Dietary counselling
Weight management

Smoking cessation
Counselling
Nicotine replacement

Behaviour modification
Stress reduction
Counselling
Support group

Home exercise program

Phase III exercise program

Community based activity
Long term compliance
Enjoyable & Convenient

CARES THAI’s recommendation

PA at moderate intensity
(50-80% VO₂ max)

20-60 minutes

3-5 days/wk

2008 Physical Activity Guidelines for Americans
& American Heart Association (2010)

Aerobic exercise
- Moderate intensity
  150 min/wk
  30 mins, 5/wk
- Vigorous intensity
  75 min/wk
  25 mins, 3/wk

Resistance exercise
- 8-12 muscles
  2/wk

Reduced CHD risk
20-25%
**Safety of exercise-based CR**

- Screening, excluding high-risk patients from some activities.
- Reporting and evaluating **prodromal** symptoms.
- Preparing fitness personnel and facilities for cardiovascular emergencies.
- Recommending prudent exercise programs.

**Exercise-related events during CR**

- Cardiac arrest: 1/117,000 patient-hours
- Non-fatal MI: 1/220,000 patient-hours
- Death: 1/750,000 patient-hours
- Sudden cardiac arrest (unknown heart disease): 1/375,000 person-hours
- Jogging: 1/888,000 person-hours

**Borg scale**

- C่าความ ระดับความเหนื่อย
- 6-7 ไม่เหนื่อยเลย
- 8-9 เริ่มเหนื่อย
- 10-11 เหนื่อยเล็กน้อย
- 12-13 เหนื่อยปานกลาง
- 14-15 เหนื่อยมากขึ้น
- 16-18 เหนื่อยมาก
- 19-20 เหนื่อยมากที่สุด

**MET = metabolic equivalent**

- 1 MET = resting energy consumption
- supine position
- 3.5 ml O₂/ kg/min
- 1.2 cal/min or 72 cal/hr

**TABLE 1. MET equivalents of common physical activities: modified as METs, moderate or vigorous intensity**

<table>
<thead>
<tr>
<th>Activity</th>
<th>METs (3–6 METs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking, slow (&lt; 3 mph)</td>
<td>1</td>
</tr>
<tr>
<td>Walking, brisk (&gt; 3 mph)</td>
<td>2</td>
</tr>
<tr>
<td>Jogging, supine position</td>
<td>4</td>
</tr>
<tr>
<td>Jogging, sitting</td>
<td>5</td>
</tr>
<tr>
<td>Jogging, standing</td>
<td>6</td>
</tr>
<tr>
<td>Aerobic exercise (moderate)</td>
<td>3</td>
</tr>
<tr>
<td>Cycling, supine position</td>
<td>3.5</td>
</tr>
<tr>
<td>Cycling, sitting</td>
<td>4.5</td>
</tr>
<tr>
<td>Swimming, supine position</td>
<td>4</td>
</tr>
<tr>
<td>Swimming, sitting</td>
<td>5</td>
</tr>
<tr>
<td>Aerobic exercise (vigorous)</td>
<td>6</td>
</tr>
<tr>
<td>Vigorous activity, sitting</td>
<td>7</td>
</tr>
<tr>
<td>Vigorous activity, standing</td>
<td>8</td>
</tr>
</tbody>
</table>

1 MET = resting energy consumption
supine position

1.2 cal/min or 72 cal/hr

**Circulation 2007**

Franklin BA, Chest 1998
Safety of exercise-based CR

TABLE 6. Prodromal Symptoms Reported by 45 Subjects Within 1 Week of Their SCD

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Reports, n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain/angina</td>
<td>15</td>
</tr>
<tr>
<td>Increasing fatigue</td>
<td>12</td>
</tr>
<tr>
<td>Indigestive/heartburn/gastrointestinal symptoms</td>
<td>10</td>
</tr>
<tr>
<td>Excessive breathlessness</td>
<td>6</td>
</tr>
<tr>
<td>Ear or neck pain</td>
<td>5</td>
</tr>
<tr>
<td>Vague nauseae</td>
<td>5</td>
</tr>
<tr>
<td>Upper respiratory tract infection</td>
<td>4</td>
</tr>
<tr>
<td>Dizziness/palpitations</td>
<td>3</td>
</tr>
<tr>
<td>Severe headache</td>
<td>2</td>
</tr>
</tbody>
</table>

Adapted from Northover et al.17

Circulation 2007

Important Warnings to Stop Exercising

Stop exercising if you experience any of the following symptoms. Rest for a few minutes and if the symptom persists, seek immediate medical attention:

- Chest pain
- Pain that spreads to the arms, ears, jaws, or back
- Light-headedness or dizziness
- Excessive fatigue
- Shortness of breath
- Excessive sweating
- Nausea or vomiting
- Irregular pulse
- Increased pulse rate that persists for more than five or six minutes after you stop exercising

In addition, stop exercising if you experience any unusual joint or muscle pain that may indicate an orthopedic injury.

Overall cardiac complication rate from exercise CR (syncope, arrhythmia, MI, sudden death)

<table>
<thead>
<tr>
<th>Morning</th>
<th>3/100,000 patient-hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afternoon</td>
<td>2.4/100,000 patient-hours</td>
</tr>
</tbody>
</table>

Murrey PA, Arch Intern Med 1993

Guidelines for Home Exercise Conditioning

- Set aside a specific time to exercise three or four times a week and stick to it. Some people prefer to work out in the early morning; others find that a session at the end of the workday helps change gears and relax. The time of day is not as important as making it a part of your regular routine.
- Wear loose-fitting, comfortable clothing that is appropriate for the temperature and weather.
- Pay particular attention to your shoes. Invest in a good pair of exercise shoes that are designed specifically for your chosen activity (for example, walking or jogging).
- Always include warm-up and cool-down exercises in each session. These help prevent the orthopedic problems that put many exercisers on the sidelines.
- Do not exercise immediately after a meal; wait at least 30 to 60 minutes.
- When it is hot and humid, plan your exercise for the coolest part of the day, or exercise in an air-conditioned indoor area.
- Avoid exercising outdoors during periods of smog or heavy air pollution.
- Avoid exercising outdoors when temperatures fall below freezing or when there is excessive wind.
Sex after heart attack

Resume 2nd week after MI

Safe if can climb 20 stairs within 10-15 sec. or 2 flights of stairs. (5 METs)

HR < 20-30 / min from RHR

NTG can be taken beforehand
be careful with viagra

Any position

Compliance of CR

1st World Congress of EIM : June 2010
Prof. Karim Khan & Prof. Steven Blair
Inactivity even worse than Smokadiabesity

Smokadiabesity (smoking, diabetes, obesity)

Review Article
Systematic Review of the Effect of Diet and Exercise Lifestyle Interventions in the Secondary Prevention of Coronary Heart Disease

Cardiology Research and Practice 2010

Judith A. Cole, 1 Susan M. Smith, 2 Nigel Hart, 1 and Margaret E. Cupples 1

Effect of exercise on cardiac risk factors

DM decrease HbA1C 0.8%
Dyslipidemia increase HDL 2.5 mg%
HTN decrease BP 3.4/2.4 mmHg
Obesity weight loss 6.7 kg/1yr. (diet + exercise)

Exercise Prescription and Primary Prevention of Cardiovascular Disease
Thomas S. Harris, H. Kettel L. Stoughton and Punt D. Thompson
Circulation June 15, 2010
Compliance of CR

Home – based CR program

The Heart Manual is the UKs leading home-based supported self management programme for individuals with CHD who may be recovering from acute Myocardial Infarction and revascularisation.

Week 1: Getting Home – Getting Better

Welcome to the first week of your 6 week recovery programme

In this first week we shall:

- answer some more questions about your heart attack and about why you feel the way you do
- introduce you to the Exercise and Relaxation Plans which will play an important part in your recovery and afterwards
- look at some of the things which might be worrying you, and show you how you can fight back
- if you live with someone, get them to read this section - it can help them as much as it helps you.
**Relaxation**

**Week 2**

Last week you were listening to two different ways of relaxing on the relaxation CD. This week, please go on listening at least once a day to whichever method you find best.

If you like them both, listen to them both.

To get the full benefits you should go on listening regularly for at least 12 weeks.

The relaxation course continues on the relaxation CD. It includes several other ways of relaxing that you may find useful.

You may choose to listen to them all now, but they will probably be more effective if you work through them in the order suggested on the CD.

---

**Week 3**

**Exercise/Activity Plan**

**Gradually building up your plan**

**How much activity should I be aiming for?**

It is important to take your time and build up your activity gradually. This may mean taking regular smaller walks throughout the day rather than one longer one. The general recommendations are to increase your physical activity until you are doing at least 30 minutes of exercise on at least 5 days of the week. This activity should make you breathe faster and feel warmer. For some people this may take several weeks or longer to achieve.

---

**Walking record**

<table>
<thead>
<tr>
<th>Date</th>
<th>I think I can easily</th>
<th>Too Easy</th>
<th>Fairly Easy</th>
<th>Fairly Hard</th>
<th>Too Hard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Week 4:**

**Getting Better All The Time**

You are into the second half of your 6-week programme. Most people are feeling much better by now. Here’s what the manual programme covers in Week 4:

This week you’ll carry on building up your regular exercise and doing regular relaxation. Most people at this stage are feeling considerably better and making good progress towards a full recovery. If you still don’t feel quite as well as you think you should, discuss your feelings with your doctor or facilitator.

---

**Week 5:**

**Feeling More Like Yourself?**

Week 5 – as you work towards the end of this programme you should be feeling much more like your old self.

Here’s what the manual programme covers in Week 5:

This week you should keep up your regular exercise and regular relaxation. Most people at this stage are feeling much more like their old selves. Many people who have used the manual are already feeling better than they did before their heart attack. This is Week 5 of the 6-week programme, but it doesn’t mean that it’s the beginning of the end. Think of it as getting near the end of the beginning – of a new and healthier lifestyle than you lived before.

---

**What has happened over the last 6 weeks**

Over the last 6 weeks we have covered all of the most important things that you need to know about and what to do after a heart attack.

**Information:**

- What a heart attack is and what causes it
- What coronary artery disease is and what causes it
- Ways of preventing heart attacks and coronary artery disease
- How to fight back and reduce the risk of having another heart attack
- What to do if you think you may be having another heart attack
Risk stratification

AACVPR guideline

Risk Stratification

Patient Flow

Patient Populations

Low

EF > 50 %
No resting or exercise induced dysrhythmia
Functional capacity > 7 METs

Moderate

EF 40-49 %
Functional capacity 5 - 6.9 METs

High

EF < 40 %
Functional capacity < 5 METs
Survival of cardiac arrest
Ventricular dysrhythmia at rest or exercise
Clinically significant depression

Risk stratification

Low

EF > 50 %
No resting or exercise induced dysrhythmia
Functional capacity > 7 METs

Moderate

EF 40-49 %
Functional capacity 5 - 6.9 METs

High

EF < 40 %
Functional capacity < 5 METs
Survival of cardiac arrest
Ventricular dysrhythmia at rest or exercise
Clinically significant depression

Don’t do any exercise in:

Unstable angina
Class IV heart failure
Uncontrolled sustained tachyarrhythmias or bradyarrhythmias
Severe and symptomatic aortic or mitral stenosis
Hypertrophic obstructive cardiomyopathy
Severe pulmonary hypertension
Resting systolic blood pressure 200 mm Hg or resting diastolic blood pressure 110 mm Hg
Active or suspected myocarditis or pericarditis, thrombophlebitis
Recent significant systemic or pulmonary embolus.

Exercise prescription

Aerobic exercise

Resistive exercise

plus

Slow deep breathing exercise
Increased physical activity

Aerobic exercise

F 3-5 days/wk
I 50-80% VO2 max
D 20-60 mins
M continuous aerobics or interval training

Resistive exercise

F 2-3 days/wk
I 10-15 rep./set, 40-60% of 1RM
D 1-3 sets of 8-10 exercises
M elastic bands, weight cuff, dumbbells, weight machine

Core Components of Cardiac Rehabilitation/Secondary Prevention Programs: 2007 Update: A Scientific Statement From the American Heart Association Exercise, Cardiac Rehabilitation, and Prevention Committee, the Council on Clinical Cardiology; the Councils on Cardiovascular Nursing, Epidemiology and Prevention, and Nutrition, Physical Activity, and Metabolism; and the American Association of Cardiovascular and Pulmonary Rehabilitation

Gary J. Balsley, Mark A. Williams, Philip A. Ates, Vera Bittner, Patricia Comos, JoAnne M. Foody, Barry Franklin, Connie Sanderson and Douglas Southard Circulation 2007;115:2675-2682; originally published online May 18, 2007.
**Unsupervised program**

Estimated maximal HR

- **Intensity**: 60-75% VO\(_2\) max
talk test
- **Borg scale**: increased HR 10-20 / min

**Duration**: 30 mins

**Frequency**: 3 per week

*Thompson P., Circulation 2005*

---

**Karvonen formula**

Estimated maximal HR

\[
\text{Estimated maximal HR} = \left[ (\text{HRmax} - \text{RHR}) \times \text{intensity} \% \right] + \text{RHR}
\]

- **HRmax**: maximum HR
- **RHR**: resting HR

\[
\text{HRmax} = (220 - 60) - 80 = 140
\]

\[
\text{Estimated maximal HR} = (140 - 80) \times 0.6 + 80
\]

\[
= 48 + 80 = 128
\]

---

**Borg scale**

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Relative Intensity</th>
<th>Maximum Heart Rate, %</th>
<th>RPE↑</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very light</td>
<td>&lt;20</td>
<td>&lt;35</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Light</td>
<td>20-39</td>
<td>35-54</td>
<td>10-11</td>
</tr>
<tr>
<td>Moderate</td>
<td>40-59</td>
<td>55-69</td>
<td>12-13</td>
</tr>
<tr>
<td>Hard</td>
<td>60-84</td>
<td>70-89</td>
<td>14-16</td>
</tr>
<tr>
<td>Very hard</td>
<td>≥85</td>
<td>≥90</td>
<td>17-19</td>
</tr>
<tr>
<td>Maximum↑</td>
<td>100</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
</table>

*Thompson P., Circulation 2001*

---

**Energy Requirements of Selected Daily Activities**

- **Leisure**
  - Billiards: 2.4
  - Canoeing (leisurely): 2.5
  - Dancing (ballroom): 2.9
  - Golf (with cart): 2.5
  - Horseback riding (walking): 2.3
  - Playing a musical instrument: 1.8
  - Accordion: 2.3
  - Cello: 2.3
  - Flute: 2.0
  - Piano: 2.3
  - Violin: 2.5
  - Volleyball (noncompetitive): 2.9
  - Walking (2 mph): 2.5

*Thompson P., Circulation 2001*
Post PCI (angioplasty and/or stent)

Start exercise training
7-14 days post PCI

Post ICD

Limit target HR at least
10 to 15 beats/min lower than
the threshold discharge rate.
**Post pacemaker**

Avoid high intensity resistance exercise
Fixed-rate pacemakers;
Activity intensity must be gauged by other methods eg. Borg scale

**Post CABG**

Avoid upper body exercise for 3 months.

---

**Take home message**

Drugs don’t work when patients do not take them.

Exercise doesn’t work in patients who do not follow recommendations.

---

**RR for sitting > 6 hr/day**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1.94</td>
</tr>
<tr>
<td>Female</td>
<td>1.48</td>
</tr>
</tbody>
</table>

---

**Thank You for Your Attention**