

# POST-MYOCARDIAL INFARCTION REHABILITATION

by M. Dercksen

It is generally accepted that following a myocardial infarction patients receive excellent medical care, both in the intensive care units and in the general wards of a hospital. However, not enough emphasis is placed on their further rehabilitation.

It is well known that these patients invariably suffer from depression, especially when they are at home again and have to resume their former way of life. They feel uncertain about the future and their ability to maintain their role as bread-winners and as members of the community. They also feel now that they have to completely change their previous way of life. Hackett and Cassem (1973) regard depression as the single main problem in the convalescence of a myocardial infarction patient, and exercise as the most efficient way of combating it.

## TREATMENT DURING HOSPITALIZATION

At the Tygerberg Hospital, Parowvallei, the myocardial infarction patients are admitted for three weeks. During this time their physiotherapy treatment consists of routine breathing exercises and a programme of graded exercises. From the eighth day after the infarct the patients are allowed to sit in a chair next to the bed. Short distances may be walked after the tenth day, and the distance walked is gradually progressed according to the patient's progress. On discharge, the patients should be able to walk approximately two hundred meters with ease. Fatigue, angina pectoris and dyspnoea are regarded as precautionary measures determining the patient's rate of progress.

## FOLLOW-UP AFTER DISCHARGE

At intervals of three and six weeks after discharge, patients are once again examined by a cardiologist. Thereafter they are referred to either their general practitioner or the internal medicine department of the hospital.

During this six-week period, despite good recovery of the heart, problems observed are domestic and those of community and work adjustment. Certain patients also find it difficult to accept and adjust to the reality of a myocardial infarction. They feel uncertain as to the type and amount of exercise permitted. Thus some patients fall into a state of complete inactivity, whilst others tend to ignore their condition and over exert themselves.

As a result of the abovementioned rehabilitation classes were commenced in the gymnasium of the Physiotherapy Department.

## SELECTION OF PATIENTS FOR REHABILITATION

General enthusiasm to attend these classes is encountered amongst all the patients. However, only those that fulfil requirements are admitted to classes.

The cardiologist decides six weeks after discharge which of the patients are suitable for these classes.

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The requirements are as follows:

1. No more than two previous infarcts.
2. Whilst in hospital:
  - (a) No hypertension with a diastolic pressure of above 110 mm Hg.
  - (b) No persistent hypotension with a systolic pressure of under 100 mm Hg.
  - (c) No persistent heart failure.
  - (d) No heart enlargement.
  - (e) No diabetic patients on insulin treatment.
  - (f) No patients with widespread peripheral vascular disease.
  - (g) No general arthritic conditions.
3. During the follow-up visit:
  - (a) No fluctuating angina.
  - (b) No deterioration in E.C.G. after discharge.
  - (c) No disturbances in heart rhythm.
  - (d) No heart failure.

These criteria determine the patients who will really benefit positively from the exercises.

## AIMS OF THE EXERCISE CLASSES

1. Helping patients to adjust by:
  - (a) Building up their physical state so that they can fulfil their normal daily routine.
  - (b) Gaining confidence in their real abilities.
  - (c) Promoting a sound psychological attitude to life and helping them to adjust to family life and the community.
2. Improving the cardiopulmonary circulation and the possible re-opening of collateral bloodvessels (Eckstein, 1957).

## GUIDELINES FOR AN EXERCISE PROGRAMME

Classes are held three times a week commencing at 08h00 so that patients may thereafter go to work. The course of exercises lasts twelve weeks.

Exercises are chosen primarily to improve the cardiopulmonary circulation, and secondly, to exercise all muscle groups. Attention is given to posture, balance and the general range of movement of all joints. Exercise of the large muscle groups, such as jogging, static bicycle riding and climbing stairs are done to improve the cardiopulmonary circulation. This is an important consideration in such a programme (Kam Yan, 1974).

Strenuous isometric exercises are not included because they cause an increase in the blood pressure which results in straining of the heart. Isometric contractions increase the heart load and oxygen consumption (Lind, 1967). At the Cardiac Rehabilitation Congress in London (Mason (Ed.) 1975) it was stated that strenuous isometric exercises can cause overloading of the left ventricle and cardiac failure.

Klingberg-Olssen (1967) states that arm exercises eg. lifting weight and push-ups are undesirable, because too they result in an increase in the blood pressure and the pulse.

### PRECAUTIONARY MEASURES

A doctor from the cardiology department attends each exercise session. Full resuscitation facilities must be at hand. So far it has never been necessary to resort to this facility at the Tygerberg Hospital, but the presence of the doctor and the apparatus reassures the patients.

Before commencement of the classes, the patients are informed about the nature of the exercises and what is expected of them. The patients are warned not to compete with one another, but to do the exercises in their own time. As soon as the patient feels tired, he must rest. If angina pain develops this must be reported to the doctor immediately. The doctor then decides if the patient should continue exercising when the symptoms have subsided. An information sheet with full particulars is distributed to all patients.

Exercise sessions should not take place within two hours after a big meal, because angina can result more easily as a result of conflicting demands between visceral and myocardial circulations (Bruce, 1973). Patients are therefore advised to eat a light meal some time before attending the classes.

The dietician is consulted in the case of weight problems.

### THE EXERCISE TABLE

The class consists basically of warming-up exercises, followed by exercises to increase the cardiopulmonary circulation. For the purpose of increasing the cardiopulmonary circulation a circuit-training programme has been instituted. Five minutes of static bicycling completes each exercise session.

The exercise table is as follows:

**WARMING-UP EXERCISES:** Do each single exercise 10 times.

1. Standing: Walk 200 metres.
2. Standing: Swing arms.
3. Stride standing: Hands on hips, rotate trunk.
4. Standing: Holding on to bars, hip swinging.

**CIRCUIT-TRAINING:** Do each single exercise 10 times.

1. Standing: Jog for  $\frac{1}{2}$  minute.\*
2. Lying: Lift 2 kg medicine ball.
3. Lying: Alternate straight leg raising.
4. Lying: Knees bent, lift head and shoulders towards knees.\*
5. Long sitting: Throw ball onto wall and catch.
6. Long sitting: Rotate trunk moving ball from side to side behind back.
7. Long sitting: Rowing 20 times.\*
8. Standing: Holding a 2 kg medicine ball, knee bends.
9. Standing: Step up and down of balance form for 1 minute.\*
10. Standing: Sit and stand again.

\* Take pulse.



PHOTO 1  
Exercising during the class



**PHOTO 2**  
**Static bicycling at the end of the class**

**COMPLETION:**

**Bicycling**

Throughout the twelve weeks the exercises remain the same, excepting that the time allowed for exercising is increased. In addition the pulse rate is allowed to increase progressively, i.e. within limits. The times for the circuit exercises numbers 1 and 9 are increased in the last six weeks of the course. This depends on the individual progress of each patient.

Each patient has a special treatment card on which a record is kept at each session of:

1. The pulse rate five minutes after arrival i.e. before starting the exercises.
2. The pulse rate immediately after static bicycling.
3. The pulse rate five minutes after static bicycling has ceased.

Certain control exercises are selected. After each of these the patient's pulse rate is taken (see exercises marked \* in the exercise table). If the pulse rate does not exceed the previously determined level, the patients are allowed to proceed with the next exercise. If the rate is too high, the patients must rest till it returns to the required level.

**MAXIMUM EXERCISE TIME AND PULSE RATE ALLOWED**

Weeks	Time allowed	Pulse rate allowed
One and two	10 minutes	100/min.
Three and four	15 minutes	110/min.
Five and six	20 minutes	120/min.
Seven and eight	25 minutes	120/min.
Nine to twelve	30 minutes	Unrestricted

**PROGRESSION**

At the beginning of the seventh week jogging time is extended to one minute and stair climbing to one and a half minutes. The resistance of the bicycle ergometer is also increased.

From the ninth week jogging and stair climbing are extended to two minutes each. An unrestricted pulse rate is now permissible.

**THE PERFORMANCE OF THE EXERCISES**

The time allowance of eg. ten minutes is solely for the circuit-training exercises and does not include the time spent on warming-up exercises or the bicycle ergometer. In the case of all ten circuit-training exercises being completed before the ten minutes is up, the patient will then start again with number one of the circuit training programme etc. All patients finish each session with five minutes of static bicycle riding.

On completion of the exercises each patient's progress is carefully recorded on his treatment card. Thus it is evident whether more exercises have been done in the same amount of time.

**MOTIVATION AND HOME EXERCISES**

On the days when patients do not attend classes, they are encouraged to walk and to progress both the distance and their rate of walking.

On completion of the course, the patients should be able to exercise without supervision or control and to resume their sporting activities. The patients are now required to jog two kilometers every day.

Six weeks after the completion of the course patients are required to return to ascertain whether or not they are maintaining the same fitness level. If not, they are required to return to the class until they regain their former level of fitness.

### THE EFFECTS OF A GRADUATED FITNESS PROGRAMME

Klingberg-Olssen (1967) provide the following data:

1. Decrease in pulse and heart rate and a greater myocardial efficiency.
2. Increase in exercise tolerance with regard to Angina Pectoris.
3. Improvement and lowering of blood pressure.
4. Decreased blood lipids.
5. A large psychological improvement.
6. New collateral circulation and an improvement in cardiac flow.

In view of the fact that the project at Tygerberg Hospital is fairly new, no valid statistics are as yet available, but the patients themselves have a far more positive outlook, are fitter and the majority have lost some weight. All patients agree that the exercise sessions have contributed in a large measure to their return to a normal life.

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# The Pinch Gauge

by

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### INTRODUCTION

In the past, the only method used by the therapist to determine improvement in finger prehension of the diseased, injured or neurologically impaired hand was subjective judgement based on experience. However in recent years an instrument known as the Pinch Gauge<sup>1</sup> has found its way into physical therapy practice and now for the first time we have a method of obtaining a reliable, objective, quantitative and valid baseline measure of finger prehension force in the above three conditions. Because prehension is so closely related to self-care and independence in the quadriplegic patient, any improvement in prehensile strength, no matter how small, is important. In this condition especially, the pinch gauge is invaluable.

It is the purpose of this article to describe this instrument so that more therapists may become aware of its potential use.

### CONSTRUCTION

The pinch gauge can be divided into three parts (Fig. 1). The first part of this instrument is a dial (A) that measures force up to 30 pounds and can be rotated so that the pressure sensitive pointer (B) is directly over zero. In order to facilitate reading there is a passive pointer (C) that is moved by the pressure sensitive pointer during testing. When pressure is released, the pressure sensitive pointer returns to zero but the passive pointer remains over the highest pressure achieved. Before the next test is begun, the passive pointer must be moved back alongside the pressure sensitive pointer by rotating the knob in the center of the dial (D). The second part of this instrument is a handle by which the therapist holds the instrument during testing (E). The most stable grip is with the palmar aspect of the end of the thumb on one side, and the lateral aspect of the index finger between the interphalangeal joints, on the other side. The third