The Application of Power-walking in Phase Ⅱ Cardiac Rehabilitation Program for the Post-PCI Patients

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CONTENTS

CHD & PCI

EVALUATION

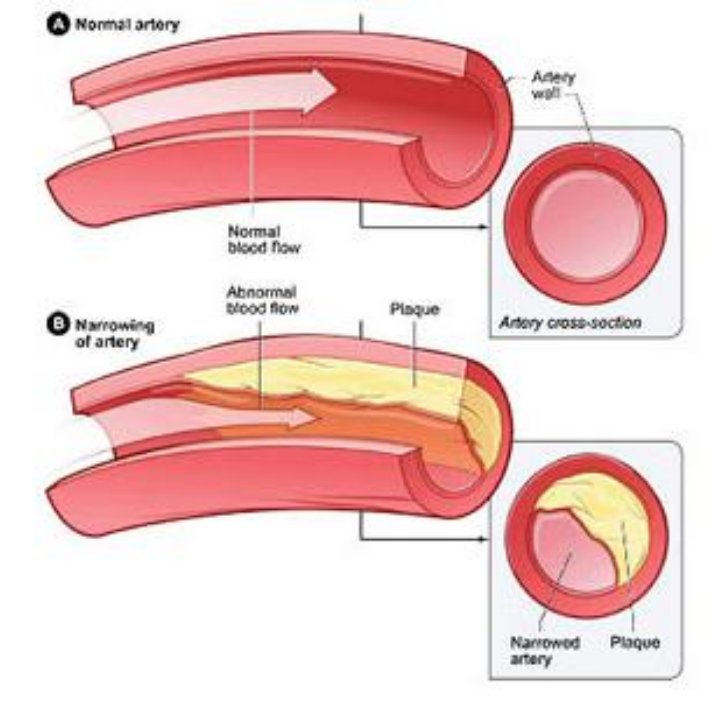
EXERCISE PROGRAM

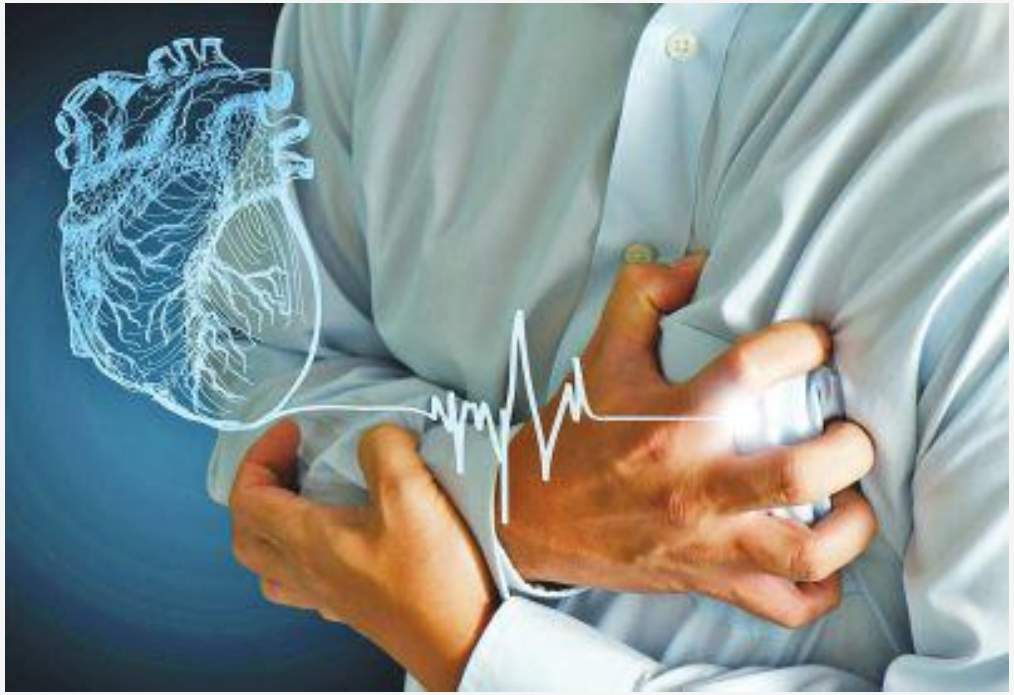
PART ONE

CHD & PCI

After which **POWER-WALKING** is applied

1-1 Coronary heart disease (CHD)





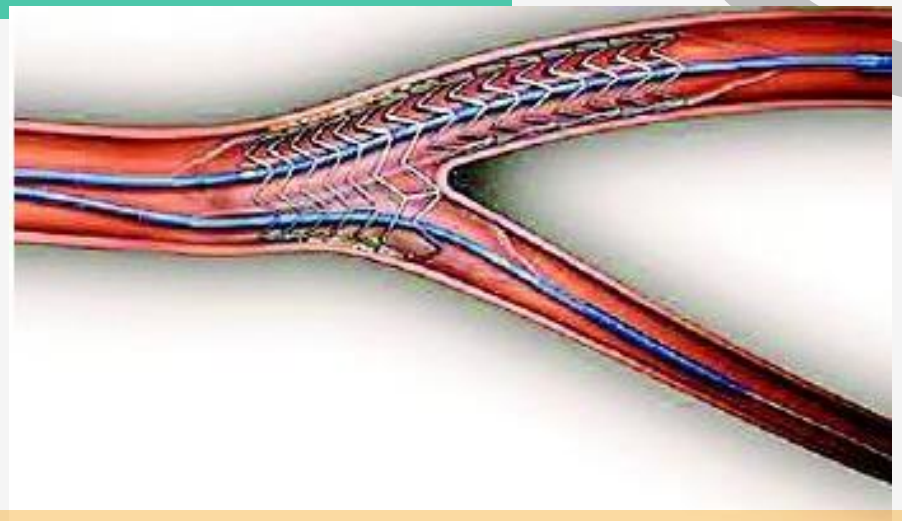
-Bhatia, Sujata K. (2010). Biomaterials for clinical applications (Online-Ausg. ed.). New York: Springer. p. 23. ISBN 9781441969200.

1-2

Percutaneous coronary intervention (PCI)

restore arterial blood flow to heart tissue

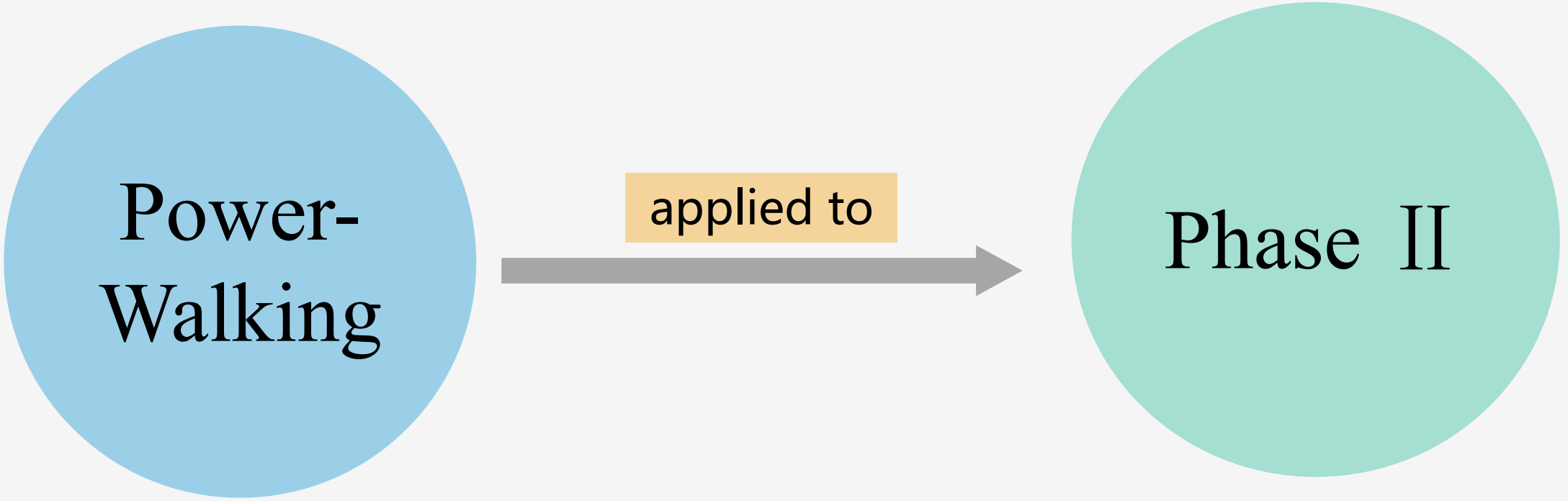
open a blocked coronary artery



- re-establish blood flow
- prevent angina, myocardial infarctions and death

-Oberhauser JP, Hossainy S, Rapoza RJ (2009). "Design principles and performance of bioresorbable polymeric vascular scaffolds".EuroIntervention. 5 (Suppl F): F15–22.

1-3 Rehabilitation program



(Kim, C., et al., 2012)

PART TWO

Basic Evaluation Of Cardiac Fitness For Exercise

--Exercise Stress Test

2

Exercise Stress Testing

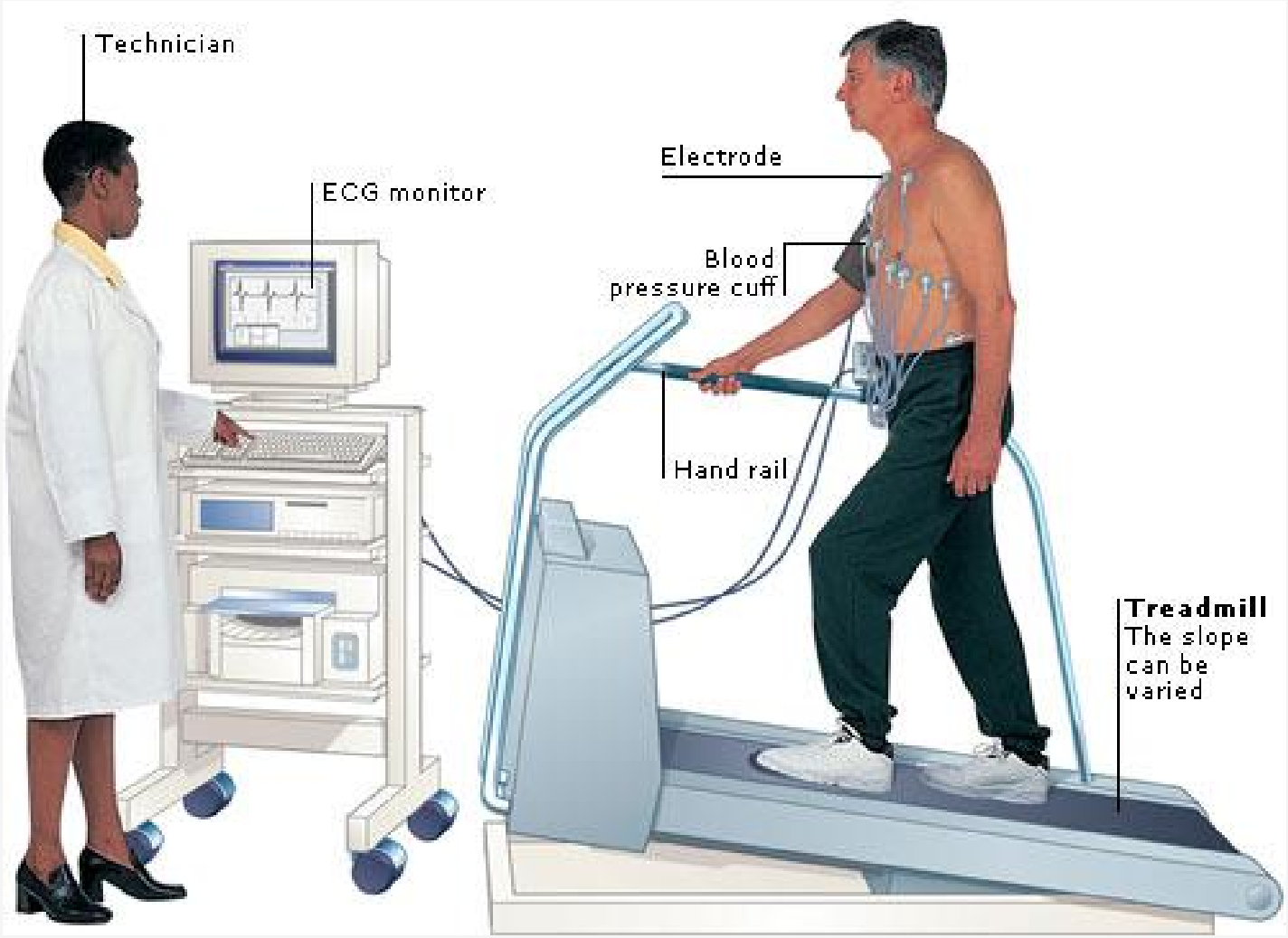
An exercise stress test is commonly conducted by health professionals to determine cardiac function of people with heart disease risk factors.

- The Bruce treadmill test , a non-invasive test
- Other similar exercise stress test protocols include Astrand, Naughton and Balke.

2 BRUCE PROTOCOL

- performed under the supervision of appropriately trained medical staff.
- for estimating VO_2 max.

the maximum amount of oxygen that an individual can utilize during intense or maximal exercise.



2 BRUCE PROTOCOL STRESS TEST

Stage	Speed (km/hr)	Speed (mph)	Gradient
10			28

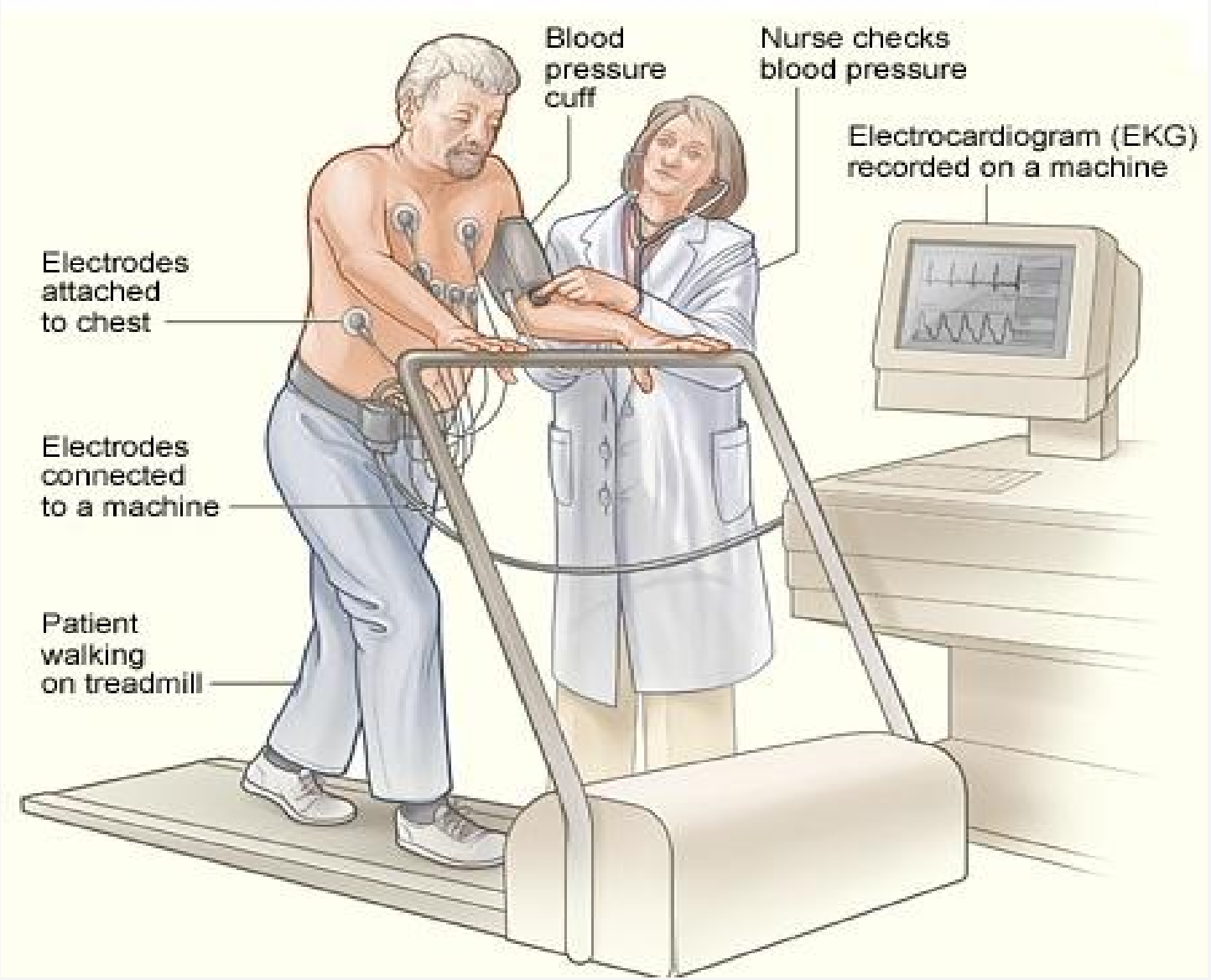
3minutes

Modified Bruce protocol

Stage	Time	Speed	Grade	Mets
1	3 minutes	1.7mph	0%	1.7
2	3 minutes	1.7mph	5%	2.9
3	3 minutes	1.7 mph	10%	4.7
4	3 minutes	2.5 mph	12%	7.1
5	3 minutes	3.4 mph	14%	10.2
6	3 minutes	4.2 mph	16%	13.5
7	3 minutes	5.0mph	18%	17.3

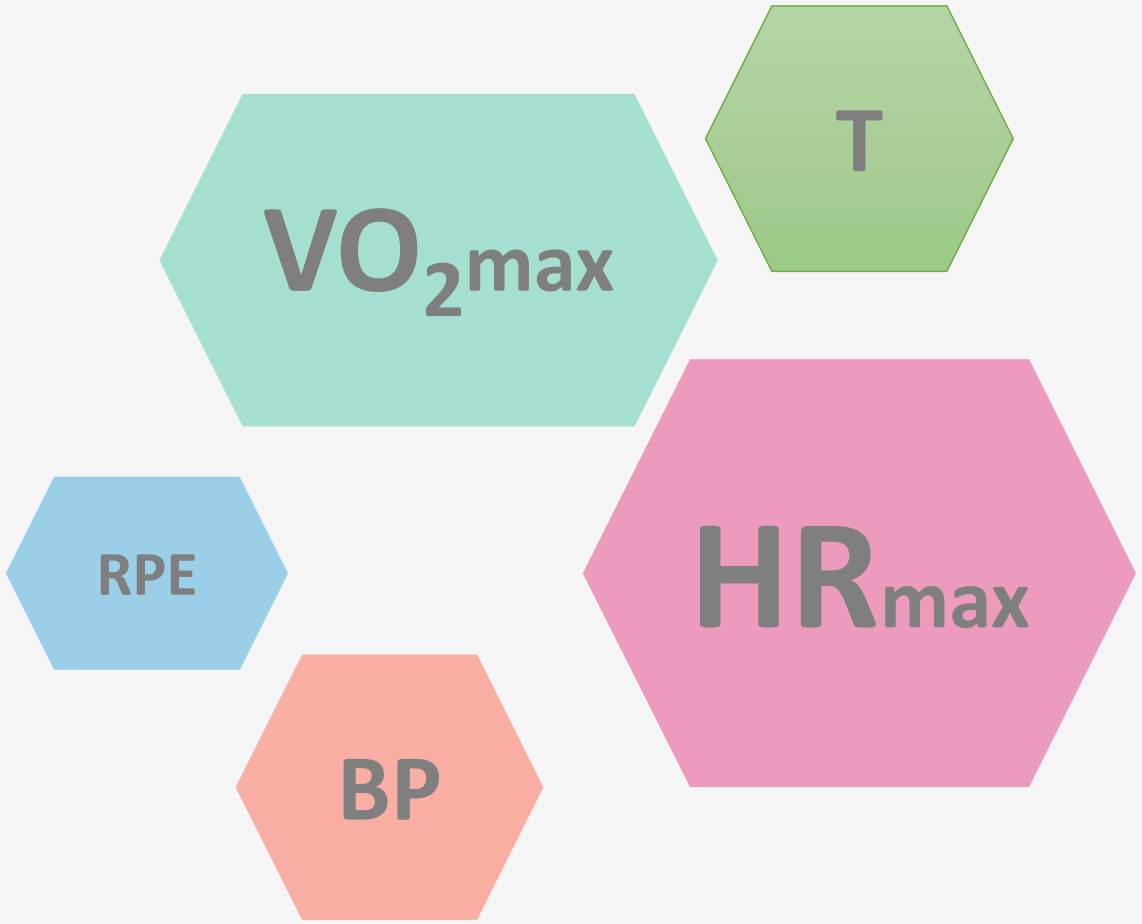
2 Procedure of Bruce Protocol

- the leads of the ECG are placed on the chest wall
- warm up
- the subject run for as long as possible on a treadmill .



Wilmore JH and Costill DL. (2005)

2 Results of Bruce Protocol



The length of time“T” on the treadmill is the test score and can be used to estimate the VO_2 max value.

Active and sedentary men

$VO2\ max = 14.8 - (1.379 \times T) + (0.451 \times T^2) - (0.012 \times T^3)$

Active and sedentary women

$VO2\ max = (4.38 \times T) - 3.$

bruce.xls

(1) Foster et al. 1984
(2)Pollock et al. 1982

2

Results of Bruce Protocol

Bruce Protocol Norms for Men

VO2 Max Norms for Men - Measured in ml/kg/min						
Age	**Very Poor**	**Poor**	**Fair**	**Good**	**Excellent**	**Superior**
13-19	<35.0	35.0-38.3	38.4-45.1	45.2-50.9	51.0-55.9	>55.9
20-29	<33.0	33.0-36.4	36.5-42.4	42.5-46.4	46.5-52.4	>52.4
30-39	<31.5	31.5-35.4	35.5-40.9	41.0-44.9	45.0-49.4	>49.4
40-49	<30.2	30.2-33.5	33.6-38.9	39.0-43.7	43.8-48.0	>48.0
50-59	<26.1	26.1-30.9	31.0-35.7	35.8-40.9	41.0-45.3	>45.3
60+	<20.5	20.5-26.0	26.1-32.2	32.3-36.4	36.5-44.2	>44.2

Wilmore JH and Costill DL. (2005)

PART THREE

EXERCISE PROGRAM

- Power waking
- Making exercise program
- Procedure

POWER WALKING

- A form of exercise where active upper body movement is added to the usual walking exercise.
- A fast walking exercise done at a speed of 6 to 8 km/h
- The elbow joints are bent 90 degrees
- At least one foot must be in contact with the ground at all times.

(Chul Kim,2012)

EFFECT

- peak oxygen uptake
- cardiorespiratory endurance
- aerobic capacity

- myocardial oxygen requirements
- risk of coronary events

(Arthur S. Leon,2005)

EXERCISE PROGRAM

Intensity: 60% of the target heart rate during the first 2 weeks
70% during 3rd and 4th weeks
85% during 5th and 6th weeks

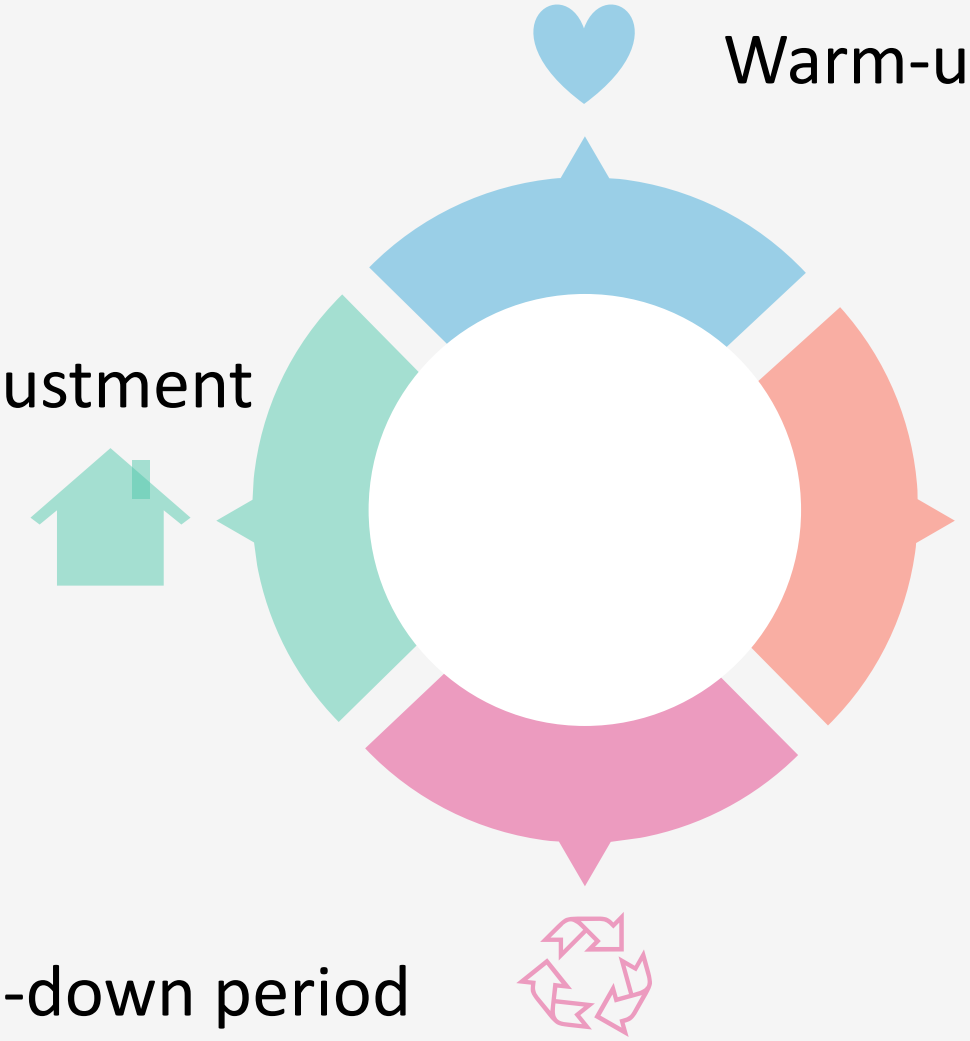
Duration:6 weeks

Frequency:3 times a week

The target heart rate=60% to 80% of the maximum heart rate

(Chul Kim,2012)

Procedure



Warm-up period

Aerobic exercise period

Cool-down period

Supervision and adjustment

WARM-UP PERIOD

Total body movement exercises and pay attention to heart rate.

Warm up

Step 1

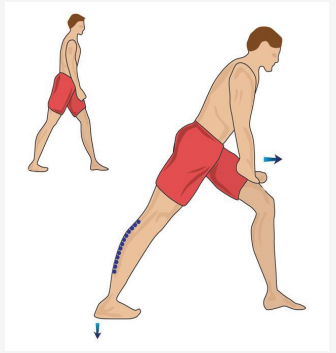
Stroll

5 to 10 minutes

Stretch

Step 2

calf



hamstring

quadriceps

hip flexors

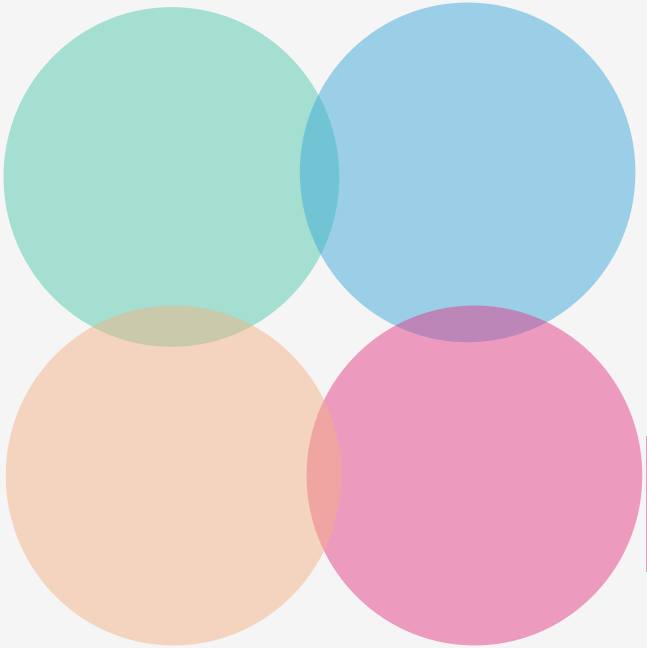
(JAVONNE BLACKLEY, How to Do Power Walking, livestrong.com website, Accessed: December 2016.
Kara Mayer Robinson, Tips for Power Walking, webmd.com website, Accessed: December 2016.)

AEROBIC EXERCISE PERIOD

Step 1

Establish a correct posture

Position your head in a neutral position and looking forward.
Open your mouth slightly.



Point your toes and knees forward.

Straighten your front leg.

Keep your shoulders relaxed.

Place your arms in a 90-degree angle.

Tighten your gluteus and abdominals.

(JAVONNE BLACKLEY, How to Do Power Walking, livestrong.com website, Accessed: December 2016.
Kara Mayer Robinson, Tips for Power Walking, webmd.com website, Accessed: December 2016.)

Step 2

Move correctly

Step with your heel first and then roll your weight forward.

Use a natural step length.

Swing your arms back and forth actively

Pay attention to direction, wrists and elbows.

(JAVONNE BLACKLEY, How to Do Power Walking, livestrong.com website, Accessed: December 2016.
Kara Mayer Robinson, Tips for Power Walking, webmd.com website, Accessed: December 2016.)

Alternate arms and legs forward to maintain walking in a straight line.

(**Chul Kim,2012**)

COOL-DOWN PERIOD

Cool down	Slowing your pace and dropping your arms by your sides.
Stretch	Stretch each muscle for 20 to 30 seconds.

(JAVONNE BLACKLEY, How to Do Power Walking, livestrong.com website, Accessed: December 2016.
Kara Mayer Robinson, Tips for Power Walking, webmd.com website, Accessed: December 2016.)

SUPERVISION AND ADJUSTMENT

Monitor heart rate, rhythm and blood pressure.

Adjust according to the patients' response.

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THANKS FOR YOUR ATTENTION