IN THE NAME OF GOD

Lifestyle Modification and Coronary Artery Bypass Graft (CABG)

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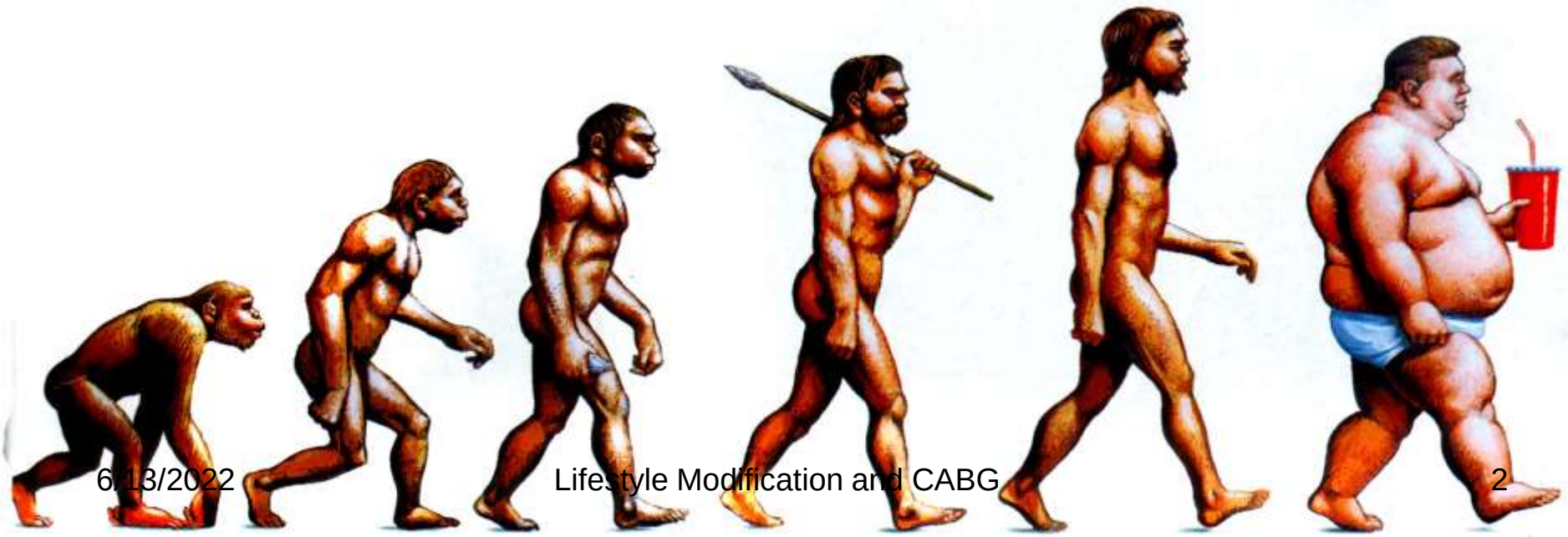
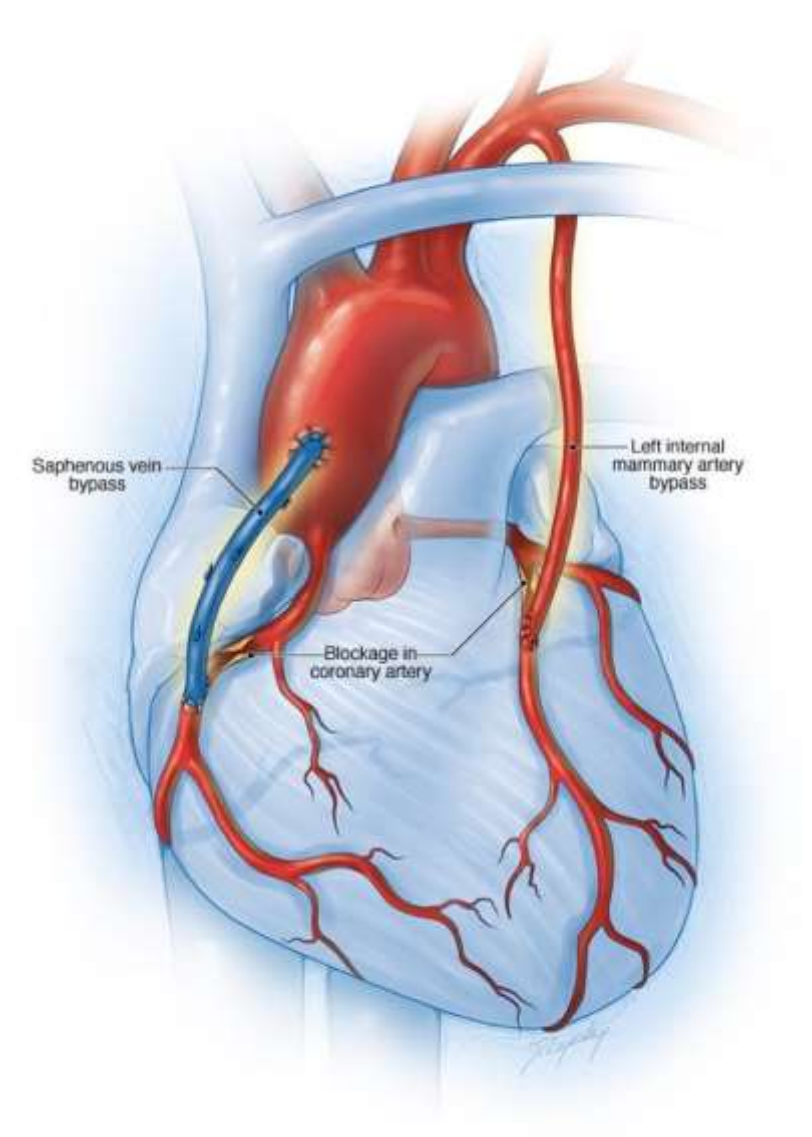
The shape of things to come

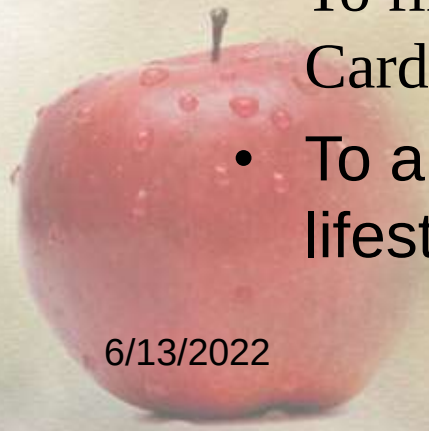


Coronary Artery Bypass Graft (CABG)



Aims of the presentation

- To introduce CABG rehabilitation
- To discuss what a ‘healthy lifestyle’ means
- To explore the adherence of patients to Phase II Cardiac rehabilitation
- To determine the safety and feasibility of outpatient exercise program.
- To introduce lifestyle factors and the impact of lifestyle modification in CABG CR
- To find out effectiveness of Supervised Exercise Based Cardiac Rehabilitation on Quality of Life following CABG
- To answer questions on healthy and unhealthy lifestyles and lifestyle diseases



Cardiovascular disease as a leading cause of death in the world

- **50 million deaths annually due to NCD**

(equivalent to 71% of all deaths globally)

- 48% related to cardiovascular disease

- 31% cancers

- 12% obstructive lung disease

- 3% DM

There is NO alternative treatment for CR

Guidelines:

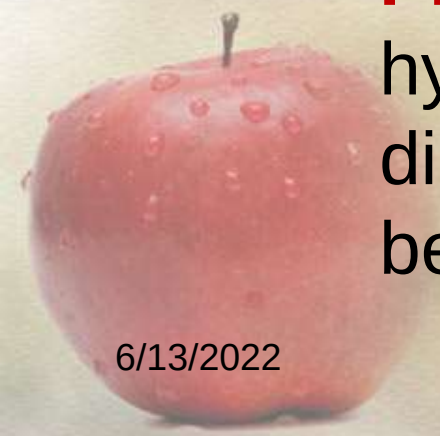
- **AHA**
- **ACSM**
- **AACVPR**
- **Exercise Leadership in Cardiac Rehab**
- **Cardiac Rehabilitation Manual**
- **Several researches**

Coronary Artery Bypass Grafting (CABG)

Coronary Artery Bypass Grafting (CABG) began in the late 1960s along two parallel paths that included bypassing coronary artery obstructions using either the **Internal Mammary artery (IMA)** as the bypass conduit or reversed **saphenous vein graft (SVG)** from the leg

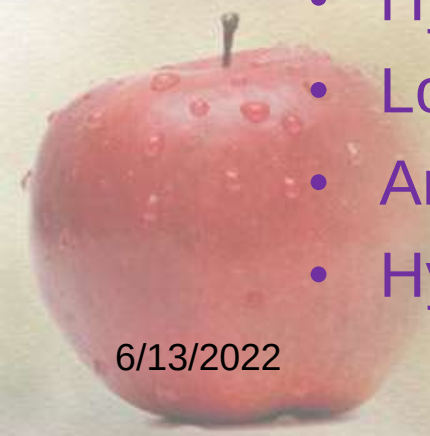
Risk Factor Concepts in Primary and secondary Prevention of the NCD

- **Nonmodifiable risk factors** include age, sex, race, and family history of CVD, which can identify high-risk populations
- **Behavioral risk factors** include sedentary lifestyle, unhealthy diet, heavy alcohol or cigarette consumption.
- **Physiological risk factors** include hypertension, obesity, lipid problems, and diabetes, which may be a consequence of behavioral risk factors



Lifestyle changes before medical therapy

- As a matter of fact, according to current guidelines, a long list of risk factors ought to be treated first by lifestyle changes before medical therapy is considered or initiated. These risk factors include:
- Physical inactivity
- Smoking
- Hypercholesterolemia
- Hypertriglyceridemia
- Low HDL cholesterol
- Arterial hypertension
- Hyperglycemia



WHAT IS LIFESTYLE ?

HOW WE LIVE OUR LIVES EVERY DAY

- Healthy Lifestyle
- Unhealthy Lifestyle
- Lifestyle Disease
- Lifestyle Departments and Schools
- Lifestyle Medicine

Healthy Lifestyle?

Healthy Lifestyle

- HEALTHY DIET
- HEALTHY BODY WEIGHT
- REGULAR PHYSICAL ACTIVITY
- NO SMOKING
- STRESS AND ANXIETY MANAGEMENT
- NO ALCOHOL CONSUMPTION
- GOOD SLEEPING
- …

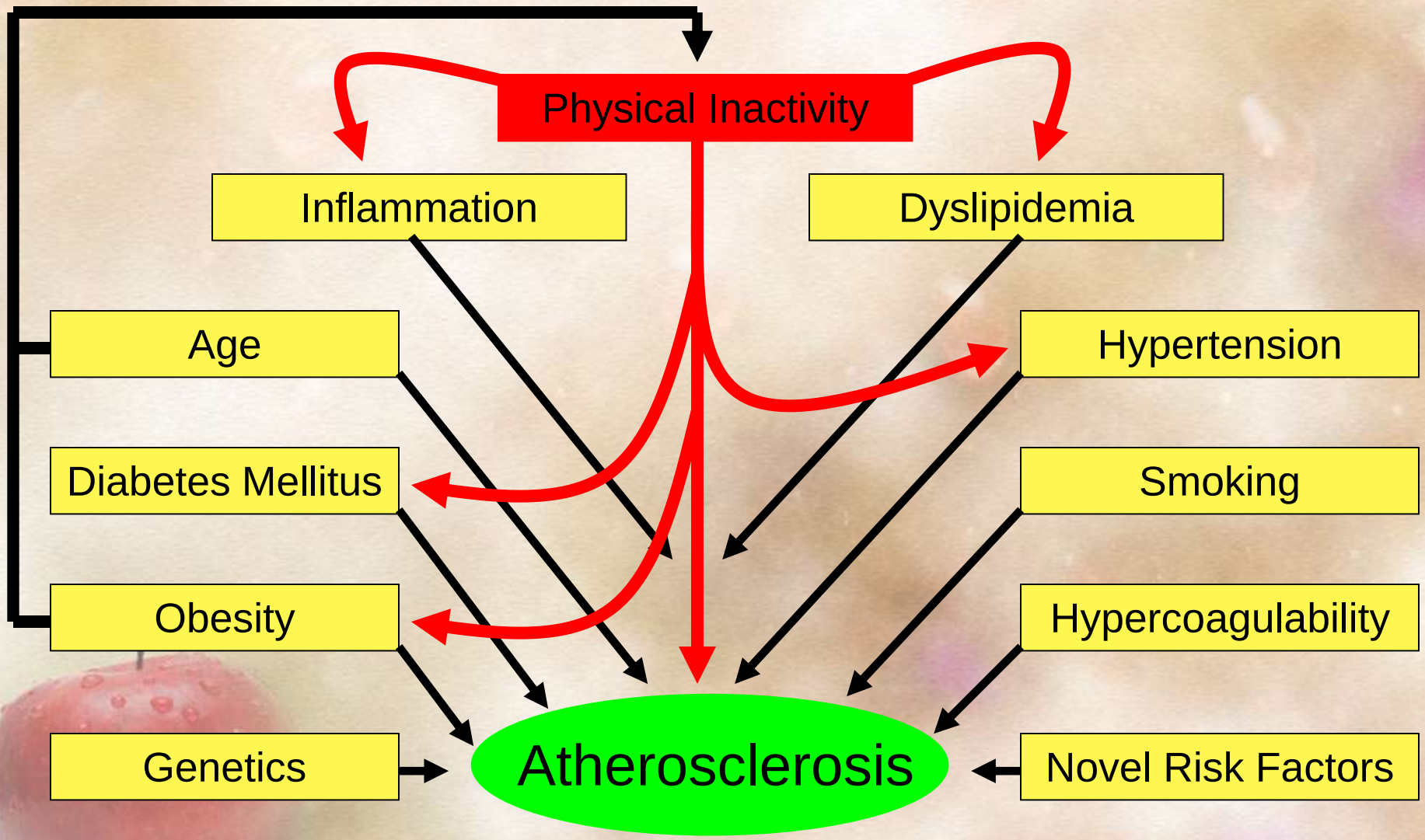
Lifestyle Modification!

MOST IMPORTANT WEAPON TO PREVENT NON-COMMUNICABLE DISEASES

Poor Lifestyle Choices

- Sedentary lifestyle
- Poor food choices
- Use of alcohol
- Use of tobacco\products
- Lack of understanding of consequences
- Lack of motivation to change

Adverse Effects of Physical Inactivity



PEN

World Health Organization

Implementation tools

Package of Essential Noncommunicable (PEN) disease interventions for primary health care in low-resource settings

Global Monitoring Framework
9 targets for 2025

Treatment to reduce risk of heart attacks and strokes 50% coverage

Physical inactivity 10% reduction

Diabetes /Obesity 0% increase

Harmful use of alcohol 10% reduction

Raised BP 25% reduction

Premature mortality From NCD 25% reduction

Salt/sodium Intake 30% reduction

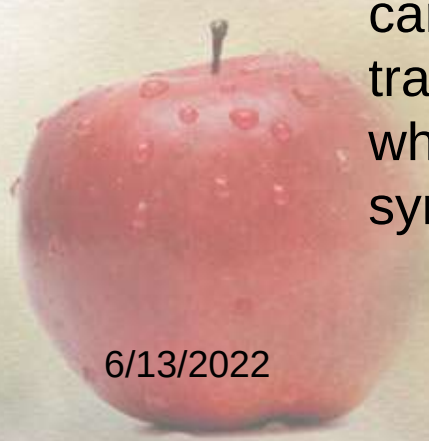
Tobacco use 30% reduction

Essential medicines & technologies

80% coverage

Definition of terms PA, Exercise, and Physical Fitness, and Cardiorespiratory fitness

- PA: any muscle contraction resulting in an energy metabolism above basal metabolic rate is characterized as *physical activity*
- *Exercise: exercise training* is any physical activity that is planned, structured, performed repeatedly, and specifically aimed at improving the physical fitness level
- *Physical fitness:* comprises the ability of performance including cardiopulmonary endurance, muscle strength, flexibility, and coordination
- *Cardiorespiratory fitness:* is determined by the maximal cardiovascular exercise capacity and is dependent on oxygen transport via lung diffusion, cardiocirculation to the muscle fiber, where it is used in the mitochondria for energy production (ATP synthase).



Steps Categories as PA levels and the Goal of 10,000 Steps

Sedentary (Inactive)	less than 5,000 steps a day
Low Active	5,000 – 7,499 steps a day
Somewhat Active	7,500 – 9,999 steps a day
Active	10,000 steps or more a day
Highly Active	12,500 steps or more a day

Assessment of PA

- Subjective methods (IPAQ)
- Objective Methods (Pedometer and accelerometer)
- Criterion Methods or gold standard methods (Indirect calorimetry, and doubly labeled water)

Physical Activity Recommendations

- ACSM/AHA guidelines focus on 30 minutes of moderate-intensity daily physical activity five days a week
- Or 75 minutes vigorous-intensity PA weekly
- Walking as a PA recommendation

Benefits of Physical Activity

- Decrease blood pressure
- Increase strength, CV endurance
- Increase balance
- Increase lung and breathing function
- Improve immune function
- Reduce depression and anxiety
- Control obesity
- ……

How Physical Activity Impacts Health

- Helps control weight.
- Reduces feelings of depression and anxiety.
- Helps build and maintain healthy bones, muscles, and joints.
- Reduces the risk of developing colon cancer.
- Helps reduce blood pressure in people who already have high blood pressure.
- Causes the development of new blood vessels in the heart and other muscles.
- Enlarges the arteries that supply blood to the heart.

WHO 2002

Successful Rehabilitation

Depends on:

- how early rehabilitation begins
- the extent of the heart injury
- the survivor's attitude
- the rehabilitation team's skill
- the cooperation of family and caregiver

CARDIAC REHABILITATION-CANDIDACY

- Patients after stabilization of MI
- Post Angioplasty
- Surgical (CABG)
- Post valve replacement
- Surgical correction of structural defect(Adult/Pediatric)
- Post Transplantation
- Asymptomatic people with positive risk factors
- Geriatric group

Leon et al, American Heart Association Scientific Statement,2005)

CR has four main parts

- Medical evaluation
- Physical activity
- Lifestyle education
- Support

Exercise Leadership in Cardiac Rehabilitation

CR program main parts

Core Components of Cardiac Rehabilitation

- **Prescribed exercise** to improve cardiovascular fitness without exceeding safe limits
- **Education** about heart disease along with counseling on ways to stabilize or reverse heart disease by improving risk factors.
- **cardiac risk factor modification**
  - Reduction/Cessation of Smoking
  - Lipid Management
  - Controlling High Blood Pressure
  - Weight Loss/Control
  - Improve/Manage Diabetes
  - Increasing Physical Activity
- Encourage Healthy Eating Habits
- Improve Psychological Well Being

CR program main parts

According to the guidelines,

- Smoking cessation
- Exercise training
- Diet and lipid management
- Psychosocial components in managing stress, anxiety and depression
- Occupational assessment and counseling

European Society of Cardiology

When ambulatory CR should be started?

- In some centers patients are invited for ambulatory rehabilitation only after a waiting period of 6–12 weeks, to allow for complete healing of the sternum.
- The data from several centers show that an early start of an adapted rehabilitation program (1–2 weeks after discharge) is safe and speeds up recovery without causing an increase in sternal problems.
- Also psychological recovery is helped by an early start of rehabilitation

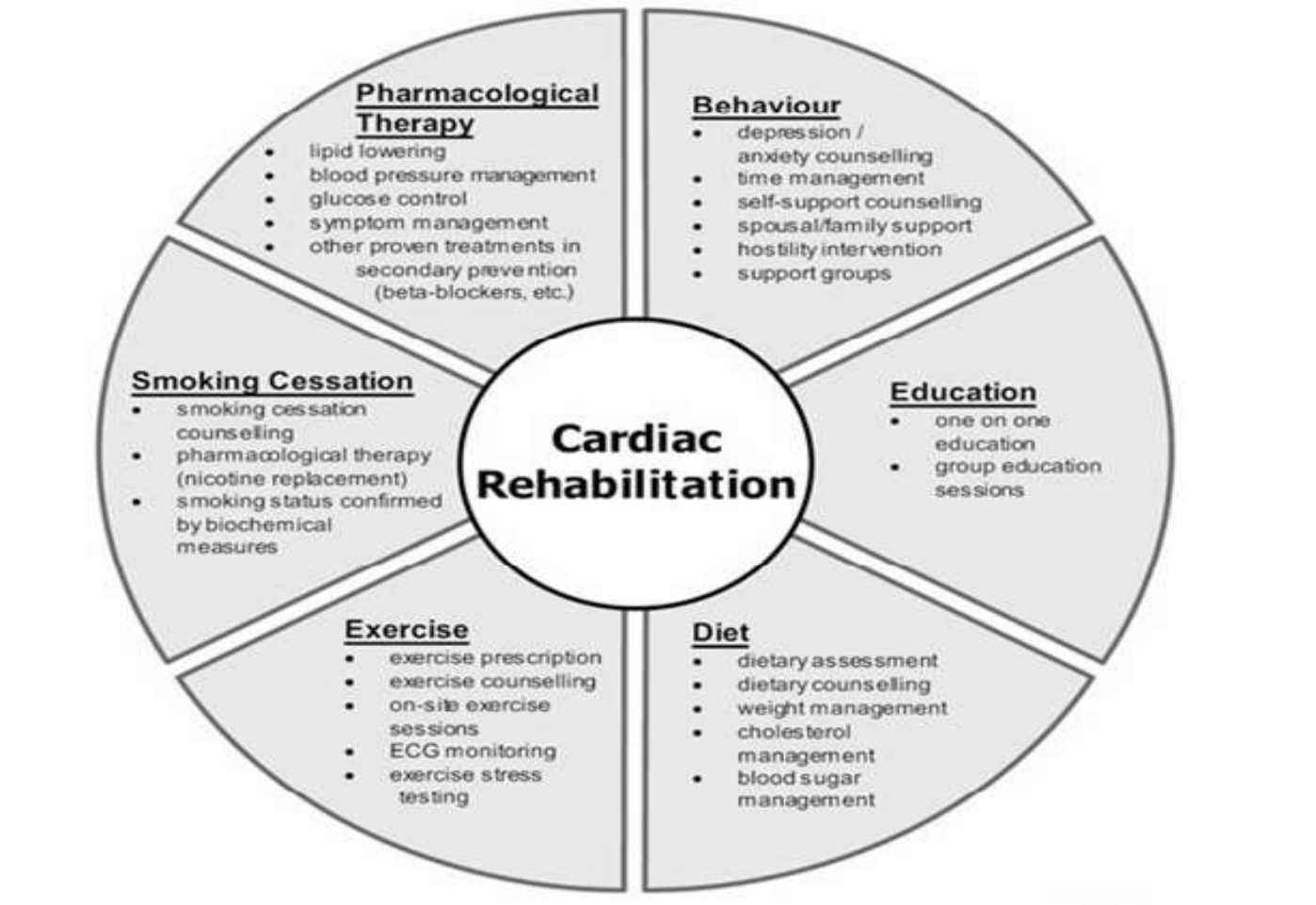
Starting lifestyle change and medical therapy

- At the time that we start medical therapy, we also tell our patients to change their lifestyle.
- But what exactly does this mean?
- What are the lifestyle changes that they are now being expected to make?
- And above all, can we provide our patients with an infrastructure that really helps them to deviate from current unhealthy behavior?

Phases of CR

- Phase I- in-patient period or after ‘a step change’ in cardiac condition
- Phase II- early post-discharge
- Phase III-supervised out-patient program including structured exercise
- Phase IV- long-term maintenance of exercise and other lifestyle changes

MULTIDISCIPLINARY NATURE OF THE MODERN CR



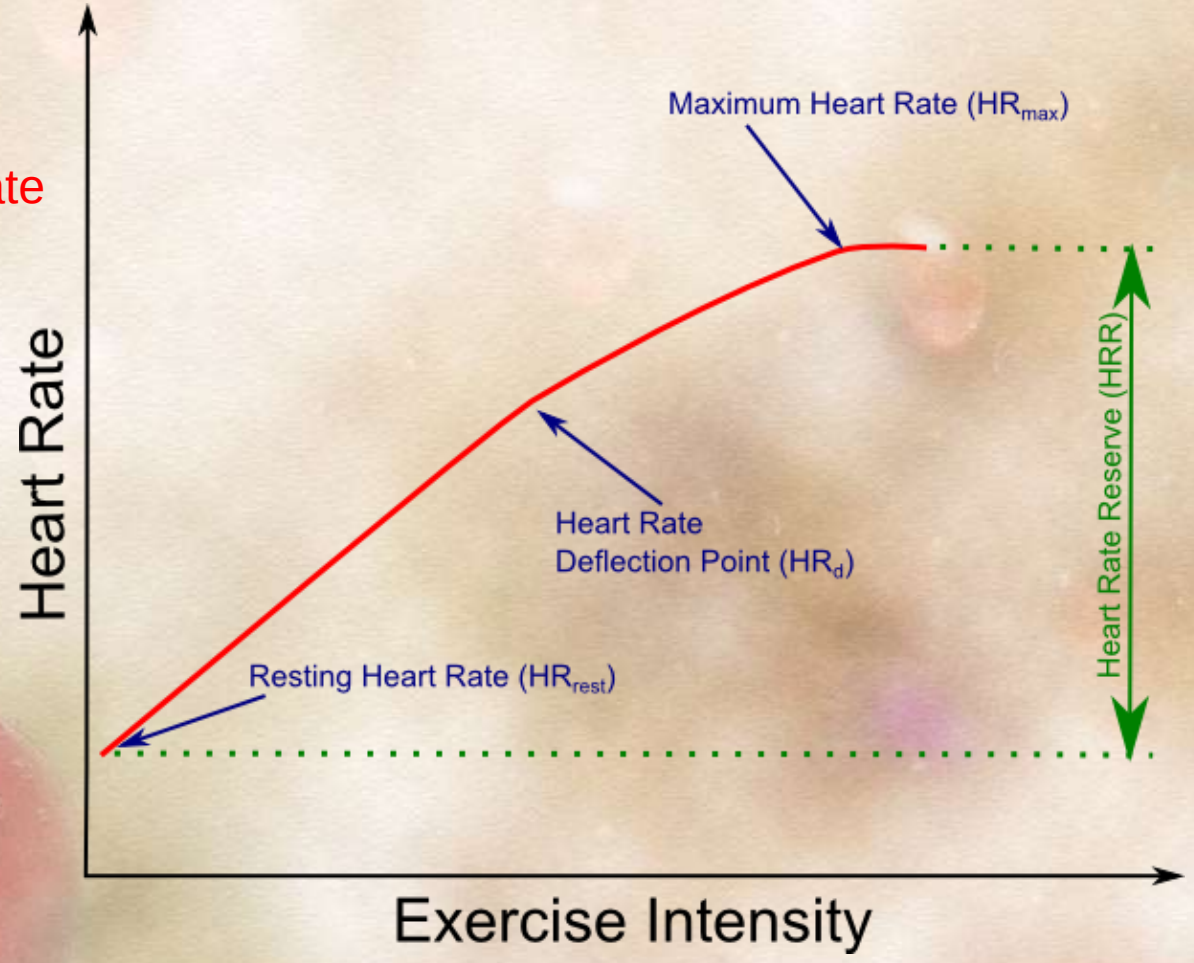
(Eagle, Guyton et al. 1999)

PA as a core component of CR

- Physical activity counseling and individually prescribed and supervised exercise training are core components of a comprehensive cardiac rehabilitation (CR) program, compromising 30–50 % (up to >70 %) of all cardiac rehabilitation activities.
- This applies to phase II as well as to phase III cardiac rehabilitation for patients post-acute coronary syndrome and post-primary coronary angioplasty (PCI), post-cardiac surgery (coronary artery bypass, valve heart surgery, cardiac transplantation), as well as in chronic heart failure patients.

Risk Stratification and Exercise prescription

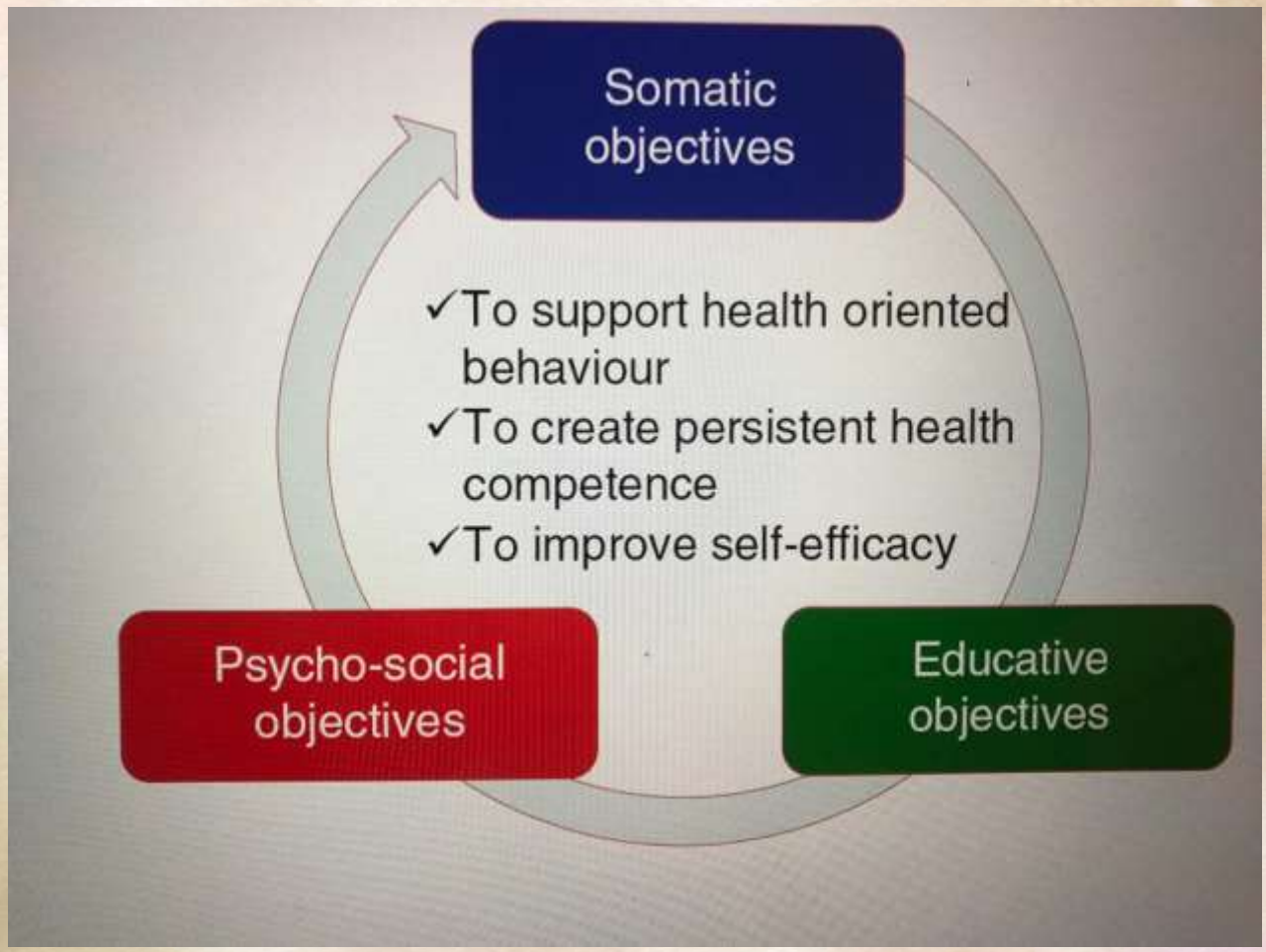
Target heart rate



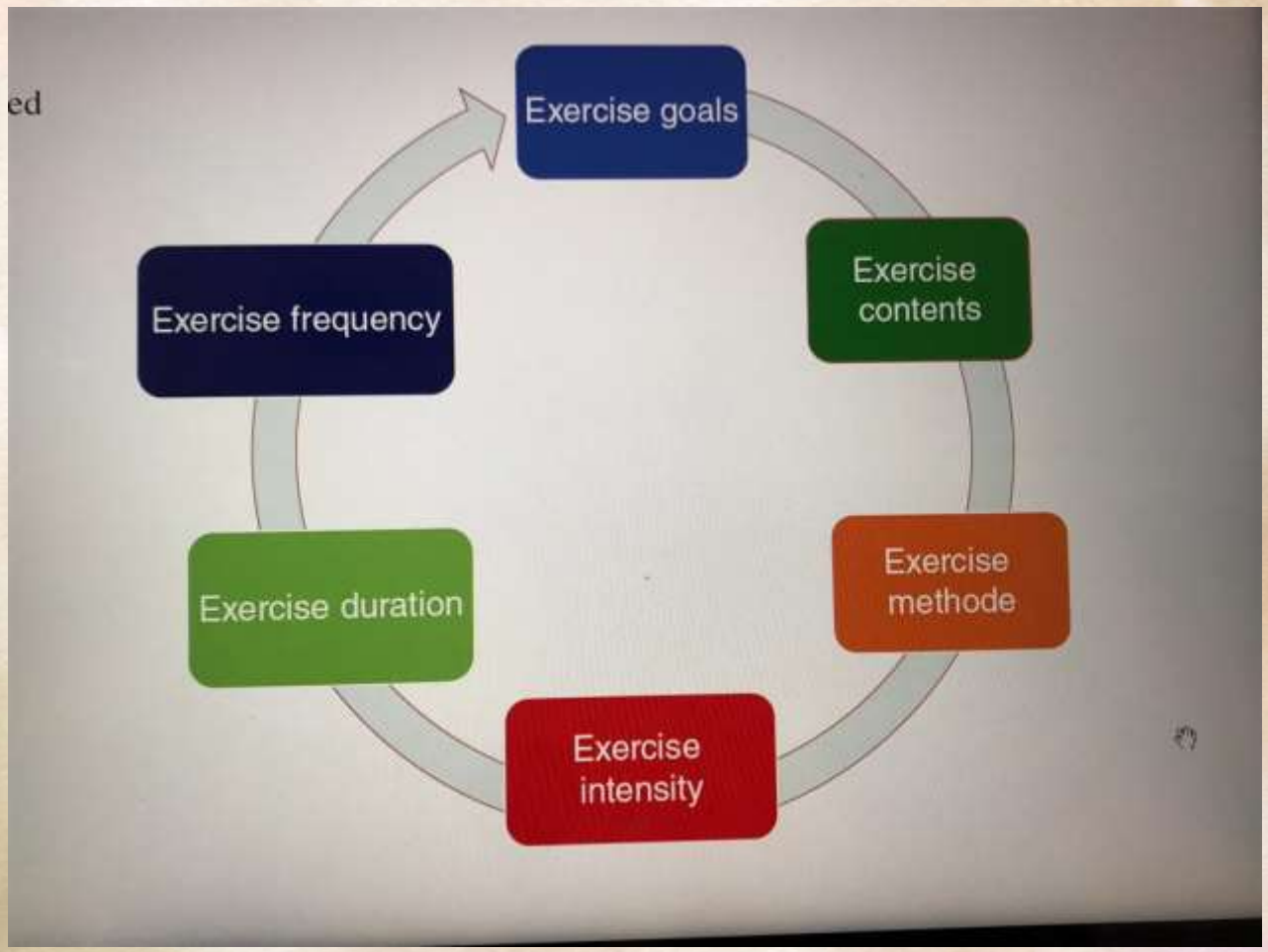
Characteristics of low and high risk CR

A low risk individual would have all of the following:	**A high risk individual would have only one of the following:**
Normal hemodynamic response to exercise and recovery	Decreased left ventricular function- ejection fraction < 40%
No evidence of myocardial ischemia	Abnormal hemodynamic response with exercise and recovery
Normal left ventricular function	Persistent or recurrent ischemia at low levels of exercise
Functional capacity of 7 METs or more	Functional capacity of < 5 METs
Absence of clinical depression	Survivor of cardiac arrest or sudden death
	Complicated recovery post-event, i.e. cardiogenic shock, CHF
	Clinically significant depression

Objectives of exercised-based training intervention



Contents of comprehensive exercise based training intervention in CR



Contents of comprehensive exercise based training intervention in CR

Borg Scale

The *Borg scale* (rate of perceived exertion (RPE)) is used to subjectively assess how the individual perceives the intensity of the performed exercise on a scale from 6 to 20 points

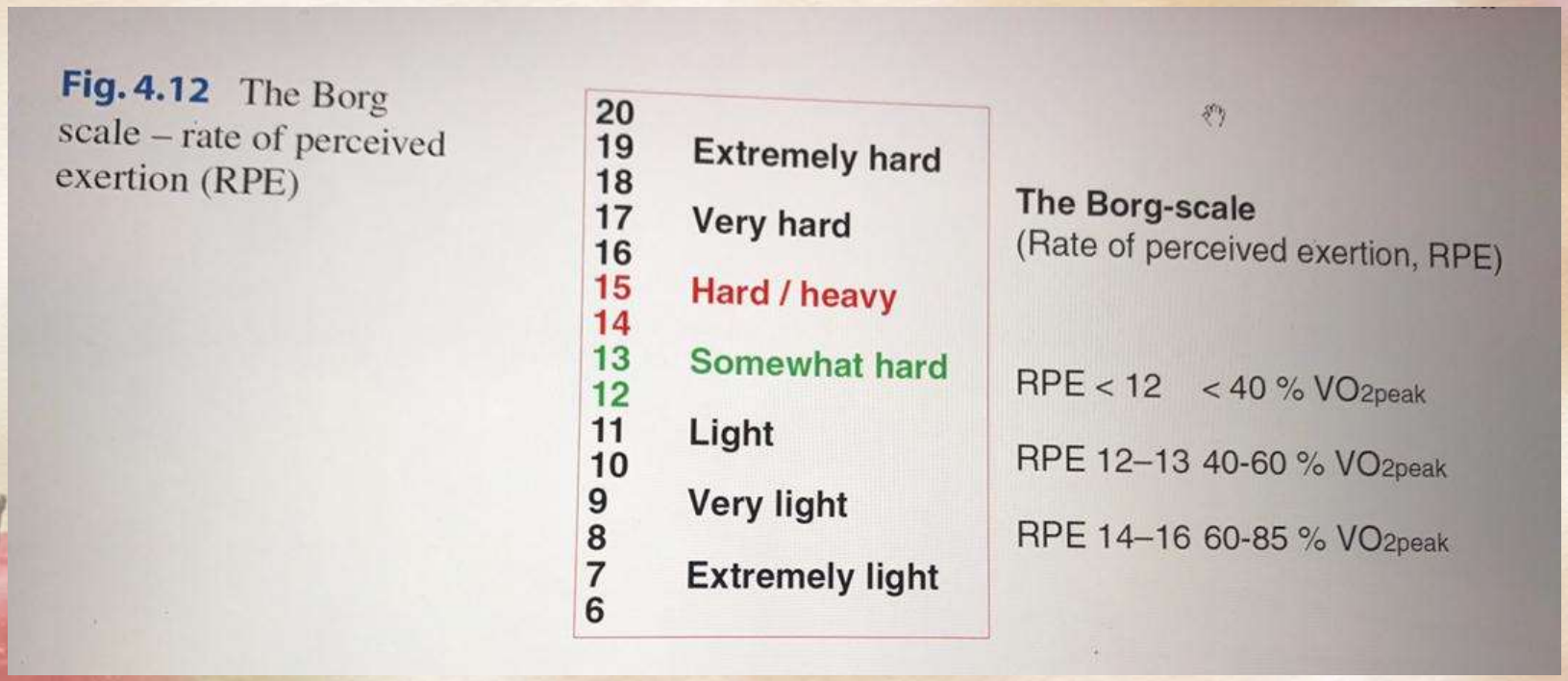
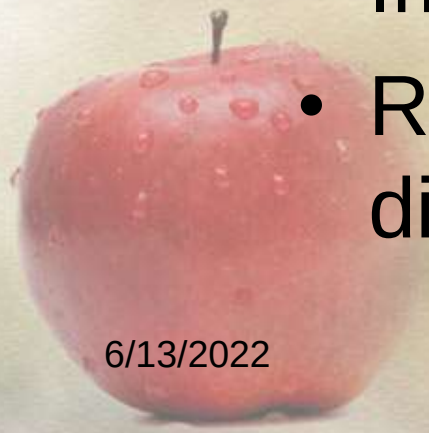


Fig. 4.12 The Borg scale – rate of perceived exertion (RPE)

Physical functioning improves after CR

- Improvement in functional capacity (strong evidence)
- Improved cardiovascular efficiency
- Reduction in atherogenic and thrombotic risk factors
- Improvement in coronary blood flow
- Reduction in risk of cardiovascular disease mortality



Psychosocial benefits of CR

- Reduction in depression and anxiety
- Enhanced mood status
- Enhanced self-confidence
- Decreased illness behavior
- Increased social interaction
- Resumption of chores/hobbies
- Resumption of sexual activities
- Return to vocation/work

HEALTHY DIET

- **Low fat, low salt, adequate liquids, proteins, vitamins, calcium, micronutrients and high fiber, fruits and vegetables**
- **Make them relish their food with good flavour, smell, colour, utensils and environment**
- **Frequent small meals, no overeating**

Antioxidants

- Antioxidants are substances that help the body get rid of potentially harmful molecules called free radicals.
- The presence of free radicals may play a role in development and maintenance of NCDs.
- Thus antioxidants are important to counteract the free radicals.

Obesity

- Vital capacity is further reduced by obesity, which increases the risk of pulmonary complications.
- Obesity is known as one of the risk factors for perioperative complications, and perioperative weight reduction has been shown to result in better postoperative recovery
- Therefore if the surgery can be postponed safely for weeks, an individual preoperative follow-up by a dietician may be useful.
- Using a short course of a protein diet, 5-10 kg of weight loss can be obtained

Abdominal Obesity

- An increased waist circumference has been recognized as an additional – possibly independent – risk factor for myocardial infarction and may be present despite a normal BMI.
- The risk for metabolic diseases is increased with a waist circumference of greater than 80 cm in women and 94 cm in men. Persons with abdominal obesity (the android pattern) are in a proinflammatory, prodiabetic, and prothrombogenic state

Weight Reduction

- If weight reduction is intended, the daily caloric intake should be reduced by 500–800 Kcal, and physical activity should be increased
- Mediterranean and low-carbohydrate

diets are effective alternatives to low-fat diets

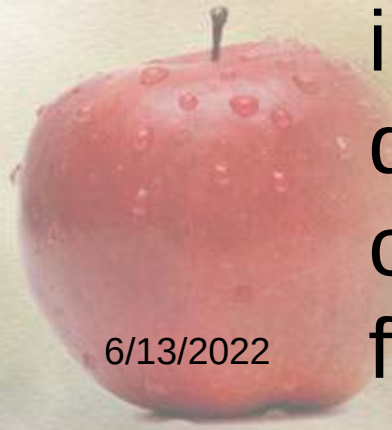
Hypertension

- Hypertension following coronary artery bypass grafting is not uncommon, especially in patients having good left ventricular function, it is often accompanied by tachycardia.
- Exercised based cardiac rehabilitation improve systolic and diastolic BP

DK Tempe et al, control of tachycardia and hypertension following coronary artery bypass graft surgery

Insufficiently treated diabetes

- In long-standing diabetes, the risk of slow or incomplete healing of the sternotomy are a typical complication in case of bilateral mammary artery bypass grafting.
- The devascularization of the sternum increases the risk of sternum dehiscence in the postoperative period, compromising pulmonary function even further.



Smoking Cessation and CR

- Several trials have shown that patients who continue to smoke in the immediate preoperative period have a significant increase in pulmonary complications, wound healing problems and a longer stay in the intensive care unit.
- An intervention study showed that a six-week period of smoking cessation significantly reduces these risks.

smoking

- Continued smoking after a cardiac event greatly increases mortality risk. Smoking cessation and participation in cardiac rehabilitation (CR) are effective in reducing morbidity and mortality. However, these two behaviors may interact; those who smoke may be less likely to access or complete CR. This review explores the association between smoking status and CR referral, attendance, and adherence.

Diann E. Gaalema et al. Smoking and Cardiac Rehabilitation Participation: Associations with Referral, Attendance and Adherence.

Smoking cessation

- Aggressive smoking cessation efforts constitute one of the most important interventions a physician can make in caring for patients with CABG.
- Individuals with CABG who smoke cigarettes or use other forms of tobacco should be advised to stop smoking and should be offered comprehensive smoking cessation interventions, including behaviour modification therapy, nicotine replacement therapy, or bupropion/vareniclin

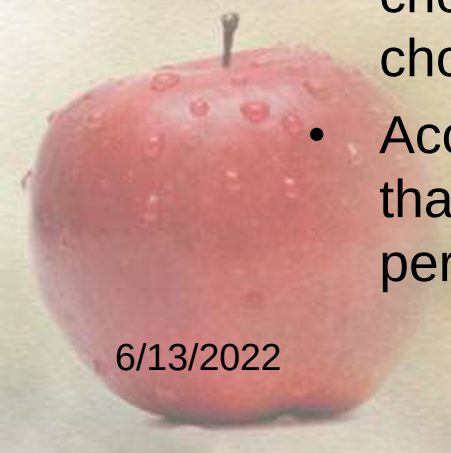
Smoking and CABG, Diann E. Gaalema et als.

Caloric restriction

- Caloric restriction has also cardiac-specific effects that ameliorate aging-associated changes in diastolic cardiac function. These beneficial effects on cardiac function might be mediated by the effect of caloric restriction on blood pressure, systemic inflammation, and myocardial fibrosis.

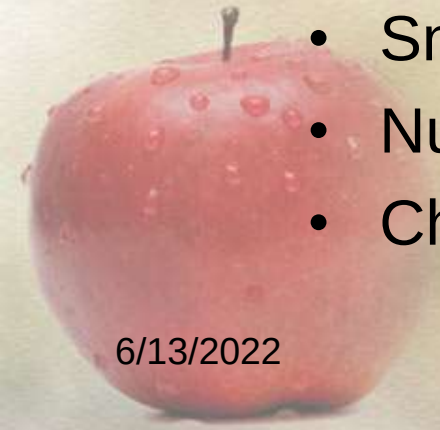
Cholesterol and Eggs

- Elevated serum LDL cholesterol levels are an established risk factor for cardiovascular disease, and lowering of serum LDL cholesterol levels decreases the risk of cardiovascular disease in persons at increased risk
- The American Heart Association (AHA) recommended in 1961 that people reduce cholesterol consumption, and eventually the AHA suggested a limit of 300 mg of cholesterol consumption per day
- Egg consumption is one of the main sources of dietary cholesterol. The yolk of a single egg contains about 200 mg of cholesterol.
- Accordingly the recommendation of the AHA was for decades that the consumption of eggs should be limited to ≤2 egg yolks per week



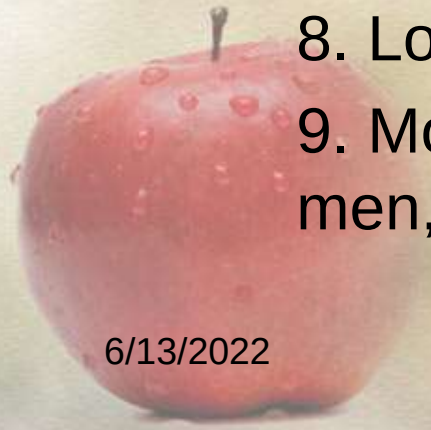
Other individual components of the diet

- Saturated and unsaturated fats
- Rapeseed oil and Olive oil
- Omega 3 (n-3) fatty acids
- Omega 6 (n-6) fatty acids
- Fruits and Vegetables
- Whole grain products
- Meat
- Snack and Sweets
- Nuts and Almonds
- Chocolate (flavanol-rich dark chocolate)



Mediterranean Diet

1. High ratio of monounsaturated: saturated fatty acids
2. High intake of legumes
3. High intake of grains
4. High intake of fruit and nuts
5. High intake of vegetables
6. High intake of fish
7. Low intake of meat and meat products
8. Low intake of milk and dairy products
9. Moderate consumption of alcohol (10–50 g/day for men, 5–25 g/day for women)

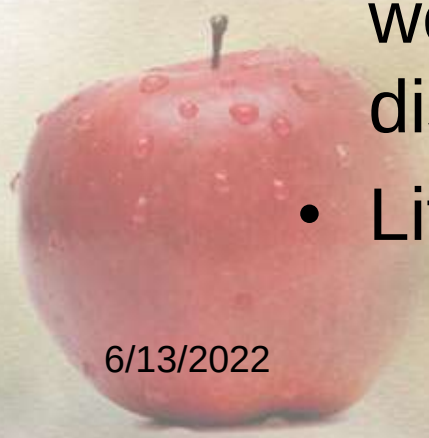


Drinks and cardiovascular events

- Coffee
- Tea
- Alcohol
- Soft drinks

Take home messages

- Cardiovascular disease as a leading cause of mortality and morbidity worldwide
- Healthy and unhealthy lifestyle
- Lifestyle disease!
- Lifestyle Medicine
- Lifestyle modification as most important weapon against the Non-communicable disease
- Lifestyle modification in patients with CABG



Thank you for listening!

- **Any Questions**

Have a healthy lifestyle!