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CHAPTER III

THE ASSESSMENT OF PHYSICAL ACTIVITY FOR THE ELDERLY

Claudio Macchi

III.1 Distinguishing features and contra-indications of motor activities.

Physical activity is often crucial in the prevention and treatment of many chronic diseases of the elderly (muscle wasting, abnormal joint flexibility, cardiovascular and respiratory de-conditioning, osteoporosis, etc.) (1). Despite its many positive effects, however, physical activity can lead to musculoskeletal and cardiovascular complications, especially if it is not performed under safely conditions. It 's the case, for example, of frail older persons, for whom a proper and balanced exercise program can be useful to reduce the risk of premature death, as well as the worsening of functional limitations and the development of disabilities (2). The possible occurrence of adverse events during the course of physical activity is significantly higher in patients with heart disease, in older, sedentary subjects and in individuals with a higher global cardiovascular risk (3). For these reasons, to take or prescribe effective and safe exercise programs, it is necessary to conduct a preliminary evaluation of the patient's health. This pre-assessment of health status consists of a set of investigations aimed at verifying the suitability of the individual to undertake a program of physical exercise under safety condition and at identifying the types of programs most appropriate to preserve the physical well being and to improve functional capabilities.

The procedures foresee an initial preventive screening, which must meet the criteria of efficiency, speed of implementation and applicability on a large scale.

Table I. III - Physical Activity Readiness Questionnaire (PAR-Q)
Reviewed by the Canadian Society for Exercise Physiology (2002)

Par-Q & YOU (Questionnaire of preventive screening for people aged between 15 and 69 years)

Fill out the following questionnaire honestly and accurately by using common sense and giving the answer YES or NO

YES	NO	
□	□	1. Did your doctor ever tell you that you have a heart disease and recommend that you only exercise with medical supervision?
□	□	2. Do you complain of chest pain when you exercise?
□	□	3. In the last month you have experienced chest pain while not exercising?
□	□	4. Have you ever lost your balance due to a feeling of confusion or have you ever lost consciousness?
□	□	5. Do you have a problem in your bones or joints that could be exacerbated by a change in your physical activity level?
□	□	6. Has your doctor ever prescribed medication for blood pressure or heart diseases?
□	□	7. Are you aware of any other reason why you should not performe physical activity?

• If there are one or more affirmative answers to questions by phone contact your doctor before you start exercising.

• If there are negative responses to any questions you can start physical activity slowly and increase intensity gradually.

Important Note: If your health changes during an exercise program, making it possible for a positive response to one of the above questions, talk with the professionals. If you are pregnant, ask your doctor before increasing their physical activity.

The aim is to identify subjects particularly at risk, especially the elderly, who often show many comorbidities and take drug therapy.

So we pay more attention to people with:

1. established medical contraindications to exercise;
2. multiple risk factors related to age and diseases;
3. symptoms which call for a specialist assessment of a second level, including the execution of more extensive instrumental testing;
4. clinically established disease whose exercise program requires the supervision of medical personnel.

With this regard, it should be remembered that preliminary investigations may consist of simple questionnaires, often self-administered, such as the PAR-Q (Physical Activity Readiness Questionnaire) which has been designed to be used before an exercise program of moderate intensity in subjects aged between 15 and 69 years

(Table I. IV). In general, these questionnaires contain quite simple and understandable questions and are reasonably efficient in highlighting possible conditions in which exercise might be contraindicated. In addition, even the American College of Sport Medicine and American Heart Association have published a questionnaire to analyze the relationship between health and physical activity (Table II.IV) (4). In the case the preventive screening shows a state of health that could jeopardize the safety of exercise programs, the person should be advised to consult a doctor or a specialist. Sometimes further diagnostic and instrumental investigations may be necessary. Evaluations may require the intervention of a specialist in cardiology, orthopedics, geriatrics, and include, along with medical history and examination, also additional diagnostic tests (X-rays, CT scans, MRI, ECG, Holter electrocardiogram; heart or vascular ultrasound scans, stress testing, spirometry, blood and urine tests).

Tab. II.III AHA/ACSM questionnaire for the preventive screening of health status.

Evaluate your health marking all true statements

Clinical history:
Have you had: X a heart attack X coronary heart surgery X angioplasty (PTCA)
X Pacemaker / implantable defibrillator X cardiac rhythm disturbances
X heart valve disease X heart failure X heart transplant X congenital heart disease
Symptoms:
X Have you ever experienced chest pain during exercise? X Have you ever felt the sensation of breathlessness? X Have you ever had dizziness, confusion or unconsciousness? X do you take drugs for the heart?
Other health conditions:
X Do you have diabetes? X Do you suffer from asthma or respiratory disease? X Do you feel burning or cramps in the legs when you walk short distances? X Have you musculoskeletal problems that limit your physical activity? X Are you anxious about the safety of physical activity? X Are you taking one or more drugs? X Are you pregnant?
If you marked any one of these statements, consult your physician before starting a physical activity. You may need to be followed by qualified medical personnel.
Cardiovascular risk factors:
X You are a man aged > 45 years? X You are a woman aged> 55 years, have you undergone hysterectomy, or are you in menopause? X Do you smoke or have you quit in the last 6 months? X Is your blood pressure higher than 140/90 mmHg? X You do not know your blood pressure. X Are you taking medication for blood pressure? X Are your blood cholesterol levels > 200 mg / dl? X You do not know your cholesterol levels. X Have your relatives had heart attacks or heart surgery before the age 55 (father or brother) or before 65 (mother or sister)
X Do you have a sedentary lifestyle (less than 30 minutes three days per week of physical activity) X Are you overweight by more than 10 kg
If you have scored two or more statements of this section, you should contact your physician before starting a physical activity. You can take advantage of the service offered by qualified personnel who will address the choice of a more appropriate exercise program.

None of the above:
You should be able to safely perform physical activity also without consulting your doctor or other qualified professional through a self-guided exercise program.

Contraindications to physical activity are represented by those conditions that limit the suitability of individuals to physical exercise as they expose them to a risk that is greater than the benefits that can be achieved.

Table III.III Main absolute contraindications to physical exercise (no exercise).	
Cardiovascular: • Unstable heart failure (signs and symptoms of heart failure at rest or during mild exercise) • Recent (< 3 weeks) acute myocardial infarction • Acute myocarditis, pericarditis and endocarditis • Unstable angina • Severe, uncontrolled hypertension (BP > 180/110 mmHg) • Cardiac or aortic aneurysm with surgical indication • Uncontrolled arrhythmias • Severe, symptomatic aortic stenosis • Ongoing thrombophlebitis or deep vein thrombosis • Recent (< 3 weeks) pulmonary embolism • Severe pulmonary hypertension (mean pulmonary arterial pressure> 55 mmHg) • A-V Block II or III degree • Resting heart rate higher than 100 bpm	Non-cardiovascular: • Acute infectious states, fever • Respiratory failure • Severe, uncontrolled dysthyroidism • Severe uncontrolled psychotic states • Severe anemia (hemoglobin < 8 mg / dl) • Poorly controlled diabetes (blood glucose > 300mg/dl or > 240mg/dl with ketonuria)

Contraindications are divided into absolute and relative. In the first case, the subject is completely excluded from exercise programs. In the second, however, may be admitted if (but only after a careful monitoring) to a custom program and under the careful supervision of qualified medical personnel.

The conditions that contraindicate exercise, either absolute or relative, are, in turn, divided on the basis of the patho-physiological mechanism in cardiovascular and non-cardiovascular (Tables III.III and IV.III).

Table IV.III - Main relative contraindications to physical exercise (starting exercise program only after medical control)	
Cardiovascular • Chronic stable ischemic heart disease • Resting ECG abnormalities previously known (pre-existing left bundle branch block, ventricular preexcitation syndrome, frequent extrasystoles) • High overall cardiovascular risk (age> 45 years, with 2 or more risk factors) • Recent pacemaker/defibrillator implantation • Anemia in patients with cardiac diseases • Aortic aneurysm without surgical indication • Atrial fibrillation with heart rate > 100 bpm	Non-cardiovascular • Severe obesity • Hepatic or renal failure • Reduced functional capacity (<4 METs) • Chronic lung disease (emphysema, chronic bronchitis, some forms of asthma) • Complicated diabetes (retinopathy, nephropathy, peripheral vascular disease, autonomic and peripheral neuropathy)

III.2 Criteria for the exclusion of older persons from Adapted Physical Activity (APA) programs.

Although adapted physical activity courses are, as stated in the very term, "adapted" to the various chronic diseases, not all individuals with chronic diseases can participate. In general terms, always keeping as valid the explicit instructions from the table above, the following criteria has been adopted for the exclusion from APA programs:

• severe cognitive impairment;

• acute medical conditions or exacerbations (vertebral fractures, contraindications cardio-respiratory exercise, etc.);

• inability to walk autonomously;

• inability to cooperate and interact within the group;

• inability to reach the gym autonomously or with family support.

Once individuals eligible for undertaking physical activity programs have been identified, precautions must be taken to reduce the occurrence of musculoskeletal and

cardiovascular complications during motor activities. It is useful to remember that the absence of blood pressure increase during the work and the slow recovery of heart rate (HR) and ventilation after a bout of exercise are indicative of an impaired cardiovascular response. In particular, before starting each session of physical activity, it is essential to check the clinical stability of the individual and exclude the presence of lower limb edema, dyspnea, impaired balance with postural instability, chest pain, bluish skin (cyanosis), presence of whistling and wheezing (asthma). If these clinical signs are present before starting the exercise, or if they appear during the exercise, it is mandatory to contact the medical practitioner. During exercise, it is important to monitor vital signs to ensure that the blood pressure does not increase above 180/100 mmHg, that the heart rate does not exceed the target values and that the subject does not experience arrhythmias; these circumstances would entail discontinuation of the session and the intervention of the physician (cardiology visit, ECG, O2 saturation).

A safe physical activity program should include at least three phases: warm-up, exercise and cool-down. The warm-up should be progressive and involve both muscle and cardio-respiratory activities. In this way, it is possible to prevent musculoskeletal damages and reduce cardiac symptoms (5). The exercise should be tailored, with regard to intensity, frequency and duration, to the subject and gradually increased over time according to the functional capacity of the subject. The cool-down phase, or post-exercise cooling, increases the venous return to the heart in the recovery phase, avoiding hypotension. Finally, to safely perform a physical activity program, environmental conditions should also be taken in the due account. In fact, in too warm environments, heart rate and myocardial oxygen demand significantly increase. This phenomenon is accentuated in the presence of a concomitant dampness. Accordingly, in this environment, it is recommended to maintain adequate hydration, reduce the intensity of exercise and wear light clothing. Conversely, physical activity in cold environments causes an increase in cardiac output and work and produces vasoconstriction. The resulting increase in peripheral vascular resistance and blood pressure, associated with a reduction of coronary perfusion due to spasm, may induce a state of silent or symptomatic cardiac ischemia (6).