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Exercise recommendations for older adults with diabetes fragile and robust

Global data on population age indicate that the world is moving towards an increasingly aging society. The World Health Organization (WHO) estimates that by 2030, 1 in 6 people will be older than 60 years, and by 2050, the population aged over 80 will reach 426 million people (1).

Spain is one of the countries experiencing the fastest aging. In 1900, there were 967,754 people older than 65 years. This number rose to 6,740,000 in 1999, and it is projected to reach 12 million by 2050.

But what is aging? From a biological perspective, aging is the result of molecular and cellular damage caused by the passage of time. The changes that occur are not homogeneous across all individuals, and their relation to a specific age is relative. It is a natural, dynamic, and inevitable process, characterized by individual changes, psychological changes, and social changes (2).

ROBUST VS ELDERLY ELDERLY

Regarding the evolutionary process of aging, it is necessary to differentiate concepts such as "healthy or robust elderly" and "fragile elderly."

A **healthy elderly person** is one with preserved functional abilities, independent in all activities, without mental or social disorders, and without illness. »

AS PILLARS IN THE PROCESS OF HEALTHY AGING, WE MUST PAY SPECIAL ATTENTION TO THE INDIVIDUAL'S EMOTIONAL WELL-BEING, ADEQUATE NUTRITION, AND PHYSICAL EXERCISE.

» In contrast, a **fragile elderly person** is highly vulnerable to becoming dependent. This is due to chronic multimorbidity and a reduced ability to cope with both acute and chronic stressors.

Therefore, **comprehensive geriatric assessment** is an essential tool at this stage of life, as it allows for the identification of health problems and the treatment of individuals in a holistic and individualized manner according to their needs. The assessment should be functional, cognitive, emotional, and nutritional, also considering comorbidities, geriatric syndromes, and polypharmacy. It is necessary to detect frailty as early as possible, so opportunistic screening is recommended for anyone older than 70 years. We should guide individuals towards healthy aging and try to avoid or delay, as much as possible, the transition from a robust elderly person to a fragile one. For this, it is crucial for health care professionals to support active aging, promoting and improving each patient's capabilities with the goal of impacting their quality of life (3).

As pillars of healthy aging, special attention should be paid to the individual's emotional well-being, proper nutrition, and physical exercise. These 3 concepts are not only highly useful at this stage but also help us manage chronic conditions that have higher prevalence in older age, such as diabetes (4). Here we will be focusing on the importance of exercise.

DIABETES AND EXERCISE

Physical exercise is part of the non-pharmacological treatment of diabetes. It should be a comprehensive part of the treatment as it provides numerous benefits such as increased insulin sensitivity, which promotes glucose uptake by the muscles and improves glycemic control by lowering hemoglobin A1c levels (4).

Health care professionals who work with diabetic people should prescribe physical exercise at all stages of life, with particular emphasis on the aging stage. Due to the physiological changes of this stage, loss of strength and muscle mass is common. When this occurs, it is called **sarcopenia**, which is associated with increased mortality in older adults. Therefore, physical exercise intervention is crucial to prevent major complications and achieve the above-mentioned benefits on glycemic control. Additionally, balance exercises should also be included in this population group, as they have been shown to reduce fall risk by 30% in older patients (3).

A proper clinical interview and correct patient assessment are necessary for personalized exercise prescription. The goal is to achieve at least 150 minutes of activity per week. Strength exercises should be performed at least twice a week to prevent muscle loss. We must raise awareness about the importance of avoiding sedentary behavior, meaning not spending prolonged periods of more than one and a half hours routinely lying down, sitting, or reclining. The person should lead as active a life as possible and break up sedentary periods with "active breaks." When prescribing exercise, it is essential to determine if the person has any contraindications for performing it. It is important to explain warning signs and symptoms and when to stop exercise, such as in patients treated with insulin or secretagogues. These drugs can cause hypoglycemia, so **recommendations for safe exercise practice should be provided, tailored to glycemic control targets**. It is important for the person to know what glucose levels are safe to start exercising, depending on the type of exercise and its duration. Additionally, as mentioned earlier, exercise increases insulin sensitivity, which can lead to hypoglycemia not only during exercise but also up to 8 hours afterward. Therefore, it must be considered that the person may need fewer units of insulin after exercise (5,6).

Once the clinical situation of the patient is analyzed, if they are a **robust elderly person**, various types of exercise can be considered:

Aerobic exercise involves large muscle groups, has cardiovascular benefits, and a greater hypoglycemic effect. It improves cardiorespiratory function, peripheral circulation, and nervous system plasticity, positively impacting mood and reducing pain when present (7). This group of exercises includes walking, Nordic walking, running, swimming, or cycling. Walking is one of the most common activities among the elderly, but there is controversy about the number of steps one should take daily. A recent meta-analysis from the European Society of Cardiology demonstrated an inverse association between the number of steps and mortality from all causes and cardiovascular mortality. It states that walking about 4000 steps per day reduces mortality from all causes and 2300 steps reduces cardiovascular mortality. Increasing daily steps by an additional 1000 further decreases cardiovascular mortality risk by an additional 15%, showing that walking has notable health benefits (8). »

» **Strength exercises** focus on muscle strengthening, which is very useful for this population profile to prevent sarcopenia and has a lesser hypoglycemic effect compared to aerobic exercise. These exercises include climbing stairs, lifting, or moving weights. It is recommended to schedule this type of exercise by muscle groups, with several repetitions and at least a couple of times a week.

It is essential to emphasize that if clinical assessment identifies a **frail patient, therapeutic exercise** should be used (9). This involves not only aerobic and strength exercises adapted to the individual's vulnerability but also balance exercises, especially in the presence of diabetic polyneuropathy. In this case, difficulties arise in performing exercises due to sensory inaccuracies in detecting floor irregularities and controlling the position of the ankles and feet on the support surface (10). Scientific evidence shows that, although the risk of falling increases notably from age 70 in the general population, this happens from age 55 in diabetic people with (11). In such cases, exercise with weight-bearing and swimming are excellent examples. However, it is advisable to maintain weight-bearing exercises that preserve skills necessary for daily functionality. Therefore, **balance** »

» **or sensorimotor exercises** should be prescribed because they are gentle, involve feet on the ground without impacts, are performed slowly, and specifically train the skills needed to maintain adequate stability. A combination of all these types of multicomponent exercises (aerobic, strength, and sensorimotor) helps frail individuals maintain their functional abilities and improve their quality of life.

Exercise should be tailored to each person by analyzing intensity parameters, including oxygen consumption and cardiac effort, or a simpler measure, perceived effort. The presence of diabetes-related complications and comorbidities strongly influences the type of exercise to be performed, so the involvement of a health care professional is essential. When individualizing the type of exercise, it is always necessary to discuss various aspects of the patient's reality:

- What exercise they prefer to do to ensure it is recommended for their clinical situation.
- When they will do it.
- How often they will do it.
- How they will carry it out.

It is important to remember that another benefit of exercise is **improving cognitive function** (12). To preserve quality of life as the years go by, it is valuable to care for various aspects of health that contribute to daily functionality. The ability to prescribe exercise tailored to each patient's specific needs becomes an indispensable and even enjoyable tool when the planning is appropriate. It is recommended that the person shares their preferences and motivations for exercise, as motivation for change must come from the individual and is closely related to therapeutic adherence. D

CONCLUSIONS

The aging process is an inherent aspect of human existence and the passage of time, though it does not occur uniformly or at the same age for everyone. One of the challenges for health care professionals, as the population continues to age, is to support individuals in achieving active aging. Physical exercise plays a fundamental role in this process.

Engaging in aerobic exercise combined with strength training in robust elderly populations provides numerous benefits and helps to mitigate frailty. Once frailty is established in a patient, it should not prevent them from exercising. It is essential to adapt exercise to associated complications and any chronic conditions the person may have to maintain as much independence as possible and ensure a better quality of life. In these cases, in addition to aerobic and strength training exercises, balance or sensorimotor exercises become a highly valuable tool.

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