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Review article

Benefits of physical exercise in postmenopausal women

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ABSTRACT

Physical inactivity not only places women's health at risk during menopause, but also increases menopausal problems. Abundant evidence links habitual physical exercise (PE) to a better status on numerous health indicators and better quality of life and to the prevention and treatment of the ailments that typically occur from mid-life onwards. We can infer that PE is something more than a lifestyle: it constitutes a form of therapy in itself. A panel of experts from various Spanish scientific societies related to PE and menopause (Spanish Menopause Society, Spanish Cardiology Society, Spanish Federation of Sports Medicine) met to reach a consensus on these issues and to decide the optimal timing of and methods of exercise, based on the best evidence available.

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1. Introduction

Physical inactivity not only places women's health at risk but it also increases menopausal problems. Abundant evidence links habitual physical exercise (PE) to a better status on numerous health indicators and better quality of life (QoL) and to the prevention and treatment of the ailments that typically occur from mid-life onwards. We can infer that PE is something more than a lifestyle: it constitutes a form of therapy in itself [1].

The aim of this review is to determine the benefits of PE after the menopause, the requirements and measures that are needed for starting PE and the characteristics of optimal PE.

2. Methods

A panel of experts from various Spanish scientific societies related to PE and menopause *(Spanish Menopause Society, Spanish Cardiology Society, Spanish Federation of Sports Medicine)* met to reach a consensus on these issues. Each society chose which of its members would participate in the reviewing and drafting of this guide. All participants approved the final version of the manuscript. The panel developed its own recommendations and clinical practice guidelines (given at the end of this paper). The GRADE (*Grading of Recommendations Assessment, Development and Evaluation)* system is used to classify the quality of the evidence and the strength of the recommendations [2].

2.1. Bone effects

Most of the available evidence concentrates on analysing the factors associated with bone strength and the risk of falling, both of which can be affected by PE. A *meta*-analysis of 22 cohort studies that included a total of 14,843 fractures showed a reduced risk of fractures in 29% of subjects [3]. Other *meta*-analyses had similar findings and suggested that the prevention of fractures results from the reduced risk of falls [4,5].

It is unclear which modality of PE is most beneficial for bone health. Although the issue requires future investigation, studies are beginning to examine the most suitable types of PE. These have considered factors such as the subject's age and the intensity, duration, and continuity of PE. For example, the precise effects of vibrational PE, which subjects the spine and leg bones to repeated impacts, on bone mineral density (BMD) depend on the age of the participant. Some analyses have found no differences between this type of exercise and conventional PE [6]. A recent *meta*-analysis found that only combined resistance exercise protocols (defined as the combination of resistance training and high-impact or weight-bearing exercise) appear effective for preserving femoral neck and lumbar spine BMD in postmenopausal women, whereas resistance-alone protocols produce a non-significant positive effect [7].

Some common PEs, such as swimming and cycling, avoid the weight-bearing nature of impact PE, and studies have shown that the BMD of subjects who perform these types of PE is similar to that of a sedentary population and inferior to that achieved with impact PE [8,9].

Finally, walking, which is likely the PE that most menopausal women prefer, has not shown a protective effect on BMD, even in the long term [10].

In summary, according to the available evidence, it is undeniable that PE has a positive impact on bone health that is more evident with combined PE (impact plus resistance), although non-impact PEs also improve balance and reduce the risk of falls.

2.2. Sarcopenia

It is estimated that the prevalence of sarcopenia in postmenopausal women is 10–40% [11], and although it can result from other conditions, one of the principal causes is hypoestrogenism [12]. During menopause, women experience a deterioration of balance that is related to android-type fat distribution and low BMD; the loss of balance in turn increases the frequency of falls [13].

In addition to its effects on bone health, PE is a principal strategy for preventing and treating sarcopenia. Progressive resistance exercise (PRE) training programmes increase muscle mass and function; improve flexibility, balance, and physical function; and correct disability [14,15]. As a strategy for improving balance and reducing the risk of falls, PE is especially successful when combined with *balance-training programmes* or aerobic exercise [16], although it is not the only strategy available.

PE programmes based on virtual reality, which are considered alternatives to conventional PE, have been associated with improvements in the postural control of older individuals [17].

Other recently popularized types of PE (e.g., Pilates) also show benefits in relation to both balance and falls [18]. Step training and whole-body vibration training can improve function and restore balance, but not strength, in older individuals [19]. Recently, exercises that incorporate electrical muscle stimulation, and that result in increased muscle mass and maximal isometric strength, have also shown these benefits [20].

2.3. Cardiovascular and metabolic effects, and weight

PE reduces the risk of cardiovascular mortality in postmenopausal women and is a recommended means of prevention. PE has a dose-dependent benefit; that is, the level of physical fitness exhibits an inverse relationship with mortality [21].

PE in postmenopausal women attenuates arterial ageing, in that it causes functional and structural vascular adaptations that help to maintain normal or to lower high arterial pressure. It has been observed that individuals who train frequently exhibit less

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