



Physical Training and Osteoarthritis: A Mini Review

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Abstract

Physical conditioning is not effective as the disease progresses. However, patients with this condition have some clinical and orthopedic particularities that require care when preparing for physical exercise. In addition, by the adjustment itself, health professional adjustment, is a health professional adjustment change, which must be the first period of months. In short, due to its benefits, this form recommendation must be individualized to its benefits.

Keywords: Physical Exercise, Osteoarthritis, Joint.

Introduction

Osteoarthritis, a degenerative joint disease characterized by high prevalence in both men and women and by considerable expenses in the treatment, is in fact, a public health problem [1]. Therefore, there is a growing demand for the study of prevention methods and treatment. Regarding the etiological factors, it is known that some of them, such as obesity, metabolic syndrome, sarcopenia and chondral microlesions, are preventable, either directly or indirectly, through physical activity [2]. It is worth noting, therefore, that physical exercise is not only a therapeutic measure, but it also prevents degenerative joint changes. In its pathophysiology, osteoarthritis has biological and mechanical changes [3]. The approach to both alterations is necessary in order to achieve success in the treatment. Some examples of direct action on the biological factors are the chondroprotectors (or nutraceuticals), viscosupplementation and physical exercise. Regarding the mechanical factors, external devices such as braces and insoles, as well as physical activity are relevant. It is noted, thus, that physical exercise is a common factor for both, so the importance of this measure is emphasized both in conservative

treatment and in the post-operative period of any joint procedure (with joint replacement or not) of degenerative pathology.

The Importance of Physical Activity in the Pathophysiology of Osteoarthritis

In general, osteoarthritis is associated with a broader pathophysiological picture, and not just with an isolated joint occurrence [2]. It is related to different metabolic pathologies and systemic inflammatory changes, which will favor the onset and especially the perpetuation of the degenerative joint condition [4]. This is one of the reasons that justify the benefits of physical exercise for patients with osteoarthritis. It is a fact that with age, an increase in sedentary behavior naturally occurs, with a consequent decrease in energy expenditure and the emergence of obesity. In addition, both age and obesity will directly trigger, for metabolic and mechanical reasons, the onset of osteoarthritis. These factors, together, are involved in a more comprehensive picture of decreased muscle strength, chronic inflammation and metabolic diseases, known as osteosarcopenic obesity [3,4]. Therefore, this important interaction between metabolic and mechanical factors in the

genesis of osteoarthritis is noticeable, and physical inactivity is the main factor to trigger this entire cascade of events. Thus, physical activity promotes anabolic responses for both, bone tissue and muscle tissue, in addition to stopping the factors of cartilage wear natural of age, and preventing the emergence of obesity, which will naturally inhibit the inflammatory process that leads to the onset and perpetuation of degenerative joint changes [5].

An approach to physical training for patients with osteoarthritis: an overview

Literature shows that, for patients with osteoarthritis, resistance exercises are the most effective to treat sarcopenia (or more precisely, dynapenia), a pathology that is closely related to the genesis of osteoarthritis [6, 7]. However, it is always important to make it clear to the patient that the beneficial effects of any physical training program will occur in the long term, after an average period of three months, and that at the beginning the pain may be intense. This information is essential even in a preventive way, as the interruption of the exercises is very common at the first stage of pain intensification. Therefore, the active participation of the health professional is important in the sense of informing the patient about pain neuroscience and clearly explaining the natural evolution of the process. Moreover, the patient with arthritis is usually an elderly person, with different physical and psychological limitations, and sometimes having been sedentary during all his/her life, which triggers a condition of kinesiophobia, that is, a fear of physical exercise. Therefore, the professional working with this patient should understand that the complex interaction between these physical, social and psychological factors may be one of the causes of failure of the treatment. However, it is also important to consider that aging is associated with a greater anabolic resistance [8], motivated by higher protein catabolism, lower blood perfusion of the skeletal muscles and lower sensitivity of the enzymes responsible for muscle hypertrophy.

Thus, in order to gain muscle mass, a greater concern with the nutritional aspect will be necessary, based, for example, on protein (or amino acid) supplementation to stimulate the anabolism. This supplementation must be individualized, according to the lifestyle and underlying pathologies of the patient with osteoarthritis.

Physical Training Approach for People with Osteoarthritis: Specificities of Each Body Segment

Regarding spinal osteoarthritis, it is known that physical training is essential for pain relief and should be focused on a multiprofessional approach. The main options of modalities are yoga, pilates, hydrotherapy and resistance exercises [7]. For patients with upper limb arthritis, the literature shows a greater scarcity of studies related to physical training [9,10], and the available studies focus mainly on resistance exercises, which show low evidence of improvement of function and pain in the short term and moderate evidence of improvement of function in the medium and long term. For arthritis of the lower limb segments, on which the literature presents more robust results [11-13], it is observed that the best

outcomes occur through the association of flexibility, strength and low-impact aerobic training. Moreover, as already mentioned, the improvement occurs in the medium and long term, around the third month after the beginning of the training, as long as it is prescribed in moderate intensity and at least three times a week. However, of all these exercises, the one that in isolation brings the best benefits are the resistance exercises, which should also be prescribed at moderate intensity and with special attention to the lumbo-pelvic-hip complex [12]. It is known that there are no benefits of this training in high intensity, as it occurs, for example, in high intensity interval training (HIIT) programs, whose most popular example today is CrossFit® [14].

For patients with more severe osteoarthritis, without surgical conditions or indications, the literature is scarcer, but it shows evidence of good results with Tai Chi Chuan training, which helps to improve functional parameters [15]. Another option is resistance exercises with restricted blood flow, also known as ischemic preconditioning, which are based on the performance of exercises with low load and that, due to the restriction of blood flow, there is the formation of a biochemical environment favorable to anabolism [16]. For cases in which surgical treatment is indicated, physical exercise is also indicated as a preoperative preparation measure, through physiotherapy or physical training, because it leads to better functional results after surgery [17]. In the postoperative period, exercises should also be prescribed, but according to the procedure performed. In general, joint replacement surgeries lead to better satisfaction regarding pain levels, but they limit the patient more regarding exercises, unlike the patient submitted to a surgery without joint replacement, such as osteotomies, which allow for a greater variety of exercises after the rehabilitation phase [18].

General Aspects of Training Prescription

The rational prescription of physical training must be based on the patient's cardiorespiratory function and joint limitations [19]. Regarding joint, the presence of biological factors, such as joint effusion, and/or mechanical factors, such as axis deviation and limited range of motion, may limit the functional performance of the exercise [20]. Modalities characterized by high-intensity repetitive exercises and plyometric movements are contraindicated to these patients, at least in the initial phase of musculoskeletal adaptation to training [20]. Starting sports practice with these modalities will cause an important exacerbation of the pain and may even inhibit the continuity of the exercises. As a whole, but always aiming to optimize the prescription according to the patient's clinical condition, resistance training should be focused on performing a greater number of repetitions (e.g.10 to 15) in low to moderate intensity (40 to 60% of one repetition maximal), two to three times a week. Both open and closed kinetic chain exercises can be prescribed, always being attentive to maintaining a protective amplitude of the patellofemoral joint and the patient's joint specificities [21]. Low-impact aerobics training, such as cycling and swimming, should be part of every training protocol.

As for exercises with higher impact, for example, running and walking, they can be more safely prescribed when there is a more satisfactory muscular base for articular supporting. Walking is seen here as a form of systematic training, with progressive intensities, and not just daily walking. Some basic precautions in any physical activity, such as type of flooring, adequate footwear, satisfactory temperature, should be observed with special attention to the population with osteoarthritis. The progression of the training should be based on clinical evolution, individualized, based mainly on the pain disproportionate to the exercise [22].

Final Considerations

Osteoarthritis is a pathology with high exercise morbidity in its evolution and advanced stages, which is mitigated by the practice of specific physical exercise for the affected body segment. Among all forms of training, resistance training stands out in terms of intensity and brings a series of benefits to patients with degenerative joint disease.

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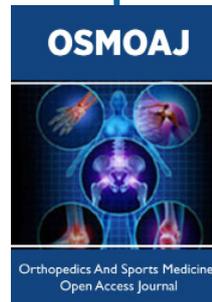
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