Editorial

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Can exercise ease the burden of hip osteoarthritis?

"Hip osteoarthritis is a common progressive degenerative joint disorder…"

Keywords: dose–response relationship • exercise • hip osteoarthritis

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Description

Hip osteoarthritis (OA) is a common progressive degenerative joint disorder, particularly in the elderly population. Clinical symptoms of OA include joint pain, stiffness and swelling, which may lead to muscle weakness and impaired muscle function [1,2]. Several risk factors are related to the onset and progression of hip OA such as genetic disposition, musculoskeletal comorbidities, previous trauma, age, occupational activity, obesity and muscle weakness [3–5]. Although originally characterized as a noninflammatory disease, current research suggests that proinflammatory mediators are key drivers in the onset and progression of the disease [1,6]. Some of the aforementioned factors co-vary, hampering to assess their independent effects on the pathogenesis of OA [1,3,5].

Treatment strategies for hip OA

Whereas disease modifying antirheumatic drugs have revolutionized treatment in rheumatoid arthritis, to date no pharmaceutical agent has been approved for the prevention and treatment of disease progression in OA [6]. Therapeutic treatment therefore aims for reduction of pain and physical disability [3]. Total hip replacement is recommended in advanced disease status if conservative treatment strategies do not provide adequate pain relief and improvement in physical functioning [2–7]. Up to that point conservative treatments should extensively be used. Management of OA incorporates a combination of pharmacological and nonpharmacological treatment strategies. Interventions that can be driven by the patients themselves should be given priority, as OA is a chronic disease necessitating a lifelong therapy [2–7]. Physical exercises are an important example of such self-dependent operable therapeutic interventions.

Definition & aims of exercise interventions

The idea of exercises in the context of therapy is to use the diverse instruments of physical training and sports to compensate and to regenerate physical, mental, as well as social functions. Exercise therapy further aims for preventing secondary damage, and is intended to foster health-related behavior [8]. As mentioned above, exercises in the context of hip OA primarily focus on pain reduction and an increase in physical functioning as well as health-related quality of life.

How the intervention might work?

Mechanisms of exercise in the treatment of hip OA may be related to its potential influence on modifiable risk factors as well as clinical symptoms of the disease [3]. Possible mechanisms of action are related to an exercise-induced improvement of the mechanical environment of the joint and an accompanying reduction of nonphysiological stress put on the joint. Furthermore, a reduction of local inflammation in adipose tissue and cartilage may be a potential pathway of the intervention. From a systemic perspective, exercise is generally considered anti-inflammatory and therefore may be an important treatment for reducing OA risk related to inflammatory mechanisms, especially in overweight patients with metabolic inflammation [3,4,9].

Future Medicine part of fsg

Efficacy of exercise interventions

Exercise is an effective intervention for pain reduction in hip OA with small-to-moderate effect sizes (ES: 0.38; 95% CI: 0.20–0.55). These are comparable to ES for pain reduction of oral unselective nonsteroidal anti-inflammatory drugs [3–10]. Exercise is superior to placebo or sham treatment [2,11,12]. It may even have positive effects on disease progression [13]. According to current meta-analytical data, ES of exercise intervention is equivalent to 8 points (95% CI: 4–11) in pain reduction on a 0 to 100 scale compared with control. Similar effects are described for physical function (ES: 0.30; 95% CI: 0.05–0.54). Improvement of physical function is equivalent to 7 points (95% CI: 1–12) on a 0 to 100 scale. Pain reduction and improvement of physical function is sustainable even 3–6 months after ceasing the monitored exercise regime [3].

> "Aquatic as well as land-based exercises such as resistance training and aerobic exercises are recommended..."

Exercise type & setting

Aquatic as well as land-based exercises such as resistance training and aerobic exercises are recommended in the treatment of hip OA [14]. Different settings can be used to introduce patients into physical exercises: aside from individual treatments on a one to one base, group sessions, home training as well as a combination of the aforementioned settings are feasible options. According to the variety of possible exercise types and settings, individual preferences, personal factors (i.e., pain, exercise related experiences, self efficacy) as well as environmental factor (i.e., access to exercise facilities or providers) have to be taken into account when choosing the right exercise regime. Despite this general assumption, it seems reasonable to combine aerobic exercises and resistance training, as both intervention types have different mechanisms of action in the treatment of OA and may therefore influence different disease related risk factors [15].

Dose–response relationship

There are still a huge number of uncertainties regarding the optimal exercise program which can be characterized by frequency, intensity, time and type of the intervention. Yet some evidence based standards for knee and hip OA should be outlined to allow physiological training adaptations: exercise programs should have a minimum of 12 training sessions and should be performed at least two to three-times a week. For aerobic exercises, longer interventional periods are associated with better outcomes [16]. Moderate as well as high intensities for strength training are efficient yet higher intensities are associated with increased strength [17].

The intervention should consider progressive training loads. Booster sessions following a prior monitored training intervention allow renewed adaptations in terms of pain reduction and improvement of physical functioning [18,19].

Sustainability of exercise interventions

Encouragement for the initiation and maintenance of exercises on a regular base are prerequisites for long-term benefit. Besides the importance of verbal support and motivation of patients by health professionals, behavior-oriented measures such as goal setting, training logs, etc. can be used to foster exercise adherence [20]. Knowledge transfer about disease management as well as the structuring of training is another important aspect and should be included in the context of exercise therapy to increase self efficacy, thereby qualifying patients for autonomous health related behavior and exercise [7,21].

Contraindications & exercise-related adverse events

Only few absolute contraindications exist for exercise therapy in hip OA. These are mainly related to comorbidities such as cardiovascular diseases or acute functional impairments of the musculoskeletal system with noticeable impairments of the load-bearing capacities.

Exercise therapy basically seems to be a save intervention as reports of adverse events are rare. Nevertheless, moderate increase in pain can potentially occur especially at the beginning of the training program [2,3,22]. Pain monitoring may be a valuable tool to control exercise related pain which should decrease to the pre-exercise pain level by next day [22]. If exercise leads to a sustainable pain increase, training should be adapted by changing its type, intensity, frequency or volume according to the assumed reason for pain increase. Health professionals should be consulted in case of uncertainty.

Future research topics

Many open questions still have to be answered in the context of exercise therapy in the treatment of OA. Aside from long-term effects of exercise therapy, optimum dose–response relationships as well as the definition of favored types of exercises should be investigated in consideration of the underlying population and related covariates for effectiveness such as disease severity, age, self efficacy, body weight, comorbidities and personal preferences. Characterization of responders and non-responders to specific exercise regimes may enable health professionals to recommend an optimal exercise regime on an individual basis. Further, important aspects of the research agenda are related to basic research. Under-

standing the mechanisms of action of exercise therapy in the treatment of OA allows target-oriented interventions: how do exercises influence joint and body composition, mechanical joint load, local and systemic inflammation, psycho-social effects on treatment efficacy etc.

Conclusion

Exercise can reduce the burden of hip OA. This has been demonstrated for strengthening, functional, aerobic exercises as well as aquatic exercises. To have a say in the matter, it is crucial to account for sufficient exercise volume and frequency and to foster long-term adherence. Both are prerequisites for sustainable treatment effects.

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