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Physical Therapy and Rehabilitation for Hip Osteoarthritis

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Hip osteoarthritis（OA）is one of the most common joint diseases and causes disability, including pain and the limitation of activities and participation in the elderly. The Japanese Hip OA guidelines were revised in 2016 based on a systematic review of research and the consensus opinions of the experts of the Japanese Hip Society. Physical therapy and rehabilitation are the core interventions prior to considering joint surgery.

Patient education is recommended to facilitate understanding of the disease and to relieve symptoms, if combined with exercise therapy. Exercise therapy is recommended for improving pain and physical function in short-term follow-up studies; however, there is little evidence for its long-term effectiveness. Manual therapy, spa therapy, and ultrasound effectively improve symptoms in the short-term; however, their long-term effectiveness is unclear. Walking aids such as canes, crutches, and walkers are recommended to relieve pain; however, their long-term effectiveness is also uncertain.

Key words: hip osteoarthritis, physical therapy, rehabilitation, physiotherapy

Osteoarthritis（OA）is the most common joint disease, mainly affecting elderly people. People with hip OA experience pain and deconditioning that may lead to disability. Treatment goals include controlling pain, preserving functional independence, and improving quality of life（QOL）. Exercise therapy is a substantial element in all guidelines for the management of hip OA.

Patient education（PE）, exercise therapy, orthoses, and assistive devices such as canes, crutches, and walkers can be used additionally in a multimodal therapeutic program. Although therapeutic ultrasound, neuromuscular as well as transcutaneous electrostimulation, pulsed magnetic field therapy, low-level laser therapy, thermal agents, and acupuncture have been used to treat hip OA［1］, the effectiveness of these modalities are limited. Those therapies should be used in combination with exercise therapy and patient education.

Guidelines are often updated, and OA guidelines are no exception. The Japanese Hip OA Guidelines［2］were updated by the Japanese Orthopaedic Association and Japanese Hip Society in 2016. This review introduces new recommendations in accordance with some international guidelines and the Japanese Hip OA Guidelines.

Patient Education and Self-management

Patient education（PE）includes helping patients understand the disease and the anatomy of the hip joint, teaching them how to improve their living environment, instructing them in weight management and the activities of daily living, guiding them to use a cane and an orthosis, telephone counselling to support patient's lives, and instructing them regarding home exercise. There have been a few reports of PE independent of physical therapy, in terms of improving pain. There have been many reports of PE in the broad sense, including physical therapy; these studies showed that PE was effective for improving pain before and after hip surgery［3-6］.

Patients who received education were significantly less anxious just before surgery than patients in the control group［3］and used fewer non-steroidal anti-inflammatory drugs than did the controls［4］. On

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the other hand, PE in the narrow sense alone did not significantly improve pain, function, and QOL in patients with hip OA [7, 8].

Those studies have some limitations. First, education method and tools were not unified, so that variations in the methods made objective evaluation difficult. Second, the follow-up period was shorter than 5 years, so that we cannot conclude the long-term effects of PE. Third, most of the studies dealt with patients that had both hip OA and knee OA in the same series, and the number of patients with hip OA was so small that the effects of PE for hip OA were not clear.

Exercise and Physical Therapy

Current international guidelines for the recommendation of therapeutic exercise for hip OA are based on limited evidence [1, 9, 10]. Those recommendations were based mainly on expert consensus because there were no studies by randomized controlled trial (RCT) with standardized methodology and sufficient number of the patients with hip OA. Exercise improves pain, the muscle strength of lower extremities, physical function, the stability of the hip joint, and the range of motion (ROM). Several studies have significant evidence supporting the efficacy of exercise for improving pain and function of the hip joints [7, 11-13]. Although most studies have reported the short-term effects of exercise, some recent studies have indicated relatively long-term effects (longer than 5 years) [14, 15]. Low-impact exercises, including both land-based exercise (e.g., aerobic exercises and muscle strengthening exercises mainly for hip abductors and quadriceps) and water-based exercises were recommended [16] and were applicable to any stage of hip OA. A study showed that exercise therapy in addition to patient education could reduce the need for total hip replacement by 44%, with a 6-year follow-up of a randomized trial [15].

Adherence to a recommended home exercise plan is an important key to obtaining better treatment outcomes regarding pain, physical function, and QOL. Recently, it was demonstrated that the integration of operant behavioral graded activity (BGA) and booster sessions results in better exercise adherence and a more physically active lifestyle, both during and after the treatment period [14]. BGA treatment is an individually tailored exercise program in which patients' most problematic physical activities are gradually increased [14]. Significant differences in favor of BGA were found at 3-month (pain and physical performance) and 9-months follow-up (pain, physical function, patients' global assessment, and patient-oriented physical function). Furthermore, the control group (usual exercise therapy) required more joint replacement surgeries as compared to the BGA group (hazard ratio [HR], 2.87; 95% confidence interval [CI], 1.1; 7.3) [14].

In 2004, Hiromatsu and Inoue, *et al*. introduced a new method, "jiggling", as a conservative treatment for hip OA and reported that some cases recovered their joint space, even patients with end-stage OA [17]. However, no studies demonstrated significant evidence for "jiggling", therefore, a multi-center study with an RCT design is being planned for Japan.

There is no consensus regarding the strength, frequency, and duration of exercise therapy. RCT studies with good quality are expected.

Physiotherapy

Manual therapy is intended to improve musculoskeletal function and pain caused by impaired kinematics of the joint, which, in OA, can be affected by joint capsule contracture, loss of periarticular flexibility, and increased intracapsular pressure [18]. Manual therapy primarily consists of manipulation and stretching. However, although manual therapy provided benefits such as the improvement of pain and physical function, there is little evidence for its long-term effectiveness [19]. A combined intervention of manual therapy and patient education was more effective than a minimal control intervention [8]. Manual therapy is conditionally recommended in combination with exercise supervised by physical therapists [20].

Although spa therapy is frequently used to soothe pain and relieve suffering in patients with OA and rheumatoid arthritis, there is little evidence for its effectiveness with hip OA patients [21, 22]. The scientific evidence is weak because of the poor

methodological quality of studies and the absence of adequate statistical analysis.

Ultrasound (US) is assumed to have thermal and mechanical effects on tissues, resulting in increased local metabolism, circulation, and extensibility of the connective tissue [23, 24]. There have been no studies regarding the effectiveness of the independent use of US in hip OA. The addition of US to traditional physical therapy showed a longitudinal positive effect on pain, functional status, and physical QOL in patients with hip OA [24].

There were no high-quality studies of transcutaneous electrical stimulation and electromagnetic therapy in patients with hip OA.

Walking Aids and Hip Orthoses

Walking aids such as canes, crutches, and walkers were generally recommended as needed for hip OA, based on expert consensus [20, 26]. Clinical and biomechanical evaluations of canes and walkers confirmed that these devices could improve balance and mobility. By decreasing weight bearing on one or both legs, walking aids may also help alleviate pain. The use of a cane or walker to rapidly generate a stabilizing force in reaction to externally applied balance perturbations was expected [26].

Hip orthosis has gained little attention historically, and there have been no RCT studies. An S-form hip brace of the Wakayama Medical College type has been developed for patients with hip OA [27]. This brace was designed to reinforce the hip joint; permit flexion, extension, and abduction; correct inadequate position of the limb; and prevent upward and outward movement of the femoral head. Sato *et al*. made the S-form brace lighter and gave it a more concise form and named the WISH-type orthosis [28]. They reported that gait pain relief was obtained immediately and dramatically in all patients, providing high compliance. Approximately three-fourths of patients acquired independence from analgesics [28]. Orthoses are used to a limited extent for pain relief and functional improvement for patients who wish to postpone surgery or who cannot receive surgery due to complications.

DISCUSSION

In the terminal stage of hip OA, total hip replacement is a beneficial and cost-effective treatment [29, 30]; however, a long-term cohort study has demonstrated that only 20% of patients with radiographic hip OA have had surgery 11-28 years after their initial diagnosis [31]. Therefore, non-surgical interventions with documented effectiveness become essential for patients who do not choose surgery or who want to postpone surgery.

Although guidelines recommend patient education and exercise therapy as core interventions [2], recommendations are not sufficiently specific about the content, intensity, frequency, duration, and mode of delivery. The research evidence for hip OA was poorer than for knee OA because the number of hip OA patients and RCT studies was smaller. Multicenter studies by multidisciplinary groups of experts in this country are needed to identify and revise the recommendations for the treatment of hip OA.

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