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Recommendations

Adherence to, and results of, physical therapy programs in patients with hip or knee osteoarthritis. Development of French clinical practice guidelines

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Abstract

Objective: To develop recommendations regarding adherence to physical therapy programs by patients with hip or knee osteoarthritis.
Methods: We used the method recommended by the French Society for Physical and Rehabilitation Therapy (SOFMER), which combines a systematic literature review, a practice survey, and validation by a multidisciplinary panel of experts.
Results: When setting up exercise programs for patients with lower limb osteoarthritis, measures should be taken to increase effectiveness by optimizing adherence. Patient selection is among these measures, as exercise programs are more likely to succeed in patients with a history of being physically active, a positive view of the suggested program, and/or favorable social and material conditions. Regardless of the type of exercise, the program should be tailored to exercise capacity and pain level (professional consensus). Patient adherence can be improved by explaining the expected results to the patient, asking the patient to keep a self-evaluation diary, conducting long-term evaluations (by phone or mail), and providing follow-up visits.
Conclusion: Studies of adherence according to the type of exercise are needed. The relevance of widely used incentives in patients with hip or knee osteoarthritis should be evaluated in new therapeutic trials.

Keywords: Hip osteoarthritis; Knee osteoarthritis; Osteoarthritis; Rehabilitation; Physical therapy; Compliance; Adherence; Recommendations

1. Introduction

According to European recommendations for managing hip and knee osteoarthritis, nonpharmacological methods are as important as medications, and the two should be used in combination. The strength of available evidence varies across nonpharmacological treatments, being greatest for physical exercise programs and weight loss in obese patients [1,2]. Treatments work only when followed scrupulously by the patient. To ensure patient adherence, the treatment must be explained to the patient (information), then understood (education), accepted (persuasion), and followed (execution) by the patient. Two nationwide surveys conducted in France showed that there is room for improvement in the nonpharmacological management of patients with osteoarthritis [3,4]. A survey detected differences in the perceptions of the European recommendations by practitioners across European countries [5]. Although a number of exercise and physical therapy programs have been found effective in hip and knee osteoarthritis, patient adherence is probably a major

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determinant of the results. Therefore, there is a need for identifying the factors that influence patient adherence and for developing recommendations about optimizing patient adherence.

2. Methods

We used the method developed by the French Society for Physical and Rehabilitation Therapy (SOFMER) [6], which includes three main steps: a systematic literature review, a practice survey, and validation by a multidisciplinary panel of experts.

2.1. Systematic literature review

2.1.1. Study selection

Two documentalists conducted a systematic literature review using a list of keywords drawn up by a scientific committee composed of physical therapy and rehabilitation physicians (PTRPs), orthopedic surgeons, and rheumatologists. The following English keywords were used: osteoarthritis, hip, knee, therapy, exercise, rehabilitation, physical therapy, physiotherapy, and exercise therapy. French keywords were arthrose, hanche, genou, rééducation, réadaptation, exercice and kinésithérapie. The PASCAL Biomed, PubMed, and Cochrane Library databases were searched. The search was limited to publications having an abstract, written in English or French, and describing studies in adult humans.

The members of the scientific committee read the abstracts to select the articles that dealt with physical and rehabilitation therapy. Electronic or hard copies of the full texts of the selected articles were sent to two experts (one rheumatologist [BM] and one PTRP [AT]), who read the materials and methods sections to identify publications dealing with adherence. The reference lists of selected articles were reviewed for relevant articles, whose abstracts were examined.

The methodological quality of the selected articles was assessed using the criteria developed by the National Agency for Healthcare Accreditation and Evaluation (ANAES) [7], which distinguish four categories. Articles in the lowest category (inadequate randomization procedure, small sample size, or poorly described intervention) were excluded.

2.1.2. Data analysis

The data from the literature review were analyzed independently by two investigators (one rheumatologist [BM] and one PTRP [AT]), who used a blind procedure.

2.2. Practice survey

The practice survey was conducted in a representative sample of PTRPs and rheumatologists during two separate meetings, namely, the national annual PTRP meeting (21st SOFMER meeting, Rouen, France, October 18, 2006) and the national annual rheumatology meeting (21st meeting of the French Society for Rheumatology, Paris, December 4 and 5, 2006). Participants were asked to complete a questionnaire using an electronic system (Mediavote, Rueil Malmaison, France). One or more response options were available, depending on the item. After completion of the questionnaire, the data from the literature review were reported to the participants. A secretary recorded the questions and comments of the participants, the answers made by the two investigators who analyzed the published data (BM and AT), and the debates that occurred; this material was examined subsequently.

2.3. Drafting of the recommendations and validation by a panel of experts

Recommendations based on the literature review and practice survey were drafted. Validation by a multidisciplinary panel of experts produced the final set of recommendations.

3. Results

3.1. Literature review

3.1.1. Selected articles

The scientific committee selected 74 articles from PASCAL Biomed, 172 from PubMed, and six from the Cochrane Library. Among these articles, 16 were selected by both reviewers (BM and AT). Four articles were literature reviews or recommendations. The remaining 12 articles, which are listed in Table 1, reported controlled studies in which adherence was among the evaluation criteria. The methodological category was 1 for five articles [8–12] and 2 for seven articles [13–19].

3.1.2. Data from the selected articles

3.1.2.1. Data about the impact of adherence on the results of rehabilitation programs. Ten evidence-based recommendations about exercise for managing hip or knee osteoarthritis were developed during the MOVE consensus conference and published in 2005 [20]. The seventh recommendation states that ‘‘Adherence is the principal predictor of long-term outcome from exercise in patients with knee or hip osteoarthritis’’ (based on category 1B evidence). Several well-designed studies showed that adherence correlated with efficacy [12,15,19,21–23]. The estimated effect size[1] was 0.42 when adherence was high, 0.34 when adherence was intermediate, and 0.16 when adherence was low [12]. Thus, exercises have only a moderate effect in relieving pain and improving function in patients with lower limb osteoarthritis. Interindividual variations range from worsening to substantial improvement. Many confounding factors may explain this variability, including stunning of the quadriceps, obesity, joint

[1] Effect size in controlled trials is computed as the difference in the quantitative primary evaluation criterion between study completion and baseline, minus the same difference in the control group, divided by the mean SD at baseline. Effect sizes are classified as nil (<0.20), small (0.20–0.50), intermediate (0.50–0.80), and large (>0.80).

laxity, malalignment of the lower limbs, fear of physical exercise [24], and adherence to the treatment program. Adherence to physical treatments usually decreases over time (see below). Although follow-up in the published studies did not exceed 18–24 months [9,12], the benefits from exercise were lost within 9–12 months after stopping the program [18]. A 2003 review article on muscle rehabilitation in patients with knee osteoarthritis emphasized not only the major impact of adherence, but also the lack of knowledge about the means to improve adherence [25].

3.1.2.2. Factors that influence patient adherence to exercise programs. Few studies were specifically designed to investigate this point.

3.1.2.2.1. Quantitative factors. Time is a crucial factor. Studies consistently showed declining adherence rates over time, although follow-up was never longer than 2 years. In the FAST study of patients aged 60 years or older with knee osteoarthritis [22], adherence to an exercise program fell from 85% after 3 months to 70% after 9 months and 50% after 18 months. Another study in the same age group showed a decrease in adherence from 85% after 3 months to 54% after 18 months [23]. In a group of younger patients (≥45 years), adherence was 48% after 2 years [12]. High study dropout rates and poor adherence may bias studies of exercise programs [13]. Baseline status may influence adherence: thus, in one study, greater disease severity as reflected by higher WOMAC scores was associated with lower adherence to exercise programs [13]. Excessively strenuous exercise programs may lead to poor adherence, at least in patients with cardiovascular disease [26]. The data from the FAST study [22] were used to assess adherence, the impact of adherence on outcomes, and potential predictors of adherence among five categories of variables (demographics, fitness, health-related quality of life, performance-related disability, and prior exercise behavior) [11]. These five categories explained 40% of the variance of the time spent in exercising during the initial 3-month phase of group exercise sessions at a healthcare center, compared to only 10% during the subsequent 15-month phase of home-based exercises. Prior exercise behavior was the strongest predictor. A study of water-based therapy in public swimming pools in the UK focus on the role for the cost of exercise treatment [27]. Adherence rates were 53% after the first year, during which treatment was free, and 19% after 18 additional months, during which patients who wished to continue paid for the sessions. A study of healthy women showed that lack of time and low motivation were the main reasons for quitting exercise, whereas a desire to look and to feel good was the main reason for exercising [28]. The type of exercise had no influence on adherence. Similarly, a study based on data from FAST [29] showed no difference in adherence between an aerobic exercise program and a weight-lifting program (level 2).

3.1.2.2.2. Qualitative data. Adherence to physical therapy is probably directly influenced by both perceptions and knowledge of the disease by the patient. Among the patients included in the intervention arm of a controlled therapeutic trial of rehabilitation therapy for knee osteoarthritis, 20 were interviewed about their reasons for adhering or failing to adhere to the study program [30]. Open-ended questions were used. The main reasons for poor adherence, most notably in the long term, were complex: they included not only willingness but also the ability to fit exercises within the everyday schedule, perceived symptom severity, attitudes toward osteoarthritis and co-morbidities, and prior experience with other treatments (Fig. 1). Another qualitative study involved semi-structured interviews of 16 middle-aged patients with knee osteoarthritis [31]. Although the patients had personally experienced the effects of exercising, they remained unsure of whether exercising was beneficial. This hesitancy should be borne in mind when designing exercise programs. Interviews of 110 elderly patients with hip and/or knee osteoarthritis showed that adherence was heavily dependent on the level of information [32]. Thus, the proportion of patients who exercised was 23% among patients given a prescription to exercise, 41% among those given medical advice to exercise, 82% among those given medical advice and educational material, and 79% of those who received medical advice, educational material and follow-up by a physician. Furthermore, the weekly number of exercise sessions followed the same pattern and was within the range expected to provide benefits (several sessions/week) in the last two groups. Exercise maintenance was investigated in 120 patients with rheumatoid arthritis or osteoarthritis 18 months after a structured exercise program [33]. Baseline aerobic capacity and perceived positive effects of exercise were associated with continued adherence to the program.

Factors that motivate older adults with knee osteoarthritis to perform strength training exercises were investigated using a self-questionnaire with Likert-scale response options [34]. Data were available from 191 patients at baseline and 125 after 12 months. Factors associated with continued exercising in the multivariate analysis were a history of physical activity during the pre-program months, particularly when the effects were perceived as positive; easy access to a facility where exercising can be performed; a well-organized and professional program; group sessions; support from family, friends, and the physician; financial support (e.g., help in paying for the costs of going to and from the exercise center), and an expectation that exercise would be beneficial. A review of the literature (level 1) also highlighted a number of patient-related and environmental factors related to adherence to exercise programs [35] (Fig. 2).

3.1.2.3. Measures likely to improve adherence. The eighth recommendation developed at the MOVE consensus conference [20] states that "Strategies to improve and maintain adherence should be adopted, e.g., long-term monitoring/review and inclusion of spouse/family in exercise." The beneficial effects of telephone contact, self-monitoring by means of a diary, attending exercise sessions with the spouse, and receiving support from family and friends were underlined. This recommendation, based on level 1B evidence, pertains to general exercise, as few studies specifically

Table 1
Main therapeutic trials reporting adherence with exercise programs

Authors, year	Design (number of patients)	Inclusion criterion	Intervention (number of patients in the intervention arm)	Adherence	Comments
Kovar et al, 1992 [14]	RCT ($n = 102$)	Symptomatic knee OA	Walking > 30 min + education, 24 sessions, 90 min each, over 8 weeks ($n = 52$)	90% at study completion Mean number of sessions: 21 ± 6 (3–28)	Per-protocol analysis – no intention-to-treat analysis
Ettinger et al, 1997 [22] [data used by Rejeski et al, 1997 [11]]	RCT ($n = 439$)	Knee OA	Aerobic program (walking) ($n = 144$) Resistance exercises ($n = 146$) Health education ($n = 149$) 3 months with supervision: 1 h × 3 sessions/week 15 months at home (visits + phone calls)	Same adherence rate in the two exercise groups Adherence decreased over time: – 85% after 3 months – 70% after 9 months – 50% after 18 months	Efficacy correlated with adherence
Rogind et al, 1998 [16]	RCT ($n = 25$)	Severe bilateral knee OA	Supervised lower limb exercises twice a week + exercises at home five times/week ($n = 11$), for 3 months	78% at study completion. Evaluation after 1 year but no data on adherence	Per-protocol analysis; small sample size
O'Reilly et al, 1999 [15]	RCT ($n = 191$)	Knee OA, any stage	Lower limb strengthening exercises at home everyday for 6 months ($n = 78$)	Diary kept by the patient + four home visits 70% of patients performed ≥ 75% of the program Efficacy (WOMAC index change) correlated with the number of sessions performed	ITT analysis Sample size estimation before study initiation
Deyle et al, 2000 [13]	RCT ($n = 83$)	Knee OA	Passive manual therapy + exercises 30–45 min/session, twice a week, 4 weeks + daily at home ($n = 42$)	Adherence was 79% in the treatment arm and 88% in the placebo arm	Adherence was lowest in patients with worse WOMAC index values at baseline
Van Baar et al, 2001 [18]	Single blind RCT, intention-to-treat analysis ($n = 201$)	Knee or hip OA	Standard care by the general practitioner alone vs. with exercise treatment from a physiotherapist (30 min, 1–3/week) and at home ($n = 102$), 12 weeks	Follow-up visits 3 and 6 months after the 12-week exercise period. Adherence, as estimated by the physiotherapist, seemed slightly better in the subgroup characterized by less severe pain after 6 months (nonsignificant difference and no data on whether home exercises were performed in the interval)	Conclusion of the authors: studies specifically designed to assess short-term and, above all, long-term adherence are needed
Thomas et al, 2002 [12]	RCT, four arms, 2 years, intention-to-treat analysis ($n = 786$)	Self-reported knee pain	Home-based exercise program, 30 min/day after instruction by a professional (four sessions over 2 months and then at 6-month intervals) ($n = 235$) Home-based exercise program + monthly phone call ($n = 235$) Monthly phone call ($n = 160$) No intervention ($n = 156$)	600 (76%) patients reevaluated after 2 years In the exercise groups ($n = 470$), adherence was 48% after 2 years	Adherence correlated with pain relief after 2 years: "High" adherence: ES 0.42 "Intermediate" adherence: ES 0.34 "Low" adherence: ES 0.16
Messier et al, 2004 [9]	RCT, four arms, 18 months, ITT ($n = 316$)	Knee OA, age ≥ 60 years, BMI ≥ 28 kg/m^2	Diet only ($n = 82$) Exercise only ($n = 80$) Diet + exercise ($n = 76$) Control ($n = 78$)	Adherence: Diet, 72% Exercises, 60% Diet + exercises, 64% Controls, 73%	No between-group differences. Factors potentially associated with adherence were not studied
McCarthy et al, 2004 [8]	RCT, two arms, 12 months, ITT ($n = 214$)	Knee OA	Exercises at home ($n = 103$) Exercises at home + 8-week class-based exercise program ($n = 111$)	Same number of exercise sessions/week and same time spent exercising/week after 6 and 12 months	Classes did not improve adherence to the home-based exercise program

Ravaud et al, 2004 [10]	RCT, four arms, 6 months, ITT ($n = 2957$)	Hip or knee OA	Self-assessment tools ($n = 782$) Exercises at home ($n = 735$) Both ($n = 680$) Usual care ($n = 760$) Fixed-dose NSAID therapy in all four groups	Two exercise arms ($n = 1415$): – full adherence (exercises at least four times/week), 31% – partial adherence (exercises done less than four times/week), 28% – discontinuation of the exercises between 3 and 6 months after enrollment, 17%	Reasons for poor adherence reported by the patients: pain induced by the exercises, program too burdensome
Van Gool et al, 2005 [19]	154 participants randomly allocated to exercise groups in the RCT conducted by Messier et al [9]	Statistical evaluation of the effects of exercise adherence on physical function		Better adherence was associated with better function	Sound evidence, but the factors potentially associated with adherence were not investigated
Tak et al, 2005 [17]	RCT, 8-week exercise program, 3-month follow-up, age $\geq$ 55 years ($n = 109$)	Hip OA	Exercises 1 h/week in classes + exercises at home ($n = 55$)	77% of the patients reported performing the exercises at home	Patients who dropped out of the study (10/55) were younger and less tolerant to pain

RCT, randomized controlled trial; OA, osteoarthritis; ITT, intention-to-treat; ES, effect size; NSAID, nonsteroidal antiinflammatory drug; WOMAC, Western Ontario and McMaster osteoarthritis index.

investigated exercise programs for hip or knee osteoarthritis. Providing advice about physical activity, including walking, in the primary-care setting was associated with longer times spent exercising 1 year later in a group of healthy, physically inactive individuals aged 60 years or older (mean, 68 years) [36] (level 2). Patients' perception that exercising was helpful and physician's recommendation for exercise were associated with exercising in a group of 205 veterans [37] (level 3). In patients aged 60 years or older who had symptomatic osteoarthritis, using a pedometer at home seemed to increase walking, strength, and performance [38] (level 3). Supplementing a home-based program with an 8-week class-based program improved the results but had no effect on the adherence to the home-based program: the median number of sessions/week was two after 6 months and one after 12 months in both groups [8] (level 1). Among the various methods used to improve adherence to exercise programs, adding computer-assisted video instruction was not effective, compared to conventional inpatient education from physical therapists used alone [39] (level 3).

3.2. Results of the practice survey

A sample of PTRPs and rheumatologists completed a questionnaire about patient adherence [6]. No significant differences in responses were noted between the two specialties. Most of the respondents (72%–80%) asked their patients about adherence to previous physical therapy programs. Among the respondents who routinely evaluated prior adherence, about half asked specific questions about quantitative and qualitative details, and 21% asked the patients to demonstrate the movements.

4. Discussion

Patients with osteoarthritis tend to decrease their levels of physical activity [40]. The main challenge is to design effective strategies for helping patients with osteoarthritis initiate and maintain a regimen of regular exercise. Exercising not only exerts beneficial effects but also decreases the risk of conditions related to physical inactivity (e.g., obesity, cardiovascular disease, and diabetes mellitus), which contribute to the quality-of-life alterations associated with osteoarthritis [7]. Lifestyle changes are essential to promote regular physical activity [41,42]. Patients should be encouraged to modify their habits as a means of promoting adherence to nonpharmacological treatments such as weight loss and exercise [43]. Several important conclusions can be drawn from the literature. First, adherence to exercise programs is usually good during the first few months in patients who are enrolled in studies involving close follow-up but declines rapidly over time. Second, adherence to exercise programs correlates with effectiveness (level of evidence, A). Third, the main determinants of adherence of exercise programs are a prior history of exercising, social support, easy access to the facility where exercising occurs, and an expectation that exercising will be beneficial (level of evidence, B). Fourth, no specific type of exercise has been proved superior over the other types, and emphasis should

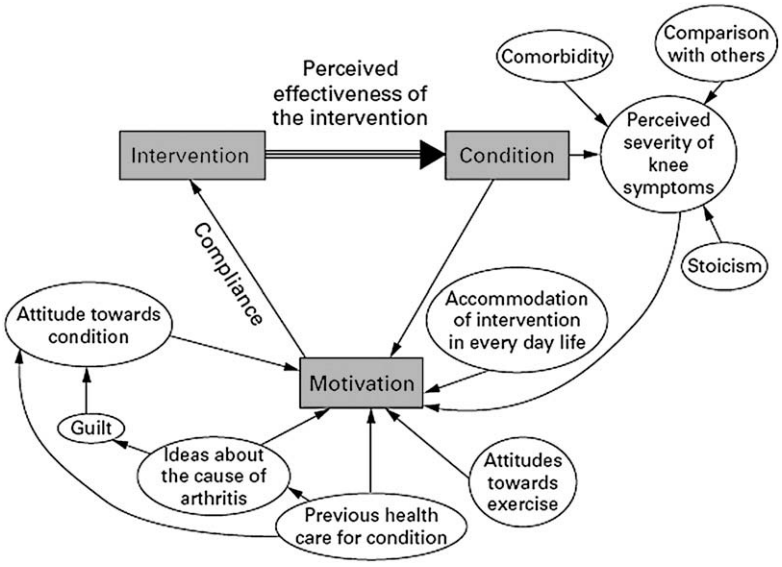

Fig. 1. Model of continued adherence (from Ref. [30]). Adherence is influenced by severity of the knee symptoms (pain and stiffness), perceived effectiveness of exercising, and motivation. Factors that influence motivation are shown in the figure.

be placed on tailoring the program to the abilities of each individual patient (level of evidence, C). The results of recent metaanalyses [20,35,43,44] support the following measures for improving adherence to exercise programs for patients with lower limb osteoarthritis: individualized follow-up and self-evaluation via an exercise diary, long-term follow-up by a healthcare professional via phone calls or mail, support by family and friends, frequent sessions of mild-to-moderate exercise, patient education, and psychological support. These are C-level recommendations, as no studies have specifically addressed adherence to exercise programs in patients with lower limb osteoarthritis.

5. Recommendations

Exercise programs for patients with osteoarthritis should include measures aimed at improving adherence and therefore increasing the likelihood of beneficial effects. Patient selection may be one such measure. Patients with a history of being physically active, a positive view of exercising, good social support, and/or easy access to exercise facilities are more likely to adhere to an exercise program. Regardless of the type of exercise, the program should be individually tailored to physical capacity and pain (professional consensus). Adherence can be improved by describing the expected results,

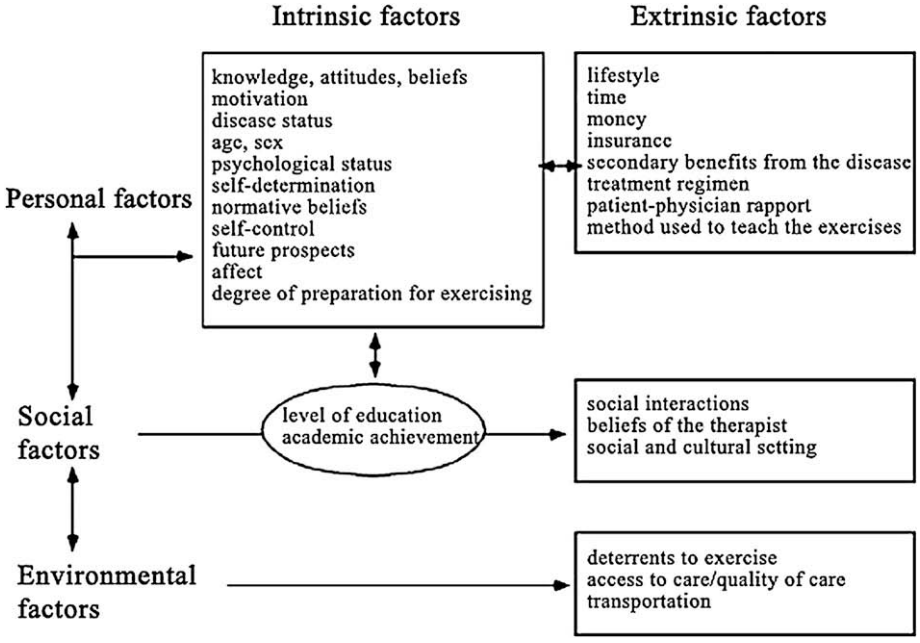

Fig. 2. List of factors that may influence adherence to exercise programs by patients with osteoarthritis (from Ref. [35]).

having the patient keep an exercise diary, contacting the patient regularly by phone or mail over the long term, and providing follow-up visits. Studies comparing adherence across types of exercise are needed. Therapeutic trials should be performed to evaluate the efficacy of widely used incentives to exercise in patients with hip or knee osteoarthritis.

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