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Review

Recommendations from the French Societies of Rheumatology and Physical Medicine and Rehabilitation on the non-pharmacological management of knee osteoarthritis

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Abbreviations: ACR, American College of Rheumatology; APA, Adapted physical activity; BMI, body mass index; CBT, Cognitive-behavioral therapies; ESCEO, European Society for Clinical and Economic aspects of Osteoporosis, Osteoarthritis and musculoskeletal diseases; EULAR, European League against Rheumatism; HAS, Haute Autorité de Santé (French Health Authority); LoE, level of evidence; OA, osteoarthritis; OARSI, Osteoarthritis Research Society International; PA, physical activity; PRM, physical and rehabilitation medicine; RCT, randomized controlled trial; SC, steering committee; SFR, French Society of Rheumatology; SOFMER, French Society of Physical Medicine and Rehabilitation; TENS, Transcutaneous Electric Nerve Stimulation; WG, working group

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ABSTRACT

Background: Although non-pharmacological therapies for knee osteoarthritis (OA) are essential pillars of care, they are often poorly considered and inconsistently applied.
Objectives: Under the umbrella of the French Society of Rheumatology (SFR) and the French Society of Physical Medicine and Rehabilitation (SOFMER), we aimed to establish consensual recommendations for the non-pharmacological management of people with knee OA.
Methods: A group of fellows performed a systematic literature review on the efficacy and safety of non-pharmacological modalities (up to October 2021). The fellows then took part in discussions with a multidisciplinary group of experts to draft a list of recommendations. The list was then submitted to an independent reading committee who rated their level of agreement with each recommendation. Each recommendation was assigned a strength of recommendation and a level of evidence.
Results: Five general principles were unanimously accepted: (A) the need to combine non-pharmacological and pharmacological measures; (B) the need for personalized management; (C) the need to promote adherence; (D) the need for adapted physical activity; and (E) the need for person-centered education. Specific positive or negative recommendations were defined for 11 modalities: (1) unloading knee brace; (2) kinesiotaping or knee sleeves; (3) shoes and/or insoles; (4) using a cane; (5) physical exercise program; (6) joint mobilization; (7) electro- or thermo-therapy; (8) acupuncture; (9) weight loss; (10) thermal spa therapy; and (11) workplace accommodation.
Conclusions: These SFR/SOFMER recommendations provide important and consensual knowledge to assist health professionals in decision-making for non-pharmacological treatments for knee OA

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Introduction

Osteoarthritis (OA) is the most common joint disease and a leading cause of disability in industrialized countries: Around 595 million people are affected worldwide and OA is now the 14th most common cause of age-standardized years lived with disability [1]. The age-standardized prevalence for knee OA was recently estimated at 4307.4 cases per 100,000 people. Over 23% of people over the age of 40 years have knee OA, with a peak occurring between the ages of 80 and 85 years [1,2]. A high body mass index (BMI) is the main risk factor, with an attributable proportion of 20.4% [1]. In France, costs relating to hip and/or knee OA are increasing, with a public health cost of more than €3.5 billion a year [3,4]. Lower limb OA is also associated with an increased risk of cardiovascular mortality because of functional disability and subsequent physical inactivity [5].

OA is a progressive disease that requires long-term management with different therapeutic options over the course of the disease. The overall management of knee OA involves several modalities combining pharmacological therapies and a range of non-pharmacological interventions to relieve pain and improve function. The French Society of Rheumatology (SFR) has established recommendations on the use of pharmacological treatments for knee OA [6]. Therefore, further work on the impact of non-pharmacological treatments for knee OA is necessary. Recently, several national and international societies (Osteoarthritis Research Society International [OARSI], European Society for Clinical and Economic aspects of Osteoporosis, Osteoarthritis and musculoskeletal diseases [ESCEO], American College of Rheumatology [ACR], American Academy of Orthopaedic Surgeons [AAOS], and the European League Against Rheumatism [EULAR]) have published recommendations on the management of knee OA, including an update on non-pharmacological treatments [7–11]. The implementation of all these recommendations is questionable in France and, in general, in daily medical practice. They are difficult to apply to the specificity and contexts of French medical practice because of the heterogeneity of opinions and experiences, the complexity of situations and decision algorithms, the failure to take into

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account certain modalities, and the lack of description and precision on the conditions of implementation of several non-pharmacological interventions [12]. In France, several healthcare professionals are involved in the management of knee OA: rheumatologists, general practitioners, orthopedic surgeons, physical and rehabilitation medicine (PRM) specialists, sports medicine specialists, pain medicine specialists, geriatricians, occupational medicine specialists, physiotherapists, occupational therapists and physical activity (PA) specialists. These professions share several therapeutic approaches, which need to be harmonized to improve the care of people with knee OA. Interestingly, several studies have highlighted individuals' lack of confidence in the skills of their health professionals. Indeed, individuals' opinions and expectations do not always align with the recommendations, which they see as "simplistic" management based on exercise and weight loss [13,14]. Conversely, some healthcare professionals are skeptical about the ability of some individuals to apply these recommendations [13,15]. In addition, there is also a lack of trust between healthcare professionals, potentially explained by a lack of knowledge about practice modalities and insufficient teamwork [16].

Given all these factors, it seemed essential to establish French recommendations to guide individuals and healthcare professionals in selecting and prioritizing the available non-pharmacological treatments for knee OA.

Materials and methods

The present recommendations on non-pharmacological treatments for knee OA are the result of collaboration between 2 French scientific societies: the SFR and the Société Française de Médecine Physique et Réadaptation (SOFMER). They are addressed to rheumatologists, PRM specialists, geriatricians, occupational medicine specialists, sports medicine specialists, pain medicine specialists, general practitioners, orthopedic surgeons, physiotherapists, occupational therapists, nurses, dieticians, adapted physical activity instructors, psychologists, medical students, health authorities and individuals with OA.

Literature review

These recommendations are based on the EULAR methodology [17,18] and were developed in accordance with the methodological principles published by the SOFMER in 2007 [19] and updated in 2023 [20]. They targeted non-pharmacological treatments for symptomatic tibiofemoral (knee) OA in adults (a full list of treatments is provided in Appendix 1). This included studies on technical aids (knee braces, insoles, shoes, walking aids, etc.), exercise and physical activities, topical treatments (laser, acupuncture, ultrasound, etc.), education, cognitive-behavioral therapies, and nutrition (weight control, food, dietary supplements, diets, etc.). Studies on symptomatic slow-acting drugs for OA were excluded since they were analyzed in the pharmacological recommendations [6].

Literature search

Five working groups (WGs) comprising at least 2 experts and one fellow were established to focus on different topics: 1) Technical aids (QK, PO, CN), 2) Physical therapies (CD, AR, FR), 3) Topical treatments (GO, ACR, PT), 4) Education (RR, EC, YMP), and 5) Nutrition (CB, JS, SW, SC). Each WG carried out a literature review (frozen until October 1st, 2021). There were 2 main working documents: the 2019 OARSI recommendations [7] and the 2020 ACR recommendations [9] which stopped their literature reviews in July 2018 and August 2018, respectively. Using the same MeSH terms, each WG included in the literature review all randomized controlled trials (RCTs), systematic reviews and meta-analyses published after those included in these 2 recommendations . When particular modalities had not been addressed in the OARSI or ACR guidelines, a full review of the literature with no date limit was conducted. In the specific case of the nutrition WG, because of the large number of heterogeneous modalities, we considered only interventions of at least 4 weeks' duration and reported in at least 2 RCTs, as well as interventions authorized by French law for use in food supplements [21]. The Decree of June 24, 2014, lists the plants that are authorized to be sold and used in food supplements (Appendix 2). In parallel to the manual literature search within each WG, we used the BiBot artificial intelligence tool, able to automate the systematic literature review based on artificial intelligence [22,23]. Safety, adherence, efficacy on pain, function, and health-related quality of life, as well as structural benefits were evaluated. Searches were conducted in the PubMed (Medline), Cochrane and PEDro databases, as well as conference abstract lists (ACR, EULAR, OARSI, ESCEO, SFR, SOFMER) from 2019, 2020 and 2021.

Literature analysis

The 5 WG members were then integrated into the steering committee (SC), which included a total of 35 participants: 7 private and/or hospital rheumatologists, 5 PRM specialists, 2 orthopedic surgeons specializing in the lower limb, 3 physiotherapists, 1 sports specialist, 1 adapted physical activity instructor, 2 general practitioners, 1 geriatrician, 1 occupational physician, 1 psychologist, 1 occupational therapist, 1 nutritionist, 1 pharmacist, 6 fellows and 2 individuals with OA. All participants submitted their declaration of interest to the SFR Ethics Commission for validation of their participation. Each WG provided the list and articles to the SC and presented their literature review during face-to-face meetings held over 2 non-consecutive days. Then, all the members of the SC discussed and drafted a list of recommendations as defined by EULAR methodology. During each session, each general principle and specific recommendation was adopted if consensus was reached by the SC (≥80% of voters). If the vote was <80%, the recommendation was discussed again and amended accordingly. Several rounds of voting were allowed. After some time had passed since the 1st vote, each member rated their agreement with each recommendation on a numerical scale from 0 to 10 (0: completely disagree, 10: completely agree). For each recommendation, a level of evidence (LoE) and a strength (A to D) were defined [18]. Finally, a 54-member multidisciplinary reading committee then rated their level of agreement with the recommendations to obtain feedback from health professionals for their everyday practice for external validity.

Results

The SC established 5 general principles and 11 recommendations (Table 1). The level of agreement on these principles and recommendations was determined by a vote from the members of the reading committee (Table 2). It should be noted that non-pharmacological treatments are offered for symptomatic and functional benefit, without a demonstrated structural or chondroprotective effect.

General principles

1. Optimal management of knee OA involves both non-pharmacological and pharmacological interventions, with support from healthcare and physical activity professionals.
   This principle should be considered in conjunction with the previously published French recommendations for the pharmacological treatment of knee OA [6]. The management of individuals with knee OA must integrate both these recommendations. In addition to healthcare professionals, APA instructors play a key role given the importance of systematic PA.

Table 1
French recommendations for the non-pharmacological core management of knee osteoarthritis (OA), with levels of evidence (LoE), strength of recommendation and levels of agreement.

	Strength of recommendation	Level of agreement Mean (SD)
General principles		
A. Optimal management of knee OA should involve both non-pharmacological and pharmacological interventions, with support from healthcare and physical activity professionals.	D	9.82 (0.72)
B. Non-pharmacological management of knee OA must be personalized and based on a shared decision-making process that considers the person's needs and preferences.	D	9.83 (0.45)
C. Long-term adherence to non-pharmacological interventions is crucial and requires regular reassessment.	C	9.65 (0.65)
D. Adapted physical activity, including regular, dynamic, general physical exercise in land-based and/or water-based environments, must be systematically proposed.	B	9.73 (0.57)
E. Person-centered education about knee OA associated with the acquisition of self-management techniques must be systematically proposed.	B	9.15 (1.10)
Specific recommendations		
1. In the presence of pain involving mainly one tibiofemoral compartment, the use of a unicompartmental unloading knee brace can be proposed (LoE = 1A).	B	9.00 (0.97)
2. Kinesiotaping (LoE = 1B) or knee sleeves (LoE = 1B) must not be proposed.	C	7.76 (2.59)
3. Soft shoes with shock-absorbing soles must be recommended (LoE = 4).	C	8.97 (1.47)
4. Use of a cane can be proposed to relieve pain and/or improve walking ability (LoE = 1B).	C	9.03 (1.05)
5. A program of physical land- or water-based exercise targeting the lower limbs must be proposed (LoE = 1A).	B	9.76 (0.61)
6. Joint mobilization must be integrated into the physical exercise program (LoE = 1B).	C	9.27 (0.98)
7. Electrotherapy (LoE = 1B), thermotherapy (LoE = 1B), extracorporeal shockwave therapy (LoE = 1A), laser therapy (LoE = 1A) and electromagnetic therapy (LoE = 1B) must not be used.	C	9.28 (1.44)
8. Acupuncture could be proposed for non-specific analgesic purposes (LoE = 1A).	B	7.97 (2.15)
9. In people with overweight or obesity, a loss of at least 5% of body weight must be targeted (LoE = 1A).	B	9.65 (0.77)
10. A thermal spa treatment integrating person education and physical activity could be proposed (LoE = 1B).	C	8.45 (1.46)
11. People with difficulties at their workplace can be referred to their occupational physician, or alternatively to a center for occupational and environmental diseases to initiate a job retention strategy (LoE = 4).	D	9.18 (1.24)

LoE: level of evidence; OA: osteoarthritis; SD: standard deviation.

2. Non-pharmacological management of knee OA must be personalized and based on a shared decision-making process that considers the person's needs and preferences.
   This recommendation highlights therapeutic partnerships as a factor for success and better adherence [24]. In the context of the person-centered approach, several parameters need to be considered in therapeutic approaches: 1) impairments and personal characteristics (presence of joint effusion, stiffness, pain type, intensity and origin, level of disability, age, comorbidities, acute or chronic pain, and all associated OA joints); 2) factors predictive of participation (adherence profile); and 3) contextual factors (socio-professional, sporting habits, cost and reimbursement of non-pharmacological measures).
3. Long-term adherence to non-pharmacological interventions is crucial and requires regular reassessment.
   Adherence to home-based physical exercise therapy decreases quickly beyond 3 months [25]. All interventions designed to enhance adherence should be implemented. Physical, telephone and written support are relevant options [26,27].
4. Adapted physical activity, including regular, dynamic, global physical exercise in land-based and/or water-based environments, must be systematically proposed.
   Adapted physical activity (APA) is a general public health recommendation promoted by an INSERM (Institut National de la Santé et de la Recherche Médicale: National Institute of Health and Medical Research) initiative in 2019 [28]. Furthermore, knee OA features in the July 2022 publication by the French Health Authority (Haute Autorité de Santé [HAS]): "Consultation and medical prescription of physical activity for health purposes" [29]. The various modalities of APA programs are specified in the HAS guidelines. These programs aim to reduce both clinical symptoms of knee OA and associated comorbidities. This recommendation applies to all stages of knee OA, tailored according to the person's physical abilities and comorbidities. It may be appropriate to start with short-duration and/or low-intensity PA to encourage adherence (expert opinion). The duration of PA is then gradually increased to reach or exceed World Health organisation health recommendations (ie, walk for 30 min 5 times per week or equivalent). PA can initially be supervised by a healthcare professional (physiotherapist) or an APA instructor. This supervision supports an individualized, person-centered educational approach and encourages self-management (expert opinion).
   Mind-body exercises have demonstrated a positive, short-term effect on pain and function in knee OA (LoE = 1B). They must be supervised by a trained professional and adapted to the individual (expert opinion). A wide range of techniques has been evaluated, including Tai Chi, Baduanjin and Yoga [30–32]. The SC highlighted

Table 2
Level of agreement (LoA) established by the reading committee.

	LoA Mean (SD)
General principles	
A. Integrated with pharmacological treatments	9.5 (1.4)
B. Personalized management	9.5 (0.9)
C. Adherence	9.2 (1.2)
D. Adapted physical activity	8.9 (1.7)
E. Education	9.1 (1.2)
Specific recommendations	
1. Unloading knee brace [R]	7.2 (2.6)
2. Kinesiotaping / Knee sleeves [NR]	6.1 (3.2)
3. Wearing soft shoes [NR]	7.7 (2.1)
4. Using a cane [R]	8.5 (1.7)
5. Physical exercise program [R]	8.9 (1.8)
6. Joint mobilization [R]	9.0 (1.5)
7. Electro-, thermo-, laser-, extracorporeal shockwave- and electromagnetic-therapy [NR]	6.8 (3.4)
8. Acupuncture [R]	6.9 (2.7)
9. Weight loss [R]	9.1 (1.3)
10. Thermal spa therapy [R]	8.0 (2.1)
11. Workplace accommodation [R]	9.2 (1.2)

NR: not recommended, R: recommended.

the positive motivational and social aspects of these practices, as well as the limitations associated with the cost and availability of training.

5. Person-centered education about knee OA associated with the acquisition of self-management techniques must be systematically proposed.
   Regardless of the individual's characteristics, person-centered education and self-management are beneficial in reducing symptoms [33–35]. They are also key interventions for improving adherence to non-pharmacological and pharmacological interventions [24]. These modalities have also demonstrated a preventive role by reducing the number of healthcare visits and costs [24]. People with OA have a wide range of requirements (knowledge of the disease, pain management, diet, physical activity, surgery preparation, etc.) [36]. Our literature review highlighted the need for healthcare professional training [16]. Several educational modalities run by different healthcare professionals are available (information, positive empowerment, problem-solving, etc.), but they have not been compared with each other [37]. Some structured therapeutic person-centered education programs are offered in France, but they are not accessible to the general population. Given the heterogeneity of educational programs and self-management techniques, the SC is unable to recommend content and implementation methods, eg, one or several sessions, group or individual sessions, face-to-face or connected interface, type of professional or expert etc. However, the SC emphasizes the value of an educational approach with a person-centered focus, considering the individual's needs [38]. This intervention can be offered by all healthcare professionals, with the aim of modifying mistaken beliefs. Individuals' knowledge and practices should be regularly reassessed. The SC suggested diversifying educational resources (paper, web), including caregivers and relatives, and individualizing training [24].

Specific cognitive-behavioral therapies (CBT) have shown benefits for chronic pain by acting indirectly on depression and secondary anxiety [39,40]. CBT are a complement to educational practices and self-management skills. The SC mentioned a benefit of CBT only when combined with other modalities for knee OA (physical exercise, disease management education, etc.) [41]. In addition, the SC pointed out several limits to these studies: modest benefits despite large sample sizes, heterogeneous CBT practices, and non-specific effects of CBT on knee OA. The SC also expressed concerns about the feasibility of implementing CBT in France, because of a shortage of resources (number of trained professionals), a lack of clarity regarding the qualifications of professionals using these techniques, and the remaining cost to the individual. Considering these limitations, the SC suggests using CBT as a complement to education, self-management and physical activity, especially for people with comorbidities, drug contraindications, a need for drug sparing or chronic diffuse pain.

Specific recommendations

1. In the presence of pain involving mainly one tibiofemoral compartment, a unicompartmental unloading knee brace can be proposed (LoE = 1A).

Valgus unloading knee braces reduce knee adduction moments by applying an opposing external valgus moment about the knee joint that improves the distribution of the compressive load and corrects alignment. Two recent randomized controlled studies of medial lateral unloading (valgus) knee braces showed positive results regarding pain, function and drug sparing (analgesics, non-steroidal anti-inflammatory drugs), although none had an adequate comparator (sham brace), they included high biases (open studies) [42,43], and the clinical effects were small. When used in addition to conventional care, medial unloading knee braces have a high level of evidence for relieving symptomatic medial tibiofemoral knee OA (LoE = 1A) [44]. In contrast, no specific studies of lateral unloading (varus) knee braces for lateral tibio-femoral knee OA are available (expert opinion, LoE = 4).

Custom-molded unloader knee braces are classified as medical devices and require the prescription of a large-scale fitting (100% reimbursement). However, their prescription is limited to a few specialists (orthopedic surgeons, PRM physicians and rheumatologists), and their effectiveness depends on regular wearing (at least 6 h daily, 5 days a week) and custom-made fabrication for best fitting [42,43]. In the presence of associated symptomatic patellofemoral damage, unloading knee braces are not recommended. All X-ray stages of tibiofemoral OA, even the most severe, are compatible with the use of an unloading knee brace (expert opinion). The SC recommends an initial assessment (multidisciplinary if possible, including the prescriber, physiotherapist, and orthotic professional) of lower limb alignment, knee stability, gait pattern, expected barriers to long-term adherence and technical difficulties (expert opinion, [45]). The use of a knee brace should be discussed with the person, notably for adherence, and short-term reassessment is essential, in particular by the prescriber or orthotic professional to adapt the brace, considering phenotype, comorbidities, medico-economic impact, tolerance, adherence, person's wishes and efficacy (expert opinion). In addition, the SC advises using unloading braces in young individuals with post-traumatic OA, or in less active individuals to facilitate physical activity (expert opinion).

2. Kinesiotaping (LoE = 1B) and knee sleeves (LoE = 1B) must not be proposed.

Kinesiotaping is a technique that involves sticking adhesive strips to the muscles around the knee to reduce pain and provide support and stability, without restricting movement. Studies showed an overall short-term effect with no lasting benefit, and a low level of evidence. The SC suggests using kinesiotaping occasionally to facilitate leisure, sport or professional activity (expert opinion).

Knee sleeves (with or without a patellar hole) are soft knee braces used to contain the knee, stabilize the patella and provide a proprioceptive effect. In tibiofemoral or patellofemoral OA, studies are scarce and inconsistent, with multiple biases (LoE = 1B). Despite a negative recommendation based on existing literature, the SC acknowledges that knee sleeves may be considered in some specific conditions for daily management (very senior adults, patellar instability, to promote PA) and/or to enhance reassurance and/or to meet the person's wishes (expert opinion).

3. Wearing soft shoes with shock-absorbing soles must be advised (LoE = 4).

The use of flat, non-supportive shoes should be avoided according to the results of a recent study that showed an increase in knee pain and ankle injuries with flat, flexible shoes in comparison with stable, supportive shoes (LoE = 1B) [46]. In addition, a Swiss study showed the benefit of footwear with convex pods attached to the sole at the heel and forefoot [47]. This device is not currently available in France and is expensive (1000 euros). The SC advises avoiding shoes with high heels and preferring comfortable shoes with good support for the medial arch of the foot (expert opinion).

The current literature does not demonstrate any benefit from valgus or varus corrective wedge insoles in the management of knee OA symptoms. The majority of studies have focused on medial tibiofemoral OA with a lateral corrective (valgus) wedge insole. Results are inconsistent and studies biased. The SC advises that neutral shock-absorbing insoles can be also useful for comfort (expert opinion). In

addition, ankle braces have not demonstrated any efficacy in knee OA and are not recommended (LoE = 1B).

4. Using a cane can be proposed to relieve pain and/or improve walking ability (LoE = 1B)

The literature is particularly poor in this area, with one reference study published in 2012 finding a weak benefit (effect size <0.2) of cane support on pain, function, health-related quality of life and walking distance [48]. The cane should ideally be used on the opposite side to the symptomatic knee, and helps to promote greater autonomy, reduce sedentarism, improve gait quality and walking reassurance, as well as prevent falls. The SC also advises using cane support temporarily in cases of bony involvement in knee OA (necrosis, fissure, edema, peri-meniscitis) (expert opinion).

5. A program of physical exercise, land- or water-based, targeting the lower limbs must be proposed (LoE = 1A)

As part of the person's care pathway, physical exercise must be prescribed by a physician specialized in general practice or another specialty. The structured program is delivered by a physiotherapist who adapts the exercises to the person's phenotype, functional capacity and activity limitations, as well as to the degree of autonomy and risks associated with the practice of exercises. A physical exercise program aims to improve joint stability and muscle performance (strength, neuromuscular control, extensibility) in the lower limbs. Numerous studies are available and have shown a benefit on pain and function in the short and medium term. The modalities of intervention (frequency, intensity, duration, types) are still not clearly defined. Muscle strengthening and stretching of the anterior and posterior chains in the lower limbs should be considered (expert opinion), preferably with moderate-intensity strengthening exercises, as high-intensity exercise has failed to demonstrate superiority [49]. Hip abductor strengthening is also recommended to limit pelvic adduction and internal rotation of the hip joint during weight bearing while walking [50]. Adaptation of exercise programs according to the most symptomatic compartment(s) and/or neuromuscular impairments is required. The SC advises initial supervision by a physiotherapist, followed by self-exercise training (expert opinion).

Massage can accompany an exercise program (expert opinion). However, studies showed a short-term analgesic effect of limited duration and with a low impact. Massage is often considered as part of usual physiotherapy and helps to enhance motivation for physical exercise. In addition, manual therapy is not recommended because of its low level of evidence.

6. Joint mobilization must be integrated into the physical exercise program (LoE = 1B).

Joint mobilization by the physiotherapist is a technique (passive or active with assistance) for maintaining or recovering physiological and/or functional joint range of motion. The available studies are heterogeneous and contain significant biases. However, the SC emphasizes the importance of preventing stiffness (knee flexion contracture), particularly preoperatively (expert opinion), because it affects the gait pattern and functional outcome of a knee prosthesis. The benefits of joint mobilization are correlated with the regularity of interventions and can be enhanced by self-mobilization (expert opinion).

7. Electrotherapy (LoE = 1B), thermotherapy (LoE = 1B), extracorporeal shockwave therapy (LoE = 1A), laser therapy (LoE = 1A) and electromagnetic therapy (LoE = 1B) must not be used.

Regarding electrotherapy techniques (TENS: Transcutaneous Electric Nerve Stimulation / Interferential Current Therapy), all studies were of low quality, with small and heterogeneous cohorts. In our literature analysis, we did not find any studies showing a clinical benefit (LoE = 1B). The literature review on ultrasound (± associated with TENS) and electromagnetic therapies reported contrasting results, with studies of insufficient quality (LoE = 1B).

Laser therapy could provide a short-term analgesic effect, which seems positive only as a complement to physical exercise as suggested by recent studies [51–53]. However, these studies included small numbers of participants (<40 participants/group) and had significant methodological biases ("no sham" and "no pain improvement" in the control group). Despite a meta-analysis published in 2019 reporting identical results [54], the SC did not consider that laser therapy had a sufficient level of evidence for the treatment of knee OA (LoE = 1A).

Regarding extracorporeal shockwave therapy, the SC does not recommend its use in people with knee OA because of the irrelevance of the scientific rationale and the low quality of most studies (LoE = 1A). A recent meta-analysis suggests a benefit [55], but numerous biases must be considered (no sham, lack of blind evaluation). Its use could be discussed in cases of associated periarticular pain (patellar tendonitis, iliotibial band syndrome, etc.).

Thermotherapy covers the local application of cold (cryotherapy) and heat. An immediate (suspensive) symptomatic effect has been observed, which does not last beyond the time of application. Three RCTs on cryotherapy are available, with serious biases and only one study showing positive results. The same trend is observed for heat applications, with significant biases, and the majority of studies show no beneficial effect on pain (LoE = 1B). The SC does not recommend thermotherapy for acute OA flares (expert opinion). However, despite a negative recommendation based on existing literature, the SC acknowledges that thermotherapy may be useful in some circumstances as part of daily management (at the start of or after exercise/PA for an immediate, transient benefit) (expert opinion).

8. Acupuncture could be proposed for non-specific analgesic purposes (LoE = 1A).

Acupuncture is a traditional Chinese medical practice that involves inserting thin needles into specific points on the body, based on the concept of Qi, which is the vital energy that flows through meridians or pathways in the body. The needles are inserted to various depths depending on the condition being treated and the practitioner's assessment. Two recent studies of good methodological quality demonstrated a significant short-term benefit of acupuncture (using 2 different modalities: electro-acupuncture or manual acupuncture) on pain and function in people with knee OA [56,57]. The SC highlights several points to keep in mind: the limited long-term effect (< 3 months), the predominantly Chinese source of the studies which limits the extrapolation of results, the heterogeneity of the techniques, the contextual placebo effect, a possible bias toward strict compliance with the sham procedure, and the potential cost of the sessions to the individual. Acupuncture appears to be a pragmatic choice for people with chronic diffuse pain when other therapies have failed (expert opinion).

9. In people with overweight or obesity, a loss of at least 5% of body weight must be targeted (LoE = 1A).

Screening for overweight and obesity by measuring BMI should be carried out regularly during consultations with general practitioners or specialists. All modes of weight reduction interventions are effective in improving knee OA symptoms, as shown by several recent meta-analyses [58–60], although only observational cohort studies are available for bariatric surgery (LoE = 3).

Collectively, the studies report a minimum threshold of at least 5% weight reduction for a significant clinical benefit, ideally 10%. Moreover, a dose-response relationship between weight loss and clinical benefit seems to exist [61]. The SC advises that weight loss should be supervised by a healthcare professional (dietician, nutritionist), and underlines the need to ensure adherence to this plan to avoid a rebound effect (expert opinion).

Very low-calorie diets are not recommended to avoid rapid weight loss and prevent the risk of sarcopenia. There is no proven efficacy of exclusion diets in knee OA. The SC advises a weight loss of 1−2 kg/month and underlines the importance of maintaining weight loss over time. Weight loss should be combined with PA for its positive effect on the symptoms of knee OA, as well as on the preservation of lean body mass, especially in older people. In terms of nutritional advice for people with knee OA, the SC suggests a healthy balanced diet, referring to the latest version of the National Nutrition Health Program (PNNS) 2019−2023 [62].

In line with recent HAS recommendations (Parcours de soins: surpoids et obésité chez l'adulte: Care pathway: overweight and obesity in adults) published in January 2023 [63], once a diagnosis of overweight and obesity has been made, the person should undergo multidimensional assessment to personalize and graduate the care plan. In addition, in case of a BMI > 35 kg/m^2 defining complex and very complex obesity, the SC advises addressing the individual to a multi-professional team specializing in nutrition for weight management as well as for a comorbidities check-up. The HAS recommendations also specify that, if bariatric surgery is considered, a multi-professional team meeting must validate the indication, in particular by accurately assessing the physical disability (which may be induced by knee OA).

We also conducted a systematic literature review of all nutritional interventions studied in knee OA: diets, dietary supplements (ie nutraceuticals) or specific foods. Because of the poor quality of the studies, the presence of numerous biases and confounding factors, and the diversity of formulations or doses used, the SC does not recommend the following interventions to alleviate knee OA symptoms: fish oil, vitamin D, seaweed (Aquamin©), creatine, willow bark, natural eggshell membrane, vitamin E, methylsulfonylmethane, boswellia serrata, collagen, ginger, pine bark, hyaluronic acid, L-carnithine, or pre- or pro-biotics.

Research on curcuma is very dynamic, with several meta-analyses [64,65] and numerous randomized trials versus placebo or non-steroidal anti-inflammatory drugs (LoE = 1A). The SC acknowledges that studies have provided the most efficacy data for this supplement, but the data and methodological quality are too heterogeneous to recommend its use in routine practice. On the one hand, studies on curcuma include many differences: bio-optimized formulations, concentration, selected comparator, duration of follow-up. On the other hand, the amount of curcuma able to induce a biological effect cannot be achieved by daily dietary intake. Currently, despite the great attention paid to supplements by people with OA, no food or dietary supplement can be recommended (LoE = 1B).

10. A thermal spa treatment integrating person-centered education and physical activity could be proposed (LoE = 1B).

Thermal spa treatment is a French specificity, not widely studied or practiced internationally. The SC underlined the low level of evidence and lack of reproducibility in studies of spa treatments for knee OA. Recent positive meta-analyses included significant biases [66,67]. A single French study of good methodological quality was published in 2010 and demonstrated a 6-month positive effect on pain and function of thermal spa treatment in combination with physical exercise and person-centered education/information in knee OA [68]. The 3 week-spa treatment included a 15-minute hydrojet session, 15 min of mineral water massage, 15 min of mud therapy and 15 min of mobilization in a mineral water pool. The SC highlighted some limitations: lack of accessibility to occupationally employed individuals and the financial impact of thermalism. In line with what is currently practiced in France [69], the SC advised thermal spa treatment for older adults with knee OA, especially in case of diffuse OA and/or presence of comorbidities limiting drug prescription (expert opinion).

11. Individuals with difficulties at their workplace can be referred to their occupational physician, or alternatively to a regional center for occupational and environmental diseases, to initiate a job retention strategy (LoE = 4).

Knee OA is one of the leading causes of unfitness for work and sick leave days, impacting professional careers [70]. This recommendation is based solely on expert opinion, with no studies available on the topic. However, out of 8266 employees declared unfit for work over a 1-year period between 2019 and 2020 in the Occitanie region (France), 186 cases were linked to knee OA, ie, an incidence of 17.6/100,000 (higher than for rheumatoid arthritis) (unpublished personal data).

The SC has therefore aligned its position with the HAS recommendations for good practice on health and job retention, published in February 2019 [71]. This recommendation aims to inform and guide affected individuals through the medical and administrative procedures required to maintain employment (workplace modification, change of workplace or reconversion), or the possibility of early retirement. Despite the difficulty in accessing occupational physicians, preventing the onset of symptoms in at-risk professions (by improving joint health, ergonomics at work, and weight control, etc.) and addressing complaints as they arise are both crucial. The SC also stresses the importance of a multidisciplinary approach (social worker, occupational physician, general practitioner, rheumatologist, occupational therapist, and PRM physician).

Discussion

These recommendations address non-pharmacological treatments for the management of knee OA, under the umbrella of the SFR and SOFMER. All people with symptomatic knee OA must receive non-pharmacological treatments that systematically include APA, person-centered education and weight loss (if required). These 3 programs are the pillars of these recommendations, with a high level of evidence.

The general principles met with a high degree of agreement within the SC. Adherence, education and PA (weekly exercise and reduced sedentary time) are all mutually complementary measures. Each non-pharmacological intervention can be applied to all people with knee OA without restriction, whatever their impairments, severity or context, as long as individual adjustments are made (eg, type and intensity of physical activity/exercise). Indeed, all these interventions effectively reduce symptoms, are very well tolerated overall, and furthermore can indirectly help to reduce drug consumption. These French recommendations are similar to recent international recommendations, particularly in their general principles [7−11]. However, our recommendations present specific measures that should be highlighted, such as the importance of PA and dedicated professionals, the role of the unloading knee brace in young people, the role of thermal spa treatment, and consideration of the individual's workstation. Regarding this last point, the EULAR task force has just expressed the same opinion concerning people with a disability or at risk of disability at work [11]. Despite the lack of literature in this field, the epidemiological burden - a growing number of young people with knee OA associated with longer working periods - must be considered and deserves to be investigated. Additional studies focusing on interventions to prevent the decline in workability are still needed.

With the exception of recommendations for kinesiotaping, knee sleeves (7.8/10), acupuncture (8.0/10) and thermal spa treatment (8.5/10), the level of agreement was very high (≥ 9 out of 10). The discrepancy for some recommendations may be due to the widespread use of certain treatments based on clinical experience, which might not be fully captured by current studies. For each explanation of the recommendations, we also positioned each intervention in a specific context in order to reflect and integrate experience-based medicine. These results support the need for further studies to invalidate or confirm some of the non-pharmacological therapies. They also aim to change practices by clarifying the level of evidence. Moreover, since these recommendations were drafted, other interventions have been investigated and will certainly be included in the update, such as a recent French study on TENS, showing superiority over weak opioids in knee OA over 3 months [72].

These recommendations also seem positively appreciated by the community of professionals who manage individuals with OA, since the level of agreement of the review committee is overall high. Only some interventions - such as knee sleeves or unloading knee braces, kinesiotaping, analgesic physiotherapy (electrotherapy, thermotherapy, shockwaves, laser, electromagnetic therapies), and acupuncture - received a low level of agreement (scores between 6.1/10 and 7.2/10), probably for several reasons (lack of knowledge of recent literature, experience-based practice, type of professionals interviewed and positioning of each intervention in a specific context).

Regarding the dissemination of these recommendations, we have planned various strategies: i) translation of the manuscript into French for educational purposes; ii) diffusion to French patient associations (such as AFLAR); iii) educational magazines or primary care journals; iv) social networks (Linked in, etc.); v) podcasts by French societies (rheumatology, PMR, general medicine, etc.); vi) professional meetings (congresses, regional meetings, medical training, and conferences); and vii) other training programs for healthcare professionals (university, faculty of medicine, faculty of health, etc.). In addition to improving their use and promoting their implementation, we will be developing clinical vignettes to determine whether these recommendations are being followed. This will enable us to integrate non-pharmacological interventions with pharmacological interventions published in 2020 [6]. We also plan to conduct future qualitative studies on healthcare professionals' awareness of the existence and applicability of these recommendations.

The strength of these recommendations lies in the fact that they were drawn up by an SC with multidisciplinary expertise in both clinical trials and clinical practice in knee OA. This diverse SC reflects the full range of healthcare professionals involved in the management of people with knee OA and also included 2 women with OA. These recommendations provide guidance on the prescription and positioning of non-pharmacological treatments for knee OA.

Conclusions

These are the first SFR and SOFMER recommendations on non-pharmacological interventions for knee OA. This work is the result of a major collaborative effort aimed at a wide audience of people and healthcare professionals (general practitioners, rheumatologists, rehabilitation specialists, physiotherapists, APA instructors, occupational therapists, occupational physicians, orthopedists, dieticians, nutritionists and geriatricians).

Members of the review committee

The reading committee was contacted by e-mail with anonymous answers. The committee comprised 54 professionals: 3 physiotherapists, 26 rheumatologists, 6 PRM specialists, 7 orthopedic surgeons, 4 nutritionists, 2 APAs, 1 sports medicine specialist and 4 general practitioners.

Declaration of competing interest

Each member of the SC submitted a declaration of interest prior to the meetings. Any potential conflicts of interest were managed by the SFR Ethics Commission before the 1st meeting. In the case of conflicts of interest, the participant(s) did not take part in discussions or vote. Some of the members of the SC declare conflicts of interest: i) PO: Proteor (consulting, hospitality, grants); ii) CN: Thuasne (consulting, hospitality); iii) YH: Wobenzym, Thuasne, Tilman (Consulting fee); iv) AD: Thuasne (consulting, hospitality). The other authors declare that they have no links of interest in connection with this work.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version at doi:10.1016/j.rehab.2024.101883.

Appendix 1: Search strategy

- Full list of interventions included in the analysis
- MeSH strategy + Entry terms for each working group (WG)

Appendix 2: Plant decree published in 2014

This document lists the plants, other than algae, fungi and lichens, approved for use in food supplements, in accordance with article 7 of decree no. 2006-352 on food supplements.

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