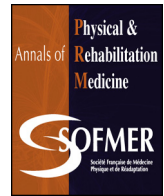




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Review

Orthoses for osteoarthritis: A narrative review

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ABSTRACT

Orthoses for osteoarthritis represent splints, taping, sleeves, unloading knee braces and insoles. This review of the effectiveness of these orthoses involved a search for articles published up to 2015 in MEDLINE via PubMed, with a focus on Osteoarthritis Research Society International, American College of Rheumatology and European League Against Rheumatology international recommendations. Evidence for splinting effectiveness in patients with thumb-base osteoarthritis is now provided. Splints for thumb-base osteoarthritis decrease pain and functional disability. Weaker evidence was found for knee bracing, including taping, sleeves and unloading braces. Low rate of observance and safety results should be considered before using current unloading knee braces for knee osteoarthritis. For insoles, data remain controversial. Orthoses for interphalangeal or hip osteoarthritis have not been investigated in a randomized trial. Regardless, if indicated in daily clinical practice, bracing must be checked by a healthcare professional to insure the suitability of the device. Patients using bracing must be educated. Patient education should include knowledge of the aims and modalities of the treatment as well as knowledge of potential side effects. Patients should be encouraged to contact the therapist if adjustment is needed, with poor tolerance or with questions about the device.

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1. Introduction

Orthoses include a large spectrum of external devices [1]. They are currently proposed for the main locations of limb osteoarthritis (OA) – hand, hip and knee. Data about the use of orthoses by patients or their medical prescription in daily practice remain sparse.

Half of the patients with hand OA have been reported to use orthoses [2]. More patients with thumb-base OA use orthoses than those with interphalangeal involvement (64% vs. 41%). Among patients with lower limb OA, the proportion is 10% to 25% for knee or foot orthoses [3]. A survey of 2000 French general practitioners indicated that 10% usually prescribe knee orthoses for patients with knee OA [4]. Surveys of rheumatologists and specialists in physical medicine and rehabilitation indicate variability in practice depending on the medical speciality and the type of device [5,6]. Among splint, tapes, sleeves, and unloading knee braces, elastic sleeves are the most-prescribed. Insoles are prescribed by 10% to 30% of physicians, more often for knee than hip OA [7]. Insoles are wedge or shock-absorbing. With the increasing importance of non-pharmacological treatment in recommendations for OA, orthoses will increase in use.

Regardless of beliefs about orthoses for OA, randomized clinical trials now provide useful information for evidence-based analyses of their effectiveness and safety profile as well as therapeutic decision making. Physicians who treat OA should be aware of this emerging literature as well as the advantages and drawbacks of orthoses for OA in daily practice. The main objectives of this review were to briefly describe the devices used for osteoarthritis and to report conclusions from recommendations, randomized clinical trials and meta-analyses on the topic.

MEDLINE via PubMed was searched for articles published up to 2015 with the keywords osteoarthritis, hand, hip, knee, orthosis, brace, bracing, splint, and external device. The following are the results for orthoses for OA, with a focus on Osteoarthritis Research Society International (OARSI), American College of Rheumatology (ACR) and European League Against Rheumatology (EULAR) international recommendations.

2. Orthoses for hand OA

2.1. Description of bracing for thumb-base and interphalangeal OA

Devices for thumb-base OA aim at immobilizing the carpometacarpal joint and opening the first web (Fig. 1A) [1]. They are semi-rigid or rigid splints that can be prefabricated or custom-made by healthcare professionals. Rest and functional orthoses

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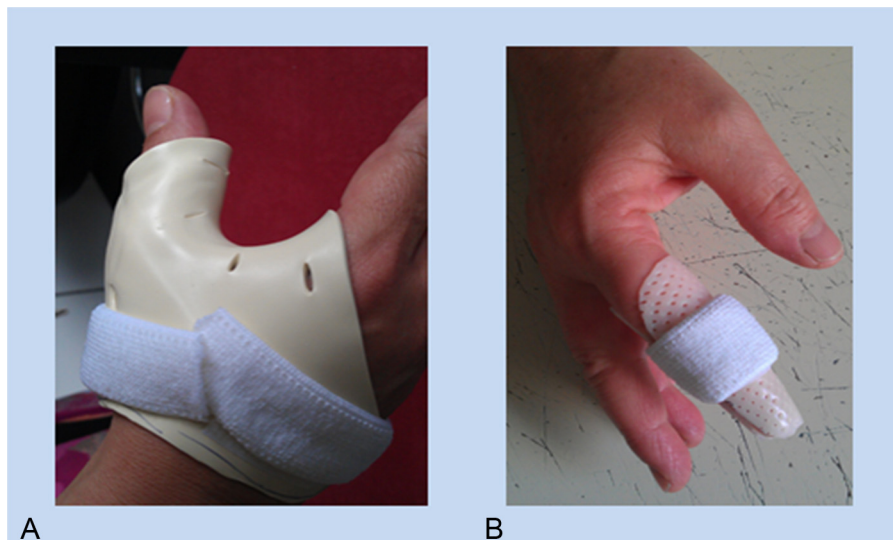


Fig. 1. A. Splint for thumb-base osteoarthritis: a custom-made device crossing the carpometacarpal and metacarpal joint. B. Splint for osteoarthritis of the digit.

are distinguished. Splints systematically cover the carpometacarpal joint and the thenar eminence. Crossing the metacarpophalangeal joint or the wrist has been proposed. Devices for interphalangeal OA aim at immobilizing the distal joints or proximal and distal digital joints. These are custom-made rest orthoses (Fig. 1B).

2.2. Effectiveness of bracing for hand OA

The EULAR and the ACR recommend splinting for thumb-base OA [8,9]. Orthoses for interphalangeal OA are not considered in these recommendations. Regardless of expert opinions, their lack of consideration is probably due to the lack of a randomized trial assessing the effectiveness of splints for interphalangeal OA.

2.3. Effectiveness of bracing for digital OA

The effectiveness of bracing for digital OA has not been studied in a clinical trial. Descriptive reviews only suggest its usefulness [1]. This hypothesis remains to be investigated in clinical trials.

2.4. Effectiveness of bracing for thumb-base OA

Splinting for thumb-base OA was investigated in a high-powered multicenter randomized clinical trial with a non-splint parallel comparison [10]; 112 patients with thumb-base OA were included. Half were asked to wear a custom-made rigid orthosis during the night. The splint covered the carpometacarpal joint, the thenar eminence and the metacarpal joint but not the wrist. Patients were assessed at 1 and 12 months. Treatment adherence was high: 93% of patients reported wearing the splint 5 to 7 nights a week at 1 month and 86% at 12 months. No adverse event directly attributable to the splint was reported. At 1 month, no between-group difference was observed. However, wearing a splint significantly decreased pain and functional disability at 12 months. Another randomized trial compared a functional splint and a non-splint control in 40 patients, with a parallel design [11]. The device was a rigid custom-made orthosis. Wearing the splint was associated with reduced pain but not functional disability at 6-week and 3-month follow-up.

Nine randomized trials – 6 cross-over and 3 parallel design – compared different orthoses: short splints covering the carpometacarpal joint only and long splints covering the carpometacarpal

and metacarpal joints; non-rigid, semi-rigid and rigid devices; and prefabricated and custom-made orthoses [12–20]. The results were negative or controversial and therefore prevent any conclusions on the relative superiority of one device over another.

3. Orthoses for lower limb OA

3.1. Description of knee bracing for knee OA

Knee bracing for knee OA includes the use of rest orthoses, taping, sleeves and unloading braces (Fig. 2) [1]. Rest orthoses aim at joint immobilization to exclude any dynamic, corrective or functional effect. They consist of a stiff composite. Taping, sleeves and unloading braces are functional devices. Knee taping for OA involves the use of elastic adhesive devices to center the patella and decrease the load applied to the lateral part of the patellofemoral joint. Knee sleeves are elastic non-adhesive orthoses associated or not with various devices aimed at patellar alignment or frontal femorotibial stabilisation. Unloading braces consist of external stems, hinges and straps. They aim at decreasing compressive loads transmitted to the joint surfaces, in the medial or the lateral femorotibial compartment, depending on the valgus or varus position of the device. As for splints for thumb-base OA, unloading braces can be prefabricated or custom-made by healthcare professionals.

3.2. Effectiveness of knee bracing for knee OA

Contrary to orthoses for thumb-base OA, recommendations about knee bracing for knee OA are controversial. The ACR conditionally recommends medial knee taping [9]. Bracing is absent from EULAR recommendations [21]. The OARSI recommends biomechanical interventions, which therefore may include knee bracing [22]. Differences in scientific panels, opinions and methodology explain in part this discrepancy.

3.3. Effectiveness of rest orthoses for knee OA

The effectiveness of rest orthoses for knee OA has not been studied in clinical trials. Descriptive reviews have only suggested their usefulness [6]. Rest orthoses could be interesting for transient immobilization in knee effusion OA. However, this hypothesis should be tested in clinical trials.

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