

# Clinical and biomechanical effects of using a customized orthosis in medial knee osteoarthritis

## Abstract

Osteoarthritis is the major cause of pain in the elderly, the primary goal of treatment is to relieve pain and prevent disease progression by reducing joint stress. Valgus orthosis are a non-invasive, non-pharmacological form of treatment of these patients. Custom-made orthoses were performed for each individual with standardization of the procedure of measurement and preparation of the same, providing better adaptation and comfort to the individual member, being considered of fundamental importance for therapeutic success.

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## Introduction

Knee osteoarthritis (OA) is the most commonly seen type of arthritis, especially in the elderly population.<sup>1</sup> The prevalence of medial compartment OA is almost five times that of the lateral compartment. A common reason cited for this increase is that 62% of the loading passes through the medial compartment during walking. Initially, there is a tendency towards a varus deformity, followed by an increase in the adduction moment in the knee during gait as well as a reduced joint space in the medial compartment.<sup>2-4</sup>

The conservative treatment of medial osteoarthritis of the knee involves several techniques; physiotherapy has an important role using several resources, among them valgus orthoses, because minimization of loading on the medial compartment is the ultimate strategic biomechanical goal of treatment, for patients with medial compartment knee OA.<sup>5-7</sup>

The benefits of using orthosis are a consensus in the literature; however, valgus orthoses are made of rigid material that promotes correction of gait moment,<sup>6,8</sup> but are of difficult adaptation to the individual, as they promote areas of pressure and, eventually, cutaneous lesions. Custom-made orthoses would have the beneficial effect of providing a better fitting and increasing adherence, reducing therefore lesions in this subjects.<sup>9</sup>

There are many studies in the literature comparing the use of orthoses, but evidencing the difficulty of adherence to treatment for several reasons. The review by Moyer et al.<sup>10</sup> pointed out that side effects were frequent, reported by 25% of the patients who used the orthoses; among these side effects are: discomfort, poor adjustment of the orthoses, sweating, and skin irritation; the latter ranking first among reported complaints. The low rate of adherence to treatment was also a concern in some studies.<sup>9,11-13</sup>

Adaptation and acceptance of orthoses by patients are still a problem; some authors have shown that the time wearing the orthosis was less than 3h per day as compared to the use of insoles.<sup>12</sup> This is probably due to the uncomfortable structure and design of the devices. There is also evidence that patients with knee OA<sup>14</sup> do not use the devices for prolonged times.

However, we believe that these effects could be minimized if

custom-made orthoses were performed for each individual, with standardization and preparation of the measurement procedure, providing better adaptation and comfort to the individual's limb, being considered of fundamental importance for therapeutic success. Only four studies report the use of custom-made valgus orthoses.<sup>9,11,13,15</sup>

Therefore, the main advantage of the adapted orthosis system is the ability to provide an adjustable corrective force within the orthosis, by the correction of the knee part by improving the load distribution at the joint.

The use of the orthosis tends to promote better alignment and provides pain relief to patients, increasing their functionality and, consequently, improving the gait pattern.

## Conclusion

The authors were sufficiently encouraged by the results obtained with the use of the orthosis and felt confident that the evaluated orthosis could represent a viable alternative to OA treatments of the medial compartment of the knee. The custom-made valgus orthosis is, therefore, an efficient method for the treatment of medial osteoarthritis of the knee with varus deformity.

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## Conflict of interest

The authors declares no conflict of interests.

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