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Extracts from:
Comparing radiological examinations between hallux valgus night brace and a new dynamic orthosis for correction of the hallux valgus

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Introduction

Hallux valgus has become the most common foot affection. Numerous studies, for example from Sim-Fook and Hodgson (1958), demonstrate that the civilizatory development from walking barefoot to wearing modern shoes massively increased the incidence of hallux valgus. A familial disposition towards hallux valgus is established. Most patients are women in their 4^{th} – 6^{th} decade (Kato und Watanabe 1981, Coughlin 1966, Coughlin und Thompson 1966). However, the patients are becoming increasingly younger.

According to the textbooks, a conservative treatment of hallux valgus is not possible (compare Bischoff and Wirth 2001, Schuh et al. 2007). Contrary to that, new studies by Torkki et al. 2001 and 2003 demonstrate that a conservative treatment of hallux valgus by means of an orthosis is promising and otherwise necessary operations can be postponed.

However, a permanent correction of the axis was not possible so far. Up to now conservative measures meant using a hallux valgus night splint for therapy and postoperative treatment. Well-known disadvantages of this rigid night splint are the local pressure load on the one hand, lack of wearing comfort and, on the other hand, the impossibility of even walking a few steps. Besides, the hallux valgus night splint does not correct the splayfoot, which is the actual cause of hallux valgus (Bischoff and Wirth 2001, Milachowski et al. 2007, Schuh et al. 2007 , Wülker 1997).

In cooperation with the Fraunhofer Institute a dynamic splint (Hallufix®) was developed for the active correction of light to moderate hallux valgus. The orthosis has six major functions:
- metatarsal bandage,
- supports the transversal arch with a pad
- anatomic splint for the 1^{st} metatarsal
- soft part pad for pressure relief
- free mobility of the base joint of the big toe
- toe splint with corrective bandage.

The individually adjustable reins enable correction of the malpositioning. The splint is designed for day and night use and can also be worn in normal shoes. Initial clinical studies demonstrated a correction of the hallux valgus with this conservative therapy (Neumann 2005, Milachowski et al. 2007).
Postoperative studies on the treatment of hallux valgus have also been performed

with the newly developed orthosis (Milachowski 2007, Werzinger 2006).

A comparative radiological study on the efficiency of the conservative correction of

hallux valgus was performed with a conventional night splint and the newly developed orthosis (Fig. 1-3).

Results

The radiological studies of 20 feet with light to moderate hallux valgus demonstrate that the malpositioning can effectively be corrected by a night splint as well as the new dynamic orthosis (Tab. 1).
The initial hallux valgus angle (α) was an average of 28.8° (minimum 20°, maximum 46°). The night splint allowed a – statistically significant – reduction to 18.4° with a low value of 10° and a high value of 30°.
The newly developed Hallufix® orthosis corrected the malpositioning to normal values with an average value of merely 11.6°, minimum 8° up to a maximum of 18°. The differences are statistically significant ($p < 0.05$).

Naturally, the splayfoot could not be corrected as well with the night splint as with the newly developed dynamic orthosis, which simultaneously serves as a metatarsal bandage.
Thus the average intermetatarsal angle DI – DII (β) was an average of 16° within a range from a minimum of 12° to a maximum of 24°.
The night splint enabled a mild correction to an average of 13° (min. 8°, max. 18°), the differences are not statistically significant ($p > 0.05$).
With the newly developed dynamic orthosis the intermetatarsal angle was also normalized at a value of 10.2° (min. 8°, max. 12°). The difference to the initial result is also significant in this case ($p < 0.05$), this correspondingly applies to the night splint and hallux valgus for the correction of the intermetatarsal angle (Fig. 4—12).

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