PEDOGRAPHIC ASSESSMENT OF CLINICAL AND FUNCTIONAL OUTCOME AFTER HALLUX VALGUS SURGERY – COMPARISON OF 32 PATIENTS BEFORE AND AFTER SCARF OSTEOTOMY

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INTRODUCTION

The Scarf osteotomy has become a standard surgical treatment of pre-arthritic hallux valgus deformities. Several reports evaluated short and long term results but focused on subjective, clinical and radiographic results [5,6]. More recent studies also applied pedographic measurements for a functional evaluation of foot loading characteristics after surgery [1,7]. However, few studies investigated the relationship between subjective, clinical and radiographic outcome with pedographic results and only one study reported also about the behavior of the, contralateral foot in comparison to the operated foot [1].

The aim of this study was to evaluate patient satisfaction, clinical, radiographic and pedographic parameters in order to determine the subjective and functional outcome after surgery.

METHODS

32 unilateral hallux valgus patients that had been treated with a Scarf osteotomy performed by one surgeon (C.K.) were investigated after a mean follow-up of 33 months. Patients reported subjective satisfaction with the surgical outcome, cosmetic appearance, and pain. For the clinical evaluation, the AOFAS score was applied [2]. Hallux valgus and inter-metatarsal angles were determined from weight-bearing x-rays. Pedographic measurements were performed before surgery and repeated at follow-up with a capacitive pressure distribution platform (emed ST-4, novel Munich). Foot prints were subdivided into ten regions and plantar pressure patterns were analyzed with respect to peak pressure, maximum force, and impulse values.

RESULTS AND DISCUSSION

28 of the patients (87.5%) described the result of the operation as excellent or good, one patient (3.1%) as fair and three (9.4%) as poor. The AOFAS Score reached 89 out of 100 points after surgery. The hallux valgus angle improved significantly from 32.5° to 6.6° ($p<0.0001$) and the inter-metatarsal angle from 15.5° to 6.6° ($p<0.0001$). Maximum force and impulse decreased under the lateral forefoot ($p<0.038$) and increased under the medial forefoot ($p<0.001$). Loading also increased significantly under the hallux (maximum force $p<0.0001$, impulse $p<0.001$) indicating that the hallux became more actively involved in the rollover process. Comparison of the operated and contralateral foot revealed a good restoration of loading symmetry. Correlation analyses demonstrated an influence of postoperative pain ($r=0.549$) and hallux valgus angle ($r=0.443$) on patient satisfaction: Patients were more satisfied with lower hallux valgus angles.

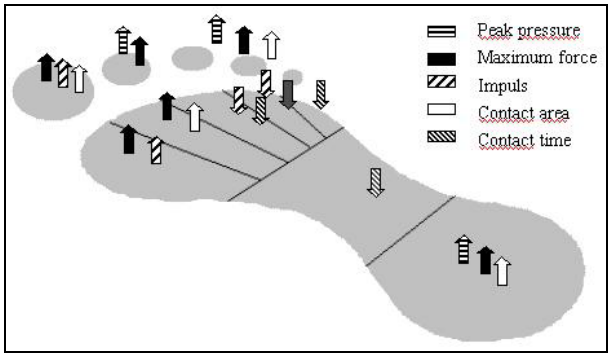

Figure 1: Summary of the significant changes of the operated foot before and after surgery.

The results indicate that the Scarf osteotomy achieved a high rate of subjective patient satisfaction, good restoration of foot function. A good symmetry between affected and contralateral feet was demonstrated. These results are reflected in the patient satisfaction. The correction of the hallux valgus angle is more pronounced than in comparable reports [4,8]. A significant relationship was seen between the postoperative hallux valgus angle and patient satisfaction as well as the extent of medial load shift. This load shift has been described after a follow-up of 20 months [1] and 18 months following Scarf osteotomy [7]. The present results showed a similar load transfer with an off-loading of the first ray before surgery that can be reversed with successful surgery to achieve a more physiologic loading. However, this may take up to one year. The loading changes are not confined to the affected foot but the contralateral foot may also show discrete changes as a consequence of the deformity as well as after surgery. Gait symmetry appeared well restored in the present population after surgery.

CONCLUSIONS

The Scarf osteotomy appears to be a well suited procedure for correction of severe hallux valgus deformities. Pedographic analyses offer an objective evaluation of the complex changes after surgery.

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