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The influence of personality traits on the subjective outcome of operative hallux valgus correction

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Abstract We studied prospectively the influence of personality traits on the subjective outcome of a chevron osteotomy in 42 patients with hallux valgus. The mean age of patients was 48.3 (20–70) years. Personality traits were evaluated by the means of the Freiburg Personality Inventory (FPI-R). Three months postoperatively 37 patients were satisfied, and five patients not satisfied with the operative procedure. The preoperative AOFAS Score improved from an average of 48.7 (30–65) points to 87.9 (50–100) points. A comparison of satisfied and dissatisfied patients revealed statistically significant differences in the personality traits aggressiveness ($p=0.003$), extraversion ($p=0.001$) and health worries ($p=0.04$). The postoperative hallux valgus angle was $12.2\pm 7.8^\circ$ and $13.4\pm 8.3^\circ$ ($p=0.74$) among satisfied and not satisfied patients, respectively, and the intermetatarsal angle (I–II) was $7.4\pm 2.5^\circ$ and $7.6\pm 4^\circ$ ($p=0.89$), respectively. The results suggest that the patient's subjective result after the operative correction may be influenced by some individual, personality profiles.

Résumé Nous avons étudié l'influence des traits de la personnalité sur le résultat subjectif d'une ostéotomie en chevron chez 42 malades avec hallux valgus. L'âge moyen des malades était de 48,3 ans (20–70). Les traits de la personnalité ont été évalués au moyen de l'Inventaire de Personnalité de Fribourg (FPI-R). A trois mois postopératoires 37 malades étaient satisfaits de la procédure opératoire, et 5 ne l'étaient pas. Le Score préopératoire

AOFAS a été amélioré d'une moyenne de 48,7 (30–65) points à 87,9 (50–100) points. Une comparaison de malades satisfaits et non satisfaits a révélé des différences statistiquement significatives dans le caractère agressif des traits de la personnalité ($p=0,003$), extraversion ($p=0,001$) et inquiétude sur sa santé ($p=0,04$). L'angle de l'hallux valgus postopératoire était respectivement de $12,2\pm 7,8^\circ$ et $13,4\pm 8,3^\circ$ ($p=0,74$) pour les malades satisfaits et les malades non satisfaits, et l'angle intermétatarsien (I–II) était de $7,4\pm 2,5^\circ$ et $7,6\pm 4^\circ$ ($p=0,89$) respectivement. Les résultats suggèrent que le résultat subjectif après la correction opératoire peut être influencé par le profil de personnalité du malade.

Introduction

Operation for hallux valgus is one of the most frequently performed surgical procedures [17]. Sometimes patients are not satisfied with the outcome although an objective examination cannot reveal any obvious complication. This experience encouraged us to perform the current study. The purpose of this prospective study was to analyse the hypothesis whether personality traits influence the outcome of hallux valgus surgery.

Materials and methods

Between August 2000 and March 2002, 46 consecutive patients scheduled for operative hallux valgus correction were enrolled in the study. For inclusion, the patients had to be between 19 and 70 years with a mild to moderate hallux valgus deformity [1]. A written informed consent form was given by every patient. Four patients were excluded from the study. Two patients did not give their consent, one patient refused to participate in the postoperative interview and in one patient the operation was cancelled due to medical problems. In total, 42 patients were included in the study.

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In all patients we performed a chevron osteotomy [1]. Patients were allowed to walk from the first day, using an off-the-shelf hallux valgus shoe. After the initial visit for removal of sutures patients returned weekly for 6 weeks. The pin was routinely removed 4 weeks after the operation. The last follow-up visit was 3 months postoperatively, which was also the endpoint of the study.

The physical examination included range of motion of the first metatarso-phalangeal joint, and an assessment using the American Orthopaedic Foot and Ankle Society's (AOFAS) hallux metatarso-phalangeal Interphalangeal scale [6]. Preoperative antero-posterior and lateral weight-bearing radiographs were compared to radiographs obtained at the last follow-up visit. The examination included measurement of hallux valgus and intermetatarsal angles [13]. The aim of the operative procedure was to correct the deformity with a resultant hallux valgus angle of less than 15° and first-second intermetatarsal angle less than 9° [1]. The patient satisfaction was rated at the time of last follow-up as very satisfied, satisfied and dissatisfied.

The patients were interviewed twice, first the day before operation, and secondly 12 weeks after the surgical procedure. All interviews were conducted by one of the authors (UL), who did not participate in operations or radiographic examinations. The psychological parameters were calculated using the Freiburg Personality Inventory (FPI-R). This inventory is a German multidimensional personality form and consists of ten traits and two dimensions of personality ("extraversion/introversion"; "emotional stability/instability"), which are reached by self-evaluation from answers to 138 questions. The scales are: life satisfaction, social orientation, performance orientation, inhibition, excitability, aggressiveness, strain, somatic distress, health worries, openness, extraversion, and emotional stability. Higher scores do represent higher expression of the items. The norms of the FPI-R are derived from a representative sample of the German population including 2,035 probands. The testing of the personality traits took approximately 30 min to complete per patient.

The statistical analysis was carried out using SPSS 11.0.1 for Windows (SPSS, Inc., Chicago, Illinois 60606). Descriptive statistics were calculated for clinical and radiographic, and psychometric tests. To establish group differences at the interval scale level, the *t*-test for independent samples was employed. To calculate differ-

ences in the nominal level, the chi-square test was used. A *p*-value of less than 0.05 was considered as statistically significant.

Results

The mean age of patients at the time of operation was 48.3 years (20–70). There were 38 female and four male patients. Hallux valgus angle was preoperatively on average 30.6° (14–50°), and at the last follow-up visit 12.3° (–14° to 28°). The first-second intermetatarsal angle improved from 13.9° (8–20°) to 7.4° (2–14°). Dorsiflexion and plantarflexion of the first metatarso-phalangeal joint was preoperatively 53.5° (30–70°) and 29.7° (15–40°), respectively, and at the last visit 42.4° (30–60°) and 24.8° (10–40°).

Three months postoperatively 24 patients were very satisfied, 13 were satisfied, and five patients dissatisfied. The preoperative AOFAS score improved from an average of 48.7 points (30–65) to 87.9 points (50–100).

An analysis of dissatisfied patients revealed an average hallux valgus angle of 13.4° (8–28°) and intermetatarsal angle of 7.6° (4–14°) at the last follow-up visit. In four patients the radiological result as judged from the hallux valgus angle and the intermetatarsal angle was stated as good. In the fifth patient the radiological result was unsatisfactory and a revision operation recommended. Employed patients returned to work after an average of 7.3 (6–12) weeks. Satisfied patients were on workers compensation for an average of 7.1 (6–12) weeks, whereas dissatisfied patients used 9.4 (8–12) weeks (*p*<0.001) (Table 1).

Complications

Pain, swelling and secretion at the pin entrance point, indicating a local infection, was seen in two patients. The patients were treated with antibiotics and early pin removal and were satisfied with the procedure at the last follow-up visit.

Table 1 Comparisons of clinical and radiological results between satisfied and dissatisfied patients

HVA stands for hallux valgus angle, IMA for first-second intermetatarsal angle, MTP I first metatarso-phalangeal joint, AOFAS American Orthopaedic Foot and Ankle Score.
^aDenotes statistical significant difference.

	Satisfied patients (N=37)	Dissatisfied patients (N=5)	<i>p</i> -value
HVA preoperative	30.9° (±7.6°)	27.2° (±7°)	0.30
HVA postoperative	12.2° (±7.8°)	13.4° (±8.3°)	0.74
IMA preoperative	14.1° (±3.2°)	13.2° (±2.2°)	0.54
IMA postoperative	7.4° (±2.5°)	7.6° (±4°)	0.89
Range of motion (MTP I) preoperative	84° (±11°)	76° (±11°)	0.15
Range of motion (MTP I) postoperative	68.5° (±13°)	58° (±13°)	0.09
AOFAS preoperative	48.4 (±6)	50 (±6)	0.6
AOFAS postoperative	89.4 (±7.8)	72.8 (±4.1)	<0.001 ^a
Weeks on workers compensation	7.1 (±1.2)	9.4 (±1.7)	<0.001 ^a

Psychometric results

The evaluation of the scales of the preoperative FPI-R, revealed statistical significant differences between the two groups (satisfied and not satisfied patients) in regard to the personality traits aggressiveness ($p=0.003$), extraversion ($p=0.001$), and health worries ($p=0.04$). With the numbers available no significant differences were found in the other personality traits of the FPI-R (Table 2).

Discussion

Patient satisfaction is an essential outcome measure indicating the quality of care with great clinical and economic implications [7]. Generally, postoperative outcomes are measured using clinical scoring systems. Whereas many scoring systems are blamed for having little correlation with the overall outcome [11], the AOFAS score [6] is considered a consensus score [11]. The AOFAS score provides a good and reliable method in representing the outcome of the procedure, which clearly has been shown in our results.

The patients' main expectations from operative hallux valgus correction are a pain-free great toe and no problems with wearing conventional shoes [12]. It has been stated that a successful correction of the hallux valgus deformity depends upon recognition of the specific anatomic deformity, followed by selection of a procedure that addresses the specific deformity [8]. In addition, careful attention should be paid to surgical technique to obtain consistent and satisfactory results [9]. The operative correction of a painful hallux valgus deformity is an effective treatment [18]. But it is important to note that with the increased numbers of bunion surgeries the potential for complications increases, even when experienced surgeons perform the operations [5, 10]. However, patient satisfaction in hallux valgus surgery seems to be related to pain relief but often includes a subjective opinion about cosmetic appearance, which makes this type of orthopaedic surgery particularly different. To the best of our knowledge, we are not aware of a study, which emphasizes a possible

influence of personality traits on the outcome of the surgical correction of the hallux valgus deformity.

However, the influence of psychological factors on the outcome of operative procedures has already been published [2, 4, 15, 16, 19]. In the study of Straub et al. on patients with endoscopic carpal tunnel release an increased likelihood of unsatisfactory results were found in patients with abnormal psychological factors ($p<0.05$) [15]. With the knowledge of the important influence of psychological stresses in patients with chronic low back pain it has been proposed that these factors should be addressed before major surgery [3]. In addition, in a recent study on the therapy of chronic low back pain, patients were randomized to surgical or non-surgical treatment [2]. The results indicated that a personality characterized by low neuroticism was a significant predictor for functional improvement after surgical treatment, and the conclusion was made that improved selection of successful surgical candidates with low back pain seems to be promoted by the evaluation of personality traits [2], a notion which we fully support. Also in studies of patients with lumbar discectomy [14], and spinal fusion [19] poor outcomes have been reported in psychologically disturbed patients. In contrast other studies have demonstrated that there is no significant difference in outcome of lumbar discectomy between normal and psychologically disturbed patients [4], and the postoperative improvement after posterior lumbar interbody fusion was unrelated to the patients preoperative psychology [16].

We tested the Personality traits in our patients with the Freiburg Personality Inventory. Significantly higher rates in the personality traits aggressiveness, health worries and extraversion were found among dissatisfied patients in our study. Interpretations of the personality traits are in regard to aggressiveness seen as a higher ability to assert oneself. The term health worries are used for being health-conscious and hypochondriac with the intention to avoid damage or risk, and the term extraversion is used for impulsiveness and the tendency to be fond of company.

We acknowledge that this study has some shortcomings. Firstly, the follow-up period of 3 months might be considered as very short. However, we have the opinion that this period is of interest, because the majority of

Table 2 Personality traits in patients scheduled for operative hallux valgus correction—as assessed by Freiburg Personality Inventory-Revised (FPI-R)—and related to the final outcome

FPI scales	Satisfied patients ($N=37$)	Dissatisfied patients ($N=5$)	p -value
Life satisfaction	8.4 (± 2.4)	9.8 (± 1.5)	0.2
Social orientation	7.2 (± 2.5)	5.4 (± 2.1)	0.1
Performance orientation	7.1 (± 2.3)	8.6 (± 2.7)	0.1
Inhibition	5.1 (± 2.5)	4.2 (± 2.8)	0.4
Excitability	4.3 (± 2.2)	6.2 (± 3.6)	0.09
Aggressiveness	3.65 (± 2.3)	7 (± 2)	0.003 ^a
Strain	5.1 (± 3.9)	5 (± 1.9)	0.9
Somatic distress	3.8 (± 2.7)	3.6 (± 3.2)	0.8
Health worries	6.6 (± 2.9)	9.4 (± 2.6)	0.04 ^a
Openness	4.2 (± 2.9)	6 (± 3.2)	0.2
Extraversion	5.4 (± 2.9)	9.8 (± 1.3)	0.001 ^a
Emotional stability	5.2 (± 3.5)	5.8 (± 3.1)	0.7

^a Denotes statistical significant difference.

patients within this time should have returned nearly pain-free and satisfied to their daily activities and work. Secondly, although a statistically significant difference was found between satisfied and dissatisfied patients according to some personality traits, the study group is rather small. However, we want to emphasize that further prospective study including larger series and longer follow-up periods are needed to better clarify the role of personality profiling prior to surgery. Thirdly, we used only one operative technique in order to achieve best comparability between the patients. It stands however in contrast to the recommendation of operative versatility to address the different anatomical abnormalities in this condition [1].

Although the hallux valgus deformity is corrected successfully according to radiological parameters, some patients are not fully satisfied with the result. Such unsatisfactory results may be influenced by personal attributes like aggressiveness, extraversion and health worries.

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