The Journal of Foot & Ankle Surgery 52 (2013) 422–425

Contents lists available at ScienceDirect

The Journal of Foot & Ankle Surgery

journal homepage: www.jfas.org

Original Research

Outcome after Metatarsal Osteotomy for Hallux Valgus: A Study of Postoperative Foot Function Using Revised Foot Function Index Short Form

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ARTICLE INFO

Level of Clinical Evidence: 3
Keywords:
bunion
bunionectomy
hallux valgus
metatarsal osteotomy
outcome study

ABSTRACT

The aim of the present study was to evaluate patients' perception of their functional outcome at 6 and 12 months after surgical correction for hallux valgus using the Foot Function Index Revised short form. A total of 59 patients underwent 68 osseous and soft tissue procedures for the correction of hallux valgus deformity from January 2009 through December 2010. The outcome analysis was based on the validated patient questionnaire, the Foot Function Index Revised. The preoperative data were collected on the day of the patient's surgery using the Foot Function Index Revised short-form questionnaire. The postoperative data were collected at 6 and 12 months after the patient's initial surgical date using the same validated questionnaire. The cumulative Foot Function Index Revised score and the scores in each subscale demonstrated statistically significant data at both 6 and 12 months of follow-up. On average, the Foot Function Index Revised scores had improved by 39% at 6 months and 50% at 12 months. The improvement in all scores indicated an improvement in health-related foot function after hallux valgus surgery, evidencing effective surgical intervention. Expectations are the best predictors of patient satisfaction, and the present study has provided statistically significant data to allow physicians to establish realistic outcomes after surgical correction for hallux valgus deformity.

Many surgical approaches and techniques are available for the repair of hallux valgus deformities; however, the goal of surgical intervention, regardless of the procedure choice, remains the same: to reduce pain and improve function and quality of life (1,2). These goals are accomplished by restoring the anatomic alignment and stability of the joint through soft tissue and osseous surgical procedures (3). Many studies have compared the surgical approaches and related the physician's perception of the outcomes (4–6); however, few studies have evaluated patient satisfaction using a validated outcomes tool (2). Several outcomes tools exist for reporting the treatment results of patients with foot and ankle disorders; however, the best choice remains unclear (7,8). One concept that remains certain is the need to assess patient satisfaction and quality of life after hallux valgus surgery. This should be accomplished with an outcomes tool that detects differences in functional status, evaluates patient perceptions of functional problems, allows for the comparison of functional status over time, and evaluates the effectiveness of treatment (8,9).

The outcomes instrument, the Foot Function Index Revised (FFI-R), is a theoretical model of foot functioning that has been validated and shown to be a reliable and responsive measure of health-related foot function (Fig. 1) (10). The FFI-R has 5 subscales that assess foot health-related quality of life in terms of the conceptual components of pain, stiffness, psychosocial stress, difficulty with everyday tasks, and activity limitations. The FFI-R short form was developed to obtain a total foot functioning score, with a greater score indicating a poorer perception of foot function. It is an abbreviated questionnaire that can determine a patient's functional status and perception of the outcome after bunion surgery (5). It also allows for preoperative and postoperative comparisons to evaluate the effectiveness of the surgery. The present prospective study evaluated patients' perception of functional outcome at 6 and 12 months after surgical correction for hallux valgus using the FFI-R short form.

Patients and Methods

The institutional review board at Loyola University Medical Center approved the present project in January 2009. All patients provided informed consent before participation in the study.

Financial Disclosure: None reported.
Conflict of Interest: None reported.

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http://dx.doi.org/10.1053/j.jfas.2013.03.004

FFI-R Short Form

Response options:

1 = No pain 4 = Severe pain 7 = Does not apply
2 = Mild pain 5 = Very severe pain
3 = Moderate pain 6 = Worst pain imaginable

Pain

1. Before you get up in the morning?
2. When you first stood without shoes?
3. When you stood wearing shoes?
4. When you walked wearing shoes?
5. When you stood wearing custom shoe inserts?
6. When you walked wearing custom shoe inserts?
7. At the end of a typical day?

Stiffness

8. Before you get up in the morning?
9. When you stood without shoes?
10. When you walked without shoes?
11. When you stood wearing shoes?
12. When you walked wearing shoes?
13. When you walked wearing custom shoe inserts?
14. Before you went to sleep at night?

Difficulty

15. Walking outside on uneven ground?
16. Walking four or more blocks?
17. Climbing stairs?
18. Descending stairs?
19. Standing on tip toes?
20. When you carried or lifted objects weighing more than five pounds?
21. Getting out of a chair?
22. Walking fast?
23. Running?
24. Keeping your balance?
25. Walking with assistive devices?

Activity Limitation

26. Stay indoors most of the day because of foot problems?
27. Limit your outdoor activities because of foot problems?
28. Limit your leisure/sport activities because of foot problems?

Social Issues

29. Embarrassment due to footwear
30. Feeling awful because of foot problems?
31. Limit social activities due to foot problem?
32. Difficulty participating in social activities due to footwear?
33. Burden of taking medication to control foot pain?
34. Concern about limited work around the house?

Fig. 1. The Foot Function Revised Index Short Form (FFI-R Short Form). From Budiman-Mak E, Conrad K, Stuck R, Matters M. Theoretical model and Rasch analysis to develop a revised Foot Function Index. *Foot & Ankle International* (27[7]), pp. 519-527, copyright © 2006 by American Orthopaedic Foot & Ankle Society. Reprinted by permission of SAGE Publications.

A total of 59 patients were enrolled in the present study, including 57 females and 2 males, with an average age of 52 (range 19 to 74) years, who underwent 68 osseous and soft tissue procedures for the correction of hallux valgus deformity from January 2009 through December 2010. Five podiatric surgeons at Loyola University Medical Center participated in the present study. The indications for surgery included a painful hallux valgus deformity not responsive to conservative care, age 18 years or older, and a first intermetatarsal angle greater than 12°. The procedures included soft tissue balancing procedures with a proximal, shaft, or distal osteotomy with screw fixation; 63 of the 68 procedures were an off-set V osteotomy. Joint destructive procedures, such as first metatarsophalangeal arthrodesis or first metatarsal–cuneiform joint arthrodesis, were not included. The patients were excluded if significant joint disease was present or if they had previously undergone surgery for repair of hallux valgus. The patients were not otherwise excluded on the basis of age, race, or other comorbidities.

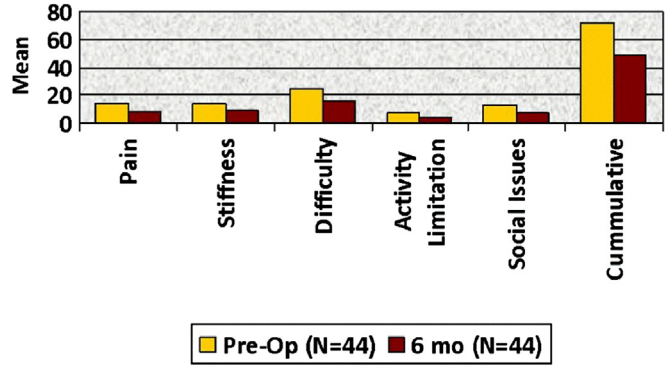

Fig. 2. Improvement in foot function at 6 months postoperatively according to the Foot Function Index Revised subscales at 6 months postoperative. (N = 44 feet in 42 patients, which was decreased to N = 25 feet in 22 patients at 12 months.)

The outcomes analysis was based on the patient questionnaire results and chart review. The preoperative data were collected from all patients on the day of surgery using the FFI-R short-form questionnaire. The postoperative data were collected at 6 and 12 months after the patient's initial surgical date. The FFI-R short form consists of 34 questions that subjectively ask patients about their foot function in regard to pain, stiffness, difficulty with everyday tasks, activity limitations, and social issues. A higher score indicates a poorer perception of foot function.

The collected raw data were entered into a Microsoft Excel (Microsoft, Redmond, WA) spreadsheet to calculate each subscale (pain, stiffness, difficulty, activity limitation, and social issues) of the short-form FFI-R. The 5 subscale scores were summed to determine a cumulative foot function score. The initial individual subscale scores were compared with the subsequent subscale scores, and the initial cumulative scores were compared with the postoperative cumulative scores. The data were analyzed by a statistician at Loyola University Medical Center using the Statistical Package for Social Sciences, version 16 (SPSS, Chicago, IL). The mean ± standard deviation was calculated between all subscales and the cumulative pre- and postoperative data. The paired *t* test was used to compare the preoperative and postoperative data within the groups and between the cumulative scores. The data demonstrated a 95% confidence interval of the difference using a 2-tailed paired *t* test, with an 0.05 α level.

Results

A total of 59 patients (68 feet) completed the baseline questionnaire. Of the 59 patients, 39 (44 feet) responded to the questionnaire at 6 months postoperatively (66% response rate). Finally, 22 patients (25 feet) responded to both the 6- and the 12-month follow-up questionnaires (37% response rate).

The FFI-R scores at 6 and 12 months revealed improvement in all subcategories (Figs. 2 and 3). Statistical significance, determined by a *p* value of <.05, was obtained in all 5 subgroups and in the cumulative scores at 6 and 12 months of follow-up (Tables 1 and 2). At 6 months of follow-up, pain had improved 41%, stiffness 29%, difficulty 39%, and social issues 44%; the activity limitation was the most improved at 47%. The 12-month follow-up data showed 51% improvement in pain, 47% in stiffness, and 52% in both difficulty and activity limitation, with 47% improvement in social issues. On average, the FFI-R scores had improved by 39% at 6 months and 50% at 12 months. Because of patient attrition, the 12-month follow-up data sample size of 25 was compared with the preoperative and 6-month data of the same sample size. The stiffness and difficulty subscale proved statistically significantly from 6 to 12 months postoperatively, with a 20% improvement in stiffness and a 17% improvement in difficulty. The cumulative score from the 6-month to 12-month