

Functional outcomes and quality of life in patients with subtalar arthrodesis for posttraumatic arthritis



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ABSTRACT

Introduction: Subtalar arthrodesis is a common salvage operation for posttraumatic subtalar arthritis, a condition frequently seen in patients who suffered major trauma. Functional outcomes in trauma patients may be influenced by concomitant injuries and the severity of the initial trauma. The aim of this study was to evaluate quality of life and functional outcomes of subtalar arthrodesis for posttraumatic arthritis in patients with severe or complex foot injuries.

Materials and methods: This is a retrospective single center study with prospective follow-up. Patients who underwent subtalar arthrodesis for posttraumatic arthritis between 2000 and 2016 were included and invited to complete a Maryland Foot Score (MFS), a EuroQol five-dimensional (EQ-5DTM) and Visual Analog Scale (EQ-VASTM) questionnaire, and four additional questions.

Results: Forty patients were included in the study, functional outcome scores were available for 30 patients (response rate 75%). Additional surgery of the fused foot was performed in 29 patients and 15 suffered multiple lower extremity injuries. Six patients were polytraumatized. Ninety percent of all patients would recommend the procedure to others, walking abilities improved in 69% and less pain was experienced in 76%. Median MFS score was 61 (IQR 53–72). Quality of life was significantly lower when compared to a reference population ($p < 0.001$).

Conclusion: Satisfaction was high, as 90% of all patients would recommend subtalar fusion to others, even though the relatively poor outcome measures would suggest differently. Existing functional outcomes measures were influenced by concomitant injuries and additional procedures. This demands development of instruments suitable for severely injured patients with multiple or complex injuries.

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Introduction

Subtalar arthrodesis is used for a variety of conditions, such as primary subtalar arthritis, congenital deformities, and inflammatory deformities [1–3]. The goals of subtalar fusion include pain relief, deformity correction, and functional improvement [4]. In trauma patients, subtalar arthrodesis is a common salvage operation for posttraumatic subtalar arthritis, mainly caused by calcaneal or talar fractures [2,5–8]. Patients who sustain these types of fractures frequently have additional injuries, such as trauma to the midfoot or ankle joints. Furthermore, fractures of the hindfoot are often found in polytraumatized patients and it has been demonstrated that lower extremity injuries have a

detrimental impact on the functional recovery [9]. As a result of the above, outcomes in a population of patients who undergo subtalar fusion for posttraumatic arthritis may be influenced by concomitant injuries and a poorer overall state of health.

There is paucity of data on subtalar fusion focusing on trauma patients explicitly and the best results for posttraumatic arthritis have been described after arthroscopic procedures in patients with isolated subtalar arthritis with minimal or no deformity, no significant bone loss, and no need for a concomitant anterior foot procedure [4,10–12]. However, it might be that most patients with severe foot injuries do not fit these criteria, causing an overestimation of functional outcomes of subtalar arthrodesis after major trauma. In addition, as poor quality of life after calcaneal fractures has been described, subtalar fusion might lead to improvement of this poor baseline situation [13,14]. The aim of the present study was to evaluate quality of life and functional outcomes of subtalar arthrodesis for posttraumatic arthritis in patients with severe or complex foot injuries.

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Materials and methods

Study design and settings

A single level 1 trauma centre retrospective cohort study with a follow-up by questionnaire was performed after institutional review board approval. Patients were selected by searching for operation codes for subtalar arthrodesis. All patients who underwent a subtalar arthrodesis for posttraumatic arthritis between January 2001 and January 2016 were invited to complete two questionnaires and four additional questions. Patients who deceased, resided in a foreign country, had amputation of the fused foot, were under the age of 16 at date of trauma or under the age of 18 during the conduct of the study, were excluded from participation. Patients who did not respond within 3 weeks were contacted by telephone to verbally administer the questionnaires.

Outcome measures and explanatory variables

Explanatory variables were derived from the Dutch National Trauma Database (DNTD) and electronic patient documentation. The DNTD contains prospectively collected documentation on demographics, trauma mechanism, sustained injuries, findings from radiologic imaging, and department of admission for all patients admitted to the University Medical Center Utrecht (UMCU) after a trauma. Data on smoking and BMI were omitted when recorded more than two months before or after the arthrodesis. A second researcher (GA) crosschecked a random 20% sample of the retrospectively collected data to ensure a robust database. Patients were considered polytrauma when an ISS of 16 or higher as a result of injury in two or more body regions was found.

The indication to perform a subtalar arthrodesis was made by a trauma surgeon based on clinical and radiologic assessment.

Radiologic examination of the subtalar joint focused on signs of arthritis such as subchondral sclerosis, osteophytes, joint space narrowing, and deformation of the joint space. Clinical assessment was based on the expertise of the surgeon; in some cases effects of diagnostic steroid injection or diagnostic cast immobilization attributed to the decision-making. Postoperatively, the position of hardware and the degree of consolidation were assessed by radiologic imaging. Standard X-ray examination included antero-posterior and lateral weight-bearing views. In case a patient underwent bilateral subtalar fusion, only data on the first procedure were studied as not to violate the statistical assumption of independence.

Quality of life was assessed using the EuroQol five-dimensional (EQ-5DTM) questionnaire. The EQ-5DTM covers five dimensions (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression) that are all divided into three levels (no problems, moderate problems, or extreme problems) with lower scores representing poorer quality of life [16]. EQ-5DTM scores for the study population were calculated using the Dutch tariff [17]. Additionally, the EuroQol Visual Analog Scale (EQ-VASTM) was assessed. This score represents a patient's self-rated health status on a scale from 0 to 100, a score of 0 being the worst imaginable and a score of 100 being the best imaginable health state.

Functional outcomes were evaluated by the Maryland Foot Score (MFS). The MFS consists of 10 questions assessing pain and function, with a score of 100 representing a normal pain-free foot. MFS outcome scores are categorized into four categories; failure (<50), fair outcome (50–74), good outcome (75–89), and excellent outcome (90–100) [18].

In addition to the questionnaires, patients were asked whether 1) they underwent surgery to their feet in another hospital, 2) the subtalar arthrodesis reduced the pain in their feet, 3) the subtalar arthrodesis improved their walking abilities, and 4) they would recommend the subtalar arthrodesis to family and friends if they

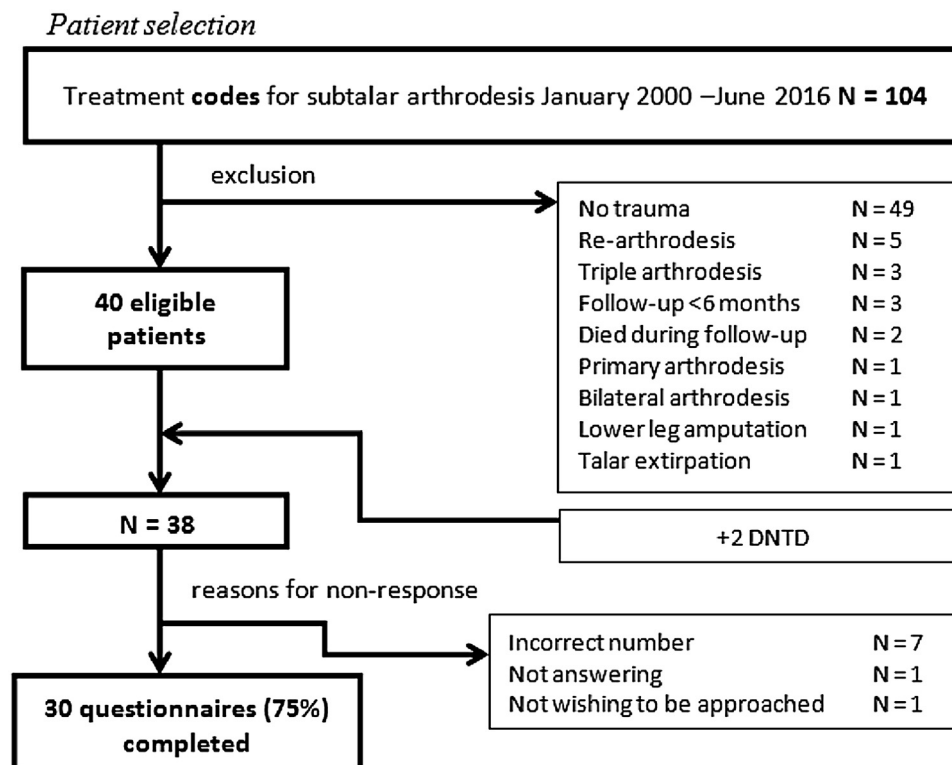


Fig. 1. Flowchart on inclusion and response. DNTD: Dutch National Trauma Database. Initial search performed for codes; unique patients extrapolated by accounting for performance of multiple procedures within one patient.

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