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Results after gastrocnemius recession in 73 patients

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ABSTRACT

Background: Very few studies describe the clinical results and complications following the surgical procedure of gastrocnemius recession.
Purpose: To survey the patient reported outcomes in patients operated with gastrocnemius recession as single procedure for various foot conditions.
Material and methods: 93 patients operated with gastrocnemius recession as single procedure between 2006 and 2011 were detected in the database. 73 patients responded to the invitation for study participation. Questionnaires containing patient reported satisfaction, complications, plantar flexion power and visual analog pain score were used for evaluation of the postoperative result.
Results: 45/73 (62%) patients reported a good or excellent result. 8/73 (11%) patients reported a significant postoperative complication. 16/73 (22%) patients noted reduced or severely reduced plantar flexion power after surgery. VAS pain score significantly decreased from 7.0 before surgery to 1.8 (p =0.015) after surgery for patients with plantar fasciitis (n =18) and from 5.6 to 2.3 ($p < 0.01$) for patients with metatarsalgia (n = 28).
Conclusion: Patients treated with gastrocnemius recession for plantar fasciitis demonstrated good clinical results. The complication rate was higher than reported by others.

1. Introduction

The gastrocnemius recession is a widely used treatment for various foot conditions, e.g. metatarsalgia, plantar fasciitis, Achilles tendinopathy, diabetic foot ulcers and pes planovalgus. The procedure is gaining popularity despite limited or missing documentation concerning relevant indication, short- and long-term outcome and complication rates.

The primary aim of this study was to evaluate the self-reported clinical results, the complications, plantar flexion power and pain in patients operated with gastrocnemius recession as single procedure in the period 2006–2011.

2. Materials and methods

93 patients operated with gastrocnemius recession as a single procedure or combined with minor procedures to the forefoot in the period 2006–2011, were invited for study participation. Additional to the gastrocnemius recession, 11 minor forefoot procedures were performed in 10 patients (corrective osteotomies of the 5. metatarsal (3), extirpation of Morton neuroma (3), hammertoe corrections (4), and screw removal (1).

Patients with major surgery in addition to gastrocnemius recession such as hallux valgus correction, midfoot arthrodesis and corrective surgery to the mid- or hindfoot were not included. The medical records were reviewed by 2 independent foot and ankle surgeons, and the patients were subgrouped based on diagnoses.

The Silfverskiöld's test was used in all patients pre-operatively to confirm an isolated gastrocnemius contracture. The test was performed with the examiner holding the subtalar joint in neutral alignment or slightly in varus with one hand, while exerting a dorsiflexing moment about the ankle joint with the other hand. The test was considered positive if the ankle did not reach plantigrade position when the knee was extended, but would dorsiflex beyond 10° with the knee flexed. The lateral border of the foot and the subcutaneous border of the tibia were used as references when measuring the range of ankle motion. A positive Silfverskiölds test was found in all the operated patients. When the patients suffered from foot conditions that could be explained by an isolated gastrocnemius contracture, in addition to a positive Silfverskiöld's test, they were offered a gastrocnemius recession.

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Table 1
Self-reported results.

Diagnose	No. of patients	Excellent/good result	Procedure done again	Recommend others	VAS before surgery	VAS after surgery
Plantar fasciitis	18	14	14	14	7.0 (2.3)	1.8 (2.5)
Calf pain	6	4	4	4	5.4 (2.8)	2.0 (1.8)
Metatarsalgia	28	14	17	17	5.6 (2.7)	2.3 (3.0)
Achilles tendinopathy	7	5	6	5	4.4 (3.2)	2.8 (3.3)
Pes planovalgus	5	3	3	3	4.3 (4.1)	3.6 (4.1)
Other	9	5	5	8	5.0 (2.8)	3.3 (2.8)

Patients sorted by diagnoses, and for each diagnosis the number of patients reporting to be satisfied with the end result, patients stating that they would have the procedure done again if they knew the result beforehand, patients who would recommend the procedure for others with the same condition and Visual Analog Scale for Pain (mean ± SD) reported before and after surgery.

A modified Strayer procedure was performed in all patients. With the patient in a supine position, the ankle was placed on a cushioned support, thus elevating it 30°. A medial longitudinal incision was made at the level of the gastrocnemius aponeurosis at the level between the gastrocnemius and the soleus muscle. The fascia was incised and approximately 2 cm of the tendo plantaris was resected. Blunt dissection was performed between the gastrocnemius aponeurosis and m. soleus and thereafter dorsal to the gastrocnemius aponeurosis. The sural nerve was identified and protected, then the gastrocnemius aponeurosis was divided. The wound was closed in layers and a plaster of Paris with approximately 10° dorsiflexion of the ankle was applied. The plaster was worn for two weeks with weigthbearing as tolerated. After two weeks the plaster was cut in half and the dorsal part was used only as a night splint for another four weeks.

The patients completed a questionnaire regarding post operative satisfaction, complications, whether the patients would have the procedure done if they knew the result beforehand, if the patients would recommend the procedure to others with the same problem and their experience of change in plantar flexion power after surgery. Visual Analog Scale (VAS) for pain pre- and postoperative was evaluated.

Statistical analysis were performed using the Statistical Package for Social Science (SPSS) software, version 18.0, for Windows (SPSS Inc. Chicago, IL, USA). Normally distributed data are presented as group means and standard deviations (SD). Differences were considered significant at p-levels ≤ 0.05. Non-parametric data are presented as median values with range.

This study was approved by the Regional Ethics Committee 270413 Ref: 2013/696.

3. Results

73 patients responded to the invitation and were included in the study (16 men, 57 women). The median age at surgery was 50 years (range 18–79) and median follow-up was 45 months (range 7–87).

18 patients were diagnosed with plantar fasciitis, 28 patients metatarsalgia, 6 patients had calf pain, 7 patients Achilles tendinopathy, 5 patients pes planovalgus and 9 patients were classified as others.

Overall, 45/73 (62%) patients reported a good or excellent postoperative result. 49/73 (67%) patients would have the procedure done again now knowing the result and 51/73 (70%) patients would recommend the procedure to others with the same condition. The results sorted by diagnoses are presented in Table 1.

10 patients had additional minor forefoot surgery. 5 of these patients reported an excellent result.

28/73 (38%) patients reported one or more postoperative complications. Complications are presented in Table 2. The patients' self-reported power for plantarflexion post surgery are presented in Fig. 1.

4. Discussion

In the present study the self-reported clinical results and complications in 73 patients treated with gastrocnemius recession were evaluated. 62% of patients reported good or excellent results. 38% of the patients reported a postoperative complication. 22% of the patients reported a reduction in plantarflexion strength affecting their gait. The subgroup of patients with plantar fasciitis ($n = 18$), however, reported good or excellent results in 78% of the cases, whereas patients with metatarsalgia ($n = 28$) reported good or excellent results in only 50% of the cases. For the other foot conditions, the number of patients were too small to be evaluated.

The main limitation of this study is its retrospective nature, the lack of a control group, and the small number of patients in each group.

Only 78% of the total number of patients that were operated with gastrocnemius recession accepted to be included in the present study. However, this is to our knowledge, the largest patient series treated with gastrocnemius recession presented [1–4].

There is no consensus regarding outcome scores for the evaluation of patients treated with gastrocnemius recession. We have used non-validated self-reported outcome scores regarding post-operative satisfaction as was also used in the report by Maskill et al. [2]. The VAS for pain is well established and has also been applied for outcome evaluation after gastrocnemius recession in other studies [2,4].

The clinical indications for gastrocnemius recession in foot pathology are not established. The Silfverskiölds test is normally used to diagnose an isolated gastrocnemius contracture. However, 25% of the normal population has a positive Silfverskiölds test [5]. In this test the passive dorsiflexion of the ankle with extended knee and the passive dorsiflexion of the ankle with the knee flexed is evaluated.

DiGiovanni et al. [5] recommended to use 5° dorsiflexion with an extended knee and increasing dorsiflexion to more than 10° with the knee flexed as cut-offs for a positive test. Maskill et al. [2] considered the test positive when there was no passive dorsiflexion of the ankle above neutral with the knee in extension.

Table 2
Complications.

Complication	No. of patients
Pain/swelling	9
Infection	3
Nerve injury	2
Leg cramps	8
Pulmonary embolus	1
Chronic regional pain syndrome	1
Deep venous thrombosis	1
Others	3

Self-reported post-operative complications.