Follow-up of Patients Treated with Sclerosing Therapy and/or Surgery for Achilles Tendinopathy

Version 2

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Abstract

**Introduction:** Achilles tendinopathy can be a chronic disabling condition. Sclerosing injections under ultrasonographic guidance is one method to treat Achilles tendinopathy. Initially good results have later been questioned. Surgery is another treatment option that has been questioned because of varying reported success rate.

**Aim:** We aimed to assess patient-reported outcome in patients suffering from Achilles tendinopathy, treated with sclerosing injections and/or surgery during a 6 ½ year-period.

**Method:** After review of patient records, the Self-reported foot and ankle score (SEFAS) together with an in-house satisfaction questionnaire were mailed to the patients. A SEFAS score of 48 represents normal foot/ankle function.

**Results:** 97 patients (53 women, 44 men, 104 tendons) were included. 69 patients (41 women, 28 men, 75 tendons) returned the questionnaires. The SEFAS values (median and range) were 37.5 (13-48) in patients treated with sclerosing therapy, 42 (15-48) in patients treated surgically and 47 (19-48) in patients that received both treatments. A greater proportion of surgically treated patients were satisfied (90% vs 50%), experienced symptom improvement and were able to return to the previous level of activity. Complications following surgery were wound infections (n=3) and deep vein thrombosis (n=3), two with pulmonary embolism. Following sclerosing injection, there was one complete Achilles tendon rupture.

**Conclusion:** Sclerosing injections seems to be a safe treatment and a positive outcome in 50% of patients might be sufficient to use this therapy in selected patients with Achilles tendinopathy. However, surgical treatments seem more effective but are associated with more severe complications.

**Key words:** Achilles tendinopathy, Conservative treatment, Physiotherapy, Sclerosing injections, Self-reported foot and ankle score
Introduction

Achilles tendinopathy (tendinosis) can be a chronic disabling condition affecting both athletic and sedentary individuals. The syndrome is characterised by pain, thickening and impaired function of the Achilles tendon [1]. Traditionally there have been many different names for the intratendinal diseases such as Achilles tendinitis, although now established that the disease is caused by a failed healing process resulting in degenerative changes, rather than an inflammatory process [2–4]. The disorder is more common in middle-aged people, and equally affects men and women [5,6]. Achilles tendinopathy can be subdivided into midportion Achilles tendinopathy (non-insertional) and insertional Achilles tendinopathy (or enthesitis) based on the anatomical location of the symptoms. 55 – 65 % of patients have symptoms located to the middle part of the tendon and 35 – 45 % to its distal attachment into the calcaneus [5,6]. The distal problems are complicated by the fact that in addition to tendon injury, symptoms derived from pathology in surrounding tissues can occur, such as bone spurs, bone fragments and calcium deposits in the distal portion of the tendon. There may also be a simultaneous inflammation of the retrocalcaneal or superficial calcaneal bursa [7]. The aetiology is considered to be multifactorial consisting both internal factors such as overweight or malalignment, as well as external factors such as overload and/or insufficient recovery [8].

Achilles tendinopathy is considered a challenging condition to treat [9]. There are today many different treatment regimens, both surgical and conservative, which implies the absence of a gold standard treatment. [8]. Strongest evidence exists for physical therapy, both concentric and eccentric loading of the tendon and the calf muscle [10,11].

Patients who do not respond to conservative treatment may require surgical intervention. The general recommendation is that all patients should try physiotherapy for at least 3-6 months before considering surgical intervention [8]. However, there are several different surgical methods and the results vary widely between different studies [12]. Most studies report successful results in over 70% of cases, but there has also been a correlation between high success rate and poorer methodology of the study [13,14]. For midsubstance Achilles tendinosis, the surgical strategy has been focused on removing the bad portion of the tendon and stimulate tendon healing by means of controlled low-grade trauma (scarification). Surgery for insertional Achilles tendinosis include removal of degenerated tissue, excision of the often inflamed retrocalcaneal bursa and sawing off the prominent posterior calcaneal prominence so that it no longer can cause irritation/inflammation of the tendon. Sometimes the tendon needs to be detached and then reattached from the calcaneal bone, to remove bony
spurs. Occasionally augmentation of the tendon using tendon transfer/grafts is necessary [8,12].

Grey-scale ultrasound in combination with colour Doppler has been used in several studies to yield reliable information about tendon structure and blood flow [15–18]. By using these techniques, data has shown a plausible relationship between neuro-vascular ingrowth at the ventral part of the Achilles tendon and chronic tendon pain [16,17]. Destroying these neovessels and associated sensory nerves using ultrasound and colour Doppler-guided injections of the sclerosing substance Ethoxysclerol (Polidocanol), have been demonstrated to yield good clinical results in patients with mid-portion and insertional chronic Achilles tendinopathy [19–22]. In a double-blind randomised controlled trial by Alfredson et al, including 20 patients, the authors found that a maximum of two sclerosing injections with the substance Polidocanol, but not injections with a non-sclerosing substance, resulted in significantly less pain during desired tendon loading activity [23]. Remaining neovascularisation was associated with poor outcome [23].

However, these initially promising results have not been reproduced [24] and the relationship between neovascularisation and chronic tendon pain has been questioned [25,26]. In 2015, a Cochrane Review concluded that there was insufficient evidence from randomized controlled trials to support routine use of injection therapies for Achilles tendinopathy [27]. In a systematic review by Morath et al published in January 2018 the authors conclude that sclerosing neovessels can be recommended and considered safe but more research is warranted to continue the support of this treatment [28]. Furthermore, the reported success rate post-surgery has varied greatly between studies published over the years, and so has the methodology of these studies [14], making it difficult to interpret the results.

Aim

The aim of the present study was to assess patient-reported outcome in patients suffering from chronic painful Achilles tendinopathy, treated with sclerosing therapy and/or surgery, at the orthopaedic and radiology clinics, Höglandssjukhuset, Eksjö.

Material and methods

Inclusion and exclusion criteria

Inclusion criteria in the current study were that the patient was diagnosed with Achilles tendinopathy at the orthopaedic outpatient ward at Höglandssjukhuset in Eksjö, Sweden, had
undergone one or more sclerosing treatments and/or surgery, was 18 years or older and that the last intervention (injection or surgery) was done at least 5 months before evaluation. If the patient was treated with sclerosing injection or surgery the last 5 months, the patient was excluded.

Method
Patients who underwent sclerosing treatment and/or surgery with the indication of Achilles tendinopathy between January 2012 and May 2018 were identified in the Journal System Cambio Cosmic. Patients were identified using ICD-10 diagnostic codes (M766, M775, M715) and a list of patients treated with sclerosing injections at the Radiology clinic, Hö glandssjukhuset, Eksjö. Journals were systematically examined to obtain information about age, sex, BMI, diagnosis, surgery, sclerosing treatment and possible complications. After review, an envelope containing study information, the questionnaire SEFAS (Appendix 1) and questions regarding subjective outcome and possible inconvenience during treatment (Appendix 2) was mailed to the patients. One remainder was sent to the patients who had not answered.

Outcome measures
The Self-reported foot and ankle score (SEFAS) is a patient-reported region-specific questionnaire designed to evaluate disorders of the foot and ankle. SEFAS psychometric properties have been evaluated with good results [29,30]. SEFAS is currently used in the Swedish ankle registry (Swedankle) and the Swedish foot surgical registry (Swefoot). The instrument consists of 12 questions regarding pain and function (swelling, pain and functional limitations in different situations). Each question has 5 fixed response options (0-4 points). The total score is added (0-48), where a sum of 0 points represents the most severe disability and 48 represents normal function [30]. Age- and gender-specific normative values for SEFAS are presented [31]. In cases of incomplete questionnaires in the SEFAS, we used the same approach as described by Cöster et al: when results from 2 or more questions were missing, the questionnaire was disregarded; when the result from 1 question was missing, the mean result of the remaining 11 questions was used; when the patients gave 2 answers for 1 question or when the patients had put a mark between 2 answers, the worse outcome was recorded [30].

A self-designed in-house satisfaction questionnaire with questions concerning the present treatment, previous treatment for Achilles tendinopathy, experienced improvement or
deterioration after treatment, satisfaction with treatment, possible discomfort during treatment and body measurements was also sent to patients.

Statistics
Statistical analysis was performed using IBM SPSS Statistics version 25. We present SEFAS scores as median with range. Differences in SEFAS score between men and women were calculated using Mann-Whitney U test. Differences in SEFAS score between treatment groups were calculated using Kruskal-Wallis test. Independent Samples Test was used to calculate differences in age and BMI. A p-value < 0.05 was considered significant.

Ethics
Before the start of the review, the project was approved by the head of the Orthopaedic clinic at Höglandssjukhuset, Eksjö. It was performed according to the declaration of Helsinki and complied by the laws of Sweden. Patient data was coded to promote integrity. The systematic review of patient medical records was carried out by obtaining only sought-after information, thus minimizing the violation of personal integrity.

Results
100 patients (111 tendons) with Achilles tendinopathy treated during a period of 6½ years were identified. Three patients were excluded from the study due to more recent treatment. The questionnaires were sent to the remaining 97 patients (53 women, 44 men, 104 tendons). Gender-specific background data for the 97 included patients are presented in Table 1. There was no significant difference between men and women regarding age, body mass index (BMI) or time from last intervention to follow-up (Table 1). 69 patients (71%) with 75 treated tendons, 41 women (77%) and 28 men (64%), with a mean age of 60 years and mean BMI of 28 returned the questionnaires. There was no significant difference between patients returning the questionnaires (responders) and non-responders regarding age (p= 0.228) or BMI (p= 0.068). Five SEFAS questionnaires and four in-house satisfaction questionnaires could not be used because they were incorrectly filled in. In male responders, 16 tendons were treated with sclerosing therapy, 8 with surgery and 7 with both treatments. In female responders 15 tendons were treated with sclerosing therapy, 21 with surgery and 8 with both treatments. All patients who underwent both treatments had first been treated with sclerosing therapy.
The SEFAS median score was 41 (range 13-48) in patients returning the questionnaires. Median was 39 (range 15 – 48) in women and 46 (range 13-48) in men, the difference was significant (p= 0.03). There was no significant difference in SEFAS score across treatment groups (p= 0.213), this was also the case when comparing men and women separately (p=0.118 and p= 0.796 respectively) (Figure 1).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Gender</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of individuals</td>
<td>44</td>
<td>53</td>
</tr>
<tr>
<td>Age (y)</td>
<td>59 ± 9.5</td>
<td>58.7 ± 10.5</td>
</tr>
<tr>
<td>Body mass index</td>
<td>27.6 ± 5.7</td>
<td>29.4 ± 5.1</td>
</tr>
<tr>
<td>Follow-up (months)³</td>
<td>35.3 ± 23</td>
<td>33.1 ± 22.3</td>
</tr>
</tbody>
</table>

A p-value of < 0.05 was considered significant.

³From last intervention to 10\textsuperscript{th} of October 2018 (date for sending out questionnaires)

The SEFAS median score was 41 (range 13-48) in patients returning the questionnaires. Median was 39 (range 15 – 48) in women and 46 (range 13-48) in men, the difference was significant (p= 0.03). There was no significant difference in SEFAS score across treatment groups (p= 0.213), this was also the case when comparing men and women separately (p=0.118 and p= 0.796 respectively) (Figure 1).

Figure 1. Self-reported outcome results (median ± interquartile range [IQR]). The box whiskers represent 1.5 x the IQR or the maximum or minimum values, observed based on whichever is less. The asterisk represents extreme outliers (values beyond the box end by 3 x IQR). Abbreviation: SEFAS, self-reported foot and ankle score. N= number of tendons.
A majority of patients in the sclerosing group had symptoms localised to the mid-portion portion of the tendon prior to intervention, and a majority of patients in the surgical group had symptoms localised to the distal portion of the tendon (Table 2).

**TABLE 2**
SEFAS Score Presented as Median and Range Based on Received Treatment and Localisation of Tendon Symptoms

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Symptom localisation</th>
<th>Number of tendons</th>
<th>Median (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sclerosing treatment</td>
<td>Mid-portion</td>
<td>21</td>
<td>39 (15-48)</td>
</tr>
<tr>
<td></td>
<td>Distal</td>
<td>3</td>
<td>44 (44-46)</td>
</tr>
<tr>
<td></td>
<td>Both</td>
<td>4</td>
<td>26 (13-33)</td>
</tr>
<tr>
<td>Surgery</td>
<td>Mid-portion</td>
<td>3</td>
<td>48 (27-48)</td>
</tr>
<tr>
<td></td>
<td>Distal</td>
<td>25</td>
<td>41 (15-48)</td>
</tr>
<tr>
<td>Sclerosing treatment and Surgery</td>
<td>Mid-portion</td>
<td>7</td>
<td>48 (20-48)</td>
</tr>
<tr>
<td></td>
<td>Distal</td>
<td>4</td>
<td>41.5 (19-47)</td>
</tr>
<tr>
<td></td>
<td>Both</td>
<td>3</td>
<td>40 (39-47)</td>
</tr>
</tbody>
</table>

Nearly all patients had tried physical therapy, and treatment with NSAIDs was the second most common treatment prior to sclerosing injections or surgery (Table 3).

**TABLE 3**
Most Common Types of Nonoperative Measures Before Sclerosing Injections or Surgery in the diseased Tendon.

<table>
<thead>
<tr>
<th>Nonoperative Measures Before Sclerosing Injections or Surgery (N= 104)</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical therapy</td>
<td>97 (93)</td>
</tr>
<tr>
<td>Extracorporeal shock wave therapy (ESWT)</td>
<td>22 (21)</td>
</tr>
<tr>
<td>Inlays</td>
<td>37 (36)</td>
</tr>
<tr>
<td>Nonsteroidal anti-inflammatory drugs</td>
<td>40 (38)</td>
</tr>
<tr>
<td>Paracetamol</td>
<td>24 (23)</td>
</tr>
<tr>
<td>Per oral opioids</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Per oral steroids</td>
<td>8 (8)</td>
</tr>
<tr>
<td>Cortisone injection</td>
<td>16 (15)</td>
</tr>
<tr>
<td>Laser</td>
<td>6 (6)</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Transcutaneous electrical nerve stimulation</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Acupuncture</td>
<td>2 (2)</td>
</tr>
</tbody>
</table>

Answers to specific questions from Questionnaire 2 are summarized in Table 4, as number of patients and valid percent. 92.5 % of the patients that had undergone surgery could consider doing the same treatment again if needed, compared to 58.1 % of the patients that had sclerosing injections. The proportion of patients that were able to fully return to previous
Among those patients who had received sclerosing injections (67 tendons), the median number of treatments was 2 (range 1 – 5). One patient treated with two sclerosing injections suffered from tendon rupture after mild trauma. That patient had also been treated with physical therapy, NSAIDs, paracetamol and inlays. No other serious complications were reported in the sclerosing group or found at journal examination. Among patients treated with surgery (53 tendons), three patients had postoperative infection treated with antibiotics, and

TABLE 4. Distribution of answers to selected questions, n (%).

<table>
<thead>
<tr>
<th>How did you experience the symptoms after versus before sclerosing treatment?</th>
<th>Much worse</th>
<th>Somewhat worse</th>
<th>No difference</th>
<th>Somewhat better</th>
<th>Much better</th>
<th>Missing answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much worse</td>
<td>1 (2.3)</td>
<td>0 (0)</td>
<td>12 (27.9)</td>
<td>9 (20.9)</td>
<td>21 (48.8)</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How did you experience the symptoms after versus before surgical treatment?</th>
<th>Much worse</th>
<th>Somewhat worse</th>
<th>No difference</th>
<th>Somewhat better</th>
<th>Much better</th>
<th>Missing answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much worse</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>3 (7.3)</td>
<td>3 (7.3)</td>
<td>35 (85.4)</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Are you satisfied with the sclerosing treatment?</th>
<th>Very dissatisfied</th>
<th>Pretty unhappy</th>
<th>Neither</th>
<th>Pretty satisfied</th>
<th>Very satisfied</th>
<th>Missing answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very dissatisfied</td>
<td>7 (16.3)</td>
<td>6 (14)</td>
<td>9 (20.9)</td>
<td>3 (7)</td>
<td>18 (41.9)</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Are you satisfied with the surgical treatment?</th>
<th>Very dissatisfied</th>
<th>Pretty unhappy</th>
<th>Neither</th>
<th>Pretty satisfied</th>
<th>Very satisfied</th>
<th>Missing answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very dissatisfied</td>
<td>0 (0)</td>
<td>2 (4.9)</td>
<td>2 (4.9)</td>
<td>5 (12.2)</td>
<td>32 (78)</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Have you been able to return to the physical activity level that you had before the symptoms debuted?</th>
<th>Not at all</th>
<th>To some extent</th>
<th>To a great extent</th>
<th>Completely</th>
<th>Missing answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>9 (13)</td>
<td>13 (18.8)</td>
<td>18 (26.1)</td>
<td>29 (42)</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did you experience any pain during sclerosing injections?</th>
<th>Much pain</th>
<th>Mild pain</th>
<th>No pain</th>
<th>Missing answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much pain</td>
<td>14 (32.6)</td>
<td>21 (48.8)</td>
<td>8 (18.6)</td>
<td>0</td>
</tr>
</tbody>
</table>
three had deep vein thrombosis (two with embolization to the lungs). Surgically treated patients were treated with low molecular heparin (Innohep) during the immobilization period.

Discussion

SEFAS data in the present study was for men equal (median 46 vs 48) and for women somewhat lower (median 39 vs 47) compared to published normal data [31]. The variation was wide, similar to the normal population [31]. We found a statistically non-significant tendency that patients treated with surgery had higher median SEFAS scores compared to those treated with sclerosis alone. Also, a greater proportion of surgically treated patients were satisfied with the procedure, experienced symptom improvement, were able to return to the previous level of activity, and could consider redoing the procedure if needed, compared to patients receiving sclerosing therapy only. To the best our knowledge, there is only one randomised trial that has compared sclerosing therapy to surgery, where the results indicate slightly better results post-surgery [19]. The number of patients that experienced symptom improvement and were satisfied post-surgery are comparable to the average success rate of 84% reported by Khan et al [14]. In the present study, about 50% felt some grade of satisfaction with sclerosing treatment and about 70% of patients experienced some grade of symptom improvement (49% much better, 20% somewhat better). 50% is lower than the results of early studies, which implied that results of sclerosis may be comparable to, or even superior to those obtained from surgery [16,18–21,23,32]. Most of these studies reported that more than 70% of patients were satisfied after sclerosing treatment and also had significantly lower pain on VAS. However, these results have not been reproduced. In a more recent paper by Sterkenburg et al, 44% of patients experienced no or minimal pain after a median of three sclerosing treatments [24], this is more in line with the data in our study.

About 30% of patients in our study were dissatisfied with sclerosing therapy and more than 40% could not consider re-treatment if needed. The obvious reason for this could be that quite many patients did not have enough effect of sclerosing treatment. About 15% of patients in this study was treated first with sclerosing injections and then surgery, indicating failure of sclerosing treatment. Another contributing factor could be that a majority of patients in our study experienced pain of varying degrees during the injections. Unfortunately pain or discomfort during the injections has not been frequently reported or commented by the inventors of the technique [18,22,23]. However, Sterkenburg et al reported that 56% of patients rated the injections as “unpleasant” [24] and Clementson et al reported that 8/25
patients described discomfort during injection treatment, but only one experienced pain [21]. Furthermore, most patients require 2-3 treatments, with around 6-8 weeks in-between for a good clinical result [20]. This is comparable to the median number of two sclerosing treatments in our patients, however in our clinic we have 12 weeks in-between sclerosing treatments. This means that the total treatment period can be relatively long, which might be considered as a negative factor.

Most patients with mid-portion tendinopathy was treated with injections, and most patients with distal tendinopathy were treated surgically. This is probably because symptoms from the distal attachment may partly be derived from pathology in surrounding tissues, not only from neuro-vascular ingrowth. Amongst the few studies made on sclerosing treatment, most have only included patients suffering from mid-portion tendinopathy [21,23,24]. However, a small pilot study showed that sclerosing injections was effective in the treatment of insertional Achilles tendinopathy [18]. Noticeably, the few patients with a diffuse localisation of tendon symptoms had very poor SEFAS scores following sclerosing injections. It is possible that symptoms localised to the major part of the tendon, indicating a more severe tendon pathology, are more resistant to sclerosing therapy.

Women had significantly lower SEFAS scores than men in accordance with previous studies [33,34]. An explanation for this could be gender differences regarding the subjective experience and management of pain. Several studies have revealed that women are at a higher risk of developing chronic pain and that women may experience more severe pain [35]. Higher female pain sensitivity was also reported for various pain scales [36]. Multiple mechanisms may contribute to these sex differences in pain, including sex hormones, endogenous opioid function, pain coping, and gender roles [35]. It is possible that the women in the present study experienced more severe pain before the intervention. Unfortunately, we did not access patients before intervention, so we cannot know if there was equal symptom improvement between men and women.

Although patients were generally more satisfied and had better relief from symptoms post-surgery, there were more complications in this group (11%). It is well-known that surgery is consolidated with more complications, especially superficial and deep infections and prolonged wound healing, but also venous thromboembolism [37]. A complication rate of 11 – 19% post-surgery has been described in previous studies [37,38]. This is comparable to the data in our study, however we did not search the journals for prolonged wound healing or other complications related to the wound, such as skin edge necrosis or fibrotic reactions.
Both cases of pulmonary embolism were in patients who underwent a more extensive type of surgery with a longer immobilization period, increasing the risk of venous thromboembolism. In the sclerosing group, there was one patient who suffered from tendon rupture after mild trauma. The use of injections with Aethoxysklerol has been associated with few and mild complications since the treatment was piloted in 2002 by Ohberg et al [22]. In a systematic review more than 600 included tendons were treated with multiple sessions of sclerotherapy or prolotherapy, there was one partial tendon rupture detected at sonography after only one sclerosing treatment [28], this is also described in case studies [39]. It is hard to know if these ruptures were caused by the injection, the diseased degenerated tendon, or a combination of the two. The case of tendon rupture in our study highlights a potential harm with this treatment and even if the risk seems to be very low it needs to be considered.

Average body mass index for the male and female patients that mailed back the questionnaires was 28.2 (28.6 in all included patients), which according to the World Health Organization (WHO), is considered pre-obesity [40]. Today, we know that obesity and altered glucose metabolism are risk factors for developing tendinopathy [8]. Among the patients who suffered a complication post-surgery in our study, the mean BMI was 33 (median 33, range 26-39), in the other surgically treated patients the mean BMI was 27 (median 26, range 21-38). To the best of our knowledge there are no studies that have examined the relationship between obesity and outcome after surgery for Achilles tendinopathy or sclerosing treatment. However, data has showed that obesity (BMI > 30) is associated with a significantly higher risk of wound complications, infection, venous thromboembolism, and medical complications after primary Achilles tendon repair [41]. These results cannot be directly applied to patients with Achilles tendinosis, nevertheless it is possible that recommending patients weight loss prior to surgery could be favourable. This hypothesis needs to be further studied.

Many other different treatments are offered to patients with painful Achilles tendons. Nearly all our patients had been treated with physical therapy before sclerosing therapy or surgical intervention. This is in line with today's recommendations [8]. The second most common treatment was nonsteroidal anti-inflammatory drugs. The use of NSAID has been questioned due to the absence of prostaglandin inflammatory mediators within the painful tendon [12]. Additionally, in a randomized, double blind, placebo-controlled trial, oral NSAID was no more effective than placebo with respect to pain, tenderness, swelling, ankle joint movement and muscle strength in patients suffering from painful Achilles tendinopathy [42]. The reason many physicians may try NSAIDs despite lack of evidence is probably due to the high
availability of the treatment and because NSAIDs are widely used to treat pain in the musculoskeletal system. Another common treatment modality in our patients was extracorporeal shock wave therapy (ESWT). Placebo-controlled trials have confirmed the beneficial effect of ESWT in chronic Achilles tendinopathy [43], however the mechanism by which ESWT works are still poorly understood. Other treatment options are not proved efficient or are poorly investigated [8].

The strength of this study was that we used a validated region-specific instrument to follow-up patients regarding pain and function. Patient reported outcome measures (PROMS) is currently used in almost all national registries to evaluate the results for different types of treatments [31]. Therefore, we think that the data collected in this study, can be considered reliable. Some limitations need to be addressed. Firstly, despite we analysed patients treated in the last 6 ½ years there were a relatively limited study population and we did not assess patients before and after treatment to measure individual outcomes, and to make more accurate comparisons between patients. The response rate was 71%, which is better or comparable to that of other studies [31,44]. It has been previously seen that patients with chronic pain are more likely to respond to questionnaires [37]. As 7/12 questions on SEFAS are related to pain, this could possibly affect the outcome given the limited number of patients included in this study. Secondly one of the questionnaires was not validated, which means that its psychometric properties have not been evaluated, but we think the data are representable given the simple construction of the questions.

Conclusively, sclerosing injections seem to be a safe treatment method and a positive outcome in about 50% of patients might be sufficient to use this therapy as a treatment option for some patients with symptomatic Achilles tendinopathy who does not respond to physical therapy. However, sclerosing treatment may not be effective in patients with a diffuse localisation of tendon symptoms. Surgical treatments are more effective but are associated with more severe complications. In agreement with previous studies we think there is a need for blinded placebo-controlled trials to further evaluate the effect of sclerosing therapy to treat chronic Achilles tendinopathy.

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Appendix

1. Self-reported foot and ankle score (SEFAS)

Frågeformulär - SEFAS
Fotoperation

**INSTRUKTION:** Detta formulär innehåller 12 frågor om hur du ser på din fot/fötet. Besvara frågorna genom att kryssa för det alternativ Du tycker stämmer bäst in på dig och beskriver ditt tillstånd under de senaste 4 veckorna.

1. Hur skulle Du vilja beskriva den smärtan som Du vanligtvis har från den aktuella foten/fötet?
   - Ingen smärta alls
   - Mycket obetydlig
   - Obetydlig
   - Mätting
   - Själv

2. Under hur lång tid har Du kunnat presentera innan det uppstår svår smärta från den aktuella foten/fötet?
   - Mer än 30 min
   - 15-30 min
   - 5-15 min
   - Mindre än 5 min
   - Jag kan inte gå alts pga svår smärta

3. Har Du kunnat gå på djämm mark?
   - Ja, med lätthet
   - Med obetydlig svårighet
   - Med mätting svårighet
   - Med mycket stor svårighet
   - Kan inte alts gå på djämm mark

4. Har Du tvingats använda inlägg i skon, hälfixering eller specialgöra skon?
   - Alltid
   - Bara tillfälligts
   - Ofta
   - Större delen av tiden
   - Alltid

5. Hur mycket har smärten från den aktuella foten/fötet hinderat Dig i Ditt vanliga arbete inl hushållsarbete och hobbyverksamhet?
   - Inte alls
   - Lite grund
   - Inmätning grad
   - Inbördes större utsträckning
   - Hel och hålet

6. Orsakar den aktuella foten/fötet att Du kolar?
   - Nej
   - Någon anstaka gång under 1-2 dagar
   - Av och till
   - De flesta dagar
   - Varje dag
2. In-house satisfaction questionnaire

För- och efternamn: _____________________________________________

Personnummer: ________________________________________________

E-postadress: _________________________________________________

(endast om du vill ta del av studiens resultat)


Höger            Vänster
2. Vilken eller vilka behandlingar har Du genomgått för hälsenebesvären i den aktuella hälsenan?

Skleroserande injektion(er)
Operation

3. Vilken eller vilka behandlingar har du testat för hälsenebesvären, utöver sklerosering/operation.

Sjukgymnastik □ Stötvågsbehandling □ Kortisoninjektion □

Kortisontabletter □ Laserbehandling □ Skoinlägg □

Värktabletter □ Om Du testat värktabletter, vad hette dessa?________________________

Annan behandling □ Om ja, vilken?_________________


Mycket sämre Något sämre Ingen skillnad Något bättre Mycket bättre


Mycket sämre Något sämre Ingen skillnad Något bättre Mycket bättre


Mycket smärta Lindrig smärta Ingen smärta

Inte alls    I viss mån    I stor utsträckning    Helt och hållet


Mycket missnöjd    Ganska missnöjd    Varken nöjd/missnöjd    Ganska nöjd    Mycket nöjd


Mycket missnöjd    Ganska missnöjd    Varken nöjd/missnöjd    Ganska nöjd    Mycket nöjd


Ja    Nej


Ja    Nej

Ungefärlig vikt (kg) ________ Längd (cm) ____________

Är det något annat Du tycker vi behöver veta, t.ex. nylig skada som kan påverka dina svar, kan Du kortfattat skriva detta nedan

___________________________________________________________________________
___________________________________________________________________________
Letter to Editor

Dear Editor of the Scandinavian Journal of Medicine & Science in Sports

Enclosed you will find our manuscript entitled “Follow-up of Patients Treated with Sclerosing Therapy and/or Surgery for Achilles Tendinopathy”.

In this follow-up study we investigated the self-reported outcome following sclerosing therapy and/or surgery in patients with chronic painful Achilles tendinopathy. We believe the results are interesting to you because they confirm the scepticism that has been directed towards sclerosing therapy lately. Using the validated questionnaire Self-reported foot and ankle score (SEFAS) and additional questions regarding satisfaction with treatment, we found that patients treated with surgery had higher median SEFAS score compared to those treated with sclerosing injections alone. A larger proportion of surgically treated patients were satisfied and experienced better symptom relief post treatment. However, surgical treatment was associated with more serious complications such as wound infection and venous thromboembolism. This study suggests that sclerosing therapy may be an effective treatment option for some patients with Achilles tendinopathy and can be considered safe. However surgical treatments are more effective but are associated with more serious complications. In agreement with previous studies we think there is a need for placebo-controlled trials to further evaluate the effect of sclerosing therapy to treat chronic Achilles tendinopathy.

This work is our own original work, has not been published and is not under consideration for publication elsewhere. All authors have approved the final version of the manuscript.

We hope that you will considerer publishing our manuscript in your journal.

Sincerely,

Adrian Clausen, Bachelor of medicine

Örebro University

Örebro, Sweden
Etisk reflektion

Populärvetenskaplig sammanfattning