

# High Volume Injection (HVI) for Achilles Tendinopathy

## Thickened Achilles Tendon



## What is Achilles Tendinopathy?

This condition (previously known as Achilles tendinitis) generally occurs when there has been excessive load (strain) placed through the tendon. Examples may include increasing running volume. The tendon may be weaker in some individuals due to factors such as age, general health (including excessive weight), muscle tightness and previous injury (e.g. rupture).

With tendinopathy there are structural changes to the tendon and clinically you see thickening and tenderness over the tendon. You may find that it's more difficult to carry out normal activities, such as running or prolonged walking.

## What is a high volume injection?

This procedure involves injecting a small volume (25-30 ml) of solution into the space between the tendon and its sheath (tendon cover). This solution contains salt (saline) water and local anaesthetic. This solution acts to induce the healing process and reduce pain.

The procedure is carried out under ultrasound guidance by Dr Robertson who has over 15 years in this technique, and 18 years in ultrasound (2021).

The treatment is successful in 50-80% of patients. It can recur, but can be repeated.

## What are the alternatives to high volume injection?

Most patients have already been given a program

of rehabilitation, including advice regarding activity, footwear advice and stretching and strengthening exercises. You may have received orthotics to improve the mechanics of your feet.

Usually, you will only be offered HVI after other conservative treatments have been tried over a period of time (and failed to resolve your symptoms to the degree you feel you need to keep fit and active within your personal goals).

What precautions should I take after the injection?

You can drive home after the injection, but only if you have an automatic car and your left foot is treated. In other circumstances we advise a friend transports you. Or a member of staff can assist with public transport (including drop off at bus or Kirkham rail station).

As long as you follow the advice on rest and progressive exercise, the risk of rupture is very small. Some people will be given an Aircast (fracture) boot to wear for a few days – but most do not need this. It is important to rest the foot as much as you can for 48 hours and walk only when necessary. After about 3 days you can return to normal walking but avoid high impact exercises or sports.

Be guided by your practitioner when to start any loading exercises or high load exercises (such as running).

Air Cast Boot,

worn after an injection:



## What are the side effects?

Rupture is a small but potential complication - hence why rest after an injection is important. You should seek medical attention if this is



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suspected.

You may experience some numbness due to the local anaesthetic. This normally wears off after a day or so. This may be followed by a short period of increased pain.

Infection of the skin or tendon is a rare complaint. You should contact your GP/or our hospital if you suspect infection. Signs of infection include warmth, spreading redness, swelling and pain on touching.

An allergic reaction is a rare complication, but can be brought on by the local anaesthetic.

### **When can I return to activities/sports?**

You will normally be advised to start some loading exercises after around 1-2 weeks; patience is advised.

This is followed by a gradual and graded return to sports dependant on pain levels and function.

It's important to complete your rehabilitation to ensure your tendon is strong enough to deal with any load you apply to it. **This should be supervised by a qualified physiotherapist that is convenient for you and experienced in treating achilles tendon injuries.**

### **Follow Up**

A telephone follow up will be offered after around 4-6 weeks to check progress. And Dr Robertson can liaise directly with the physiotherapist - as you prefer.


### **Contact details**

If you have any issues after your injection please contact the clinic on 01772 802200 or [info@fysicl.co.uk](mailto:info@fysicl.co.uk).

### **References:**

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Plus see extracts attached from articles.

# Effectiveness of dry needling and high-volume image-guided injection in the management of chronic mid-portion Achilles tendinopathy in adult population: a literature review

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**Abstract** Achilles tendinopathy is a common overuse condition affecting the adult population. The incidence is on the rise because of greater participation of people in recreational or competitive sporting activities. There are several treatment options available both non-operative and operative. Ultrasound-guided dry needling and high-volume image-guided injection is relatively a new procedure. The aim of this study was to find out the effectiveness of dry needling and HVIGI in the management of mid-portion chronic Achilles tendinopathy by performing a literature review. Search strategy was devised to find the suitable articles for critical appraisal using the electronic databases. Four articles were selected for critical appraisal, and these papers showed good short- to long-term results of image-guided high-volume injection in the management of Achilles tendinopathy. We conclude that high-volume image-guided injection is effective in the management of Achilles tendinopathy. It provides good short- and medium-term relief of symptoms. It should be considered as one of the many options available for this condition.

**Keywords** Achilles tendinopathy · High-volume image-guided injection · Dry needling

## Introduction

Tendinopathies are soft tissue disorders related to tendons [1]. Non-insertional Achilles tendinopathy occurs because of failure to mediate the repair and degeneration processes,

leading to pain and disability [2]. The use of injectable substances such as platelet-rich plasma, autologous blood, polidocanol, corticosteroids and aprotinin in and around tendons is popular for Achilles tendinopathy, but evidence to support their role is minimal [3]. Ultrasound-guided high-volume image-guided injection (HVIGI) is relatively a new technique, and the literature on this technique is limited. This technique can be combined with dry needling.

## Background

Achilles tendinopathy is a common overuse condition affecting the adult population. The incidence is on the rise because of greater participation of people in recreational or competitive sports [2]. The general population has an incidence of 2.35 per 1000 people, which is roughly equivalent to more than 150,000 people in the United Kingdom every year [4]. It is a clinical triad of pain, impaired performance and swelling [5]. The main stimulus to cause tendinopathy is excessive repetitive overload; however, about one-third of the studied group did not participate in the vigorous physical activities [6]. During running, forces up to 12.5 times body weight pass through the Achilles tendon which may contribute to tendinopathy [7].

## Aetiology

Tendinopathies have been linked to poor vascularity, poor flexibility, genetic make-up, endocrine and metabolic factors [2]. Use of quinolone antibiotic has also been linked [8]. The pathological stimulus is excessive loading of the tendon during physical activity. Various intrinsic factors include poor vascularity, dysfunction of the gastrocnemius-

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soleus, age, gender, body weight, pes cavus and lateral instability of the ankle [2]. Changes in training pattern, poor technique, previous injuries, footwear and environmental factors such as training on hard, slippery or slanting surfaces are extrinsic factors [2]. The term “tendinopathy” is a description of a clinical condition which includes both

## What is dry needling and high-volume image-guided injection (HVIGI)

Dry needling involves repeated needling in the abnormal tendon to promote an inflammatory response. Repeated passage of the needle produces physical trauma to the



## High Volume Image Guided Injections with or without Steroid for Mid-Portion Achilles Tendinopathy: A Pilot Study

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### Abstract

**Objective:** High volume image guided injections of local anaesthetic and saline plus steroid plus structured rehabilitation (HVIGI&SR) have been shown to improve outcomes in Achilles tendinopathy (AT) patients. Due to concerns about steroid safety, our aim was to determine whether omitting the steroid altered the clinical effects of HVIGI&SR.

**Methods:** 23 consecutively recruited patients with AT (26 symptomatic tendons) were treated with a HVIGI composed of 10mls of 0.5% Marcaine mixed with either 40 ml of normal saline including 25 mg of hydrocortisone or 40 ml of saline only. Treatment allocation was determined by patient selection. The VISA-A questionnaire and visual analogue scales (VAS) were administered at pre-injection; 2, 6 and 10 weeks; and 12-month follow-up.

**Results:** VISA-A scores improved significantly in both groups, from a pre-injection mean ( $\pm$  SD) of 42.0 ( $\pm$  20.5) to 86.9 ( $\pm$  11.8) ( $p < 0.01$ ) in the 'with steroid' group, and from 42.6 ( $\pm$  9.1) to 83.3 ( $\pm$  12.2) ( $p < 0.01$ ) in the non-steroid group at final follow-up. VAS scores improved significantly in both groups. There was no statistically significance difference between the groups at baseline or any follow-up, in either VISA-A and VAS changes. A stronger effect size in favour of no steroid was seen at 10 weeks.

**Conclusion:** Overall, HVIGI&SR without steroid yields similar effects on pain reduction and functional improvement in comparison to HVIGI&SR with steroid. These results suggest that the effects of the injection may be mechanical rather than chemical, and that the steroid can be omitted. A randomised controlled trial is required to confirm this.

**Keywords:** Injection; Ultrasound; Corticosteroid; Achilles tendinopathy; Victorianinstitute of sports assessment-Achilles; Visual analogue scale; High volume

### Introduction

Achilles tendinopathy is the most common foot and ankle overuse injury in sport. Among runners, Achilles tendinopathy is the most frequent overuse injury, accounting for 6-17% of all running injuries [1-3]. It is also the most common foot and ankle overuse injury in activities such as rugby union, football, and gymnastics [1,4,5]. It is also common in non-athletes, with an incidence of 1.85 per 1000 in general practice [6]. It most commonly occurs in the mid portion of the Achilles tendon, an area 2-6 cm above the calcaneal insertion [7-9]. The condition is difficult to manage, with only extra corporeal shockwave therapy and eccentric loading exercises shown to have strong evidence of efficacy [10].

The diagnosis is a clinical one, best confirmed by imaging. Common imaging signs include tendon thickening, disorganised collagen structure, and neovascularisation around the tendon [11]. It has been shown by various case series that high volume injections deep to the

tendon can alleviate pain and improve performance, and have long term success when combined with structured rehabilitation (SR). These effects are hypothesised to be mediated by local mechanical effects including stretching, breaking or occlusion of neo-vessels with disruption of the associated neural ingrowth [12,13]. Other possibilities are a chemical effect of steroid or local anaesthetic, or a combination of mechanisms. A number of studies have evaluated High Volume Image Guided Injection and structured rehabilitation (HVIGI&SR), and consistently found significant improvement in short and medium-term pain and function as well as a reduced grade of neovascularisation and tendon thickness [12-16]. One recent study showed greater improvement in the short term for HVIGI&SR when compared to platelet-rich plasma (PRP) injections and structured rehabilitation [17].

Typically, HVIGI has included 25 mg of hydrocortisoneacetate a steroid although one evaluation with similar results used Aprotinin, a broad-spectrum serine protease inhibitor [18]. An early case series suggests promising results of a HVIGI&SR without corticosteroid or aprotinin, but there was no comparison group [16]. The rationale of each chemical additive is to prevent an acute inflammatory reaction in response to the large amount of fluid injected and to inhibit scarring

[13]. The mechanism of action, and indeed requirement for any chemical additive to the saline volume is worthy of investigation so as to minimise the chances of tendon degradation due to steroid administration. This is especially pertinent as steroid use in soft tissue injections is widely debated, due to reported risks such as tendon degeneration and rupture [19]. Furthermore, there have been reports of 8% of patients reporting pain, & <1% report rupture in patients receiving corticosteroid injections for tendinopathy [20]. The complication rates are not clear from the literature but concerns

The patient was asked for consent to the injection. Written consent for follow-up measures was obtained and a pre-injection VISA-A questionnaire completed based on the week prior to the injection. Patients were counselled regarding potential adverse events regarding corticosteroid use in the procedure, balanced with our experience of minimal side-effects and published case series, and then asked to make an informed decision as to whether they would receive steroid as part of the injection mixture or not.



# High volume distension injection (HVDI) for chronic mid-portion Achilles tendinopathy: A service evaluation of clinical outcomes

Samuel Edwards<sup>1</sup> and Manoj Sivan<sup>2,3</sup>

## Abstract

**Purpose:** High Volume Distension Injection (HVDI) is a treatment adjunct in chronic mid-portion Achilles tendinopathy. This study analysed whether HVDI is safe and effective in an outpatient clinic setting. **Methods:** Retrospective service evaluation of 18 participants over 18 months. Ultrasound-guided saline, corticosteroid and bupivacaine was injected to disrupt vasculo-neural ingrowth, with post-procedure eccentric exercises. Mean follow-up was 8 weeks. Outcomes used were Numeric rating Scale (NRS) of pain, tendon thickness and Modified Ohberg score (MOS) of neovascularisation measured on Ultrasound and Doppler imaging. **Results:** Mean reduction in NRS was  $5.30 \pm 2.53$  ( $P < 0.001$ ). Mean tendon thickness reduction was  $0.21 \pm 0.17$  cm ( $P < 0.001$ ). Median MOS improved from  $2.00 \pm 2.00$  to  $1.00 \pm 3.00$  ( $P = 0.009$ ). No complications occurred. 11 participants had successful primary HVDI, 3 responded to a second injection. Two non-responders were referred for surgery and two referred for alternative therapy by patient preference. **Conclusion:** Significant reduction in pain, tendon thickness and neovascularity was observed in 78% of patients. Recurrence in 39%. HVDI with eccentric training is safe and effective intervention in outpatient clinic setting.

## Keywords

Saline distension, ultrasound, neovascularity

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## Background

The Achilles tendon is the mechanical connection between the calf muscles (gastrocnemius and soleus) and the calcaneus bone. It is anatomically named the Tendo-calcaneus. If the tendon is chronically overloaded this can cause tendon disrepair resulting in degenerative tendinopathy.<sup>1</sup> Achilles Tendinopathy (AT) classically results in: pain, stiffness and impaired performance. Clinically, thickening of the tendon is associated with degenerative tendinopathy, this is due to recurrent tendon injury resulting in collagen disarray and an increase in glycosaminoglycans. These polysaccharides cause an increase in oedema resulting in a palpable swelling.<sup>2</sup> This condition can impact physical and daily activities, having both health and social implications if prolonged or untreated. The pathological process of tendinopathy is summarised below (Figure 1).

The incidence of AT among people aged 21–60 years old is 2.35 cases per 1,000 people<sup>3</sup> with approximately

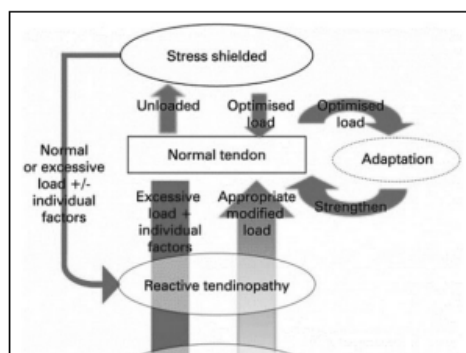
150,000 cases per year in the UK.<sup>4</sup> AT commonly affects physically active individuals who do training or sport that involves running and jumping<sup>5</sup> as these activities can result in repetitive, excessive tendon loading. With increased popularity of sports and endurance events, incidence of AT is increasing.<sup>6,7</sup> It is also strongly related to metabolic disorders such as Diabetes Mellitus, Thyroid dysfunction and Dyslipidaemia<sup>8</sup> these causes may be more commonly seen in a community Musculoskeletal (MSK) service.

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In this study HVDI refers to an injection of local anaesthetic, 0.9% sodium chloride (saline) and corticosteroid with a total volume of roughly 40 mls. Kager's fat pad lies anteriorly to the Achilles tendon, vasculo-neural ingrowth originates from here and so the high volume of fluids is injected into this area. Care is taken to avoid intra-tendon injection of corticosteroid and the procedure is performed under direct visualisation using ultrasound imaging.

There is limited research regarding HVDI but recent studies suggest there is clinical promise. A literature review of four HVDI studies demonstrated improved patient symptom severity scores in the 'short to medium term'<sup>15</sup> (Table 1). All studies involved in this review used the 100 point scale of Victorian Institute of Sports Assessment-Achilles (VISA-A) questionnaire, a validated and reliable