The purpose of this document is to summarize common medical and surgical interventions which may be considered for the management of Achilles tendinopathy – particularly if it is not responding adequately to more strongly supported conservative management strategies (see “Achilles Tendinopathy: Summary of the Evidence for Physical Therapy Interventions”).

## Pharmacological Approaches

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Method</th>
<th>Proposed Mechanism</th>
<th>Benefit: Pros/Cons</th>
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<th>Implications for Physiotherapy</th>
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<tbody>
<tr>
<td><strong>NSAIDs</strong></td>
<td>Short term benefit in the acute stage of tendinopathy to minimize inflammatory process.</td>
<td>Interrupts the chemical pathway of inflammation.</td>
<td><strong>PROS:</strong></td>
<td></td>
<td></td>
<td>PTs are involved in the treatment of tendon pain at all stages of recovery. General knowledge of commonly used NSAIDS is important for treatment planning.</td>
</tr>
<tr>
<td><strong>Corticosteroid (injection)</strong></td>
<td>Short-term benefit in acute stage. In chronic tendinopathy, the role of inflammation is unclear, and the rationale for the use of anti-inflammatory injections is controversial. Many studies report an absence of cellular features of inflammation in chronic tendinopathy.</td>
<td>Injection into the paratendon to interrupt the inflammatory process.</td>
<td><strong>PROS:</strong></td>
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<td></td>
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<td><strong>CONS:</strong></td>
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| **Glycerol Trinitrate (GTN)** | Nitro-glycerine patches applied over tendon to enhance healing. | Nitric oxide may increase blood flow to the tendon and stimulate repair by enhancing fibroblast proliferation. | **PROS:**  
- GTN improves outcomes compared to exercise alone.  
- Increased compliance because of ease of application. Self-applied.  
- Non-invasive.  

**CONS:**  
- Labour-intensive; requires repeated applications over 12 weeks.  
- Potential headache as a side-effect of nitro patch. | Conflicting evidence limits conclusions. | Use of GTN may enhance exercise outcomes. If prescribed by a physician may be applied by a physiotherapist and used in conjunction with an eccentric exercise program. |

### References:


### Injection Therapies

*Chronic Achilles tendinopathy is associated with abnormal proliferation of neovessels in the ventral portion of the tendon, and along with accompanying neural tissue, is associated with pain in tendinopathy. The presence of neovessels can be visualized by use of ultrasound (US) (sonography). Grey-scale US is a reliable method to assess tendon structure. Color Doppler or power Doppler has also been used to visualize blood flow.*

*Conservative treatment for Achilles tendinopathy is unsuccessful in 24-45% of cases. US-guided injections are becoming increasingly considered as part of ‘best practice’ for treatment of tendinopathies that have failed to respond to other conservative treatment.*

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| **Polidocanol** | Originally developed as an anaesthetic, and widely used as a sclerosing agent in the treatment of varicose veins. | There is a body of literature that supports the use of US-guided injections of polidocanol to disrupt neovessels and accompanying nerve structures associated with chronic tendinopathy. | **PROS:**  
- Increasingly used, registered drug with few side-effects.  
- No need to use additional anaesthetic, as it has its own aesthetic properties.  

**Evidence:**  
There is some evidence which supports the use of sclerosing agents to treat Achilles tendinopathy, although some studies present conflicting results.  
**Take Home Message Implications for Physiotherapy:**  
PTs should have knowledge of more invasive techniques to help to facilitate referral of patients to other procedures when conventional treatment fails to result in a sufficient positive response. |
**Injection Therapies** (continued)

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<td>Prolotherapy</td>
<td>Injection of hyperosmolar dextrose with small amount of anesthetic to induce a ‘pro-inflammatory’ proliferative cell response.</td>
<td>Fibroblast proliferation, collagen maturation and resolution of neovessels are observed, with near normal appearance of tendon tissue structure observed with US. New viable tissue hypothesized to result from local release of cell growth factors. Medical dextrose also has a weak sclerosing effect on vessels.</td>
<td><strong>PROS:</strong>&lt;br&gt;• Can be performed with or without US-guided localization.&lt;br&gt;• US-guided technique permits localization to a specific target site. However, injections without US imaging may also be effective, even in a subcutaneous approach superficial to the target tissue.</td>
<td></td>
<td>Prolotherapy combined with eccentric exercise for Achilles tendon loading provides more rapid improvement in symptoms than eccentrics alone, although long-term VISA-A scores are similar.</td>
<td>Prolotherapy may enhance outcomes compared to using eccentric exercise, alone.</td>
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**References:**

## Injection Therapies (continued)

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| **Platelet Rich Plasma (PRP) and Autologous whole blood** | Centrifuge of autologous blood to collect a concentrate of the platelets and plasma. This is then injected back into the patient’s tendon. | Cellular and humoral (blood) mediators promote healing in areas of tendon degeneration. | PROS: *Growing interest in PRP (platelet rich plasma).*  
CONS: *Requires expensive blood processing equipment and centrifuge. Also, it is a US-guided technique requiring sonography and an experienced operator.* | A single RCT demonstrated no benefit of PRP compared to saline injections in AT. A consensus panel from the International Olympic Committee (IOC) recommended that physicians should proceed with caution using PRP in sports medicine (including Achilles tendon injuries). | PTs are part of a treatment team when treating tendon injury. General knowledge of PRP, PRGF and PDGF is important to assist patients in decision-making. |

**References:**

| **High volume injection (HVI) or Hydrostatic dissection** | Small volume of anaesthetic/steroid and high volume of saline, delivered by US-guided imaging. | The pressure created by the volume of substance into the tendon sheath is proposed to disrupt the neovessel ingrowth in Achilles tendinopathy. | PROS: *Non-surgical option.*  
CONS: *Requires sonography equipment.* | Potential treatment option for Achilles tendinopathy that has failed to respond to a more conservative approach. | Provides another treatment option when conservative treatment has been unsatisfactory. |

**References:**
Dry Needling

The term ‘dry needling’ has been used to describe several techniques that involve insertion of a needle without injection of a substance. Needling of the tendon has been described by a number of practitioners using a hypodermic needle. Similar results using acupuncture needles have become more common. The technique is described below.

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| Dry Needling using a Hypodermic Needle ('tendon fenestration') | Tissue trauma from the cutting edge of the needle/lumen. | Repeated lancing of abnormal tendon tissue creates haemorrhage followed by an inflammatory response, granulation and healing. Some needling techniques employ US to guide the needle (percutaneous needle tenotomy). | **PROS:**  
- Invasive treatment that avoids full surgical exposure and risks.  
**CONS:**  
- Requires sonography equipment. | Needling alone without injection of a substance has shown a positive result for improving pain without complications. | Provides another treatment option for clients that have failed to respond to other conservative treatment. |

**References:**

Surgical Approaches

Surgical success rates are reported at 85% for Achilles tendinopathy that have failed to respond to conservative measures.

| Percutaneous tenotomy | Techniques include closed dissection of the tendon sheath by US-guided percutaneous longitudinal internal tenotomy; or open surgical exposure of the tendon, followed by multiple longitudinal splitting of the tendon. | Surgical trauma creates granulation and repair, and interrupts fibrous adhesions. | **PROS:**  
- Simple procedure that can be done as an outpatient.  
- Short recovery compared to more invasive surgery.  
**CONS:**  
- Risk of infection. | Satisfactory outcomes for selected patients that do not have complicated Achilles pathology, and have failed to respond to a conservative treatment approach. | PT may be involved in the post-op rehabilitation following surgery. |

**References:**

| Surgical Debridement | Central longitudinal incision to expose the tendon, with excision of disorganized and fibrotic tendon tissue and adhesions. Additional diathermy to destroy neovessels. | Surgery creates granulation and repair, and removes fibrotic tissue. | **PROS:**  
- High success rates reported by some centres.  
**CONS:**  
- Risk of infection.  
- Long post-op recovery of 3-6 months. | Surgery may be a successful option for patients that have failed to respond to conservative treatment, or have complicated Achilles tendon pathology. | PT may be involved in the post-op rehabilitation following surgery. |

**References:**
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<td>Minimally invasive stripping</td>
<td>Small incision is made allowing a probe or scalpel to be inserted ventral to the tendon. The area of neovascularisation is stripped.</td>
<td>Disrupts abnormal blood/nerve supply, releases adhesions.</td>
<td><strong>PROS:</strong></td>
<td>Retrospective, short-term studies only.</td>
<td>PT may be involved in the post-op rehabilitation following surgery.</td>
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<td></td>
<td></td>
<td></td>
<td>• High success rates reported.</td>
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<tr>
<td></td>
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<td>• Minimal trauma to tendon.</td>
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<td>• Quick return to sport.</td>
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<td><strong>CONS:</strong></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Risk of infection.</td>
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<td></td>
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<td></td>
<td>• Potential loss of gliding function due to long term increased fibrosis around tendon.</td>
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