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>
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<tr>
<th>Intervention</th>
<th>Method</th>
<th>Proposed Mechanism</th>
<th>Benefit: Pros/Cons</th>
<th>Evidence</th>
<th>Take Home Message Implications for Physiotherapy</th>
</tr>
</thead>
</table>
| **NSAIDs**   | Short term benefit in the acute stage of tendinopathy to minimize inflammatory process. | Interrupts the chemical pathway of inflammation. | **PROS:**  
- Inexpensive, easily accessible.  
- Precautions and contra-indications that accompany specific medications.  
- Inhibition of inflammation may delay repair of muscle tissue or tendon insertion.  
| Limited evidence for a modest effect of topical or oral NSAIDs in acute stage in Achilles tendinopathy. | 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. |

**References:**

| **Corticosteroid (injection)** | Short-term benefit in acute stage. In chronic tendinopathy, the rationale for the use of anti-inflammatory injections is controversial. | Injection into the paratendon to interrupt the inflammatory process. | **PROS:**  
- Easily accessible.  
- Careful administration outside the structure of the tendon is considered ‘safe’ i.e., in the paratendon sheath. | Limited evidence to support the use of local corticosteroid injections in chronic Achilles tendon lesions. Generally, lack of well-designed clinical trials. | PTs are involved in the treatment of tendon pain at all stages of recovery. There are animal studies that suggest risk of tendon rupture after corticosteroid injection. Caution is recommended in progressing the loading of the tendon within two weeks of a corticosteroid injection (exercise precautions). |

**References:**

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<tr>
<td>Glycerol Trinitrate (GTN)</td>
<td>Nitro-glycerine patches applied over tendon to enhance healing.</td>
<td>Nitric oxide may increase blood flow to the tendon and stimulate repair by enhancing fibroblast proliferation.</td>
<td><strong>PROS:</strong>&lt;br&gt;• GTN may improve outcomes compared to exercise alone.&lt;br&gt;• Increased compliance because of ease of application. Self-applied.&lt;br&gt;• Non-invasive.&lt;br&gt;&lt;br&gt;<strong>CONS:</strong>&lt;br&gt;• Labour-intensive; requires repeated applications over 12 weeks.&lt;br&gt;• Potential headache as a side-effect of nitro patch.</td>
<td>Conflicting evidence limits conclusions and widespread use.</td>
<td>If prescribed by a physician may be applied by a physiotherapist and used in conjunction with an eccentric exercise program.</td>
</tr>
</tbody>
</table>

**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. | Conflicting evidence limits conclusions and widespread use. | 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. |

**References:**
### Injection Therapies (continued)

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| **Prolotherapy**              | Injecting a small volume of an irritant solution at multiple sites around a tendon insertion to induce a ‘pro-inflammatory’ proliferative cell response. One study used hyperosmolar dextrose while another used hypertonic glucose, both with a small amount of anaesthetic. | 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. | **PROS:**  
• Can be performed with or without US-guided localization.  
**CONS:**  
• Not covered by medical plans (BC); usually requires a private fee that reflects the expertise of the practitioner.  
• Requires three or more repeated treatments. | Limited evidence suggests that prolotherapy combined with eccentric exercise for Achilles tendon loading may provide more rapid improvement in symptoms than eccentrics alone, although long-term VISA-A scores are similar. | Prolotherapy may enhance outcomes compared to using eccentric exercise, alone. |
| **Platelet Rich Plasma (PRP) and Autologous whole blood** | Autologous blood injections involve the reinjection of a patient’s own whole blood. In PRP the autologous blood is centrifuged 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:**  
• Non-surgical option  
• Can be performed with or without US-guided localization  
**CONS:**  
• RCT-level evidence of lack of effectiveness  
• Requires expensive blood processing equipment and centrifuge. | Two high-quality RCTs have shown both PRP and autologous whole blood injection to be ineffective. | PTs are part of a treatment team when treating tendon injury. General knowledge of PRP and relevant high quality RCTs is important to assist patients in decision-making. |

**References:**


**Injection Therapies (continued)**

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| 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. | Limited evidence of effectiveness. | Potential treatment option for Achilles tendinopathy that has failed to respond to a more conservative approach. |

**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.  
- Potential to permanently injure the tendon | Limited evidence of effectiveness, | An invasive treatment with limited evidence. |
## Surgical Approaches

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

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| Percutaneous tenotomy      | Techniques include closed dissection of the tendon sheath by US-guided percutaneous longitudinal internal tenotomy; or open surgical exposure of the tendon. | Surgical trauma creates granulation and repair, and interrupts fibrous adhesions. | **PROS:**  
• Simple procedure that can be done as an outpatient.                                                                 | Satisfactory outcomes for selected patients that do not have complicated Achilles pathology, and have failed to respond to a conservative treatment approach. Treatment seems to be effective in the long-term with regard to returning to pre-injury level of functioning. Paratendinopathy is a negative prognostic factor. | PT may be involved in the post-op rehabilitation following surgery.                                                                 |
|                            |                                                                        |                                                                                  | **CONS:**  
• Risk of infection.                                                                                                           |                                                                                                                                           |                                                                                                                                                  |

### 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> • High success rates reported. • Minimal trauma to tendon. • Quick return to sport. • Reduced risk of infection comparing to open surgery</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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**References:**

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Minimally invasive stripping

- Central longitudinal incision to expose the tendon, with excision of disorganized and fibrotic tendon tissue and adhesions. Additional diathermy to destroy neovessels.

**Surgical Debridement**

- Surgery creates granulation and repair, and removes fibrotic tissue.

**PROS:**
- High success rates reported by some centres in terms of reducing pain and improving functionality.

**CONS:**
- Risk of infection.
- Long post-op recovery of 3-6 months.

**Evidence:**
Retrospective, short-term studies only.

**Take Home Message Implications for Physiotherapy:**
PT may be involved in the post-op rehabilitation following surgery.

**References:**