ACHILLES TENDON
INSERTIONAL ACHILLES TENDINOPATHY

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INSERTIONAL ACHILLES TENDINOPATHY
- 25% of Achilles tendon pathologies

Classification:
- Insertional
- Preinsertional (retrocalcaneal bursitis)
- Superficial calcaneal bursitis

PRE-INSERTIONAL ACHILLES TENDINOPATHY
- Haglund’s exostosis: clinical assessment characterized by pain and tenderness at the postero-superior side of the calcaneus, where a calcaneal prominence is often felt.
- The Haglund disease and the other conditions, as the superficial Achilles bursitis, are different in terms of causes, histopathology, prognosis and treatment.

INSERTIONAL ACHILLES TENDINOPATHY
- It is located at the insertion of the Achilles tendon onto the calcaneus, often associated with the formation of bone spurs and calcifications at the insertion site.
- The pain is mostly localized at the mid-portion of the posterior aspect of the calcaneus, where the bone spur may be palpable.
- Over the years, various terms have been proposed to describe the same pathological process.
- «Haglund», for example, is a much-used eponym for pathologies around the Achilles tendon insertion.
- In 1992, the Achilles tendonitis was classified as «insertional» and «non insertional» for the first time.
- Maffulli et al suggested to name the clinical syndrome of pain, swelling and impaired function as «tendinopathy».
- Non insertional Achilles tendinopathy consists of mid-portion Achilles tendinopathy and/or paratendinopathy. These conditions may co-exist.
- Retrocalcaneal bursitis may be combined with insertional Achilles tendinopathy.

PATHOPHYSIOLOGY
- Intrinsic risk factors: hyperpronation, obesity, diabetes, hypertension, use of steroids, estrogens and fluoroquinolone antibiotics, genetics
- Extrinsic risk factors: changes in training pattern, footwear and running on smooth, hard or sloping surfaces

In a review of biomechanical studies, Maganaris et al. observed that the strains within the tendons near their insertion site are not uniform.
The forces transferred through the insertion usually load the part of the tendon not yet affected: the side affected by tendinopathy may be considered as “stress-shielded”.

Cook et al proposed a pathology model to explain the overuse tendinopathies development:

**Reactive tendinopathy**: non-inflammatory proliferative response to acute tensile or compressive overload. It is a short-term adaptation, reversible if overload is reduced enough or if there is sufficient time between loading sessions.

**Tendon dysrepair**: greater matrix breakdown, chondrocytes and myofibrobalsts increase in number, as well as proteins like proteoglycans and collagen matrix disorganization.

**Degenerative tendinopathy**: poorly reversible stage. Areas of degenerative tissue among other pathological stages and normal tissue.

- The histopathologic process consists in an *ossification* of the enthesial fibrocartilage, with small tendon tears occurring at the tendon-bone junction.
- The tenocytes from affected tendons may show *chondral metaplasia*. The consequent altered production of collagen may be one of the reasons for the histopathological Alterations of the insertional tendinopathy.

**CLINICAL EVALUATION**

- A palpable point of tenderness and swelling on the posterior aspect of the calcaneal tuberosity.
- Pain reported over the area with extremes of dorsiflexion or resisted plantar flexion.
- An enlarged postero-superior calcaneal process, intratendinous bone spur(s) or calcification(s) may be palpated.
- Possible thickening of the Achilles tendon in chronic cases.

**RADIOGRAPHIC EVALUATION**

- **PLAIN RADIOGRAPHS**: alteration of the medial longitudinal arch of the foot, intratendinous calcifications.
- **US**: expansion of the tendon in the ap view, with heterogeneous loss of reactivity and loss of the normal fibrillar pattern. Possible presence of partial tears of the deep tendon surface. Cost effective, dynamic, high spatial resolution, guiding therapeutic interventions.
- **MRI**: tendon insertion expanded in the ap view, variable level of ill-defined longitudinal high signals, usually on the deep tendon surface and near to the os calcis. The sagittal mri is the optimal imaging tool for diagnosis an insertional Achilles tendinopathy. More effective for assessing alternative diagnosis.

**MANAGEMENT**

Decreasing pain and improving function

- **Acute phase/late dysrepair**: initial rest or immobilization, modifying sports activity

Conservative options:

- Stretching - strengthening exercises
- Extracorporeal shock wave therapy
- Non-steroidal anti-inflammatory drugs
- Orthotics, heel raise inlay
- Shoe modification
- Us-guided interventions

!! Eccentric training is poorly effective in case of insertional tendinopathy

- **Extra corporeal shock wave therapy**
• Indications: failure of traditional non-operative procedures, chronicity and persistence of symptoms for more than 4-6 months.
• Contraindications: infections, pregnancy, advanced peripheral neuropathy, skeletal immaturity and unsolved fractures.
• Well tolerated technique, effective and easy to perform.

• **Us-guided interventions / injecting therapy**
  • Prolotherapy (intratendinous hyperosmolar dextrose injection).
  • Platelet-rich plasma (prp) injection.
  • Sclerosing agents injection, under doppler us guidance.
  • Aprotinin injection.
  • Hyaluronic injection.

Patients not responding to conservative management for at least 3-6 months may require a different surgery.

**WHICH SURGICAL APPROACH?**

**Insertional tendinopathy**
  • Open tenotomy

**Pre-insertional tendinopathy**
  • Endoscopic calcaneoplasty

**INSERTIONAL ACHILLES TENDINOPATHY**

**Aims of open surgery:**
• Debridement of diseased tendon and calcifications within the tendon insertion.
• Removing any retrocalcaneal bursal tissue.
• Decompressing the calcaneal prominence if impinging on the tendon.
• Reattachment or augmentation of the tendon, when the residual Achilles tendon following debridement is inadequate for optimal function.

**INSERTIONAL ACHILLES TENDINOPATHY**

Debridement of the degenerative tissue and osteotomy are especially indicated for patients:
• Younger than 50 years
• With moderate tendon involvement

In elder people persistent pain and limited function may last after surgery due to limited vascularization and a lower capacity for full recovery.

A central tendon splitting incision is useful to remove better the degenerative tissue and the calcifications.

A medial and/or a lateral approach does not often show the real extent of the calcifications, which usually occur within the middle third of the tendon insertion.

Furthermore, given the blood supply of the tendon is via the paratenon, a lateral or medial incision may disrupt the blood supply.

**PRE-INSERTIONAL ACHILLES TENDINOPATHY**

Endoscopic calcaneoplasty:
• Indicated when lateral radiographs show hypertrophy of the postero-superior calcaneus and signs of chronic retrocalcaneal bursitis.
• Advantages: low morbidity, short time of surgery, high scar healing capacity, short rehabilitation time, quick resumption of sport activities.
• Remove enough bone to prevent recurrent traumas of the calcaneus against the Achilles tendon!
• Perform the calcaneoplasty without damaging the Achilles tendon insertional area!

INSERTIONAL ACHILLES TENDINOPATHY: SURGICAL TECHNIQUE

• Excision of the calcific insertional body
• Calcific bodies removed
• Achilles tendon suture after central tendon splitting at the end of surgery.

POSTOPERATIVE COMPLICATIONS:

• Wound dehiscence
• Infection
• Sural nerve damage
• Tendon necrosis scarring
→Mini-invasive techniques should be preferred

MECHANICAL LOADING

• Mechanical stimuli activate myofibroblasts and fibroblasts
• Orientation of fibroblasts along the longitudinal axis of the tendon
• Early motion accelerates nerve regeneration

POSTOPERATIVE PROTOCOL

• Some authors recommend a cast for 6 weeks, to guarantee healing of the Achilles tendon insertional area.
• Others prefer an ankle immobilization for 2 weeks or more, followed by a weight-bearing plantarfleked cam walker boot or cast for further 3-4 weeks
• A removable boot brace is usually suggested for 1 month

The postoperative protocol depends on:
• The physician’s confidence in the tendon reattachment
• The tendon portion removed

Focus on:
• Gait training
• Gradual ankle range of motion recovery
• Progressive gastrocnemius-soleus strengthening program

A full recovery of range of motion and muscle strength is usually gained from 6 weeks to 1 year

CONCLUSIONS

• Insertional Achilles tendinopathy is a painful and debilitating condition.
• When necessary, surgery should be carefully planned.
• Less invasive surgical techniques are preferable.