PERIOSTITIS & COMPARTMENT SYNDROMES

Fiona Rattray & Linda Ludwig Pg.423

PERIOSTITIS

- **Periostitis and compartment syndromes produce P in the lower leg.**
- These conditions, as well as tibialis posterior tendinitis and tibial stress fractures, can be grouped together under “shin splints”, a non-specific phrase that describes pain along the medial border of the tibia with exercise.
- **Periostitis is inflammation of the periosteum.**
- This inflammation develops at the insertion of the leg muscles of the tibia.
- Most common are at the muscles that attach posteromedial to the tibia.
- Can occur at the anterior portion called medial tibial stress syndrome, tenoperiostitis, and soleus syndrome.
- Medial stress syndrome compromises up to 18% of running injuries and effects women more than men. If left untreated, it can lead to a stress fracture.

CAUSES & PREDISPOSING FACTORS OF PERIOSTITIS

- Overuse: due to over training, poor technique.
- Poor biomechanics: posteromedial periostitis occurs with excessive pronation, varus knee, and excessive external rotation of the hip.
- Medically: diagnosis can be done with a bone scan. NSAIDS, ice, and rest from activity.

SYMPTOM PICTURE

- Excessive pronation, tension is placed on the periosteum with repeated muscular contraction. Overtime the periosteum is unable to repair itself, and potential tearing of the tissue off the bone. Symptoms may be BL.
- After the acute stage, and in the chronic stage, chronic inflammation can occur, accompanied by adhesions and fibrosing.
- Achiness is worse in the morning and with exercise, then decreases after a period of warm up.
- There is tightness and cramping if the client runs through the pain.

COMPARTMENT SYNDROMES

- **A compartment syndrome is the result of an increase in pressure within the compartments of the lower leg.**
- There are 4 compartments around the tibia and fibula, which are divided by dense, inelastic fascia.
- Anterior compartment: contains the tibialis anterior, extensor hallucis longus, and extensor digitorum muscles, anterior tibial artery, and veins, and deep peroneal nerve.
- Superficial posterior compartment: contains the gastrocnemius, and soleus mm's.
- Deep posterior compartment: contains tibialis posterior, flexor digitorum longus, and flexor hallucis longus mm's, posterior tibial artery and veins, tibial nerve, and peroneal artery, and vein.
- Lateral compartment: contains peroneus longus, and brevis mm's.

COMPARTMENT SYNDROME

- Anterior compartment is the most prone at 45 % of cases.
- Deep posterior compartment is next at 40%.
- Another long term for chronic compartment syndrome is chronic exertional compartment syndrome, usually occurring in athletes under 40 years of age.

CAUSES & PREDISPOSING FACTORS

- Acute trauma: direct blow to the compartment.
- Chronic: overuse due to over training, poor technique or training on hard surfaces.
- Anatomical configuration, where the affected compartment is smaller than normal.
- Mm imbalance and mm tightness, more so tight antagonists. Anterior compartment syndrome for example, gastrocnemius and soleus are tight, which overloads the anterior compartment mm's.
- Improper foot wear, that is worn out, to flexible, too stiff or does not provide adequate arch support.
- The mm type involved, which may create an imbalance. Example: Tibialis anterior is a phasic mm responding to stress by fatiguing, gastrocnemius and soleus are postural mm's, responding to stress by shortening.

MEDICAL TX

- A compartment syndrome is diagnosed with compartment pressure testing.
- Chronic compartment syndromes, a post exercise of 15mm Hg (a unit of pressure) measure 15 minutes post exercise.
- Acute compartment is treated with an immediate fasciotomy.

SYMPTOM PICTURE

- Acute compartment syndrome is a medical emergency.
- Bleeding, swelling within the compartment increases the intercompartmental pressure.
- In an anterior compartment case, which is the most commonly affected, pressure may increase to the point where the anterior tibial artery and peroneal nerve are compromised. Permanent nerve damage and mm necrosis may result if a fasciotomy is not performed.
- P is severe and persistent.
- Skin is taut and shiny from swelling. The affected compartment is harder and hotter then the unaffected side.
- Sensation may be diminished in the web space between the first and second toes.
- Paresthesia and motor loss may be present.
- Dorsalis pedis pulse may be absent.
- Active free dorsi flexion and toe extension, inversion are difficult due to P.
- Passive stretch of the affected compartment is painful.
- Anterior compartment syndrome may be BL, but is usually worse on one side.

SYMPTOM PICTURE

- Chronic compartment syndrome symptoms are usually associated with exercise.
- P begins at the same time or distance into the activity, and is relieved by rest.
- Increased blood flow to the mm's during exercise increases their size, and intercompartment pressure.
- Initially there is an ache and tightness over the entire compartment. The symptoms increase with exercise and decrease with rest.
- As the condition progresses, the ischemia causes P, which limits activity.
- There may be paresthesia in the leg or foot during exercise.
- Deep posterior compartment syndrome is often BL.

ASSESSMENT

- Palpation: reveal tightness, occasionally defects in the fascia from continued pressure.
- ROM: all ranges will be restricted by P.
- Length tests: Antagonists of the affected compartment reveal shortness.

DIFFERENTIATING CAUSES OF LEG PAIN

- **Tibialis posterior tendinitis**: P is worse on activity than at rest. P is along the course of the tendon, just posterior to the medial malleolus and along the proximal tibia.
- **Tibial stress fracture**: P is sharp and localized to the fracture site. Medial aspect of the tibia is a common location. 2-3 week onset of symptoms. Initially P is worse on activity and is relieved with rest. With progression, P is constant and worse with impact. The person is unable to run through the P. Night P is experienced. Stress fracture test is positive.
- **Deep vein thrombosis**: Feeling of local tightness and tenderness in the calf. P is relatively constant regardless of activity. Warmth and redness are classic indicators, these may be absent. Homan's sign or Ramirez's test are likely positive.

SELF-CARE PERIOSTITIS

- Acute: Rest from activities and ice 3-4x/day to control inflammation.
- Chronic: Return to activity is gradual.
- Correct pre-disposing training factors such as improper footwear, training on hard, inclined or uneven surfaces.
- Pre-activity heat to the compartment, self massage and stretching are indicated.
- The client is referred for orthotics if needed.

SELF-CARE

- Rest from activity that cause P.
- Gradual return to activity.
- Proper warm up period.
- Self massage to the compartment borders and the antagonists.
- Stretching for the leg is performed, starting with the antagonists of the affected compartment.
- Client is referred for orthotics if needed. If the condition does not respond to conservative treatment within 3 months, refer out to physician.