Calf pain in runners

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Overview of calf pain in runners

Runners may experience diffuse ache or tightness in the calf when running. This is associated with an insidious onset and symptoms resolve when they stop running. The onset is usually insidious but the runner may report previous calf tightness which begins to develop earlier during a run.

Findings from MRI and ultrasound scans are unremarkable which suggests this condition is an overuse injury. Overuse calf pain is different from acute calf tears. Gastrocnemius tears are associated with a sudden onset of pain caused by a rapid push off movement in knee extension. Symptoms are present with daily activities unlike overuse calf pain which is only associated with running.

Biomechanical overload syndrome

Calf pain when running was previously thought to be caused by tissue hypoxia as a result of elevated intramuscular pressure, and diagnosed as chronic exertional compartment syndrome. In 2012, Franklyn-Miller et al. questioned the reliability of this diagnosis instead outlining a new condition called biomechanical overload syndrome. Biomechanical overload syndrome is based on the idea that pain is caused by fatigue failure which occurs when a muscle is overload.

By thinking about calf pain in runners as fatigue related, the emphasis of management is on conservative treatments to increase load capacity instead of surgical management to reduce intra-compartmental pressure. Biomechanical overload syndrome is a challenging condition to treat as it does not follow a predictable healing process like an acute gastrocnemius tear.

Risk factors

Deconditioned athletes aged 40-60 are at the highest risk of developing biomechanical overload syndrome. Other risk factors include:

- Change in training load, specifically increased pace or training volume
- Switch to forefoot running or minimalist shoe, as this increases calf work by 10%
- History of previous calf injury
- Calf weakness and reduced flexibility
- Inadequate rest or recovery
- Stress and lack of sleep
- Weakness in the kinetic chain
- Loss of flexibility of the sciatic nerve

Objective assessment

Assessment of runners with calf pain should include:

- Observation of static posture and muscle bulk, specifically the calves and quadriceps
- Range of movement testing of the foot and ankle, specifically ankle dorsiflexion and great toe extension
- Straight leg or bent leg calf capacity testing
- Strength testing of local muscle including the toe flexors, tibialis posterior and ankle evertors
- Strength testing of the kinetic chain, including the quadriceps and gluteal muscles
- Palpation of the calf complex

Calf capacity test

The calf capacity test is best performed on the edge of a step. This allows for assessment of the capacity of the calf through the full ankle range of motion. The number of calf raises prior to fatigue, or a reduction in range of movement, is compared between sides. Common compensatory strategies that can be observed with fatigue include increasing the speed, hip hitching, bending their knee or using their toes. A metronome may be used to standardise the test speed. The patient should be able to complete 25 calf raises prior to fatigue, however this may be reduced on symptomatic leg. If there is no deficit on capacity testing, an assessment of calf strength is indicated. Use of a 10RM via the addition external load is recommended.

Links associated with this episode:

Twitter - @Tomgoom
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Articles associated with this episode:

Franklyn-Miller et al. (2012). Biomechanical overload syndrome: defining a new diagnosis.

Running Physio – Calf pain when running