QUEENSLAND ORTHOTIC LAB

Richie AeroSpring

Achilles Tendon Offloading System

Clinical Indication:

- ❏ Tendinopathy of the Achilles tendon
- ❏ Non-surgical management of the Achilles tendon rupture
- ❏ Post surgical management of the Achilles tendon rupture

Achilles offloading

Features:

- ❏ Carbon fibre ankle foot orthosis - controls ankle joint dorsiflexion and load on the Achilles tendon
- ❏ Custom functional foot orthosis (one pair) - controls rearfoot pronation, patented Richie ArchLock™ offloads the medial-central band of the plantar fascia
- ❏ Graduated Heel Wedges - Up to 30 mm heel lift provided by layers of 10 mm heel wedges

Rationale:

Recent research has shown:

- ❏ The injured Achilles tendon will heal faster when subjected to dynamic loading
  (Thevendran G, Sarraf KM, Patel NK, Sadri A, Rosenfeld P. The ruptured Achilles tendon: a current overview from biology of rupture to treatment. Musculos- kelet Surg 2013;97(1):9)
- ❏ Patients with Achilles injuries heal faster when allowed to bear weight compared to the non-weight bearing condition
  (Kearney RS, McGuinness KR, Achten J, Costa ML. A systematic review of early rehabilitation methods following a rupture of the Achilles tendon. Physiotherapy 2012;98(1):24–32.)
- ❏ Positioning the ankle in extreme plantarflexion (30 degrees) actually slows the rate of healing in the Achilles tendon compared to slight plantar flexion (10 -20 degrees).
  (Froberg A, Komi P , Ishikawa M, Movin T, Arndt A. Force in the achilles tendon during walking with ankle foot orthosis. Am J Sports Med. 2009 Jun;37(6):1200-7)

The Richie Achilles Off-Loading System provides the following advantages compared to walking boots:

- ❏ Dynamic Loading
- ❏ Full weight bearing
- ❏ Optimal heel elevation and ankle plantarflexion angle (10-20 degrees)

Visit www.qol4feet.com.au
Email info@qol4feet.com.au
Phone 07 3823 1531
1/10 Christine Place, Capalaba QLD 4157

How to order:

Scanning:

- ❏ Take a scan of both feet (same as your foot orthotic scans)
- ❏ Email the scans along with a completed order form to info@qol4feet.com.au

Casting:

- ❏ Take a cast of both feet (same as your foot orthotic casts)
- ❏ Send the casts along with a completed order form to:
  QOL, 1/10 Christine Place, Capalaba, QLD, 4157

Recent insights from published research

Immediate weight bearing with early mobilization of the ankle after surgical repair of the acutely ruptured Achilles tendon has now become standard protocol around the world. (1-7) More recently, a compelling body of evidence has validated equivalent outcomes with non-operative treatment of the acute Achilles tendon rupture compared to immediate surgical repair. (8-9) In the non-operative treatment of the acute Achilles rupture, immediate weight bearing with early immobilization has again produced the best results. (3,10)

Studies of early weight bearing after Achilles rupture have utilized various types of walking boots and casts to limit ankle joint motion and protect the injured tendon. There is no clear preference or standard for which type of immobilizing device or which position of ankle joint alignment is favored. (11) While standard practice has favored positioning the ankle in extreme equinus when weight bearing after an Achilles rupture, studies have shown favorable outcome when orthoses or braces are used which simply restrict ankle dorsiflexion to neutral (90 degrees).

Positioning the ankle in extreme (30 degrees) plantarflexion puts the Achilles in a slack position without the benefits of loading which is essential to proper tendon healing. Furthermore, decreased muscular activity in the calf while non-weight bearing in this position may account for long term deficits which patients suffer after Achilles tendon rupture including reduced calf circumference and reduced calf muscle strength. (6)

These studies have shown that there are no increased risks of re-rupture with weight bearing in an AFO regardless of whether the ankle was maintained in a plantarflexed position or allowed dorsiflexion to neutral. (12,13,14)

While intuitively we assume that less tension is placed on the Achilles when the ankle is held plantarflexed in a boot or AFO, we do not consider the compensatory muscle activity and tension which develops in the Achilles when the patient is required to walk in an extreme plantarflexed

position at the ankle joint. A study of Achilles tension in human subjects showed that INCREASED tension in the Achilles resulted when the foot was positioned 20 degrees plantarflexed in a brace compared to a neutral ankle position. (15) Thus, a CAM type walking boot with the ankle set plantarflexed 20 degrees, causes the patient to walk on the forefoot only, which greatly increases Achilles tension to the same level as when they walked barefoot. (15) On the other hand, when patients ambulate in a walking boot, set at 90 degrees, two studies have shown that the reduction in contractile activity in the gastrocnemius and soleus is reduced to only 79% of normal walking (21% overall reduction). (16,17) However, when a 1 inch heel lift is applied inside the boot, reduces contractile activity to 57% of normal walking, while causing minimal plantarflexion of the ankle to 10 degrees. (16) Therefore, a 1 inch heel lift to a walking boot can be expected to reduce muscular activity of the ankle plantarflexors by 22% compared to walking in a boot in neutral position.

Walking boots with heel lifts will increase heel pressures while causing gait disturbances. (18) These negative changes include decreased time spent in terminal stance (propulsion) and pre-swing phase. (18) This accounts for the development of pain in the hips and knees reported by patients who must be immobilized in walking boots. A carbon fiber AFO with a one-inch heel raise will protect the Achilles by limiting ankle dorsiflexion, while restoring near-normal gait paramenters compared to a walking boot. The authors stated that this carbon fiber AFO could lead to an accelerated return to function and avoid the effects of disuse atrophy in the calf musculature. (18)

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