

# EVALUATING THE PROGRESS OF MID-PORTION ACHILLES TENDINOPATHY DURING REHABILITATION: A REVIEW OF OUTCOME MEASURES FOR MUSCLE STRUCTURE AND FUNCTION, TENDON STRUCTURE, AND NEURAL AND PAIN ASSOCIATED MECHANISMS

Myles Murphy, PT<sup>1-3</sup>

Ebonie Rio, PT, PhD<sup>4,5</sup>

James Debenham, PT, PhD<sup>1</sup>

Sean Docking, PhD<sup>4</sup>

Mervyn Travers, PT, PhD<sup>1,6</sup>

William Gibson, PT, PhD<sup>1</sup>

## ABSTRACT

**Introduction:** Alterations in tendon structure and muscle performance have been suggested as mechanisms driving improvement in pain and function with mid-portion Achilles tendinopathy (AT). However, few trials have used consistent outcome measures to track differences in muscle structure and function, tendon structure and neural and pain associated mechanisms.

**Objectives:** 1) Identify the outcomes measures used in trials utilising loading protocols for mid-portion AT that assess muscle structure and function, tendon structure and neural and pain associated mechanisms in order to report on the reliability of the identified measures, and 2) Propose a summary of measures for assessment of muscle structure and function, tendon structure and neural and pain associated mechanisms in patients with AT.

**Design:** Literature Review

**Data Sources:** Three electronic databases were searched from inception until May 2016 for studies using loading protocols for mid-portion AT.

**Eligibility Criteria:** Randomized and non-randomized trials of loading protocols for mid-portion AT.

**Results:** Twenty-eight studies were included; seven assessed muscle, 21 assessed tendon and two assessed neural and pain associated mechanisms. Evidence suggests that isokinetic dynamometry, eccentric-concentric heel raise tests, single leg drop counter-movement jumps or hopping are the most reliable ways to assess muscular adaptation. Assessment of tendon structure is unlikely to have any benefit given it does not appear to correlate to clinical outcomes. The neural and pain associated mechanisms have not been thoroughly investigated.

**Conclusion:** Further research needs to be done to determine the role of muscle, tendon and neural adaptations using reliable outcome measures during the management of mid-portion AT.

**Level Of Evidence:** Level Five.

**Key Words:** Achilles; outcome measures; reliability; tendinopathy; tendon structure; tendon function

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## CORRESPONDING AUTHOR

Myles Murphy  
School of Physiotherapy, The University of  
Notre Dame Australia,  
Fremantle, WA, Australia.  
Mobile: 0414015434  
E-mail: myles.murphy1@my.nd.edu.au

<sup>1</sup> School of Physiotherapy, The University of Notre Dame Australia, Fremantle, Australia

<sup>2</sup> SportsMed Subiaco, St John of God Health Care, Subiaco, Australia

<sup>3</sup> Sports Science Sports Medicine Department, Western Australian Cricket Association, East Perth, Australia

<sup>4</sup> Sports and Exercise Medicine Research Centre, La Trobe University, Bundoora, Australia

<sup>5</sup> Australian Collaboration for Research into Injury in Sport and its Prevention (ACRISP), Bundoora, VIC, Australia

<sup>6</sup> School of Physiotherapy and Exercise Science, Curtin University, Bentley, Australia

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