

# **Conditioned Pain Modulation Does Not Differ Between People with Lower-Limb Tendinopathy and Nontendinopathy Controls: A Systematic Review with Individual Participant Data Meta-analysis**

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## **Abstract**

**OBJECTIVE:** To explore whether people with lower-limb tendinopathy have reduced relative conditioned pain modulation (CPM) when compared to nontendinopathy controls.

**DESIGN:** Systematic review with individual participant data (IPD) meta-analysis.

**LITERATURE SEARCH:** Eight databases were searched until August 29, 2022.

**STUDY SELECTION CRITERIA:** Cross-sectional studies comparing the magnitude of the CPM effect in people with lower-limb tendinopathy to nontendinopathy controls in a case-control design.

**DATA SYNTHESIS:** Included studies provided IPD, which was reported using descriptive statistics. Generalized estimating equations (GEEs) determined between-group differences in the relative CPM effect, when adjusting for co-variables. Study quality was assessed using a Joanna Briggs Institute checklist, and certainty of the evidence was assessed using the Grading of Recommendations Assessment, Development, and Evaluations.

**RESULTS:** Five records were included, IPD were provided for 4 studies (n = 219 with tendinopathy, n = 226 controls). The principal GEE (model 1) found no significant relative CPM effects for tendinopathy versus controls (B = -1.73, P = .481). Sex (B = 4.11, P = .160), age (B = -0.20, P = .109), and body mass index (B = 0.28, P = .442) did not influence relative CPM effect. The Achilles region had a reduced CPM effect (B = -22.01, P = .009). In model 2 (adjusting for temperature), temperature (B = -2.86, P = .035) and female sex (B = 21.01, P = .047) were associated with the size of the relative CPM effect. All studies were low-quality, and the certainty of the evidence was moderate.

**CONCLUSION:** There were no between-group differences in the magnitude of the CPM effect, suggesting clinicians should manage lower-limb tendinopathy using interventions appropriate for peripherally dominant pain (eg, tendon loading exercises such as heavy slow

resistance). Based on the “moderate”-certainty evidence, future studies are unlikely to substantially change these findings.