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GAIT ANALYSIS AFTER ACUTE ACHILLES TENDON RUPTURE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective and aims

Achilles tendon rupture (ATR) can have a significant impact on gait, as it can cause problems with balance and stability. The purpose of this study is to document differences in gait assessment after the management of ATR in the literature.

Methods

A comprehensive literature review and meta-analysis were performed. Following the PRISMA guidelines, MEDLINE, Embase, Web of Science, and Google Scholar were searched to identify high-quality research articles. Search terms included "Achilles tendon rupture," "Gait," and "Gait analysis." The full text of articles, including gait as a functional outcome measurement, was assessed. Meta-analysis was performed for the same outcomes measured in at least three studies.

Results

In total, 2339 articles were found on Achilles tendon rupture and gait analysis. 19 studies were included in our study. The meta-analysis showed that, overall, patients with an ATR displayed a statistically significant difference between limbs in ankle range of motion (mean difference -4.51, 95% CI -5.99 to -3.03), peak plantar flexion (mean difference -5.33, 95% CI -7.29 to -3.37), toe-off plantar flexion (mean difference -2.27, 95% CI -3.63 to -0.92), and initial contact dorsiflexion (mean difference 0.89, 95% CI 0.33 to 1.45).

Conclusions

This systematic review and meta-analysis suggests that gait analysis may have a role in the management of patients with ATR by providing objective evaluations of gait parameters and functional recovery. The analysis showed that ATR significantly affects the patients' ankle range of motion, peak plantarflexion, toe-off plantarflexion, and initial contact dorsiflexion.

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References

[1]. Alviti F, Gurzì M, Santilli V, Paoloni M, Padua R, Bernetti A, Bernardi M, Mangone M. Achilles Tendon Open Surgical Treatment With Platelet-Rich Fibrin Matrix Augmentation: Biomechanical Evaluation. J Foot Ankle Surg. 2017 May-Jun;56(3):581-585. doi: 10.1053/j.jfas.2017.01.039. PMID: 28476390.

[2]. Zellers JA, Cortes DH, Pohlig RT, Silbernagel KG. Tendon morphology and mechanical properties assessed by ultrasound show change early in recovery and potential prognostic ability for 6-month outcomes. Knee Surg Sports Traumatol Arthrosc. 2019 Sep;27(9):2831-2839. doi: 10.1007/s00167-018-5277-8. Epub 2018 Nov 10. PMID: 30415387; PMCID: PMC6510650.

[3]. Chan AP, Chan YY, Fong DT, Wong PY, Lam HY, Lo CK, Yung PS, Fung KY, Chan KM. Clinical and biomechanical outcome of minimal invasive and open repair of the Achilles tendon. Sports Med Arthrosc Rehabil Ther Technol. 2011 Dec 20;3(1):32. doi: 10.1186/1758-2555-3-32. PMID: 22185429; PMCID: PMC3259046.

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References

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