

Anatomy and biomechanics of the deltoid ligament complex in healthy ankles:

Protocol for a systematic review and meta-analysis



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BACKGROUND



Chronic ankle instability affects up to 50% of individuals with a history of ankle injury

(e.g., persistent pain, swelling, weakness, limited range of motion)



↑ Risk of repeated ankle injuries in high-intensity multidirectional sports

↑ Risk of early-onset osteoarthritis



Concomitant deltoid ligament injures (inner side of the ankle) is often neglected due to inconsistent understanding of its anatomy and biomechanics

AIM

This study describes a protocol for a systematic review that aims to summarise current evidence on the anatomy and biomechanics of the deltoid ligament complex in healthy adult ankles.

METHODS

Search

Scopus, MEDLINE, Embase, CINAHL and SPORTDiscus databases



Inclusion criteria

- Healthy adult ankles
- Dissection and imaging studies (*in vitro* and *in vivo*) in English
- Anatomical and biomechanical properties of the deltoid ligament



Study quality

Will assess using the Anatomical Quality Assessment (AQUA) tool



Data synthesis



Meta-analysis

- Parameters for computational modelling: band prevalence, length, width, cross-sectional area, maximum load and elastic modulus
- ≥3 studies per parameter
- Pooled means and 95% confidence intervals

Narrative analysis

- Other clinically relevant parameters (e.g., strain, attachment sites and area)

Evidence certainty

Will assess using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) framework



DISCUSSION

Significance



1. Review will inform computational modelling, clinical management and biomechanics for chronic ankle instability (CAI)
2. Review will identify research gaps and directions for future research



FOR
CLINICIANS



FOR
RESEARCHERS



FOR PEOPLE
WITH CAI

Strengths



1. Protocol is based on rigorous piloting and robust guidelines (e.g., Cochrane, PRISMA)
2. Comprehensive coverage of deltoid ligament properties
3. Anatomical and biomechanical findings will be integrated to provide a holistic understanding of the ligament's role in ankle functions

Limitations



1. Review will be restricted to English studies investigating healthy adult ankles (given that normal anatomy is not well understood)
2. Computational modelling studies will be excluded (as they often report data from only 1-2 subjects with limited methodological details)



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