

The effect of chronic ankles sprains on functional movements and ground reaction forces.

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Rationale



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- ❖ Improvement in the rehabilitation environment
 - ❖ Prevention of reoccurrence of the injury
 - ❖ Optimisation of performance
 - ❖ Personal interest in injuries

Background reading

- ❖ According to Newton's third law, the ground reaction force (GRF) is the force exerted by the ground on a body in contact with it (Bartlett and Bussey, 2014)
- ❖ Ankle sprains represents 30% of all registered musculoskeletal injuries in sports, up to 79% recurrence of injury (Fong *et al.*, 2007; Mitchell *et al.*, 2008)
- ❖ Up to 53% of all patients report a residual condition described as chronic ankle instability (De Ridder *et al.*, 2015; Huurnink *et al.*, 2014)
- ❖ Unstable ankles demonstrated altered patterns of ground reaction forces due to their neuromuscular response (Dayakidis and Boudolos, 2006)
- ❖ Differences in ankle eversion and GRF in injured and uninjured runners (Kuhman, Paquette, Peel and Melcher, 2016)

Aim & Objective

AIM

- ❖ To research the effect on chronic ankle sprain on functional movement and ground reaction force

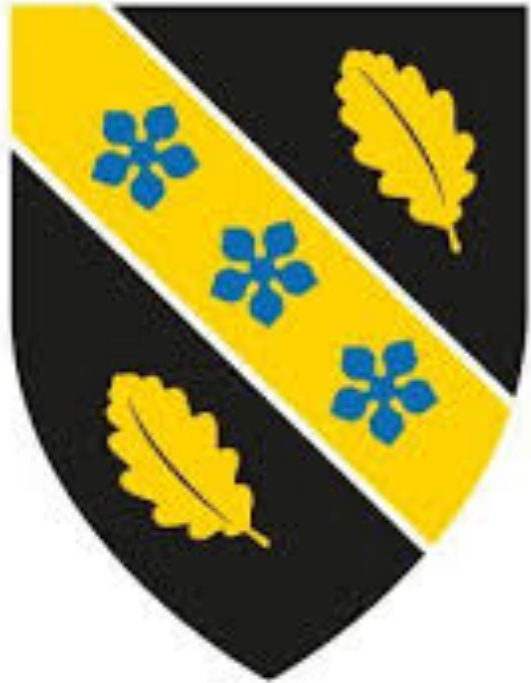


✓ Chronic ankle sprain does affect the functional movement and ground reaction force

✗ Chronic ankle sprain does affect the functional movement and ground reaction force

OBJECTIVES

- ❖ Measure the effect of chronic ankle injuries on functional movement
- ❖ Measure the effect of chronic ankle injuries on ground reaction force (GRF)
- ❖ The data from both sets will be synthesised to establish if correlation points exist between GRF and ROM



Methodology: Participants

- ❖ 10 UWTSD Population
- ❖ Past ankles sprains
- ❖ Over 18
- ❖ Recruitment via email
- ❖ Questionnaire (Huurnink *et al.*, 2014)

Methodology: Protocol

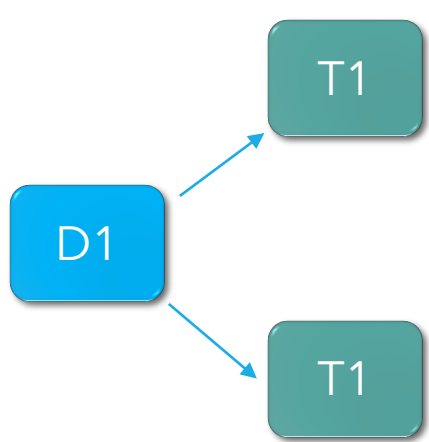


- ❖ Bilateral measurement of PlantarFlexion and DorsiFlexion **Range of Movement**
- ❖ Barefoot walking and running on the force platform (**Ground reaction force**)
- ❖ Hudl Technique app Video Analysis (**Functional Angles**)

Methodology

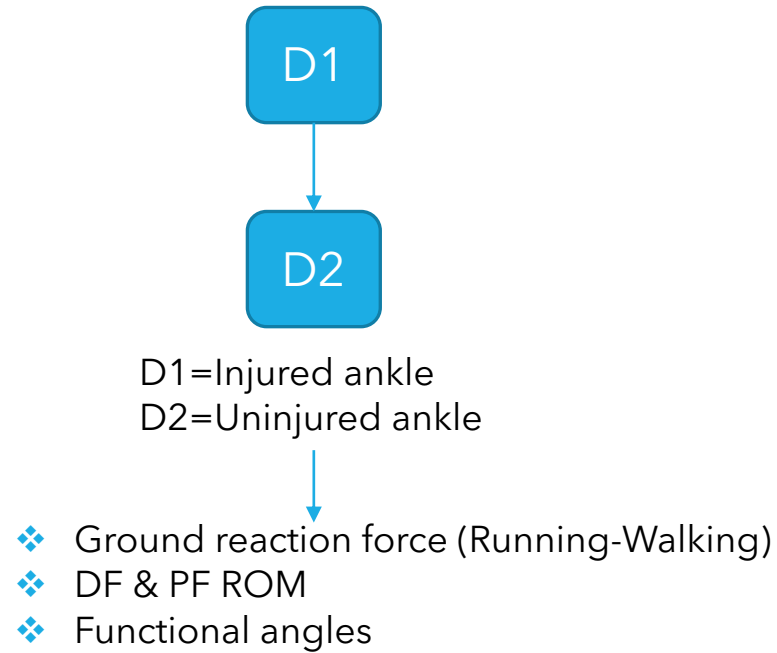
Research Design

Observational cross-sectional research design

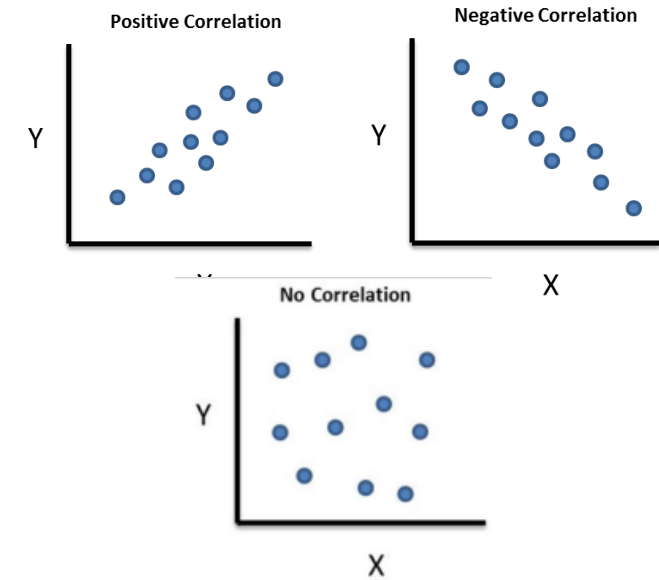


Data Analysis

Independent T-test



Pearson Correlation



Ground reaction force- ROM

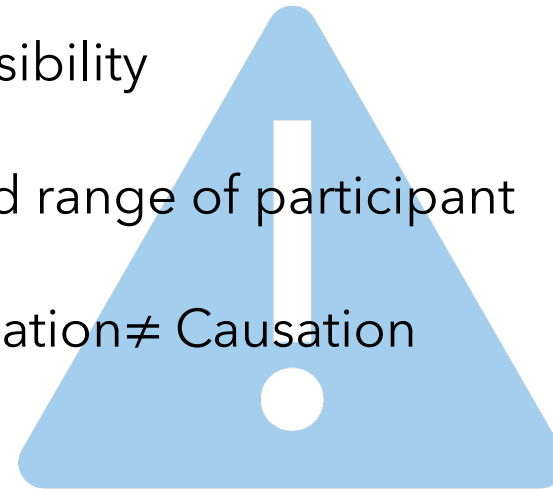
Ethical consideration

- ❖ Informed consent
- ❖ Confidentiality
- ❖ Withdraw any time
- ❖ Data security
- ❖ Risk assessment
- ❖ Plagiarism
- ❖ Convenience sampling
- ❖ Standardise the test protocol



Limitation

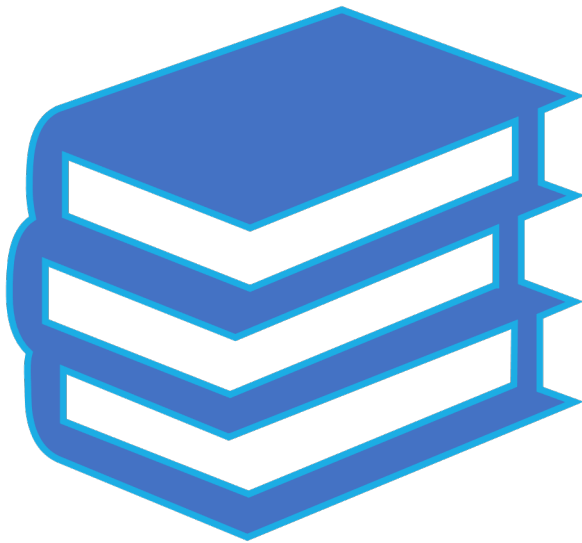
- ❖ Human error
- ❖ Accessibility
- ❖ Closed range of participant
- ❖ Correlation $\neq$ Causation



Timeline

Task name	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr
Research proposal								
Literature research								
Ethical approval								
Data gain								
Data analysis								
Writing poster								

References:



Bartlett, R. and Bussey, M., 2014. *Sports Biomechanics*. 3rd ed. Routledge, pp.200-205.

Dayakidis, M. and Boudolos, K., 2006. Ground reaction force data in functional ankle instability during two cutting movements. *Clinical Biomechanics*, 21(4), pp.405-411.

De Ridder, R., Willems, T., Vanrenterghem, J., Robinson, M., Palmans, T. and Roosen, P., 2015. Multi-segment foot landing kinematics in subjects with chronic ankle instability. *Clinical Biomechanics*, 30(6), pp.585-592.

Fong, D., Hong, Y., Chan, L., Yung, P. and Chan, K., 2007. A Systematic Review on Ankle Injury and Ankle Sprain in Sports. *Sports Medicine*, 37(1), pp.73-94.

Huurnink, A., Fransz, D., Kingma, I., Verhagen, E. and van Dieën, J., 2014. Postural stability and ankle sprain history in athletes compared to uninjured controls. *Clinical Biomechanics*, 29(2), pp.183-188.

Kuhman, D., Paquette, M., Peel, S. and Melcher, D., 2016. Comparison of ankle kinematics and ground reaction forces between prospectively injured and uninjured collegiate cross country runners. *Human Movement Science*, 47, pp.9-15.

Mitchell, A., Dyson, R., Hale, T. and Abraham, C., 2008. Biomechanics of Ankle Instability. Part 1. *Medicine & Science in Sports & Exercise*, 40(8), pp.1515-1521.

A close-up photograph of a person's hand holding a bright red circular sticker. The sticker features a simple black smiley face with two dots for eyes and a curved line for a mouth. Overlaid on the sticker is white text in a bold, sans-serif font. The background is blurred, showing what appears to be a table with some items on it.

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