



► Is There a Relationship Between Hamstring Eccentric Strength and Hamstring Extensibility on the Development of Acute Lower Back Pain in CrossFit Athletes?

Presented by Joshua Richards-Fisher

A Brief History and Background on CrossFit

- ▶ CrossFit – first established in 1996 by Greg Glassman
- ▶ Rapid uptake in participation (<10,000 affiliates)
- ▶ Combines aerobic, anaerobic and metabolic workouts into a 'WOD' (workout of the day)
- ▶ High injury incidence
- ▶ Little literature to support epidemiological rates of injuries
- ▶ Mechanisms? Causation vs result?
- ▶ Qualitative/subjective epidemiology prevalence
- ▶ Hypothesis?

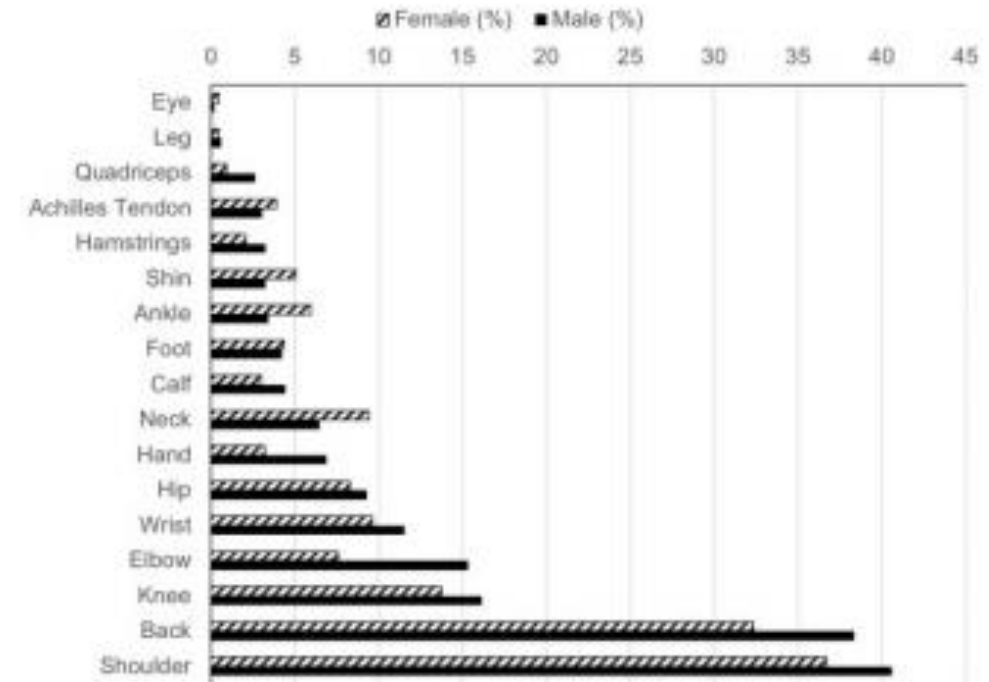
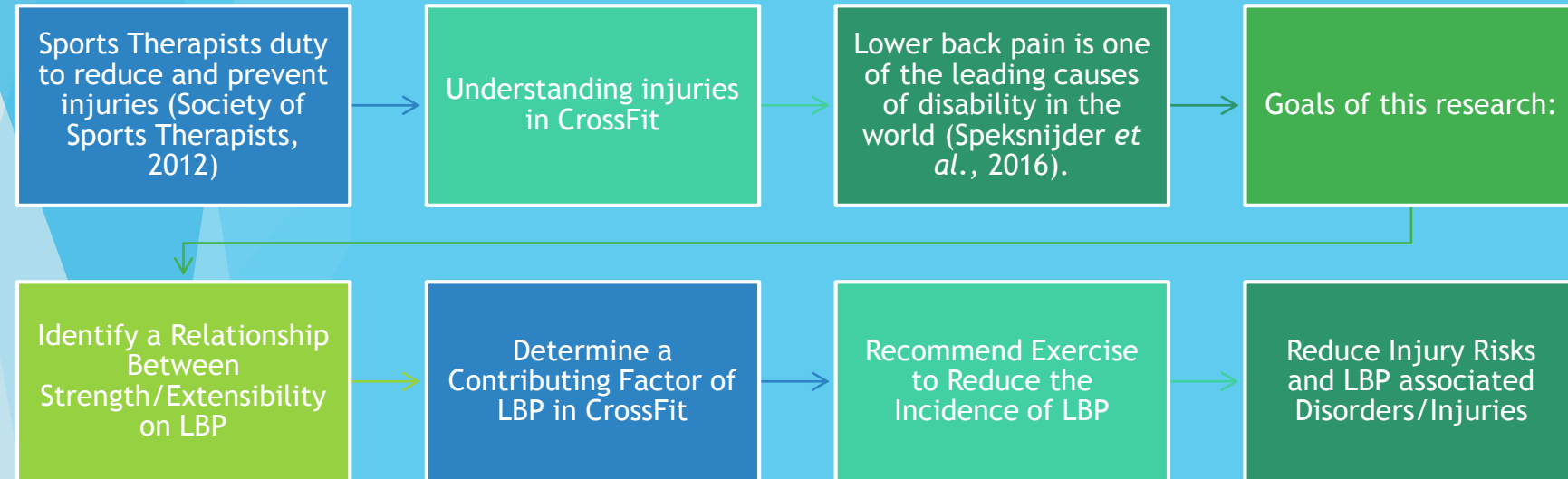


Figure 2. Distribution of the location of injuries between male and female participants.

Why This Topic Area?



Inclusion/ Exclusion Criteria



CrossFit Athletes



Acute Lower Back Pain



Male or Female



1+ Years Experience



No History of Hamstring Strains (>12 Months)



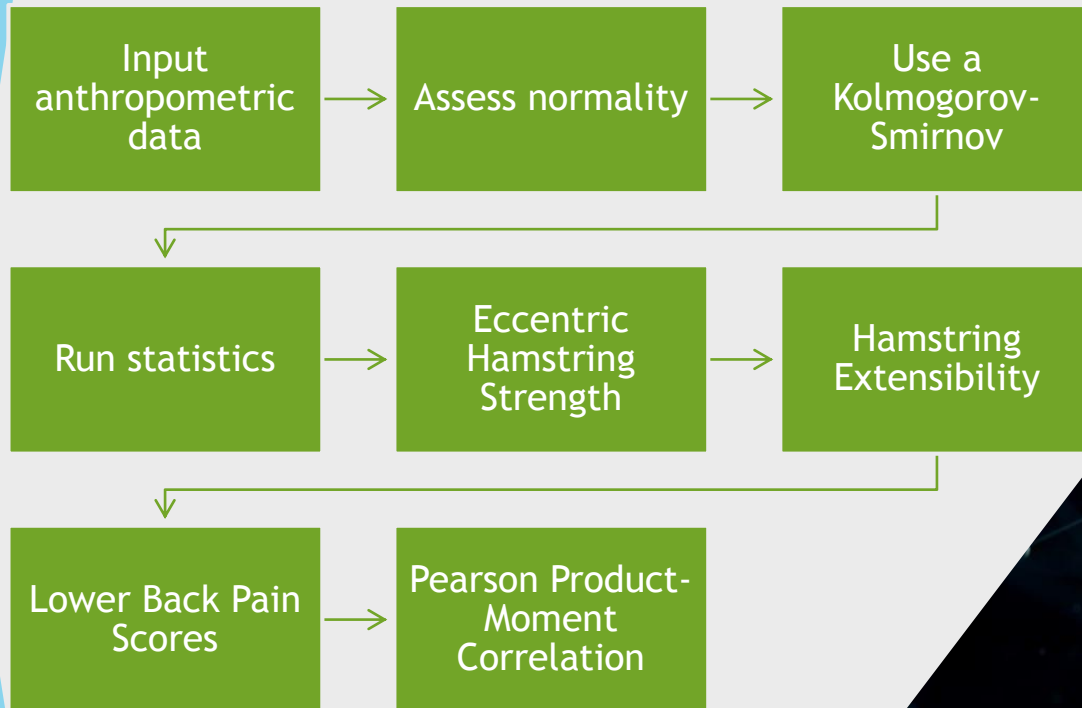
Over 18+

Methods Section

- ▶ Hamstring Extensibility Testing
- ▶ MHFAKE
- ▶ Goniometer Application
- ▶ Horizontal = 0° of Hamstring Extensibility
- ▶ Warm-Up
- ▶ Nordic Hamstring Curl x 3
- ▶ Nordbord
- ▶ SPSS Data Analyses



Data Analyses + Research Design



Observational Cross-Sectional Design

1 Group

Testing Protocol 1
Dependent 1

Testing Protocol 2
Dependent 2

Ethical Considerations



RISK ASSESSMENT.



MAKE THE PARTICIPANTS
AWARE OF ANY POTENTIAL
DANGERS ASSOCIATED
WITH THIS STUDY (OUT OF
THE OVERSEER'S
CONTROL) - REFER TO
PARTICIPANT
INFORMATION SHEET.



DOMS - DELAYED ONSET
MUSCLE SORENESS.



INFORMATION WILL BE
SHARED WITH
INDIVIDUALS, COACHES
AND THEIR THERAPIST
UPON REQUEST.



GENERAL HEALTH
QUESTIONNAIRES/PAR Q'S.

References

- ▶ Ayala, F. and de Baranda Andújar, P.S. (2010) 'Effect of 3 different active stretch durations on hip flexion range of motion' *The Journal of Strength & Conditioning Research*, 24(2), pp. 430-436.
- ▶ Buchheit, M., Cholley, Y., Nagel, M. and Poulos, N. (2016) 'The effect of body mass on eccentric knee-flexor strength assessed with an instrumented Nordic hamstring device (Nordbord) in football players' *International Journal of Sports Physiology and Performance*, 11(6), pp. 721-726.
- ▶ Feito, Y., Burrows, E.K. and Tabb, L.P. (2018) 'A 4-Year Analysis of the Incidence of Injuries Among CrossFit-Trained Participants' *Orthopaedic Journal of Sports Medicine*, 6(10), pp. 1-8.
- ▶ Frey, M., Poynter, A., Younge, K. and De Carvalho, D. (2019) 'The relationship between lumbopelvic flexibility and sitting posture in adult women' *Journal of Biomechanics*, 84, pp. 204-210.
- ▶ Gonzalez, S.L., Diaz, A.M., Plummer, H.A. and Michener, L.A. (2018) 'Musculoskeletal screening to identify female collegiate rowers at risk for low back pain' *Journal of Athletic Training*, 53(12), pp. 1173-1180.
- ▶ Green, B., Bourne, M.N. and Pizzari, T. (2018) 'Isokinetic strength assessment offers limited predictive validity for detecting risk of future hamstring strain in sport: A systematic review and meta-analysis' *British Journal of Sports Medicine*, 52(5), pp. 329-336.
- ▶ Hasebe, K., Sairyo, K., Hada, Y., Dezawa, A., Okubo, Y., Kaneoka, K. and Nakamura, Y. (2014) 'Spino-pelvic-rhythm with forward trunk bending in normal subjects without low back pain' *European Journal of Orthopaedic Surgery & Traumatology*, 24(1), pp. 193-199.
- ▶ Marshall, P.W. and Siegler, J.C. (2014) 'Lower hamstring extensibility in men compared to women is explained by differences in stretch tolerance' *BioMedical Central Musculoskeletal Disorders*, 15(1), pp. 1 -7.
- ▶ McGrath, T.M., Hulin, B.T., Pickworth, N., Clarke, A. and Timmins, R.G. (2019) 'Determinants of hamstring fascicle length in professional rugby league athletes' *Journal of Science and Medicine in Sport* pp. 1-18.
- ▶ Montalvo, A.M., Shaefer, H., Rodriguez, B., Li, T., Epnere, K. and Myer, G.D. (2017) 'Retrospective injury epidemiology and risk factors for injury in CrossFit' *Journal of Sports Science & Medicine*, 16(1), pp. 53-59.
- ▶ Radwan, A., Bigney, K.A., Buonomo, H.N., Jarmak, M.W., Moats, S.M., Ross, J.K., Tatarevic, E. and Tomko, M.A. (2015) 'Evaluation of intra-subject difference in hamstring flexibility in patients with low back pain: An exploratory study' *Journal of Back and Musculoskeletal Rehabilitation*, 28(1), pp. 61-66.
- ▶ Speksnijder, C.M., Koppelaar, T., Knottnerus, J.A., Spigt, M., Staal, J.B. and Terwee, C.B. (2016) 'Measurement properties of the Quebec back pain disability scale in patients with nonspecific low back pain: Systematic review' *Physical Therapy*, 96(11), pp. 1816-1831.
- ▶ Suarez-Arrones, L., Lara-Lopez, P., Rodriguez-Sanchez, P., Lazaro-Ramirez, J.L., Di Salvo, V., Guitart, M., Fuentes-Nieto, C., Rodas, G. and Mendez-Villanueva, A. (2019) 'Dissociation between changes in sprinting performance and Nordic hamstring strength in professional male football players' *PloS One*, 14(3) pp. 1-12.
- ▶ Weisenthal, B.M., Beck, C.A., Maloney, M.D., DeHaven, K.E. and Giordano, B.D. (2014) 'Injury rate and patterns among CrossFit athletes' *Orthopaedic Journal of Sports Medicine*, 2(4), pp. 1-7.
- ▶ Claudino, J.G., Gabbett, T.J., Bourgeois, F., de Sá Souza, H., Miranda, R.C., Mezêncio, B., Soncin, R., Cardoso Filho, C.A., Bottaro, M., Hernandez, A.J. and Amadio, A.C. (2018) 'Crossfit overview: Systematic review and meta-analysis' *Sports Medicine-Open*, 4(1), pp. 1-11.
- ▶ Sannicandro, I., Traficante, P. and Cofano, G. (2019) 'Hamstring injury prevention: The strength assessment in young soccer players' *MOJ Sports Medicine*, 3(2), pp. 28-32.