A PROSPECTIVE INVESTIGATION OF THE ASSOCIATION BETWEEN ISOMETRIC MUSCLE STRENGTH AND RUNNING RELATED INJURY AMONG NOVICE AND RECREATIONAL RUNNERS.

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7.9 million people participate in running events.

The 3rd most popular form of exercise

(Irish Sports Council, 2017)
Novice runners: 17.8 injuries per 1000 hours
Recreational: 7.7 injuries per 1000 hours

(Videbaek et al., 2015)
Proposed Injury Risk Factors

- Technique
- Impact Forces
- Training load
- Previous injury history
- Flexibility
- Muscle strength

De Wijer et al. 2015, Van Gent et al. 2007, Ceyssens et al., 2019.
WHY STUDY MUSCLE STRENGTH?

Role of Muscles

Attenuate forces
(Perry and Burnfield, 1992)

Mediate movement
(Coventry et al., 2006)
**WHY STUDY MUSCLE STRENGTH?**

Association between muscle strength and injury

- Decreased muscle strength in injured cohorts
  - (Noehren et al., 2014; Frericson et al., 2000; Niemuth et al., 2005)

Relationship between biomechanics and muscle strength

- (Dierks et al., 2008; Loudon and Reiman, 2012; Ferber et al., 2011)
WHY STUDY MUSCLE STRENGTH?

Clinical Relevance

Screening tool

Quick and easy
Can muscle strength predict running related injury?
Recruitment
n=176
110 males, 66 females
42±5 years

Methods

Isometric Muscle Testing
LOCATION OF INJURY

- Foot/Ankle: 19%
- Hip/Back: 19%
- Knee: 17%
- Lower Leg: 37%
- Thigh: 8%

INJURY TYPE

- Tendonitis: 22%
- Muscle Strain: 27%
- Lower Leg: 37%
- Ankle Sprain: 7%
- ITB: 8%
- PFPS: 10%
- Stress fracture/reaction: 12%
- Other: 7%
- Plantar Fasciitis: 7%
- Hip/Back: 19%
- Knee: 17%
Results

- Stepwise backwards regression.
- Statistically significant model generated to predict injury including hip extension strength and age.
- $p=.023$, $r^2 = .045 - .059$, cases classified correctly - 66.7%
- High sensitivity: 95.7%
- Low specificity: 10.2%
RESULTS

• Null model predicted 66.1% of cases correctly.

Manual muscle strength was not able to accurately predict injury
In agreement with similar research. (Thijs et al., 2011; Yagi, Muneta and Sekiya, 2013; Torp et al., 2018).

Strength measures:
- May not reflect the ability to effectively implement an injury-resistant running technique.
- May not reflect tissue strength.
TAKE HOME MESSAGES

High prevalence of lower limb injury among runners.

Manual muscle strength may not predict future running injury.

Future directions: consideration of muscle strength in conjunction with measures of loading.
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REFERENCES


