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A retrospective cohort study**

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Musculoskeletal fitness as a predictor of injury during police academy training



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Introduction

- Tactical training institutions (like those for military, law enforcement and firefighting) often implement intensive training regimes to adequately prepare their candidates (Bullock et al. 2010)
- Recruit training physical fitness assessment items are performed to determine baseline fitness of each recruit
- Previous research has investigated fitness measures as a positive injury predictor among tactical recruits during basic training (Bedno et al., 2013; Knapik et al., 2001; O'connor et al., 2011; Rosendal, et al., 2003)
- However protocols generally include aerobic fitness as part of the process with predominantly military recruit populations (Lisman, et al. 2013; Knapik et al., 2001)



Aim

To investigate using the push-up, vertical jump and grip strength tests as a valid musculoskeletal fitness measure for predicting injury during police academy training



Methods

- Retrospective cohort study
- Non-identifiable data provided from 219 police recruits, covering a period from January 2013 to December 2013
- Inclusion criteria;
 - >18 years
 - Recruit able to complete all areas of fitness assessment
 - No existing injuries at commencement of fitness assessment
- Ethics approved by Bond University HREC, Protocol Number RO1898



Methods

- Fitness testing:
 - Police Physical Training Instructors conducted all of the standardised academy PU, GS and VJ assessments and were unaware of the research
 - The assessments were performed in a single session by all recruits
- Injuries recorded over 12 weeks for each recruit
- Recorders and data processors blinded
- Stats: Backwards linear regression, indep. sample t tests and spearman's correlations



Results

Over 12 weeks of recruit training, of the 219 Police recruits:

- 26% (n=56) injured
- 74% (n=163) non-injured

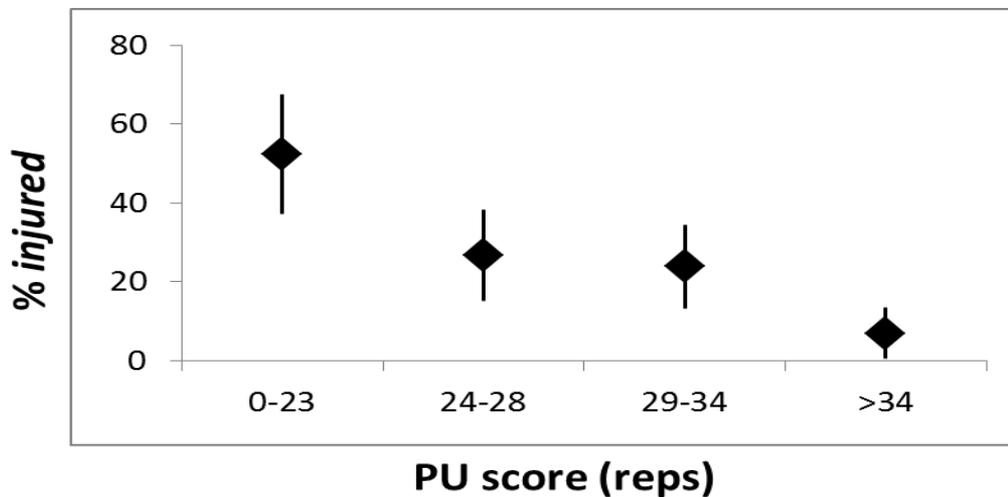
Backwards linear regression showed a significant ($p < 0.001$) relationship between combined scores for PU, VJ height GS and injury ($R^2 = .112$)

Most predictive variable was push ups ($R^2 = .110$). **Lowest scoring group >7 times as likely to sustain injury** compared to highest scoring group



Results: *injury* vs PU score

Percentage of Recruits injured, by PU score, with 95% CI



Spearman's rank-order correlation between *injury* status & PU score:

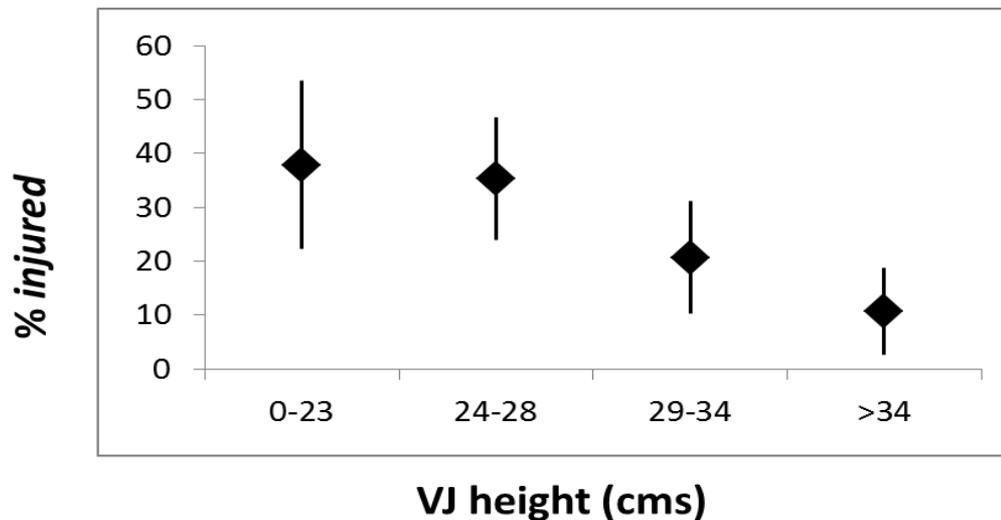
$$r_s = -0.348, p < 0.001$$

*bins in quartile ranges



Results: *injury* vs VJ height

Percentage of Recruits injured, by VJ height, with 95% CI



Spearman's rank-order correlation between *injury* status & VJ height:

$$r_s = -0.224, p = 0.001$$

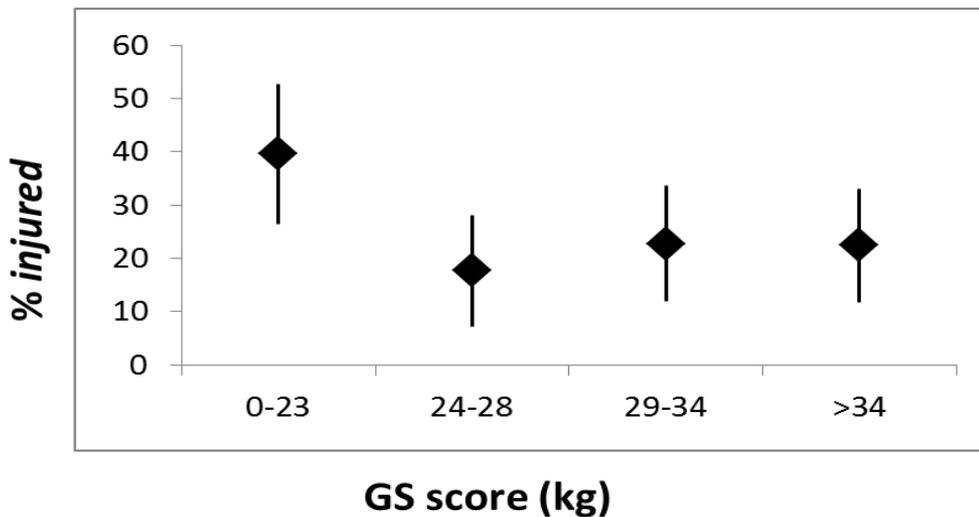


*bins in quartile ranges



Results: *injury* vs GS score

Percentage of Recruits injured, by GS score, with 95% CI



Spearman's rank-order correlation between *injury* status & GS score:

$$r_s = -0.138, p = 0.042$$

*bins in quartile ranges





Discussion

- PU, VJ and GS scores were significantly associated with injury risk
- Musculoskeletal strength and power is a known occupational requirement for Police officers
- Findings by Knapik et, al. (2001) and Butler et, al. (2013) are in agreement showing a correlation between low PU scores and incidence of injury for army and firefighting recruits respectively
- In agreement with our findings Orr et, al. (2016) showed significant correlation between low VJ height and risk of injury



IMPLICATIONS FOR PRACTICE

- Musculoskeletal health and fitness is vital for new recruits wishing to commence police recruit training.
- Therapists treating police recruits undergoing training need to ensure their musculoskeletal rehabilitation and **reconditioning** is optimised prior to a return to training in order to increase their chance of training success.



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Questions

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