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# A Functional Movement Screen profile of an Australian police force

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# Background

- Police officers are required to perform tasks that can include dynamic movements

(Blacker et al., 2013; Carlton et al., 2013)

- The results of these actions can lead to injury

(Orr & Stierli 2013)





# Background

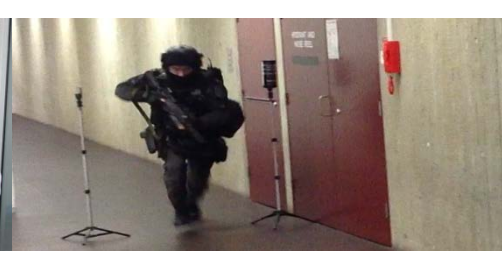
- Poor execution of FMS elements is associated with an increased risk of musculoskeletal injury

(Cook et al., 2006)

- The FMS tool offers an approach to injury prevention and performance prediction by identifying an individual's functional limitations and / or asymmetries

(Gribble et al., 2013; Perry & Koehle, 2013; Kiesel., 2007; Cook et al., 2006)





# Aims

- Aims:
  - To profile FMS movement patterns of NSW Police personnel
  - To determine whether differences existed between recruit and attested officers and within genders





# Participants

- A total of 1512 personnel
  - ♂n = 1155 (31.34±8.41 years): ♀ n= 357 (27.99±8.02 years)
- 823 police recruits
  - ♂n = 573 (25.78±5.57 years): ♀n = 250 (25.07±5.99 years)
- 689 attested officers
  - ♂n = 582 (34.84±8.00 years): ♀n = 107, (36.87±6.88 years)

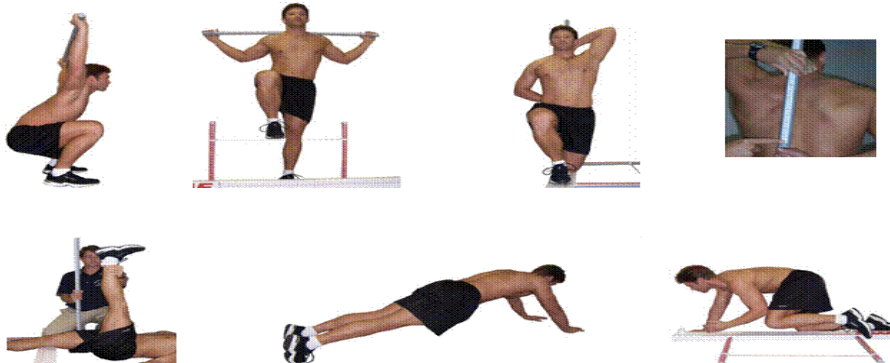


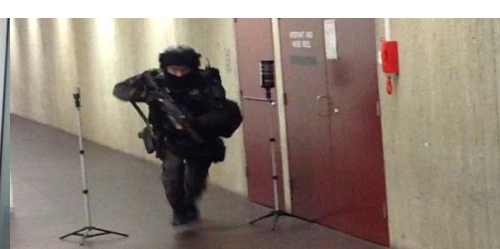


# Methods

- FMS selected as the evaluation tool used to assess fundamental movement patterns
- Consists of seven movement patterns

(Cook et al., 2006)





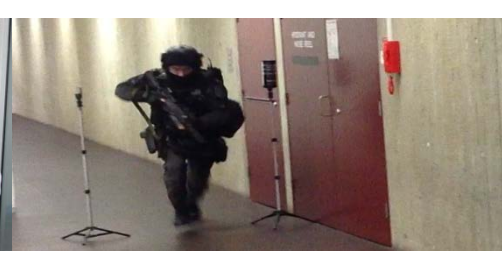
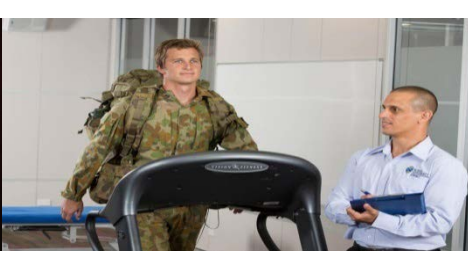
# Methods

- Scored for 0-3 for a total of 21 points

(Cook et al., 2006)

Frontal View			
Sagittal View			
Score	3	2	1
Criteria	<ul style="list-style-type: none"> <li>•Hips, knees and ankles remain aligned in the sagittal plane</li> <li>•Minimal to no movement is noted in the lumbar spine</li> <li>•Dowel and hurdle remain parallel</li> <li>•Foot remains dorsiflexed</li> </ul>	<ul style="list-style-type: none"> <li>•Alignment is lost between hips, knees and ankles</li> <li>•Movement is noted in lumbar spine</li> <li>•Dowel and hurdle do not remain parallel</li> </ul>	<ul style="list-style-type: none"> <li>•Contact between foot and hurdle</li> <li>•Loss of balance is noted</li> </ul>

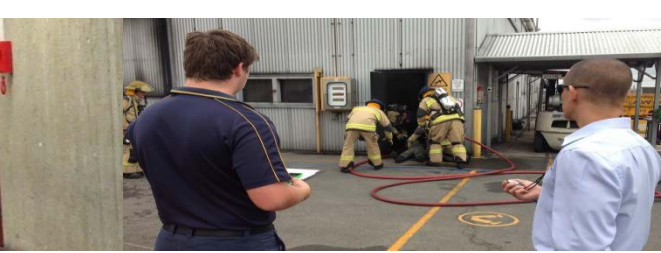
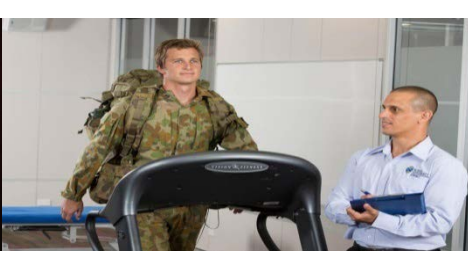
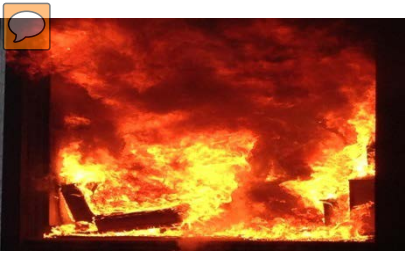




# Methods

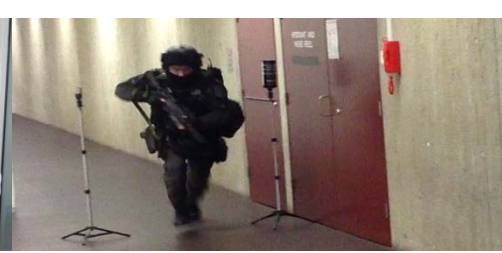
- Inclusion criteria were:
  - a) the participant completed all aspects of the FMS; and
  - b) the police recruit participants had not attempted the police training previously
- FMS completed at commencement of training for recruits and voluntary basis for officers
- Assessors were NSW Police PTI trained in FMS





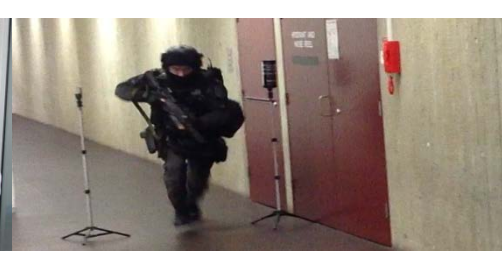
# Methods

- Mann-Whitney Tests were performed to investigate differences in scoring distributions across qualification (trainees and attested officers) and gender.
- ANCOVA and subsequent independent t-tests with a Bonferroni correction to examine differences between pairs of groups
- Alpha was set at 0.05 *a priori*



# Results

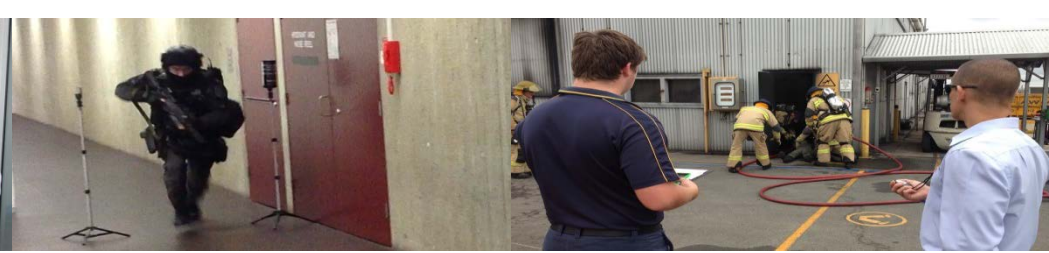
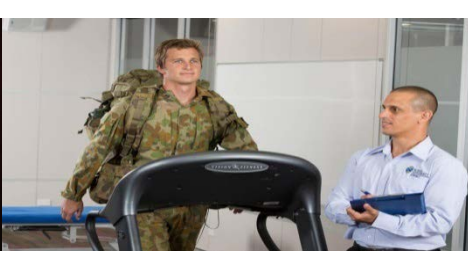
- Significantly higher mean FMS scores were found
  - recruits ( $15.23 \pm 2.01$ ) v. attested officers ( $14.57 \pm 2.96$ ;  $p < .001$ )
  - females ( $15.24 \pm 2.35$ ) v. males ( $14.84 \pm 2.55$ ;  $p = .008$ ).
- A FMS score of  $\leq 14$  points, predictive of higher injury risk, was observed in
  - 43% of male police officers & 41% of female officers
  - 36% of male recruits & 33% of female recruits.



# Results

- An ANCOVA revealed that age was a significant factor accounting for the total FMS score differences between
  - male trainees ( $25.78 \pm 5.57$  years) when compared to male attested officers ( $34.84 \pm 8.00$  years,  $F(2,1) = 17.417$ ,  $p < .001$ ).
  - female trainees ( $25.07 \pm 5.99$  years) when compared to female attested officers ( $36.87 \pm 6.88$  years,  $F(2,1) = 6.196$ ,  $p = 0.013$ ).





# Results

- The components of poorest performance, were
  - the hurdle step
  - rotary stability





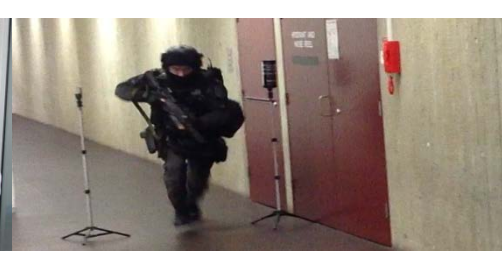
# Discussion

- In our study, mean FMS scores ( $14.93 \pm 2.51$ ) were  $\downarrow$  than:
  - active duty service members ( $16.2 \pm 2.2$ ) (Teyhen, et al, 2014)
  - Emergency Task Force police officers ( $15.1 \pm 2.1$ ) (McGill, et al, 2013)
  - in an active younger population of between 18 and 30 years of age ( $15.7 \pm 1.9$ ) (Schneiders et al., 2011)



# Discussion

- In our study, mean FMS scores ( $14.93 \pm 2.51$ ) were  $\uparrow$  than:
  - Canadian general population ( $14.14 \pm 2.85$ ) (Kiesel, et al., 2007)
  - fire fighters ( $13.6 \pm 1.9$ ) (McGill, et al, 2013)
  - football players ( $13.3 \pm 1.9$ ) (McGill, et al, 2013)



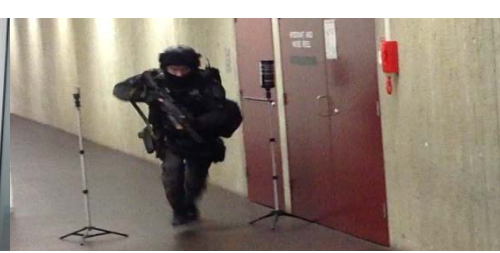
# Discussion

- The components of poorest performance, being the hurdle step and rotary stability, correspond to the leading sites of injury in this population, being knee and back.



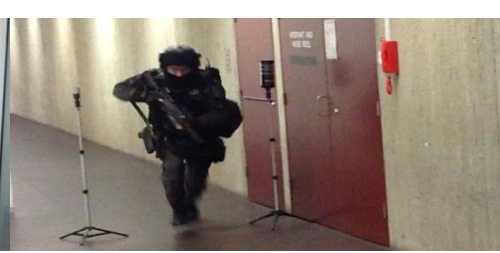
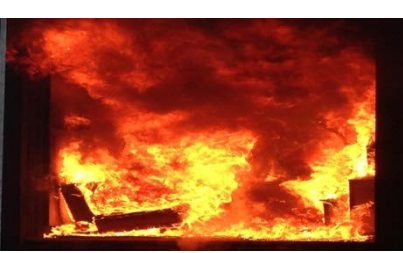
(Orr & Stierli 2013)





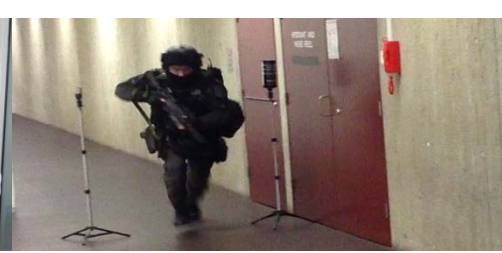
## Conclusion / Take Home Message

- The FMS is a useful outcome measure for police officers.
- FMS movements with poorest performance correspond to injuries typically sustained in a police population.
- Specific conditioning programs to improve performance in movements identified with poorer performance may reduce injuries in police officers.



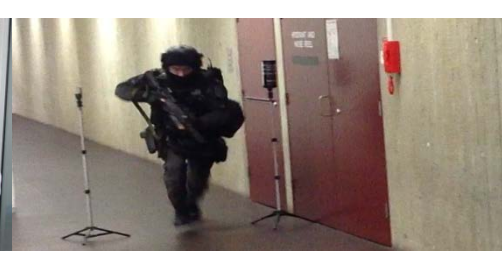
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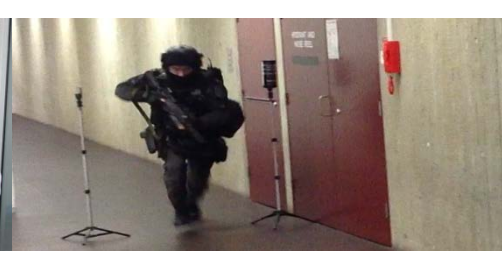
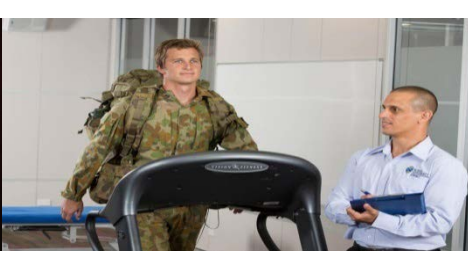
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