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Fitness testing in law enforcement officers: A critical review

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Background

- Tactical personnel perform physically and mentally demanding tasks as part of their occupation [1].
- The ability to perform strenuous physical tasks is an expected requirement for incumbent officers if they are to complete their occupational tasks safely and in a manner that positively overcomes an adverse situation [2].
- Research shows that decreased muscle power, muscle strength, metabolic fitness, and muscle endurance are components of physical fitness that may be associated with injury risk amongst police officers [3].
- As police officers have a relatively higher risk of suffering cardiovascular disease (which can potentially be fatal) than the general population instances that force an officer to go from a sedentary state to a physiologically demanding state are of concerning [4].
- On the basis of occupational performance, injury risk and health risks, fitness testing is often undertaken with new police force recruits.
- The aim of this review was to critically appraise research studies employing various fitness testing that police officer recruits complete, with an aim to inform on the use of fitness testing in an occupational setting.

Methods

- Two authors (M.Z. & J.W.) independently performed a comprehensive literature search of four databases (PubMed, Embase, CINAHL, SPORTDiscus) as shown in Figure 1.
- After duplicates were removed, the remaining articles were screened for the following inclusion criteria:
 - Must contain Law Enforcement Officers,
 - Must contain a fitness/or physical measure, and
 - Must be within the years 1997-2018.
 Articles were excluded if they met the following criteria:
 - Testing only one fitness measure,
 - Health concerns, or
 - Perceptions/ Opinion surveys.
- Articles were critically appraised to determine the methodological quality by two authors (M.Z & J.W.) using a modified Downs and Black Checklist [5].
- Cohen's Kappa coefficient was used to measure the level of agreement and calculated by a third author (R.O.).
- The final score for each study, the Critical Appraisal Score (CAS), was calculated as a percentage and graded according to Kennelly's grading system [6].



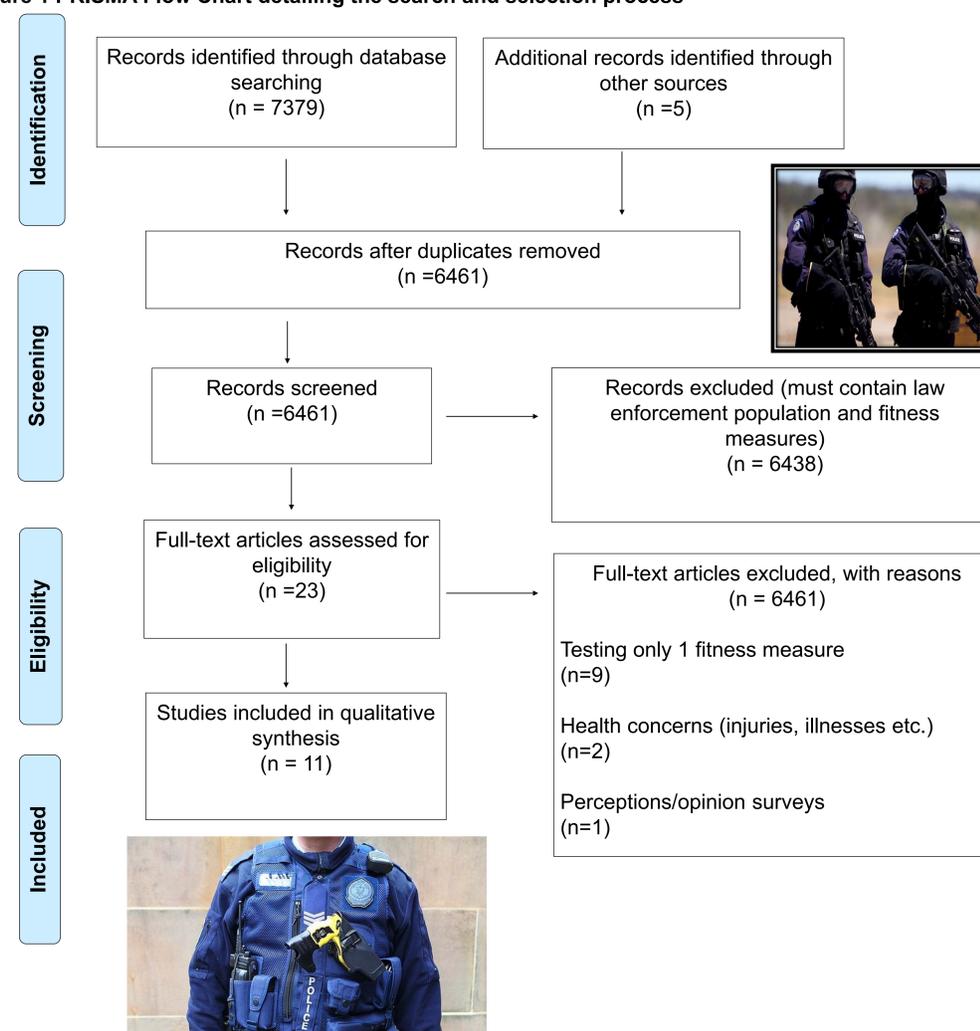
Results

Article Title	STR	END	PWR	AC	ANC	ORPT	AGI	D&B	K
Beck et al., 2015	✓	✓	✓	✓	x	✓	✓	72%	Good
Cocke et al., 2016	✓	✓	✓	✓	✓	x	x	73%	Good
Dawes et al., 2017	✓	✓	✓	✓	x	✓	x	72%	Good
Dawes et al., 2017	✓	✓	✓	✓	✓	x	x	74%	Good
Dawes et al., 2016	x	✓	✓	✓	x	x	x	75%	Good
Lockie et al., 2018	x	✓	x	✓	x	✓	x	75%	Good
Lockie et al., 2018	x	x	✓	x	x	x	x	73%	Good
Lockie et al., 2018	✓	✓	x	✓	✓	x	x	77%	Good
Orr et al., 2018	✓	✓	✓	✓	✓	x	x	68%	Good
Shusko et al. 2017	x	✓	x	✓	x	x	x	77%	Good
Violanti et al., 2017	x	✓	x	✓	x	x	x	82%	Good

STR= Strength, END= Endurance, PWR= Power, AC= Aerobic Capacity, ANC= Anaerobic Capacity, ORPT= Occupational Related Physical Testing, AGI= Agility, D&B= Downs and Black Score, K= Kennelly Grade

Table 1. Results of Critical Review

Figure 1 PRISMA Flow Chart detailing the search and selection process



Results

- The mean critical appraisal score was 74.36% ($\sigma=1.48$) which is considered as 'good' quality according to the Kennelly grade [6].
- The level of agreement between the reviewers ($k=0.750$) was considered a 'substantial agreement'.
- The most common measures assessed were endurance and aerobic capacity. The least common measure was agility (Table 1).
- Push-up testing and 1.5 mile run testing had the strongest correlations to police academy graduation.
- Unlike other fitness measures of muscle endurance, sit-ups had a stronger correlation to fat mass than lean muscle mass.
- Grip strength fitness test results may predict occupational performance (marksmanship) as well as longevity [7].

Summary

- Given that these exercises (e.g. push-ups and running) are commonly performed in these environments, push-up and 1.5 mile run testing may be useful measures through which to assess a trainees potential to complete training.
- Considering a stronger correlation between sit-up fitness testing and fat mass as opposed to lean muscle mass, sit-ups may not be an efficient method of measuring trunk muscular endurance
- As grip strength is a functional measure of upper body strength as well as a necessity to handle firearms, this fitness test is occupationally specific for police officers and would be beneficial to include in fitness testing for this population
- Due to the high amount of cardiovascular related deaths amongst police officers, it may be beneficial to use cardiovascular based fitness tests (like the 1.5 mile run) as an ongoing assessment for qualified officers to mitigate health risks associated with police work

Conclusion

- This review found that push-up testing and the 1.5 mile run times had a strong positive correlation to police academy graduation. This may be due to the fact that push-ups and the 1.5 mile run are common methods of training for police officers and offer the convenience of equipment-free training options.

Key References

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