

**Associations Between Lower-Body Power and Body Composition to Change of Direction Speed Under Two Loading Conditions Among Female Police Officers**

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# ASSOCIATIONS BETWEEN LOWER-BODY POWER AND BODY COMPOSITION TO CHANGE OF DIRECTION SPEED UNDER TWO LOADING CONDITIONS AMONG FEMALE POLICE OFFICERS.

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## ABSTRACT

Law enforcement is a physically demanding occupation. For the general duties officer, lower-body power, speed, and agility may be required to carry out a multitude of occupational tasks and maintain personal safety.

**PURPOSE:** To investigate which measures of fitness are related to performing a CODS tasks among female police officers under loaded and unloaded conditions..

**METHODS:** Archived physical abilities data for fifty-one (n = 51) female police officers from Serbia police was provided to the primary investigators for analysis.

**RESULTS:** There were significant negative correlations between IAT performance, SLJ (r = -.586) and PSMM (r = -.528). Additionally, there were significant negative correlations between the IATL and SLJ (r = -.56) performance. Furthermore, there was a significant positive correlation between IAT, HT (r = .355), BMI (r = .346), and PBF (r = .523).

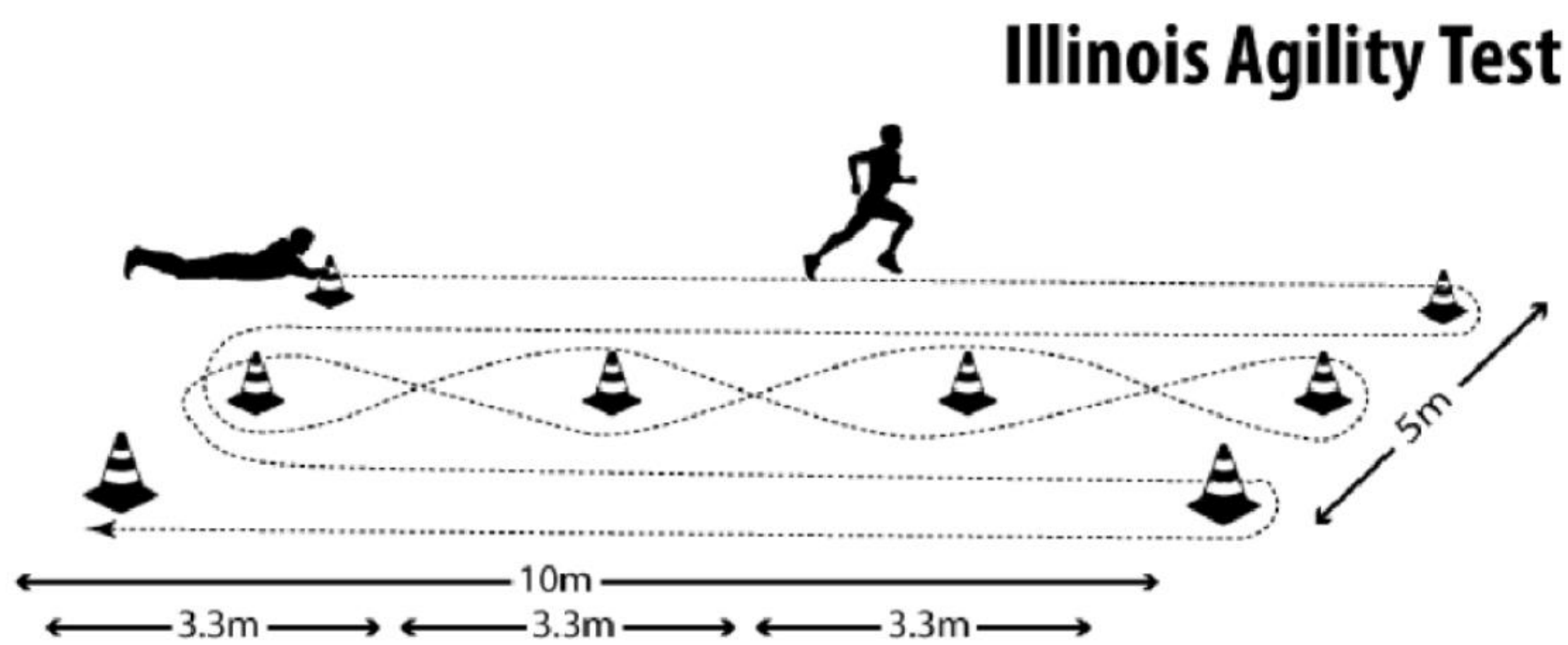
**CONCLUSION:** Performance on the IAT and IATL was significantly and positively related to body composition and lower-body power.

## INTRODUCTION

- Law enforcement is a physically demanding occupation. For the general duties officer, lower-body power, speed, and agility may be required to carry out a multitude of occupational tasks and maintain personal safety. Additionally, these tasks are generally performed while wearing personal protective equipment (PPE) that typically weigh around 10 kg for general duties officers.
- As female officers may carry a relatively greater PPE load compared to males, it is of interest to determine if their fitness and body composition relate to faster performance under load during police-specific tasks.
- One example is a change of direction speed (CODS), as this is a skill needed in tasks such as a foot pursuit.
- **The purpose of this study was to investigate which measures of fitness are related to performing a CODS tasks among female police officers under loaded and unloaded conditions.**

## METHODS

- Archived data for 44 female police officers from Serbian police was provided to the primary investigators for analysis.
- The assessments of physical abilities were conducted as part of the regular physical conditioning for this agency and were assessed via; height (HT), body mass (BM), body mass index (BMI), percent body fat (PBF), and percent skeletal muscle mass (PSMM), standing long jump (SLJ), Illinois agility test (IAT), Illinois agility test with a 10-kg load (IATL).
- Pearson's correlations (p < 0.05) were used to calculate relationships between the IAT and IATL with lower-body power (SLJ) and body composition.



## RESULTS

Table 1. Mean ± SD for height (HT), body mass (BM), body mass index (BMI), percent body fat (PBF), and percent skeletal muscle mass (PSMM), standing long jump (SLJ), Illinois agility test (IAT), Illinois agility test with a 10-kg load (IATL).

Assessment	Mean ± SD
HT	170.05 ± 4.23
BM	64.96 ± 7.76
BMI	22.45 ± 2.39
PBF	26.04 ± 4.99
PSMM	40.77 ± 2.81
SLJ	180.41 ± 15.34
IAT	22.43 ± 1.37
IATL	24.52 ± 1.37

## RESULTS

Table 2. Correlations for height (HT), body mass (BM), body mass index (BMI), percent body fat (PBF), and percent skeletal muscle mass (PSMM), standing long jump (SLJ), Illinois agility test (IAT), Illinois agility test with a 10-kg load (IATL).

Assessment	HT	BM	BMI	PBF	PSMM	SLJ	IAT	IATL
HT	-							
BM	.467**	-						
BMI	.54	.907**	-					
PBF	-.251	.518**	.699**	-				
PSMM	.306*	-.433**	-.628**	-.992**	-			
SLJ	.465**	.212	.006	-.354*	.394**	-		
IAT	-.191	-.085	-.012	.207	-.226	-.406**	-	
IATL	-.348*	-.235	-.104	.170	-.217	-.504**	.747**	-

\*\* . Correlation  
\* . Correlation is significant at the 0.05 level (2-tailed).

Significant negative correlations were identified between IAT performance and:

- SLJ and PSMM
- HT, BMI, and PBF

Additionally, there were significant negative correlations between:

- IATL and SLJ

## CONCLUSIONS

- Performance on the IAT was significantly related to measures of body composition and lower-body power
- While performance on the IATL was significantly related to lower-body power.
- These findings suggest that for the female officer, improving body composition and developing lower-body power will improve overall CODS performance.

## PRACTICAL APPLICATIONS

While wearing occupational loads, female police officers may have to perform CODS during on foot pursuit. Therefore, understanding the relationships between fitness measures and CODS performance with and without a load may help inform and optimize strength and conditioning programming. Furthermore, in an effort to improve their CODS performance under load, female officers should attempt to increase lean body mass and develop lower-body power.

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