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Original Research

The Use of Musculoskeletal Fitness Measures as Indicators of Performance in Police Occupational Tasks

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ABSTRACT

International Journal of Exercise Science 17(4): 819-830, 2024. Fitness testing is employed by some law enforcement agencies to assure performance in occupational tasks. The aim of this study was to investigate associations between musculoskeletal fitness assessment scores and performance in police occupational tasks. Retrospective data from 106 law enforcement officers who completed five musculoskeletal fitness assessments (vertical jump (VJ), hand grip strength, leg back dynamometer, 1-minute push-ups and sit-ups) and three routine occupational tasks (1.22m fence jump (FJ), 8.5m victim drag (VD) with 101kg and a get-up (GU)) were collected. A standard multiple regression was performed to determine if the results in fitness assessments were predictive of performance in the occupational tasks. Models combining all fitness assessments significantly predicted performance in FJ ($F(5,88)=12.228$, $p<0.001$; adjusted $R^2=0.38$), VD ($F(5,88)=9.407$, $p<0.001$; adjusted $R^2=0.31$) and GU ($F(5,87)=14.319$, $p<0.001$; adjusted $R^2=0.42$). Further analysis of individual predictors highlighted that performance in the VJ test was a significant contributor for all models, uniquely predicting 15% of FJ ($p<0.001$), 4% of VD ($p=0.03$) and 8% of GU ($p=0.001$) performance. Grip strength uniquely contributed 3% to performance in the VD ($p=0.05$) and performance in the sit-up test contributed 8% to GU performance ($p=0.001$). Performance in police-specific occupational tasks requires a combination of muscular strength, power, and endurance. These musculoskeletal fitness components should be ideally assessed in recruitment and return-to work practices to ensure officers can safely and optimally perform their occupational requirements.

KEY WORDS: Strength, power, law enforcement, victim drag, assessment

INTRODUCTION

Police occupational tasks are widely varied and range from checking an individual's credentials to attending a domestic violence incident and arresting non-compliant individuals (23). Long periods of sedentarism (e.g., administrative tasks, car patrol, etc.) may be interrupted by high-intensity, physically demanding tasks (7). As such, fitness testing is employed by most law enforcement agencies with the aim to recruit new candidates or evaluate the physical fitness of existing or returning to work officers (11, 14, 26). Fitness tests can be employed for a variety of reasons including to assure performance in occupational tasks such as jumping, running, carrying/pulling loads, and defensive tactics and arrest control techniques (26). Previous research has shown that performance in such tasks is moderately correlated with measures of metabolic fitness (both aerobic and anaerobic) (2, 13); however, less is known about the ability of muscular fitness (i.e., power, strength, and endurance) assessments to predict performance in occupational tasks among general duties law enforcement officers. Having a greater understanding of these relationships may assist agencies in determining which fitness tests best predict performance across the occupational lifespan of police officers and guide strength and conditioning practices to optimize on-the-job performance.

Several studies have investigated the relationships of musculoskeletal fitness tests to specific aspects of occupational performance within various law enforcement populations. For instance, research by Dawes et al (4) reported that, in addition to the 20m multistage fitness test, both trunk muscular endurance (i.e., 60s sit-up test), and lower-body power (i.e., vertical jump height) were the best predictors of a Physical Agility Test (PAT) performance within a group of state patrol officers. This PAT consisted of a series of tasks requiring change of direction, obstacle avoidance, a simulated victim rescue, crawling and pushing a sled for distance. Stanish and colleagues (30) found that a 70-lb bench press, standing long jump, and agility performance explained 79% of the variability on a Physical Ability Requirement Evaluation (PARE) among the Royal Canadian Mounted Police. These findings, further supported by the work of Lockie et al (10), suggest that muscular fitness, especially muscular endurance and power in the lower-body, are important physical attributes when performing a series of consecutive job tasks that are reflective of those an officer might encounter on duty.

Several investigations have also explored the relationships between muscular fitness performance and specific occupational tasks. Beck and colleagues (1) found that upper-body muscular endurance as measured by the push-up significantly related to building entry ($r = -0.62$, $p \leq 0.05$), whereas the curl-up test was associated with a stair ascent/descent and the 159 m run ($r = -0.62$ and $r = -0.58$, respectively), when conducted as part of an Occupational Physical Ability Test (OPAT) performed by a group of university campus police officers. Research by Post et al (28) reported associations between jumping ability ($r = -0.53$ to -0.68) and a 75-yard simulated pursuit run in civilians. The summation of these findings suggest that musculoskeletal fitness is of great importance to job performance within law enforcement officers.

While many studies have used musculoskeletal fitness tests to profile law enforcement populations (4-6, 25), less is known about the contribution of each muscular fitness tests in predicting performance on specific occupational tasks. Therefore, this study aimed to investigate relationships between standard musculoskeletal fitness assessments and occupational task performance in law enforcement officers. It was hypothesized that musculoskeletal fitness tests results would correlate with occupational task performance. Identifying significant relationships of individual musculoskeletal fitness tests may help with the formation of a standardized assessment law enforcement agencies can implement into their departments to analyze the fitness of their officers as well as guide return to work reconditioning for injured officers.

METHODS

Participants

Retrospective data for 106 male and female law enforcement officers from a US State Police Force were provided for analysis. Informed consent was obtained from all individual officers included in the study. The officers were chosen from a larger population of patrol officers using an online number generator to create a randomized population. Once officers were chosen, their participation was completely voluntary. Officers were excluded from the study if: injuries were present or if they were ill on the day testing took place. Officers could wear athletic apparel when completing fitness assessments but were required to be in full occupational uniform (including occupational equipment like sidearms, handcuffs, duty belt, etc.,) during simulated tasks. As this was a sample of convenience the researchers had no control of the number of officers available, however, post hoc analyses indicated that a power of 0.86 was achieved with a medium effect of 0.15 for a linear multiple regression analysis. Ethics approval for the study was provided by the Human Research Ethics Committee at Oklahoma State University (IRB # ED-19-146-STW). The research also adhered to the recommendations of the Declaration of Helsinki (31) and the ethical guidelines set forth by the editorial board for the International Journal of Exercise Science (22).

Protocol

Data were collected over multiple days, but each officer tested and completed all trials on the same day. All testing sessions were completed indoors at the police training facility. The collection of data and administration of fitness protocols and occupational tasks were by the staff of one US State police patrol and the senior investigator. The law enforcement agency staff were all trained by one of their members who was a Tactical Strength and Conditioning Facilitator (TSAC-F). The TSAC-F-certified instructor verified the proficiency of the staff. The following paragraphs provide details of the specific order and protocols for each assessment.

Height (cm) and body mass (kg) were measured on a doctor's beam scale (Cardinal; Detecto Scale Co, Webb City, MO, USA). All imperial measures were subsequently converted to metric values for analysis.

Vertical jump height, hand grip strength, leg/back isometric power, push-ups, and sit-ups assessments were used to measure elements of assessments. These assessments are commonly used in law enforcement populations (4-6, 10, 18, 32) and were those used as standard practice in the law enforcement agency from which this population were drawn. Tests were completed in this order, alternating between lower and upper body demands, so that the results of one test would not be affected by the other tests.

Lower body muscular power was determined using the vertical jump test and the scores were measured with the Vertec™ apparatus (Vertec Scientific Ltd., Aldermaston, UK). The test process has been used before in testing this population in other studies (4-6, 10, 18, 32). Before the vertical jump test was administered, officers performed a 3-5-minute warm up. No familiarization tests were conducted for this assessment as all officers had conducted this test previously as part of their yearly fitness assessment or academy entrance standard. Each officer's standing reach heights was then measured. After measurements were taken, the officer was then instructed to execute a countermovement jump with an arm-swing to reach the highest level they could on the device. All officers were allowed no less than 10 seconds and up to 30 seconds' rest between each jump (29). The officer's vertical jump height was then determined by subtracting standing reach height from jump height. Officers were given three attempts and the greatest height achieved (rounded to the nearest 0.5 inch) was used as their final score. The results were then converted to centimeters.

A hand grip dynamometer (Takei Scientific Instruments, Nigata, Japan) was used to assess dominant handgrip strength and has been used before in testing tactical populations (4-6, 10, 32). The dynamometer was adjusted so that the base of the first metacarpal and the middle four fingers were in contact with the handle. Officers were instructed to extend the arm so that the hand was at shoulder height and squeeze the handle as hard as possible. Two attempts were allowed due to time constraints. The score on this test was recorded as the amount of isometric force produced as measured in kilograms.

Previously used in a police population (4, 5, 32), a leg/back chain dynamometer (Medico Inc., Phoenix, AZ, USA) was used to assess isometric strength of the legs and lower back. The chain, which connects the scale on one end and a handle on the other, was adjusted so that the officers' knees were bent at approximately 120–130°. While maintaining good spinal posture, straight arms, and feet flat on the base of the dynamometer, the officers pulled the handle upward as hard as possible by extending through the hips and knees. This dynamometer was calibrated within 0.05 kg using an industrial portable digital hanging scale before use. The officers were allowed three trials. The score on this test was recorded as the amount of isometric force produced as measured in kilograms.

The 1-minute push-up test provides a measure of muscular strength and endurance for the upper-body muscles and is commonly used in law enforcement (18, 32). All officers were required to begin the test in the standard "up" position with the body rigid and straight, the hands positioned slightly wider than shoulder-width apart and the fingers pointed forward. A partner then placed a fist on the floor directly under the officer's chest. On the "go" command, the tester began the stopwatch (CASIO HS -20; Tokyo, Japan), and the officer bent their elbows, lowering themselves until their chest was in contact with their partner's fist and then extend the elbows until back in the "up" position. The officers then proceeded to perform as many push-

ups as possible in the time allotted using this technique. Officers could rest in the straight-arm position, provided that a neutral trunk position was maintained. The test was terminated when an officer was unable to perform this movement with proper technique, or when the one-minute time limit expired.
The 1-minute sit-up test provides a measure of muscular strength and endurance for the trunk muscles and is commonly used in law enforcement (18, 32). All officers were required to begin the assessment lying in a supine position, with the knees bent, feet flat on the ground and the arms positioned in front of the body with arms wrapped across the chest and each hand on the opposite shoulder. Once in position the officer flexed their trunk, elevating their shoulders off the floor until their elbows touched their knees. During this assessment, each officer had a partner anchor their feet in place to assist in keeping their feet flat on the floor throughout the exercise movement. On the "go" command, the tester began the stopwatch (CASIO HS -20; Tokyo, Japan), and the officer began the assessment. The officer then proceeded to perform as many sit-ups as possible in 60s using this technique.

Tasks that police officers may be required to complete on duty, like negotiating a fence, dragging an injured person to safety, or getting up off the ground during or following use-of-force incidents, have been previously reported in the literature (2, 18) and served as the occupational tasks selected by the agency. A free-standing chain-link fence was secured to a wooden portion of the gymnasium flooring for repeatability and safety. The fence was constructed to be 1.22m tall and 2.21m wide. A laser timing gate was set up exactly five meters away from the fence on either side to mark a start and ending point. The officer was then instructed to prepare at the start timing gate, without breaking the line. The test facilitator would command the officer to begin. The officer would run up to the fence, get over the fence as quickly and safely as possible, and then run to through the ending time gate. Time taken to perform the exercise was recorded using the laser timing system. Multiple personnel were used to evaluate the officers and their ability to get over the fence safely. Upon the officer concluding the exercise, they were asked to rank the physical difficulty of the exercise on a scale of "1-10" (10 being the hardest thing "they" had done and 1 being the easiest). The officer's rating of perceived exertion (RPE), efficiency in movement rating, delay in decision on how to get over the fence, method used to get over the fence, technique safety, general acceptableness, and total time taken were noted by the evaluators. While the scoring does not form part of this research it highlights the assessment conditions guiding the officers' approach to the negotiation of the fence.

For the get up task, the officer started laying supine on the floor with palms facing upwards and arms shoulder width apart. When instructed by the test facilitator, the officer was required to get up from the supine position as quickly and safely as possible. This task was assessed indoors on a matted floor. The officer completed the task wearing their occupational uniform, with all load equipment attached. The facilitator recorded how quickly the officer performed the exercise with a stopwatch (CASIO HS -20; Tokyo, Japan), starting the timing from the moment the officer moved to when they stood steadily on two feet. Multiple personnel were used to evaluate the subject's technique and the success of the subject during the task.

To perform the victim drag, an 8.5 meter by 1.5-meter-long track was set up on a level carpeted surface of the cardio-room at the gymnasium. A 101kg rescue training dummy was placed at the start line, marked by small plastic orange cones and a laser timing gate. Officers were instructed to drag the dummy the length of the 8.5 meters by taking both of their hands and grasping one of the dummy's hands. Officers were instructed to start by holding the hand of the dummy and being prepared to pull without crossing the plane of the timing gate. When the test facilitator was sure the officer was ready to perform the task, they could cross the timing gate which initiated the timing process and drag the dummy backwards as quickly as possible. When the subject crossed the second timing gate the timing stopped. The test facilitator then announced the end time. Multiple evaluators were used to assess technique to drag the dummy, time taken, and the overall success of the subject. Final time was recorded in seconds to the nearest 10th of a second.

Statistical Analysis

SPSS (version 28.0.1.0; IBM Corporation, NY, USA) was used for statistical processing of the data provided. Descriptive statistics (means and confidence intervals) were calculated for all variables to profile the population being tested. Officers who could not complete different portions of the assessment or for whom data were missing were not included in the data analysis. Normality of the data were evaluated by Kolmogorov-Smirnov test and visual analysis of Q-Q plots. A Wilcoxon signed rank test was used to compare the weight carriage between the athletic apparel worn during the fitness measures to the use of the full occupational uniform (including load carriage) worn during the simulated tasks. As police duties and academy training are not differentiated based on sex, multiple regression was performed with the entire cohort. This cohort-centric approach has been previously used in these populations (19). Alpha level was set at a=0.05. Effect sizes (ES) were calculated by transforming z to r, as described by Clark-Carter (3). The magnitude of the correlation coefficients were considered trivial ($r < 0.1$), small ($0.1 < r < 0.3$), moderate ($0.3 < r < 0.5$), large ($0.5 < r < 0.7$), very large ($0.7 < r < 0.9$), nearly perfect ($r > 0.9$) and perfect ($r = 1.0$) (9).

A standard multiple regression analysis was performed to estimate the proportion of variance in the results of the simulated tasks (fence jump, get up, and 8.5m victim drag) that may be accounted for by results of the general fitness tests (1-minute push-up, 1-minute sit-up, vertical jump, leg/back chain dynamometer, and hand grip dynamometer). Alpha level was set at α=0.05.

RESULTS

One hundred and six officers were initially enrolled in the study. Despite all officers completing the events, one male subject was excluded from the descriptive analysis due to incomplete data. Demographic and physical characteristics of the remaining 105 officers are displayed in Table 1. Wilcoxon signed rank test identified a significant difference between the officer's mass and their duty weight, for both male (T=5050.00, z=-8.682, p<0.001, two-tailed, ES=-0.61) and female (T=15.00, z=-2.023, p=0.043, two-tailed, ES=-0.64) officers.

Table 1. Descriptive characteristics of the officers.

	Male			Female		
		95% CI			95% CI	
	Mean	Lower Bound	Upper Bound	Mean	Lower Bound	Upper Bound
Age (yrs)	42.0	40.6	43.4	42.0	32.3	51.7
Height (cm)	179.1	177.6	180.5	168.7	160.1	177.2
Mass (kg)	96.6*	93.1	100.1	77.9†	57.8	98.0
BMI	29.9	28.9	30.8	27.0	21.6	32.5
Duty weight (kg)	106.1*	102.6	109.5	89.2†	67.0	111.4

* Significant difference (p<0.001): † Significant difference (p<0.05)

There were 12 cases of missing data from male officers relevant to the fitness tests and occupational tasks. Therefore, only 93 cases of performance for fitness tests and occupational tasks are reported in Table 2.

Table 2. Descriptive results of fitness tests and occupational tasks.

	Male (n=88)			Female (n=5)			Overall (n=93)		
		95% CI			95% CI			95% CI	
	Mean	Lower Bound	Upper Bound	Mean	Lower Bound	Upper Bound	Mean	Lower Bound	Upper Bound
Vertical Jump (cm)	49.0	47.3	50.6	33.5	30.8	36.2	48.2	46.5	49.9
Grip Strength (kg)	53.4	51.9	54.9	40.2	32.0	48.4	52.7	51.1	54.3
Leg/Back Dynamometer (kg)	397.1	383.9	410.4	289.0	234.5	343.5	391.3	377.7	404.9
Push-ups (n)	39.3	35.8	42.8	23.4	13.0	33.8	38.5	35.1	41.8
Sit-ups (n)	38.4	36.1	40.7	35.0	19.4	50.6	38.2	36.0	40.5
Fence Jump (s)	5.5	5.2	5.9	7.0	6.2	7.8	5.6	5.3	5.9
Victim Drag (s)	7.2	6.7	7.6	10.1	9.0	11.2	7.3	6.9	7.8
Get-up (s)	2.7	2.5	2.8	3.8	2.6	5.0	2.7	2.6	2.9

The unstandardized (B) and standardized (β) regression coefficients and the squared semi-partial correlations (sr^2) for each fitness test as predictors of performance in the occupational tasks are reported in Table 3. In combination, the fitness tests accounted for 41% of the variability in the FJ performance (R^2=0.41, adjusted R^2=0.38, F(5,88)=12.228 p<0.001). The scores in the vertical jump test uniquely contributed a significant 15% of the variability of the FJ performance (p<0.001, Table 3). Similarly, the combination of all fitness tests accounted for 35% of the variability in the victim drag performance (R^2=0.35, adjusted R^2=0.31, F(5,88)=9.407 p<0.001). The scores in the vertical jump and the grip strength provided a significant unique contribution of 3.7% (p=0.028) and 2.9% (p=0.049), respectively, to the time to complete the victim drag. Further, 45% of the variability in the get-up performance was accounted for by the variability in fitness test scores (R^2=0.45, adjusted R^2=0.42, F(5,87)=14.319 p<0.001). Performance in the vertical jump and the number of sit-ups performed in one minute uniquely contributed a significant 7.9% (p=0.001) and 7.5% (p=0.001) to the performance in the get-up task.

Table 3. Regression coefficients and semi-partial correlations for each fitness test in a regression model predicting performance in police occupational tasks.

	Variables	B	95% CI		β	sr^2
			Lower	Upper		
Fence Jump	Vertical Jump	-0.10*	-0.14	-0.06	-0.61	0.15
	Grip Strength	0.01	-0.02	0.05	0.07	0.00
	Leg/Back Dynamometer	0.00	0.00	0.00	0.01	0.00
	Push-ups	0.01	-0.01	0.03	0.13	0.01
	Sit-ups	-0.03	-0.06	0.01	-0.19	0.02
Victim Drag	Vertical Jump	-0.08†	-0.14	-0.01	-0.30	0.04
	Grip Strength	-0.06†	-0.11	0.00	-0.20	0.03
	Leg/Back Dynamometer	0.00	-0.01	0.00	-0.10	0.01
	Push-ups	-0.01	-0.04	0.03	-0.04	0.00
	Sit-ups	-0.03	-0.08	0.02	-0.17	0.01
Get-Up	Vertical Jump	-0.04*	-3.54	0.00	-0.44	0.08
	Grip Strength	-0.01	-1.31	0.19	-0.12	0.01
	Leg/Back Dynamometer	0.00	-0.08	0.94	-0.01	0.00
	Push-ups	0.01	1.30	0.20	0.16	0.01
	Sit-ups	-0.03*	-3.45	0.00	-0.39	0.08

B=unstandardized regression coefficient; CI=confidence intervals; β=standardized regression coefficient; sr^2=squared semi-partial correlations: *Significant unique contribution ($p<0.001$): †Significant unique contribution ($p<0.05$).

DISCUSSION

The need for musculoskeletal fitness is apparent when considering the physical demands required of law enforcement officers, notably in critical instances (e.g., apprehending and restraining a suspect, dragging a victim or colleague to safety, etc.). It was hypothesized that musculoskeletal fitness tests results would correlate with occupational task performance. This hypothesis was partially proven. Results of this study suggest that scores obtained in musculoskeletal fitness tests can, at least partially, predict performance on various occupational tasks essential to policing. Specifically, these findings highlight the importance of lower-body muscular power, total body strength and muscular endurance. Thus, to develop and maintain functional abilities across the occupational lifespan resistance training should form an essential element in the conditioning process for law enforcement personnel and reconditioning process for injured personnel wishing to return-to-work.

In the line of duty officers may be required to clear barriers while in pursuit of a suspect or when trying to get to the scene of an incident (16), hence its common inclusion in various law enforcement agency assessments (10, 18). In this assessment battery, the 1.22 m fence jump was used to simulate this task. It was discovered that 18% of the total variance in performance on this task could be explained by the fitness testing battery utilized with 15% explained by vertical jump height alone. These results are similar to those of Lockie et al (18) who found that the vertical jump explained 6.3% of the variance for recruits scaling a 1.83m chain link fence.

Differences in the strength of the relationships can be explained by the higher vertical jump ability of the participants of Lockie et al (18) (53.6 cm versus 48.2 cm) and the higher fence (1.83m versus 1.22m). Considering both studies did find significant relationships it is not unsurprising that previous research has found that lower-body power is significantly related to occupational performance within tactical populations (19, 24). Unfortunately, lower-body power has been found to diminish with age in police officers (6, 15), whilst the demands of an officer's job do not. Thus, performing specific training, such as resistance training and plyometric activities, may help preserve these abilities as officers age.

The need for an officer to extract victims from dangerous situations is paramount to maintain safety and preserve life. In this study it was found that the fitness tests performed accounted for only 9% of the explained variance in the officer's ability to perform the victim drag, with vertical jump height and grip strength accounting for 4% and 3% of performance, respectively. Lockie et al (17) found that grip strength accounted for 35% of the variance in a lighter dummy drag (74.84kg versus 101kg). Furthermore, unlike the findings of this study, Lockie et al (17) found that leg/back dynamometer isometric strength was significantly associated with the lighter dummy drag (r^2=.443, p<.001). Potential reasons for the differences in findings between the two studies could be the means in which the drag occurred. In this study, officers dragged the dummy by the arms, whereas in the study by Lockie et al (17) the dummy was lifted from the floor so that the officers were able to wrap their arms around the dummy's chest. As such, it is purported that the requirement to lift the dummy from the ground may require greater leg strength, as evidence by the findings of Orr et al (27) and Lockie et al (12), who likewise found a deadlift to be significantly correlated with 85kg dummy drag by specialist police (r^2=.558, p<.001) and 74.84kg dummy drag by civilians (r^2=0.443, p=.003) respectively, when the drag required a lifting of the dummy. Thus, the level of strength required during a dummy drag may be more closely related to the means in which the dummy is dragged, a supposition supported by Lockie et al (12), who reported different deadlift strength relationships when drag methods changed.

Subsequently, the actual dragging movement, which is to be completed as quickly as possible may, although not always, have a greater power requirement. The findings of this study whereby the vertical jump accounted for 4% variance is similar to those Moreno et al (19) who likewise found that the vertical jump accounted for 4% of the variance in dummy drag (74.84 kg) performance. In contrast, the findings by Lockie et al (18) failed to find any significant relationship (r^2=.008, p=.16; 74.84 kg dummy). Of note, and as can be expected, the study by Moreno et al (19) found that the power relationship increased when power was measured linearly (broad jump r^2=0.370, p<.001) as opposed to vertically (vertical jump r^2=.043, p<.001). As such, the situation in which the drag occurs and the officer's capability would dictate the technique used and need for lower-body power and upper-body strength when performing a drag.

In the event of an attack or ambush it is incredibly dangerous for an officer to be in a vulnerable position. The get-up drill in this study was used to simulate a scenario in which an officer may be in a precarious position and must get up into a fighting stance quickly while protecting their sidearm. It was discovered that 19% of the variance in performance on this measure could be explained by the fitness battery utilized, with 16% of this variance being explained by the vertical jump performance (8%) and sit-up score (8%). Unfortunately, this assessment is unique to the agency in which this research took place and as such there is no similar research to compare against. However, the findings do highlight the need for officers to develop lower-body power and trunk muscular endurance during law enforcement officer training programs as these parameters may be vital if an officer needs to regain their footing when facing an assailant.

There are some limitations to the study that must be acknowledged. Firstly, the population came from one region within the United States and from one law enforcement agency and differences in fitness levels (21) and tasks (23) between and within agencies are noted. In some studies, participants did not wear their occupational clothing wearing sportswear instead (17-19). Thus, some variations in results may occur with differences in movement mechanics imparted by their occupational load (8). Considering this, these officers would be required to perform their occupational tasks wearing their occupational loads and, as such, performing their tasks wearing load may be more closely aligned to actual requirements. Nevertheless, the findings from the current study, especially relative to the clothes worn by officers, provides useful considerations for the conditioning of recruits.

The results of this study highlight the differences in officer requirements, be it for muscular strength, power, or endurance based on the task being performed. These differences in fitness requirements for differing tasks have been reported in the wider law enforcement literature (10, 13) even to the point where the same task (e.g., marksmanship) performed differently (e.g., marksmanship while standing or moving (20)) will require distinctly different fitness characteristics. As such, physical conditioning for law enforcement officers should include a variety of musculoskeletal fitness profiles (i.e., strength, power, and endurance), as should ongoing fitness assessments.

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