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articoli

L'allenamento multilaterale come metodo didattico innovativo a supporto della formazione continua in polizia

Multilateral training as an innovative didactic method to support continuous education in police

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Abstract

Il lavoro in polizia richiede continua formazione professionale sia tecnica che fisica per far fronte a situazioni di stress elevato e soddisfare le esigenze lavorative. Lo scopo di questo studio è stato di valutare l'efficacia di un programma di educazione fisica nel quadro generale della formazione continua rivolta all'efficienza lavorativa. Sono stati misurati gli effetti di un programma motorio basato sul metodo didattico dell'allenamento multilaterale (MT) di otto settimane costituito da agility e allenamento della forza sull'efficienza fisica nei poliziotti. 20 poliziotti maschi sani (età 46,8 ± 3,9 anni) volontari sono stati assegnati ad un gruppo sperimentale (EG, n: 10) o ad un gruppo di controllo (CG, n: 10). Nella prima e ottava settimana sono stati valutati il picco di altezza raggiunto nello squat jump (SJ) e nel ountermovement jump (CMJ) test e il tempo per eseguire un 505 CODS (cambio di direzione rapido) test. L'indice di massa corporea (BMI) e la circonferenza della vita (WC) sono stati misurati come indicatori di adiposità. Successivamente, EG e CG hanno eseguito MT (90 minuti, due volte a settimana) e nessun allenamento, rispettivamente. I risultati mostrano che negli operatori di polizia, il metodo didattico del MT è efficace nell'incrementare l'efficienza fisica.

Parole chiave: didattica multilaterale; allenamento della forza; agility; efficienza fisica

Abstract

Police work requires continuous professional and physical training to cope with high stress situations and meet occupational tasks needs. The purpose of this study was to evaluate the effectiveness of a physical education program in the general framework of continuing education for work efficiency. We measured the effects of an eight-week motor program based on the didactic method of multilateral training (MT) consisting of the agility and strength training on physical efficiency in policemen. 20 healthy male volunteer policemen (age 46.8 ± 3.9 years) were assigned to an experimental (EG, n: 10) or control (CG, n: 10) group. At weeks one and eight, the peak height reached during a squat jump (SJ) and a countermovement jump (CMJ) test and the time to run a 505 CODS (change of direction speed) test were assessed. Body mass index (BMI) and waist circumference (WC) were measured as adiposity indicators. Thereafter, the EG and CG performed MT (90 minutes, two times a week) and no training, respectively. The findings show that in policemen, the didactic method of MT is effective in increasing physical efficiency.

Keywords: multilateral didactics; strength training; agility; physical efficiency

1. Introduction

Police work is complex and varied, but most of the time, a police officer does not require a great deal of physical ability. In fact, research has demonstrated that a police officer's job is often sedentary (Adams et al., 2010; Anderson, Plecas, & Segger, 2001). Moreover, police officers tend to have a higher prevalence of overweight and obesity caused by poor dietary habits while at work and by shift work rotation (Gu et al., 2012). Additionally, anthropometric changes may be related to the deleterious influence of police work because the job's physical demands are often inadequate for the physical fitness maintenance necessary to perform occupational tasks (Stamford, Weltman, Moffatt, & Fulco, 1978). This excess body weight is suggested to be associated with emotional and physical stress at work (Santana et al., 2012), depression (Violanti et al., 2011), and a higher risk of metabolic complications (Donadussi, Oliveira, Fatel, Dichi, & Dichi, 2009). Moreover, obese workers are more prone to illnesses, absenteeism, and earlier retirement than non-obese workers (Harvey et al., 2010).

However, Spitler, Jones, Hawkins, and Dudka (1987) emphasized that police officers should have good physical fitness to meet the job's demands. Although it does not occur frequently, policeman must be prepared to address critical tasks, such as pursuing fleeing suspects, controlling those resisting arrest or tackling, grappling, and handcuffing. Crowd control is also often very physically demanding (Trottier & Brown, 1994). The ability to perform these various physical responsibilities can determine the occupational effectiveness of a police officer. Therefore, physical fitness is a key requirement for this population (Alasagheirin, Clark, Ramey, & Grueskin, 2011). However, the body mass increases caused by obesity can compromise an individual's physical condition (Sorensen, Smolander, Louhevaara, Korhonen, & Oja, 2000).

Unfortunately, there are no national standards of physical fitness for law enforcement officers, but the development of a physical abilities standard is necessary to ensure that officers are able to efficiently perform police work (Bonneau & Brown, 1995; Trottier & Brown, 1994). This gap in the literature may be a result of the different tasks that police officers perform, as there are various specialties. As such, it is difficult to standardize the physical abilities required by police officers. However, some studies have reported that, in general, aerobic capacity, anaerobic power, muscular strength and endurance, agility, age, and body mass index are correlated to law enforcement performance (Rhodes & Farenholtz, 1992; Sirressi et al., 2014; Stanish, Wood, & Campagna, 1999; Strating, Bakker, Dijkstra, Lemmink, & Groothoff, 2010). With regard to previous findings, we wanted to focus this research on a didactic method of multilateral training (MT) including primarily muscular strength and agility, which are regarded as two components of physical fitness. Resistance training (i.e., muscular strength training) is effective in enhancing several important aspects of physical and mental health. In fact, resistance training can induce a significant increase in lean weight and metabolic rate and is often accompanied by a significant decrease in fat weight. It can also decrease symptoms of depression, increase self-esteem and physical self-concept, and improve cognitive ability (Westcott, 2012). In addition, agility training appears to be effective in enhancing specific measures of physical and cognitive performance, such as physical agility, cardiorespiratory fitness, memory, and vigilance (Lennemann et al., 2013).

According to these considerations, it is reasonable to assume that interventional studies are necessary to ensure the physical and mental well-being of officers, improve their quality of life, and, in particular, to prevent obesity related to police work because this occupation requires the maintenance of a healthy weight status, physical fitness, and adequate mental health condition (Da Silva et al., 2014). Consequently, we focused our research on filling these gaps identified in the literature, particularly in Italian police officers. Thus, the aim of the present study was to examine the effects of a supervised eight-week multilateral training (MT) program on physical fitness in police officers. Based on the findings of the previously mentioned studies, we hypothesized that a period of MT, including resistance training and agility, would be effective in improving health (i.e., leg muscular strength and body composition) and skill-related (i.e., agility, speed, and power) components of physical fitness in policemen.

2. Methods

2.1. Experimental Design

To test our hypothesis, adaptations following MT were assessed using a non-randomized controlled study design that included pre- and post-testing (at weeks one and eight, respectively). This research study was designed to determine baseline data of the health-related (i.e., leg muscular strength and body composition) and skill-related (i.e., agility, speed, and power) components of physical fitness (Caspersen, Powell, & Christenson, 1985) in police officers to evaluate whether a supervised eight-week MT program could produce improvements. This outcome was identified by statistically significant improvements in adiposity measurements (i.e., BMI and waist circumference, WC) and in physical fitness tests (i.e., squat jump, SJ test, countermovement jump, CMJ test, and 505 change of direction speed, CODS test).

2.2. Subjects

Twenty (*n*=20) healthy males (age: 46.8±3.9 years; body height: 177.4±4.7 cm; and body mass: 87.9±10.5 kg; mean ± SD), belonging to the Italian State Police, volunteered to participate in this study.

Characteristic	Experimental Group (n=10)		Control Group (n=10)		
	M	SD	M	SD	*p*-value
Age (years)	46.6	4.2	47.0	3.6	0.822
Body height (cm)	176.9	4.9	178.0	4.5	0.607
Body mass (kg)	85.8	10.7	90.0	10.3	0.383

Note: M=mean; SD=standard deviation.

Figure 1. Characteristics of the study participants.

An a priori power analysis (Faul, Erdfelder, Lang & Buchner, 2007) with an assumed Type I error of 0.05 and a Type II error rate of 0.20 (80% statistical power) was calculated for measures of physical fitness and adiposity, and it revealed that eight participants per group would be sufficient to observe medium “Time x Group” interaction effects. The anticipated number of participants was increased to prevent expected drop out. However, all of the participants completed the testing. It was explained to the participants that they would be free to attend an intense training protocol during the following eight weeks. The subjects who accepted formed the experimental group (EG), whereas subjects who were not interested were placed in the inactive control group (CG), which continued to perform normal daily activities. The characteristics of the study population are described in Figure 1.

All participants were eligible for inclusion in this study because they had no history of musculoskeletal, neurological, or orthopedic disorders that might have affected their ability to perform the physical fitness tests and MT program. The subjects were recruited at a Police Station (Puglia, Italy), and the EG completed the full eight-week MT protocol during the months of October-November 2015. All of the measurement procedures and potential risks were verbally explained to each participant, and their informed consent was obtained. This study has been performed in accordance with the ethical standards laid down in the Declaration of Helsinki.

2.3. Procedures

Adiposity measurements and physical fitness testing were performed at weeks one (baseline) and eight (end of the study). All of the subjects participated in an introductory training session before the testing procedures. Prior to the pre- and post-test, all of the participants underwent a standardized ten minutes warm-up, which consisted of sub-maximal running, lateral displacements, dynamic stretching, and light jumping. After the warm-up session, the policemen rested for two minutes. The anthropometric measurements and physical fitness testing were conducted indoors at the university sports center of Bari. To account for diurnal variation in fitness abilities and according to their availability, policemen were tested on three consecutive days at the same time (3 - 6 pm) outside working hours; the testing was conducted during October. The order of tests was as follows: non-fatiguing (weight and height measurements for calculating BMI and WC measurement), strength and leg muscle power tests (SJ and CMJ), and change of direction speed test (505 CODS). The break between the two fitness tests was approximately 15 minutes. After the testing procedures, the subjects performed approximately five minutes of stretching exercises. All of the measurements for testing were performed by the same operator, and the test procedures were supervised by a physical education graduate. All of the trials were performed using standardized test protocols and observing the same conditions. Upon completion of testing, the subjects were assigned to groups. The reliability of the dependent measures was calculated using the Intraclass Correlation Coefficient (ICC).

Adiposity measurements. Body Mass Index: BMI is the most complete and easiest to use indicator. For most people, body fat is better correlated with BMI than with other indicators (Pi-Sunyer, F.X., Becker , 1998). BMI was calculated as body weight divided by the square of body height. Body height (in cm to the nearest 0.1 cm) was measured using a SECA® stadiometer, and body weight (in kg to the nearest 0.1 kg) was measured using Tanita® digital scales. The policemen were barefooted and wore light clothing during the measurements (WHO, 1995). Height and weight were measured twice without delay between the measurements, and for both, the mean value of the two measurements was taken. Next, BMI was calculated from these averaged values. The test-retest reliability showed a high reliability for BMI (ICC = 0.99) (Vincent, 2005).

Waist Circumference: WC provides a simple measure of central adiposity, which may be more predictive of adverse outcomes, such as lipid profile. It has also been shown to be positively associated with cardiometabolic risk factors, given the relationship between waist measurement and visceral adiposity (Pouliot et al., 1994). WC (cm) was measured twice, to the nearest 0.1 cm, at the midpoint between the lower border of the last rib and the iliac crest, at the end of a normal expiration, using a non-elastic tape measure (WHO, 1995). Next, the two measurements were averaged. The two measurements were taken right after one another, without delay. The test-retest reliability showed a high reliability for WC (ICC = 0.98) (Vincent, 2005).

Physical fitness testing. Squat Jump test: the SJ test is a reliable and valid test for the estimation of the explosive power of the lower limbs (Markovic, Dizdar, Jukic, & Cardinale, 2004). The SJ was performed from a starting position in which the participants' knees were at a 90 degree knee angle, without allowing any counter movement. The participants' hands were kept on their hips, thus avoiding any arm swing. The subjects were required to jump as high as possible, without performing a countermovement (pre-stretch), and to land at the same point of takeoff. They were also required to rebound with straight legs when landing to avoid knee bending and alteration of measurements. The SJ was conducted on a resistive (capacitative) platform connected to a digital timer (accuracy ±0.001 second) (Ergojump, Psion XP, MA.GI.CA., Rome, Italy) that recorded the flight and contact times of each individual jump. The height of the jump was calculated from the flight time (t f in seconds) by applying ballistic laws. Each participant was given three trials, which were separated by 1 minute intervals, to complete their highest jump (Markovic et al., 2004). The maximal height (cm) reached in the trials was taken as the dependent variable. The test-retest reliability reported a high reliability for CMJ (ICC = 0.97) (Vincent, 2005).

Countermovement Jump test: compared to the SJ, CMJ assesses the subject's ability to use a stretch-shortening cycle with leg muscles, and it involves many complex and interacting neural and mechanical processes (Bosco, Tarkka, & Komi, 1982). The CMJ test began with a policeman standing in an upright position. A fast downward movement to approximately a 90° knee flexion was immediately followed by a quick upward vertical movement, as high as possible for the subject, all in one sequence. The test was performed with hands on hips. The subjects were required to land at the same point of takeoff and rebound with straight legs when landing to avoid knee bending and alteration of measurements. CMJ was conducted on a resistive (capacitative) platform connected to a digital timer (accuracy ±0.001 seconds) (Ergojump, Psion XP, MA.GI.CA., Rome, Italy) that recorded the flight and contact times of each individual jump. The height of the jump was calculated from the flight time (t f in seconds) by applying ballistic laws. Each participant was given three trials, which were separated by 1 minute intervals, to complete their highest jump (Markovic et al., 2004). The maximal height (cm) reached in the trials was taken as the dependent variable. The test-retest reliability reported a high reliability for CMJ (ICC = 0.98) (Vincent, 2005).

505 Change of Direction Speed test: this test was used to measure a component of agility, which is defined as including perceptual and reactive decision-making factors, and CODS. CODS is determined by technical factors, such as stride adjustments, and by physical elements, such as straight sprinting speed and leg muscle qualities, which include strength, power, and reactive strength (Young & Farrow, 2006).

In this study, the 505 CODS test was used as the high velocity 180° directional change executed within the test. The subjects began by standing behind a set of timing gates

(Microgate, Bolzano, Italy) before sprinting 10 m through a second set of timing gates, then sprinting a further 5 m, before passing through a photocells system with both feet, turning 180°, and completing the test by sprinting 5 m back through the timing gates. The scheme of the 505 CODS is shown in Figure 2. The subjects completed three trials, with a five minutes rest period in between them. The subjects only planted and changed direction with their preferred leg. Limb dominance or "preferred limb" was defined as the limb that subjects chose and relied on to perform a variety of functional activities. The minimum time (s) recorded in the trials, to the nearest 0.01 s, was taken as the dependent variable. The test-retest reliability reported a high reliability for CODS (ICC = 0.95) (Vincent, 2005).

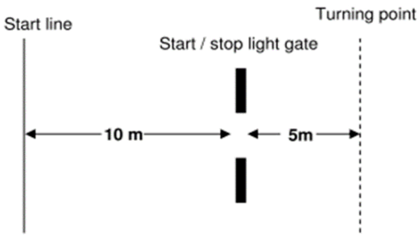

Figure 2. Layout of the 505 change of direction speed test. Participants performed test as fast as possible from the start to the turning point (5 meters) and to the stop light gate (5 meters).

Multilateral training protocol. The subjects allocated to the EG received an MT program for a period of 90 minutes, two days a week, with a total of 16 training sessions. These training sessions were performed at different times of the day, depending on the availability of the policemen outside working hours. The entire intervention program was performed over eight weeks, from the beginning of October until the end of November 2015. The MT program was supervised and conducted by two experienced instructors, who are graduates in physical education. The subjects were instructed to report injuries sustained during training. Each training session started with a brief dynamic warm-up program, mainly consisting of calisthenics-type exercises for approximately ten minutes, and ended with a cool-down program, consisting of static stretching exercises for approximately ten minutes. The targeted components of the MT program mainly included lower limb strength training and agility in addition to training for the upper limbs to enhance a balanced physique. On the first day, the training was focused on plyometrics and weight training. On the second day, plyometrics and agility training were performed. During the first two weeks, the training primarily consisted of preconditioning. From the third week onwards, we gradually increased the intensity and volume of the training. For an effective workout, the principles of overload and specificity were addressed (Baechle & Earle, 2008).

The *dynamic warm-up program* included arm swings, trunk twisting, high marching, jumping jacks, stride jumping, high knees, side bending, side stretching, skipping leg swings, backward sprinting, carioca, and lateral shuffles. The subjects performed each exercise for 1 set of 60 s.

The *resistance training protocol* included plyometrics and weight training. During body weight plyometrics, the subjects performed Jump Squats, burpees, lunges, push-ups, pull-ups, sit-ups/crunches, back extensions, single or double leg hops, half squats, long jumps, planks, and medicine ball tosses. In total, 1-2 sets of 10 reps, with 30-60 s of slow walking between each exercise, were performed. During weight training, the subjects performed 2-3 sets of 8-12 reps (60/80% of 1 RM), with 1 minute rest periods in between sets. The 10 exercises performed included leg presses, leg extensions, leg curls, lat pulldowns, seated rows, bench presses, shoulder presses, triceps presses, arm curls, and calf raises.

The aims of the *agility training protocol* were to challenge hand-eye coordination, foot-eye coordination, dynamic balance, standing and leaning balance, and psychomotor performance (reaction time). Ball games, relay races, box drills, shuttle run, lateral coach drills, and obstacle courses were used to achieve these goals. The agility training was performed for 30-40 minutes.

The *cool-down program* was performed with static stretches, which included movements, such as Achilles' tendon/calf stretches, skier's stretches, quadriceps stretches, hurdler's stretches, straddle stretches, groin stretches, back stretches, and archers.

2.4. Statistical analyses

The data are presented as group mean values and standard deviations. A multivariate analysis of variance (MANOVA) was used to detect differences in all baseline variables between the study groups. A mixed between-within subjects analysis of variance (ANOVA) was used to determine the interaction between the two independent variables of training (pre/post; within subjects factor) and group (EG and CG; between subjects factors) on dependent variables of physical fitness. When "Time x Group" interactions reached the level of significance, group-specific post-hoc tests (i.e., paired t-test) were conducted to identify the comparisons that were statistically significant. Additionally, the classification of the effect size (f) was used to estimate the magnitude of the differences within each group by calculating partial η^2. According to Cohen (1988), $0.00 \leq f \leq 0.24$ indicates small effects, $0.25 \leq f \leq 0.39$ indicates medium effects, and $f \geq 0.40$ indicates large effects. An alpha value of $p < 0.05$ was set as the criterion level of significance. All analyses were performed using the SAS Jmp Statistics (Cary, NC, USA) version 12.1.

3. Results

	Experimental Group (n=10)					**Control Group (n=10)**					**p-value (effect size *f*)**		
Variables	**Pre**		**Post**		**Δ (%)**	**Pre**		**Post**		**Δ (%)**	**Main effect: Time**	**Main effect: Group**	**Interaction: Time x Group**
	M	**SD**	**M**	**SD**		**M**	**SD**	**M**	**SD**				
BMI (kg/m^2)	27.4	3.5	26.4	2.1	-3.65	28.4	2.9	28.6	2.6	0.70	0.6114 (0.12)	0.1964 (0.32)	0.3269 (0.24)
WC (cm)	99.2	3.7	94.9	6.5	-4.33	98.8	5.1	101.0	3.8	2.23	0.4500 (0.18)	0.1089 (0.40)	0.0258 (0.57)
SJ test (cm)	21.5	5.1	28.9	6.3	34.42	20.6	3.1	21.4	4.1	3.88	0.0303 (0.55)	0.0040 (0.78)	0.0743 (0.45)
CMJ test (cm)	23.7	4.0	30.1	3.5	27.00	20.6	3.0	21.9	1.9	6.31	0.0003 (1.05)	0.0001 (1.17)	0.0083 (0.70)
505 CODS test (s)	3.18	0.23	2.87	0.10	-9.75	3.27	0.04	3.24	0.26	-0.92	0.0089 (0.69)	0.0010 (0.92)	0.0219 (0.59)

Note: M=mean; SD=standard deviation; BMI=body mass index; WC=waist circumference; SJ=squat jump; CMJ=countermovement jump; CODS=change of direction speed; Δ=mean difference.

Figure 3. Effects of an eight-week multilateral training program on measures of physical fitness.

All subjects received the allocated treatments. In total, 20 participants completed the training program, and none reported any training-related injury. Figure 3 describes the pre- and post-intervention results for all outcome variables. Overall, there were no statistically significant differences in mean age, height, weight, and baseline values between the two intervention groups ($p > 0.05$).

Body mass index. Our statistical calculations revealed no significant main effects of "Time" and "Group" and no significant "Time x Group" interaction for the BMI measurements (Figure 3).

Waist circumference. Our statistical analyses revealed no significant main effects of "Time" and "Group" for WC. However, a significant "Time x Group" interaction was found ($F_{1,18} = 5.90$, $p = 0.0258$, $f = 0.57$, Power = 0.99) (Figure 4). The post-hoc analysis revealed a significant decrease in WC measurements from pre- to post-test in the EG (Δ -4.33%, $p < 0.05$). In contrast, we found a significant increase in the CG (Δ 2.23%, $p < 0.05$) (Figure 3).

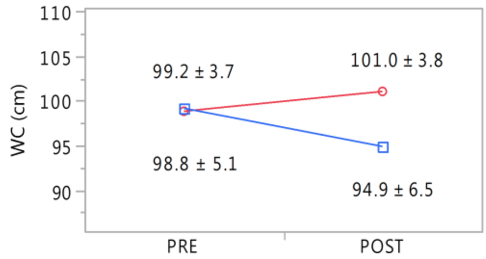

Figure 4. Mean ± SD pre- and post-testing data for waist circumference for the experimental (multilateral training program, unfilled squares) and control (inactive, unfilled circles) groups.

Squat jump test. A significant main effect of "Time" ($F_{1,18} = 5.54$, $p = 0.0303$, $f = 0.55$, Power=0.99) and a significant main effect of "Group" ($F_{1,18} = 10.87$, $p = 0.0040$, $f = 0.78$, Power = 0.99) was found for the SJ test. We did not detect a significant "Time x Group" interaction (Figure 5, Figure 3).

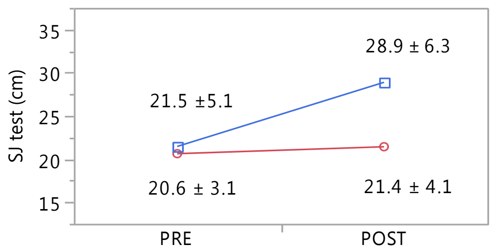

Figure 5. Mean ± SD pre- and post-testing data for squat jump for the experimental (multilateral training, unfilled squares) and control (inactive, unfilled circles) groups.

Countermovement jump test. Our statistical analysis revealed significant main effects of "Time" ($F_{1,18} = 19.93$, $p = 0.0003$, $f = 1.05$, Power = 1.00) and "Group" ($F_{1,18} = 24.66$, $p = 0.0001$, $f = 1.17$, Power = 1.00) for the CMJ test. Additionally, a significant "Time x Group" interaction was found ($F_{1,18} = 8.81$, $p = 0.0083$, $f = 0.70$, Power = 0.99) (Figure 6), and the post-hoc analysis revealed a significant increase in maximal height reached from pre- to post-test in the EG (Δ 27.00%, $p < 0.01$) (Figure 3).

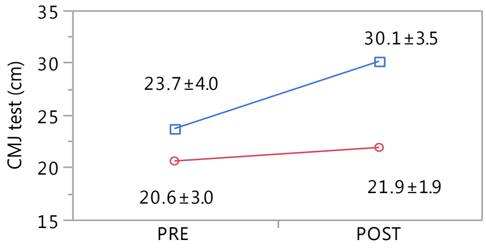

Figure 6. Mean ± SD pre- and post-testing data for CM jump test for the experimental (multilateral training, unfilled squares) and control (inactive, unfilled circles) groups.

505 CODS test. The statistical analyses indicated significant main effects of "Time" ($F_{1,18}$ = 8.59, *p* = 0.0089, *f* = 0.69, Power = 0.99) and "Group" ($F_{1,18}$ = 15.26, *p* = 0.001, *f* = 0.92, Power = 1.00) for the 505 CODS test. Additionally, a significant "Time x Group" interaction was found ($F_{1,18}$ = 6.29, *p* = 0.0219, *f* = 0.59, Power = 0.99) (Figure 7), and the post-hoc analysis revealed a significant decrease in run time from pre- to post-test in the EG (Δ -9.75%, *p* < 0.01) (Figure 3).

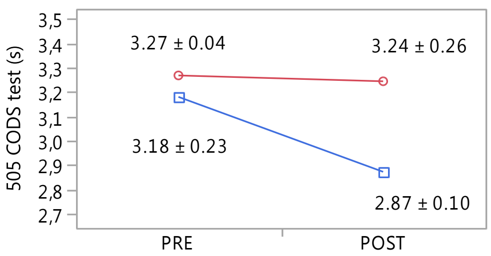

Figure 7. Mean ± SD pre- and post-testing data for 505 CODS test for the experimental (multilateral training program, unfilled squares) and control (inactive, unfilled circles) groups.

4. Discussion and conclusion

The purpose of this study was to evaluate the effectiveness of a physical education program in the general framework of continuing education for work efficiency in policing. We measured the effects of a supervised eight-week MT program, including resistance and agility training, on physical fitness components (i.e., body composition, leg muscular strength, agility, speed, and power) in police officers. In the present study, body composition was examined using BMI and WC; muscular strength and explosive power of lower limbs were assessed using the SJ and CMJ; and agility and speed were measured using the 505 CODS test. The findings suggest the following: (i) adiposity measurements (i.e., WC) significantly decreased in the EG after eight weeks; (ii) performance on the physical fitness tests (i.e., SJ, CMJ, and 505 CODS tests) significantly improved in the EG after same training period.

Thus, after being on the training program for eight weeks, policemen who performed MT showed a significant decrease in WC measurements, indicating a reduction of central fatness. Conversely, policemen who remained inactive maintained a high WC, which represents a cardiovascular disease risk factor (Pouliot et al., 1994). The inconsistent effects found in the EG with respect to BMI are likely attributed to the increase in lean body mass, a result of the muscular strength training performed in this study (Westcott et al., 2009). Regardless, at baseline, the policemen were classified as overweight (Pi-Sunyer, Becker, & Bouchard, 1998). In effect, an important aspect of the current study, which confirms previous research, is that policemen tend to have a higher prevalence of being overweight, likely because of their work, which is often sedentary, a lack of physical activity, and poor eating habits (Adams et al., 2010; Anderson et al., 2001; Gu et al., 2012; Stamford et al., 1978). However, after the training period, the EG showed significant improvements in body composition. Body composition has an impact on health and performance in police officers. As a result, this MT program could help police officers maintain an appropriate body composition that is required to meet the job's demands in terms of physical and psychological conditions (Alasagheirin et al., 2011; Donadussi et al., 2009; Harvey et al., 2010; Santana et al., 2012; Sorensen et al., 2000; Spitler et al., 1987; Trottier & Brown, 1994; Violanti et al., 2011).

An important aspect of the current study is that the specific adaptations to resistance training and agility (leg muscular strength, speed, power, and motor skill performance) were specific to the stimulus applied by the eight-week MT program (Baechle & Earle, 2008). Specifically, the EG showed a great increase in height of the peak reached during the SJ and CMJ tests. Moreover, the EG showed a significant decrease in the time required to run the 505 CODS test. This result could be due to improvements in leg muscle strength, which is an important factor in determining an individual's ability to stop and change direction rapidly (Hoffman, Maresh, Armstrong, & Kraemer, 1991).

With reference to the literature (Alasagheirin et al., 2011; Rhodes & Farenholtz, 1992; Sirressi et al., 2014; Stanish et al., 1999; Strating et al., 2010; Trottier & Brown, 1994) and our own findings, the results of the present study suggest that the effects of the MT can improve an individual's physical ability for performing occupational tasks in policing. The results of this study illustrate that MT, including resistance training and agility, is a feasible (i.e., high adherence rate of 100%) and safe (i.e., no injuries reported) training modality that produces marked increases in health and skill-related components of physical fitness in healthy male policemen. This goal, that can be achieved under the responsibility of a physical education instructors, can help police officers better meet the job's demands. Improvements in physical fitness should continue beyond eight weeks and should be targeted toward job specific training tasks, according to the specialties of the individuals. Contrary to our hypothesis, the EG did not show a decrease in the BMI after the eight-week MT program. This result is likely attributed to the increase in lean body mass, a result of the muscular strength training performed in this longitudinal research study.

A limitation of the present study is related to the origin of the subjects, as Apulian police officers can only be considered a representative sample of southern Italy, not the Italian population in whole. Further studies that include other geographical areas should be performed. A further limitation of the present study is the use of a non-randomized design. The subjects assigned to the EG may have been more motivated to improve their performance. However, the present research provides novel findings in the field of innovative didactics methodologies to support continuous education in the police officers.

In summary, this investigation provides evidence that maintaining a Physical Education Program in Continuing Education of the police officers is strongly recommended. In policing, the didactic method of multilateral training is effective in increasing physical efficiency, preventing overweight and obesity, and improving quality of life. Improvements in physical fitness should continue beyond eight weeks and should be targeted toward job specific training tasks, according to the specialties of the individuals. A physical education graduate instructor is necessary to design and administer a periodized training program for this population. To do so, public policies are required to promote the practice of physical activities as continuing education, including leisure and sports activities, and to promote the prevention of obesity related to work, psychological stability, work efficiency, changes in living habits, improvements in wellbeing and, therefore, improvements in quality of life.

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