TRAINING STRENGTH AND SPEED IN LOCAL POLICE OFFICERS

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Abstract. *Strength training is a fundamental component of physical training activities targeting the employees of the Romanian Police and Local Police. Strength, speed and endurance are basic physical qualities involved in the proper conduct of police missions. As gatekeepers of the criminal justice system, police officers are usually the first to encounter crime victims. This study aimed to evaluate the effectiveness of a physical training program in terms of enhancing strength and speed among local police officers. Ten local police members participated in the study, which examines how a three-month physical training program, carried out in 2021, can improve muscle strength and running speed (50 meters). A paired sample t-test was used to assess the differences between the initial and final evaluations. The results indicated significant improvements - following the course of the educational curriculum - in the field of general physical training/in the field of self-defence, related to the initial training course of local police officers. Improvements were recorded in the values of all investigated indicators, including muscle mass, punching strength, and 50-meter running speed. The study discusses the implications, emphasizing that strength should be periodically trained, and force used gradually - and only when necessary - to prevent illegal actions that could endanger the lives or safety of police officers or others.*

Keywords: *police, use of force, self-defence.*

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Introduction

Policing is frequently regarded as one of the most stressful professions, with police officers regularly facing dangerous situations and traumatic experiences on the job (Kurtz & Hughes, 2019). Physical fitness is a non-negligible part of a police officer's ability to perform law enforcement duties effectively (Bonneau & Brown, 1995), reinforced through regular training in the lawful use of force. For local police officers, learning new breathing techniques that enhance lung capacity, volume and function, may play a significant role in the recovery from illnesses such as flu, common cold and also COVID-19 (Raim et al., 2021).

Police training plays a crucial role in the development of police officers (Klevgrewe et al., 2021). Regarding the activity and competencies conferred by the law to the public institutions with responsibilities in our country's public order line (Romanian Police and Local Police), and in accordance with the framework laws under which these public institutions operate, a proper

performance of the duties of their staff requires regular training in general/applicative physical training in the field of self-defence.

Force, speed and endurance represent basic physical attributes necessary for proper conduct of police missions. Strength can be defined as the ability of the human body to exert effort to defeat, maintain or yield in relation to an external or internal resistance, by contracting one or more muscle groups (Dragnea et al., 2006).

Strength training is a major constant of physical training targeting the employees of the Romanian Police and Local Police. The Local Police in Romania constantly strives to evolve and improve its activity, modelling itself on the discipline and rigor of the Romanian Police, supported by the legal and methodological framework of Order of the Minister of Administration and Interior no. 154/2004 regarding physical education and sport activities (Minister of Administration and Interior, 2004). Training programs for local officers are designed to modernize practices and adapt them to the evolution of the operational situation. While the law specifies *what to do*, professional intervention techniques should answer the related question *how to do.*

Police officers must be physically fit to perform all the requirements of their profession and to maximize the safety of the community and the people involved (Yuliang et al., 2023).

Bringing together under the same dome principles such as minimizing risk, the gradual use of methods and means of action, the limitation and proportionality of the use of force, etc., the concept of gradual intervention represents a continuation of coercive measures, materialized by an evolution that begins with the mere presence of the officer, continues with the use of self-defence, then the use of means of intervention and ends, only if needed, with the use of non-lethal or even lethal weapons as the final solution, according to the law.

The police officers are responsible for their actions during the performance of the duties conferred by the law and professional status. However, society also holds the responsibility to provide them with the appropriate means to handle situations correctly with the situation that requires their intervention. Coercion and confrontation are the essential characteristics of police combat (Liu Kaiji, 2014).

Aiming to dominate and, where appropriate, to control the actions of the opponent, the police officers must apply the optimal level of force required to neutralize threats against them or other persons, ensuring that all actions remain within the boundaries of law, both in letter and spirit.

To effectively carry out their daily duties, police officers in any country must possess the specific knowledge necessary for the lawful and justified use of force. to enhance their professional performance, they require regular physical and applied training in self-defence, which includes consistent force training. Police physical fitness evaluations were mostly focused on basic physical fitness indicators, such as general strength, endurance and speed (Dawes et al., 2021).

Employees of the two Romanian public institutions analysed (National and Local Police) must regularly participate in general and applied physical trainings in the field of self-defence, during which methodological aspects of force training are addressed and adapted in order to ensure officers can intervene promptly in various situations when persons/groups of persons violate legal provisions and norms of social coexistence, requiring police intervention to restore order.

The essential element that determines the policeman's use of force is the existence of an opponent and an implicit real threat. Identifying the opponent-threat duality will determine a police officer's appropriate reaction procedures. Many professional requirements of police work involve the body control of suspects (Anderson et al., 2001).

"Law enforcement ability is where police use coercion as the main form of clearing confrontation" (Zhang Bing, 2006). In the last decades, there has been an increased interest in psychological vulnerabilities among police suspects (Geijsen et al., 2018), and in certain situations of suspects found with mental problems, a higher attention should be given to the proper level of force used against them.

When the person whose illegal actions require the intervention of the police manifests a cooperative behaviour and proves the understanding and voluntary submission to the police officer, the use of several tactics, including "human" (reducing the power differential between the cop and the citizen) and "calm" (the officer making an effort to control his or her own emotions), was associated with calm citizen demeanour (Todak & Lois, 2018).

Exposure to critical incidents and hence potentially traumatic events is endemic in law enforcement (Papazoglou et al., 2020). In order to prevent accidents involving individuals subjected to lawful force by police officers, police arrests in law enforcement combat are commonly used to control the fall, such as double full-confrontation wrestling, full control, and counter-control after the fall (Fu & Jia, 2021).

In light of these considerations, regular training of strength by police officers is highly required.

Methodology

Purpose

The aim of the study was to investigate the efficiency of a physical training program in terms of strength and speed development among local police officers.

Hypothesis

H1: Investigating muscle mass and the clamping force of the fist in police officers reveals significant improvements after 3 months of physical training sessions.

H2: There is a significant improvement of running time (50 meters) after the physical training intervention.

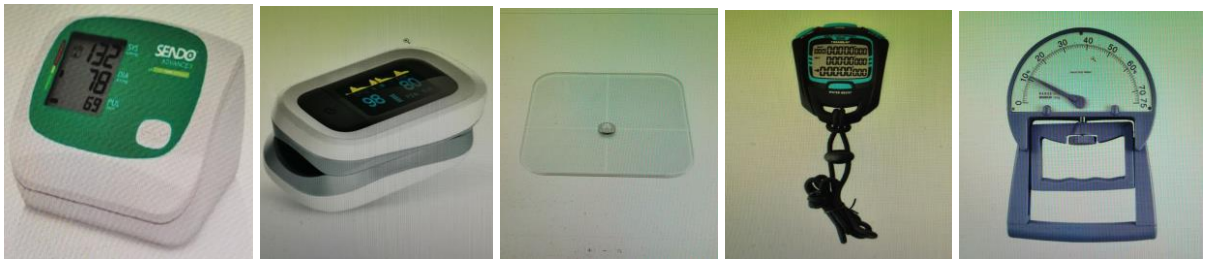
Participants

10 local police officers from the Bucharest Local Police, aged between 28 and 54 years (8 males and 2 females), took part in the investigation.

Measures

Measurements were taken of physical parameters, and results obtained at physical tests using five measuring devices (the present study being part of a larger research) - Figure 1:

- digital sphygmomanometer SENDO ADVANCED 3 – measuring blood pressure and pulse;
- digital pulsoximeter PERFECT MEDICAL PM 23 – measuring oxygen saturation;
- electronic scale HUAWEI AH 100 – measuring body weight, muscle mass, basal metabolism, percentage of body fat, visceral fat level, body mass index, protein content in the body, mineral content of bones and percentage of water in the body;
- electronic timer TREMBLAY – for measuring results at physical tests: speed running and resistance running;
- hand dynamometer GIMA 28790 – for measuring the clamping force of the fist (bilateral).



Sphygmomanometer Digital pulsoximeter Electronic scale Electronic timer Hand dynamometer

Figure 1. Instruments used for investigating physical parameters and for physical tests

At the beginning and end of the intervention (a physical training program), we measured 13 body parameters (body weight, blood pressure, pulse, muscle mass, basal metabolism, body fat percentage, visceral fat level, body mass index, protein content, bone mineral content, body water percentage, oxygen saturation, and bilateral clamping force of the fist) and conducted 4 physical tests (speed running, endurance running, push-ups, and sit-ups). However, this study specifically focused on the evolution of two body parameters: muscle mass and clamping force of the fist, as well as the performance of the 10 local police participants in a 50-meter speed running test.

Muscle mass has a major role in developing the strength necessary for local police officers to perform kicks (self-defence techniques executed with palms, fists, elbows, knees, feet) or other tasks, such as transporting an injured person to the police service vehicle, ambulance or Police headquarter). Also, training clamping force of the fist has a major role in the training programs of the Local Police to effectively execute holds during self-defence processes that involve measures taken to immobilize potential opponents and transport them to the police vehicle or, as the case may be, to the headquarters of the National/Local Police for further investigation into their illegal activities and determining their culpability.

Procedure

The current research was based on the premise that regular institutional strength training can contribute to the success of the missions assigned to the Romanian/Local Police (in addition to providing health benefits for all institution's staff).

From August 30 to December 20, 2021, we conducted a comparative study to evaluate the impact of weekly physical training sessions. These sessions, consisting of two 2-hour workouts each week, were organized over a three-month initial training course (September 13 - December 11, 2021) for local police officers from the General Directorate of Local Police and Control of Bucharest Municipality. The initial and final testing was conducted by one of the authors of this research, while the training process was led by specialists from the Institute for Public Order Studies (I.P.O.S.). The physical training sessions were carried out in accordance with the training curriculum presented in the psycho-physical education manual developed by the Institute for Public Order Studies (I.P.O.S.) (Galan & Gârbea, 2013), adapted to the specifics of the Local Police activities.

Police agencies aim to create training situations that closely resemble real-world experiences – e.g., realistic or representative training (Kleygrewe et al., 2022). Consequently, the training sessions during the three-month course by I.S.O.P. were progressively adapted to real-life scenarios. They began with fundamental elements such as "falling school" and guard positions, continued with the practice of Ju-jitsu holds and other attack or defence techniques (including movements, strikes with hands and feet, reapers, escaping from holds), and finally complex training sessions based on scenarios with armed opponents or multiple assailants.

All self-defence techniques were adapted to real-life situations because police officers frequently encounter potentially dangerous or violent situations (Cushion, 2021). Police trainees need to accumulate experience by practicing skills in complex and realistic circumstances (Andersen & Gustafberg, 2016). The instructional process must be carefully designed and implemented at an institutional level, as organizational commitment is crucial for optimizing the physical training of police officers (Belur et al., 2020).

The training course from I.S.O.P. spanned 13 weeks and included 25 training sessions. The first session was dedicated to explaining the training curriculum, and safety and health standards at work. The remaining 24 sessions focused on two key areas:

1. Training of the basic motor skills. This involved exercises to enhance speed, endurance, strength, agility, and flexibility with the help of several exercises performed with one's own body (push-ups, squats, chin-ups, abdominal flexions, long jumps, various movements of the lower or upper limbs, trunk, neck, etc.), or using dumbbells with discs, cable machines and other physical training equipment from the sport gym.

2. Acquisition, by the trainees from Local Police, of knowledge about basic self-defence procedures, adapted to the service activities executed by local police officers. The instruction was progressive, starting with fundamental skills like "falling school" and guard positions, techniques for imbalance and falls, and escapes from holds. This progressed to throwing and ground fighting techniques from Judo, Ju-Jitsu, Freestyle Wrestling, and Aikido, as well as powerful strikes from Karate, Boxing, Kickboxing, and Krav Maga. Training included restraint techniques and, in the final sessions, self-defence strategies against multiple opponents and armed attackers.

For relaxation and mobility purposes, the 10 participants of our study executed different exercises adapted from fitness and sports games like: football, handball, volleyball or basketball.

Results

Table 1 shows a noticeable improvement in both physical parameters selected for this study between the initial and final evaluations.

Table 1. *Evolution of muscular mass and clamping force of the fist (n = 10)*

MM – kg.	CFF – kg.	
	left	right
60,7 (initial)	44 (initial)	46 (initial)
61,0 (final)	45 (final)	48 (final)
59,0	49	50
59,7	51	50
67,4	46	48
68,0	48	49
70,0	49	54
70,3	51	55
68,7	49	48
69,5	51	48
45,0	30	30
45,6	31	32
56,0	39	40
57,1	41	41
62,5	47	50
63,1	48	52
55,9	43	42
56,6	44	44
54,3	40	40
55,1	40	41

Note: MM = muscle mass, CFF = clamping force of the fist.

We also analysed the evolution in the results of the 50-meter sprint, highlighting the importance of training for the necessary reaction rate in situations where it is necessary to pursue and apprehend individuals involved in committing crimes that try to flee crime scenes and the local police officers must swiftly pursue, immobilize and transport these individuals to the patrol cars or police headquarters. Comparative results are shown in Table 2.

Table 2. *Evolution of results at speed running*

Evaluation type (initial/final)	Results at speed running – 50 meters (seconds, hundredths of a second)
I.E	9,27
F.E.	9,03
I.E	7,83
F.E.	7,75
I.E	7,40
F.E.	7,30

I.E	7,22
F.E.	7,15
I.E	9,30
F.E.	8,90
I.E	7,75
F.E.	7,30
I.E	10,20
F.E.	10,00
I.E	6,09
F.E.	5,91
I.E	8,29
F.E.	8,20
I.E	8,92
E.F:	8,82

"The 50 meters running test can effectively measure the ability of the human body to move quickly and is often used, in several countries, as a police speed test item" (Dong Rujun, 1999).

Significant improvements were observed among all 10 participants following the three-month training course in the two studied body parameters (muscle mass and clamping force of the fist) as well as in the 50-meter sprint test.

Analysis for muscle mass, clamping force of the fist, and speed running – paired sample t test

The analysis for muscle mass (MM) yielded the following results (Table 3):

• Average differences: 0.65 kg.; Standard deviation of differences: 0.23 kg.; Standard error of average differences: 0.075 kg.; t-value: -8.677; p-value < 0.01. Significant p-value (below 0.05) indicates that this improvement is statistically significant. This underscores the effectiveness of the training program in promoting muscle growth among the group of 10 participants studied.

The analysis for the force of the clamping force of the fist (CFF) shows the following results:

• Average differences: 2.6 kg.; Standard deviation of differences: 0.699 kg.; Standard error of average differences: 0.221 kg.; t-value: -11.758; p-value < 0.01. This analysis indicates a significant increase in the force of the punch tightening after the training program, with a p-value well below 0.05, which means that the results are statistically significant.

For running time at 50 meters, we have the following results: Average improvement 0.191 seconds; Standard deviation of improvement 0.136 seconds; Standard error of average improvement 0.043 seconds; t-value = 4.433, while p = 0.0016. The results indicate a significant improvement in running time to 50 meters, with shorter run times at the final evaluation compared to the initial one. The null hypothesis is rejected, all three variables explored (MM, CFF, respectively speed running) showing significant improvements after the training program.

Table 3. *Inferential statistics – paired t-test*

Variable	Average differences	Std. deviation of differences	Standard error	t value	p value	Cohen's d
MM (kg.)	0.65	0.23	0.07	-8.677	< 0.01	-2.74
CFF (kg.)	2.6	0.69	0.22	-11.758	< 0.01	-3.72
Speed running (s)	0.191	0.13	0.043	4.432	< 0.01	1.40

Cohen's d values are showing a very strong effect (see, for example, Predoiu, 2020, for effect size interpretation) of the training program on the three measured variables.

Discussions and conclusion

The National/Local Police institution proves its essential role in upholding legal provisions and societal norms applied within human communities. This is achieved through diligent and continuous efforts to prevent antisocial behaviour and, when necessary, employing proportional and timely use of force within legal boundaries. This is crucial in halting the actions of individuals or groups whose engagement in illegal activities poses risks to public safety and order, and serves as an easy source of profit.

Studies indicate a decline in the physical fitness levels of police officers (Orr et al., 2018). It is emphasized that the use of force should always be seen as a means to an end, rather than an end in itself. It should be periodically trained for and applied gradually, only when necessary, to intervene against individuals engaging in illegal activities that threaten the lives or safety of police officers and others, as well as jeopardize property, values, and public order. It is important to note that decisions regarding the `use of force` continue to be a significant concern for both the police and the public (Cushion, 2020).

Police officers are the *gatekeepers* of the criminal justice system and are usually the first to come into contact with crime victims (Zvi & Shechory-Bitton, 2020). The well-known saying ,,Force imposes respect" holds true in Police activities only when personnel are appropriately trained and apply force judiciously, depending on the operational context and the severity of the offenses, ensuring legitimate use without rights abuses. Knowledge of the law and tactical rules regarding legal use of force, coupled with regular physical training, ensures the safety of police officers and the successful execution of their missions. This includes saving lives, safeguarding property, maintaining public order, and preventing disturbances.

Given the relatively recent establishment of the Local Police institution from Romania, in 2010 (comparative with the previous foundation of the National Police - first historical mention being discovered during the 16th century), comprehensive scientific studies on the use of force by the local police officers from Romania are lacking.

The findings of this present research show that following the course of the educational curriculum in the field of general physical training/in the field of self-defence, related to the initial training course of local police officers (with a duration of 3 months), there have been significant improvements in the values of all investigated indicators: muscle mass, clamping force of the fist, and, also, for speed running (50 meters). Consequently, such training positively

influences the speed and effectiveness of legally justified force used by local police officers in order to carry out their daily responsibilities in a timely manner.

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Institutional Review Board Statement: The research was conducted according to the principles stated in the Declaration of Helsinki. Written informed consent was obtained for the participants involved in the research. The study was approved by the Ethics Committee of the National University of Physical Education and Sport in Bucharest (ID: 705/0311/SG).

Informed Consent Statement: The participants provided their written informed consent to take part in this study.

Data Availability Statement: Data can be made available upon request to the contact author.

Conflicts of Interest: The authors declare no conflicts of interest.

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