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The importance of hand-to-hand fights for determining psychomotor competence of antiterrorists

Authors' contributions:

A Study design
B Data collection
C Statistical analysis
D Data interpretation
E Literature search
F Manuscript preparation
G Funds collection

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Summary

Study aim:

To assess various approaches to determining components of psychomotor competence with respect to hand-to-hand fights.

Material/methods:

A group of 14 students (Grade 4) of the Military Institute of Physical Culture in St Petersburg. Four principal factors determining psychomotor competences in hand-to-hand combat, 5 methods of determining them, and assessment criteria were selected. The result of 10 fights with an armed opponent preceded by a 3000-m run served as a reference task.

Results:

Highest association with the reference task, equal to 87.5%, showed two elements: the results of free fights not preceded by running and hand-to-hand combat exercise while running an obstacle course.

Conclusions:

The results of properly selected tests based on hand-to-hand fights should serve as one of the principal criteria when assessing the psychomotor competence of antiterrorists.

Key words:

Test accuracy • Hand-to-hand combat • Combat sports • Antiterrorist training

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INTRODUCTION

Optimising the antiterrorist training procedures for military and police teams appears one of the urgent social and scientific tasks. This requires an assistance of sport and physical education specialists, experts in the efficacy of close-range combat. Using a gun at a distance of few metres or at close range (shooting or striking), a knife (throwing, cutting, striking), or other objects like bottles, stones, etc., may serve as examples. Close-range combat may also be performed without any tools, i.e. like in combat sports.

Our earlier study showed that in Russia only 6% of police interventions are conducted without the use of weapons, 9% with using police weapons, 18% with side-arms, 13% with guns and in 54% of cases various available objects. Those who attacked policemen used clubs of various length (41%), bottles (32%), seats and stools (25%), stones (15%), shovels or pitchforks (12%), as well as axes, umbrellas, screwdrivers, sand, etc. (6%) [2]. These facts do not contradict the view that combat sports are quite unique means which improve the competences of soldiers and antiterrorist police squads. This is because offensive actions in combat sports are directed at the opponent's body.

When undertaking this study we assumed that the training should contain elements of professional activities, e.g. observing the procedures, ranges of

activities and their psycho-physiological intensities, etc. A profound knowledge of the accuracy of the tests used in the assessment of proficiency in hand-to-hand fights, an issue very hard to quantify, is indispensable for a precise evaluation of results.

The aim of the study was to assess various approaches to determining components of psychomotor competence with respect to hand-to-hand fights.

MATERIAL AND METHODS

Subjects: Fourteen 4th grade students of the Military Institute of Physical Culture in St Petersburg volunteered to participate in the study. Their age was 20 - 21 years, body height 176 ± 2 cm, and body mass 75.5 ± 1.7 kg. During the studies, the students completed a course in hand-to-hand fights. Prior to entering the study, they passed another course covering the sets of exercises consisting of 16 elements of hand-to-hand fights with or without weapons and familiarised themselves with the study protocol.

Methods: All students were subjected to 5 "specific tests" listed in Table 1 and to a more exhausting test consisting of a 3000-m run followed by 10 fights with an armed (knife or automatic rifle) opponent. That latter test served as the reference one ("external criterion"). The specific tests were quantified according to military classification criteria [18]. A detailed description of methods and tests listed in Table 1 is about to be published.

Table 1. Principal determinants of psychomotor competence in hand-to-hand fight and approaches to their assessment

Training components in hand-to-hand fight	Specific tests	Assessment criteria
1. Technique of executing offensive and defensive actions	1. Sets of hand-to-hand fight exercises with or without weapons (8 out of 16 and 8 out of 32)	<ul style="list-style-type: none"> • Consistency with protocol • Quickness of performance • Technical errors (wide swing, excessive movement amplitude, etc.) • Unjustified breaks
2. Level of skills in hand-to-hand fight under stable conditions	2. Offensive and defensive actions directed at special targets; actions with information feedback 3. Conventional fights (the subject knows the mode of attack and tools used; the instructor prompts to attack)	<ul style="list-style-type: none"> • Consistency with protocol regarding: <ul style="list-style-type: none"> – Speed – Smoothness – Equilibrium • Duration of execution • Number of targets hit • Force and precision of hitting targets
3. Level of skills in hand-to-hand fight under changing conditions	4. Free fights (the mode of attack and tools used are determined by a conventional attacker)	<ul style="list-style-type: none"> • Defence and counterattack skills, the mode of attack being unknown • Speed • Equilibrium
4. The capacity for hand-to-hand fight in a state of fatigue due to overcoming obstacles	5. Hand-to-hand fight exercises while running an obstacle course	<ul style="list-style-type: none"> • Time of running obstacle course • Number and quality of hitting targets • Quality of elements of hand-to-hand fight

The performance of individual elements of specific tests 1 - 4 was rated by 3 referees by a 10-point scale. In Test 1, the following elements were rated: performance technique, posture stability, defensive/offensive performance, synchronisation of team actions, and psycho-emotional mobilisation and concentration. Test 2 consisted of applying 5 kinds of blows onto specially designed dummies. Test 3 consisted of 5 tasks of hand-to-hand fights: use of weapon, use of hands and legs, holds/breaks, incapacitating the opponent, throws. Test 4 consisted of performing 5 specific tasks in hand-to-hand fights with 5 opponents, the tasks being randomly assigned. Test 5 consisted of running an obstacle course combined with hand-to-hand fights and applying blows onto dummies. The time of executing Test 5 and its elements was measured with an accuracy of 0.1 s.

The coefficient of determination (r^2) served as a measure of predictability of the reference test result when applying one of the 5 specific tests.

RESULTS

Scores of the referees for Tests 1 – 4 ranged from 7 to 10 points, no significant between-test differences being noticed. All subjects passed Test 5 but every subject received a 5-s penalty when running the obstacle course. The results are indicative of a high competence of participants in all relevant elements of hand-to-hand fight, including the use of weapons.

Coefficients of correlation between the results of various tests are presented in Table 2. The results of the reference task (results of hand-to-hand fights after running 3000 m) significantly correlated with all tests studied except actions using training devices. Highest correlation coefficient was found for Variable 4 (free fights) but no significant differences between those coefficients were found.

Table 2. Coefficients of correlation between the results of tests and of the reference task performed by military students ($n = 14$).

	2	3	4	5	6
1	-0.001	0.668**	0.399	0.224	0.631*
2		0.340	0.250	0.500	0.486
3			0.160	0.510	0.624*
4				0.440	0.785***
5					0.694**

1 – Sets of exercises (specific *kata*); 2 – Actions using training devices; 3 – Conventional fights; 4 – Free fights; 5 – Fights at an obstacle course; 6 – Fights after running 3000 m (reference task)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

When multiple correlation coefficients were computed, highest predictability ($R^2 = 0.88$) of the reference test result was found for Variables 4 and 5.

DISCUSSION

The reference test (“external criterion”) adopted in this study was based on the fact that most interventions of various security squads are preceded by a running fight [8] and the results of that test were correlated with all other ones. Although only 4 out of 5 tests studied correlated significantly with the reference test, no significant differences between those coefficients of correlation were found. That means, that all 5 “specific tests” reflect to a fair extent the subject’s psychomotor capacity, although Tests 4 and 5 (free fights and fights at an obstacle course) seem to be most informative, as follows from the multiple determination coefficient.

Chodała [4], in a study on 24 cadets, intensively trained in hand-to-hand fights, found strong correlations between the results of conventional fights, but not of sumo-based tests, and scores for demonstrated falls ($r = 0,802$) or for a preset pattern of blows and kicks ($r = 0,771$). The results of conventional fights and of sumo-based tests were rather weakly correlated with one another ($r = 0,472$). In another study on 23 female students of self-defence courses [16], the last two correlations were 0.608 and 0.519, respectively, the first one being non-significant.

By applying cluster analysis to a number of variables recorded in 63 students of detective courses, Sterkowicz et al. [15] found that scores for demonstrated falls, results of conventional fights and scores for a preset pattern of blows and kicks formed the strongest set of variables.

In all the studies discussed above, “conventional fights” represented the 3rd group of basic defensive actions, i.e. defence against arm bars, strangling and blows [10].

Carzyński et al. [3] found no significant correlation between the results of hand-to-hand fights (offensive and defensive elements) and those of test fights based on judo formula and the same was true for the study of Chodała [6], who applied sumo-based test.

It should be emphasised that test fights of sumo or judo structure, mentioned by other authors [3,4,6,16], have not been considered equivalent to the conventional fights as defined in this study. Nonetheless, test fights designed according to various combat sports enable investigating into the intervention process when



the objective is to evaluate psychomotor competence in cases of being forced to undertake a close-range struggle. Moreover, application of test fights based on combat sport structures is much simpler, safer and economic compared with the tasks described in this paper, and enables systematising knowledge on potentially effective actions under various conditions of hand-to-hand struggle. In another study [11], a high correlation was found between the efficacies of fights in vertical position (sumo formula) and in the horizontal one (judo formula; $r = 0.892$). That discrimination of ranges of activities under various motor conditions of hand-to-hand struggle enables monitoring the relations with the general physical fitness and may be important for establishing selection criteria and training programmes for soldiers, policemen, security guards, etc. [1,5,7-9,12-14,17].

The question, whether unarmed subjects, efficient in hand-to-hand fights would be equally efficient when using weapons during an intervention, i.e. at close-range contacts, is a vital one especially from practical point of view. Such a relationship was demonstrated under definite conditions; namely, sport-trained cadets, who passed military service lasting from 15 to 50 months, judoists proved the most efficient ones in both instances. After having run an 800-m distance, 68% of their pistol shots hit the target (range 40 – 100%). Best results in shooting (72%; range 40 – 100%) achieved those who trained military patrol racing (pistol shooting preceded by 2000-m run, including 200 m of obstacle run at mid-distance). On the other hand, cadets who trained marksmanship achieved nearly worst results amounting to

48% (range 0 – 80%). As expected, the best results in test fights in horizontal position (judo formula), mostly ahead of time, achieved those who trained judo [5]. It was demonstrated in another study [3] that all test fights based on judo formula, conducted in teams, 5 subjects each (a judoist, a military patrol racing athlete, a marksmanship athlete, a track-and-field athlete and one untrained cadet), were won by judoists. Only in one team the judoist was next to the last (albeit he had been the winner in a team of judoists two months earlier) and the winner was a kick-boxer. That shows that training a combat sport does not automatically gives advantage over a close-range opponent without such training.

SUMMARY AND CONCLUSIONS

Confrontation of our results with those from other reports and with the analyses of various interventions makes obvious the leading role of combat sports in shaping the psychomotor dispositions of candidates for antiterrorist groups. Especially, the results of appropriately selected tests based on hand-to-hand fights should constitute one of the principal criteria of assessing psychomotor competence. The range of that competence ought to be as wide as possible, since the refinement of contemporary means of individual and mass aggression is steadily growing.

Summing up, the presented results suggest that the test consisting of conventional fights at an obstacle course might be the most informative among the specific tests, as it simulates, to some extent, a pursuit combined with engaging into a close-range fight.

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