

## Technical Analysis of Close Quarter Combat with Rifle

José Juan Robles-Pérez<sup>1</sup>, José Antonio Aguirre-Puig<sup>2</sup>, Pedro Montañez-González<sup>2,\*</sup>, Domingo Jesús Ramos-Campos<sup>3</sup> and Vicente Javier Clemente-Suárez<sup>4</sup>

<sup>1</sup>Department of Melee Combat and Self Defense, Military Sports Area, Central School of Physical Education of the Army, Toledo, Spain

<sup>2</sup>I Airborne Flag, Airborne Brigade. Spanish Army, Paracuellos del Jarama. Madrid, Spain

<sup>3</sup>Education Faculty, Pontifical University, Salamanca, Spain

<sup>4</sup>Department of Physical Activity and Sport Science, Sport Science Faculty, University of Castilla la Mancha, Toledo, Spain

**Abstract:** The present study aimed to analyze the characteristics of close quarter combat with rifle and to analyze the most effective rifle fencing techniques used in combat. Fourteen professional soldiers were analyzed in 24 random combats with a rifle replica. Results showed that direct attack was the most used technique, the combat action more executed was the attack and the body area most impacted was the trunk. It has also been proved that combat rifle is a maneuver that takes place in a short time, most of the combats being developed in durations less than 20s. This data could help improve current training systems for the troops who have to serve in actual operation zones and also could be used in the basic training for new recruits.

**Keywords:** Close quarter combat, rifle, soldier, fencing, stress, rifle techniques.

### INTRODUCTION

Currently, armies are equipped with modern weaponry systems, but this armament often cannot be used in current theaters of operation, where contact with civilian prevents the use of their potential, forcing them to use these weapons at close range, where survival depends on their quick decision and perfect preparation [1, 2].

The current armed conflicts are completely different to traditional warfare because they are asymmetric conflicts between hegemonic nations and under developing nations, taking place in urban areas which reduces the distances of confrontation. These characteristics in accordance with the great concern of the public opinion with respect to human rights make the melee and close quarter combats a very useful tool of soldier, allowing the neutralization of the opponent, without causing death, or even injury, but could be lethal [1].

Actually soldiers are armed with rifle. The basic training is based on shooting abilities leaving forgotten the use of this weapon in close quarter combat. Therefore, to address this knowledge area, it must be taken into account the fencing sportive base and weapons handling techniques, the motion biomechanical bases [3], the application in a self defense

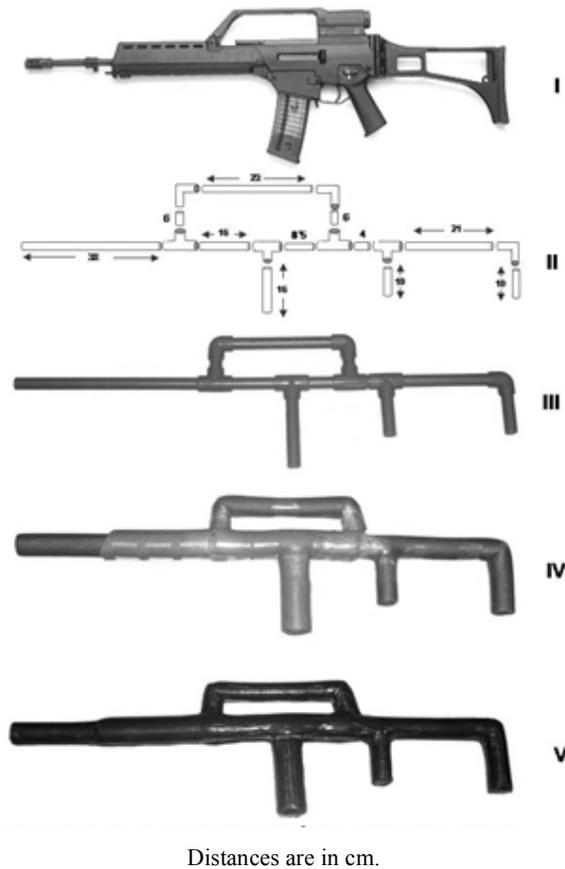
situation [4]) and the practical applications of the principal movements [5].

Previous studies in similar areas of knowledge such as fencing [3, 6, 7] allow to lay the foundations of technical analysis of fencing rifle movement. Actual rifle fencing training is focused to teach all the possible repertoire of techniques that could be used in any combat situation. This training does not take into account the influence of combat in soldier's organism, because as has been shown recently the combat stress causes a decrease in arousal levels, central nervous system fatigue and the activation of primitive and innate defense mechanisms as the fight-flight response [8-11]. This organic response could influence the correct application of the fencing techniques of soldiers, making their actuation less efficient and/or making it more innate and irrational [8, 10]. The present study was conducted in order to analyze the characteristics of close quarter combat with rifle and to analyze the most effective rifle fencing techniques used in combat to improve the actual training systems.

### METHODS

Fourteen male soldiers of Spanish Army (26.2±3.0 years; 174.3±5.8 m; 75.6±4.9 kg) were analyzed. All subjects had minimum of 4 years of professional experience in their units and the same experience in fencing rifle training before the study (basic fencing training during the basic military formation process). Prior to participation, the experimental procedures were explained to all the participants, who gave

\*Address correspondence to this author at the Pedro Montañez, Río Jarama, 75. 45007, Toledo, Spain; Tel: 0034925245775; Fax: 0034925245752; E-mail: polmita@hotmail.com



Distances are in cm.

Fig. (1). Reconstructive process of HK-G36 replica.

their voluntary written informed consent in accordance with the Declaration of Helsinki.

The dependent variables of combat duration (s), percentages of use of each technique (%), combat action when the techniques were performed (attack, defense, anticipation or concatenation [linked techniques]) and body location of impact (body, arms, legs or head) were measured in 24 randomly rifle combats (independent variable) between the soldiers. Each soldier performed two combats against different soldiers in which both fighters were equipped with a rifle replica and with the objective to obtain one point according to the criteria explained in the following lines (there were no offender and defender roles). Before combats, subjects performed a standardized individual warm up consisting of aerobic running and stretching exercises during 15 min to prevent injuries during combats. For safety reason soldiers used a replica of the HK-36 rifle. In Fig. (1), the constructive process followed to develop the replica is presented. For combats, soldiers were equipped with the standard uniform of the army without girdle and boots, with a padded helmet and the HK-G36 replica. Combats were performed in a 4 cm thick *tatami*. The objective of the combat was to neutralize the opponent using rifle melee techniques. The combat was a victory for the subject that obtained 1 point, according to the following range of scores.

- Percussive blow to head or trunk: 1 point.
- Percussive blow to limbs: 0.5 point.
- No percussive blow to head or trunk: 0.5 point.

Table 1. Combats Duration

Combat Duration	Percentage (%)
5 s or less	31*
Between 5 and 20 s	54
Between 20 and 25 s	15*

p<0.05 vs. Between 5 and 20 s

Table 2. Combat Action when the Techniques were Performed.

Combat Action	Percentage (%)
Attack	80
Counter	6*
Anticipation	7*
Concatenation	7*

p<0.05 vs. Attack action.

Table 3. Body Location of Impacts.

Body location	Percentage (%)
Head	16*
Trunk	61*
Legs	2*
Arms	21*

\* p<0.05 vs. Trunk

- No percussive blow to limbs: 0 points.
- Forcefully projection and control of the situation: 1 point.

This scoring system was selected since it can evaluate with reliability the combat actions, and was the standardized system used in the rifle fencing training in the Army. A jury composed of 3 instructors of the army was arbitrating the combats, and to score any punctuation at least 2 of them had to confirm the technique and the punctuation. All the combats were filmed by a video camera (Panasonic SD40) to analyze the body location of the impact and the technique used.

Data obtained in this study were analyzed by SPSS 15.0 statistical program. A one-way repeated measures analysis of variance (ANOVA) with Levene test was conducted to analyze the variables. The level of significance for all the comparisons was set at (p<0.05).

**RESULTS**

Most of the combats were conducted in less than 20 s (Table 1). The 80% of the techniques were performed in attack action (Table 2) and trunk was the body location most impacted (Table 3). The technique used most was the direct attack (56%) followed by the descendent exterior attack (10%) and descendent interior attack (7%) (Table 4 and Fig. 2).

**Table 4. Rifle Technique Used.**

Technique	Percentage (%)
Direct attack	56
Descendent attack on forearm	1.5*
Descendent attack on head	2.5*
Descendent exterior attack	10*
Descendent interior attack	7*
Circular attack on knee	1.5*
Circular butt	3*
Descendent attack on forearm in anticipation	2.5*
Descendent attack on head in anticipation	1.5*
Descendent attack in anticipation	1.5*
Circular attack on flank in anticipation	1.5*
Direct attack with butt	3*
Descendent attack on forearm with butt	3*
Condecatenation direct attack-descendent exterior attack	1.5*
Condecatenation direct attack-direct attack	2.5*
Condecatenation descendent attack on forearm-direct attack	2.5*

\* p<0.05 vs. Direct attack

**DISCUSSION**

The aim of the present research was to study the characteristics of close quarter combat with rifle and to analyze the most effective rifle fencing techniques used in combat. The principal combat action was the attack, soldiers tried to attack the opponents firstly to obtain rapidly the initiative that increased the possibility to win the combat [12], possibly for this reason the majority of impacts were reached in attack actions. The low percentage of use of counter, anticipation and concatenation actions obtained in the present research could be due to the short time of rifle fencing training of soldiers, which did not receive a specific fencing training before the study, they just conducted a basic rifle fencing in the basic military training. Moreover, to perform these combat actions more training is needed because of the complexity and the higher technical and tactical requirement of these rifle fencing techniques.

The principal body location of impacts was the trunk, it could be explained since it is the biggest part of the body and could have multitude of vital points that could be reached impacting this area. After trunk, arms obtained the second higher percentage of impact, since the rifle is wielded by arms and if the arms are wounded, soldier cannot use the weapon and cannot continue the combat. With similar percentage of impact to arms, head is the third body location of impact, it is one of the principal vital areas in the body,

but it is more difficult to hit on head than trunk and soldiers focused their attack on trunk. Finally, legs presented only the 2% of impact, since legs have not easy vital point to hit and soldiers have to descend to try to hit the legs that compromise their integrity and make them more vulnerable.

Results obtained had showed the rapidity of rifle fencing combat, finishing the 85% of them in less than 20s. These data differ to values found in judo with an average of combat duration of 100s and also fencing athletes who need more time to achieve a victory, possibly because they require a greater number of hits [13]. The results obtained in the present research are in consistent to the study of Hübner [14] that analyzed real combats in which the 30.7% of the actions were performed in less than 5s and 67. 9% of the actions were performed in less than 45s. These data suggest that trainings have to be focused to improve the alactic anaerobic capacity, because of most of combats finished in less than 20s.

The most frequently used technique was the direct attack (56%), being one of the easiest and the most instinctive technique because the soldier just has to realize one movement stretching his/her arms towards the opponent. Despite its simplicity, it is one of the most effective techniques because it has a fast movement, is difficult to predict and is directed to the main vital areas of the body such as head and trunk, the factors that might justify the fact that more than half of the attacks were performed with a direct attack. The rest of techniques obtained small percentages of use, being the most used attacks directed to the legs (descendent outside and inside attacks) and attacks using the rifle butt. Attacks in concatenation and anticipation were poorly used because of their greater technical difficulty, and possibly for this reason soldiers used mainly simple techniques and more natural attack than complex and elaborated techniques.

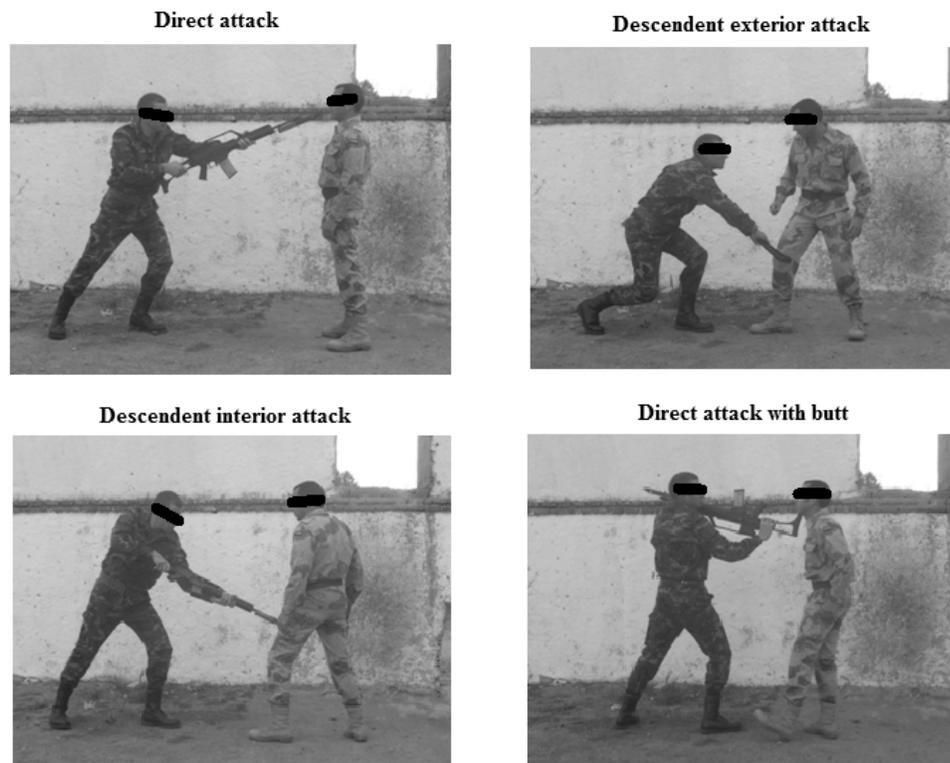
The data obtained in the present study have shown the main techniques used in close quarter combat with rifle, as well as the principal impact areas and actions and combat techniques most used. The direct attack has been with difference to the most used technique, the combat action more executed was the attack and the body area most impacted was the trunk. It has also been proved that rifle combat is a maneuver that takes place in a short time, and most of combats are developed in durations less than 20s. This data could help to improve current training systems for the troops who have to serve in actual operations zones and also could be used in the basic training to instruct new recruits.

**LIMITATION OF THE STUDY**

The small number of participants included in the study limits the generalizability of the results.

**FUTURE RESEARCH LINES**

- Use psycho-physiological measures to control the level of activation prior to execution. The trigger level could influence the performance and the type of technique used with the rifle.
- Analyze the level of self-efficacy since this parameter could influence the perception of difficulty of the exercise and the performance obtained.



**Fig. (2).** Most used techniques.

- Analyze the effect of anthropometric factors of the soldiers (themselves and opponents). The size and other factors could directly influence decision-making and implementation of techniques rifle.

- In future research, simulated situations could be designed with other standard weapons as carbine, pistol and knife.

- Simulated situations could be designed where the soldier demanded more time for action. With increased exercise duration, the influence of fatigue on the execution type, intensity and frequency of attacks made could be observed.

#### CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

#### ACKNOWLEDGEMENTS

Declared none.

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