EXAMINATION OF THE VELOCITY OF FENCING LUNGE

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INTRODUCTION

In fencing the essential condition of hand technique is the appropriate foot technique. This is the reason we have to deal with is the foot technique. The most frequent footwork is fencing lunge. That is why our first aim will be the description of the analysis of lunge.

METHODOLOGY

Ten fencers have participated in the study. They were from 18 to 20 years old and their antropological parameters were similar. All of them were male foil fencers from the same sport club. All of them were right-handed, with the same qualification, with the similar style of fencing. They successful in the national championship both individually and in teams. We chose this group because this way we could study the details of lunge on a homogeneous sample. This was necessary for letting the different kinetic elements and kinematic parameters be identifiable and comparable. During the study we identified some of the kinematic parameters of lunge. These were the followings: displacement, period of time, average velocity, highest velocity. We studied how these elements depend on the type of combinations of the movements. The studied combinations were the following: simple lunge, step forward-lunge, jump forward-lunge, step backwards-lunge, jump backwards-lunge. We asked the fencers at the execution of foot works to carry out the task as if being in real combat.

The measurement has been made at the Department of Biomechanics, Hungarian University of Physical Education. We used a measurement system developed by SELSPOT AB (Sweden) for these measurements. The infra-red LEDs were fixed to the following points:

LED 1. hip joint,
LED 2. knee joint,
LED 3. ankle joint,
LED 4. fifth toe.

We valued the movement of LED 1 because it approaches the best the movement of the centre of gravity. The common analysis of the movements of LED1, LED2, LED3, LED4 made the followings possible: the study of the angle of the shin and the thigh, the angle of the shin and the foot, the angle of the high and horizontal, the angle of the shin and the vertical. The observation of these angle values and its changing made it easier to make difference between the movements.

All of the studied fencers had to carry out all the specified footwork 3 times. Their task was the classical technical execution. Taking it into consideration we asked a combating execution.

The data processing was made on an IBM 386 AT computer. The processing program ran on the MULTILAB PC-AT Version 2.0-A System developed by SELSPOT AB (Sweden). We determined the selected parameters of lunges in all the specified footwork groups. After we calculated the average typical for the group. Later we valued these.

RESULTS AND DISCUSSION

The results computed from the measured data is summarised in Table 1.

According to execution of lunge the following order arose (the shortest in the front, the longer after, in execution): step forward-lunge, jump forward-lunge, lunge, step backwards-lunge, jump backwards-lunge.

According to the period of time the following order arose (the shortest in the front the longest after in execution): step forward-lunge, jump forward-lunge, lunge, step backwards-lunge, jump backwards-lunge. According to the average velocity the following order arose (the highest velocity in the front, the lowest after):

step forward-lunge, jump forward-lunge, lunge, step backwards-lunge, jump backwards-lunge.

These results are in connection with that empirical fact that the end of the attack the step forward-lunge and the jump forward-lunge is used mostly.

The lunge in itself is used less often. But it is used often for the arrest, because at that time the relative velocity growth, origining from the opponent's approaching, can be utilised.

	EXTENTION mm	PERIOD OF TIME S	AVERAGE VELOCTITY mm/S	HIGHEST VELOCITY mm/S
FENCING LUNGE	1049	0, 84	1251	2486
STEP FORWARD FENCING LUNGE	990	0, 60	1652	2885
STEP BACKWARD FENCING LUNGE	995	0, 60	1638	2830
JUMP FORWARD FENCING LUNGE	1055	0, 85	1249	2560
JUMP BACKWARD FENCING LUNGE	1066	0, 90	1184	2593

Table 1 The summary of results

The step backwards-lunge is the frequent footwork of here the task of the step backwards is the creation of the optimum distance necessary for the riposte. The lunge gets connected with it only in the last phase of the movement. The execution of the jumps backwards lunge caused obvious technical difficulties in the studied group. Fencers do not use this variation in real combat.

The largest velocity of lunge can be measured between 50-60% of the time of starting and finishing a lunge. This supports the educational theory, according to which the hit must be seated before the end of the lunge. That is if the lengthening of the arm started in the right time, the highest velocity of the point of the foil can be reached towards the opponent's direction. It is necessary to strive after this because the fast hit leaves a short period of time for the opponent to defend himself.

The study of the starting of lunge led to an interesting result. We discovered that all the studied fencers started in a similar way but it differed essentially from the classical execution. The order of starting was not the classical toe-heel-knee order. In some cases the knee-heel-toe, in others the heel-knee-toe order occurred. These latter differences can be reasoned by individual coordinational differences, but not by the difference from the classical technique.

CONCLUSION

The study of the extension, the average velocity and the highest velocity of lunge in the case of a homogeneous group showed the followings.

The biggest lunge of average velocity and highest velocity can be reached after a step or jump. The reason for this is that the step and the jump is a progressive movement, in consequence the lunge can be started with a certain initial velocity. The big distance makes it more difficult for the opponent to keep the distance and to defend himself. The average velocity and the highest velocity of the lunge in itself, executed after the step backwards on jump backwards, is essentially smaller on the other hand. In these combinings the task of the lunge is the increasing of the relative velocity in certain phases of the defending actions (arrest, riposte).

It is a surprising experience that the execution of the lunge, in the combinations that seem to be the most practical ones from the view of the attack, is the smallest. The reason for this can be that in these cases gaining ground is the task of the step and the jump (in the first place). After this with the lunge the already gained velocity must be increased to the possible highest degree.

In the case of not classical starting it is possible to approach a higher velocity the successful combatants apply it after by instinct. But the bigger vertical movement can be noticed easier. For this the question is that how much is the disadvantage of the starting, that can be noticed easier decreases the advantage coming from the higher velocity.

The aim of our further studies is the exact revealing of the present experiences. We intend to make the following measurement series:

- the comparison of numerous homogeneous groups
- the comparison of kinematic parameters of steps, jumps and lunges
- the comparison of not classical and classical starting
- study of other, more frequently used jump backwards lunge variations.