

## **Abstract**

### **Title:**

Comparison of the kinematic indicators of the front kick without and with the military load carried

### **Objective:**

The study aimed to determine the differences between executing a front kick without carrying the military load and with a 30 kg military load., also in connection with the possible differences between the group of elite and sub-elite military personnel. The distances between the right and left hip, knee and ankle in the individual axes of the coordinate system, the angles in the knee joint of the kicking and standing lower limb and the maximum velocity of the hip, knee and ankle of the kicking lower limb upon impact into the fixed target were compared.

### **Methods:**

The diploma thesis was processed as a quantitative comparative study. The research group consisted of 12 chief instructors of the Czech Armed Forces in close combat (Age  $41 \pm 8$  years; Weight:  $83 \pm 6$  kg; Height:  $178 \pm 5$  cm) and 21 students of the Military Physical Education at the Faculty of Physical Education and Sports of Charles University in Prague (Age  $23 \pm 2$  years;  $81 \pm 10$  kg Weight;  $182 \pm 7$  cm Height). The velocity and positions of individual segments were captured using the Qualisys camera system and subsequently extracted using the Qualisys Track Manager. The Shapiro-Wilk test was used to assess the normal distribution of the data. The Wilcoxon paired test was used to compare maximum velocity and distance between segments, and the Wilcoxon signed-rank test was used to compare mean values between groups. The alpha level  $\leq 0.05$  was used to determine significant differences and Cohen's delta for the effect size.

### **Results:**

The elite group exhibited a change in distance in the anteroposterior plane by advancing the hip of the kicking lower limb, resulting in better technique execution of the front kick both without load and with a carried load of 30 kg. The sub-elite group showed greater variability in recorded distances between segments, leading to higher instability among the tested subjects. Higher maximum velocities of individual segments were achieved by elite-level subjects, especially for the knee joint and hip. The carried load of 30 kg did not affect the change in angle at the knee joint at the moment of impact for the kicking lower limb or the supporting lower

limb in both groups of subjects. The carried load of 30 kg influenced the distances between individual segments more in the sub-elite group compared to the elite group of subjects.

**Keywords:**

Army, Biomechanics, Close Combat, Maximum Velocity, Segments position