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## BIOMECHANICAL ANALYSIS OF SEGMENTAL BODY ACCELERATION AND ITS IMPACT ON SHOOTING ACCURACY WITH LONG AND SHORT FIREARMS

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Sharpshooting is one of the oldest activities people have participated in. Nowadays it is mostly performed using short and long firearms that can discharge projectiles with high speed and energy. Most commonly shooting is performed during sports competitions, hunting, or combat. In all those fields, the most important parameter that determines the effectiveness of a marksman is accuracy. It is determined by a range of factors one of which is the acceleration of body segments while firing a shot. Body segments of professional sharpshooters are accelerating differently than those of amateurs which usually results in better accuracy and performance.

The study was conducted on a group of twenty people divided into two groups, professionals - containing shooters experienced using firearms and amateurs without any experience. The age of subjects varied between eighteen and fifty. To measure body segments' acceleration kinetic tests were carried out using the Noraxon Myomotion analysis system. Shooters were asked to take ten shots as accurately as possible using a short firearm at a distance of ten meters, and a long firearm at a distance of twenty meters, during which Noraxon inertial sensors, placed on hands measured acceleration. Recorded accelerations were later compared to the accuracy and repeatability of each shooter. When analyzing the results, accuracy was defined as the distance from the circle's center circumscribed by all marked hits to the center of the shooting target, and repeatability was defined as the length of the circle's radius. In case some of the shots did not hit the shooting target a penalty shot was added behind the verge of the target at the shortest possible distance from the center of the circle.

The research results indicate dependency between shot spread, shot distance from the middle of the target, and body acceleration during short and long firearm studies. Sharpshooters who were able to transfer recoil from their hands into their spine and pelvis tend to shoot more precisely and repeatably.