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EFFECTS OF WEARABLE RESISTANCE LOADING DISTRIBUTIONS ON KINEMATICS OF JUMPING KICKS AMONG PENCAK SILAT ATHLETES

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Introduction: Wearable resistance (WR) is increasingly used in sport training to enhance performance by allowing athletes to perform sport-specific movements under added load. Despite its potential, research on the effects of WR during jumping kicks in Pencak Silat remains limited.
Objective: This study aims to determine the effects of wearable resistance with loading distributions on the kinematics of jumping kicks among Pencak Silat athletes.
Methodology: Fifteen university-level Pencak Silat athletes participated in a within-subjects, randomized crossover design. The acute effects of four WR conditions—3% of body mass (BM) applied at the shank, thigh, and combined shank and thigh—and an unloaded condition (0% BM) were examined during the execution of jump front kicks and back kicks. Kinematic variables analyzed included kicking velocity, kicking time, kicking height, hip angle, and leg displacement. Each participant completed one WR condition per session, with four sessions separated by at least 72 hours. Kinovea software was used for video-based motion analysis.
Results: Results showed that for the jump front kick, WR led to significantly longer kicking time, reduced kicking velocity, shorter kicking distance, and decreased hip angle and leg displacement compared to the unloaded condition. For the jump back kick, significant differences in kicking velocity were observed across WR load placements.
Discussion: This study demonstrates that applying 3% wearable resistance (WR) to the lower limbs induces subtle but measurable changes in the kinematics of jumping kicks among Pencak Silat athletes. Specifically, WR slightly reduced performance indicators such as kicking velocity, height, and displacement, particularly in the jump front kick. Although these changes were statistically significant, the magnitude of performance decline was minimal and likely within acceptable limits for training purposes. These findings suggest that low-level WR can be strategically used to stimulate neuromuscular adaptations without substantially impairing technical execution.
Conclusions: Applying 3% wearable resistance (WR) to the lower limbs resulted in measurable yet minor changes in kicking kinematics. While some performance variables such as kicking velocity and displacement were slightly reduced, the overall impact was limited. These findings support the use of WR as a sport-specific training tool to promote neuromuscular adaptation without substantially altering the measured kinematic patterns.

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