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Research article

The Influence of Musical Cadence into Aquatic Jumping Jacks Kinematics

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ABSTRACT

The aim of this study was to analyze the relationships between the head-out aquatic exercise "Jumping jacks" kinematics and the musical cadence in healthy and fit subjects. Five young women, with at least one year of experience conducting head- out aquatic programs were videotaped in the frontal plane, with a pair of cameras providing a double projection (above and below the water surface). Subjects performed an incremental protocol of five bouts (120 b·min⁻¹, 135 b·min⁻¹, 150 b·min⁻¹, 165 b·min⁻¹ and 180 b·min⁻¹) with 16 full cycles of the "Jumping jacks" exercise. Data processing and calculation of upper limbs' (i.e. hands), lower limbs' (i.e. feet) and center of mass' 2D linear velocity and displacement were computed with the software Ariel Performance Analysis System and applying the 2D-DLT algorithm. Subjects decreased the cycle period during the incremental protocol. Significant and negative relationships with the musical cadence were verified for the center of mass and upper limbs vertical displacement. On the other hand, for the lower limbs lateral velocity, a significant and positive relationship was observed. It is concluded that expert and fit subjects increase the lower limb' s velocity to maintain the range of motion, while the upper limb' s displacement is reduced to cope the music cadence.

Key words: Aquatic jumping exercises, simultaneously actions, music rhythm, range of motion, segmental velocity

Key Points

- While performing the Jumping Jacks, expert and fit subjects increase their lower limbs segmental velocity to maintain the range of motion.
- The upper limbs displacement is reduced to maintain the music cadence.
- Expert and fit subjects present similar response for alternating or simultaneously head-out aquatic exercises when increasing the music cadence.

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