Effects of Musical Cadence in the Acute Physiologic Adaptations to Head-Out Aquatic Exercises

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Abstract

Barbosa, TM, Sousa, VF, Silva, AJ, Reis, VM, Marinho, DA, and Bragada, JA. Effects of musical cadence in the acute physiologic adaptations to head-out aquatic exercises. *J Strength Cond Res* 24(1): 244–250, 2010—The purpose of this study was to analyze the relationships between musical cadence and the physiologic adaptations to basic head-out aquatic exercises. Fifteen young and clinically healthy women performed, immersed to the breast, a cardiovascular aquatic exercise called the "rocking horse." The study design included an intermittent and progressive protocol starting at a 90 b·min^{-1} rhythm and increasing every 6 minutes, by 15 b·min^{-1}, up to 195 b·min^{-1} or exhaustion. The rating of perceived effort (RPE) at the maximal heart rate achieved during each bout (HRmax), the percentage of the maximal theoretical heart rate estimated (%HRmax), and the blood lactate concentration ([La-]) were evaluated. The musical cadence was also calculated at 4 mmol·L^{-1} of blood lactate (R4), the RPE at R4 (RPE@R4), the HR at R4 (HR@R4), and the %HRmax at R4 (%HRmax@R4). Strong relationships were verified between the musical cadence and the RPE ($R^2 = 0.85$; $p < 0.01$), the HRmax ($R^2 = 0.66$; $p < 0.01$), the %HRmax ($R^2 = 0.61$; $p < 0.01$), and the [La-] ($R^2 = 0.54$; $p < 0.01$). The R4 was 148.13 ± 17.53 b·min^{-1}, the RPE@R4 was 14.53 ± 2.53, the HR@R4 was 169.33 ± 12.06 b·min^{-1}, and the %HRmax@R4 was 85.53 ± 5.72%. The main conclusion is that increasing musical cadence created an increase in the physiologic response. Therefore, instructors must choose musical cadences according to the goals of the session they are conducting to achieve the desired intensity.

Key Words basic aquatic exercises, music rhythm, rate of perceived effort, heart rate, blood lactate

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24(1)/244–250

Journal of Strength and Conditioning Research

Introduction

Head-out aquatic exercises became a popular physical activity within the fitness context in the last few decades. Apparently, the number of head-out aquatic practitioners is increasing every day. For some instructors, one of the most important aspects when conducting such type of activities is to include music. According to the technical literature (e.g., 20) music has some basic functions: a) it is a way to motivate practitioners during a session; b) it allows for maintaining the synchronization of the subjects during specific routines and; c) it is used to achieve a given intensity of exertion.

Moreover, some instructors plan their sessions according to the music's characteristics. They choose a given music for a specific part of the session, according to its cadence or rhythm, to achieve a predetermined intensity of exertion. For this to be true, it is assumed that aquatic instructors are familiarized with the concept of "water tempo" and follow the music metric throughout the sessions. The "water tempo" is characterized by the countdown of only 1 beat in every 2 musical beats in the music tempo (20). The countdown of that musical beat is synchronized with the execution of a given segmental action of the full basic exercise being performed. This way, the movement frequency of the practitioners is related to the music's cadence. Increasing the music tempo will increase the movement frequency; decreasing the music tempo will therefore decrease the movement frequency.

For head-out aquatic exercises on regular bases, music cadences between 130 and 150 beats per minute (20) are suggested. However, this suggestion is based on the common sense or the author's experience and background. It appears that the number of investigations describing the relationship between musical cadence and the acute physiologic adaptations to head-out aquatic exercises is small.

Although it appears that data about the relationship between musical cadence and acute physiologic response in head-out aquatic exercises are scarce, some similarities can be seen in other types of activities. A description of an increase of