Heart Rate and Variability of Marine Special Operations Students during Close Quarter Battle Training

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Enemy engagement at close proximity and making accurate decisions during close quarter battle (CQB) is a critical skill set of Marine Corps Forces Special Operations Command Operators. Monitoring physical demand and autonomic response during the tactical skills training would identify the responsive stress level to these encounters and provide the first step towards understanding the relationship between the baseline physical fitness, physical stress during tactical skills and tactical proficiency (shooting accuracy and decision making). PURPOSE: To evaluate Marines’ stress levels during the shoot-house exercise by monitoring heart rate (HR) and heart rate variability (HRV) measures. METHODS: Nine male Marines (age = 25.7 ± 2.2 years, mass = 87.1 ± 5.0 kg, height = 182.0 ± 4.7 cm) participated in close quarter battle during a school housing training session. A single channel electrocardiogram was worn during CQB activities to collect HR and HRV. Five minute resting HR/HRV measures (Rest) were recorded with the subject supine. The HR/HRV measures were also recorded during a waiting phase (Wait) immediately prior to the start of the activity as well as during the CQB. Mean HR and root mean square of the mean squared differences of successive RR intervals (RMSSD) were used to assess physical demand and autonomic response as stress indicators, respectively. Paired samples t-tests were used to compare HR and RMSSD between phases. RESULTS: There was a significant increase in HR from Rest to Wait phase (54.5 bpm, 82.8 bpm, p < 0.001) and Wait to CQB phase (82.8 bpm, 102.1 bpm, p = 0.001). Similarly, there was a significant decrease in RMSSD from Rest to Wait phase (136.6 ms, 34.0 ms, p = 0.005) and Wait to CQB phase (34.0 ms, 15.9 ms, p = 0.007). CONCLUSION: The increased HR and decreased RMSSD found in this study are physiological indications of increased physical demands and stress levels. Since the current investigation is one of the first studies to quantify the HR/HRV during CQB training, future studies should examine their baseline physiological characteristics and tactical proficiency score in relation to their HR/HRV data. Additionally, future research could track their HR/HRV data and determine if there is a certain improvement that occurs with experience and training.

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