Task Description and Physiological Demand of Marine Special Operations Students during Amphibious Training

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The amphibious operations skillset is crucial for Marines. For Marine Special Operations (MARSOC) students, this training includes small boat operation, open-water navigation, and beach reconnaissance. Training is highlighted by a daily 2000 meter swim with fins, and night-time navigation exercises in speed boats. Understanding the relevant tasks and physiological demand of this training can help identify the necessary physical traits for this population's success in amphibious operations. **PURPOSE**: To investigate the physiological demands and mechanisms associated with injury risk in Marines during MARSOC amphibious training. **METHODS**: Ten male Marines (age=25.4±2.5 years, mass=87.1±5.0 kg, height=181.6±4.9 cm) participated in a two-day observation. Marines wore a GPS-watch during the swim to estimate energy expenditure. A Borg Scale was used to estimate their Rate of Perceived Exertion (RPE) immediately post-swim. A trained clinician documented potentially injurious mechanisms during each exercise and consulted on-site corpsmen about injury complaints. **RESULTS**: Swims were completed in 50.3±3.1 mins and students expended approximately 445±58.4 kcals. Swimming was an aerobic activity, completed at a RPE >8. Corpsmen reported the high intensity/repetitive nature of the swim led to common complaints of hip flexor/peroneal tendonitis. Boat preparation was an anaerobic activity that occurred over several hours with short periods of lifting heavy objects, such as the fuel bladder, engine and boat itself. Thus, lumbar/thoracic spine injury from improper lifting technique is possible. Those seated in the front of the boat are susceptible to repetitive, rapid forward flexion of the neck/lower back, similar to a "whiplash" mechanism. **CONCLUSION**: Amphibious training has a high physiological demand in this population. Several tasks were identified with injury risk, based on clinician observation and reports from corpsmen. Prior to training, increasing muscular strength/endurance of the hip flexors, peroneals, and lower back/neck musculature while emphasizing aquatic exercise with proper form could help prevent such injuries. Future research should investigate the effects of a preventative program aimed at improving these characteristics on injury rates in MARSOC amphibious training.

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