

Patterns and Associations of Shoulder Motion, Strength, and Function in MARSOC Personnel Without History of Shoulder Injury

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Abstract

Introduction

Military personnel are at an increased risk of shoulder injuries due to training and deployment demands, however, there is a lack of information on the tactical athlete's upper extremity profile. Therefore, the purpose of this study was to examine shoulder musculoskeletal characteristics, including range of motion (ROM), strength, and function, and the relationships between these measures in Marine Corps Forces Special Operations Command (MARSOC) personnel without history of shoulder injury.

Materials and Methods

Participants included 195 full-duty male MARSOC personnel (age: 25.38 ± 2.85 yr; height: 1.79 ± 0.06 m, mass: 82.79 ± 7.88 kg) without history of shoulder injury. Measurements of ROM, strength, and function were obtained bilaterally. Shoulder internal rotation (IR) and external rotation (ER) ROM were summed to calculate total arc of motion (ARC). Shoulder IR and ER strength were assessed using an isokinetic dynamometer. Function was evaluated with an explosive push-up.

Results

MARSOC personnel present with significantly increased ER ROM, and decreased IR ROM and ARC in their dominant shoulder. They demonstrated greater IR strength and peak force during the explosive push-up on the dominant side but no bilateral differences in average or peak rate were found. Correlation analyses suggest a weak inverse relationship between strength and ARC ($r = -0.15$ to -0.24). Positive relationships between strength and function were identified except for dominant IR strength and push-up variables. Those with the greatest ARC demonstrated significantly weaker IR and ER strength compared to those with less motion.

Conclusions

MARSOC personnel demonstrate shoulder ROM and strength symmetry patterns similar to overhead athletes. Increased dominant shoulder strength does appear to translate to a bilateral functional performance, but overall performance may be limited by the weaker nondominant upper extremity. As ARC increases, IR and ER rotation strength decrease. Repetitive, increased loading of the dominant shoulder during functional movements and training may increase risk of chronic, overuse-type injuries, common to the military. Unilateral exercises and movement analysis should be incorporated to encourage proper development of bilateral shoulder strength, which may be particularly important in those with high ranges of ARC.

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