THE IMPORTANCE OF PROPER MOVEMENT FOR MARINES—PART 2: THE SOLUTION

This the second part of a four-part series on proper movement as it pertains to Marines. The first part discussed the current issues commonly found in the United States Marine Corps including musculoskeletal injuries caused by overtraining or repeated improper movement patterns.

Current musculoskeletal injury rates continue to hamper operational readiness and it is well established that quality movement gained through increased mobility and stability reduces injuries (15). The following holistic solution is proposed to increase functional, quality movement among Marines, thereby increasing physical performance, reducing injuries, and developing more effective warfighters. The holistic solution includes:

1. Enhancing mobility, stability, and movement quality by adjusting the standards of movement on the pull-up, crunch, and ammunition can lift.

2. Incorporating an evidence-based movement assessment into the Physical Fitness Test (PFT) and Combat Fitness Test (CFT) in order to ensure Marines are executing functional movement patterns and to hold Marines accountable for maintaining their mobility and stability.

3. Enhancing the current Combat Conditioning Instructor billet by providing formal education, similar to the Army’s Master Fitness Trainer Course, as well as increasing movement education at the recruit depots, Officer Candidate School, The Basic School (TBS), and the Staff Noncommissioned Officer (SNCO) Academy in order to ensure Marines understand how to move functionally and why it is important.

The approach to improving movement quality must be comprehensive. If only certain elements are implemented with certain populations, the change will be less likely to last (5). For example, if recruits at the Marine Corps Recruit Depot (MCRD) are given thorough instruction on proper movement, but upon reaching the operating forces those same movement assessment practices are not followed, these Marines may resort to doing what their small unit leaders are doing and lose the quality movement patterns gained during boot camp. Likewise, if SNCOs are given thorough movement instruction and assessment training at the SNCO Academy, but then return to their units where there is no movement accountability and the concept is not fully embraced by their unit’s leadership, they may be unable to share their newly gained knowledge. Similarly, if a new lieutenant checks into a unit and wants to assess the Marines’ movement quality and teach the proper movement techniques learned in TBS, but no one else in the unit is on board with these concepts, the lieutenant may be unsuccessful.

The Joint Services Physical Training Injury Prevention Working Group, which consisted of 29 military and civilian public health practitioners, clinicians, training officers, epidemiologists, analysts representing the four United States military services, injury experts from the Center for Disease Control (CDC), and professors at academic institutions, determined that education and leadership support were two absolutely necessary factors when implementing any type of injury prevention program (1). Leaders must fully buy into the concept and Marines must understand why it is important to have quality functional movement. Implementing these changes will require engaged leadership as resistance to any change is likely to be high. However, the current musculoskeletal injury rate affects operational readiness too much to continue to ignore the problem and hope that by continuing to do things the same way the problem will magically disappear.

PROPOSED MODIFICATIONS TO CURRENT MOVEMENT STANDARDS

In addition to evidence-based movement screening and education to increase their mobility and stability, the Marine Corps can require Marines to meet modified movement standards on the PFT and CFT, which will subsequently force Marines to increase their mobility and stability and improve their movement quality. Research shows that Marines will train to the tested standard (16). For example, in 1996 when Marines were allowed to kip on pull-ups, the average PFT score was 252 out of 300. When the standard changed the following year to dead hang pull-ups, the average PFT score dropped to 225; however, by 2010 the average was back to 252 (12). Individual event scores were not kept prior to 2009. Knowing that pull-ups are worth five points on the PFT and that nothing else changed from 1996 to 1997, one can surmise that the average Marine performed five fewer pull-ups when the standard initially changed. The fact that the average PFT score incrementally rose back to where it was pre-dead hang pull-ups implies that Marines knew the maximum score for pull-ups was 20 and they trained to that standard. This also infers that if the standard were adjusted to 25 pull-ups as the maximum score, for example, the average number of pull-ups would potentially increase. Capitalizing on that concept, if the standards for movement with the current PFT and CFT exercises required more mobility, stability, and movement quality to execute, Marines would likely develop the appropriate movement patterns in their training to complete each event.
The Commandant of the Marine Corps explains that “the PFT was specifically designed to test the strength and stamina of the upper body, midsection, and lower body, as well as efficiency of the cardiovascular and respiratory systems,” (3). Implementing changes to movement standards that require increased mobility, stability, and movement quality can better execute the intent of the PFT. The first standard that should be adjusted is the pull-up. The current pull-up instructions in Marine Corps Order (MCO) 6100.13 allow for the palms to face inward or outward, the legs to bend at the knee, the head to be cocked back with the chin extended upward, and the thumbs to be either wrapped around the bar or placed adjacent to the fingers on top of the bar (3). The first modification proposed is to require the thumbs to be wrapped around the bar. Whether executing a pull-up (pronated grip) or chin-up (supinated grip), the thumb wrapped around the bar sets the shoulders into an internally rotated position, which is far more stable than an externally rotated shoulder position (17). The second modification proposed with respect to the pull-up involves maintaining a stable body position throughout the entire pull-up movement. Current standards allow Marines to overextend the lumbar spine and extend the neck to raise the chin to the bar.

Therefore, the recommended movement standard modification is to require Marines to create a stable torso by contracting the glutes and core muscles, and keeping a neutral head position when executing the pull-up.

While executing one set of pull-ups for a PFT with a dysfunctional movement pattern may not cause musculoskeletal injuries, executing hundreds of sets of pull-ups in training to prepare for the PFT may cause injury. Is executing a pull-up with the proposed grip and torso fully stabilized harder than the current standard? Absolutely; however, in keeping with the psychological aspects of training to the standard, Marines will likely make the necessary adjustments in their training and eventually achieve the same scores currently achieved (12).

In addition to modifying the pull-up movement standards, an exercise should be considered as an alternative to the crunch, which may more directly correlate with the ability to stabilize under load. Conducting a tactical task, such as dragging a wounded Marine to safety with dysfunctional movement can contribute to a lower back musculoskeletal injury (13). The fireman’s carry that is part of the Maneuver Under Fire course in the CFT requires trunk stabilization and directly reflects the stability required for various combat-related tactical tasks. While many Marines do not realize that this maneuver is evaluating the ability of the abdominals to stabilize under load, they do train specifically for that movement because they know it is part of the test. While the CFT does currently have an event that evaluates the abdominals through a stabilization requirement, the PFT does not. Knowing that Marines will train to the test, incorporating exercises into the test that require abdominal involvement that directly corresponds to improved stabilization under load may decrease musculoskeletal injuries and improve operational effectiveness.

The final proposed movement standard modification involves the CFT’s ammunition can lift. The current ammunition can lift instructions permit Marines to bend the knees, stagger the feet or have them shoulder-width apart, lean back, and press the ammunition can over their chest instead of their head (3). The fundamental flaw with this exercise is that Marines are allowed to move their back into hyperextension, and while executing one ammunition lift in this sequence may not cause a musculoskeletal injury, doing hundreds of sets in this manner may lead to musculoskeletal injuries in the lower back (11,13).

In addition, movement patterns become permanent; so, if Marines become accustomed to lifting items overhead with a hyperextended back, this pattern will likely be what they resort to during combat (4). The proposed movement standard should be adjusted to require a vertical torso at the end of the exercise. The ammunition can should finish over the head and not out in front of the body so that from a side view the ammunition can, participant’s arms, shoulders, torso, and legs are all in one straight line. Leaning back slightly while pressing the ammunition can overhead should still be permitted but a vertical torso angle should be reached upon full extension of the ammunition can overhead. Adjusting the ammunition lift to require trunk stabilization and overhead mobility will enforce positive movement patterns, which may help to create more effective warfighters. Without a doubt, all the proposed changes make the exercises harder to perform because the modifications require increased mobility, stability, and movement quality.

These proposed movement standard modifications are a critical component to a holistic approach at improving Marines movement quality. Modifying the movement standards for pull-ups, crunches, and ammunition can lifts in the PFT and CFT may be a key component to improving movement quality among Marines. When combined with an evidence-based movement assessment they can make direct contributions to musculoskeletal injury reduction and increased operational readiness across the Marine Corps.

Part three of this series will discuss evidence-based movement assessments, and how they can help with this issue facing the United States Marine Corps.
REFERENCES
12. McGuire, B. Examination of pull-ups and push-ups as possible alternatives to the flexed arm hang on the USMC PFT. PowerPoint Presentation for 2011 Sergeants Major Symposium, Training Programs Section, Ground Training Branch, TECOM, Quantico, VA, August 2011.

ABOUT THE AUTHOR
Matt Zummo is currently the Executive Officer for 2d Tank Battalion, 2d Marine Division. He has over 15 years of experience as an active duty Marine Corps officer with multiple combat deployments. Having served as a platoon commander, company commander, battalion operations officer, and at the Marine Corps Recruit Depot San Diego and Officer Candidate School, he has trained thousands of Marines in various environments to include during austere combat deployments. He has a Bachelor of Science degree in Business Administration from the University of Colorado, a Master’s degree in Military Studies from the Marine Corps University, and is a Level 1 FMS, Level 1 USAW Sport Performance Coach, and CrossFit Level 1 coach.