The Army’s Combat-Relevant Physical Fitness Test: A Look Ahead
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Introduction
The United States Army is planning to overhaul the 30-year-old Army Physical Fitness Test (APFT) in the near future. The consensus seems to be that soldiers agree more. There were many soldiers that responded to a recent Army Times (3) request for opinions on how and what they would like to see changed on the current APFT. The responses showed that soldiers want to see a combination of task-specific movements implemented into the new combat-relevant physical fitness test. The survey completed by Army Times suggests that soldiers want to add pull-ups and crunches, eliminate sit-ups, and also implement shuttle runs or a road march. They also suggest that they would like to work out in combat gear instead of PT uniforms.

The current APFT has not been reviewed since 1980 and the Army’s Training and Doctrine Command is working to overhaul the test with a revised, more combat-focused approach where performance tests much more accurately model warfighter performance. The new doctrine, the first since 1992, is part of a multiphase effort that will culminate in a new physical fitness test sometime after 2011 (3). One important comment made in the article is the current physical fitness test continues to drive physical training to primarily train for this assessment.

The United States Marine Corps has already employed a new Combat Fitness Test (CFT). In an article by White (15), it was stated that data collected from veterans in Afghanistan and Iraq recognized that Marines need to be trained differently, with less aerobic and more anaerobic conditioning. This CFT, which is now a part of Doctrine in the Marine Corps, was necessary in order to drive their new way of training for this assessment. Marines who have taken the CFT realized that they needed to train differently in order to score higher on this evaluation. The purpose of this commentary was to bring attention to the possible changes in performance testing and to summarize the literature concerning the APFT to better illustrate the rationale underlying such alterations. We assume that these findings will potentially influence and guide development of the future doctrine.

Limitations of Current APFT
The United States Army’s current APFT is widely considered to be a measure of health-related fitness and is very conducive to mass testing; thus requiring little logistical planning (8). Completion of the APFT is an annual requirement for service members and scores are important in determining promotion of sol-
Vanderburgh and Crowder were able to quantify the impact of body mass in the APFT by calculating the difference in test scores between lighter and heavier men (60 vs 90kg) and women (45 vs 75kg) (13). Their analyses showed that heavier service members’ scores were 15 – 20% lower than their lighter counterparts, with differences explained by total body mass (including lean mass) and not just body fat. APFT scores are important in promotions, this body mass bias may be large enough to impose disadvantages in promotion against larger men and women (11).

An important caveat about the APFT is the primary resistance used is body weight and little else. Many physically demanding military specialties require soldiers to move their own bodyweight along with equipment, supplies, and/or weapons, which requires more absolute strength and power and is often associated with larger lean body mass (4). This notion suggests that performance of such military tasks may correlate only moderately with APFT scores and may be highly correlated with body mass such that larger service members are better performers (11). Interestingly, a study conducted by Bilzon et al. suggest that the distance run test, a surrogate measure of performance of certain military tasks and concluded that load carriage, lifting, pushing, and exerting torque closely relate to lean body mass (4). They also reported that push-ups, sit-ups and 2-mile run scores are not strong determinants of physically demanding military performance tasks. Harman et al. made a great statement that sums up this difference in APFT events and occupational relevance. They recognized that, “on the battlefield, there are activities other than casualty rescue that also involve the manipulation of relatively heavy loads, e.g., setting up field artillery, hauling heavy weapons and ammunition, and moving obstacles. These are activities in which larger soldiers, who may not excel at physical fitness tests, could also be at an advantage,” (5).

The evidence is clear that physically demanding military tasks are highly correlated with absolute measures of physical performance and lean body mass and moderately correlated with military performance tests such as the APFT. The ability to move one’s weight in a muscular endurance or aerobic power event contributes to some success in certain physically demanding military tasks, but the ability to demonstrate absolute amounts of muscle strength and endurance (e.g., repetitions of fixed external weights) and aerobic power (e.g., absolute VO₂ peak) is a stronger determinant of military occupational fitness. Although the APFT events favor smaller soldiers, evidence consistently indicates performance of occupationally relevant military tasks favor larger soldiers. This body mass bias tends to reward superior performers on the high-stakes APFT and penalize superior performers of occupationally relevant physically demanding tasks (11). Assuming that these findings factor into future decisions concerning the new APFT, it would be reasonable to expect the incorporation of performance tests that reduce the body mass bias while demonstrating greater occupational relevance.

Potential Future Directions

When this new combat-focused physical fitness test becomes a part of doctrine it will drive a new way of physical training within the United States Army. A recent paper titled, “A Concept for Functional Fitness,” addressed the fact that Marines needed a different type of training, the kind collegiate or professional athletes receive, and it is feasible that similar alterations may be implemented by the Army (9). The concepts addressed in this article can also be used as basic guidelines for strength and conditioning professionals that train military personnel. These general concepts are as follows: 1) Fitness should follow combat function. 2) A balanced approach must be used to develop power, strength, flexibility, speed, endurance, agility, and coordination. 3) A program must have intensity and great variety. 4) A program is characteristically general and well balanced. The intensity leads to positive physical adaptation and the variety keeps the stimulus fresh yet helps avoid overtraining related injuries. 5) Pre-habilitation is a major component of the functional fitness program. This includes a broad range of topics including education on efficient biomechanics for running, lifting, jumping, and landing. The article also addresses the fact that Marines, as combat athletes, need compre-
Comprehensive training that develops core strength, endurance, speed, and coordination which will be accomplished by working in a multi-planar environment (15).

Summary
The United States Army is embracing the concept of a new combat-focused physical fitness test that will incorporate tasks which soldiers undertake on a daily basis in a combat theater of operations. This new test will need to be thoroughly examined and planned before it will become integrated into doctrine. It is clear that the current APFT and way of conducting physical training needs to be altered in order to be more combat-focused and allow soldiers to train as they fight. The evidence demonstrates an inherent bias against larger soldiers in the current APFT leaving them at a disadvantage for promotions, but it does not reward the larger soldier’s superior performance in occupational-relevant tasks. Although the development of a combat-focused physical fitness test is very immature, strength and conditioning specialists and tactical trainers that are responsible for training soldiers can think about new training concepts that will be of benefit.

References
When constructing an exercise program for someone involved in the tactical community, separating training theory from training reality can often be a daunting task. Most competent training specialists can regurgitate the basic requirements of a proper fitness program with their eyes closed. However, the longer you are in the business of prescribing fitness/performance enhancing programs for this community, the more you realize that the real world is going to mess with that “optimal” program you just gave your client.

Start to factor in the long hours, the nature of shift work, the less than optimal dietary habits, callouts and the need to occasionally spend some time with loved ones and the program can quickly dissolve. Unrealistic expectations will not be met because of the inability of officer to adhere to the program’s template.

Understand that the lunch break workout is not complete, but it does have a place in our toolbox of programs to offer the tactical athlete. I prescribe it to officers that are short on time or are in need of a change from a more traditional training program.

This workout is generally geared toward someone that works a four on, two off schedule but it can easily be adjusted to other work schedules by inserting a light cardio day or scheduling an additional day off in the middle of the work week for the 5/2 schedule.

Be aware that although this is a relatively short program in length of time it takes to complete, the intensity level is such that it is not appropriate for the unconditioned or beginner. I strongly advise against anyone in this category attempting this type of training and as always the client should take the proper precautions to ensure they are fit enough to perform a program of this intensity level.

This workout is designed to fit into a 45-minute lunch period or can be done immediately before or after a shift. The workout itself will take about 35 minutes. You can adjust the workout length by either increasing or decreasing the number of cardio time periods. It is designed for work on a piece of cardio equipment such as a treadmill, stationary bike or elliptical machine. That is not to say that it couldn’t be done while skipping rope, jogging in place or doing some other form of cardio exercise that doesn’t require a machine. It is designed to break up some of the boredom associated with machine-based cardio training.

The first step is to find your target heart rate. Use the simpler standard formula of 220-age = Maximum Heart Rate (MHR). Multiply this number by 0.7 to find 70% of your MHR.

Example: A person 25 years old would make the calculation like this:
220-25 = 195 x 0.7 = 136.5 (round off to 136). This is the number of beats per minute that are needed to keep your heart rate at 70% of max.

You can take the heart rate measurement yourself by taking your pulse for 10 seconds and multiplying it by six, or use the heart rate feature on the piece of equipment you are using. Use 70% or your MHR as your initial target. As you become fitter you can slowly increase the percentage.

The second step is to pick four exercises that consist of a vertical push, a vertical pull, a horizontal push, and horizontal pull. Whatever exercises you choose, make sure they allow you to “bailout” if unable to complete the reps. For example, a barbell bench press is a poor choice for this workout as fatigue may put you into a dangerous situation in which the bar could trap you or injure you. Push-ups or a dumbbell bench press would be the better choice.

Now to begin, pick your preferred piece of cardio equipment (I strongly suggest that you rotate through different pieces of equipment through the week if your facility is so outfitted). Start off at an easy pace for one minute. Progressively increase either the speed or the resistance every minute for the next five minutes in a manner that will allow you to reach your training heart rate by the end of the fifth minute.

Once you have reached the end of the fifth minute, stop the machine and immediately move to the exercise you have chosen for that day. If it is a weight lifting movement, make your first set about three-quarters of what you plan on using for a working weight (If you elected to do dumbbell standing presses with 40lbs, do your first set at 30lbs). This will act as a quick warm-up. As soon as you are done with that set, get back on the piece of cardio equipment you were
using and check your pulse rate. It should be still within the
target heart rate range if you worked hard enough. It may be
higher depending upon the exercise you performed.

Now depending on your level of conditioning and what em-
phasis you are putting on your training, you can determine
how much time to take between sets. You can progress from
longer periods of time to shorter periods of time (10mins to
8mins to 5mins to 3mins). The shorter the cardio periods, the
greater the number of sets and higher volume of work will be
performed. The last five minutes of the routine should consist
of gradually decreasing the intensity or pace on the cardio ma-
chine as a cool down period.

Keep your repetitions in the 5 – 8 range. For push-ups/pull-
ups you can make the reps higher but try to keep them fewer
than 20. To stay at this rep limit, you may externally load your
body to perform the exercise. I have found that reps under five
are too heavy to be performed correctly while in a fatigued
state.

For a four on, two off work schedule, perform this workout
every day you work. Do only one exercise per day following
this format: day 1 – horizontal push, day 2 – vertical pull, day
3 – vertical push, day 4 – horizontal pull.

You will note that there are no lower body exercises in the
workout format. Lower body exercises such as squats and dead-
lifts, due to their technical nature and high heart rates they
produce in this format, are generally not used. I believe this
format could be used with an extremely well conditioned ath-
lete but I still believe the subject should become familiar with
this type of training before including any lower body work. In
the interim, I would recommend that some form of lower body
exercise such as squats be performed using a more traditional
strength routine such as the 5x5 format on either one of the
“off days” or scheduled in the middle of the week in lieu the
aforementioned training.

The athlete should always take at least one full day off and it
may be prudent at the start of this program to follow a two
days on, one day off schedule.

There are several different options you can experiment with
using this workout. If you are interested in trying more than
one exercise per day, alternate a push movement, cardio, a pull
movement, cardio etc. I would recommend you only do this
when you are training in a manner that the cardio sessions are
shorter to allow enough time to get in sufficient volume for
both exercises. If you do train this way, I also recommend that
you do not train back to back days in this manner but either
take a day off or keep the day in between as a light cardio,
recovery day.

This workout is quick and simple and has a lot of room for
variation. Change the exercises every few weeks. Keep track of
progression by increases in weight used, number of sets per-
formed, increases of total repetitions for the entire workout or
distances covered while on the cardio equipment.
My old platoon sergeant had a saying when it came to physical fitness, “if you don’t feel like you’ve been mauled by a grizzly bear, you didn’t get a good workout.” While his philosophy does not mirror the latest in strength and conditioning research, it is not without merit. Members of elite units have a need to push themselves up to and beyond their physical limits in an almost addictive manner. This need often goes unfulfilled when personnel find themselves in austere locations that lack the facilities, equipment, or the secure space for vigorous exercise. Moreover, the limited amount of secure space severely impedes a unit’s personnel from exercising together, which can have a negative impact on morale and esprit de corps. Finally, time restraints often force these personnel to choose between a cardiovascular or strengthening workout. Overall, the inability to obtain an intense and exhaustive workout can negatively impact a unit physically and psychologically.

These dilemmas are solved by the Grizzly Bear Individual Circuit Training program (Table 1). The Grizzly Bear requires a space just four feet deep and six feet wide to perform. It is also time-friendly, taking just under 30 minutes to complete. It will provide a complete workout to the cardiovascular system, the lower body, the core, as well as an excellent upper body workout with the exclusion of the “pulling” muscles.

Unlike most circuit training programs, the Grizzly Bear does not require any specialized equipment or stations—just gravity. The participants stay in the same spot throughout the program while changing exercises. The program is composed of four phases: upper body, abdominals, lower body, and a combination phase. Each phase is made up of three cycles, consisting of six exercises each. The exercises alternate from an aerobic exercise to a strengthening exercise with each exercise lasting 15 seconds. The transition between each exercise should take no more than five seconds. All told, each cycle lasts only two minutes. Each exercise is performed for 15 seconds with a one-to-one work:rest ratio. A 15 second exercise/15 second rest ratio has been found to be superior to other methods in regards to oxygen consumption (VO₂) and increased work output (1). In order to maximize the cardiovascular component, each rest cycle is a low-level cardiovascular exercise (jumping jacks, jogging in place, etc).

One of the keys to this program is the use of time instead of the number of repetitions performed. By using time, individuals of different abilities can still train together and obtain an excellent workout. It also satisfies the emotional need to push oneself. Participants are afforded the opportunity to get the maximum workout in the time allotted. Participants can rotate the order of the first three phases and/or the order of the exercises within each cycle in order to keep the workout fresh and challenging. Alternative exercises are supplied in Appendix A in order to maximize the variations available with this program. Based on an individual’s training needs and/or time constraints, cycles can be added or removed from each phase as deemed necessary.

The Grizzly Bear Individual Circuit Training program offers a simple, time and cost-effective means for individuals to obtain an excellent overall body strengthening and cardiovascular workout. It can be varied according to the needs of the individual and allows for personnel of different abilities to train side by side and encourage one another for maximum benefit and esprit de corps.

References
Table 1: Grizzly Bear Individual Circuit Training Program

*Phase 1: Upper Body (Cycle 1)
1. Jumping Jacks
2. Push-ups
3. Jumping Jacks
4. Arm Circles
5. Jumping Jacks
6. Diamond Push-ups

*Phase 1: Upper Body (Cycle 2)
1. Jumping Jacks
2. Push-ups
3. Jumping Jacks
4. Arm Circles
5. Jumping Jacks
6. Diamond Push-ups

*Phase 1: Upper Body (Cycle 3)
1. Jumping Jacks
2. Push-ups
3. Jumping Jacks
4. Arm Circles
5. Jumping Jacks
6. Diamond Push-ups

Phase 2: Abdominals (Cycle 1)
1. High Knees
2. Flutter Kicks
3. High Knees
4. Y2K Crunch - Right
5. High Knees
6. Y2K Crunch - Left

Phase 2: Abdominals (Cycle 2)
1. High Knees
2. Flutter Kicks
3. High Knees
4. Y2K Crunch - Right
5. High Knees
6. Y2K Crunch - Left

Phase 2: Abdominals (Cycle 3)
1. High Knees
2. Flutter Kicks
3. High Knees
4. Y2K Crunch - Right
5. High Knees
6. Y2K Crunch - Left

Phase 3: Lower Body (Cycle 1)
1. Jumping Jacks
2. Lunge Jumps
3. Jumping Jacks
4. 180° Jumps
5. Jumping Jacks
6. Vertical Jumps

Phase 3: Lower Body (Cycle 2)
1. Jumping Jacks
2. Lunge Jumps
3. Jumping Jacks
4. 180° Jumps
5. Jumping Jacks
6. Vertical Jumps

Phase 3: Lower Body (Cycle 3)
1. Jumping Jacks
2. Lunge Jumps
3. Jumping Jacks
4. 180° Jumps
5. Jumping Jacks
6. Vertical Jumps

Phase 4: Combo (Cycle 1)
1. High Knees
2. Push-ups
3. High Knees
4. Flutter Kicks
5. Jumping Jacks
6. Lunge Jumps

Phase 4: Combo (Cycle 2)
1. High Knees
2. Push-ups
3. High Knees
4. Flutter Kicks
5. Jumping Jacks
6. Lunge Jumps

Phase 4: Combo (Cycle 3)
1. High Knees
2. Push-ups
3. High Knees
4. Flutter Kicks
5. Jumping Jacks
6. Lunge Jumps

*Note: One of the push-up exercises in Phase 1 can be substituted for a bent-over row using approximately 3 feet of surgical tubing to provide a more thorough upper body workout, if available.
Appendix A

Lunge Jump
Start with your right leg in front of your left leg with approximately three feet between your left toes and your right heel. Keep your body upright and place your hands on your hips (Fig 1A). Start the exercise by lowering your left knee straight down to the ground (Fig 1B) and then jump upwards in an explosive manner (Fig 1C). Land in the same position ensuring you maintain an upright trunk (Fig 1D). Hint: try to land “softly” and don’t let your front knee go past your toes as this may cause knee pain.

Alternate Methods
1. Alternate legs—Jump as before but switch your legs in mid-air and land with your left leg in front of your right.

2. Body Twist—Elevate your arms to the front at shoulder height and to the side of your lead leg (Fig 2A). Start the exercise by lowering your left knee straight down to the ground (Fig 2B). Perform the jump and alternate arm and leg positions in mid-air. Land with your left leg forward and your hands to the left (Fig 2C). This will increase the load on your core stabilizers.

Vertical Jump
Start with your feet shoulder-width apart and your hands by your side. Bend your knees and explode upwards into a vertical jump while simultaneously elevating your hands over your head. Bring your hands down by your sides and land with your feet shoulder-width apart.

Alternate Methods
1. High Knee Jump—Perform the same starting positions as the Vertical Jump (Figs 3A-B) but bring both knees towards your chest while in mid-air (Fig 3C). Land in the same position as in the Vertical Jump (Fig 3D).

2. Mule Kicks—Perform the Vertical Jump but bend your knees while in mid-air and attempt to put your heels in contact with your buttocks (Fig 4). Land in the same position as in the Vertical Jump.

3. Cyclist Spring—Start with your feet shoulder-width apart. Bend your knees and explode upwards into a Vertical Jump. While in the air, bring your left hip up towards your chest while extending the right leg behind you (Fig 5). Bring your legs together prior to landing, and land in the starting position. Alternate legs during the next jump.

180˚ Degree Jump
Start with your feet shoulder-width apart and your hands by your side (Fig 6A). Bend your knees (Fig 6B) and explode upwards into a Vertical Jump and spin 180˚ clockwise (Fig 6C) while simultaneously elevating your hands over your head. Bring your hands down by your sides and land with your feet shoulder-width apart (Fig 6D). Alternate between jumping clockwise and counterclockwise.

Y2K Crunch
Start on your right side with your weight supported by your feet and elbows (directly under your shoulder), forearm and fist. Raise your right hip off the ground until your upper body and legs form a straight line then lower yourself down to the starting position. Repeat on the same side.

Alternate Method
1. Close your eyes to increase the instability factor.

Advanced Alternative Exercises

Single-Leg Vertical Leap
Performed similarly to the Vertical Jump but jump off of your right leg (Fig 8A) and land on your left leg (Fig 8B). Upon landing, another leap is immediately performed with minimal ground contact time.

Single-Leg High Knee Vertical Jump
Performed similarly to the High Knee Jump but jumping off and landing on the same leg throughout the exercise. The knee is brought towards the chest while in mid-air. Upon landing, another jump is immediately performed with minimal ground contact time.

Single-Leg Lateral Hop
Stand on your right leg with your hands on your hips. Jump vertically and to your left (Fig 9A), landing on the same leg (Fig 9B). Upon landing, another jump is immediately performed vertically and to the left with minimal ground contact time.

Alternate Method
1. Place an object on the ground to jump over to maintain a consistent vertical and lateral jump distance.
Figures 1A – 1D: Lunge Jump

Figures 2A – 2C: Lunge Jump, Body Twist Variation

Figures 3A – 3D: Vertical Jump, High Knee Variation
Figure 4: Mule Kick

Figure 5: Cyclist Spring

Figures 6A – 6D: 180° Jump

Figures 7A – 7B: Y2K Crunch
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