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## **Mission essential fitness: comparison of functional circuit training to traditional army physical training for active duty military**

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TITLE PAGE

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Mission Essential Fitness: Comparison of Functional Circuit Training to Traditional Army  
Physical Training for Active-Duty Military

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KEYWORDS: Fitness; Functional; Army Physical Readiness Training; Injuries; Army  
Physical Fitness Test; Circuit Training; Body Composition; High Intensity

## INTRODUCTION

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7 It is widely known that soldiers require a certain level of overall or complete fitness to  
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9 meet the physical demands of war. Jumping, crawling, rolling, stopping, starting, bounding,  
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11 climbing, pushing, sprinting from cover to cover, carrying heavy loads long distances and still  
12  
13 being able to complete the mission at hand represents a short list of the required tasks placed  
14  
15 upon a soldier.<sup>1</sup> Key measurable fitness components include endurance, mobility, strength and  
16  
17 flexibility.<sup>2</sup> Throughout Army basic training and their Army careers, soldiers are told that they  
18  
19 are first soldiers and that their military occupation specialty (MOS) comes second. Thus, all  
20  
21 soldiers must be capable of completing basic infantry tasks. Today soldiers of the United States  
22  
23 Military are deemed “Tactical Athletes” or individuals that require high levels of strength, speed,  
24  
25 power, and agility due to potential engagement in combat.<sup>3</sup> Deciding on the most appropriate  
26  
27 physical training program is imperative for soldier survival and mission success.  
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34 To date, most training research conducted by the military emphasizes combat readiness  
35  
36 and overall performance improvements on the Army Physical Fitness Test (APFT),<sup>1</sup> which tests  
37  
38 aerobic and muscular endurance. The Army Physical Readiness Training Program (APRT) is  
39  
40 conducted five days per week with a focus on mobility, strength and endurance. The APRT  
41  
42 program consists of a warm-up, 50 minutes of exercise, and a cool-down. The exercise portion  
43  
44 consists of aerobic and resistance training, a combination that commonly is used by the Army  
45  
46 and shows improved fitness and performance on the APFT.<sup>4-5</sup> However, some have argued that  
47  
48 the APFT test does not adequately test combat preparedness (i.e., it does not contain mobility,  
49  
50 strength, or anaerobic fitness components and focuses too much on endurance) and the APRT  
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52 program is not sufficient for combat preparation.<sup>6</sup> Accordingly the Functional Movement Screen  
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4 testing endurance, mobility, strength, and flexibility has been implemented for some military  
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6 populations.<sup>2,7</sup>  
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9 Other training methods combining aerobic and resistance exercises have demonstrated  
10 similar improvements in fitness as the APRT program. For example, a 12 week study compared  
11 a circuit resistance-training program (i.e., 25 minute sessions for 3 days per week of weight  
12 machine exercises interspersed with stationary cycling in 60 second intervals) to a standard  
13 aerobic exercise program (i.e., 60 minute running sessions for 4-5 days per week) with Air Force  
14 personnel and found significant improvements on the APFT with less training volume, as well as  
15 improvements in abdominal circumference for the circuit training group only.<sup>8</sup> Eight weeks of  
16 weight-based training (i.e., 60-80 minute sessions for 5 days per week including weight training  
17 exercises, 3.2 kilometer runs, sprinting, agility training, and weighted hikes) were compared to  
18 the APRT program for Army personnel and resulted in similar improvements on a series of  
19 fitness tests.<sup>9</sup>  
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36 More recently, circuit-style programs emphasizing functional fitness exercises (i.e.,  
37 training that familiarizes the body with its operational environment) performed at high intensity  
38 have begun to gain popularity among military populations.<sup>10-11</sup> However, in a meeting with  
39 professionals from the American College of Sports Medicine, the Department of Defense  
40 expressed reservations about programs characterized by high-intensity repetitions and short rest  
41 periods between sets due to increased risk of muscle strains, ligament tears, stress fractures, and  
42 the threat of rhabdomyolysis.<sup>11</sup> Stated strengths of these programs included their ability to  
43 motivate, excite, and meet unmet training needs in military personnel, as well as their ability to  
44 better address skills related to combat readiness. It was deemed important that effective  
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4 implementation of such programs would need to minimize injury risk and should be monitored  
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6 closely for signs of overtraining as well as effectiveness.<sup>11</sup>  
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9 A newer, mission-specific comprehensive strength and conditioning program called  
10 Mission Essential Fitness (MEF) was created to specifically address perceived weaknesses of the  
11 existing APRT program (e.g., insufficient for combat preparation) by focusing on movements in  
12 multiple planes using a variety of speeds in a circuit training format. MEF is designed to be  
13  
14 integrated, progressive, periodized and focused on increasing core stability. Functional exercises  
15 are utilized to mimic movements experienced in combat situations. The purpose of this study  
16 was to compare the MEF training program to a standard APRT program. We hypothesized that  
17 soldiers randomly assigned to the MEF training would show greater overall physical  
18 preparedness through improvements on APFT, physiological and other fitness measures when  
19 compared to APRT training, while maintaining body composition and minimizing injuries.  
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## 33 **METHODS**

### 34 **Participants**

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36 Following standard chain-of-command protocol, approval was obtained to conduct and  
37 evaluate the MEF training program compared with the APRT program. Active duty Army  
38 personnel were invited to participate in the study through contacts with the army chain-of-  
39 command. Rank and years of service were used to randomly assign participants to the MEF  
40 intervention group (n = 34) or the APRT group (n = 33). All participants were currently active in  
41 regular physical training. As shown in Table 1, MEF participants were 82.4% (n = 28) male,  
42 average age was 27.29±5.68 years, and average years of service were 5.52±4.9. Participants in  
43 the APRT group were 84.8% (n=28) male, 27.88±5.38 years of age and averaged 6.92±5.39  
44 years of service. Institutional review board approval was received to publish study results.  
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## Measures

Each of the following measures was completed prior to the initiation (baseline) and at the end of the participants' respective 8-week training programs (post-test). Testing was done during the same time of day for both groups. Participants were asked to maintain adequate hydration throughout the testing as water was provided on-site.

*Army Physical Fitness Test (APFT).* Pushups were tested using the Army standards; men and women began with hands shoulder width apart and elbows and body straight. Participants were required to lower themselves until their upper arms were parallel to the ground and complete as many pushups as possible in one minute, pausing only in the up position to rest.<sup>1</sup>

Sit-ups also were tested using the Army range of motion standards; men and women began lying on their backs with their knees bent 90-degrees.<sup>1</sup> While a partner secured their ankles, participants interlocked their fingers behind their head and raised up until the base of their neck was above the base of their spine. They completed as many sit-ups as possible in one minute, pausing only in the up position to rest.

One-and-a-half mile and 2 mile run times and maximal heart rate were tested simultaneously on a flat paved road running route. Participants were split up into groups of 10 and outfitted with racing numbers and heart rate monitors. Five testers monitored the run with two at the start/ finish line and two testers at the 1.5 mile mark. Run times were recorded using an Ultrak gl10-10 lane timer. Heart rates were monitored using Polar F-11 heart rate monitors. Run times and heart rates were recorded for each participant at the 1.5 and 2 mile markers.

*Physiological Indicators and Body Composition.* Physiological measures included resting heart rate, blood pressure, and height. Resting heart rate and blood pressure were taken using a machine after participants had rested for 10 minutes. Height was measured using a wall-mounted

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4 FMS grid. These tests, along with body weight, were entered into the Polar Body Age System.  
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6 Body weight, body composition and metabolic rate were estimated using a Tanita segmental  
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8 body composition analyzer/scale (model BC418), a single-frequency device with 8 polar  
9  
10 electrodes (Tanita, Japan). This model has shown acceptable validity in comparison to DXA for  
11  
12 men ( $r = .54-.78$ ,  $p < .05-.001$ ) and women ( $r = .37-.91$ ,  $p < .05-.001$ ).<sup>12</sup> Height and weight were  
13  
14 used to calculate body mass index (BMI).  
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19 *Field Fitness Indicators.* The Kasch three minute step test (i.e., a submaximal measure of  
20  
21 cardiorespiratory fitness) using a 12-inch box and heart rate monitors was conducted where each  
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23 participant stepped 24 cycles (up-up-down-down) per minute (to a metronome setting of 96) for  
24  
25 3 minutes.<sup>13</sup> Immediately after the three minutes of stepping, the participant sat down. Heart rate  
26  
27 was taken 60 seconds after completion of stepping. The Kasch test has been established as a  
28  
29 valid submaximal test of VO<sub>2</sub>max in males and females ages 7-57 ( $r = .95$ )<sup>14</sup> as well as in  
30  
31 women ages 28-35 ( $r = .824$ ).<sup>13</sup>  
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36 To assess strength, one rep max bench press was tested after instructing the participants  
37  
38 on proper form and technique for flat bench press. Participants completed 10 repetitions with a  
39  
40 light to moderate load followed by an additional heavier warm-up set of 3-5 repetitions. Weight  
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42 was added in increments until muscular failure was obtained after one successful lift. A two  
43  
44 minute rest period was given between each lifting attempt. This test is the standard for  
45  
46 determining isotonic strength<sup>15</sup> and has shown significant test-retest reliability ( $r > .90$ ).<sup>16</sup>  
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50 Mobility components that were tested included flexibility, power, and agility as detailed  
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52 below.  
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55 Flexibility was tested using a flex-tester sit and reach box. Participants sat shoeless with  
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57 feet six inches apart, toes pointed upward, and heels flat against the flex-tester. The participants  
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4 kept their hands adjacent to each other and maintained contact with the box during the reach,  
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6 pushing the guide as far as possible without bending their knees. The best of three trials were  
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8 recorded to the nearest 0.25 inch (or 1cm). The sit and reach test has been found to be a good  
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10 predictor of hamstring flexibility with high reliability ( $r = .96-.98$ ) and validity ( $r = .24-.53$ ,  
11  
12  $p < .05$ ) for females and males.<sup>17</sup>  
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16 To assess power, standing vertical jump was measured using a wall-mounted vertical  
17  
18 jump tester. Participants began each test with both feet flat on the floor and reaching as high as  
19  
20 possible, marked their reach with a magnet. The participant then lowered themselves to jump  
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22 without a preparatory or stutter step. A counter movement was performed during the jump, with  
23  
24 the arm reaching up and placing an additional marker on the wall. The score was the vertical  
25  
26 difference between the two magnets. The best of three trials was recorded to the nearest 0.5 inch.  
27  
28 This test has shown acceptable validity in comparison to peak and average power measured by  
29  
30 force plates ( $r = .88$  and  $r = .73$ , respectively)<sup>18</sup> as well as high reliability (Chronbach's  $\alpha \geq$   
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32  $.962$ ).<sup>19</sup>  
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39 Standing broad jump was tested to also assess power using a starting line and additional  
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41 marks every three feet. Participants stood with toes just behind the starting line and jumped as far  
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43 forward as possible. The participants were required to land on both feet for the jump to be  
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45 scored. A marker was placed at the back edge of the athletes' rearmost heel, and the yard stick  
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47 was used to determine the distance from the starting line to the mark. The best of three trials was  
48  
49 recorded to the nearest 0.5 inch. This test has shown good reliability ( $ICC = 0.97$ ) and validity  
50  
51 for peak power ( $r = .334$ ,  $p < .01$ ) and mean power ( $r = .499$ ,  $p < .01$ ).<sup>20</sup>  
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56 Agility was tested using the pro-agility test, which is a highly utilized test with a  
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58 standardized protocol and norms for comparing results.<sup>21</sup> Three parallel lines five yards apart  
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4 were marked with tape. Participants straddled the centermost of the three lines using a three-  
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7 point stance. On the tester's call the participant sprinted five yards to the line on the left, then  
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9 changed direction and sprinted 10 yards to the line on the right, then again changed direction and  
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11 sprinted five yards back to the center line. Foot contact was required at all lines. The better of  
12  
13 two trials was recorded to the nearest 0.01 second.  
14

15  
16 Aerobic capacity was calculated using 1.5 mile run times with the following formula:  
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19 
$$\text{relative VO}_2 = 3.5 + 483 / (\text{time to run 1.5 miles in minutes}).^{21}$$
  
20

### 21 **Intervention**

22  
23 The MEF training program (see <http://www.blissmwr.com/functionaltraining/>) consisted  
24  
25 of multiple exercises that focused on strength, power, speed, and agility and was designed to  
26  
27 train the body in various planes of movement and at different speeds.<sup>22</sup> This was accomplished  
28  
29 by using exercises that allowed the joints to be flexed, extended, and/or rotated. Movement speed  
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31 was manipulated by adding resistance to the exercise such as barbells, dumbbells, resistance  
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33 bands, medicine balls, sleds, tires and body weight. All exercises involved multiple joints (e.g.,  
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35 Olympic lifts, squats, bench press, and pull ups). Exercises were set up in a circuit fashion,  
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37 including Olympic weight lifting movements, plyometrics, lower body movements (e.g.,  
38  
39 weighted walking lunges), upper body movements (e.g., band bicep curls), and core exercises  
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41 (e.g., plank with feet elevated on a medicine ball). In total, fifteen different exercises were  
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43 performed for 60-90 seconds each, with little to no rest in between each station, for a total of  
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45 forty-five minutes. Participants attended fifteen separate MEF sessions during the eight weeks,  
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47 averaging 2 sessions per week.  
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55 The APRT program (see <http://www.scribd.com/doc/32717729/TC-3-22-20-Army-Physical-Readiness-Training-March-2010>) followed published guidelines and focused on a  
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4 combination of mobility, strength and endurance exercises.<sup>1</sup> APRT participants attended fifteen  
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6 one-hour sessions during the eight weeks, averaging 2 sessions per week.  
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### 9 Statistical Analyses

10 All data were double-entered and standard data cleaning and verification procedures  
11 employed. Statistical analyses were conducted with PASW Statistics 18. Independent samples t-  
12 tests were used to compare groups on baseline characteristics. Analysis of covariance  
13  
14 (ANCOVA) was used to evaluate between-group changes in study outcomes with the baseline  
15 testing value as the covariate and group as the constant. Paired samples t-tests were used to  
16  
17 evaluate within-group changes in body composition. The value for statistical significance was set  
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19 at  $p < .05$ .  
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## 28 **RESULTS**

29 Random assignment to training groups resulted in statistically equivalent groups on all  
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31 baseline measures. Characteristics of each training group at baseline, including demographics,  
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33 body composition, physiological indicators, APFT and other fitness indicators are shown in  
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35 Table 1.  
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Insert Table 1 Here

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Table 2 displays change scores across all measured fitness variables for both groups. On the APFT measures, the MEF intervention group significantly increased their pushups by an average of  $4.2 \pm 5.4$  compared to  $1.3 \pm 5.9$  additional pushups for the APRT group ( $p = .033$ ). The MEF group also significantly decreased their 2-mile run times ( $-89.91 \pm 70.23$  seconds) as compared to the APFT group ( $-15.33 \pm 69.16$  seconds;  $p = .003$ ). The MEF group did show a

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4 significant decrease in heart rate of  $-17.0 \pm 15.0$  on the step test compared to a  $-9.0 \pm 16.1$  for the  
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6 APRT group ( $p = .004$ ). The MEF group improved significantly over the APRT group in bench  
7  
8 press strength ( $13.2 \pm 12.1$  versus  $2.7 \pm 11.5$  pounds;  $p = .001$ ) and flexibility ( $0.6 \pm 1.3$  versus  $-0.5 \pm$   
9  
10  $1.5$  inches;  $p = .003$ ). As shown in Table 3, changes in body composition measures and  
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12 physiological indicators were not statistically significant for either group ( $p > .05$ ).  
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Insert Tables 2 and 3 Here

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### Discussion

We compared a novel and comprehensive fitness training program, MEF, with standard APRT. Results indicated that MEF participants significantly improved their pushups, 2 mile run times, step test heart rate, bench press strength, and flexibility as compared to participants engaging in APRT. Thus, MEF positively impacted the comprehensive fitness domains, i.e., strength, power, both cardiorespiratory and muscle endurance, flexibility, and mobility, recently outlined as being important part of “Total Force Fitness.”<sup>2</sup> It is notable that the MEF program produced these measurable improvements after a relatively low dose of training (i.e., 2 sessions per week), which may have helped prevent injuries and overtraining. Previous studies used 3-6 training sessions per week.<sup>8-9</sup> No significant differences were found between groups for changes in blood pressure, or resting heart rate. Neither group experienced significant changes in body composition nor reported any injuries.

This study provides evidence that the MEF training program results in greater fitness gains than the APRT program, differing from previous research that found similar improvements between APRT and a weight-based training program.<sup>9</sup> The MEF program successfully used

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4 functional exercises in multiple planes (i.e., sagittal, lateral and rotary exercises) addressing  
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6 combat readiness to increase fitness,<sup>2,6</sup> with no reported injuries or signs of overtraining.<sup>11</sup>

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8  
9 Combat situations may require soldiers to move laterally in and out of enclosed areas or vehicles  
10  
11 with weighted packs and unstable surfaces, requiring muscles, tendons and ligament strength for  
12  
13 controlled acceleration and deceleration. The absence of injuries during the MEF program  
14  
15 suggests that progressive and scaled workouts are safe when incorporating weight lifting and  
16  
17 technical lifts into a circuit-type routine that they address important fitness domains relevant to  
18  
19 combat readiness.<sup>2,6</sup>  
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23  
24 The current APFT emphasizes muscular and aerobic endurance with the use of push-ups,  
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26 sit-ups, and the 2-mile run.<sup>1</sup> However, the U.S. military now recognizes that there are other  
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28 important fitness domains that deserve attention and that are critical to mission completion and  
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30 combat readiness. The APRT program currently trains soldiers in a limited number of fitness  
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32 domains, while the MEF program is designed to address all physical fitness domains recognized  
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34 by “Total Force Fitness.”<sup>2</sup> The broad stimuli provided by the MEF program resulted in multiple  
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36 training adaptations and fitness improvements in muscular and aerobic endurance, strength, and  
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38 flexibility. In fact, the MEF may better prepare soldiers for the new APFT that also includes  
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40 tests (e.g., 60m progressive shuttle runs, rower exercise, standing long jump, pushups, and a 1.5  
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42 mile run) of domains beyond those in the traditional APFT that may better prepare warriors of  
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44 the demands of modern warfare.<sup>2,6,23-24</sup>  
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51 Our study had several important strengths including the participation of active duty Army  
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53 personnel, demonstrating feasibility of real-world implementation during physical training  
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55 sessions, and the fact that the MEF demonstrated measurable early phase improvements in a  
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57 sample of young and healthy soldiers. In addition, we assessed a broad range of fitness domains  
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4 as recommended by “Total Force Fitness.”<sup>2</sup> Finally, the MEF program itself is a novel approach  
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6 to circuit training that optimizes functional training to prepare soldiers for real-world conditions  
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8 and improved combat readiness.<sup>24-25</sup> Our primary limitation for this study was equipment  
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10 availability for broad assessment of multiple physical fitness domains. For example, it would  
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12 have been ideal if the oxygen volume testing could have been done using the Bruce treadmill  
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14 protocol to determine actual  $VO_{2max}$  rather than relative  $VO_2$ . Additional strength testing also  
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16 could have been conducted that more closely matched the MEF training protocol to include  
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18 movements such as the deadlift and shoulder press. Tracking nutrition intake could have  
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20 provided more information regarding body composition. However, budgetary and practical  
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22 factors limited our access to additional measures. Future studies should include these additional  
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24 measures to ensure comprehensive physical fitness assessment. As well, future studies could be  
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26 powered to examine gender differences as well as effects for soldiers with limited mobility.  
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### 33 **Conclusions**

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35 In conclusion, the results of this study demonstrate that MEF improves muscular strength,  
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37 endurance, cardiovascular endurance, strength, and flexibility while maintaining body  
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39 composition and minimizing injuries. These outcomes support the utility of circuit-style  
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41 functional fitness training for military personnel. Future research could examine whether MEF  
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43 training leads to better combat specific preparedness for military personnel.  
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**Table 1. Baseline Group Characteristics.**

Variable	MEF Mean (SD) n = 34	APRT mean (SD) n = 33	p-value
<b>Demographics</b>			
Age	27.3 (5.7)	27.9 (5.4)	.67
Percent Male	82.4 (n = 28)	84.8 (n = 28)	.78
Years of Service	5.5 (4.9)	6.9 (5.4)	.27
<b>Army Physical Fitness Test</b>			
Pushups (in 1 minute)	42.8 (10.9)	41.3 (10.7)	.57
Sit-ups (in 1 minute)	41.2 (5.9)	39.7 (7.8)	.37
2.0 Mile Run (time)	18:08.02 (2:08.39) <sup>2</sup>	17:38.40 (2:56.17) <sup>4</sup>	.48
<b>Body Composition</b>			
Height (cm)	177.1 (9.6)	175.6 (9.7)	.52
Weight (kg)	88.6 (18.3)	83.7 (17.9)	.27
BMI (kg/m <sup>2</sup> )	28.0 (4.7)	27.0 (4.8)	.41
Body Fat Percentage	22.3 (7.9)	22.0 (6.5)	.87
<b>Physiological Indicators</b>			
Systolic Blood Pressure	140.9 (12.7)	137.6 (12.6)	.29
Diastolic Blood Pressure	81.4 (12.8)	80.0 (9.8)	.60
Resting Heart Rate	74.0 (15.9)	70.7 (12.7)	.36
Basal Metabolic Rate	2049.2 (421.5)	1942.3 (373.9)	.28
Relative VO <sub>2</sub> (ml·kg <sup>-1</sup> ·min <sup>-1</sup> )	40.6 (6.6) <sup>3</sup>	40.7 (4.5) <sup>4</sup>	.97

Field Fitness Tests			
Step Test Heart Rate	99.9 (18.7)	101.9 (22.6)	.70
1.5 Mile Run (Time)	13:33:27 (1:30:33) <sup>3</sup>	13:13:57 (2:07:26) <sup>4</sup>	.88
Vertical Jump (cm)	42.3 (11.5)	44.0 (10.1)	.52
Broad Jump (cm)	200.0 (29.1) <sup>1</sup>	195.8 (29.0)	.57
Agility (seconds)	5.8 (0.4) <sup>1</sup>	5.7 (0.4)	.90
Bench Press (kg)	71.5 (20.5) <sup>1</sup>	70.9 (27.2)	.93
Flexibility (cm)	26.8 (7.3)	27.6 (10.0)	.71

<sup>1</sup>Missing data for 1 participant

<sup>2</sup>Missing data for 5 participants

<sup>3</sup>Missing data for 6 participants

<sup>4</sup>Missing data for 8 participants

**Table 2. Between Group Comparisons for Changes in APFT, Physiological, and Fitness****Variables.**

$\Delta$ Variables	MEF mean (SD)	APRT mean (SD)	F statistic	p-value
Army Physical Fitness Test (APFT)				
$\Delta$ in Pushups	4.2 (5.4)	1.3 (5.9)	4.761	<b>.033</b>
$\Delta$ in Sit-ups	0.7 (4.9)	-2.3 (4.9)	2.778	.120
$\Delta$ in 2 Mile Run time (seconds)	-83.9 (70.2)	-15.3 (69.2)	9.992	<b>.003</b>
Physiological Indicators				
$\Delta$ in Systolic Blood Pressure	-7.7 (16.1)	-3.4 (11.8)	1.196	.278
$\Delta$ in Diastolic Blood Pressure	3.4 (16.7)	0.6 (13.5)	1.446	.234
$\Delta$ in Resting Heart Rate	-6.0 (11.6)	-3.0 (11.7)	.380	.540
$\Delta$ in Basal Metabolic Rate	-22.85 (197.60)	42.39 (324.14)	1.017	.317
$\Delta$ in Relative $\text{VO}_2$ ( $\text{ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ )	2.39 (5.93)	1.24 (2.40)	.568	.455
Other Fitness Tests				
$\Delta$ in Step Test Heart Rate	-17.0 (15.0)	-9.0 (16.1)	8.839	<b>.004</b>
$\Delta$ in Vertical Jump (in)	1.2 (1.9)	0.7 (2.4)	.750	.390
$\Delta$ in Broad Jump (in)	3.0 (13.4)	-0.9 (3.5)	2.469	.121
$\Delta$ in Agility	-0.2 (0.4)	-0.2 (0.3)	.099	.754
$\Delta$ in Bench Press (pounds)	13.2 (12.1)	2.7 (11.5)	12.933	<b>.001</b>
$\Delta$ in Flexibility (in)	0.6 (1.3)	-0.5 (1.6)	9.729	<b>.003</b>

$\Delta$  = change

*Note:* Baseline values were used as covariates.

**Table 3. Within Group Comparisons for Changes in Body Composition.**

$\Delta$ Variables	$\Delta$ Score Mean (SD)	t	p-value
MEF Participants (n = 34)			
$\Delta$ Weight	1.3 (4.0)	1.92	.063
$\Delta$ Body Mass Index	0.2 (0.7)	1.26	.216
$\Delta$ Body Fat Percentage	0.3 (1.9)	0.90	.375
APRT Participants (n = 33)			
$\Delta$ Weight	0.3 (4.2)	0.45	.732
$\Delta$ Body Mass Index	0.03 (0.6)	0.27	.787
$\Delta$ Body Fat Percentage	0.1 (1.5)	0.30	.776

$\Delta$  = change

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