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The Navy Physical Fitness Test: A Proposed Revision to the Navy Physical Readiness Test

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ABSTRACT

THE DEPARTMENT OF DEFENSE MANDATES THAT EACH BRANCH OF THE ARMED FORCES DEVELOP AND USE ANNUAL PHYSICAL FITNESS TESTS TO ASSESS THE PHYSICAL READINESS OF THEIR SERVICE-MEMBERS. IN AN ATTEMPT TO IMPROVE TEST VALIDITY AND BETTER PREDICT BATTLEFIELD PERFORMANCE, MOST OF THE SERVICES HAVE MADE SIGNIFICANT CHANGES IN RECENT YEARS TO THEIR PHYSICAL FITNESS TESTS. HOWEVER, THE NAVY'S PHYSICAL READINESS TEST HAS REMAINED RELATIVELY UNCHANGED SINCE 1986. THIS ARTICLE INTRODUCES A REVISED PHYSICAL FITNESS TEST, THE NAVY PHYSICAL FITNESS TEST, THAT OFFERS SIGNIFICANTLY IMPROVED VALIDITY AND OPERATIONAL RELEVANCE.

INTRODUCTION

Numerous tasks expected of military personnel require a high level of physiological effort and capacity to perform. Therefore, the ability to accurately assess the physical fitness of service-members is of vital importance to military commanders. Because of the time and resources required for testing through traditional laboratory means (e.g., indirect calorimetry $\dot{V}O_2$max testing), the military uses a variety of field tests to assess physiological performance and ability.

Harman et al. (18) suggest that semiannual fitness testing can provide military commanders with the following: (a) an accurate assessment of the physical capabilities of their personnel, (b) assistance in the proper selection of personnel for physically demanding tasks, (c) recommendations for the type of training and test events essential to occupational and/or battlefield performance, and (d) a valuable tool to assess the effectiveness of physical fitness programs. Additionally, Miller (24) suggests that periodic fitness testing can predict future performance, track performance over time, and assign training recommendations (e.g., intensity, volume, load). Military commanders can use this information to assess individual service-members' potential as well as evaluate the overall effectiveness of a conditioning program in improving physical readiness.

The purpose of this article is 3-fold: (a) discuss the history behind and current composition of the Navy's Physical Readiness Test (PRT); (b) define the field tests used by the other armed services; and (c) introduce a proposed field test that could be used in lieu of the PRT.

HISTORY OF THE PHYSICAL READINESS TEST

In 1980, President Carter requested an assessment of the physical fitness of military personnel from the Secretary of Defense. This request facilitated a symposium on military physical fitness for the purpose of reviewing existing physical fitness policies and practices for each of the different services. The findings indicated that although each service had preexisting physical readiness programs in place, none of them could provide an accurate account of the current physical fitness level of their personnel (19). As a result of the symposium, a new Department of Defense (DoD) instruction was released (i.e., DoD 1308.1), which mandated that each service develop and implement a physical fitness test and body composition program. In response, the Navy updated its current instruction (OPNAVINST 6110.1) and released the OPNAVINST 6110.1A. The new instruction was virtually identical to its predecessor but included a physical fitness test. Since then, the Navy has made several changes to its physical fitness test. Table 1 provides a comprehensive

KEY WORDS:
Department of Defense; Physical Readiness Test; Navy Physical Fitness Test; Body composition

listing of the different physical fitness tests used by the Navy since 1980.

PHYSICAL FITNESS TESTS USED BY THE OTHER SERVICES

The current Department of Defense (DoD) instruction (i.e., DoD 1308.3) mandates that each service develop and use a physical fitness test that evaluates aerobic capacity, muscular strength, and muscular endurance. Although the required components of fitness to be tested are the same, each service was afforded the liberty to determine which test(s) to use to evaluate those components (10–14). Table 2 provides a current listing of the physical fitness tests used by the different branches of service.

Several of the services have developed additional tests in an attempt to better predict performance in austere environments and/or on the battlefield. In 2008, the Marine Corps developed the Combat Fitness Test (CFT) to assess a Marine's ability to perform specific battlefield tasks. The CFT consists of 3 major events: 880-yd run in boots, ammo can lifts using 30-lb ammo cans, and various maneuver under fire drills (e.g., 15-yd high crawl, 10-yd casualty drag, multiple sprints with two 30-lb ammo cans, dummy grenade toss). Similarly, in 2010, the Army developed and evaluated the Army Physical Readiness Test (APRT) and Army Combat Readiness Test (ACRT) to more accurately assess a soldier's ability to perform basic warrior tasks and battle drills. The APRT consists of a 60-yd shuttle, 1-minute rower exercise, standing long jump, 1-minute push-up, and 1.5-mile run. The ACRT consists of a 400-m run, low hurdle, high crawl, under and over, casualty drag, balance beam ammo can carry, point-aim-move maneuver, and various sprint maneuvers (e.g., 100-yd ammo can shuttle sprint and agility sprint). However, neither the APRT nor ACRT have been formally implemented.

Table 1
Evolution of the PRT

	OPNAVINST 6110.1A (1980)	OPNAVINST 6110.1B (1982)	OPNOTE 6110 (1984)	OPNAVINST 611.10C (1986)	OPNAVINST 6110.1F (2000)	NAVADMIN 293/06 (2006)	NAVADMIN 011/07 (2007)	OPNAVINST 6110.1J (2011)
Sit-reach	-	X	X	X	X	X	X	-
Sit-ups/curl-ups	X	X	X	X	X	X	X	X
Push-ups	X	-	-	X	X	X	X	X
Flexed-arm hang	X	-	-	-	-	-	-	-
Pull-ups	X	-	-	-	-	-	-	-
1.5-mile run	X	X	X	X	X	X	X	X
3-min run-in-place	X	X	-	-	-	-	-	-
500-yd swim	-	-	X	X	X	X	X	X
450-m swim	-	-	-	-	X	X	X	X
12-min elliptical	-	-	-	-	-	X	X	X
12-min stationary bike	-	-	-	-	-	-	X	X

The X represents which modalities (e.g., sit-reach) were included in the PRT as mandated by the different instructions (e.g., opnavinst 6110.1a). PRT = physical readiness test.

THE PERFECT PHYSICAL READINESS TEST

For a test battery to effectively measure physical fitness, it needs to be valid,

Table 2
Physical fitness tests used by the other services

	Navy	Marine Corps	Army	Air Force
Aerobic capacity	1.5-mile run	3.0-mile run	2.0-mile run	1.5-mile run
Alternate aerobic capacity options[a]	500-yd swim; 450-m swim; 12-min elliptical; 12-min stationary bike	—	800-yd swim; 6.2-mile stationary cycle ergometer; 6.2-mile bicycle; 2.5-mile walk	1.0-mile Rockport Walk Test
Muscular strength	Push-ups	Pull-ups (M); flexed-arm hang (F)[b]	Push-ups	Push-ups (1 min)
Muscular endurance	Curl-ups	Crunches	Sit-ups	Sit-ups (1 min)

[a]Requires Commanding Officer approval (USN) or Medical Waiver (USA, USAF).

[b]ALMAR 046/12 announced the replacement of the flexed-arm hang for females with pull-ups beginning in January 2014. However, the transition is being delayed after only 45% of the female recruits tested were able to meet the minimum standard of 3 pull-ups.

reliable, and feasible (24). Validity means that a particular test measures what it is supposed to measure. Reliability means that the test is repeatable and free from individual bias. Feasibility means that the test is easily administered and does not require a great deal of skill or equipment.

Ironically, field tests can be both reliable and feasible but have poor validity. For example, the Navy added push-ups (maximum number performed in 2 minutes) to the PRT in 1986 in an attempt to add a dynamic strength test (19). Muscular strength is defined as the ability of a muscle or group of muscles to exert maximum force against an external resistance (24). By this definition, push-ups are not a valid test for assessing muscular strength but rather muscular endurance. Field tests should also be feasible. Although tests like indirect calorimetry and 1 repetition maximum (1RM) bench press are considered to be the criterion measures for predicting aerobic capacity and muscular strength, respectively, they are not recommended for large populations due to their inherent cost, equipment, and/or time requirements. A test should also provide similar results regardless of who administers it. In this regard, the push-up has also been shown to have poor reliability. Although the OPNAVINST 6110.1J provides clear guidance as to proper depth criteria (i.e., lower entire body until arms bend to at least 90°), and that only properly performed push-ups shall be counted; however, some test administrators are more lenient than others resulting in inconsistent scoring.

In addition to being valid, reliable, and feasible, a test battery should also be operationally relevant. Operational relevance (also known as face validity) refers to the extent that a particular test mimics actual occupational and/or battlefield requirements. Current research suggests that traditional military physical fitness tests have poor operational relevance. Harman et al. (18) reported that the Army Physical Fitness Test (APFT) correlated poorly to predicting success in the Special Forces Assessment and Selection Program ($r = 0.25$). Similarly, another study showed that general physical fitness test measures (e.g., push-ups, curl-ups, 1.5-mile run, 500-yd swim) were poor predictors of actual job performance for explosive ordnance disposal (EOD) divers (18). In 1985, the Navy Personnel Research and Development Center was tasked by the Commander, Naval Military Personnel Command, to identify a list of common occupational tasks requiring significant amounts of muscular strength and develop a strength test battery that could be used to properly identify personnel suitable for muscularly demanding jobs. The study revealed that the 3 most commonly performed movements requiring significant strength were lifting, carrying, and pulling–accounting for roughly 84% of all common shipboard tasks (30). These findings suggest that for the PRT to be operationally relevant, it should include tests that evaluate these specific movements–or at least select tests that accurately predict service-member performance in said movements.

Finally, the ideal test battery should include as many components of fitness as possible. The components of fitness can be broken down into 2 major categories: health related and skill related. Health-related components of fitness include body composition, flexibility, muscular strength, muscular endurance, and cardiovascular endurance (encompassing both aerobic and anaerobic capacity). Skill-related components of fitness include power, speed, agility, coordination, reaction time, and balance (2). Although this PRT incorporates several of the health-related components of fitness (i.e., body composition, muscular endurance, aerobic capacity), it contains none of the skill-related components of fitness–which are arguably the most important in terms of operational relevance.

Unfortunately, a perfect PRT may not be financially and logically possible for some populations–to include the military. As a result, organizations that require periodic fitness assessments as part of their employment criteria are forced to settle for well-designed field tests that incorporate some of the more critical components of fitness required for operational success as well as are relatively easy and inexpensive to administer.

NAVY PHYSICAL FITNESS TEST

In an attempt to improve validity and operational relevance, several of the services have made significant changes to their physical fitness tests in recent years. However, the Navy PRT has remained relatively unchanged since 1986. In response to known discrepancies with current PRT, a revised test, the Navy Physical Fitness Test (NPFT), is proposed. The composition of the NPFT is provided in Table 3. The proposed performance standards for the NPFT are provided in Table 4. Rationale for each of the modalities selected is also provided below.

Similar to the scoring systems used in the physical fitness tests used by the other services, the NPFT would be scored using a point system. Performance on each event would correlate to a specific number of points with the overall score equating to the sum of the 3 events. The proposed performance categories, which would serve both males and females, are provided in Table 5. Because the physical demands required to complete numerous job-related tasks (e.g., general quarters, weight of ordnance) within the Navy are constant and independent of age and gender, the NPFT uses a baseline standard that all naval service-members would be required to meet to pass the NPFT. However, because of the known physiological differences associated with age and gender (e.g., amount of bone and lean muscle mass, heart size and aerobic capacity, body fat percentages and distribution), these standards are different for males, females, and various age groups.

Baechle and Earle (2) recommend the following sequence of events for an exercise test battery: nonfatiguing tests (e.g., anthropometric tests); agility tests; maximum power and strength tests; sprint tests; muscular endurance tests; fatiguing anaerobic capacity tests; and aerobic capacity tests. Therefore the following order is proposed for the NPFT: plank, standing long jump, and 300-yd shuttle (or 2-km rower).

PROPOSED MODALITIES

Plank. Although curl-ups are a valid, reliable, and feasible test, they have poor operational relevance as service-members rarely perform repetitive torso flexion as a specific job task. In fact, core musculature is more frequently used to stabilize the torso to lift, push, pull, or carry (9,27). Additionally, regularly performing curl-ups may actually promote lower back injuries instead of prevent them (23). In 2005, the Army conducted a study to determine the type and location of injuries attributed to participation in the APFT for service-members attending basic combat training (n = 1,532). The findings revealed there were a greater number of injuries reported for the sit-up than for the push-up and run events combined (16). As a result, Army researchers recommended that the sit-up event be removed as a physical fitness test requirement for service-members with previous low back injuries.

Most researchers agree that the standard front plank is a much safer and more operationally relevant alternative to the curl-up. Although disputed by the findings of Whitehead et al. (37), other studies have shown the plank to have acceptable intrarater (Intraclass Correlation Coefficient [ICC] = 0.83), inter-rater (ICC = 0.62), and test-retest (ICC = 0.63) reliability (5). These findings would suggest that the plank is both a valid and reliable field test.

Standing long jump. Several studies have shown the standing long jump to correlate well with lower-body muscular strength (r = 0.829–0.864). Castro-Pinero et al. (8) also reported high correlations (r = 0.694–0.851) between the standing long jump and various upper-body muscular strength tests (i.e., basketball throw, push-ups, isometric strength exercises). Carlock et al. (7) reported a strong correlation between the countermovement vertical jump and the 1RM squat (r = 0.92). Jump tests, such as the vertical jump and standing long jump, are quick and easy tests to administer that seem to be a reliable indicator of both muscular power and strength (8,22,35).

In 2008, the Army conducted a study to determine which field tests best prepared service-members for the rigors of the battlefield. Of all of the tests evaluated (i.e., push-ups, sit-ups, 3.2-km run, vertical and horizontal jumps), the horizontal and vertical jump had the highest correlation with simulated battlefield tasks (r = 0.77–0.82). These findings suggest that the explosive nature of the horizontal and vertical jump is highly correlated to the kinds of short-duration high-intensity movements required on the battlefield (18). However, none of the other events used in the APFT (i.e., push-ups, sit-ups, and 3.2-km run) correlated well with the ability to generate lower-body explosive power. As a result, Harman et al. (18) recommends the Army include a jump test to its physical fitness test to improve service-member jumping ability which, in turn, would likely improve their

Table 3
Proposed Navy Physical Fitness Test

Muscular endurance	Aerobic endurance	Muscular strength
Plank	300-yd shuttle	Standing long jump
	2K rower[a]	

[a]Requires medical waiver.

Table 4
Proposed NPFT Performance Standards

Male					Female			
Plank	SLJ (cm)	300-yd shuttle	2K rower	Points	Plank	SLJ (cm)	300-yd shuttle	2K rower
4:00	275	00:55	07:00	100	4:00	225	01:00	08:00
3:58	272	—	07:06	99	3:58	222	01:01	08:06
3:56	270	00:56	07:12	98	3:56	220	01:02	08:12
3:54	267	—	07:18	97	3:54	217	01:02	08:18
3:52	265	00:57	07:24	96	3:52	215	01:03	08:24
3:50	262	—	07:30	95	3:50	212	01:04	08:30
3:48	260	00:58	07:36	94	3:48	210	01:05	08:36
3:46	257	—	07:42	93	3:46	207	01:06	08:42
3:44	255	00:59	07:48	92	3:44	205	01:07	08:48
3:42	252	01:00	07:54	91	3:42	202	01:08	08:54
3:40	250	01:01	08:00	90	3:40	200	01:09	09:00
3:38	247	01:02	08:06	89	3:38	197	01:10	09:06
3:36	245	01:02	08:12	88	3:36	195	01:11	09:12
3:34	240	01:03	08:18	87	3:34	190	01:12	09:18
3:32	235	01:04	08:24	86	3:32	185	01:13	09:24
3:30	230	01:05	08:30	85	3:30	180	01:14	09:30
3:28	229	01:06	08:33	84	3:28	179	01:15	09:33
3:26	228	01:07	08:36	83	3:26	178	01:16	09:36
3:24	227	01:08	08:39	82	3:24	177	01:17	09:39
3:22	226	01:09	08:42	81	3:22	176	01:18	09:42
3:20	225	01:10	08:45	80	3:20	175	01:19	09:45
3:18	224	01:11	08:48	79	3:18	174	01:20	09:48
3:16	223	01:12	08:51	78	3:16	173	01:21	09:51
3:14	222	01:13	08:54	77	3:14	172	01:22	09:54
3:12	221	01:14	08:57	76	3:12	171	01:23	09:57
3:10	220	01:15	09:00	75	3:10	170	01:24	10:00
3:08	219	01:16	09:15	74	3:08	169	01:25	10:15
3:05	218	01:17	09:30	73	3:05	168	01:26	10:30
3:00	217	01:18	09:30	72	3:00	167	01:27	10:30
2:55	216	01:19	09:45	71	2:55	166	01:28	10:45
2:50	215	01:20	10:00	70	2:50	165	01:29	11:00
2:45	210	01:21	10:02	69	2:45	164	01:30	11:02
2:40	205	01:22	10:05	68	2:40	163	01:30	11:05

Table 4 (continued)								
2:35	200	01:23	10:07	67	2:35	162	01:31	11:07
2:30	195	01:24	10:10	66	2:30	161	01:32	11:10
2:25	190	01:25	10:12	65	2:25	160	01:33	11:12
2:20	185	01:26	10:15	64	2:20	158	01:34	11:15
2:15	180	01:27	10:17	63	2:15	156	01:35	11:17
2:10	175	01:28	10:20	62	2:10	154	01:36	11:20
2:05	170	01:29	10:25	61	2:05	152	01:37	11:25
2:00	165	01:30	10:30	60	2:00	150	01:38	11:30

NPFT = Navy Physical Fitness Test; SLJ = Standing Long Jump.

ability to fight and survive on the battlefield. These findings agree with other studies that have shown the ability to generate power is especially important in explosive movements such as sprinting and jumping. The standing long jump is recommended over the vertical jump because it more closely mimics several of the tasks service-members may encounter on the battlefield (e.g., traversing obstacles) (18).

Three hundred–yard shuttle. As described previously, each service currently uses a distance run test to evaluate aerobic capacity. These tests are easy and time efficient to administer and correlate well to $\dot{V}O_2$max ($r = -0.84$) (6). However, these tests require an optimal pacing strategy and adequate levels of motivation to sustain maximum effort for the entire test duration (1). Additionally, these tests may contribute to lower-body overuse injuries. For example, the Army reported an injury rate of 75 and 78% for males and females completing basic combat training–with the majority of injuries occurring in the lower back and lower body (16). It is quite probable that the majority of these injuries were caused by the high volume of running being performed by the service-members as they "train to the test."

As a result, Army researchers are now recommending interval training (e.g., shuttle runs) as an effective means of building speed, stamina, and preparing for the APFT without the risk of running over a service-member's volume threshold (16). Additionally, several foreign military services are using shuttle runs in lieu of distance runs to evaluate the aerobic capacity of their military personnel (1). Research suggests that shuttle run performance correlates well to distance run tests, and therefore, conducting both may be redundant and unnecessary (1).

Shuttle run tests also offer several advantages over traditional distance runs in that they can be performed indoors or outdoors and incorporate multiple components of fitness (e.g., aerobic capacity, anaerobic capacity, speed, agility, coordination). Additionally, shuttle tests have be shown to have high reliability {$r = 0.99$ (hexagon multilevel running aerobic test 10 m [$HMRAT_{10\ m}$]); $r = 0.95$–0.96 (20-m shuttle run); $r = 0.96$ (300-yd shuttle)} and correlate well with measured $\dot{V}O_2$max ($r = 0.82$) (1,28,33). Shuttle tests also offer improved operational relevance as well since they rely heavily on anaerobic capacity, lactate threshold, running economy, and the ability to tolerate high levels of fatigue (1). According to Aandstad et al. (1), shuttle tests not only provide an assessment of aerobic capacity but also reflect a participant's total work capacity thereby providing a more complete picture of the service-member's level of physical readiness.

The 300-yd shuttle is recommended over other shuttle run tests because it is one of the easiest shuttle tests to administer and does not require the use of audio signals, forced pacing strategies, and $\dot{V}O_2$max predictive equations for performance estimation.

Table 5
Proposed NPFT Performance Categories (male/female)

	≤34 y	35–44 y	45–54 y	55+ y
Maximum	300	285	260	240
Outstanding	275	260	235	220
Excellent	250	235	215	200
Good	225	215	195	190
Satisfactory	180	180	180	180

NPFT = Navy Physical Fitness Test.

Two-kilometer rower. As documented in Table 2, the Navy currently uses a 500-yd swim, 450-m swim, 12-minutes elliptical trainer, and 12-minutes stationary bike test as an alternative to the 1.5-mile run. However, there are some concerns with each of these tests that may question their legitimacy for inclusion into the PRT. Another alternate aerobic capacity test option for those service-members that are either physically unable or medically discouraged to run is the 2-km rower. Similar to the other tests, the rower is a low impact means of assessing aerobic fitness. The rower also offers several advantages over the other tests. Unlike elliptical trainers and stationary bikes, concept 2 rowers are self-calibrating. The performance monitor calculates power based off the energy dissipation that occurs at the flywheel. In other words, the rower continuously monitors changes in the drag factor (i.e., numerical value for the rate at which the flywheel is decelerating) and compensates by calculating an equivalent value for power and pace before sending the data to the display. Soper and Hume (35) have shown the concept 2 rower to have high test-retest reliability (r = 0.96) and a small standard error of the mean (%SEM = 0.8–2.9). Additionally, rowing tests have also shown to correlate well to $\dot{V}O_2max$ (r = 0.98) (34).

A 2-km race distance is recommended because it had the most reliable mean power estimates when compared with other row distances (e.g., ICC = 0.88–0.99 [2 km]; ICC = 0.88 [5 km]) (32).

MODALITIES ELIMINATED

Push-ups. As mentioned previously, the current push-up test is shown to have poor reliability due to differences in inter-rater scoring. The push-up is also shown to have poor operational relevance because it does not correlate well with or mimic the majority of job specific tasks performed by service-members. Additionally, it is difficult for service-members to self-regulate proper technique (e.g., lowering the entire body until there is at least a 90° bend at the elbows) while performing the test–especially as they become more fatigued. It has been demonstrated that push-ups are not a good predictor of upper-body maximal strength since they have only a modest correlation (r = 0.61) with other upper-body muscular strength tests such as the 1 repetition maximum (RM) bench press (36).

Five hundred–yard/450-m swim. The swim was first added to the PRT in 1986 as an alternative aerobic capacity test for service-members unable to participate in the 1.5-mile run due to medical problems. Although numerous jobs within the Navy require service-members to work on or near water, very few require them to work in the water. Furthermore, swim tests are already in place for those jobs that require service-members to be in the water (e.g., Sea, Air, Land Teams [SEALs], explosive ordnance disposal (EOD), Navy diver, rescue swimmers). In other words, although it may be worthwhile for all naval service-members to know how to swim, it does not mean that swimming in itself is operationally relevant for most service-members. In 1988, the Naval Health Research Center (NHRC) conducted a study evaluating the validity of the 500-yd swim. The findings suggested that the swim test is not a valid method for assessing aerobic capacity because it correlated poorly with both $\dot{V}O_2max$ (r = −0.32) and 1.5-mile run time (r = 0.44). Instead, swim skill was determined to be the best independent predictor of 500-yd swim time (r = −0.83) (6). As a result, NHRC recommended that the Navy reconsider the use of the 500-yd swim test as a medical alternative to the 1.5-mile run.

Twelve-minute elliptical trainer/12-minute stationary bike. In 2006, NHRC conducted a study to determine the feasibility of adding an elliptical trainer test to the PRT (20). Additionally in 2007, NHRC conducted a follow-on study to determine the feasibility of adding a stationary bike test (21). NHRC developed prediction equations to convert the number of calories burned in 12 minutes to an estimated 1.5-mile run time. Despite the Navy's rationale for additional tests for evaluating aerobic capacity, the 12-minute elliptical trainer and stationary bike tests are not viable alternatives to the 1.5-mile run for several reasons. First, and most importantly, both tests have proven to have known reporting inaccuracies. For example, the average predicted 1.5-mile run time for the elliptical trainer was calculated to be 1:33 minutes faster than the average measured run time, which was determined to be statistically significant (t = −8.09) (25). Second, said devices cannot be calibrated, and therefore make it is impossible to verify the accuracy of the reported caloric expenditure. According to the American College of Sports Medicine, electronic devices that cannot be calibrated should not be used for official testing (26). Third, because said devices cannot be calibrated, each model of elliptical trainer and stationary bike must be validated using indirect calorimetry–which imposes a tremendous cost burden on the Navy as well as a time burden on the test administrators as each model (i.e., 35 different elliptical trainers and 7 stationary bikes) uses a different test protocol and prediction equation.

REVISED AGE CATEGORIES

The age-associated loss of skeletal muscle mass (aka sarcopenia) is well documented in the literature. The gradual loss of muscle mass seems to be inevitable and is likely responsible, at least in part, to the decline in muscular strength with age. Research has shown that strength peaks for most individuals around the age of 25–35 years. After the age of 30, strength declines at a rate of 10–15% per decade and continues to decline 12–14% per decade after the age of 50 (3,15). However, this gradual loss of strength is not considered to be functionally significant until after the age of 55 or 60 years for most adults (15). Similar findings are reported for aerobic capacity and athletic performance. One study reported a gradual decline in $\dot{V}O_2max$ of approximately 0.5% per year from the age of 40–59 years and 2.4% per year after the age of 60 years. Ransdell et al. (29) also reported that athletic performance declines with age and that the decline is more pronounced in running events than swimming or cycling events and is more pronounced in female athletes than male (4,15,17,31).

Although numerous studies have postulated as to what causes these age-related decreases in physical capacity (e.g., changes in hormonal factors and/or muscle contractile function), many researchers now believe that it may be a result of a sedentary lifestyle (4). It seems that reductions in training volume and intensity are likely contributors to the age-related decline in maximal heart rate, $\dot{V}O_2$max, and athletic performance (29).

Collectively, these findings justify the rationale for implementing age-specific performance standards. However, these findings do not support the rationale for dividing the age standards into 5-year increments (e.g., 17–19, 20–24, 25–29, 30–34) as currently used in the PRT. Instead, these findings seem to support the following gender-specific age categories: $\leq$34, 35–44, 45–54, and 55+. If implemented, this would reduce the number of age categories from 11 to 4.

CONCLUSIONS

The purpose of any physical fitness test is to accurately assess the performance capabilities and limitations of those tested. Physical fitness tests should be valid, reliable, feasible, and relevant to the tasks and activities performed in the particular sport and/or job for which it is administered. Although criterion measures (e.g., indirect calorimetry, 1RM bench press) provide the most accurate assessments, simple field tests are often used instead due to their simplicity and ease of administration. Since 1980, military services have used physical fitness tests to assess the physical readiness and battlefield capabilities of their service-members. The DoD 1308.3 mandates that the services evaluate aerobic capacity, muscular strength, and muscular endurance, although it is left up to the individual service to determine which test(s) to use to assess each component. In an attempt to ensure accuracy and relevance of the information reported, most of the services have made significant changes to their physical fitness tests in recent years. However, the Navy's Physical Fitness Test has remained relatively unchanged since 1986. The proposed NPFT would significantly improve the validity, feasibility, and operational relevance of the Navy's Physical Readiness Program. It would eliminate several of the alternate aerobic capacity tests that are proven to have low validity (i.e., 500-yd/450-m swim, 12-minute elliptical trainer/stationary bike) as well as incorporate new events that are shown to have significant operational and battlefield relevance (i.e., plank, 300-yd shuttle, standing long jump). Additionally, the NPFT is significantly more cost-effective and easier to administer and score than the current PRT.

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