USAWC STRATEGY RESEARCH PROJECT

FITNESS AND ITS AFFECTS ON THE MILITARY

by

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ABSTRACT

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The purpose of this research paper is to look at the different aspects of fitness in our military services to determine if the programs are adequate. Do we need to have different levels of physical fitness standards based on the types of duty assignments among our military service members? For example: Does a military supply clerk have to have the same fitness standards as a combat soldier? In order to answer these questions, we need to first take a closer look at the different military fitness programs and the way they look at acceptable fitness levels among their military members. It is perceived that throughout our military history, physical fitness has been a cornerstone for all our personnel among the various Armed Forces. The military, in general, feel that the physical conditioning of our soldiers has enhanced success on a very stressful and physically demanding battlefield throughout past conflicts. It is an essential part of our everyday life in serving the United States in both peacetime and wartime. A good fitness program assists in accomplishing better performance and overall good health.

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FITNESS AND ITS AFFECTS ON THE MILITARY

The purpose of this research paper is to look at the different aspects of fitness in U.S. military services to determine if the programs are adequate. The Services may need to have different levels of physical fitness standards based on the types of duty assignments among military Service members. For example: Should a military supply clerk have to have the same fitness standards as a combat soldier? In order to answer these questions, need to first take a closer look at the different military fitness programs and the way they look at acceptable fitness levels among their military members. It is perceived that throughout military history, physical fitness has been a cornerstone for all personnel among the various Armed Forces. The military, in general, feel that the physical conditioning of soldiers has enhanced success on a very stressful and physically demanding battlefield throughout past conflicts. It is an essential part of everyday life in serving the United States in both peacetime and wartime. A good fitness program assists in accomplishing better performance and overall good health.

The question is not that physical fitness is important, but how can measure and performance be conducted. The concept is to have military members participate in, and evaluated on, their level of fitness based on a standardized fitness conditioning and evaluation process. Each of the military services has different styles of conditioning programs and various ways and standards to measure overall physical condition. Another way in which the different Services measure physical conditioning is through body weight. All the different military Services conduct an annual or semi-annual weigh-in. This is a way to see if an individual is within a normal standard of where their weight falls in regards to recommended medical health charts for various ages and height.

Each of the Services has its own directives that govern Physical Fitness programs. For the Army, it is the Field Manual 21-20, Physical Fitness Training (1998). For the Air Force, it is the Air Force Instruction 40-501, the Air Force Physical Fitness Program (1998), and AFI 40-502, the Weight Management Program (1994). For the Navy, it is Navy Instruction 6110.1E (1998), and for the Marines it is Marine Corps Order 6100.3J Physical Fitness (1998) and Marine Corps Order 61001B Weight Control and Personal Appearance (1993).[1]

A closer look at each of the four services will identify the similarities and philosophy pertaining to Physical Fitness. The Army stresses the importance of physical fitness through good leadership, proper exercise techniques, nutrition, and environmental conditions. The Army mandates a vigorous program consisting of physical training three to five times per week. There is a four-week course to qualify personnel to be the experts in fitness training and in conducting

Physical Fitness Tests. These individuals are called Master Fitness Trainers, responsible for training others in the area of fitness through sound, safe exercise programs. In order to measure the effectiveness of these Physical Training (PT) programs, the Army administers a semi-annual PT Test to measure the soldier's Physical condition. This is done by evaluating three different events that include a 2 mile timed run, push-ups, and sit-ups. This test is based on a points system to determine if the individual passes or fails the test.[2]

The Air Force also stresses the importance of a good Physical Fitness Program. Command emphasis is given to provide actual duty time for each person to exercise. The fitness concept is centered on individual physical training allowing each to set an individual pace. The Air Force also incorporates a fitness test to measure a person's fitness condition. It is based on cycle ergometry. This test is to measure the effectiveness of the Physical Fitness Program based on aerobic capacity. The results of the test are used more for a screening process on the program rather than an actual evaluation of fitness of the individual. The Air Force tests the heart rate to estimate the volume of oxygen consumed to determine the best course for optimal good health and fitness.[3]

The Navy's fitness program is basically the same as the Army and Marine Services. It too stresses the importance of a good Physical Fitness Program to be a part of every sailor's daily life. The Navy has several levels of formalized training to certify personnel to administer, conduct, and supervise fitness training and assessments. Mission readiness and operational effectiveness is contingent upon a good physical fitness program that reflects conditioning and good health. There is a formalized Command Fitness Enhancement Program to assist in increasing and maintaining each sailor's over all cardio respiratory fitness, muscular strength and endurance, flexibility, and reduction in excess body fat. The Navy has a Physical Fitness Assessment to measure both health and physical conditioning. The Navy's Physical Fitness Test is also semi-annual and encompasses four events. These events, sit and reach, push-ups, curl-ups, and either a 1.5 mile run or 500 yard swim, are scored on a point system similar to the Army's Fitness Test structure.[4]

Physical Fitness excellence is an important part of the Marine Corps. It focuses on combat conditioning, which stresses good health, excellent fitness, and unit cohesion. The common goal of the Marine Corps is to conduct regular exercise, fitness tests, and health education. This will enhance soldier's physical performance both on and off the battlefield. The commander will assign a Command Physical training Representative to administer physical conditioning, testing, and remedial programs. It is a requirement for every Marine to participate in PT a minimum of three hours per week and have a fitness test semi-annually. The events

used to measure physical strength and endurance are the pull-ups and flexed-arm hang. The abdominal crunch and three mile timed run are the other events administered during the Marine fitness test. This is an evaluation based on a point system adjusted according to age group to determine the level of physical conditioning for each Marine.[5]

As shown from each of the U.S. military Services, Physical Fitness Programs are instituted to condition and test personnel in over-all physical condition and health. There are a few distinct differences among the Services. One of these is the assessment of flexibility administered by the Navy. The Air Force is the only service that leaves fitness conditioning up to the individual. The consensus across the board is the positive impact physical fitness has on an individual's health. It is proven time and time again that a regular exercise program and good nutritional habits will produce better alertness, mental, and physical health. In order for Soldiers, Airmen, Sailors, and Marines to be effective in combat, they need to be in the best physical condition to endure all the stresses associated with a wartime environment.

IMPORTANCE OF PHYSICAL FITNESS FOR GOOD HEALTH AND PERFORMANCE.

It is important to understand why each Service has a common goal to increase and maintain good physical fitness for their service members. According to article, Fitness Fundamentals, it said, "fitness is the ability to perform daily tasks vigorously and alertly, with energy left over for enjoying leisure-time activities and meeting emergency demands. It is the ability to endure, to bear up, to withstand stress, to carry on in circumstances where an unfit person could not continue, and is a major basis for good health and well-being."

In order to reach a good fitness level of conditioning, it is important to know and understand the four components of physical fitness. The first component is cardio respiratory endurance. This is the ability or efficiency for the body to deliver oxygen and nutrients to muscle tissues and to remove wastes over sustained periods of time. The second component is muscular strength. This is the ability or efficiency of the muscle to exert force for a brief period of time. The third component is muscular endurance. This is the ability or efficiency of the muscles to sustain repeated contractions or to continue applying force against a fixed object. The fourth component is flexibility. This is the ability or efficiency to move joints and use muscles through their full range of motion. Body composition also plays a key role in physical fitness. It refers to the makeup of the body in terms of lean mass to include muscle, bone, vital tissue and organs, and fat mass. This is a good measure of an individual's level of fitness based on the optimal ratio of fat to lean mass. In order to maximize the efficiency of all these fitness components, one needs to incorporate exercises tailored to optimize these muscle

groups. The military is constantly striving to train as well as to fight. This needs to be the same philosophy for physical fitness, that is, train the cardiovascular and muscle groups specifically utilized on the battlefield or combat environment.

It is important to understand that physical fitness is a cornerstone for the ability to fight and win wars. Ronald Reagan stated on December 10, 1982 that, "The preservation of America's freedom is dependent on a strong defense. Our Armed Forces must be mentally and physically prepared at all times, leaving no doubt about this nation's will and ability to defend itself. For this reason, it is necessary to better understand the importance of physical fitness. Even with today's modern weapon systems, it is the Service man and woman who are physically, mentally, and spiritually ready to serve their country who will make the difference in any future conflict."[6] This same philosophy has been incorporated into the Armed Forces policies and regulations to ensure every military member achieves and maintains a level of physical fitness and good health to allow productivity in various duties and assignments.

Some ways to get the best out of these major fitness components will be discussed. There have been several scientific studies conducted by both military and civilian research institutions that demonstrate the importance of regular exercise to achieve a healthy life-style. One of these institutions is the American College of Sports Medicine (ACSM). The ACSM recommends a fitness program that incorporates aerobic activity involving 20-60 minutes of continuous exercise five to seven days a week. They also recommend stretching exercises to enhance flexibility. This should focus on the lower back and thighs for a minimum of three times per week. Daily stretching should be routine in all exercises performed. The last recommended activity is strength training. This should involve up to ten separate exercises that encompass the major muscle groups. This should include two to four sets of eight to twelve repetitions each until the point of muscle fatigue.[7] These are the basics for developing fitness programs to meet individual needs. For the military, it is a starting point to establishing a program that covers the basics while encompassing the elements that provide optimal performance under strenuous physical activities. A good physical fitness program conducted on a regular basis has been proven to decrease the possibility of heart disease, high blood pressure, and other related diseases. Besides all of these benefits, medical costs for the Armed Forces are reduced. Personnel who are physically fit are normally in very good health, which reduces illnesses and disease.

DOWNSIDE TO STRENUOUS PHYSICAL FITNESS PROGRAMS

There are some of the negative impacts of the robust programs conducted in the military. The Army Medical Department Center and School at Fort Sam Houston, Texas has conducted studies to research physical injuries due to strenuous military fitness programs. Most of these data collected focused on basic trainee populations. This institution reviewed approximately 339 medical records from a total of around 3,200 light infantry Soldiers over 13 months. The Army Medical Department concluded that the annualized incidence of injuries was 95 per 100 soldiers per year vs. 74 per 100 for illness. There were 372 injuries, representing 56% of sick-call diagnoses. Physical training caused 50% of all injuries, and 30% of those were linked to running. These type injuries caused nearly ten times the number of limited duty days as illness. Soldiers with these lower extremity-running injuries spent seven times more days on profile than those with nonrunning injuries.[8]

Another study conducted by the Occupational Medicine Division, U.S. Army Research Institute of Environmental Medicine, Natick Massacusitts concluded that injuries are a common occurrence in young, active civilian and military populations. They examined approximately 298 male soldiers assigned to an infantry battalion in Alaska. They reviewed their physical fitness records assessed from the 2-mile run, sit-ups, and push-ups. There were injuries documented from a retrospective review of the Soldiers' medical records for a 6-month period before the fitness testing. Fifty-one percent of the soldiers suffered one or more injuries. The most common injury diagnosis was musculoskeletal pain, followed by strains, sprains, and cold-related injuries. According to this study, Soldiers experienced a total of 212 separate injuries, which resulted in 1,764 days of limited duty. The annualized injury rate was 142 injuries per 100 Soldiers (a Soldier could experience more than one type of injury). The interesting results showed that the proportion of Soldiers injured decreased as age increased. Slower 2-mile run times and fewer sit-ups were associated with a higher incidence of musculoskeletal injuries. The final analysis from this particular study documents the injury incidence in infantry Soldiers and identifies younger age and low physical fitness as potential risk factors for these injuries.[9]

The last study presented for discussion was from the Department of Physical Medicine and Rehabilitation from Johns Hopkins University School of Medicine, Baltimore, Maryland. They looked at both athletic injuries and physical training from an Army database of all hospital admissions for active duty Army personnel in the 1989-1994 period. During this six year period reviewed, there were 13,861 hospital admissions for injuries resulting from sports or Army physical training. Out of these 13,861 soldiers, 94% were men and 6% were women. The rates of sports injuries were 38 and 18 per 10,000 person-years for men and women. These sports

injuries accounted for an average of 29,435 lost duty days each year. Acute musculoskeletal injuries in the categories of fractures, sprains/strains, and dislocations accounted for 82% of all injuries. The knee (particularly the Anterior Curciated Ligament (ACL)), was identified as the most often injured body area in both genders. The highest rate of injuries for men was from basketball and football. The highest rate of injuries for women was the Army physical training and basketball. The leading cause of lumbosacral strains for both genders came from the Army physical training. The final conclusion to this study was that the sports and Army physical training injuries accounted for a significant amount of lost duty time which impacted military readiness.[10]

There is a probability of acquiring injuries in participating in any type of physical fitness. The examples of injuries from these research studies show that it is important for the military to identify how to minimize the risk by providing guidance that incorporates a thorough warm-up period that encompasses stretching type exercises that will be effective. The benefits from the physical fitness programs in place today may outweigh the risks of these sports and exercise-induced injuries. Even though some of these studies showed a fairly significant impact on loss of duty days due to fitness related injuries, what would be the impact of not requiring optimal fitness among military service members versus the impact of redefining optimal fitness? As discussed earlier, there seems to be more significant problems that result in someone who is sedimentary or hardly ever exercises. Not only does this increase chance of various diseases, it also impacts flexibility, which could hamper mobility during elderly years of life. Obesity is known as the primary culprit for a lot of health problems. The only way to keep weight within a healthy range is by diet and exercise. Even though physical fitness programs may cause potential muscle and bone type injuries, it does not seem to compare to the numerous health problems perceived by a lack of exercise in a person's daily life. It is also perceived that good fitness could potentially extend longevity and improve the quality of life.

PREVENTING OR MINIMIZING PHYSICAL FITNESS INJURIES

In order to create a good injury prevention program, it must be understood what increases risk of injury and to act on this risk to minimize these injuries. Based on research conducted by the Army Physical Fitness Research Institute (APFRI) at the U.S. Army War College, there are two risk factors to help understand how to reduce these risks. The first types of risk factors are "extrinsic," which means that they are characteristics of the environment in which exercise is performed. Some of these extrinsic risk factors include running distance, running shoes, and the weather. Each one of these risk factors may involve risks. According to the APFRI study, it

has been shown that as the distance of running increases, so does the risk of injury. If this is the case, it makes sense to limit mileage of running to the minimum required for good health and/or fitness.[11] Dr. Michael Pollock conducted a study that analyzed the association of frequency and duration of running with injury incidence.

EFFECTS OF FREQUENCY AND DURATION OF RUNNING ON INJURY INCIDENCE AND AEROBIC FITNESS

Exercise Frequency			Exercise Duration		
Frequency (days/wk)	Injury Incidence (%)	Aerobic Fitness Improvement (%)	Duration (min/day)	Injury Incidence (%)	Aerobic Fitness Improvement (%)
0	0	-3.4	0	0	0.7
1	0	8.3	15	22	8.7
3	12	12.9	30	24	16.1
5	39	17.4	45	54	17.0

TABLE 1

According to these figures, the frequency of more days results in more fitness as well as an increase of injury rates. These rates between fitness and injuries are disproportionate. When it comes to the amount of time spent exercising for each session, there seems to be little change in fitness after 30 minutes of exercise. With injury, the rates more than doubled at 45 minutes of exercise. Even though 30 minutes is not a magic number, it may be a good guideline to keep in mind. While performing exercise five days per week for a 30-minute duration gives a substantial increase in aerobic fitness improvement, it also minimizes the rate of injury incidence. Another extrinsic risk factor that plays a key role in stress fracture type injuries are running shoes. It is taken for granted that what is worn for exercising is something that does not get much attention. According to a study conducted by Dr. Lytt Gardner, Marine recruits at Parris Island who began training with newer running shoes had a lower incidence of stress fractures than those that had shoes several months or a year old. Support and cushioning ability comes from running shoes. It is very important for one to periodically examine running shoes to determine the degree of wear and tear. It is time to replace running shoes when this bottom layer is worn. This is an investment that could significantly reduce chances of getting any stress related injuries to legs and feet. When looking for what type of shoe to purchase, look for shoes that provide good shock absorbency and traction. According to Dr. Gardner's study, when purchasing running shoes it is important to make sure there is a good fit;

not too loose or too tight, and that also support the balls of feet. The last extrinsic risk factor is the weather. As the weather gets warmer more effort and fatigue sets in at a faster rate. Studies conducted by the APFRI have also concluded that there is an increase in injuries to the bones, muscles, and joints with an increase in warm weather. The best way to minimize the risks is to slow down and possibly exercise for shorter periods of time when the weather is hot or humid. It is also imperative to always keep hydrated in any environment.[12]

The second types of risk factors are "Intrinsic," which means that they are characteristic of an active person. These risk factors include prior physical activity, physical fitness, aerobic fitness, muscular endurance, flexibility, past injuries, cigarette smoking, life and job satisfaction, gender, age, anatomic factors, foot arch height, and knee alignment. Each of these factors can impact fitness as it relates to possible injuries. The first of these risk factors is prior physical activity. It is common sense to understand that a person who has not been physically active in the past is more vulnerable to injury when it comes to physical activities. By living a sedimentary type life, the stronger muscles, bones, and joint structures that tend to resist injury are not developed. That is why it is important to start a fitness program with easy and short duration type exercises to minimize possible injuries. After one starts to develop more strength and endurance, one can increase the intensity and length of physical activities.[13]

The overall aerobic fitness and muscular endurance is about physical fitness. Low aerobic fitness and low muscular endurance will have a higher risk for injury. Further, it is important to participate in an activity of sufficient intensity, frequency, and duration to increase and enhance overall fitness. The more fit one is, the less susceptible one is to injuries. It has been suggested by the Executive Health and Fitness Guide that flexibility along with good stretching and warm-up activities prior to starting physical activity is an excellent way to minimize risk of stress and muscle related injuries. By having good warm-up and stretching activities, increased body temperature and blood flow in muscles will not only reduce possibility for injury, it will also increase the flexibility in joints involved in the activity. The easiest and most valuable type of warm-up activity is to start the activity very slowly and then gradually increase the intensity as heart rate increases. For example: If one is going out for a run, one may want to start out walking then go into a slow jog and then into a quicker pace as the body starts to warm-up to that activity. It is also good practice to adequately stretch before and after your physical fitness activity.[14]

If a past injury exists, it may increase the risk for future injury. People who have suffered an ankle sprain in the previous four to five years were more likely to suffer another sprain. It is important to see a health care provider to ensure the proper medical prevention measures for

that past injury. Again, this is another reason why it is so important to have a good stretching and warm-up before starting a particular exercise or physical fitness event.

THE IMPORTANCE OF FITNESS TEST TO MEASURE OVERALL PHYSICAL PERFORMANCE

Fitness programs need to be designed to produce optimal conditioning while minimizing injuries. In order to have a better understanding of the importance of how the military evaluates the success of these fitness programs, the different fitness test need to be viewed in more detail. In order to help improve on peak physical performance, the armed forces are continually looking at better ways to improve physical training tests. Each Service, based on its mission profile, drives its physical fitness requirements and the different ways to measure physical fitness.[15] As mentioned earlier, the Army, Navy and Marines evaluate physical fitness among its Service members twice a year, where the Air Force only tests its Service members once a year. For the Air Force, the physical fitness evaluation consists of a stationary bike event, which tests the heart rate response to a given workload. This single event replaced the Air Force 1.5 mile run and 3 mile walk. Their main concern regarding fitness performance is the aerobic capacity. This stationary bike event consists of a warm-up period that increases into a normal workload. The service member pedals for eight to fourteen minutes. The tests monitor the volume of oxygen consumed during the workload period to provide an accurate aerobic capacity score. By monitoring the heart rate during this test period, the evaluators can prevent people from over exerting themselves. According to the Air Force, this prevents personnel from pushing themselves to a point of injury or even death. The duration of the actual increased workload portion of the stationary bike test is approximately six minutes, which is enough time to get an accurate read on aerobic capacity of that individual.[16] Based on the Air Force's continued research on physical fitness, they are looking at revamping their fitness test to incorporate strength and flexibility components to get a better overall fitness performance measurement.

The Army bases its physical fitness test on three events as stated earlier in this paper. The push-ups and sit-ups are timed for a two-minute duration to determine the muscle strength and endurance. The push-ups have to be performed according to the Army fitness regulations to be counted correctly during the event. This also applies to the push-ups. The hands have to remain interlocked behind the head during the whole repetition. The last event provides a good measure for aerobic performance that consists of a timed two-mile run. The Army physical fitness test is evaluated using a point system based on the individual's age and gender to determine the level of physical fitness. The Army is currently looking at new fitness events to

add to this test in order to enhance individuals' ability to better determine a service members level of physical fitness.

The Navy has four events incorporated into its physical readiness test. The difference in the Navy is the event that measures the Service member's flexibility and abdominal muscle endurance. This event is called the sit-reach. This is where the member sits on the ground with legs extended, feet together, and pointed up, and knees slightly flexed. The individual reaches slowly forward and touches the toes with the fingertips of both hands at the same time. That reach is held for one second in order to be counted as satisfactory. The second abdominal event is the curl-ups. This is similar to the Army's sit-ups, but the arms are folded across the chest and the knees are bent. This is to help prevent muscle injury to the neck. This event, along with the push-ups, is counted based on a two-minute time limit. There are two events that can be used to measure cardiovascular endurance. One is the 1.5 mile run/walk, and the other is the 500 yard or 450 meter swim. The Navy also uses a 300 point system to determine the physical fitness score for the test.[17]

Like the Army and Navy, the Marines use a 300 point system for determining the over-all fitness score of their service members. The Marine physical fitness test consists of three events that also measure muscular strength, endurance, and cardiovascular endurance. The first event is the pull-up in which the individual has to perform as many accurate and complete pull-ups before dropping off the bar. This is the only physical fitness test event that is not timed. The female Service members will conduct the flexed arm hang in which they hang as long as possible before dropping from the bar. The second event, used to measure abdominal muscle endurance, is the abdominal crunch. This event is similar to the Navy's curl-up event in which the member completes a sit-up with arms across chest. The last event conducted in the Marine physical fitness test is the 3 mile run. The Marine Corps believed that in order to get a good assessment of an individual's cardiovascular endurance capability is to evaluate individual time on a three mile run along a relatively flat surface. Obviously, the different Services have various ways to evaluate the level of physical fitness.[18]

Although the concept of measuring muscular strength and cardiovascular endurance is basically the same among the different Services, weighing the scoring is a little different. Here is an example using a 22 year old male and female and what must be done to receive a perfect score of 300 points in each service: Marine men must perform 20 pull-ups, 100 sit-ups, and run three miles in 18 minutes. Women Marines must hold the flexed-arm hang for 70 seconds, do 100 sit-ups and run three miles in 21 minutes. Army men must perform 75 push-ups, 80 sit-ups and run two miles in 13 minutes. Army women must do 46 push-ups, 80 sit-ups and run two

miles in 15:35. Navy personnel, regardless of age or gender, must perform 67 push-ups, 100 curl-ups, and run 1.5 miles in 8:10 to score 300. For the Air Force, the men must perform a minimum of 35 and women at least 27 on the cycle ergometry test. This number represents the amount of oxygen taken in over a given period of time and how well it is used by the muscles.[19] As you can see each service has specific goals and mission needs to determine their own criteria for the amount of points a service member can score to receive a max on a physical fitness test.

A significant amount of research has been conducted by all the Services to determine the most appropriate values when calculation the fitness level of an individual. This research has shown that age may produce a gradual decline in the amount of physical performance when participating in a military fitness test. There are physiological differences between genders that need to be considered in order to get a fair assessment of over-all fitness performance or status. There are several differences that have to be weighed in the evaluation charts to allow for an equal assessment between males and females. Physical size, muscle mass, amount of fat, bone structure, heart size and rate, flexibility, lung capacity, and response to heat are all components that show significant physical differences between the genders. These components are taken into consideration when deciding the appropriate measurement for scoring on a fitness evaluation. This is why there is a point difference on the amount and time a man and woman receive for an over-all physical fitness score. It is important for leaders to understand that women have physiological limitations which generally preclude similar performance on same events. In order for everyone to receive the maximum benefits from training, leaders need to incorporate an exercise and evaluation program that takes these physiological differences into consideration. This is the only way to get a fair and accurate assessment from each individual to equally provide a successful physical fitness program. This is why the fitness tests are calculated proportionately to provide an accurate fitness assessment.[20]

ASSESSMENT AND CONCLUSION TO FITNESS AND TESTING IN OUR MILITARY

As stated in this research paper, the different aspects of fitness in U.S. military services have been analyzed. The various training programs among different Services provide various ways to enhance fitness performance in order to help achieve maximum proficiency from military members both on and off the battlefield. There is no conclusive evidence that all military members, regardless of occupational specialty, unit assignment, age or gender, should acquire the same level of physical fitness. Fitness needs to promote a standard of physical readiness

commensurate with the active lifestyle and deployability of the military profession. Since each Service has a different mission, approach, and capability in meeting these general fitness goals, there needs to be some flexibility in meeting a common physical fitness standard. This standard should include aerobic fitness, muscle strength, and muscle endurance that are gender and age dependent where appropriate to include the type of occupation conducted in a particular Service.[21]

Another aspect to consider when looking at successful fitness programs is to ask if these programs incorporate sound and beneficial fitness criteria incorporated in the training to match the combat readiness activities facing service members today. The ability to match individual capabilities to job specific physical task demands will potentially lead to improved job performance, job satisfaction, retention, and ultimately reduce injuries and lost duty time. Based on limited resources and physical training facilities throughout the Armed Forces, there are only a few ways to measure the success of service specific fitness programs. Research data show that the current fitness tests conducted from the different Services provide an adequate measure to determine an individual's physical fitness based on gender and age, regardless of the type of occupation a service member is assigned. The military needs to take into consideration that brain power can be just as important as physical power. While physical fitness needs to be a requirement across the board, the level of fitness should be commensurate with the duty assignment or occupation. For example, even if an individual may spend 97% of their duty day behind a desk, they still have to pass a fitness test with the same standards as an infantry or combat related service member.

The physical fitness test themselves seems to provide a good assessment. The only component that could be adjusted or improved upon is the types of events that can potentially minimize injuries while producing a good measure for evaluation purposes. For example, the way a Service member needs to conduct sit-ups during a physical fitness test can minimize injury. Can a crunch style of sit-up measure the level of muscle endurance as well as the normal sit-up with hands behind the head? If so, which of these sit-ups will minimize the risk of muscle strain or injury? That there will always be certain techniques that work better than others when performing these types of exercises. The risk of injury will always be prevalent when doing any type of physical fitness activity. The bottom line is to have a solid physical fitness program that fits the mission profile and interjects good fitness education to minimize injuries. As far as the evaluation criteria for the various fitness tests among all the Services, enough studies have shown compatibility with each other in that it gives the Service members a fair and accurate assessment based on age and gender.[22]

How ever, it does not make some allowance based on what that individual spends most of the duty day accomplishing. The military can still achieve adequate performance in physical fitness by applying different standards on the components of a fitness test based on an occupational level of activity necessary to successfully accomplish the mission. It is going to be a continuing effort to identify and improve on the different facets of the current fitness programs to achieve optimal and fair physical fitness standards in the military.

Physical fitness and its affects on the military promote good health practices and physical activities to try and enhance an individual's ability to achieve success in both peacetime and war. The availability of health and fitness information in the military community today has provided a solid baseline for assistance in developing sound programs to achieve the level of fitness in the Service members to accomplish missions. The various roles in which the military as a whole plays in the different regions around the world justify the continuing effort to strive for optimal health and fitness for Service members. It is imperative for leadership to continue to test and develop better fitness programs to insure a fair assessment based on all the variables in order to be success in all the missions conducted throughout the Armed Forces. The military will continue to rely on physical fitness training to enable Soldiers, Sailors, Airmen, and Marines to accomplish peak performance to effectively accomplish the mission.

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ENDNOTES

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[18] Department of the Navy, *Marine Corps Order P6100.12,* Physical Fitness Test and Body Composition Program (Washington, D.C.: U.S. Department of the Navy, 10 May 2002), Chap 2.

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