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United States Marine Corps
Command and Staff College
Marine Corps University
2076 South Street
Marine Corps Combat Development Command
Quantico, Virginia 22134-5068

MASTER OF MILITARY STUDIES

TITLE:
**USE OF CERTIFIED ATHLETIC TRAINERS TO INCREASE PERSONNEL
READINESS IN UNITED STATES MARINE CORPS OPERATIONAL UNITS**

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

AUTHOR:
MAJOR ROBERT A. MONROE

AY 16-17

Mentor and Oral Defense Committee Member: Jill Goldenziel
Approved: [Signature]
Date: 25 April 2017

Oral Defense Committee Member: ERIC Y. SAIBUYA, PhD
Approved: [Signature]
Date: 25 APRIL 2017

Oral Defense Committee Member: Kathleen Dagher
Approved: [Signature]
Date: 25 Apr 2017

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Preface

Throughout my career in the Marine Corps, I have seen Marines, including myself, struggle with a multitude of relatively minor injuries during both training and combat. These injuries ranged from specific and acute injuries such as twisted ankles during hikes and pulled hamstrings during unit football games, to the nagging and persistent injuries such as lumbar pain from poorly designed aircraft seats to torn rotator cuffs. Marines often push through even the more serious injuries and delay treatment because they don't want to "let down their Marines" or miss key deployments or billets. Often, the Naval health system seems cumbersome and unresponsive to their particular circumstances with regard to treatment options.

As an instructor at The Basic School (TBS) in Quantico, Virginia, I witnessed the value of certified athletic trainers (ATCs) for both the students and staff. The dedicated and professional athletic trainers fixed broken bodies, instructed injury prevention, and developed into trusted and dependable advisors to the commanders aboard TBS. The expertise of the ATCs would be just as valuable in the operating forces, and prevent those instances I witnessed of Marines gritting their teeth through injury for years.

I would like to acknowledge the guidance and assistance from my MMS mentor, Dr. Jill Goldenziel, for her valuable insights and recommendations. Additionally, I would like to thank Mr. Brian McGuire, Colonel, USMC (Ret) for his invaluable assistance in researching the early implementation of the Sports Medicine Injury Prevention (SMIP) program. Mr. Jess Veracruz and Mr. Jay Sedory provided tremendous information regarding the roles and capabilities of ATCs in practice at both TBS and Officer Candidate School. Most importantly, I would like to thank my wife, Alicia Monroe, for her insights, recommendations, and expertise throughout all phases of this project.

Executive Summary

Title: Use of Certified Athletic Trainers to Increase Personnel Readiness in United States Marine Corps Operational Units

Author: Major Robert A. Monroe

Thesis: Assigning certified athletic trainers (ATCs) to Marine Corps operational units will improve personnel readiness by increasing physical performance during training events, reducing injury rates, and decreasing lost training time due to injury recovery.

Discussion: Musculoskeletal injuries have a significant and negative impact on the training and operational readiness of Marine Corps units. Injuries can reduce the performance and effectiveness of Marines in both training and combat operations, can result in missed training and increased medical costs, and often result in permanent disability or attrition from military service. ATCs serve as additional safety advisors to unit commanders, expand and compliment medical services provided by the Naval medical system, and improve the physical fitness and resiliency of Marine Corps personnel.

Conclusion: Assigning ATCs to Marine Corps operational units will significantly contribute to personnel readiness, enhanced capabilities and resiliency within operational units.

As part of his initial guidance as Commandant, General Robert B. Neller directed the Marine Corps to increase personnel readiness and “immediately and aggressively reduce the number of non-deployable Marines and Sailors, especially those injured during training.”¹ One method of achieving this goal is to assign certified athletic trainers (ATCs) to operational units. ATCs are currently assigned to all Marine Corps entry-level training (ELT) commands, to include recruit depots, schools of infantry (SOI), Officer Candidates School (OCS), and The Basic School (TBS). ATCs assist medical personnel and Navy corpsmen at these training commands with assessing and treating injuries, rehabilitating injured Marines and Sailors, and providing injury prevention education. Additionally, the ATCs provide instruction on proper exercise movements and training to increase athletic efficiency among the military trainees. However, ATCs are not currently assigned to operational units, resulting in a deficiency in preventing and efficiently treating musculoskeletal injuries among the Marines and Sailors most likely to deploy in the short term.

Assigning certified athletic trainers to Marine Corps operational units will improve personnel readiness by increasing physical performance during training events, reducing injury rates, and decreasing lost training time due to injury recovery. Additionally, the use of ATCs is a cost-effective method of improving personnel readiness. The costs of staffing and equipping athletic training rooms will be offset by cost savings of injury prevention and reduction, while physical capabilities and performance of Marines and sailors will be enhanced.

Background

Musculoskeletal injuries have a significant and negative impact on the training and operational readiness of Marine Corps units. Across the military services as a whole, more than 600,000 members sustain musculoskeletal injuries each year.² These injuries result in more than

2.2 million medical visits and \$550 million in medical costs each year.³ From 2004 to 2007, musculoskeletal injuries accounted for 24% of all medical evacuations in Operation Iraqi Freedom and Operation Enduring Freedom, whereas actual combat injuries accounted for only 14% of evacuations.⁴ Many of these injuries are sprains, strains, and overuse injuries as a result of physically demanding roles and heavy equipment requirements.⁵ Additionally, many musculoskeletal injuries occur in occupational fields not traditionally associated with physical exertion. Between 64% and 89% of all military helicopter and jet pilots reported neck or back pain, and 55% to 60% demonstrated spinal disk degeneration.⁶ Many of these injuries lead to permanent disability and attrition from the military. Musculoskeletal injuries are the most common service-connected disability among former service members, accounting for almost 37% of total disabilities.⁷

In other cases, musculoskeletal injuries are relatively minor, resulting in symptoms of pain and discomfort, but if properly treated, result in few or no long-term symptoms. For example, Iliotibial Band Syndrome (ITBS) is a generally minor, but painful issue, causing significant lateral knee pain in affected athletes. This condition affects up to 22% of military recruits, but is also present in significant numbers of all exercising adults.⁸ Many military members in the operating forces push through minor injuries, such as ITBS, and avoid reporting them through the medical system. The members are able to continue to perform their duties, but at a reduced level due to pain and discomfort.

Ankle injuries rank among the most common musculoskeletal injuries among athletes and military personnel, with up to 75% of athletes reporting ankle sprains.⁹ Although the majority of ankle injury patients will quickly recover from minor ankle sprains and strains, approximately 40% of patients suffer more significant injuries that take up to six months to fully

heal.¹⁰ During that time, patients may experience persistent pain at the injury site and dysfunction, to include loss of strength and mobility. These symptoms will not necessarily prevent Marines from performing their duties, but they can limit the effectiveness of the Marines and create mental distractions during critical or dangerous activities. Additionally, pushing through the pain of minor injuries may exacerbate the original injury or cause additional injuries from abnormal muscle use.¹¹

Foot and leg injuries, in addition to ankle sprains, are common during activities associated with Marine Corps training and operations. Among professional and non-professional runners, 25-50% sustain serious injuries, many in the lower limbs.¹² Running has always been an integral part of military and Marine Corps physical training, resulting in many Marines experiencing serious leg injuries.

Other common musculoskeletal injuries among both athletes and military personnel are stress fractures, especially in the lower limbs. Stress fractures are a type of overuse injury in which the small cracks form on the bone. They often result from repetitive motions or increasing frequency or intensity of physical activity too rapidly. Stress fractures have been reported in 20% of male recruits and 40% of female recruits during basic training.¹³ TBS reported 25 stress fractures among student officers from September 2014 to August 2015, averaging just over two stress fractures each month.¹⁴ Although many of these stress fractures may be the result of inexperienced Marines increasing activity too rapidly, the repetitive activities inherent in many Marine Corps training events increases the risk for stress fractures throughout a Marine's career.

While injuries present among males and females, female injury rates have been statistically higher. From 2008 to 2011, 32.4% of female students at TBS were injured during training, compared to 16.9% of male students.¹⁵ Additionally, female students suffered a higher

rate of multiple injuries than their male counterparts, and suffered more injuries that resulted in light duty, no duty, or attrition from their training company.¹⁶ The Marine Corps Ground Combat Element Integration Task Force (GCEITF) study reported similar results, with musculoskeletal injury rates of 40.5% and 18.8% for females and males, respectively.¹⁷ As women are more fully integrated into previously closed, load bearing Military Occupational Specialties (MOSs), ATCs will be more critical to maintaining the health and readiness of the Marines.

Most studies of injury rates, including those cited above, have been limited to ELT commands. This is due to the large number of test subjects, consistent training methods and schedules, and accessibility. However, senior Marines continue to benefit from ATC treatment at these ELT sites. The Warrant Officer Basic Course (WOBC), comprised of former enlisted Marines at the grade of staff sergeant and above, trains at TBS for four months each year. During WOBC 2015, the warrant officers accounted for over 50% of the athletic training room (ATR) visits for two months, and more than 30% of the ATR visits for the other two months.¹⁸ Additionally, TBS instructor staff account for approximately ten visits to the ATR each week.¹⁹ Marines beyond ELT consistently take advantage of ATC treatment where it is available.

ATCs are currently employed in all U.S. military services, but their assignments have generally been limited to training units. Athletic trainers were first employed in their traditional role with the sports teams of the four service academies.²⁰ Approximately 10 years ago, the Army began employing ATCs at Initial Entry Training and has continued to expand the program to additional training units as recently as 2016.²¹ The Air Force began an ATC program based on the Army's plan and has incorporated ATCs into three training squadrons.²² The Navy has implemented similar programs at the Naval Special Warfare Command Basic Underwater

Demolition School (BUDS) and other training units.²³ A report for the National Athletic Trainers' Association (NATA) lists multiple employment opportunities for athletic trainers within the Morale, Welfare, and Recreation (MWR) systems across the services, but only lists limited positions at Marine Corps training sites, Navy medical clinics, and minimal ATCs working directly with Navy SEAL teams.²⁴ While the military services have been using ATCs for many years, with the exception of the Navy SEALs, they have been limited to the service academies and training units.

The Marine Corps first utilized ATCs as members of Navy Sports Medicine and Rehabilitation Teams (SMART) at clinics located near training sites.²⁵ These SMART teams include Navy surgeons, physical therapists, and ATCs who work in teams to provide seamless patient care throughout the evaluation, treatment, and rehabilitation processes.²⁶ Due to the positive benefits derived from the SMART clinics, the Marine Corps submitted a Universal Needs Statement (UNS) in December 2001 seeking additional athletic trainer support.²⁷ In response, the Assistant Commandant of the Marine Corps, General Michael J. Williams, directed a pilot program for the Sports Medicine Injury Prevention (SMIP) initiative, and assigned the Commanding General (CG), Training and Education Command (TECOM) as the Program Sponsor in May 2002.²⁸ By June 2003, ATCs were established at ELT commands, with Sports Medicine medical doctors (MDs) in support.²⁹ Initially, three ATCs were assigned to Marine Corps Recruit Depot (MCRD) Parris Island, and one ATC was assigned to each MCRD San Diego, Officer Candidate School, The Basic School, School of Infantry-East, and School of Infantry-West.³⁰ Following the success of the pilot program, in October 2007 the Navy Surgeon General (SG) and the CG TECOM signed a Memorandum of Agreement (MOA) detailing the coordination of the SMIP program with the existing Navy medical structure.³¹

Under this MOA, the Marine Corps retains responsibility for funding and leading the SMIP program.³² The ATCs are tasked and administratively controlled by the Marine Corps Operations Section of their assigned command.³³ This allows ATRs to be established in close proximity to training areas, and allows ATCs to be more responsive to varied and changing training locations and conditions, increasing convenience and access for their patients. However, the SMIP program is still aligned with the Navy SMART Clinic operations and clinically supervised by local Sports Medicine MDs.³⁴ This alignment provides a medical safety backstop for the ATCs by the Navy's medical system. Additionally, the MOA specified that the Navy SG recognized the National Athletic Trainers Association (NATA) Standards of Practice as the common standard for Navy and Marine Corps SMIP ATCs.³⁵ This common standard facilitates continuous care if patients are transferred between the ATRs and SMART clinics.

Capabilities and benefits of ATCs for the Marine Corps.

Athletic trainers “specialize in the prevention, assessment, treatment, and rehabilitation of injuries and illnesses that occur to athletes and the physically active.”³⁶ SMIP ATCs, aligned with the Navy SMART clinics, can provide various forms of injury prevention and treatment along the Prevention and Treatment Continuum, as depicted in Figure 1.³⁷

Primary Injury Prevention

The low end of the Prevention and Treatment Continuum begins with Primary Injury Prevention and Operational Risk Management (ORM). These measures, which include policies, procedures, manuals, and formal curriculums and periods of instruction, are the responsibility of Marine commands, but they can be augmented by ATCs.³⁸ Specifically, SMIP ATCs are tasked with teaching injury prevention classes to instructor cadres, discussing injury prevention strategies with training company staff, observing physical training, discussing proper equipment

and techniques with staff, assisting in the development of strength and conditioning programs, inspecting conditioning hike routes, and providing instruction and consultation with field corpsmen on current injury prevention and treatment techniques.³⁹ These tasks allow ATCs to advise instructor cadres in the development of safe programs of instruction and provide an additional safety backstop during the planning process.

Officer Candidate School provides several examples of the value of ATC advice to Marine commanders and instructor cadres. Jess Veracruz, one of the original SMIP ATCs, has been employed at Marine Corps OCS in Quantico, Virginia, since 2004. His experiences in observing and participating in the training program have enabled him to develop a crucial role in supporting the primary injury prevention efforts at OCS. In an effort to reduce the number of foot and ankle injuries, Veracruz recommended changes to the process for issuing boots to officer candidates, to include a pre-issue brief and more time allowed for fitting. The brief described the proper fit of combat boots; common pitfalls in boot fitting that result in blisters, sprains, and other foot and ankle injuries; and innovative methods to quickly break in new boots. Additionally, the OCS staff was instructed to allow more time for officer candidates to try on multiple pairs of boots and immediately return ill-fitting pairs. After implementation of the new boot issue process, OCS reported a decline in foot and ankle injury rates among officer candidates, as well as a reduction in number of used boots returned and replaced by officer candidates later in the program of instruction (POI).⁴⁰ In fulfilling the task to discuss proper equipment wear with staff, the ATC's advice resulted in fewer injuries to candidates and monetary savings on issued gear for the Marine Corps.

A second example demonstrates the ATC's ability to provide independent safety assessments to commanders. Several candidates in multiple training companies suffered

fractured arms while negotiating the Zig-Zag log and water obstacle as part of the OCS Combat Course. Veracruz observed the event, and noted that officer candidates walked along wooden beams to a creek, yelled “combat,” and jumped into the water. The injured candidates had landed on uneven ground, fallen to one side after jumping into the creek, and fractured their arms on underwater tree roots. Veracruz recommended adjusting the event so that officer candidates would carefully and deliberately enter the creek, rather than jumping into the murky water. The staff agreed that the new method was not only safer, but more tactically sound, and adjusted the POI.⁴¹ Veracruz utilized a technique referred to as “environmental surveillance,” in which the ATC observes the event, the field or location, and the specific physical requirements, while avoiding critique of the purpose of the event. This provides a more disinterested analysis of the event, enabling more effective risk mitigation.⁴² Veracruz reported no further arm fractures during this event after implementing the changes.⁴³

A similar example demonstrates how ATCs can use knowledge and experience from outside the military to improve risk management. Veracruz witnessed four different officer candidates fall from the Obstacle Course rope obstacle over the course of two days and suffer combined tibia and fibula fractures. He recommended that the OCS staff implement a new rule, which he had previously observed on collegiate gymnastics teams. The candidates were required to climb up or down the ropes, but they had to maintain constant motion; they were not allowed to pause or rest on the ropes. This rule prevented the candidates from becoming overly fatigued near the top of the ropes and falling from greater heights, which significantly reduced the number of traumatic injuries on the rope obstacle.⁴⁴ These three examples provide excellent examples of the multiple roles ATCs can perform to support the overall physical wellness within a command.

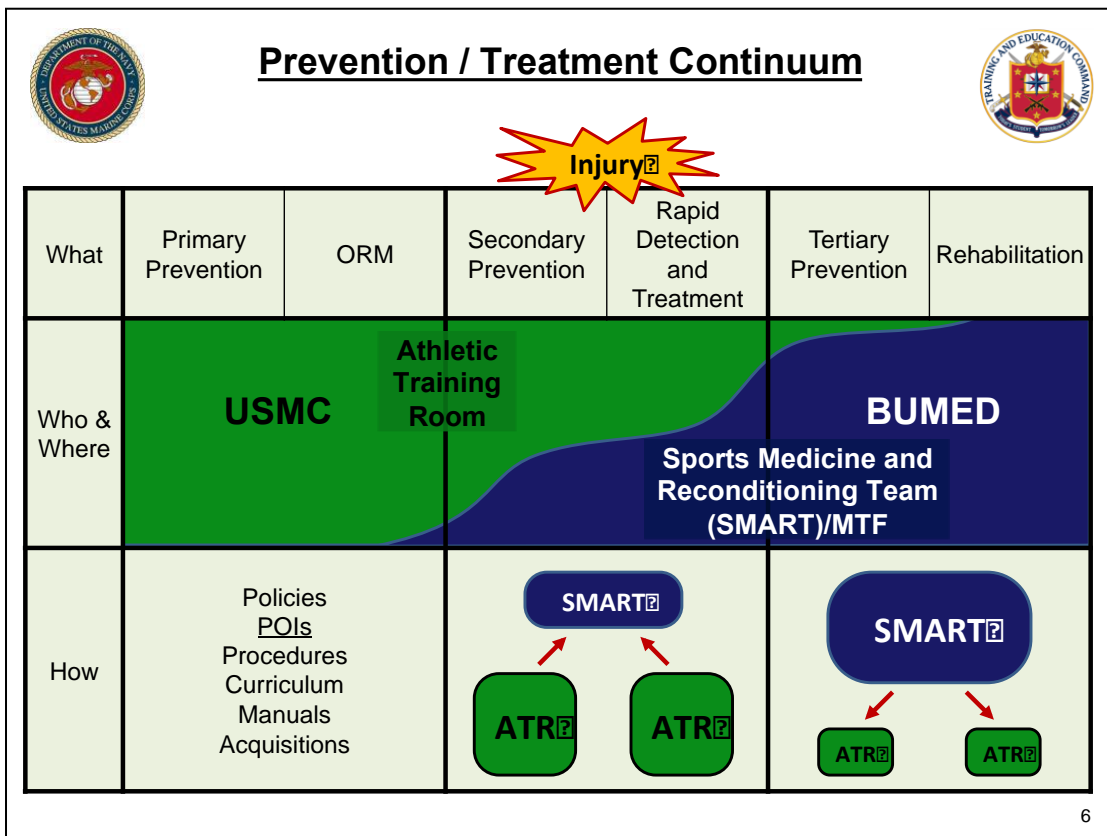
Athletic Trainers can also assist leaders in mitigating risk for individual Marines. Jay

Sedory, an ATC at TBS since 2007, noted that the ATCs' priorities are, "#1 Injury prevention, #2 Reducing severity of injuries, and #3 Providing advice to commanders."⁴⁵ As an example, after evaluating an injured Marine, an ATC could advise the commander to direct the injured Marine to "lay off an injury, reduce the workload, or fight through the pain."⁴⁶ This provides more flexibility for commanders to train their Marines while mitigating the risk of further injury.

The previous examples demonstrate the capability of ATCs to apply their knowledge of physiology and injury prevention to assisting Marine leaders with improving their own risk management practices. However, more traditional ATC roles will also contribute to primary prevention methods. Several studies indicate the benefits to injury prevention from pre-exercise stretching and warm-up, which are basic skills of ATCs.⁴⁷ Additionally, ATCs advise Marine Corps leaders on effective training programs, and the proper fit and wear of issued equipment in order to prevent or reduce common injuries.⁴⁸ The ATCs at TBS commonly provide classes to students and staff regarding stretching, warm-up, and cool-down techniques. Additionally, the TBS ATCs often participate in "train-the-trainer" events in which they instruct student leaders in those techniques. The student leaders are then responsible for training the rest of their peers. This method builds leadership experience and prepares the student officers to instruct their enlisted Marines in the future, but it does not fill the gap created by a lack of athletic trainers.⁴⁹

Athletic trainers also assist the OCS staff in risk mitigation during the development of the physical training (PT) program. The ATC at OCS works directly with the Royal Marine Color Sergeant to ensure the PT plan is safe and sustainable over the entire course. By reviewing the schedule for light days, heavy days, and alternating muscle groups, the staff is able to reduce the number of overuse injuries suffered at OCS.⁵⁰

Figure 1: Prevention / Treatment Continuum
 Source: Figure reproduced from USMC SMIP Program Brief, April 6, 2016



Secondary Injury Prevention

In contrast to primary prevention, which is led by the Marine Corps, secondary prevention is the primary responsibility of ATCs.⁵¹ Secondary prevention includes the rapid detection and treatment of injuries to reduce the severity of the injuries and prevent follow-on injuries from occurring.⁵²

A key aspect to the success of the SMIP pilot program in secondary prevention was proximity of care for the staff and trainees.⁵³ SMIP ATRs were located at the training sites rather than at the off-site SMART clinics.⁵⁴ This reduced the time out of training for both staff

and trainees to transit to receive treatment.⁵⁵ Sedory referred to this benefit as the “Red Tape Tax.”⁵⁶ With ATCs available for treatment or consultation near the training site and during standard sick-call hours, injured personnel are more inclined to visit the medical providers. Additionally, without the long sick-call lines and administrative processing associated the Navy medical clinics, Marines are more likely to seek treatment for minor injuries and discomfort, rather than waiting for them to become more serious. Staff and students quickly learned at TBS that the informal protocols for minor injuries allowed them to visit the ATR and receive treatment “if I’ve got a small tweak, but I’m not injured yet, rather than waiting to see medical when my knee has swollen up.”⁵⁷

Immediate treatment of minor injuries and stabilization of more significant injuries enables ATCs to mitigate the severity of those injuries and prevent additional or more serious injuries from occurring. A common example of a minor injury is a twisted, or sprained ankle. Marines are able to visit the ATRs during sick call and prior to PT events to have minor ankle injuries taped. This provides structure and reinforcement to prevent the injury from worsening during PT. Additionally, if the injury is not treated, the Marine may favor the injured ankle, creating additional stresses on the knee, hip, and back. These stresses can lead to additional acute or overuse injuries if allowed to persist.⁵⁸

Acute and overuse injuries, including minor injuries, continue to pose a danger to Marines once those injuries have healed. Previous muscle injuries, decreased muscle strength, muscle imbalance, and decreased flexibility are among the intrinsic risk factors for acute muscle injuries in sports.⁵⁹ These risk factors can all be mitigated by ATCs through secondary prevention methods, such as strength and flexibility protocols to reduce the risk of additional or repeat injuries.⁶⁰ Additionally, soft-tissue massage and therapeutic ultrasound are both shown to

increase healing in soft tissue injuries.⁶¹

Long-term injury recovery for many musculoskeletal injuries requires correcting underlying biomechanical issues with the patients.⁶² ATCs are able to provide functional movement screening to assess overall biomechanical efficiencies, as well as evaluate the biomechanics of the specific injury area.⁶³ A significant advantage afforded by ATCs over other medical providers is their familiarity with the specific tasks and requirements of military personnel. Whereas biomechanics and functional movement can be evaluated by the physical therapists in the SMART clinics, the ATCs can conduct those same assessments for Marines with their normal equipment or combat loads. This enables to ATC to provide a more accurate evaluation of the underlying biomechanical issues or the state of injury recovery, thus providing additional protection from follow-on or repeat injuries.⁶⁴

The alignment of the Navy SMART clinics with the SMIP program also enables seamless continuation of care for serious injuries that are beyond the scope of ATC capabilities. In these cases, the ATCs are able to transfer the patients' treatment program to the SMART clinic after providing the first echelon of care.⁶⁵ For example, acute traumatic injuries such as broken bones can be assessed and stabilized by on-scene ATCs immediately after they occur. The patient is then transferred to the Navy medical clinic or SMART clinic for follow-on care such as X-rays, surgery or casting. The ATCs observation of the patient at the time of injury, as well as their knowledge of the PT events and familiarity with training routines, provides valuable insight into the nature of the injury which the medical providers at the SMART clinic do not have. The ATC provides additional insight to the medical providers at the SMART clinic, which enables them to make more efficient decisions regarding treatment options. Finally, the ATCs provide valuable reach-back resources for the medical providers to clarify any issues regarding

the nature of the injury.⁶⁶

Tertiary Injury Prevention

Tertiary prevention involves the full rehabilitation of significant injuries so that the likelihood of recurring injury is minimized.⁶⁷ Tertiary prevention is led by the Navy SMART clinics, but as the patients are transitioned towards full recovery, much of their treatment, strength, and conditioning programs are transferred back to the ATR.⁶⁸ This enables the trainees to conduct the final portions of their rehabilitation while at the training site, which not only facilitates their physical recovery, but also positively contributes to their re-integration into the training program. ATCs also facilitate more effective rehabilitation for specific training or operational requirements. The ATCs' detailed knowledge of the training and operational requirements of specific Marines allows them to "dial it in closer with a tailored rehabilitation program" to support their needs.⁶⁹

Athletic Trainers provide significant benefits during the transition from rehabilitation to full duty. Currently, medical chits for injuries indicate that the patient is on "light duty" and specify activities that the patient is prohibited from performing. Once recovered, the patient immediately returns to "full duty," with no restrictions, and is expected to be able to perform all activities on par with the non-injured Marines. In these situations, ATCs are able to bridge the gap between medical providers and Marine leaders by recommending courses of action that will allow the previously injured Marine to safely transition back to full duty. While not restricting the Marine from duty requirements, the ATCs can recommend modifications to physical activities that will promote enhanced performance and reduce the chance of repeat injury.⁷⁰

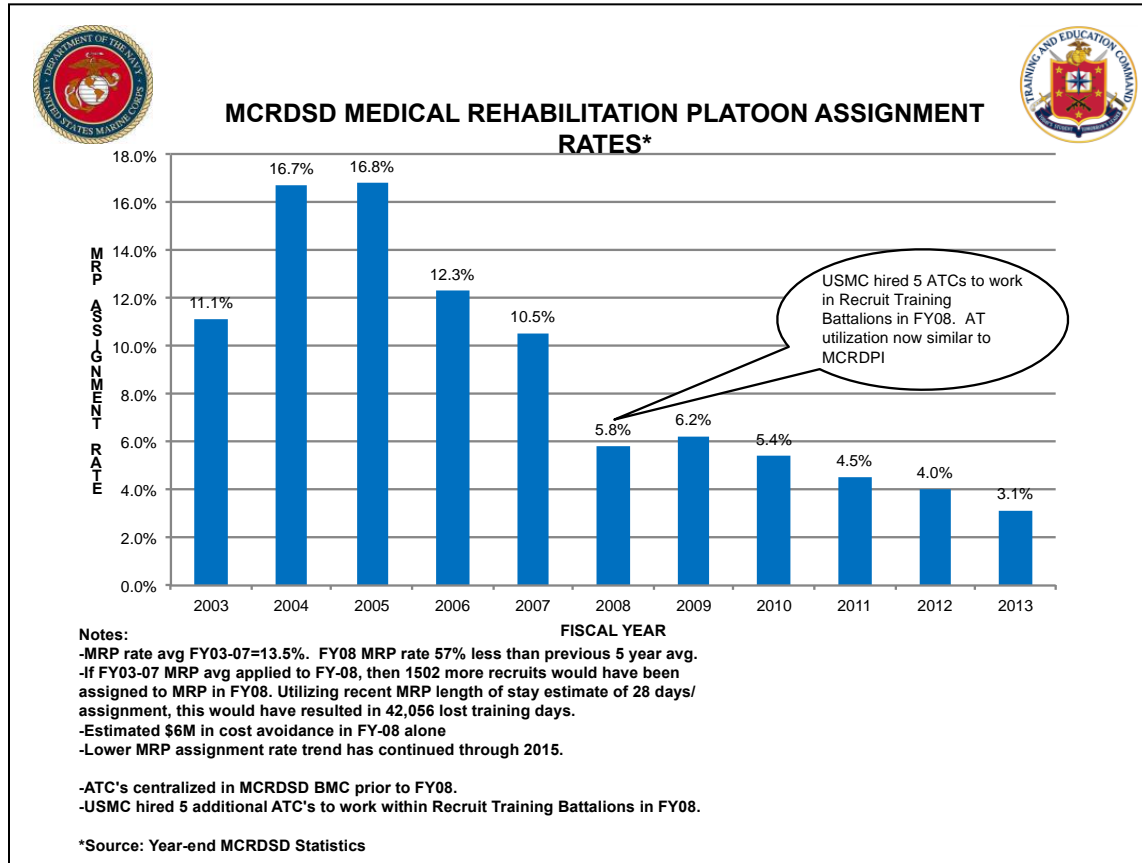
Results of the SMIP Pilot Program

The initial SMIP pilot initiative from Fiscal Years (FY) 2003 to 2007, and the follow-on SMIP program from FY 2007 to 2015 have been extremely successful in preventing, mitigating, and rehabilitating injuries in Marine Corps ELT programs. MCRD San Diego reported significant decreases in the number of recruits who were dropped from training for medical issues and assigned to the Medical Rehabilitation Platoon (MRP).⁷¹ At the initiation of the pilot program in FY 2003, 11.1% of recruits were assigned to MRP.⁷² After an increase in FYs 2004 and 2005 to a high of 16.8%, MRP assignment rates have steadily decreased to the current year.⁷³ The decrease in MRP assignment rate was most significant in FY 2008 with the increase of five ATCs.⁷⁴ The SMIP program not only benefited the individual recruits receiving

Figure 2: MCRDSD MRP Assignment Rates

Source: Figure reproduced from USMC SMIP Program Brief, April 6, 2016

treatment, saved the MCRD more than 42,000 lost training days and over \$6 million in training costs.⁷⁵



During this same period of time, both MCRD San Diego and Parris Island reported a decrease in the rate of lower leg stress fractures⁷⁶ and reduced lower extremity injury drop rates.⁷⁷ In addition to injury prevention, the SMIP program enhanced the physical performance of the non-injured trainees and staff. From FY 2006 to 2013, Physical Fitness Scores for recruits increased from an average of 233.9 to 251.4 for males and 246.7 to 257.8 for females,⁷⁸ while initial strength test failures decreased for both genders.⁷⁹

The benefits and cost effectiveness of the SMIP program were evident to both the trainees and staff of the ELT programs. Requests for similar services in the operating forces, and recommendations from former beneficiaries of the SMIP program contributed to a recommendation to expand the SMIP program.⁸⁰ The Ground Board 2-11 noted in their report the large number of medically non-deployable Marines and recommended an expansion of the SMIP program to the operating forces to mitigate the high injury rate.⁸¹ Specifically, the board

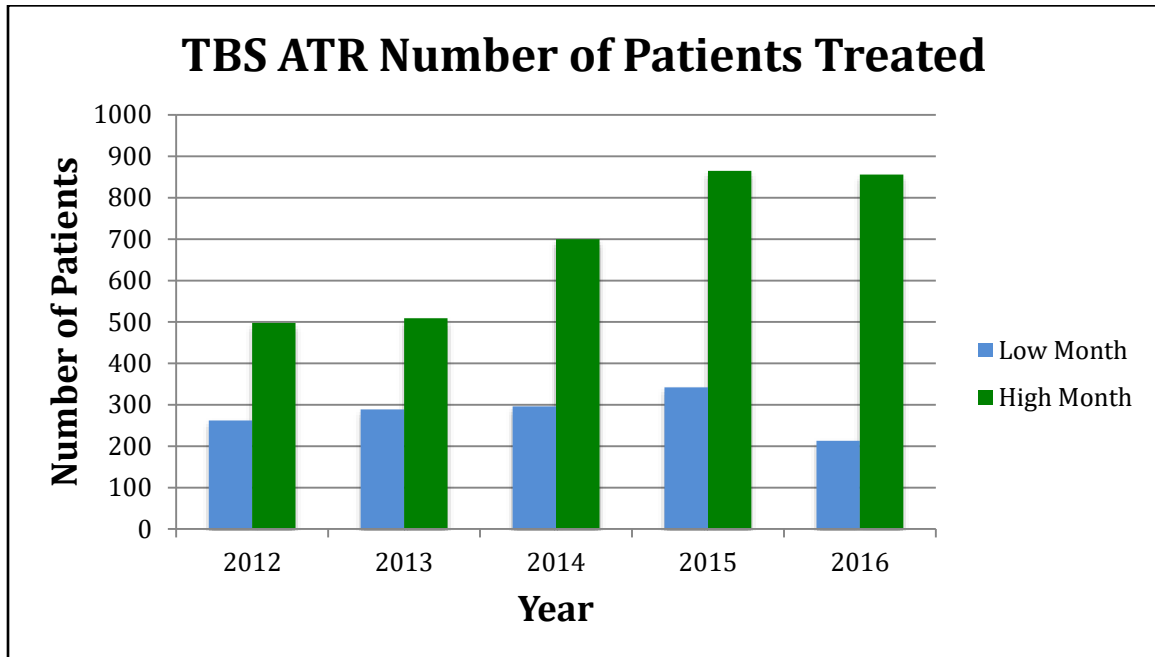
recommended assigning ATCs at the Battalion level in the Ground Combat Element (GCE) and at the Regimental and Group level in the Logistics Combat Element (LCE) and Aviation Combat Element (ACE), respectively.⁸²

The Ground Board recommendation was accepted and an expansion of the SMIP program was funded in the Program Objective Memorandum for FY 2014 (POM-14).⁸³ However, due to sequestration of the Budget Control Act of 2011, funding for the expanded SMIP program was removed from the POM-15.⁸⁴ Rather than fund the program for only one year, the expanded operating force SMIP program was eliminated.⁸⁵

Additional Benefits of Athletic Trainers

Although the SMIP Program was not expanded beyond training commands, it has demonstrated its value in several significant ways. The ATCs at TBS have continued to increase their support to the staff and students both in garrison and in the field. From 2012 until 2016 the ATR has consistently increased the number of patients treated each month.⁸⁶ Figure 3 details the lowest number of patients and greatest number of patients treated in a single month from 2012 to 2016. TBS is a regiment-size command with approximately 2,000 to 3,000 students and staff at any given time during the year. Figure 3 demonstrates that a significant portion of those personnel is treated each month. Of note, two additional civilian ATCs were hired at TBS in fiscal year 2014.⁸⁷ The corresponding increase in patients seen, as depicted in figure 3, demonstrates that as more ATCs are available, their supported Marines and sailors utilize them more often.

Figure 3: TBS ATR Patients Treated by Low Month and High Month Each Year
Source: Data derived from interview with Alicia Monroe, January 3, 2017



Proximity of the ATR and familiarity between ATCs and their potential patients results in more frequent and effective treatment.⁸⁸ As the ATCs spend more time with the units, not only in the clinic or ATR, but also in the field and during training, they build trust with their patients who are then more apt to seek out advice and treatment from the ATCs. Sedory supports this theory, and notes that once the Marines know and trust the ATCs, they understand that they “can be seen without getting dropped” for minor injuries.⁸⁹

In addition to the patients treated in the ATR, the ATCs at TBS supported between 10 and 15 training support requests (TSRs) each month.⁹⁰ Those TSRs included field support such as observing and providing medical coverage for obstacle course, endurance course events, and conditioning hikes, providing pre- and post- PT event medical evaluations and treatments, and providing injury assessments and treatments during field exercises.⁹¹

Another subjective benefit of the SMIP program has been the ATCs ability to provide training and PME for Navy corpsmen. According to Sedory, corpsmen are generally very good

at treating traumatic injuries, but they often lack training in other medical disciplines.⁹² As military medical personnel supporting Marines, the corpsmen “are pretty good at treating bullet wounds and other trauma, as they should be,” but their orthopedic evaluation capabilities are lacking.⁹³ During field exercises and deployments, however, the corpsmen are often the only medical providers available to Marines. “That’s why they get called ‘Doc.’ They’re expected to know everything about medical.”⁹⁴ In order to mitigate these knowledge shortfalls, the ATCs at TBS often conduct training for the corpsmen. When the ATCs were attached to training companies, they established combined sick calls so that the corpsmen could observe the ATCs during patient assessments and treatments, and practice evaluating and taping patients under the ATC’s supervision.⁹⁵ The ATCs also provided clinics to instruct the corpsmen on musculoskeletal injury assessments and taping techniques.⁹⁶

The ATCs themselves have also expanded their roles to influence the Marine Corps beyond medical care. Alicia Monroe, an ATC at TBS since 2007, served as the ombudsman for the Infantry Officers Course (IOC) in Quantico, Virginia from 2013 to 2016 during their research on women in the infantry. Her formal duties included ensuring the fairness of the course for men and women, ensuring the fairness of recruitment of female test subjects for the course, and ensuring that women volunteers understood the physical risks of participation. These duties required Monroe to understand the course requirements and objectives, as well as the physical and mental stresses experienced by the students. As the research progressed, the IOC staff consulted Monroe on a variety of health and safety issues. Monroe provided briefs to the staff regarding indications, prevention, and treatment of heat illnesses, rhabdomyolysis, and overtraining injuries, and provided recommendations for updating traumatic brain injury and concussion protocols. Additionally, Monroe participated in risk analysis discussions regarding

injury risk tradeoffs between conducting the Combat Endurance Test at night or during the day, and training schedule changes due to weather. Finally, Monroe advised the IOC staff regarding safety issues related to male and female anatomy during high intensity, high stress training evolutions.⁹⁷

During 2014, the ATCs at TBS were individually assigned to specific training companies rather than consolidated at the ATR. This assignment policy was ended after one year due to the lack of sufficient ATC personnel to support every training company. However, during that time period, the training company staffs employed the ATCs similarly to IOC. In addition to providing medical care and injury prevention, the ATCs were utilized as staff advisors for the company commanders. While attached to Company G, Basic Officer Course 7-14, Monroe's staff duties included reviewing all training schedules and recommending changes due to weather, overtraining risks, and the number of injured student officers. Additionally, Monroe provided daily injury status updates for the staff and developed a physical training remediation plan. This remediation included PT plans and nutrition counseling for struggling students, hike progression and gear and equipment fitting for hike failures, and a pull-up remediation plan tailored for female Marines. Monroe stated that in addition to the subjective success of the policy, the most striking objective measurement was that "there was not a single stress fracture or stress injury through the entire [program of instruction] POI," and that these results were similar for all training companies with attached ATCs.⁹⁸ Typical training companies at TBS without an attached ATC experienced between two and five stress fractures or stress injuries, with some companies as high as 15.⁹⁹ On average, two of those stress injuries resulted in the students being dropped from training and recycled into another training company.¹⁰⁰

Sedory has contributed to the development of the Marine Corps Force Fitness Instructor (FFI) Program. The FFI program began in 2016 in response to General Neller's guidance in FRAGO 01/2016, Advance to Contact,¹⁰¹ and seeks to develop unit physical fitness instructors "that will leverage total fitness enablers such as nutrition, injury prevention, and sports medicine."¹⁰² Sedory applied his training and experience as an ATC to develop some of the course content and provide instruction during the FFI course POI. This instruction included minimal "diagnosis training" for common musculoskeletal injuries. While the FFIs are not qualified to provide medical treatments, they are capable assessing the likely severity of injuries and referring the patients to the appropriate medical providers for follow-on care.¹⁰³ Sedory's expertise was critical to the development of the FFI course because "the scope of athletic training is huge. It ranges from strength and conditioning training, to medical diagnosis and treatment, to education, health, nutrition, etc. The expertise of the AT can be flexed" to the training and operational requirements of the unit.¹⁰⁴

Way Forward

The SMIP program should be expanded and ATCs assigned to operational units at the battalion and regimental/group level. Operational units are defined as those units assigned to Marine Forces that participate, or provide detachments that participate in, operational deployments, to include the Unit Deployment Program, Marine Expeditionary Unit (MEU) deployments, and squadrons deploying with carrier battle groups.¹⁰⁵ Operational units should be prioritized over supporting establishment units because the medical readiness and physical fitness of their personnel most directly and significantly contribute to the ability of the Marine Corps to successfully fulfill its assigned missions. Additionally, the physical and medical readiness of Marines assigned to operational units are critical to minimizing casualties while

conducting training and operations.

Assigning ATCs at smaller unit levels increases access to ATC services for the Marines in those units, and therefore, the effectiveness of injury prevention and treatment. In addition to convenient access to treat injured Marines and Sailors in those units, the ATCs would be available to accompany their units on routine PT events and training exercises. This would provide the ATCs with significant observation of their patients and their training and operational requirements. This familiarity would enable ATCs to correct poor biomechanics and gear loading, tailor PT and nutrition plans, optimize injury treatment protocols, and provide risk mitigation advice to commanders. Additionally, the proximity to the patients and their shared “hardships” during training would build familiarity and trust in the ATCs, which would encourage proactive treatment of minor injuries. Finally, convenient access to ATCs for treatment of minor or chronic injuries is critical to reducing time away from training for their supported personnel. ATCs located at or near their supported units, preferably co-located with existing Battalion Aid Stations, would enable personnel to receive treatment during traditional sick call periods and return to work immediately.

However, each ATC requires a minimum amount of equipment to assess, treat, and rehabilitate injuries. The cost of each ATC at the recruit depots total approximately \$93,000, which includes over \$90,000 for salary and benefits of each ATC, and approximately \$2,500 in equipment and supplies each year.¹⁰⁶ As ATCs are assigned to smaller units, the cost of establishing redundant ATRs at each unit eliminates efficiencies in resource allocation. Additionally, ATCs are civilian employees and are not deployable with the Marine units to which they are assigned. Deployments would create significant disruption to the civilian ATCs’ employment and quality of life, as well as redundancy in the resources left behind at the home

stations. Assigning ATCs to battalions and larger units will mitigate these disruptions by allowing for more predictable training and deployment cycles. Additionally ATR equipment and resources can be passed between deploying and redeploying units to minimize redundancy.

Operational units designated as load-bearing units (infantry battalions, reconnaissance battalions, force reconnaissance companies, combat engineer and assault companies, and raider companies)¹⁰⁷ will generally demonstrate the greatest need for ATCs due to the highly physical nature of their operations. These units should be assigned ATCs at the battalion level and prioritized for ATR facilities and equipment. This will provide efficient access to ATC services for units with the greatest need. Additionally, a pilot program should be implemented at specified infantry battalions. Third Battalion, Fifth Marines (3/5) in Camp Pendleton and First Battalion, Eighth Marines (1/8) in Camp Lejeune should be designated for the pilot program. 3/5 recently completed a one-year designation as the Marine Corps' "experimental unit"¹⁰⁸ and 1/8 is first the infantry battalion to have been assigned female infantry Marines.¹⁰⁹ Priorities for the SMIP pilot program at these units include "right-sizing" the ATRs to optimize efficient access and effective treatment for the Marines, developing procedures to reassign ATCs from deployed units, and confirming that the cost benefits of the program demonstrated at Marine ELT programs apply to operational units.

All other operational units, to include non-load bearing GCE units, LCE and ACE should be assigned ATCs at the regimental or group level. This will ensure availability of ATCs for severe or chronic musculoskeletal injuries, while providing efficient allocation of resources for units with lower requirements for those services.

Athletic Trainers assigned to operational units will also provide valuable support to the FFI program as new FFIs begin populating the force. FFIs can leverage the resources and fitness

expertise of base and installation High Intensity Tactical Training (HITT) instructors to develop tailored fitness programs for their units. But ATCs will “provide subject matter expertise in anatomy, physiology, mobility, exercise techniques, and knowledge of how those exercises affect the body” as a valuable reach-back resource for the FFIs.¹¹⁰ ATCs will also complement the FFI’s fitness goals with injured and recovering Marines. This ATC/FFI integration will be particularly beneficial during the transition from light duty to full duty. ATCs will be able to advise FFIs regarding exercise modifications, alternative exercises, or training program progressions as risk mitigation techniques for recovering Marines.¹¹¹ This will allow Marines to continue to train while they are recovering from injury rather than simply sitting out on light duty.

ATCs can also provide FFIs with unit specific fitness program techniques and modifications. Some MOSs and Marine units have specialized or specific requirements that are not necessarily addressed by a fitness program that is applicable to the force as a whole. ATCs attached to operational units would observe the training and operations of those units, assess the potential and historical injury trends, and recommend fitness program modifications for the FFIs to incorporate in their PT programs. This will also meet the Commandant’s intent for FFIs to “leverage total fitness enablers such as nutrition, injury prevention, and sports medicine in addition to managing the daily physical fitness regimen of the unit.”¹¹²

Conclusion

Assigning ATCs to Marine Corps operational units will significantly contribute to personnel readiness within those units. In addition to reducing lost training time to injury to specific individuals, the injury prevention protocols provided by ATCs will reduce the frequency and severity of musculoskeletal injuries throughout the unit. ATCs can also provide training in

injury prevention protocols, as well as some basic injury treatment methods, to unit leaders and military medical personnel who will provide continued benefits to the unit during deployments. The cost-savings provided by reduced medical expenses for treatment of musculoskeletal injuries and personnel not medically qualified for deployment will offset the cost of funding the salaries for the assigned ATCs. Finally, the training and medical treatment provided by unit assigned ATCs will contribute to enhanced capabilities and resiliency within operational units. On February 7, 2017, Commandant General Robert Neller stated, “If we look at Marines that are not deployable, what we want to do is have less injuries based on not PTing smart. If somebody gets hurt, we want to get them rehabilitated faster.” Assigning ATCs to operational units is a proven method to accomplish just that.¹¹³

Endnotes

¹ Commandant of the Marine Corps, *FRAGO 01/2016: Advance to Contact*, January 19, 2016, 7, <http://www.marines.mil/Portals/59/Publications/CMC%20FRAGO%201%20-%2019JAN16%20-%20CMC%20FINAL.pdf>.

² Jordan Grantham, “Opportunities Continue to Grow for ATs in the Military,” *NATA Committee on Practice Advancement Military Workgroup*, January 20, 2016, 1, <http://www.nata.org/blog/jordan-grantham/opportunities-continue-grow-ats-military>.

³ Ibid.

⁴ Francis G. O’Connor et al., “Functional Movement Screening: Predicting Injuries in Officer Candidates,” *Medicine & Science in Sports & Exercise* 43, no. 12 (2011): 2224.

⁵ Bryant Jordan, “Skeletal Injuries Top Afghan War Ailments,” *Military.com*, March 16, 2011.

⁶ Roger O. Kollock et al., “Vehicle Exposure and Spinal Musculature Fatigue in Military Warfighters: A Meta-Analysis,” *Journal of Athletic Training* 51, no. 11 (2016): 981.

⁷ Jordan, “Skeletal Injuries Top Afghan War Ailments.”

⁸ E. C. Falvey et al., “Iliotibial Band Syndrome: An Examination of the Evidence Behind a Number of Treatment Options,” *Scandinavian Journal of Medicine & Science in Sports* 20, no.

4 (2010): 580, <https://search.ebscohost.com/login.aspx?direct=true&db=rss&AN=52170205&site=ehost-live>.

⁹ Hans Van der Wall and Ignac Fogelman, "Scintigraphy in Sporting Injuries of the Ankle: A Review," *International SportMed Journal* 4, no. 4 (July 2003): 6, <https://search.ebscohost.com/login.aspx?direct=true&db=rss&AN=26316854&site=ehost-live>.

¹⁰ Ibid., 3.

¹¹ Alicia Monroe, Certified Athletic Trainer, The Basic School, Quantico, VA, April 20, 2017.

¹² Van der Wall and Fogelman, 2.

¹³ Ibid., 9.

¹⁴ Navy and Marine Corps Public Health Center, EpiData Center Department, "SMIP Monthly Report, The Basic School," September 2014 -August 2015, reports provided by Alicia Monroe, February 28, 2017.

¹⁵ Margaux Hoar and Cathy Hiatt, CNA Scientific Analysts to CG, TECOM, to LtCol Daniel Tarbutton, XO, TBS, and Staff, June 6, 2013, 2.

¹⁶ Ibid., 3.

¹⁷ "Marine Corps Force Integration Plan - Summary," September 10, 2015, 4, <http://www.npr.org/2015/09/10/439246978/marine-corps-release-results-of-study-on-women-in-combat-units>.

¹⁸ SMIP Monthly Reports.

¹⁹ Alicia Monroe, Certified Athletic Trainer, The Basic School, Quantico, VA, discussion with author, January 3, 2017.

²⁰ Grantham, "Opportunities Continue to Grow for ATs in the Military," 1.

²¹ Ibid.

²² Ibid.

²³ Ibid., 2.

²⁴ NATA, "Current Status of ATCs in the Military," *The National Athletic Trainers' Association*, 1-2, <http://www.nata.org/sites/default/files/Status-of-ATCs-in-the-Military.pdf>.

²⁵ Grantham, 1-2.

²⁶ Monroe, January 3, 2017.

²⁷ Brian McGuire, "USMC SMIP Program Brief for the Medical Officer of the Marine Corps" (PowerPoint presentation, TECOM, Quantico, VA, April 6, 2016), 3.

²⁸ Ibid.

²⁹ Ibid.

³⁰ Ibid., 12.

³¹ Ibid., 3.

³² Ibid., 5.

³³ Ibid.

³⁴ Ibid.

³⁵ Ibid., 3.

³⁶ Charles W. Kimmel, Jr., "The Marine Corps Transforms Recruits into 'Warrior Athletes' with Athletic Trainers," *Marine Corps Gazette* 89, no. 2 (February 2005): 40, <http://pqasb.pqarchiver.com/mca-members/doc/221454872.html?FMT=TG...%27Warrior+Athletes%27+With+Help+From+Certified+Athletic+Trainers>.

³⁷ McGuire, "SMIP Program Brief," 6.

³⁸ McGuire, "SMIP Program Brief," 6.

³⁹ Commanding General, Training and Education Command, "Sports Medicine and Injury Prevention Program," TECOM Order 6260 Ch 1, September 17, 2012, Encl 4.

⁴⁰ Jess Veracruz, Certified Athletic Trainer, Officer Candidate School, Quantico, VA, discussion with author, February 2, 2017.

⁴¹ Ibid.

⁴² Monroe, January 3, 2017.

⁴³ Veracruz, February 2, 2017.

⁴⁴ Ibid.

⁴⁵ Jay Sedory, Certified Athletic Trainer, The Basic School, Quantico, VA, discussion with author, February 1, 2017.

⁴⁶ Ibid.

⁴⁷ Krista Woods, Phillip Bishop, and Eric Jones, "Warm-Up and Stretching in the Prevention of Muscular Injury," *Sports Medicine* 37, no. 12 (2007): 1094, 1098, <https://search.ebscohost.com/login.aspx?direct=true&db=rss&AN=27647011&site=ehost-live>.

⁴⁸ Kimmel, Jr., "The Marine Corps Transforms Recruits."

⁴⁹ Monroe, January 3, 2017.

⁵⁰ Veracruz, February 2, 2017.

⁵¹ McGuire, "SMIP Program Brief," 6.

⁵² Ibid., 6.

⁵³ Kimmel, Jr., "The Marine Corps Transforms Recruits."

⁵⁴ Ibid.

⁵⁵ Ibid.

⁵⁶ Sedory, February 1, 2017.

⁵⁷ Ibid.

⁵⁸ Monroe, January 3, 2017.

⁵⁹ Martin P. Schweltnus, "A Clinical Approach to the Diagnosis and Management of Acute Muscle Injuries in Sport," *International SportMed Journal* 5, no. 3 (September 2004): 189, <https://search.ebscohost.com/login.aspx?direct=true&db=rss&AN=26316746&site=ehost-live>.

⁶⁰ Monroe, January 3, 2017.

⁶¹ Schweltnus, 194.

⁶² Falvey et al., 585.

⁶³ Sedory, February 1, 2017.

⁶⁴ Monroe, January 3, 2017.

⁶⁵ Brian McGuire, Branch Head, Force Fitness Branch, USMC Training and Education Command, Quantico, VA, discussion with author January 19, 2017.

⁶⁶ Monroe, January 3, 2017.

⁶⁷ McGuire, "SMIP Program Brief," 6.

⁶⁸ Ibid.

⁶⁹ Sedory, February 1, 2017.

⁷⁰ McGuire, January 19, 2017.

⁷¹ McGuire, "SMIP Program Brief," 7.

⁷² Ibid.

⁷³ Ibid.

⁷⁴ Ibid.

⁷⁵ Ibid., 8.

⁷⁶ Ibid.

⁷⁷ Brian McGuire, "SMIP ATC Value" (PowerPoint presentation, TECOM, Quantico, VA, July 8, 2014), 3.

⁷⁸ Ibid., 4.

⁷⁹ Ibid., 5.

⁸⁰ McGuire, January 19, 2017.

⁸¹ McGuire, "SMIP Program Brief," 11.

⁸² Ibid.

⁸³ McGuire, January 19, 2017.

⁸⁴ Ibid.

⁸⁵ Ibid.

⁸⁶ Monroe, January 3, 2017.

⁸⁷ Ibid.

⁸⁸ Nathaniel S. Nye and Sarah J. de la Motte, "Rationale for Embedded Musculoskeletal Care in Air Force Training and Operational Units," *Journal of Athletic Training* 51, no. 11 (2016): 847.

⁸⁹ Sedory, February 1, 2017.

⁹⁰ Monroe, January 3, 2017.

⁹¹ Ibid.

⁹² Sedory, February 1, 2017.

⁹³ Ibid.

⁹⁴ Ibid.

⁹⁵ Ibid.

⁹⁶ Monroe, January 3, 2017.

⁹⁷ Ibid.

⁹⁸ Ibid.

⁹⁹ Ibid.

¹⁰⁰ Ibid.

¹⁰¹ FRAGO 01/2016, 7.

¹⁰² CG TECOM, Quantico, VA, "MARADMIN 460/16 Force Fitness Instructor Course" (2016), <http://www.marines.mil/News/Messages/Messages-Display/Article/936334/force-fitness-instructor-course/>.

¹⁰³ Sedory, February 1, 2017.

¹⁰⁴ Ibid.

¹⁰⁵ Commandant of the Marine Corps, "Marine Corps Personnel Assignment Policy," MCO 1300.8 (2014), A-2, <http://www.marines.mil/Portals/59/MCO%201300.8.pdf>.

¹⁰⁶ McGuire, "SMIP ATC Value," 6.

¹⁰⁷ Commandant of the Marine Corps, "Advance Notice of Forthcoming Changes to MCO 1300.8 Marine Corps Personnel Assignment Policy," MARADMIN 193/16 (2016), 1, <http://www.marines.mil/DesktopModules/ArticleCS/Print.aspx?PortalId=59&ModuleId=46529&Article=897871>.

¹⁰⁸ Hope Hodge Seck, "Marines Designate Infantry Battalion as New Experimental Unit," *Www.military.com*, February 20, 2016, <http://www.military.com/daily-news/2016/02/20/marines-designate-infantry-battalion-as-new-experimental-unit.html>.

¹⁰⁹ Jeff Schogol, "First Female Infantry Marines Joining Battalion on Thursday," *Marine Corps Times*, January 3, 2017, <https://www.marinecorpstimes.com/articles/women-join-infantry>.

¹¹⁰ Sedory, February 1, 2017.

¹¹¹ *Ibid.*

¹¹² MARADMIN 460/16.

¹¹³ Jeff Schogol, "Top Marine's 2017 To-Do List: Better PT, Fixing Aviation and Cracking Down on 'General Jackassery,'" *The Marine Corps Times*, February 7, 2017, https://www.marinecorpstimes.com/articles/commandant-lays-out-prio...ign=EBB%2002.08.2017&utm_term=Editorial%20-%20Early%20Bird%20Brief.

Bibliography

- CG TECOM, Quantico, VA. MARADMIN 460/16 Force Fitness Instructor Course (2016).
<http://www.marines.mil/News/Messages/Messages-Display/Article/936334/force-fitness-instructor-course/>.
- Commandant of the Marine Corps. Advance Notice of Forthcoming Changes to MCO 1300.8 Marine Corps Personnel Assignment Policy, MARADMIN 193/16 § (2016).
<http://www.marines.mil/DesktopModules/ArticleCS/Print.aspx?PortalId=59&ModuleId=46529&Article=897871>.
- . FRAGO 01/2016: Advance to Contact (2016).
<http://www.marines.mil/Portals/59/Publications/CMC%20FRAGO%201%20-%2019JAN16%20-%20CMC%20FINAL.pdf>.
- . Marine Corps Personnel Assignment Policy, MCO 1300.8 § (2014).
<http://www.marines.mil/Portals/59/MCO%201300.8.pdf>.
- Commanding General, Training and Education Command. Sports Medicine and Injury Prevention Program, TECOM Order 6260 Ch 1 § (2012).
- Falvey, E. C., R. A. Clark, A. Franklyn-Miller, A. L. Bryant, C. Briggs, and P. R. McCrory. "Iliotibial Band Syndrome: An Examination of the Evidence Behind a Number of Treatment Options." *Scandinavian Journal of Medicine & Science in Sports* 20, no. 4 (2010): 580–87. <https://search.ebscohost.com/login.aspx?direct=true&db=rss&AN=52170205&site=ehost-live>.
- Grantham, Jordan. "Opportunities Continue to Grow for ATs in the Military." *NATA Committee on Practice Advancement Military Workgroup*, January 20, 2016.
<http://www.nata.org/blog/jordan-grantham/opportunities-continue-grow-ats-military>.
- Hoar, Margaux, and Cathy Hiatt. "Male and Female Injuries at TBS," June 6, 2013.
- Inscore, Matthew, and Christopher Rennix. "SMIP Monthly Report, The Basic School, September 2014 through August 2015," November 2014.

-
- Jordan, Bryant. "Skeletal Injuries Top Afghan War Ailments." *Military.com*, March 16, 2011.
- Kimmel, Jr., Charles W. "The Marine Corps Transforms Recruits into 'Warrior Athletes' with Athletic Trainers." *Marine Corps Gazette* 89, no. 2 (February 2005): 40–41.
<http://pqasb.pqarchiver.com/mca-members/doc/221454872.html?FMT=TG...%27Warrior+Athletes%27+With+Help+From+Certified+Athletic+Trainers>.
- Kollock, Roger O., Kenneth E. Games, Wilson, Alan E., and JoEllen M. Sefton. "Vehicle Exposure and Spinal Musculature Fatigue in Military Warfighters: A Meta-Analysis." *Journal of Athletic Training* 51, no. 11 (2016): 981–90.
- "Marine Corps Force Integration Plan - Summary," September 10, 2015.
<http://www.npr.org/2015/09/10/439246978/marine-corps-release-results-of-study-on-women-in-combat-units>.
- McGuire, Brian. Branch Head, Force Fitness Branch, USMC Training and Education Command, Quantico, VA, January 19, 2017.
- . "SMIP ATC Value." PowerPoint presentation, TECOM, Quantico, VA, July 8, 2014.
- . "USMC SMIP Program Brief for the Medical Officer of the Marine Corps." PowerPoint presentation, TECOM, Quantico, VA, April 6, 2016.
- Monroe, Alicia. Certified Athletic Trainer, The Basic School, Quantico, VA, January 3, 2017.
- . Certified Athletic Trainer, The Basic School, Quantico, VA, April 20, 2017.
- NATA. "Current Status of ATCs in the Military." *The National Athletic Trainers' Association*, n.d. <http://www.nata.org/sites/default/files/Status-of-ATCs-in-the-Military.pdf>.
- Nye, Nathaniel S., and Sarah J. de la Motte. "Rationale for Embedded Musculoskeletal Care in Air Force Training and Operational Units." *Journal of Athletic Training* 51, no. 11 (2016): 846–48.
- Schogol, Jeff. "First Female Infantry Marines Joining Battalion on Thursday." *Marine Corps Times*, January 3, 2017.
- . "Top Marine's 2017 To-Do List: Better PT, Fixing Aviation and Cracking Down on 'General Jackassery.'" *The Marine Corps Times*, February 7, 2017.
https://www.marinecorpstimes.com/articles/commandant-lays-out-prio...ign=EBB%2002.08.2017&utm_term=Editorial%20-%20Early%20Bird%20Brief.
- Schwellnus, Martin P. "A Clinical Approach to the Diagnosis and Management of Acute Muscle Injuries in Sport." *International SportMed Journal* 5, no. 3 (September 2004): 188–99.
<https://search.ebscohost.com/login.aspx?direct=true&db=rss&AN=26316746&site=ehost-live>.
- Seck, Hope Hodge. "Marines Designate Infantry Battalion as New Experimental Unit." *Www.military.com*, February 20, 2016. <http://www.military.com/daily-news/2016/02/20/marines-designate-infantry-battalion-as-new-experimental-unit.html>.
- Sedory, Jay. Certified Athletic Trainer, The Basic School, Quantico, VA, February 1, 2017.
- Van der Wall, Hans, and Ignac Fogelman. "Scintigraphy in Sporting Injuries of the Ankle: A Review." *International SportMed Journal* 4, no. 4 (July 2003): 1–12.
<https://search.ebscohost.com/login.aspx?direct=true&db=rss&AN=26316854&site=ehost-live>.

Veracruz, Jess. Certified Athletic Trainer, Officer Candidate School, Quantico, VA, February 2, 2017.

Woods, Krista, Phillip Bishop, and Eric Jones. "Warm-Up and Stretching in the Prevention of Muscular Injury." *Sports Medicine* 37, no. 12 (2007): 1089-99.

<https://search.ebscohost.com/login.aspx?direct=true&db=rss&AN=27647011&site=ehost-live>.