# Chapter 2

# PHYSICAL THERAPY IN A WARTIME ENVIRONMENT

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## INTRODUCTION

Military physical therapists (PTs) are essential members of the healthcare team and have proven their worth in rehabilitation and preventive care during peace and war. The mission of military PTs is to provide physical therapy evaluation and treatment to correct or prevent physical impairments resulting from injury, disease, or preexisting problems. This is done via utilization of physical modalities and therapeutic exercise to increase joint mobility, muscle strength, and cardiovascular endurance. Military PTs also serve as independent practitioners and nonphysician healthcare providers when administering primary care to patients with neuromusculoskeletal (NMS) conditions. Military PTs serve as technical advisors to commanders of troop units providing guidance in the areas of physical fitness, physical training, and injury prevention. During mass casualty situations, PT personnel assist in managing patients categorized as delayed or minor, and also augment the orthopedic section.

Historically, the requirement for extensive physical reconditioning of large numbers of soldiers committed by the United States in World War I was a major catalyst in promoting the formation of the profession of PT in the United States. Army PTs lead their profession and excel in clinical practice, education, and research. To observe the professional contributions that military PTs have provided in peace time and war time, the Diamond Jubilee (75th Year Anniversary: 1918–1993) of military PT education in the United States was celebrated at the 1993 Annual Conference of the American Physical Therapy Association.

The purpose of this chapter is to describe the past, present, and future professional roles of U.S. Army PTs. A perspective of the historical function of army PTs in World Wars I and II, the Korean War, and the Vietnam War is presented. During the Persian Gulf War, army PTs provided medical support services in Southwest Asia, Europe, and the continental United States (CONUS). An analysis of the involvement of army PTs in the Persian Gulf War is also provided.

The experiences of army PTs deployed in field training exercises and humanitarian missions to third world countries are also discussed. In addition, the evolving role of military PTs as nonphysician healthcare providers in the evaluation and treatment of patients with NMS conditions is described. As the U.S. Army Medical Department (AMEDD) progresses into the 21st century, army PTs will continue to perform their professional duties within the emerging structure of Medical Force 2000 (MF2K).

## U.S. ARMY PHYSICAL THERAPY IN THE 20TH CENTURY

### World War I

At the outbreak of World War I, the use of reconstructive therapy utilizing massage, electrotherapy, exercise, and hydrotherapy was not well established in the United States. Because the number of reconstruction aides needed by the Division of Special Hospitals and Physical Reconstruction was not obtainable from the nation's manpower pool in 1917, the Office of The Surgeon General (OTSG), U.S. Army, established emergency training programs for reconstruction aides in 1918[1] and the army recruited and trained "reconstruction aides" to fill this void in healthcare.

Reconstruction aide requirements included completion of at least a four-month course in theoretical and practical physiotherapy in two of the following modalities: hydrotherapy, mechanotherapy, massage, or electrotherapy. Also required were 240 certified hours of active clinical work, completion of a secondary school education, and a physical examination. The aides could be married and included men as well as women. Typically, the first reconstruction aides to serve in World War I were teachers of physical education in colleges and universities.[1]

Mary McMillan was an American PT trained in England under Sir Robert Jones, a noted orthopedic surgeon, and had attended war wounded at a base hospital in England. During World War I, McMillan structured the education programs for the reconstruction aides.[1] These programs were conducted in 7 of the 14 civilian institutions whose curricula met standards set by the OTSG. The courses taught at Reed College in Eugene, Oregon, contributed the largest number of graduates (over 200) for the U.S. Army Medical Department. To organize administrative details of the reconstruction program, establish the training curricula, and prepare reconstruction aides for overseas duty once they were trained, Marquerite Sanderson was appointed the first supervisor of reconstruction aides in the OTSG.[1]

Fig. 2-1. World War I—Army physical therapist instructing a below-knee amputee in range-of-motion and strengthening exercises. Photograph: Archives, U.S. Army Center of Military History, Washington, DC.

In February 1918, at the request of The Surgeon General, McMillan left Boston and joined Sanderson to assume duties as the head reconstruction aide at Walter Reed General Hospital in Washington, DC. In late 1919, she was appointed Superintendent of Reconstruction Aides in Physiotherapy, OTSG, and completed the first book to be published in the United States on physical therapy, *Massage and Therapeutic Exercise*.[1] McMillan is considered by many to be the founder of physical therapy in the United States and was elected the first president of the American Women's Physical Therapeutic Association in 1921.[2]

The stated mission of the U.S. Army Medical Department was to heal the injured soldier and to equip him with the training and skills necessary for becoming an effective member of society both industrially and socially.[1,2] In support of that mission, physiotherapy reconstruction aides of World War I served in large hospital complexes at home and abroad (Figure 2-1). Military hospitals in the United States were constructed, some entirely new structures, and some extensive additions to established hospitals. The reconstruction aides treated soldiers with battle injuries, including those caused by gases (chlorine, phosgene, mustard, and arsine) and shrapnel damage to the extremities.[1] The aides also managed patients with infectious diseases, especially influenza and pneumonia. Patients' hospital stays were often extended over several months until rehabilitation was completed.

In July 1920, 175 physiotherapy reconstruction aides were employed by the army, and by June 1921, the specialty was practiced in six U.S. Army hospitals.[1] In 1926, the term "reconstruction aide" was discontinued by directive of The Surgeon General, and the more definitive title "physiotherapy aide" was instituted. Following World War I, physical therapy was recognized in the United States as a profession, training programs were instituted, formal professional societies were formed, and civilian salaries for the specialty were increased.

**World War II**

Between 1934 and the onset of World War II, the number of physical therapists in the U.S. AMEDD remained consistent, absorbing graduates of the army training programs and allowing for attrition. PTs maintained civil service status during this time, and there was no longer a permanent staff position in the OTSG. Professional staff input concerning PT practice and personnel was provided to OTSG by Colonel Emma Vogel, who had served as an assistant instructor under McMillan. Colonel Vogel had assumed the chief's position at Walter Reed General Hospital in 1922, when McMillan returned to civilian practice.[1]

In September 1939, in response to the militarily enforced expansionist policies of Italy and Japan, and shortly after Germany occupied Austria and Czechoslavakia, President Franklin D. Roosevelt declared a national state of emergency. The President's declaration initiated a massive training effort by the military services to acquire and develop personnel necessary for overseas deployment. The anticipated army requirements for PTs far exceeded the staffing ceilings of the U.S. Army Medical Department,

and also exceeded the number of PTs recorded by the national professional organizations.[1,2]

Following Japan's attack on Pearl Harbor, the United States entered World War II. As in World War I, The Surgeon General , U.S. Army, organized hospitals to support the armed forces. Civil service PTs were recruited and trained by the army, and then deployed to military hospitals in the United States and overseas. U.S. Army physical therapists served in every Theater of Operations (TO) during World War II.[1]

In July 1943, the Reconditioning Division of the OTSG was established to direct an armywide reconditioning program under the leadership of Lieutenant Colonel Walter E. Barton, Medical Corps. In this division, Colonel Vogel was appointed Superintendent of the Physical Therapy Branch, OTSG.[2] As in the first World War, U.S. Army physical therapists played a major role in World War II in the evaluation and treatment of injured, wounded, and sick servicemen of our armed forces (Figure 2-2).[1]

On June 22, 1944, Public Law 78-350 was passed by Congress (House of Representatives, 78th Congress, 2nd Session). Known as the Bolton Bill in honor of Representative Frances P. Bolton, who introduced it, this milestone bill granted commissioned status for dietitians, physical therapists, and nurses in the U.S. Army, granting them the same allowances, rights, benefits, and privileges as other commissioned officers. The news of this landmark legislation and the protection under the war clause for women serving overseas was welcomed at home and abroad.[1,2]

PT equipment used during World War II had been evaluated and standardized in the late 1930s through efforts of the American Medical Association's Council on Physical Therapy.[1] In 1939, U.S. Army equipment purchase requests were processed in anticipation of wartime requirements. Even so, in the early months of the war in remote locations, PTs often rehabilitated the wounded with improvised equipment, demonstrating their ingenuity and a "can do" work ethic. Mess tables were used as plinths, and weights for resistance exercises were made from cans filled with dirt, rocks, and sand. Large basins and bathtubs became whirlpools, and water for these whirlpools was heated on field ranges. Bamboo, scrap lumber, and salvaged parts from vehicles or aircraft were used to construct and adapt inventive apparatus for treatment.[1]

By August 1945, 1,300 PTs were on active duty in the U.S. Army, and approximately 570 of them were assigned overseas in all theaters. Two of these American PTs, Brunetta A. Kuehlthau and Mary McMillan, were captured by the Japanese and interned in prison camps in the Philippines and China, respectively.[1] McMillan was repatriated in 1943 in China, and Kuehlthau was liberated by U.S. forces in February 1945.

**The Korean War**

In June 1950, North Korean forces accompanied by Soviet advisors and equipped with Soviet military hardware crossed the 38th parallel to invade South Korea. Within hours, President Truman di-

**Fig. 2-2.** World War II—Therapeutic Exercise Section, Physical Therapy Clinic, Walter Reed General Hospital, Washington, DC. Photograph: Archives, U.S. Army Center of Military History, Washington, D.C.

rected the United States Far East Command to use American combat forces in support of the Republic of Korea. The Korean War provided the first opportunity for the Women's Medical Specialist Corps (WMSC) to support the army medical department in a wartime situation.[1] The WMSC, which was established in 1947 by Congress, was composed of occupational therapists, physical therapists, and dietitians. In contrast to World War I and World War II, the WMSC facilitated the assignment and training of physical therapists, occupational therapists, and dietitians from both active and reserve components.

Led by Colonel Vogel, the WMSC increased and expanded training programs for physical therapy and began a recruitment program using corps officers in army area headquarters. The corps leadership appointed prominent members of the civilian specialties as consultants. By June 1953, the WMSC was composed of 607 women, 201 regular army and 406 reserve component officers.[1]

During the Korean War, U.S. Army PTs were deployed to hospitals in Korea, Japan, and Hawaii in support of the fighting forces. Additional U.S. Army PTs were mobilized and assigned to Continental United States hospitals. In support of the Republic of Korea, U.S. Army PTs instituted clinical training programs in physical therapy for Korean medical personnel and designed PT facilities for several Republic of Korea military hospitals.[1] To supplement the shortage of trained PT technicians in the Far East Command hospitals, PTs conducted "on the job" training for enlisted personnel within numerous army PT clinics during the early stages of the war. This training was formalized in 1952 into four 12-week courses that followed the recommended army program of instruction for PT technicians.[1]

The primary long-term rehabilitative effort for Korean War casualties occurred in general hospitals located in Japan, Hawaii, and the United States. After discharge from army hospitals, long-term rehabilitative efforts were continued for war injured patients by therapists assigned to Veteran's Administration hospitals. Reconditioning program development and innovative techniques were stimulated among army PTs by the rehabilitative requirements of patients who contracted poliomyelitis, tuberculosis, Japanese B encephalitis, or who were recuperating from the effects of cold weather injuries.[1]

**Vietnam War**

In 1955, through congressional action, the WMSC became the Army Medical Specialist Corps (AMSC) and male officers were added to the three specialty sections (Occupational Therapy, Physical Therapy, and Dietetics). AMSC officers played key roles in the U.S. Army Medical Department involvement in Vietnam, and in post-Vietnam military operations (Grenada, Panama, and the Persian Gulf War). In 1992, the Physician Assistant (PA) Section was created as the fourth section of the AMSC. Prior to 1992, PAs held the rank of warrant officer, and were assigned to the Medical Corps. The 1992 congressional action gave the AMEDD the ability to commission the army PAs and subsequently place them in the AMSC.

Between 1962 and 1973, in support of the military mission in South Vietnam, The Surgeon General of the Army deployed 24 hospitals, which were established as fixed medical installations with area support missions. These included surgical, evacuation, and field hospitals, and a 3,000 bed convalescent center. The first AMSC officer to arrive in Vietnam was Major Barbara Gray, a physical therapist, assigned to the 17th Field Hospital in Saigon. Her arrival in March of 1966 marked the first time an army PT or AMSC officer had been assigned to an active combat zone.[1]

Prior to her arrival in Saigon, Major Gray had developed a staff study indicating the need for physical therapy in the Vietnam scenario. As a result of this study, the OTSG deployed nine PTs and their enlisted physical therapy personnel to Vietnam in 1967. As Major Gray had hypothesized, the early intervention of PT in patient treatment programs improved the patients' medical prognoses, reduced healing times, and helped return soldiers to duty more rapidly. As a result of Major Gray's study, army PTs were assigned to the 3rd, 8th, and 17th Field Hospitals, the 12th, 24th, 29th, 36th, 67th, 71st, 93rd, and 95th Evacuation Hospitals, and the 6th Convalescent Center.[1]

The determining factor affecting assignment of PTs to Vietnam was direct requests for PT service by hospital commanders. Shortly after their arrival in Vietnam, U.S. Army PTs began treating Vietnamese military personnel and civilians in army hospitals. This interaction between U.S. and Vietnamese military personnel expanded to include PT instruction of patients and medical staffs regarding positioning and exercise in Army of the Republic of Vietnam (ARVN) hospitals. Between 1966 and 1973, 47 PTs served in Vietnam as members of the AMSC.

The primary treatment goal of physical therapy in Vietnam was the rehabilitation of patients who were capable of being returned to duty. For patients requiring evacuation out of the theater, treatment

focused on basic rehabilitation procedures that would be continued at each evacuation stage. Because of the relatively short periods of patient hospitalization in Vietnam, physical therapy was typically limited to ward programs, although a small number of outpatients were also treated in selected hospitals. As facilities and equipment were improved, expanded treatment in physical therapy clinics was available (Figure 2-3).[3]

During the Vietnam War, orthopedic surgeons assigned to army hospitals in Vietnam found that their time was consumed with evaluating and treating patients requiring surgical management. This forced a large number of patients with nonsurgical musculoskeletal problems to wait until physician manpower became available to evaluate and treat them. Because of this, army PTs assigned to the combat zone (CZ) acquired a new and expanded role: nonphysician healthcare provider.[1] The newly designated function was the early evaluation and treatment of patients with NMS conditions without physician referral.[1,3] Army PT met that challenge and created programs and protocols where PTs evaluated and treated patients with nonsurgical orthopedic conditions. The program outcomes were decreased hospitalization, decreased patient waiting and treatment times, and facilitation of soldiers' rapid return to duty.[1]

**Fig. 2-3.** Vietnam War—Army physical therapist performing passive range-of-motion exercises for a patient with a femur fracture and associated nerve injuries of the lower limb. Photograph: Archives, U.S. Army Center of Military History, Washington, DC.

**Physical Therapy in the 1970s: Evolution of the Profession**

U.S. Army PTs have successfully practiced in a direct access environment as primary nonphysician healthcare providers for patients with NMS disorders since the early 1970s. The need for army PTs to assume this role and provide NMS evaluation and treatment for their patients without physician referral was a direct result of the evolving practice of army PT in a wartime environment (Vietnam) and the shortage of army physicians, especially orthopedic surgeons, following the Vietnam War.

In 1972, the AMEDD was plagued with a large number of patients with NMS complaints and a shortage of orthopedic surgeons to evaluate and treat these patients. This resulted in long delays in administration of primary healthcare to patients with NMS conditions. The traditional system of triage for these patients was initial evaluation and diagnosis by an orthopedic surgeon followed by a referral to PT for services. The modified system of triage for patients with NMS problems was evaluation, diagnosis, and treatment by PTs with appropriate referral to orthopedic surgery or other medical specialties as required.

Implementation of the NMS role for army PTs required formalizing extensive training and privileging protocols. The regulations that document the army PT nonphysician care provider role are Army Regulations 40-48 and 40-68.[4,5] Army PTs privileged to perform NMS evaluations and treatment may perform within the scope of physical therapy practice, refer patients to radiology for appropriate radiographic evaluation, restrict patients to quarters for 72 hours, place patients on temporary profiles up to 30 days, and refer patients to all medical specialty clinics. In some medical treatment facilities (MTFs) PTs may be privileged to order certain analgesic and nonsteroidal antiinflammatory medication.[4]

The advantages of having PTs perform NMS evaluation and treatment include (*a*) prompt evaluation and treatment for the patients with NMS complaints; (*b*) promotion of quality healthcare; (*c*) decrease in sick call visits; (*d*) more appropriate use of physicians; and (*e*) more appropriate use of PT education, training, and experience.[1] The use of PTs as nonphysician healthcare providers in the U.S. Army has been an overwhelming success. Presently, other branches of the uniformed services (Air Force, Navy, and Public Health Service) provide direct access to PT services for patients with NMS complaints.

The U.S. Army is fortunate to have an educational program to prepare PTs for their role in evaluating and treating patients with NMS dysfunction. The U.S. Army-Baylor University Graduate Program in Physical Therapy, located at Fort Sam Houston, Texas, is an entry-level master's degree program accredited by the Commission on Accreditation for Physical Therapy Education (CAPTE). The Army-Baylor PT program has a triservice function to prepare entry-level PTs for active duty service in the Army, Navy, and Air Force. The faculty of the Army-Baylor PT program is composed of representatives from these three services; however, the army remains the lead agent.

The Army-Baylor PT curriculum meets the accreditation requirements of CAPTE for an entry-level generalist PT, but the curriculum emphasizes the evaluation and treatment of patients with NMS problems. Following entry-level training, these army PTs are trained clinically, following specific credentialing protocols, and then credentialed to perform NMS evaluation and treatment. A two-week advanced NMS evaluation course was designed and implemented to enhance the continuing education of PTs performing NMS evaluations.

As the role of the PT in the U.S. Army changed in the 1970s, there was a concomitant change of the role of PTs in civilian practice. The evolution of PT practice proceeded toward a greater level of autonomy commensurate with increased levels of education and experience and an expanded research base.[1] The scope of PT practice changed from a limited role as technician to that of a professional member of the healthcare team.

With this evolution in the scope of civilian PT practice came an increased responsibility for PTs to provide optimal healthcare for their patients. At present, 28 states permit (by law) the evaluation and treatment of patients by physical therapists without physician referral. Forty-two states permit PTs to evaluate patients without physician referral but require physician approval before initiating PT treatment. The PT associations in an increasing number of states continue to pursue legislative changes to permit direct access to PT services.[6]

**Persian Gulf War**

In August 1990, the United Nations (UN) quickly responded to the Iraqi invasion of Kuwait by mobilizing United States and other UN coalition forces. As a part of this mobilization of American forces, U.S. Army physical therapists were deployed into the TO—Saudi Arabia, Kuwait, and Iraq—and communications zone—Europe—in support of the Persian Gulf War. In addition, army PTs were utilized in military hospitals in the CONUS in support of this operation. Active and reserve component PTs and PT enlisted specialists were deployed during this operation (Figure 2-4).

**Fig. 2-4.** Persian Gulf War—U.S. Army 47th Field Hospital, Bahrain. Photograph: Archives, U.S. Army Center of Military History, Washington, DC.

**Fig. 2-5**. Captain Don Hansen, U.S. Army physical therapist, performing cervical mobilization procedures on a patient with cervical joint dysfunction. Captain Hansen was assigned to the 47th Field Hospital, stationed in Bahrain. Photograph: Archives, U.S. Army Center of Military History, Washington, DC.

Six PT and 12 PT enlisted specialists were deployed to the TO during the Persian Gulf War. PT enlisted specialists (enlisted soldiers with the rank of Private First Class through Sergeant First Class) received 27 weeks of didactic and clinical PT training at the AMEDD Center and School at Fort Sam Houston, Texas. PT enlisted specialists assist the PT by performing modality and exercise treatments. PT personnel were assigned to the 47th Field Hospital (Bahrain), 50th General Hospital (Riyadh), 316th Station Hospital (Riyadh), and 300th Field Hospital (Saudi Arabia/Iraq border). Europe was designated the communication zone (COMMZ) for the Persian Gulf War. In addition to the active component PT personnel assigned to Europe/COMMZ (18 PTs and 32 enlisted specialists), an additional 11 PT officers and 21 enlisted specialists from the reserve component were deployed to Europe for augmentation of PT services.

At the onset of this operation, there were 186 PTs and 198 PT enlisted specialists on active duty and assigned to army hospitals in CONUS. An additional 40 PTs and 57 PT enlisted specialists from the reserve component were mobilized and deployed to army hospitals in the United States. One army PT and one PT enlisted specialist from the active component were deployed following the Persian Gulf War to serve six months with the 21st Evacuation Hospital in Saudi Arabia (Figure 2-5).

Navy and Air Force PTs were also deployed to the TO during the Persian Gulf War. Navy PTs were assigned to the navy hospital ships (*Comfort* and *Mercy*) and fleet marine hospitals. Air Force PTs were assigned to air transportable hospitals (ATHs) in the TO, and additional PTs were deployed to "warm base" hospitals in the COMMZ (United Kingdom and Germany).

The mission of army PTs in the Persian Gulf War was to provide physical therapy evaluation and treatment to correct or prevent physical impairments resulting from injury, disease, or preexisting conditions. PTs served as independent practitioners and nonphysician healthcare providers performing primary evaluation and treatment of patients with NMS complaints. Physical therapists also served as technical advisors to commanders, providing guidance in the areas of physical fitness, physical training, and injury prevention. U.S. Army PTs treated enemy prisoners of war and supplemented the staff in host nation hospitals, which required a shift from practice models to community health models with cultural integration.

Several significant issues pertaining to PT practice and personnel became evident during the Persian Gulf War. First, there was a lack of PT personnel to accomplish the mission at the hospitals deployed in the TO. This lack of PT personnel, especially in support of the orthopedic service, resulted in the needless evacuation of a large number of patients with NMS problems from the TO to the COMMZ (Europe) or CONUS. Second, an insufficient number of PT personnel in the TO was available to provide evaluation and treatment of work-related, training, and sports injuries. Insufficient staffing of PT personnel resulted in an increased evacuation rate of patients with NMS problems, and delayed soldiers' rapid return to duty following training or sports injuries (Figure 2-6).

During the period of August to December 1990, 986 orthopedic admissions were documented in the TO. As reported by the Patient Administration Division, OTSG, this included 270 patients (27%) with knee dysfunction, 202 patients (19%) with spinal dysfunction, 61 patients (6%) with foot/ankle dys-

**Fig. 2-6.** Persian Gulf War—Physical Therapy Clinic, 47th Field Hospital, Bahrain. Photograph: Archives, U.S. Army Center of Military History, Washington, DC.

function, and 35 patients (4%) with other musculoskeletal dysfunctions. Forty-two percent of the total number of patients evacuated to the COMMZ during the same time frame were patients with orthopedic conditions. These patients were evacuated to the COMMZ for further evaluation and treatment of their conditions.[7] After-action reports from army orthopedic and PT personnel hypothesized that increased PT personnel assets in the TO would have decreased the orthopedic hospital admissions in the TO and decreased the number of evacuations out of the TO during the buildup, preparation, and training phases of the operation.

In addition, the Army Patient Administration Division (OTSG), which was responsible for recording hospital admissions and dispositions, could not document the number of outpatient visits in the TO during the Persian Gulf War, including the buildup and training phases of the operation. Considering the number of orthopedic admissions during this time for back, knee, and ankle dysfunction, one can deduce that many more patients were evaluated and treated as outpatients for NMS conditions without the benefit of PT services. Early physical therapy evaluation and treatment of patients with NMS conditions have proven to be beneficial in rapidly returning soldiers to duty. Physical therapists are valuable in conserving the fighting force.

One significant "lesson learned" by the AMEDD for army PT services was a result of experiences in the Persian Gulf War. An insufficient number of PT personnel were deployed to the TO to optimally complement the assigned orthopedic physicians in accomplishing the mission of providing physical therapy evaluation and treatment of patients with work-related, training, and sports injuries.

### Physical Therapy Study From The Persian Gulf War

To document the injury characteristics and recovery patterns in physical therapy referrals during the Persian Gulf War, a Physical Therapy Registry was developed by the Chief of Army Medical Specialist Corps Clinical Investigation and Research (AMSC-CIR). In previous mobilization environments, Army PTs did not implement systematic data collection as part of the clinical management of patients. Anecdotal reports and generalized historical reviews were the only sources of PT practice analyses from previous deployments.

Past attempts by PTs to quantify the information relevant to the recovery of individuals injured during deployment were limited to the data collected by army PT clinical researchers participating in the Vietnam Head Injury Study, a 10 to 14 year follow-up of veterans with penetrating head injuries incurred during the Vietnam War.[8,9] PT records during the Vietnam deployment were limited to treatment cards that were later destroyed, a common administrative procedure for army PT files retained for two years. At that time, PTs were not permitted to write in the progress note section of patients' medical records; therefore, retrospective record reviews for PT data were nonproductive. A clinical study of injury characteristics and a registry of injuries referred during a major combat-related, army PT practice have not been accomplished.[10]

During the period of October 1990 to May 1992, 1,433 patients were treated by army PTs in the Persian Gulf War field hospitals and evacuation sites. Each case was entered into the Persian Gulf War Army Physical Therapy Registry at three combat sites in the Persian Gulf region and three evacuation sites in West Germany.[10,11]

Design, management, and analyses of all data occurred at the AMSC-CIR office at Walter Reed Army Medical Center, Washington, DC. The qualitative data (patient count, work hours, military duties, adequacy of clinical and military training) from monthly surveys of practice were consolidated and forwarded by the Chief, AMSC-CIR, to the Physical Therapist Section, OTSG, for action.

The average PT patient profile from the combined caseload at combat and evacuation sites in the Persian Gulf War had the following characteristics: 29 years of age, caucasian, male, active duty army enlisted rank E1–E4, Army Physical Fitness Test score of 245/300 (82%), 94 weeks of experience in military service, and 13 weeks in the combat zone before injury. Only 42% (607) of the PT patients were treated in the Persian Gulf, compared to 58% (826) of the patients treated by PTs in the evacuation sites of Landstuhl, Frankfurt, and Nuremburg, Germany.[10,11]

Army physical therapy in the combat zone consisted of managing soldiers with injuries incurred primarily from training (69%) and off-duty (26%) activities. Patients treated by PTs in the COMMZ sustained injuries mainly during combat (75%) or training maneuvers (22%).[10,11]

The causes of injuries treated by physical therapists in CZ and COMMZ were primarily in two categories: (1) lifting or falling (37%); and (2) preexisting medical conditions (22%) such as degenerative joint disease, temporomandibular joint dysfunction, headaches, gout, or tumors. Less frequent mechanisms of injury were vehicle accidents (12%), weapons (7%), burns (6%), tools or machinery (4%), and unclassified (12%).[10,11]

The locations of injuries from this caseload were spine (38%), knee (27%), ankle or foot (12%), shoulder (7%), hip or thigh (6%), brain or cranium (6%), wrist or hand (3%), and elbow (1%). The average duration of PT treatment in the combat zone was 10.7 inpatient days and 1.8 outpatient days. If evacuated to Germany, PT patients were treated an average of 4.3 inpatient days before being transferred to stateside hospitals.[10,11]

Eighty-five percent of PT patients in the combat zone were returned to duty. On a case-by-case analysis, it was the professional opinion of PTs in the evacuation zone that 21% of their Persian Gulf caseload could have been returned to duty if treated in the combat zone by a PT. The shortage of PTs in the Persian Gulf contributed to excessive evacuation of troops with musculoskeletal injuries who could have remained in the combat setting for treatment. PTs in the field combat environment during the war played an important role in expedient assessment, treatment, and return to duty of acutely injured soldiers with only 15% of physical therapy patients requiring evacuation.[10,11]

### U.S. Army Physical Therapists Deployed to Third World Countries

U.S. Army PTs and PT enlisted specialists have recently been deployed with AMEDD units and civilian humanitarian organizations to Third World countries. This humanitarian role for army PTs included assignments to El Salvador, Russia (burn care assistance), Turkey, Romania (pediatrics), and Croatia. In addition to the general practice of physical therapy, this type of assignment enables army PTs to serve as consultants and educators to the local medical community.

## PHYSICAL THERAPY IN EVOLVING DOCTRINE

Recent events have dramatically changed the threat facing the United States. With those changes came the need to review and revise the army's warfighting concept. The army's current warfighting doctrine, "AirLand Battle," is primarily oriented toward conventional warfare within a European scenario. Today, that single entity threat no longer exists. Improvements in East–West relations have shifted the focus to regional threats of consequence to United States vital interests.[12]

The medical mission for the U.S. AMEDD of the future includes four aspects. First, AMEDD must maintain the health of the army. Second, it must conserve the army's fighting strength. Third, it must prepare for health support to the army in time of war, international conflict, or natural disaster. Fourth, it must provide healthcare for eligible beneficiaries in peacetime, concurrently with the above missions.[12]

To meet the requirements of the AMEDD mission for AirLand Battle doctrine, the Medical Force 2000 (MF2K) structure was developed to provide field medical support during the first decade of the 21st century. Medical Force 2000 places Army physical

therapists and physical therapy specialists in the Combat Support Hospital (NATO [North Atlantic Treaty Organization] Level III), Field Hospital (NATO Level III/IV), and General Hospital (NATO Level IV).[12]

Army physical therapists in MF2K are employed as healthcare providers in the evaluation and treatment of patients with NMS disorders along with their general PT duties. In addition, army PTs have been trained and should be used as consultants in injury prevention, physical training, and physical fitness. During mass casualty situations, PT personnel may assist in managing "delayed" or "minor" category patients, or augmenting the orthopedic section by evaluating and treating patients with nonsurgical NMS conditions.[13]

Army policy states that PTs plan, evaluate, supervise, and implement treatment regimens to correct, prevent, or retard physical dysfunction resulting from injury, disease, or preexisting biomechanical problems.[12] Physical therapists perform baseline and progress assessments of gait, structure, mobility (including strength and joint motion), neurological and circulatory status and function. Data from these assessments provide objective information for duty fitness determinations. Physicians reference PT data as indicators of the stability, improvement, or deterioration of a patient's condition.[13]

## CONCLUSION

Army physical therapists are essential members of the healthcare team and have demonstrated their merit during wartime and peacetime. Historically, army PTs have contributed to the medical support of U.S. Forces in World War I, World War II, Korea, Vietnam, and, most recently, in Southwest Asia. In wartime deployments and field training exercises, army physical therapists have made substantial contributions to military healthcare in primary NMS assessment, rehabilitation, and injury prevention.

In peacetime, the scope of PT continues to evolve and expand into multiple practice settings and specialty areas. In the 21st century, army physical therapists will continue to lead the way in practice, education, and research, particularly in the advanced specialty area of orthopedic physical therapy.

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