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**REHABILITATION OF THE INJURED COMBATANT**  
**VOLUME 1**

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The Coat of Arms  
1818  
Medical Department of the Army

A 1976 etching by Vassil Ekimov of an  
original color print that appeared in  
*The Military Surgeon*, Vol XLI, No 2, 1917

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The first line of medical defense in wartime is the combat medic. Although in ancient times medics carried the caduceus into battle to signify the neutral, humanitarian nature of their tasks, they have never been immune to the perils of war. They have made the highest sacrifices to save the lives of others, and their dedication to the wounded soldier is the foundation of military medical care.

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# Textbook of Military Medicine

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Editor in Chief

Brigadier General Russ Zajtchuk, MC, U.S. Army  
*Director, Borden Institute  
Commanding General  
U.S. Army Medical Research and Materiel Command  
Professor of Surgery  
F. Edward Hébert School of Medicine  
Uniformed Services University of the Health Sciences  
Bethesda, Maryland*

Managing Editor

Ronald F. Bellamy, M.D.  
*Colonel, MC, U.S. Army (Retired)  
Borden Institute  
Associate Professor of Military Medicine  
Associate Professor of Surgery  
F. Edward Hébert School of Medicine  
Uniformed Services University of the Health Sciences  
Bethesda, Maryland*

Executive Officer

Lieutenant Colonel Elias G. Nimmer, MSC, U.S. Army  
*Deputy Chief of Staff, Comptroller  
U.S. Army Medical Research and Materiel Command  
Fort Detrick, Frederick, Maryland*

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*Exercise Period for Wounded*

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# REHABILITATION OF THE INJURED COMBATANT VOLUME 1

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*Specialty Editors*

TIMOTHY R. DILLINGHAM, M.D.  
*Associate Professor  
Johns Hopkins University Hospital*

PRAXEDES V. BELANDRES, M.D.  
*Colonel, Medical Corps, U.S. Army*

---

*Borden Institute  
Walter Reed Army Medical Center  
Washington, DC*

*Office of The Surgeon General  
United States Army  
Falls Church, Virginia*

*United States Army Medical Department Center and School  
Fort Sam Houston, Texas*

*United States Army Medical Research and Materiel Command  
Fort Detrick, Frederick, Maryland*

*Uniformed Services University of the Health Sciences  
Bethesda, Maryland*

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# Foreword

Highly skilled soldiers, sailors, airmen, and marines in today's military services possess knowledge of weapons systems that requires considerable training to acquire. These combatants are difficult to replace should they become severely injured during conflict or training. Providing the best medical care possible to America's military sons and daughters and returning these highly trained individuals to duty are, therefore, dual needs of paramount importance. Rehabilitation plays an essential role in the return to duty through both exercise, which prevents contractures, and beginning ambulation at the earliest possible time after injury, which prevents the deleterious effects of bedrest.

Lieutenant Colonel Howard A. Rusk, MD, the US Army Medical Corps officer in World War II who introduced active rehabilitation into Army Air Corps hospitals, and one of the founders of modern rehabilitative medicine, observed that "men did not get ready for full duty playing blackjack or listening to the radio."<sup>1(p463)</sup> It was apparent to physicians in World War I and World War II that physical rehabilitation was supremely important. In order to return to duty, aggressive therapies were necessary soon after injury. For those unable to return to duty immediately, early rehabilitative intervention prevented the effects of immobility and maximized the patients' functional potential.

Rehabilitation must be thought of as a continuum of care spanning the time from shortly after injury to full functional restoration. It is a common misconception that rehabilitative care should be relegated largely to Veterans Affairs hospitals. This argument has been made in the past, but we need only look at historical experience to realize that rehabilitation must begin soon after injury—while the patient is still being treated in military hospitals. During World War II, for example, the army established amputation centers where the highest quality rehabilitation could be provided. But in 1946 the Special Exhibit Committee for Rehabilitation stated:

Delay in inaugurating rehabilitation procedures is the most frequent cause of failure. If there is too much delay in instituting a program of rehabilitation, muscular atrophy, fixation of joints, and mental depression may progress to a point at which complete restoration becomes impossible.<sup>2(p497)</sup>

Far too often the hard-earned lessons of war are forgotten between conflicts. Physical medicine and rehabilitation developed as a specialty as a direct consequence of the great conflagrations of the two world wars. Although medical science has progressed at a phenomenal pace, more than 50 years have elapsed since the last book of rehabilitation specifically regarding war injuries, *Rehabilitation of the War Injured*, was published in 1943. It is fitting that the vastly improved diagnostic and therapeutic rehabilitation interventions be consolidated in the *Textbook of Military Medicine*, a series that will constitute an encyclopedia of combat casualty care. For this reason, this textbook, *Rehabilitation of the Injured Combatant*, will be a valuable reference for the physicians and allied providers who care for those who are injured while fighting for our nation.

Lieutenant General Ronald R. Blanck  
The Surgeon General  
U.S. Army

April 1998  
Washington, DC

1. Rusk HA. The growth and development of rehabilitation medicine. *Arch Phys Med Rehabil*. 1969;Aug;463–466. Editorial.
2. Special Exhibit Committee on Physical Medicine of the American Medical Association. Exhibit on physical medicine: Physical therapy, occupational therapy and rehabilitation. *Arch Phys Med*. 1946;Aug;491–498.



# Preface

This nation has no more solemn obligation than healing the hurts of our wounded and restoring our disabled men to civil life and opportunity. The Government recognizes this and the fulfillment of the obligation is going forward fully and generously. ... It is merely the payment of a draft of honor which the United States of America accepted when it selected these men, and took them in their health and strength to fight the battles of the Nation. They have fought the good fight; they have kept the faith, and they have won. Now we keep faith with them, and every citizen is endorser on the general obligation.

—Woodrow Wilson<sup>1(pv)</sup>

These words from the past ring as true today as they did in 1919. It is the responsibility not only of our nation but also of the medical corps of all the services to ensure the very best care possible for all combatants. This best possible care includes the responsibility to provide the highest-quality rehabilitative care when a soldier, sailor, airman, or marine has sustained a potentially disabling condition. For this reason, a textbook on rehabilitation is considered essential by the Borden Institute.

Rehabilitation traces its roots to the two world wars. The tremendous needs of injured combatants with amputations, severe hand injuries, spinal cord injuries, brain injuries, burns, and nerve injuries stimulated development of this field, which includes physiatry (physicians specializing in rehabilitation), physical therapy, and occupational therapy. As modern warfare has drastically improved its lethality, medicine has also improved its ability to save lives. But during their recuperative phase, almost all those with war wounds need at least strengthening to prevent complications of immobility, and range of motion exercises to prevent contractures.

Medical literature is replete with textbooks on the rehabilitative care of civilians. This textbook, however, focuses on the aspects of care that are specifically related to wounds sustained through combat and military training, for almost all of these require some component of rehabilitation to ensure full functional restoration. The textbook is published in two parts and organized into three sections. The first section introduces the field of rehabilitation, its history, and its functions in the modern military. The second section, the largest and most comprehensive, deals with injury-specific rehabilitation: of burn wounds, nerve injuries, spinal injuries, the special problems of amputees, and so forth. The authors of these chapters produced comprehensive treatises far beyond any preconceived expectations. They have captured the essence of modern rehabilitation and its application to the military. The chapter on preventing complications of immobility is an important contribution; all military physicians and healthcare providers must understand these important principles. The third section deals with exercise and training in ways to prevent injuries, yet maximize performance and strength. In addition, the army's medical boarding system has been outlined admirably and will guide the reader through this complicated system.

In the modern military services, which make substantial investments in training their personnel, vocational restoration encompasses returning to active duty. Depending on the needs of the military, the current national situation, and the special skills possessed by the injured combatants, rehabilitation to the point of return to duty can be an important source of force reconstitution during a conflict.

(Preface continues)

The efforts of the two specialty editors of this textbook, Timothy R. Dillingham, MD, and Praxedes V. Belandres, MD, Colonel, Medical Corps, US Army, have made this two-part volume a reality, and I thank them for their determination to provide nothing less than the best for those in their care. *Rehabilitation of the Injured Combatant* is a welcome addition to the *Textbook of Military Medicine* series. This volume symbolizes the armed forces' commitment to providing the finest rehabilitative care possible to those who "fought the good fight" in service to their nation and in so doing sustained grievous injuries.

Brigadier General Russ Zajtchuk  
Medical Corps, U.S. Army

April 1998  
Washington, DC

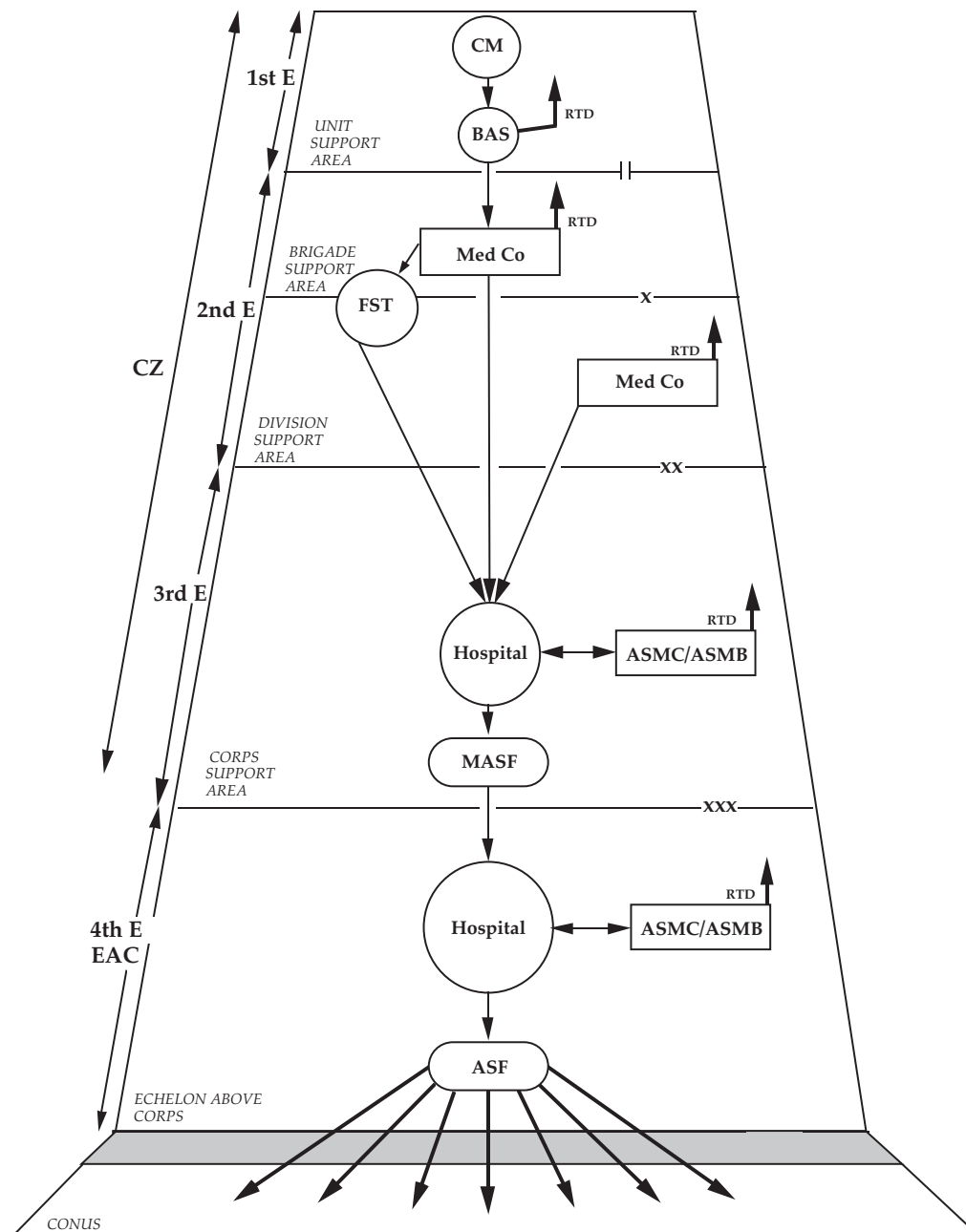
1. Wilson W. Epigraph. In: Harris G. *The Redemption of the Disabled: A Study of Programmes of Rehabilitation for the Disabled of War and of Industry*. New York, NY: D. Appleton and Co; 1919: v.

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The current medical system to support the U.S. Army at war is a continuum from the forward line of troops through the continental United States; it serves as a primary source of trained replacements during the early stages of a major conflict. The system is designed to optimize the return to duty of the maximum number of trained combat soldiers at the lowest possible echelon. Far-forward stabilization helps to maintain the physiology of injured soldiers who are unlikely to return to duty and allows for their rapid evacuation from the battlefield without needless sacrifice of life or function.

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# Medical Force 2000 (MF2K) PATIENT FLOW IN A THEATER OF OPERATIONS



ASF: Aeromedical Staging Facility, USAF  
 ASMB: Area Support Medical Battalion  
 ASMC: Area Support Medical Company  
 BAS: Battalion Aid Station  
 CM: Combat Medic  
 CONUS: Continental United States  
 CZ: Combat Zone

E: Echelon  
 EAC: Echelon Above Corps  
 FST: Forward Surgical Team  
 MASF: Mobile Aeromedical Staging Facility, USAF  
 Med Co: Medical Company  
 RTD: Return to Duty