

PHTLS BASIC AND
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PRE-HOSPITAL TRAUMA LIFE SUPPORT

SECOND EDITION



NAEMT

NATIONAL ASSOCIATION OF
EMERGENCY MEDICAL TECHNICIANS

Pre-Hospital Trauma
Life Support Committee of
the National Association of
Emergency Medical Technicians
In Cooperation With
The Committee on Trauma of
The American College of Surgeons



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Dedication

This revised and enlarged text, the numerous other materials necessary for both the Basic and Advanced PHTLS courses, and the availability of hundreds of courses given throughout the United States each year, have become a reality through the hard work of many individuals who have given of their time, their insights, and their expertise.

The achievements of the past few years in improving prehospital trauma care have only occurred because of the dedication and effort of the tens of thousands of EMTs who successfully completed the courses, and the countless number of health care professionals who served as lecturers, skill station facilitators, victims, and coordinators.

These achievements, and the constant growth of PHTLS, would not have been possible without the continuing contribution of the PHTLS Committee members, Regional Coordinators, State Coordinators, and special members. Each of these members of the PHTLS National Faculty has made a unique contribution, and works countless hours to ensure its continuance.

Those of us who contributed to the development of the PHTLS Course and who have worked on the Second Edition of the text, unanimously agreed, without his knowledge, that one individual merits special recognition. His singular vision was the seed from which PHTLS grew. From its onset, he has constantly challenged us, requiring all involved to re-examine the basis of their beliefs. Without his knowledge, skill, and leadership the PHTLS course would not have become a reality or have constantly improved and grown. No single person has worked harder, cared more, or contributed more.

*This Book
is Dedicated to*

Dr. Norman E. McSwain, Jr.

**For His Outstanding Leadership in
Pre-Hospital Trauma Care
and for**

**Continuing The Leadership and Excellence Initiated by
Dr. "Deke" Farrington
in**

All Areas of Emergency Medical Services

Preface to the Second Edition

There are two **Pre-Hospital Trauma Life Support** courses: one for the advanced EMT (Intermediate and Paramedic) and one for the Basic EMT. Since November of 1989, when pilot testing ended, the PHTLS-Basic course has become a part of the PHTLS training program. Rather than developing two textbooks, it was the decision of the PHTLS Committee to develop one textbook for use in both courses.

For the PHTLS-Basic program, this text provides additional information so that the EMT-A can have the opportunity to review skills and knowledge beyond which he is currently certified. This will allow complimentary and integrated interaction with Advanced Life Support personnel on the scene.

For the PHTLS-Advanced course, this text provides discussion of advanced skills as well as a review of basic trauma knowledge and skills. This will enable the EMT-P an opportunity to refresh lost or deteriorated information prior to taking the PHTLS course or for general review.

This is more than just a textbook for both courses, it is an in-depth explanation of the prehospital aspects of trauma care.

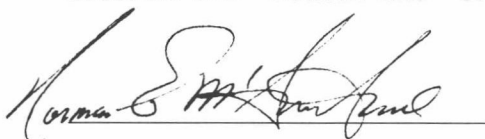
For the EMT-A, the EMT-I, or the EMT-P student, it can be used as a textbook to gain insight into the presently accepted methods of managing the trauma patient. Even though its main purpose is to support the PHTLS program, it is also a valuable reference and a useful textbook for any course which includes a discussion of pre-hospital trauma care.

This course is based on the 1989 Advanced Trauma Life Support Course® of the American College of Surgeons, and proposed changes for the 1992 version of that program. Both the PHTLS-Basic course and the PHTLS-Advanced course have been developed by the Pre-Hospital Trauma Life Support Committee of the National Association of Emergency Medical Technicians in cooperation with the Committee on Trauma of the American College of Surgeons.

Emphasis is placed on rapid resuscitation of the patient in the pre-hospital period, and transfer to an appropriate hospital as quickly as possible.

Necessary stabilization and resuscitation in the field should be as efficient as possible, and completed enroute to the hospital.

It is the hope of the National Association of EMTs, the PHTLS Committee, and the Committee on Trauma of the American College of Surgeons that this textbook and the PHTLS Courses will be of benefit to the providers who take them, but more importantly to the patients who are ultimately served by improved prehospital care. Patient care must be the "bottom line" of all that we do.



Norman E. McSwain, Jr., M.D.
National PHTLS Medical Director

Notes on Terminology

GENDER

Throughout this text, reference to the gender of patients and responders is in the masculine. This usage stems from the generally accepted standards of grammar and is not in any way indicative of any desire on the part of the authors, editors, or the National Association of EMT's to deny the very real role played by members of both sexes in providing prehospital emergency care.

PROVIDER LEVEL

The PHTLS Course originally developed by the National Association of EMT's in cooperation with the Committee on Trauma of the American College of Surgeons, was written primarily for EMT-Paramedics and EMT-Intermediates. More recently, the PHTLS-Basic version for EMT-A's has been implemented. It is recognized, however, that prehospital care providers, and the readers of this text, vary widely in educational background and certification—from EMT-A to physicians. Accordingly, in the interests of simplicity and consistency, a policy decision has been made to use the generic term “EMT” throughout these pages to refer to the person providing the prehospital care described in the text.

RESPONSE ENVIRONMENT

EMS systems throughout the country have different geographic response area sizes, terrain, population densities, weather conditions, hospital facilities, distances to the hospital, and available resources. All of these affect response times to the patient and travel times to the hospital. In spite of these variants, travel time in the majority of cases is held to within reasonable time frames. Most trauma patients are neither entrapped, inaccessible, nor injured in a location where the ambulance can not be brought within a short carrying distance from them.

This text focuses upon the general concepts of pre-hospital trauma care including practices and skills that will be applicable to the trauma situations that are the **most common**. It is not within the scope of this text (or of the PHTLS Course) to include the necessary knowledge, variations, or additional skills that may be required in treating patients in each specialized rescue, environmental or prolonged care situation. Usually any of these special areas of consideration require comprehensive additional formal training to safely provide care in such a situation.

Situations commonly associated with producing special circumstances include:

- Entrapment and need of extrication
- Delayed EMT access to the patient (Search & Rescue (SAR), building collapse, mine cave-in, etc.)
- Vertical rock, ice, or structure incidents requiring high angle technical rescue

- Remote area or Wilderness rescue (may be hours, even days before arrival at the hospital)
- Trail rescue (with long carrying times or use of special off-road vehicles)
- Cross country or downhill skiing rescue (requiring treatment on snow, and toboggan or ski machine transport to base/trail head)
- White water, open water, diving or small craft rescue
- Ice, under ice, or other cold water near drowning incidents
- Aero-medical transport
- Mass Casualty Incidents
- Region-wide Disasters (disrupting transport and normal medical resources)
- Hazardous Material Environment or presence of other hazards (i.e., downed electrical wires)
- Extreme weather conditions

Although the general principles of trauma care are unchanged, some sequencing, methods, and skills included in this book may require modification, enlargement, or abridgement when employed in special circumstances.

INTRODUCTION

Historical Perspective

“Injuries sustained in accidents affect every part of the human body. They range from simple abrasions and contusions to multiple complex injuries involving many body tissues. This demands efficient and intelligent primary appraisal and care, on an individual basis, before transport. It is obvious that the services of trained ambulance attendants are essential. . . . If we are to expect maximum efficiency from ambulance attendants, a special training program must be arranged.”¹

These words are taken from a 1965 text edited and compiled by Dr. George J. Curry, a leader of the American College of Surgeons and its Committee on Trauma. Although Dr. Curry was addressing the primitive state of prehospital care existing in 1965, his words still hold true today as we address the specific field of prehospital trauma care rather than the broad issue of general emergency medical services.

Dr. Curry’s call for the specialized training of “ambulance attendants” has been answered over the past 25 years. Indeed, as we read not only his text but also the landmark White Paper “Accidental Death and Disability—the Neglected Disease of Modern Society,” which the National Academy of Science’s National Research Council issued just one year later, we remember how primitive our efforts were, and how far we have come in a brief time. Despite the constant rush of new developments, procedures, equipment, provider levels, and standards, there seems to be a need to go back and rethink issues, to fill in the spaces left by the charge of progress through the field of EMS.

For that reason, the Pre-Hospital Trauma Life Support Course (PHTLS) is timely for our profession and the patients we serve.

The PHTLS course is unique in that it is the first nationally recognized continuing education program for prehospital care personnel that brings the care of the trauma patient into a single focus. Previous training has been notable for fragmenting our approach to, and understanding of, the trauma patient as a single entity. A trauma patient is not “a knee, a belly, a shoulder, and a head,” but a trauma patient with knee, belly, shoulder and head injuries. The difference may appear semantic, but its understanding and acceptance by prehospital care personnel can make the difference between life and death.

The national EMT-A and EMT-P curricula, at least until the 1986 EMT-Paramedic revision, treated the trauma patient as a collection of chapters, with little emphasis on the relationships between injuries. The trauma patient was seen as simply the sum of his individual injuries, when in reality the multisystem trauma patient is considerably more than that sum. Appropriate care for the multisystem trauma patient may differ considerably from the principles gleaned in a review of each of the pertinent but separate chapters in a text.

The Committee on Trauma of the American College of Surgeons (ACS) recognized this fact early, and trauma research provided clues to the best means of caring for the multisystem patient. The ACS Advanced Trauma Life Support Course (ATLS) provides physicians with

critical training in the proper handling of such patients in the initial hospital setting. The success of that course prompted the National Association of Emergency Medical Technicians (NAEMT) to provide similar pertinent instruction for its members and for prehospital emergency care personnel in general.

Purpose

A Statement of Purpose is much akin to a Creed, a declaration not only of purpose and intent, but of belief. This chapter not only describes the history and purpose of the Prehospital Trauma Life Support Course, but also attempts to provide the reader with the underlying beliefs upon which this course has been built.

Prime among those beliefs is the conviction that ***definitive care cannot be provided for the critical trauma patient in the field.*** Time is of the essence: prehospital care, stabilization in the Emergency Department, and surgical intervention in the Operating Room, must all be provided within the first critical post-insult “Golden Hour.” The role of prehospital emergency care personnel must be to identify the critically injured trauma patient rapidly, and to prioritize the provision of essential, appropriate, and meaningful stabilization in the field and while enroute to the hospital.

The PHTLS course introduces few new hands-on skills to the EMT at any level — Basic, Intermediate or Paramedic. It does, however, increase each participant’s skill in the delivery of patient care. An increased understanding of the mechanism of injury (Kinematics), the pathophysiology of life-threatening etiologies and their systemic impact, the physiological meaning of signs and symptoms, and the skill of doing a meaningful patient assessment, combine to result in rapid identification of multisystem trauma patients and of their unique individual needs. The PHTLS course provides a re-evaluation of the individual EMT’s skills, including an understanding of the benefits and limits of each, provides the EMT with a better basis from which to decide upon the best ways to meet the individual patient’s needs. This is done in the context of an overall prehospital treatment plan which incorporates the patient’s individual priorities and decisions based on the unique situation of the event.

In sum, the PHTLS course provides a new philosophical overview to trauma care, stressing the need to identify and consider the multisystem trauma patient as a unique entity with special and specific needs — needs that may, at times, require an approach that varies from or exceeds traditional treatment modalities for specific injuries. To this end, the PHTLS Course emphasizes the need for:

- Rapid assessment of the critical trauma patient.
- Treatment for shock and hypoxemia.
- Rapid transportation to an appropriate hospital.

This text, although a valuable tool in itself, is the text for the PREHOSPITAL TRAUMA LIFE SUPPORT CONTINUING EDUCATION COURSE (PHTLS). The PHTLS Course also includes practical exercises and examinations, which reinforce the material presented in the text and in lectures. Skill stations cover assessment, airway management, spinal immobilization, helmet removal, and rapid extrication.

At the very beginning of the course, each student participates in a session entitled “Baseline Determinations”, which has both written and practical elements. Although often thought of as a “pretest” by students, the real purpose of the Baseline session is to fix in each participant’s mind his personal level of trauma care at the beginning of the course. The sessions are made as realistic as is possible in an obviously artificial situation. Experience in numerous courses has shown the value of this session. Throughout the lectures and skill stations that follow, a frequent comment is, “I wish I had known this (or done this) during Baselines!” While the Baseline patients usually deteriorate and “die”, patients presented in similar situations at the conclusion of the course are typically judged to have “survived”.

For the critical trauma patient to survive, intelligent prehospital care is needed. Unless care is focused on conditions that are critical and on rapid transportation to the hospital, potentially salvageable patients may die. The purpose of this course is to prevent such needless deaths.

History of PHTLS

In 1981, NAEMT President Gary Labeau charged Norman E. McSwain, JR., MD, FACS, of Tulane University School of Medicine, and Robert Nelson, REMT-P, of Michigan, with the responsibility of studying the feasibility of establishing what was then called an “ATLS Course for Nonphysicians.” Their report in the fall of 1982 included a curriculum outline and provided a basis for the further development of the course. Throughout 1983 the Pre-Hospital Trauma Life Support Committee (Richard Vomacka, BA, REMT-A, Chairman; Norman McSwain, Jr., MD, FACS, REMT-P, Medical Director; Alexander M. Butman, EMSI, REMT-P; and Jeanne O’Brien, RN, REMT-P), with the assistance of many others, continued to develop the course curriculum. The first course developed was designed to meet the needs of Advanced Life Support providers. Pilot courses were run from April 1983 through early 1984. The first pilots, in Iowa, Connecticut, and Louisiana, helped direct further changes and resulted in the addition of Don E. Boyle, MD, FACS, and Joseph P. Dineen, MD, FACS, the chairman of the ACS Committee on Trauma in the states of Iowa and Connecticut respectively, to the committee.

By the beginning of 1984, with the appointment of an enlarged formal PHTLS Committee, the machinery was established to provide for a fully credentialed nationwide PHTLS course. The PHTLS Commit-