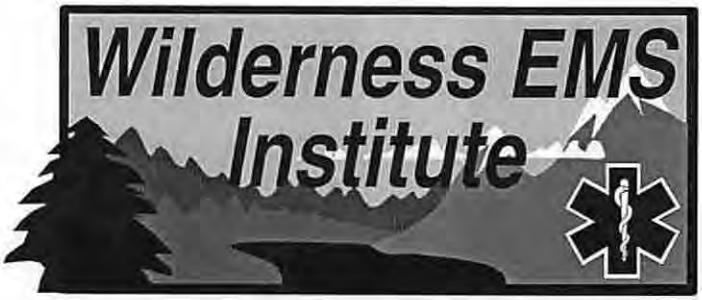
Chapter XV:

Immobilization and Packaging



Appalachian Search and Rescue Conference
Center for Emergency Medicine of Western Pennsylvania

Wilderness EMT Textbook

Chapter XV: Immobilization and Packaging

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Background Information

The ASRC-CEM Wilderness Emergency Medical Services Institute

The ASRC-CEM *Wilderness Emergency Medical Services Institute*, previously named the *Wilderness Emergency Medicine Curriculum Development Project*, is devoted to developing curricula for wilderness EMS providers and medical control physicians, and fosters wilderness EMS research. It is a cooperative venture of the Appalachian Search and Rescue Conference and the Center for Emergency Medicine of Western Pennsylvania. The ASRC is a large, tightly-knit wilderness search and rescue organization with eight teams throughout the mid-Appalachian states. The Center for Emergency Medicine is an emergency medicine and prehospital care research and teaching organization. It provides a medical helicopter service, an emergency medicine residency, Emergency Medical Services for the city of Pittsburgh, and conducts a variety of related projects.

The WEMSI Wilderness EMT Curriculum

This chapter is part of the WEMSI Wilderness Emergency Medical Technician Textbook. In concert with the WEMT Curriculum, the Textbook has been in development since 1986, and took as its starting point a program Dr. Conover developed for the National Association for Search and Rescue in 1980. The Project also draws on many other sources. These include the Wilderness EMT program of SOLO (Stonehearth Open Learning Opportunities), the WEMT program developed by Wilderness Medical Associates, and the Winter Emergency Care Course of the National Ski Patrol. The Wilderness Medical Society's educational and research publications provide needed background for the Textbook. The National Association of EMS Physicians has developed and has published clinical guidelines for delayed/prolonged transport; WEMSI protocols are also available as a model.

With textbooks used by its EMT and SAR prerequisites, the WEMT text provides the material needed to complete the Wilderness Prehospital Emergency Care curriculum established by the Wilderness Medical Society. (Indeed, early drafts of this textbook were a major resource for the WMS curriculum.) We assume that students have the knowledge and skills of an EMT-Basic or EMT-Paramedic. (The curriculum can accommodate both EMTs and paramedics in the same class.) We also assume that students have the knowledge and skills of the Virginia Ground Search and Rescue Field Team Member standards or better. (EMT standards are available from state EMS offices or the U.S. Department of Transportation. The Virginia GSAR standards and GSAR Manual are available from the Virginia Department of Emergency Services, 310 Turner Road, Richmond, VA 23225-6491.) The curriculum is competency-based rather than hours-based, but can be competed in 5-6 intensive days. The curriculum also recommends clinical training, for which guidelines are available in the Curriculum.

WEMT Textbook Chapter Development

An outline for each of the twenty sections was created by a Task Group of five to twenty selected members, but draws on many published sources and consultants. A Task Group Leader guides the Task Group in reviewing and revising the section, and the Curriculum Coordinator supervises all aspects of curriculum development. When the outline satisfies the Task Group, it goes to the **Editorial Board**, including officers of the ASRC and CEM. It also includes experts in emergency medicine, search and rescue, and education, and a State EMS director. Once acceptable to the Board, it is released to the public.

The Task Group Leader and Editor-in-Chief then produce a Textbook chapter based on the outline. Having a single editor provides a coherent, unified style. Basing chapters on the Task Group's Lesson Plans, as approved by the Editorial Board, ensures accuracy. Each chapter provides a glossary of terms new to a reader with basic EMT and SAR training. In the complete textbook, these glossaries are merged and alphabetized. Each chapter also provides references to support its statements and for further reading. Background that need not be presented in a class based on the Curriculum appear *in a small, italic font.*

The textbook will be commercially published when completed. All profits will be used to support curriculum development. The textbook will be submitted for publication in 1997. Until then, preliminary versions of the chapters will be printed in this format. These preliminary versions are for use at classes only when authorized by WEMSI. A Course Guide with information about Wilderness Emergency Medical Technician training and course scheduling, and a checklist for recommended in-hospital training are available. For a price list of available publications, write to: Center for Emergency Medicine, 320 McKee Place, Suite 500, Pittsburgh, PA 15213-4904, (412) 578-3203, or email wemsi+@pitt.edu.

We solicit suggestions from those reading any of our Lesson Plans or Textbook chapters. Please send your comments to the Editor-in-Chief, (see title page).

Educational Objectives

1. Demonstrate the ability to apply different extremity immobilization materials in an appropriate manner, and to evaluate the adequacy of immobilization effected.
2. Demonstrate the ability to effectively and efficiently apply the following immobilization devices:
   a) "fiberglass" and similar splinting (casting) material for extremities;
   b) flexible aluminum/foam splints (e.g., SamSplints™) for extremities; and
   c) finger and toe taping.
3. Describe good ways to implement the following immobilization techniques:
   a) improvised splinting using foam pads;
   b) improvised splinting using sticks and clothing; and
   c) improvised splinting using duct tape and other body parts.
4. Describe the advantages and disadvantages of the following methods for splinting femur fractures for wilderness evacuation, including:
   a) Jones' dressing (bulky dressing and splint);
   b) simple splinting;
   c) traction splint with a commercial or improvised ankle hitch, or with skin traction using moleskin (or duct tape) and benzoin;
   d) improvised traction splinting in a litter using the litter as a splint.
5. Describe specific medical hazards of "standard" litter packaging for wilderness patients, including:
   a) pressure necrosis (status ulcers, decubiti, bedsores);
   b) restriction of ventilation;
   c) restriction of venous circulation and venous return from the legs; and
   d) management of the patient's wastes.
6. Direct moving patients with suspected spinal injuries from various contorted and confined positions to the neutral position for immobilization, using a people's hands and webbing slings.
7. Outline the advantages and disadvantages of the following methods for spinal immobilization:
8. cervical collars, both commercial and improvised with SamSplints™, Ensolite™, pack hipbelts or similar foam pads;
   a) padding inside a litter and duct tape;
   b) helmet and duct tape;
   c) Ensolite™, ThermaRest™, or similar foam pads for lumbar immobilization;
   d) full-body vacuum splints;
   e) unpadded backboards;
   f) wire basket or plastic basket litters without backboards;
   g) cervical immobilization devices (e.g., CID™); and
   h) short-board extrication devices (e.g., KED™, Sked-Ked™, XP-1™).
9. Demonstrate an acceptable method for packaging a minimally-injured patient for a lengthy wilderness evacuation.
10. Outline methods for packaging patients in a basket ("Stokes") litter given the following problems:
    a) pelvis fracture;
    b) leg fractures;
    c) unilateral or bilateral chest trauma (e.g., rib fracture, pulmonary contusion);
    d) unilateral pneumonia;
    e) decreased level of consciousness, with and without trauma;
    f) hypothermia/cold exposure;
    g) diarrhea/vomiting; and
    h) oozing wounds.
11. Discuss methods to deal with the following packaging problems:
    a) patient becomes incontinent of urine/feces;
    b) patient complains of pain in pressure areas; and
    c) IV line comes out.
12. Outline the advantages, disadvantages, specific patient-care considerations, and general packaging considerations for the following litters:

a) improvised litters and backboards (outhouse doors, packframes, skis and ski poles, pole-and-parkas, pole-and-blankets, rope stretcher);
b) wire-basket and plastic-basket ("Stokes") litters;
c) "Army" stretchers;
d) toboggans; and
e) flexible plastic litters (e.g., Sked).

13. Outline the advantages, disadvantages, and specific patient-care considerations for the following evacuation methods:
a) vertical and near-vertical lowering, raising, and high-line traverses;
b) hand-carried litter evacuations;
c) wheeled litters;
d) drags and carries; and
e) improvised carries (pack-and-pole, strap and rope-coil "piggyback" carries, "tragsitz" vertical carries).

14. Given a choice of several evacuation routes with different times, and different special problems (e.g., necessity for a vertical head-up lower or raise), give medical recommendations for choice of evacuation route for the following patients:
a) multiple trauma with ongoing fluid resuscitation;
b) uncomplicated mild (90.5 degree F) subacute hypothermia;
c) isolated head injury with decreasing level of consciousness;
d) uncomplicated cervical spine injury; and
e) acute myocardial infarction.

15. Outline the advantages, disadvantages, and specific patient-care considerations for the following transportation methods:
a) helicopter:
b) ground-loading,
c) long-line "pick-off" or "pull-out",
d) hoist ("horse collar," jungle/forest penetrator, and litter;
e) watercraft:
f) rafts,
g) canoes and kayaks, and
h) larger rescue boats;
i) motor vehicles:
j) All-Terrain Vehicles (ATVs),
k) motorcycles and trail bikes, and
l) snowmobiles; and
m) pack animals.

16. Outline positioning and managing patients with head injuries. In particular, describe the effects of:
a) Trendelenburg position;
b) restriction across the external neck veins;
c) positions with the head to one side or the other; and
d) the slightly head-up position with the head in neutral position.[1]

17. Describe principles for selecting items for personal and team medical kit contents exclusive of medications, including durability, flexibility, simplicity, size, cost, safety, and security.

18. Identify appropriate and inappropriate items for personal and team medical kits.

Spinal Immobilization

Vacuum splints for spinal immobilization.[2]

Glossary

References

1. Ampel L, Hott KA, Sielaff GW, Sloan TB. An approach to airway management in the acutely head-injured patient. Am J Emerg Med 1988; 6:1-7.
2. Hamilton RS. The use of full-body vacuum splints for mountain rescue, Second World Congress on Wilderness Medicine, Aspen, CO, 1995. Wilderness Medical Society.