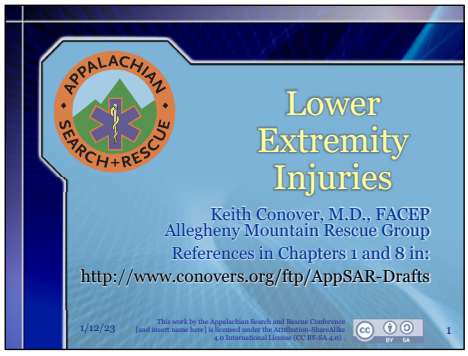
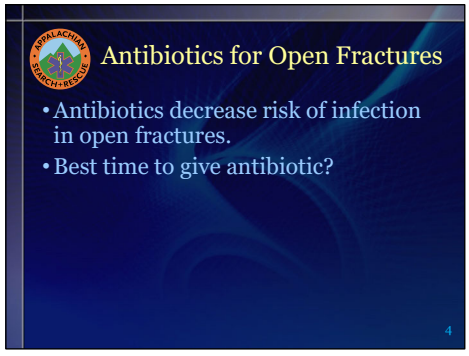


The most common injury in outdoor recreation and likely in SAR is to the ankle and lower leg. We'll consider how to deal with them at the wilderness first aid and wilderness EMS levels.

What's the street care for this: control bleeding if needed (this isn't bleeding much), dry dressing, bandage and splint? Antibiotic?
Wilderness first aid/EMS care? High-pressure irrigation? IM or PO antibiotics?
(Via Wikimedia Commons, this work has been released into the public domain by its author, آرمین)



Excellent evidence that an antibiotic decreases the risk of bone infection after an open fracture.
Best time to give antibiotic: "on call to OR." Orthopedic surgeon's day job is to make and close open fractures (some call this total joint replacement or open reduction and internal fixation). Best time is about half an hour prior to the fracture, later increases risk of infection.

WMS Guideline Says:

An attempt at wound cleansing is recommended in the presence of high bacterial contaminants and dirt. If it's dirty, clean and irrigate in the field.

5

I'll be putting up text from the current Wilderness Medical Society Clinical Guideline on wound management in blue, and the translating from medicalese to plain English in yellow.

Irrigating a Wound

- High-pressure wound irrigation decreases wound infections in contaminated wounds.
- High-pressure irrigation **increases** infections in clean wounds by increasing swelling and damaging local defenses against infection. ("Just slosh some water through it.")
- Irrigation recommended for open fractures.
- Hazards: splashes in the eyes, nose, mouth.

6

WMS Guideline Says:

Wounds should be treated using a clean field, including gloves and instruments; sterility is not necessary. Clean exam gloves and a clean Swiss army knife is good enough.

7

WMS Guideline Says:

The use of high-pressure irrigation (6–12 psi) is recommended to lower wound infection rates, especially in the case of open fractures. A ziplock bag with a hole in it isn't really high pressure but it's better than nothing.

8

Irrigate contaminated wounds with high-pressure clean (not necessarily sterile) water. Right pressure from a 35 mL syringe, 19 ga angiocath, and an average 2nd-year surgical resident (per Edlich's original study): decreases wound infections. But for non-contaminated wounds (elbow vs. chin, for example), swelling from the irrigation will actually increase wound infections, so just slosh some water through it.

WMS Guideline Says:

Irrigation should be performed as quickly as practical as there is a direct correlation between timing and effectiveness of irrigation. Irrigate right away.

9

WMS Guideline Says:

Irrigation should include at least 1 L of irrigant. Use a liter…

In a wilderness setting, potable water is the preferred solution for wound irrigation. …of drinking water, it's as good as sterile water for irrigation.

10

WMS Guideline Says:

Wounds with significant devitalized tissue should be left open. Most wounds can be treated safely with acute primary closure. Grossly contaminated wounds should be packed open to allow for closure by secondary intention or delayed primary closure. If it looks bad, don't try to close it in the field.

11

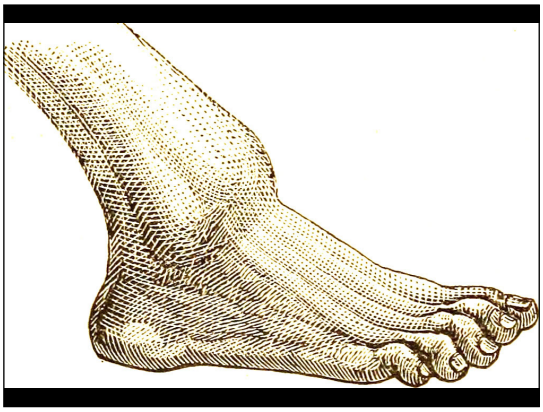
This is for those of you who know how to close wounds. "Acute primary closure" means closing it in the field. Closure by secondary intention means leaving it open to scar closed. Delayed primary closure means leaving it open and keeping it clean for about 4 days from the primary injury.

Ankle Fracture-Dislocations

- As with all fractures, realign in field using traction
- Make sure splint is prepared **first**, and hold in place as splint applied
- If let go of foot, muscle spasm usually pulls back out of place
- Pain control (see Chapter 8 of Appalachian Search and Rescue)

12

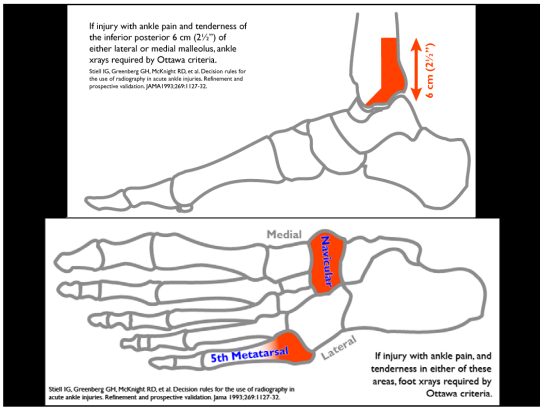
Ankle dislocations are essentially unheard of. But ankle fracture-dislocations are fairly common. There are usually closed. Treatment is to realign ("Reducing" is getting in good enough alignment to leave that way to heal, which is not our goal in the field. An you need X-rays to see if the alignment is good enough to heal.



Ankle fracture dislocation from 1875 textbook. Often the foot is off to one side instead of backwards like this.

Public domain via Flikr, from Internet Archive scan of page 768 of "A practical treatise on fractures and dislocations" (1875).

The Ottawa rules tell you when you don't need to get X-rays of the foot or ankle. If someone doesn't need X-rays, you can treat as a sprain and no need to go to the ED.



These are my own drawings, available as a 3"x5" pocket card on my ftp site, http://www.conovers.org/ftp/ and in Chapter 8 of *Appalachian Search and Rescue*.

Note that the base of the fifth metatarsal is the most commonly broken bone in the foot. It's also the most commonly bruised bone in the foot, because of investion injuries. (Demonstrate.)

(By Keith Conover, released to public domain)

An Aircast Airstirrup is the best treatment for a sprained ankle; larger Force Protection kits might stock them. I keep a couple in the back of my truck. I have sent one into the field to aid a team member with a twisted ankle to self-evacuate. They are also available from amazon.com for $30.

(Photo by Keith Conover. Used with permission. All rights reserved.)

In the field, you probably won't have an Aircast. But almost any team will have duct tape. You DO have duct tape, right? When taping an ankle sprain, do so as shown. tape only on the side that hurts, this shows taping to support the ligaments on the outside of the ankle, especially the anterior talofibular ligament which is most commonly sprained. Flex a bit so as to protect the sprained ligament (to shorten it) as taping.

(Photo by Keith Conover. Used with permission. All rights reserved.)