BLEEDING & SHOCK

Managing Trauma

Overview

- We will review basic A&P as it relates to injury and blood loss.
- We will review the stages of shock and how the body compensates for injury / volume loss.
- We will discuss the types and severity of blood loss.
- We will discuss causes, signs and symptoms of internal blood loss.
- We will discuss managing injury to tissues and controlling blood loss in the field.

Circulatory System Review

- Heart: pumps blood to all areas.
- Blood: liquid circulated for many reasons – responsible for carrying oxygen, glucose, and various blood cells to all body areas (platelets crucial in the clotting process, WBC's, RBC's…).
- Vessels: arteries, arterioles, veins, venules, capillaries.

Causes of Shock Related to Injury

- Failure of the “pump” – heart.
- Failure to maintain adequate / appropriate vessel diameter.
- Loss of volume – blood or other liquid components.
- Opening in blood vessel(s).
- When all works well all body areas are adequately perfused (perfusion) with life sustaining blood.
- Inadequate perfusion is also known as “hypoperfusion”.

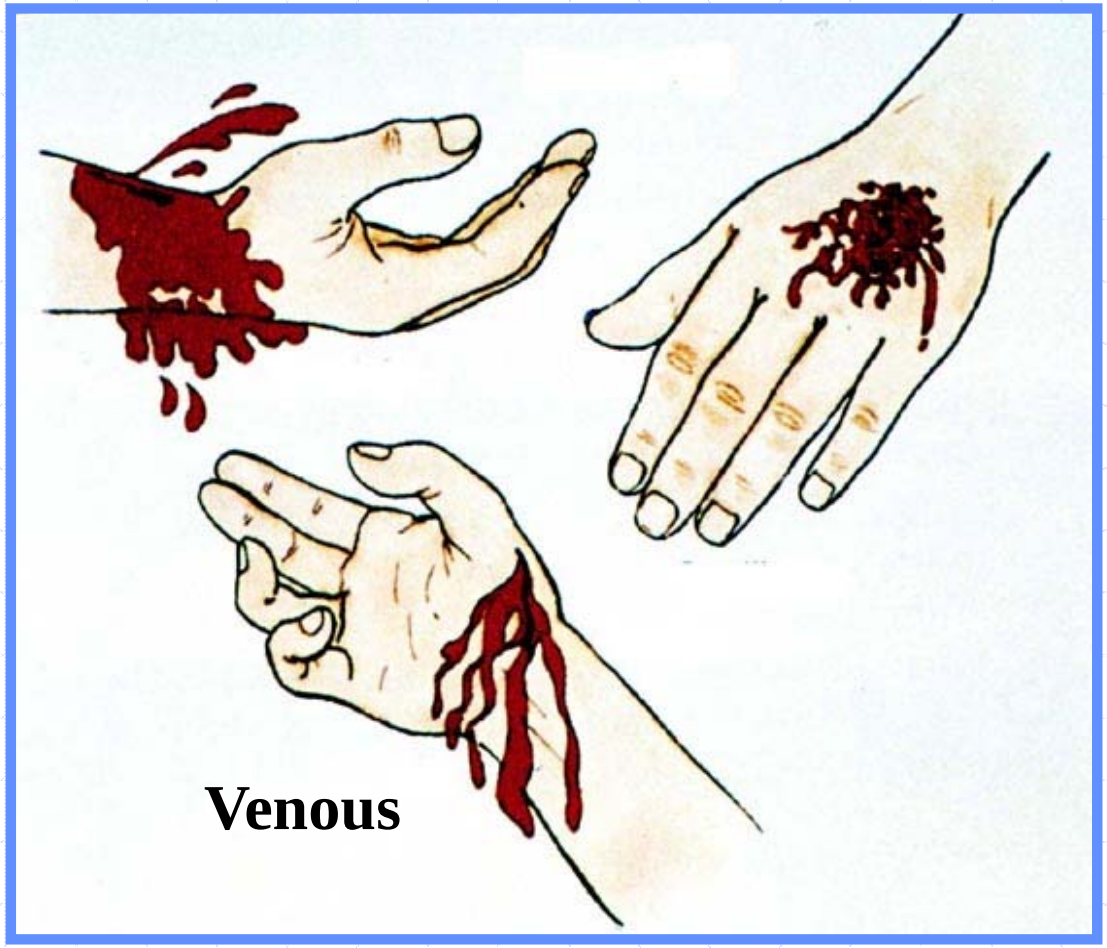
Basic Rules for Managing Soft Tissue Injuries and External Blood Loss in the Field

- Wear PPE as you approach the scene. Keep spare gloves available at all times. Wear your gloves + PRN.
  - When possible change gloves between patients to avoid unnecessary cross-transmission of disease to others.
  - **DO NOT** leave gloves at the scene.
- Control moderate to severe bleeding ASAP during your initial rapid assessment process.
- **Cover injuries** with **sterile dressings** and use **bandages** to **hold them in place**.

Take body substance isolation precautions when controlling bleeding.

3 Types of External Bleeding

Arterial



3 Types of External Blood Loss

- Capillary:
  - Slow superficial oozing of blood. Scrapes.
- Venous:
  - Steady flow of relatively dark or maroon colored blood.
- Arterial:
  - Brighter red in color and “spurting” from wounds.

Determining the Severity of Blood Loss

- Sign / Symptoms of shock or hypoperfusion.
  - Tachycardia
  - Peripheral vasoconstriction – poor color, cool skin, diaphoresis.
  - Diminished or diminishing LOC.
  - Delayed CRT.
  - Eventual hypotension and collapse / cardiac arrest.
- Visible amount of blood loss.

Significant Blood Loss Based on Age

- In general the following blood loss in a short time is considered a serious situation:
  - Adult: 1 liter (1,000 ml)
  - Child: ½ liter (500 ml)
  - Infant very young child: 100 – 200 ml, often less can be significant and lifethreatening.
    - A puddle of blood the size of a silver dollar can be very significant for an 8 pound infant.

Serious Bleeding that is

NOT

controlled promptly can cause almost immediate death or Delayed Organ Failure liver, kidney… that will lead to delayed death (days to weeks).

Direct Pressure

Elevation

<u>Always</u> check for fractures before elevating an extremity to avoid compounding an existing condition.

Pressure Dressing & Bandage

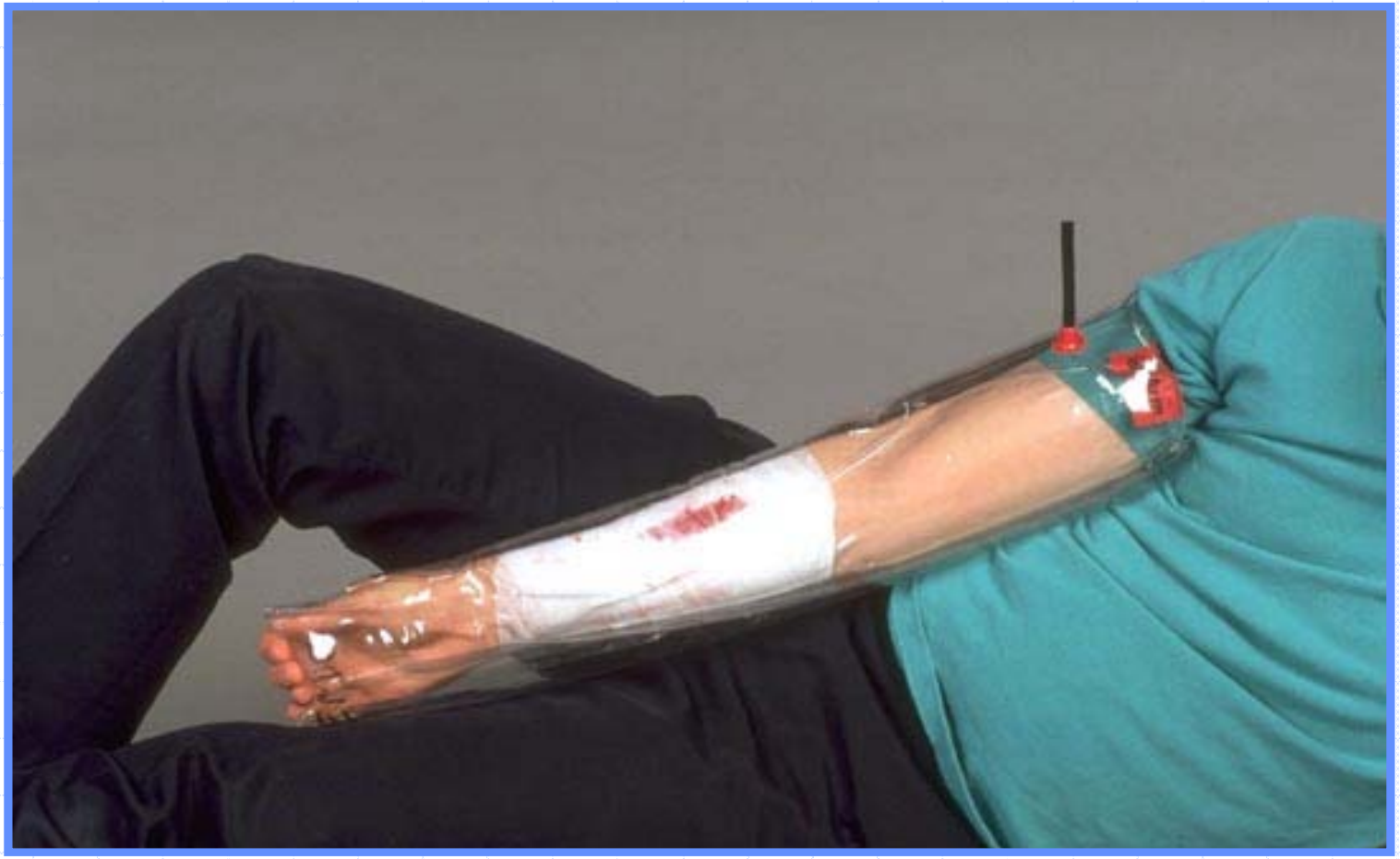
A Tourniquet (TK)

If a BP cuff is used it must be pumped to a pressure greater than the systolic pressure to serve as a TK.

Using a Tourniquet (TK)

- Place the device as low on the extremity as possible. No more than 2” proximal to the wound.
- A Tourniquet is designed to stop **ALL** blood flow – both venous and arterial.
  - During periods of anoxia tissues develop lactic acids and cell damage may occur.
- When a TK is applied write (**TK**) on their forehead and the time applied if possible. Do not cover the extremity.

Use of Air Splints are Generally No Longer Recommended Due to BBP Concerns



Managing a Simple Nosebleed Using Finger Pinch Pressure

Skull Fractures with Bleeding into the Skull

- Consider mechanism of injury (MOI) and physical findings of head injury.
- Blood (or clear fluid – cerebrospinal fluid) may be seen draining from the ear(s) or nose.
- **DO NOT ATTEMPT TO STOP THIS BLEEDING!**
  - This is a pressure release mechanism.
- Cover with a sterile dressing to minimize contamination.
- Elevate the head of the board **slightly** to minimize intracranial pressure build-up.

Internal Bleeding

- The severity of bleeding should be based on several factors / findings:
  - S & S's of shock as mentioned previously.
- Mechanism of injury (MOI).
- General impression and physical findings / type of injuries.
  - Pain, tenderness, bruising, swelling, abdominal distension, wet breath sounds associated with trauma, bleeding from any orifice, vomiting blood, coughing up blood, bloody bowel movements…

Consider Mechanism of Injury to Suspect Traumatic Internal Bleeding.

List Examples of MOI for Potentially Significant Internal Blood Loss?

Examples of Potential Significant MOI's

- Falls
- MVA
- Motorcycle accidents
- Industrial incidents
- GSW
- Penetrating trauma
- Internal organ disease (ulcers, cancer, esophageal varices)

Gastro-Intestinal (GI) Bleeding

- Coffee ground looking vomitus.
  - Older blood in the upper GI tract.
  - Dark blood clots – sometimes quite large.
- Bright red blood in the vomitus.
  - Active bleeding in the upper GI tract.
- Very dark / tarry looking bowel movements / stools.
- Bright red blood in the stool or from the rectum during bowel movements.

Emergency Care for Significant Blood Loss

- BSI / PPE. ADVANCED LIFE SUPPORT.
- Control the bleeding if possible.
- High concentration oxygen administration.
- Treat for shock:
  - Keep warm
  - Elevate feet slightly
- Transport ASAP. Rapid assessment and transport is vital.
- Recognize S&S's of shock very early for the most positive outcomes. Failure to do so can be a fatal error.

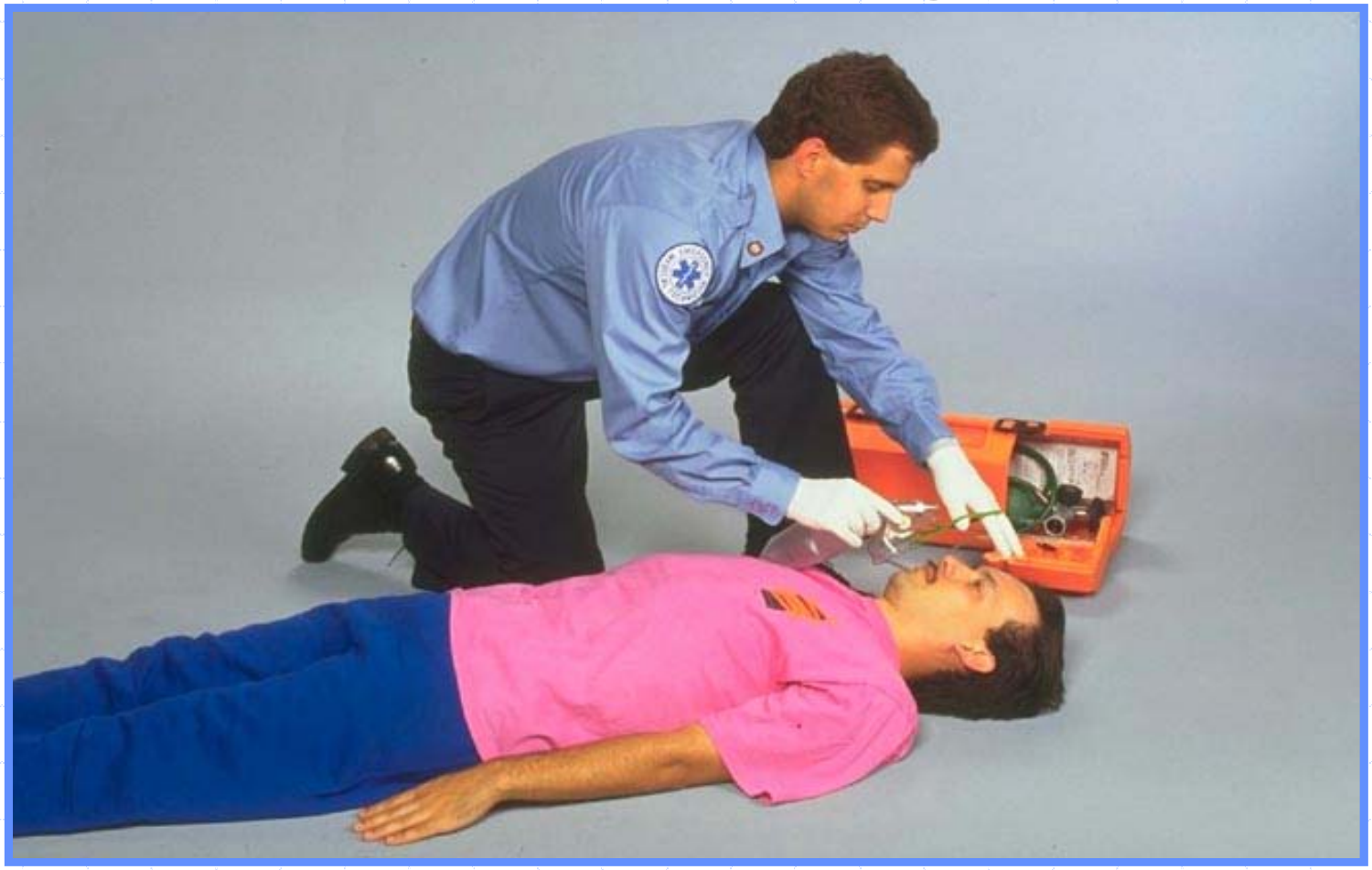
What is Shock????

- Shock is **defined as inadequate tissue perfusion**.
- S&S's have been discussed repeatedly in the past:
  - Tachycardia
  - Diaphoresis
  - Cool, clammy skin
  - Altered LOC – restlessness, confusion, disorientation, slow responses
  - Sluggish pupillary response
  - N&V
  - Delayed CRT
- Toxins / lactic acids / waste products begin to accumulate in the system compounding and accelerating the shock process.
- **HYPOTENSION** is a very late, often terminal sign of shock. Other S&S's should have been observed prior to a failing BP.
- Remember the Cardiac Output formula: HR X SV = C.O.

Shock Facts

- With many adults almost half of their circulating blood volume can be lost before their BP drops appreciably.
- Hypotension in the infant and child is a sign death is near.
- Early stage shock must be recognized and managed to delay or prevent late stage shock and death.

PPE / BSI. Maintain Airway. Administer Oxygen.



Control External Bleeding.

Elevate Lower Extremities 8-12 inches.

If traumatized & on a board elevate the foot of the board.

Prevent Loss of Body Heat.

Transport <u>IMMEDIATELY</u>.

LOAD AND GO PATIENT!

Summary

- Failure to use PPE / BSI can lead to life altering problems for healthcare providers in any setting where blood exposures are possible.
- Managing blood loss is a frequent skill called upon by EMS providers at all levels. Many techniques are used to control bleeding in the field. Skills sessions will address these skills.
- Failure to recognize and manage shock in its early stages often results in death or other significant complications.
- ALS should be involved in significant or potentially significant blood loss situations.