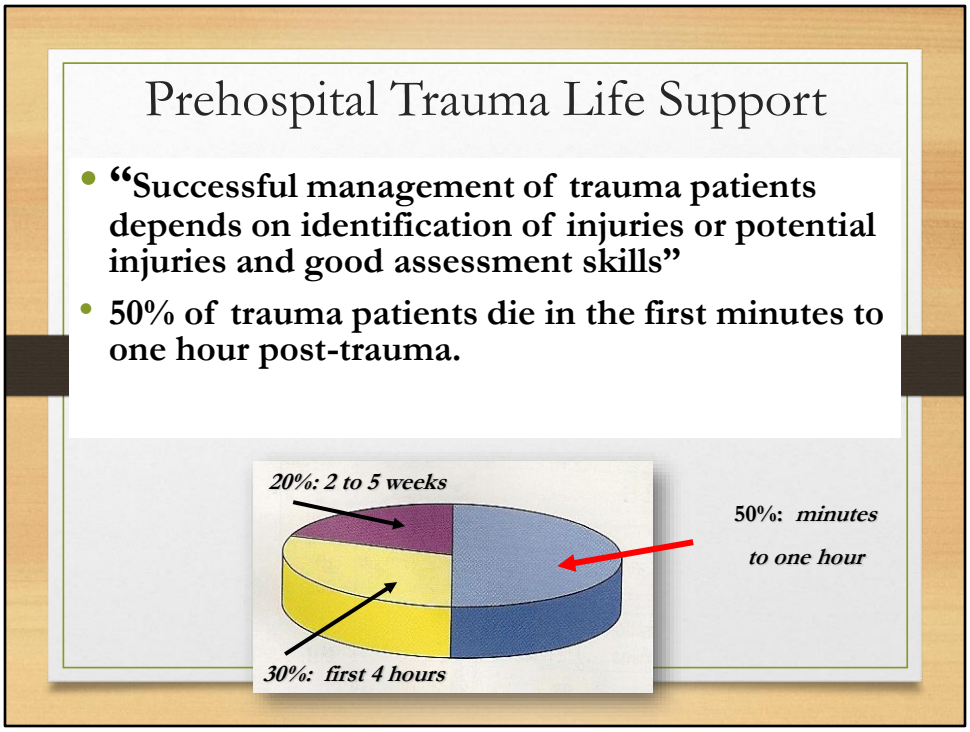
Circulation Emergency Medical Training

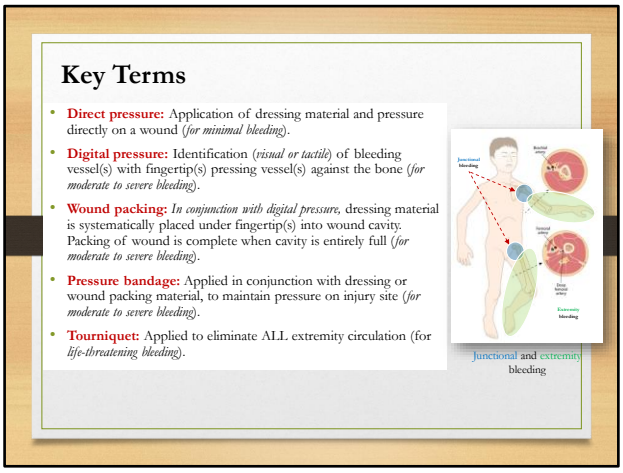
Goal of this Training

- **Trauma is the fourth leading cause of death in the United States;**
  - **The shock that follows traumatic injury plays a large role in those deaths**
- **First Responders must be able to recognize shock and react swiftly to provide proper treatment.**

The most common form of shock we see in the emergency field is from massive hemorrhage. What is “shock”?



Our window of opportunity is that first hour – the so-called "golden hour": in trauma, that's where we can do the most good



Objective 1: List five established methods to control hemorrhage.

Note : This illustration begins the conversation regarding differences between Junctional and Extremity bleeding control.

There are five established, evidenced based methods to control bleeding discussed and demonstrated **within this program.**

- **Direct pressure:** Application of dressing material and pressure directly on a wound (*for minimal bleeding*).
- **Digital pressure:** Identification of bleeding vessel(s) (accomplished *visually and deliberately {see and compress}, or tactilely / blindly {feel for and compress anything wet and warm}*) with fingertip(s) pressing bleeding vessel(s) against the bone (*for moderate to severe bleeding*).
- **Wound packing:** *In conjunction with digital pressure,* is the *methodical* process of placing dressing material *systematically* under finger-tip(s) into, and then completely filling, a wound cavity. **Packing of wound is complete - ONLY - when the cavity is entirely full** (*for moderate to severe bleeding*).
- **Pressure bandage:** Applied, in conjunction with dressing or wound packing material, to maintain pressure on injury site and hold would packing in position. (*for moderate to severe bleeding*)
- **Tourniquet:** Applied to eliminate **ALL** circulation to an extremity (for *life-threating bleeding*).

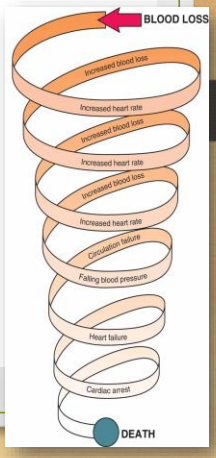
Hypoperfusion

Hypoperfusion is Shock

- ***Hypoperfusion*** **is the failure of the body's circulatory system to provide enough oxygenated blood to all organs of the body**
- **Very often you have enough "clues" to warn you about the possibility of shock in your patient;**
  - **But they are subtle**
- ***Death in the first hours following trauma is generally the result of acute traumatic shock***
- **If you do not continuously monitor your patient you may miss the subtle signs of progressing shock.**

Shock (Hypoperfusion)

- **Collapse of the cardiovascular system**
- **State of inadequate delivery of blood to the organs**
- **Four main causes:**
  1. **Heart failure**
  2. **Loss of blood volume**
  3. **Blood vessels dilate**
  4. **Obstruction; prevents blood flow to the heart.**



Good illustration spiral here – but one thing it is missing is the role of hypothermia – we talked about that in TECC. The main causes can be thought-of as a failure of the heart, the blood, or the vessels.

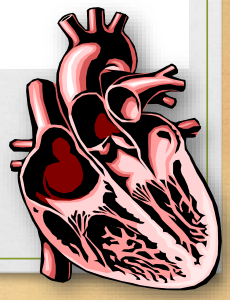
Physiology of Shock

- **Good perfusion is dependent on 3 components:**
- **The Pump (heart)**
- **The Fluid (blood)**
- **The Container (blood vessels).**

Similar to a fire engine – pump, fluid and containers get water to the fire

#1: The Pump

- Our heart receives blood from the veins, then pumps the blood to the lungs for O_2
- Then delivers oxygenated blood to the whole body
- If this is reduced – by either failure of the heart or obstruction of blood flow to the heart – it results in less blood flow out, which means less oxygen to the tissues.



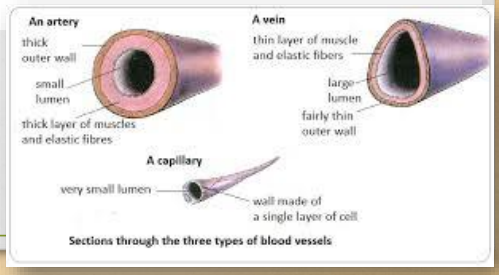
#2: The Fluid

- **Blood is the fluid**
- **Adequate amount is required for perfusion**
- ***Fluid can be lost by:***
  - **Hemorrhage**
  - **Large burns**
  - **Vomiting**
  - **Diarrhea**
  - **Dehydration.**

Loose either the whole blood volume or just the non-cellular part and you have hypovolemic shock.

#3: The Container

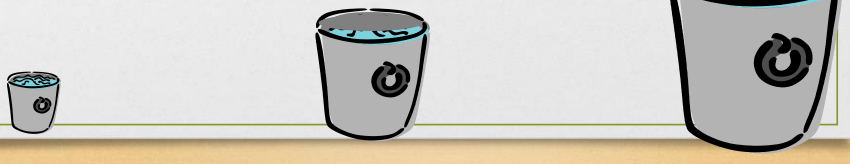
- **Blood vessels make up the container**
- **Continuous closed, pressurized pipeline that moves blood through the body**
- **Includes arteries, arterioles, capillaries, venules and veins.**

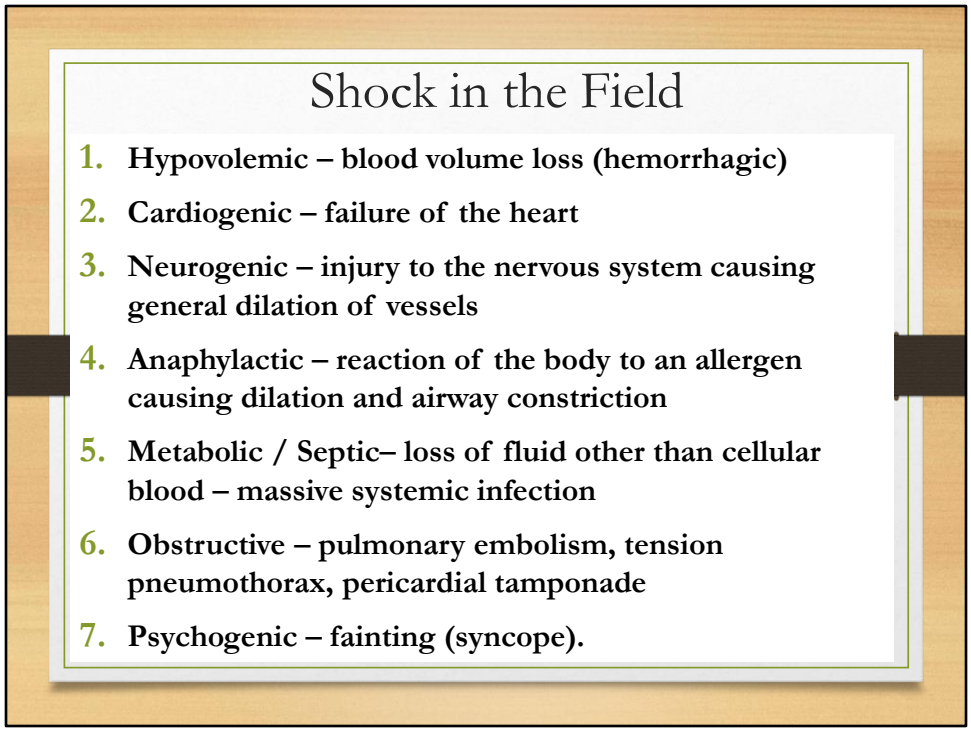


Vessels can also reroute blood to different areas of the body to meet the needs called shunting.

#3: The Container

- The vessels can control the flow of blood (and the blood pressure) by increasing or decreasing their size
- Can also become dilated and "leaky" with sepsis
- When the blood vessels increase and the blood volume remains the same, the net result is a relative loss of volume.





These are the main kinds of shock we will see in the field – we MUST recognize them AS shock. Let's take a closer look at these…

Hypovolemic Shock

- **Internal or external uncontrolled bleeding:**
  - **Blunt or penetrating trauma**
  - **Severe GI bleed**
  - **Aortic aneurysm**
  - **Intramuscular bleeding**
  - **ICP - cranial**
  - **Hemothorax.**

This is the “classic” shock. Probably the one we would see most (other than cardiac)

Blood Loss

Estimating External Blood Loss

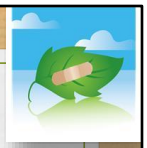
- **Arterial bleeding is the most serious**
- **Veins have a tendency to collapse, helping to control blood loss**
- **Capillary bleeding is serious if large amounts of skin is opened**
- **The "C" of ABCDE – uncontrolled bleeding MUST be controlled during the primary assessment**
- ***"What will kill my patient first?"***
- **Body's normal response to bleeding:**
  - **Vessel constriction**
  - **Clotting.**

Body Substance Isolation

- **Most soft-tissue injuries involve bleeding**
  - **Internal and/or external**
- **Take appropriate measures to prevent contact with patient's body fluids**
- **At a minimum: Gloves must be worn to avoid contact with patient's blood**
- **You may also need a mask and eye protection.**

First off – we MUST protect ourselves – trauma is usually bloody

Wilderness



- **What if you don't have gloves and you need to help your patient control bleeding?**
- **Ask your patient to hold direct pressure first**
- **Get *some kind* of barrier between your hand and the blood:**
  - **Plastic bag**
  - **Clothing (use patient's first)**
  - **Fire shelter – plastic liner is thick and can be used to protect your skin.**

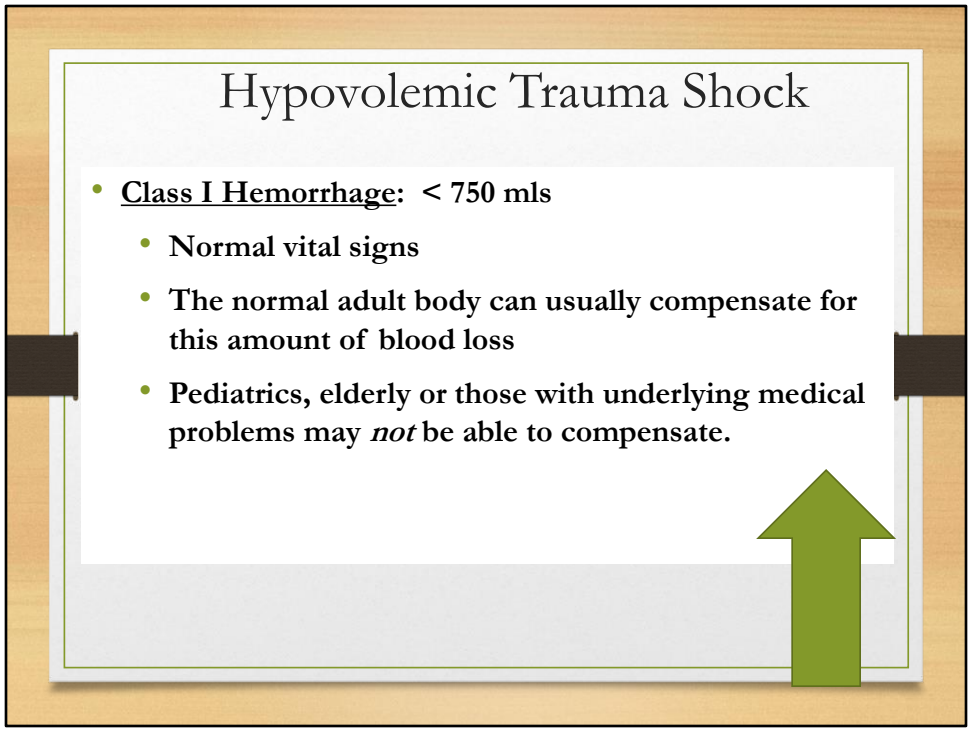
How Much Blood Can You Lose?

- **How much blood can an adult body lose before we start to see signs and symptoms of shock?**

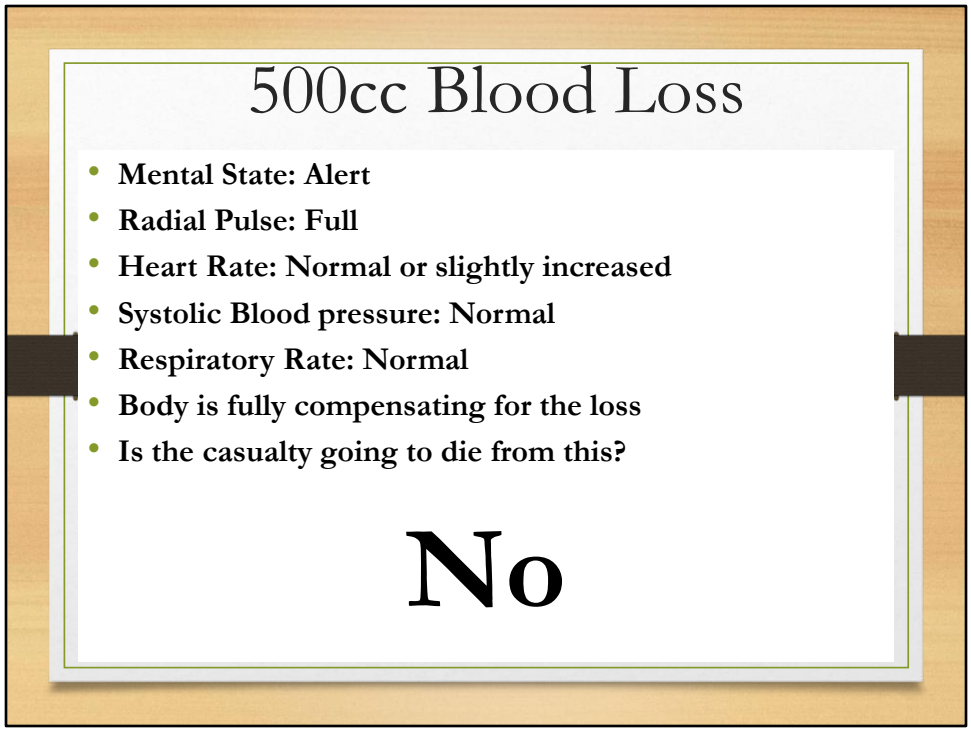
For demonstration – this slide shows 5 liters of simulated blood.
Shown in five 1-liter bottles to help with the demo.

500cc Blood Loss

So – here we have lost the first 500cc of blood.
This is what you lose when you donate a “pint” or a unit of blood at the blood bank. A healthy donor may donate red blood cells every 56 days.
A healthy donor may donate platelets as few as 7 days apart, but a maximum of 24 times a year.

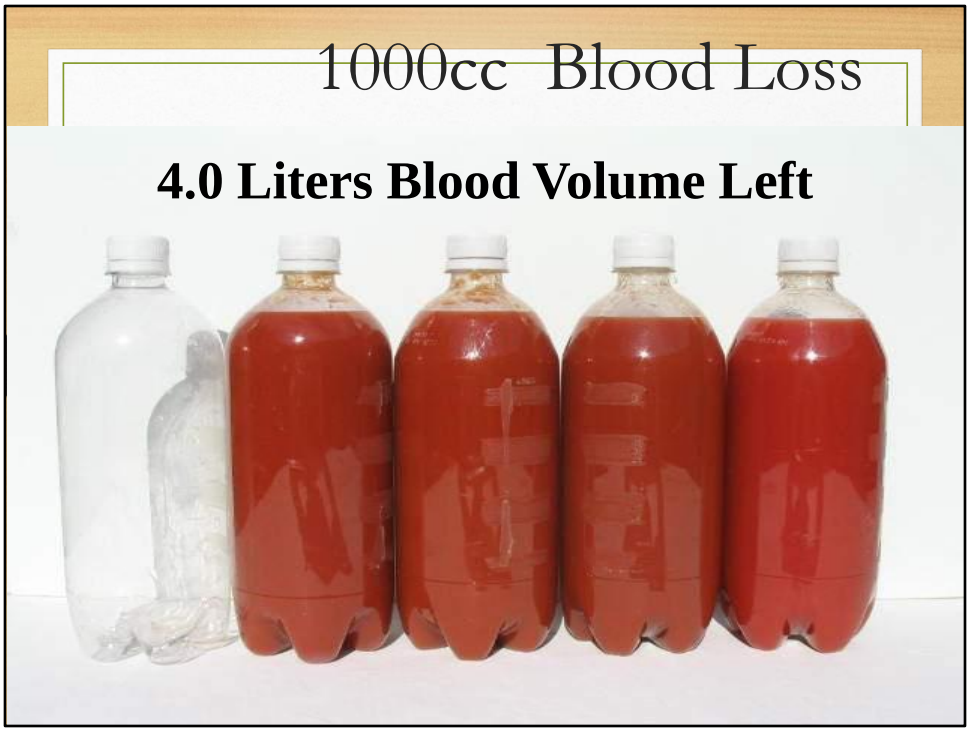


Class I hemorrhage – we should be able to handle this due to the compensatory mechanisms in the body – what signs & symptoms would we see?

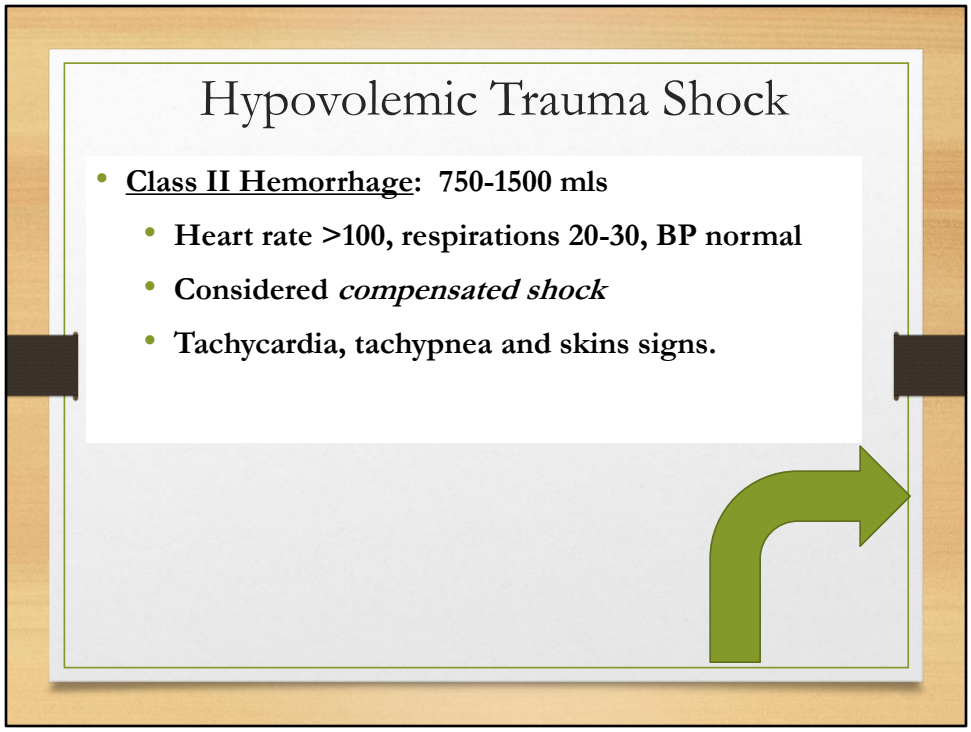


No danger from this level of blood loss. This is what we lose when we donate blood. **Roughly 1 pint** is given during a donation. A healthy donor may donate red blood cells every 56 days, or double red cells every 112 days.

Keep in mind that factors such as exertion, fear, and pain may affect heart rate and breathing rate, and these factors will affect anyone engaged in combat, especially someone who has been wounded. You have to consider these things when treating casualties on the battlefield. For this demonstration, though, we are ignoring these factors, so the physiologic changes you see here are due solely to blood loss.



So now we lose another 500cc of blood.
How are we doing now?



Now we are starting to see the body try harder to compensate for this amount of blood loss. The heart and respiratory systems are trying hard to oxygenate the blood that is left. And you're going sto start seeing some skin signs as the body shunts blood away from the skin to the important organs.

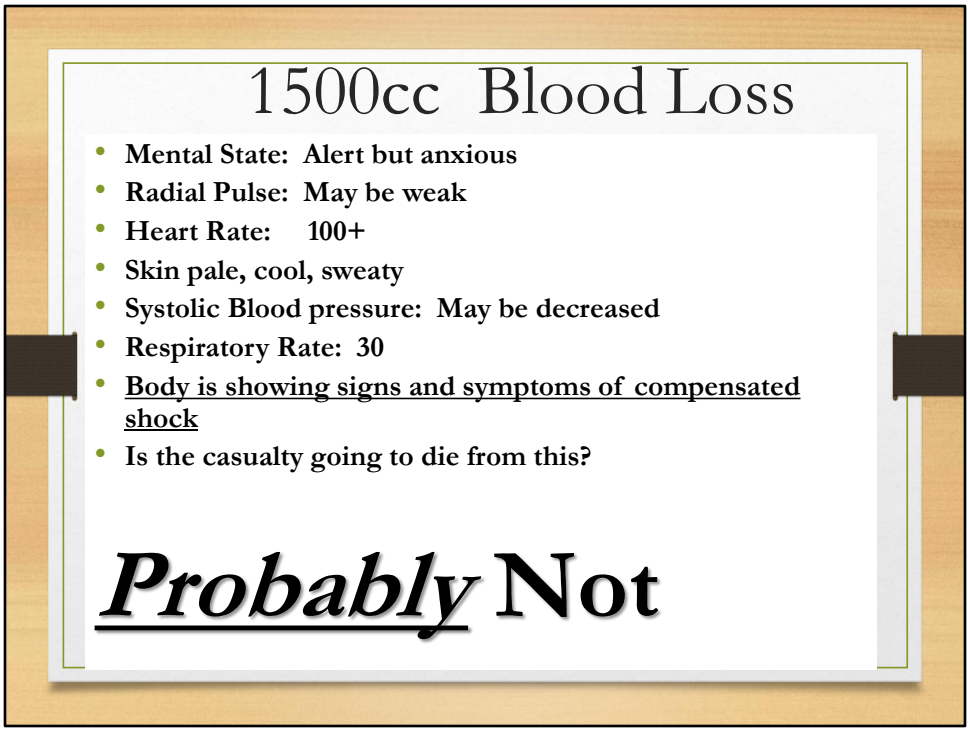
1000cc Blood Loss

- **Mental State: Alert**
- **Radial Pulse: Full**
- **Heart Rate: 100 +**
- **Skin is pale, cool**
- **Systolic Blood pressure: Normal lying down**
- **Respiratory Rate: May be normal**
- **Body is *capable* of compensating for this loss**
- **Is the casualty going to die from this?**

No

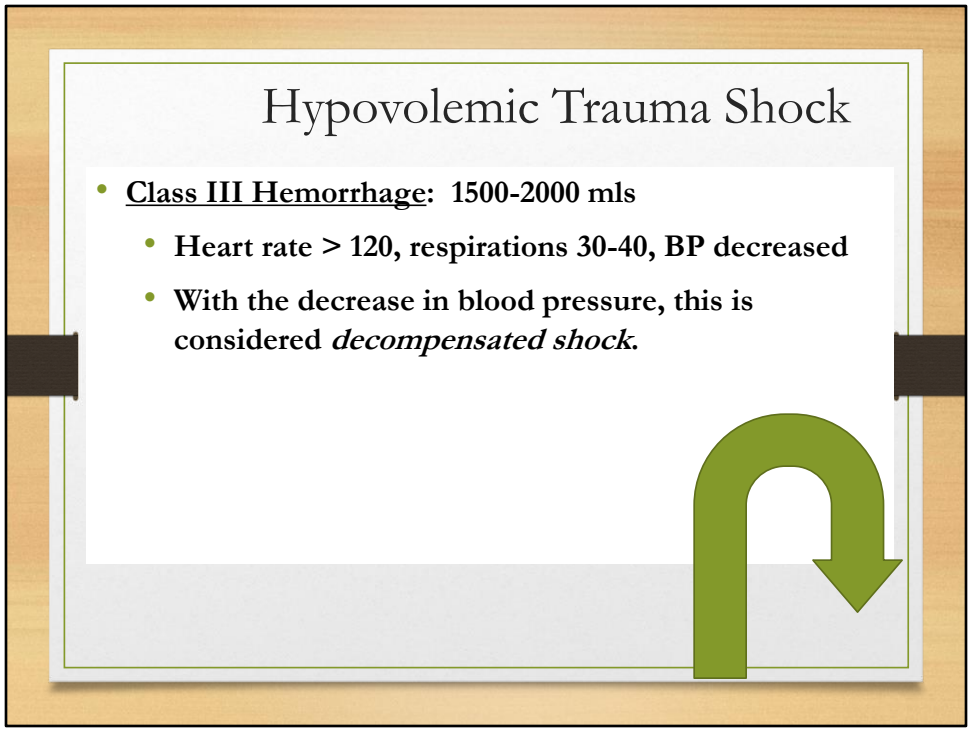
Still basically OK.
Heart rate may be up a little.

Lose another 500cc of blood.
How are we doing now?

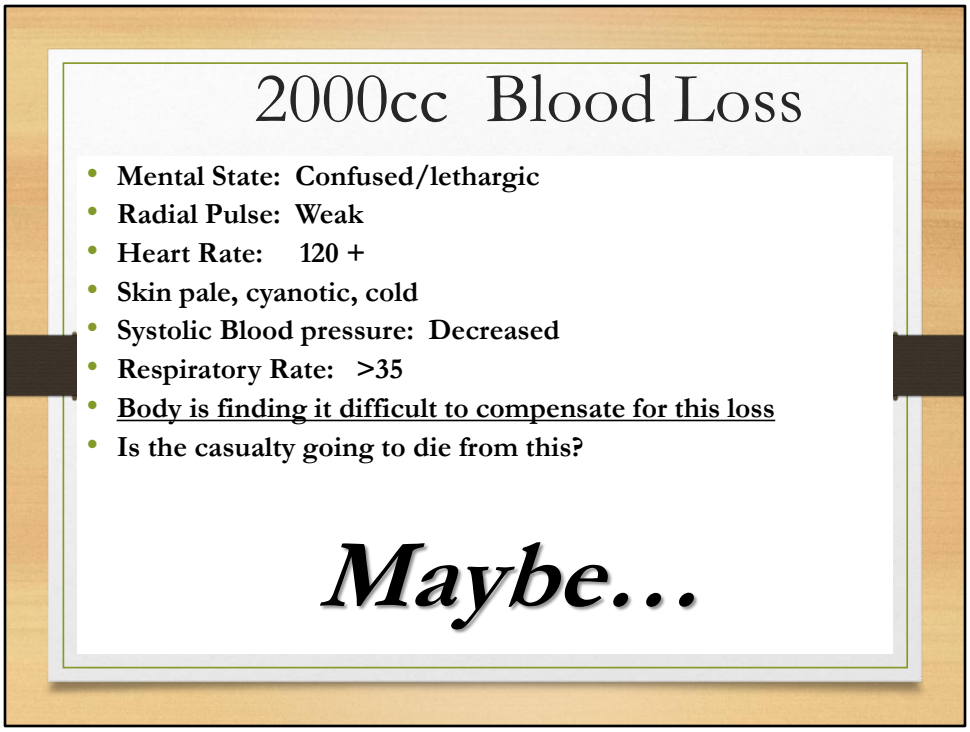


At this point, the casualty is showing some symptoms from his blood loss. Would probably not die from this., providing the patient receives care – NOW>

Lose another 500cc of blood.
On the battlefield, this would represent ongoing uncontrolled hemorrhage.
How is the casualty doing now?

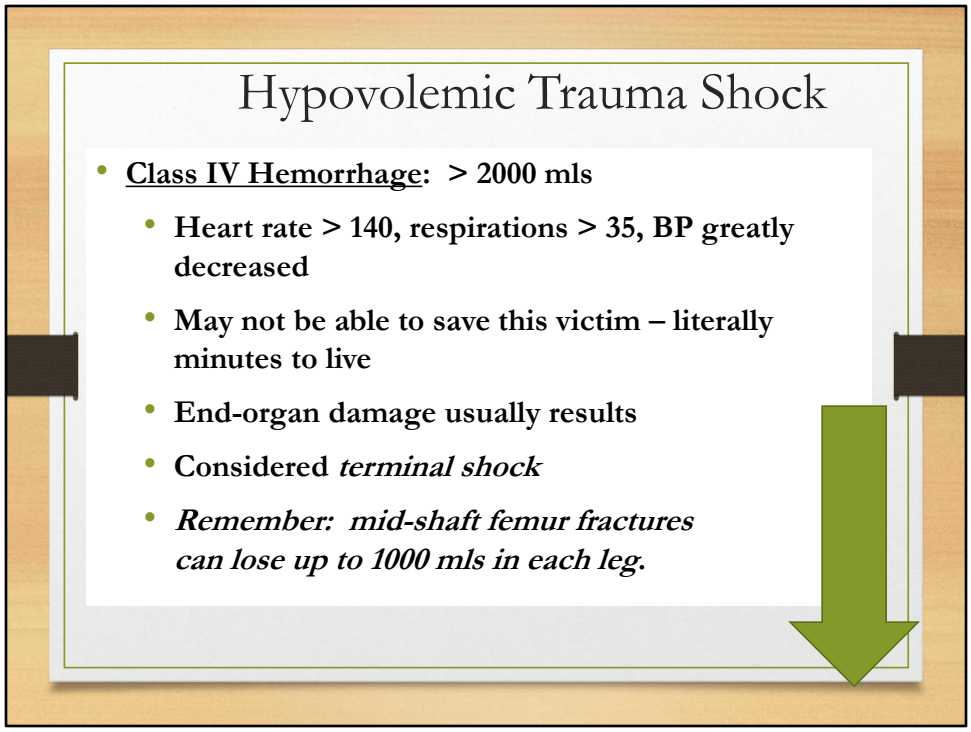


With this much blood lost the body is now finding it hard to compensate. All the mechanisms are working hard to keep the organs perfused, but it is simply not working.

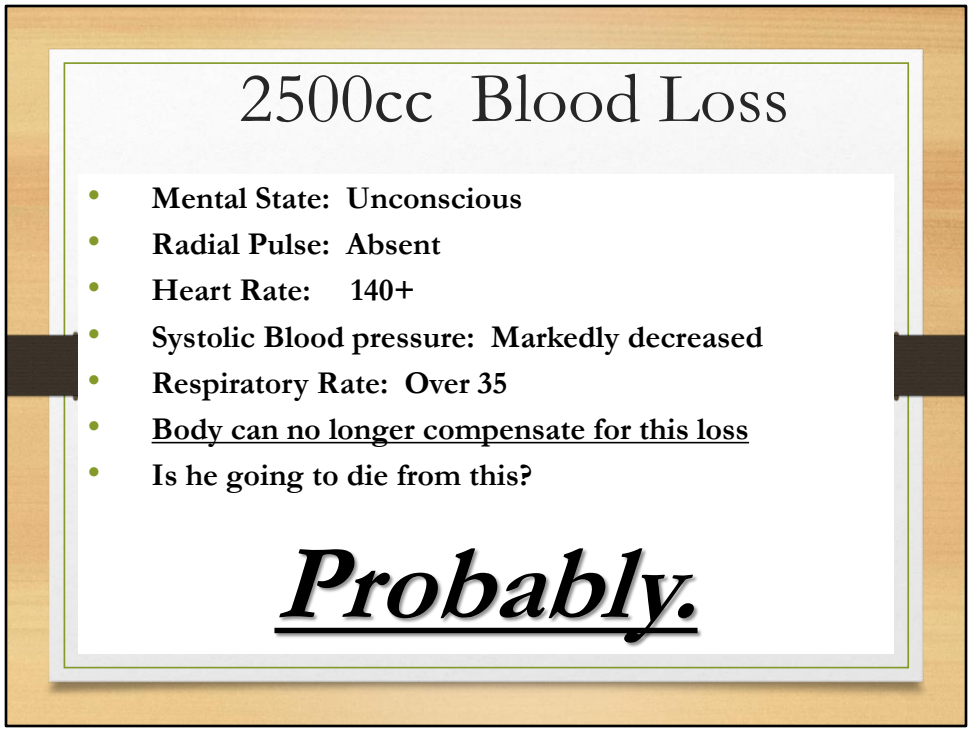


Not so good.
At this point, it is quite possible that he or she could die from the blood loss.
This is “hemorrhagic” or “hypovolemic” (meaning “not enough blood volume”) shock.

So let's take away another 500cc of blood from our simulated casualty. Casualty is now in big trouble.



Loose more than 2 liters and your patient will probably not be able to compensate for the loss



At this point – the casualty has lost HALF of the blood in his/her body.
This level of hemorrhage is likely to be fatal.
YOUR JOB IS NOT TO LET THEM LOSE THIS MUCH BLOOD!
Treating the blood loss after the fact is not as good an option.

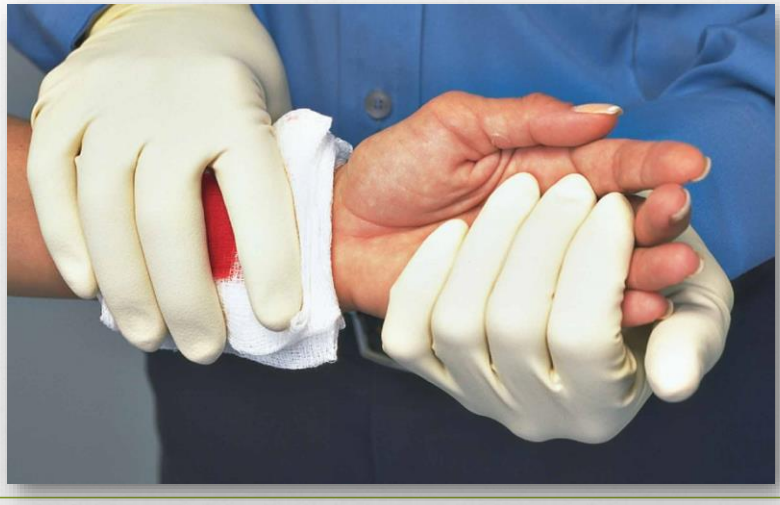
Controlling Blood Loss

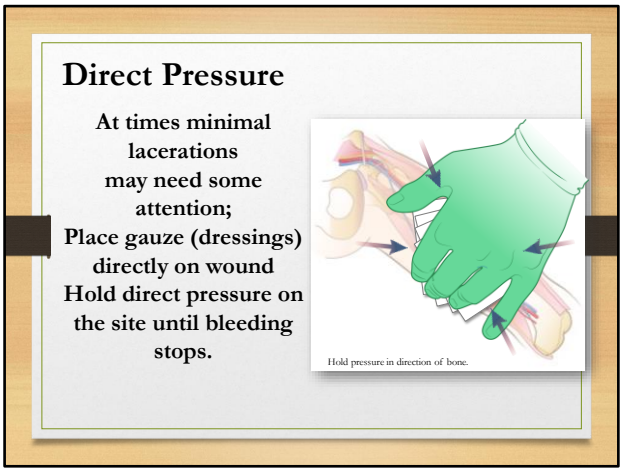
Controlling External Blood Loss

- **Use proper BSI**
- **Apply direct pressure using sterile dressing (on wound), then a bandage to hold in place**
- **Use a pressure dressing when needed**
- **Use tourniquet when necessary**
- **Hemostatic dressing for wounds that are not amenable to tourniquet placement.**

Most bleeding will be controlled by direct pressure – this is where we start. A pressure dressing will hold that pressure on the wound after you let up. A tourniquet is needed if you cannot stop the bleeding with direct pressure. Hemostatic dressing is used for those wounds that are not amenable to tourniquet placement. Demonstrate direct pressure.

Direct pressure





Superficial lacerations (wounds that DO NOT exhibit continues blood flow, spurting, or immediate swelling) may still require professional attention.

Note that sterile dressings (4x4s for example) are placed directly onto a superficial wound. The dressing should be accompanied by direct pressure (shown here with a gloved hand). This can be followed by a pressure bandage (to hold the dressing in position) relieving the provider for other responsibilities.

KEY POINTS:

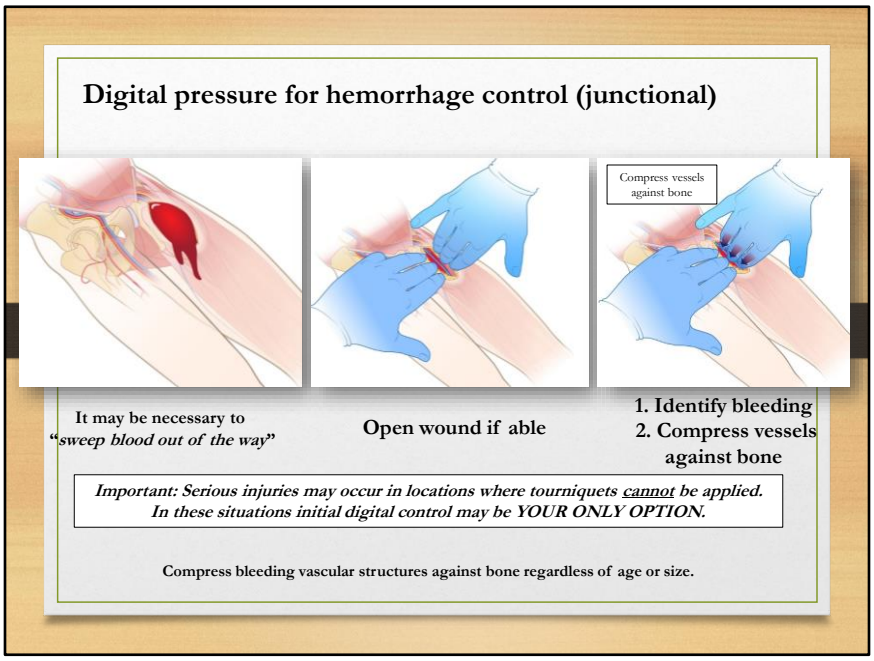
- By placing sterile dressings directly on the wound, you will help prevent further wound contamination and possibly infection.

- By holding direct pressure on the sterile dressings, you should be able to easily control minimal bleeding.

IMPORTANT: Bleeding that soaks a dressing or continues, even with direct pressure, <u>REQUIRES</u> more aggressive management (*techniques for managing significant injuries are described in the materials that follow*).

Again: Superficial wound bleeding does NOT exhibit spurting or heavy flow. These injuries generally stop bleeding within 3-5 minutes from the application of direct pressure (for patients who do not take anticoagulants or have bleeding disorders).

CAUTION: A wound that initially appears superficial, yet exhibits spurting, heavy flow, or causes immediate swelling within the extremity, **<u>IS NOT superficial and requires more aggressive management</u>.**

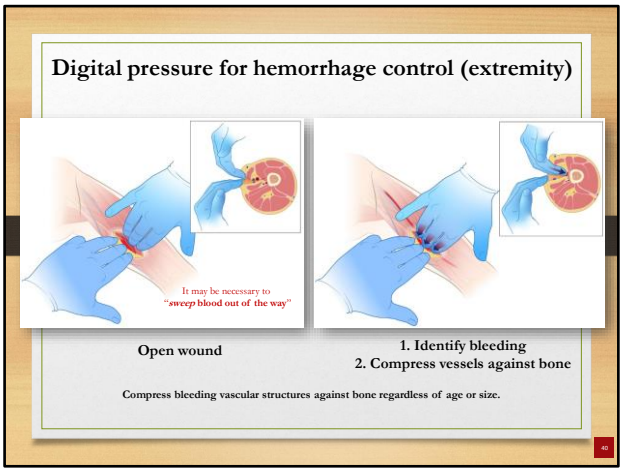


This slide discusses digital hemorrhage control of junctional injuries. These are injuries that may include the groin (depicted here), the armpit or neck (not shown).

Important: *Serious injuries may occur in locations where tourniquets* ***cannot*** *be applied. In these situations, initial digital control (and aggressive wound packing) may be YOUR ONLY OPTIONS.*

1. It may be necessary to "sweep" blood out of the wound in order to momentarily see the source of bleeding.
2. It may be necessary to manually open (spread apart) the wound to both visualize and gain access to the injured vessels.
3. Once bleeding vessels are identified, compress them directly against the bony structures of the leg or pelvis (*or arm and torso if an upper extremity, or spinal column if junctional injury is on the neck*).

KEY POINT: Significant wound bleeding may exhibit spurting or heavy flow. These injuries may not stop bleeding with direct pressure – and - likely require digital pressure *and aggressive wound packing* *(again, because a tourniquet cannot be applied in these areas).*

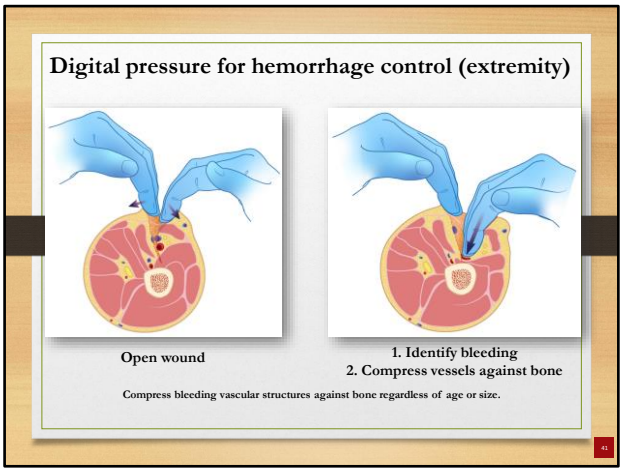


This slide discusses digital control of extremity injuries. These injuries may include the leg (shown here) or the arm (not shown).

Important: *Serious injuries may occur in locations where tourniquets* ***can, and likely should, be applied.*** *In these situations* ***it may be life-saving to first apply a tourniquet*** *and then consider other options.*

1. It may be necessary to "sweep blood out of the wound" in order in momentarily identify the source of bleeding.
2. It may also be necessary to manually open the wound to visualize and gain access to the injured vessel(s).
3. Once the bleeding vessel(s) are identified, compress them directly against the bony structures of the leg (or arm).

KEY POINT: Significant wound bleeding may exhibit spurting or heavy flow. These injuries may not stop bleeding with direct pressure and will likely require digital control of the vessel(s). Even with digital control one should rapidly consider application of a tourniquet.



This slide more closely examines digital control of extremity injuries. These may include injuries of the leg (cross section of the mid-shaft femur illustrated here) or the arm (not shown).

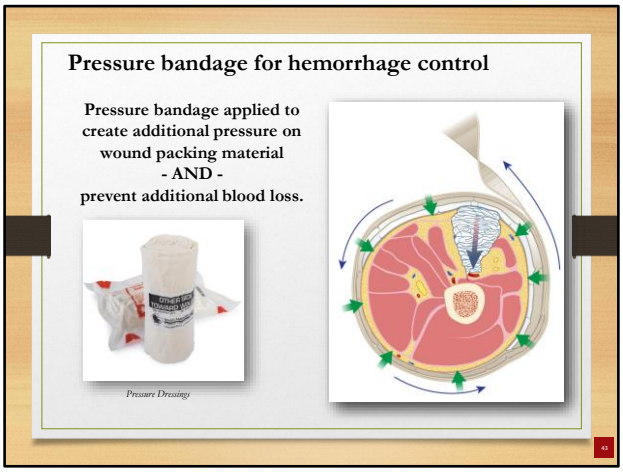
Important: *Serious injuries may occur in locations where tourniquets* ***can, and likely should, be applied.*** *In these situations* ***it may be life-saving to first apply a tourniquet and then consider other options.***

1. It may be necessary to "sweep" blood out of the wound in order in momentarily see the source of bleeding.
2. It may be necessary to manually open the wound to both visualize and gain access to the injured vessel(s).
3. Once the bleeding vessels are identified compress them directly against the boney structures of the leg (or arm).

KEY POINT: Significant wound bleeding may exhibit spurting or heavy flow. These injuries may not stop bleeding with direct pressure and will likely require digital control of the vessel(s). Even with digital control one should rapidly consider application of a tourniquet.

Pressure dressing

Pressure dressing is easier with a stretchable material like Coban or vet wrap

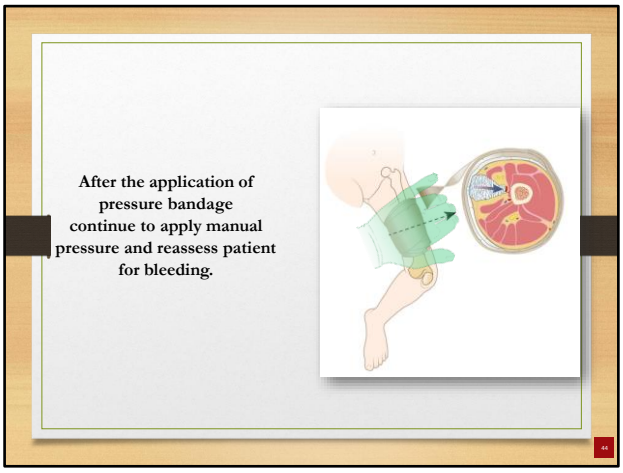


A pressure bandage, such as the one depicted in this slide, is **generally applied circumferentially to an extremity for two reasons:**

1. **To maintain pressure on the wound**
2. **To hold a dressing** (wound packing) **in position**

Additionally, a pressure bandage might be utilized if other tasks must be accomplished and the provider needs to manage other patient care needs or leave the injured patient.

It is important to **ensure** that the pressure dressing does not cut off circulation to the extremity. This can be accomplished by checking the distal pulse or capillary refill.



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Tourniquet

Tourniquet Use

- There is no doubt that tourniquets provide an effective means to stop 'catastrophic hemorrhage' - serious bleeding wounds to the extent that death is imminent due to blood loss
- There is also evidence to support the negative consequences of inappropriate or prolonged use of tourniquets, including nerve damage, tissue death and circulatory complications.

Tourniquet Use

- Tourniquets are effective and appropriate but only if their use is warranted and the person applying the tourniquets understands what they are doing, how to do it and why.

Tourniquet Use

- **Amputation:**
  The risks of hypovolemic shock greatly outweigh the potential damage to the limb beyond the point of tourniquet application in the case of an amputation
- **High-Hazard setting:**
  Such as industrial environments experience similar injuries to those seen in hostile environment; principally traumatic amputation and blast injuries
- **Multiple casualties:**
  Mass casualty incidents result in multiple casualties with serious limb injuries without the resources to treat all casualties with direct pressure.

Tourniquet Use

- **Multiple Injuries:**
  A casualty with multiple injuries, including serious bleeding limb injuries may be effectively managed by the immediate application of a tourniquet as a temporary measure to stop bleeding while Airway and Breathing are assessed and managed
- **Entrapment:**
  Where a casualty is trapped and direct pressure may not be applied to the limb injury because of lack of access a tourniquet may be appropriate as the only remaining method of controlling the bleed.

Tourniquet Use Side Effects

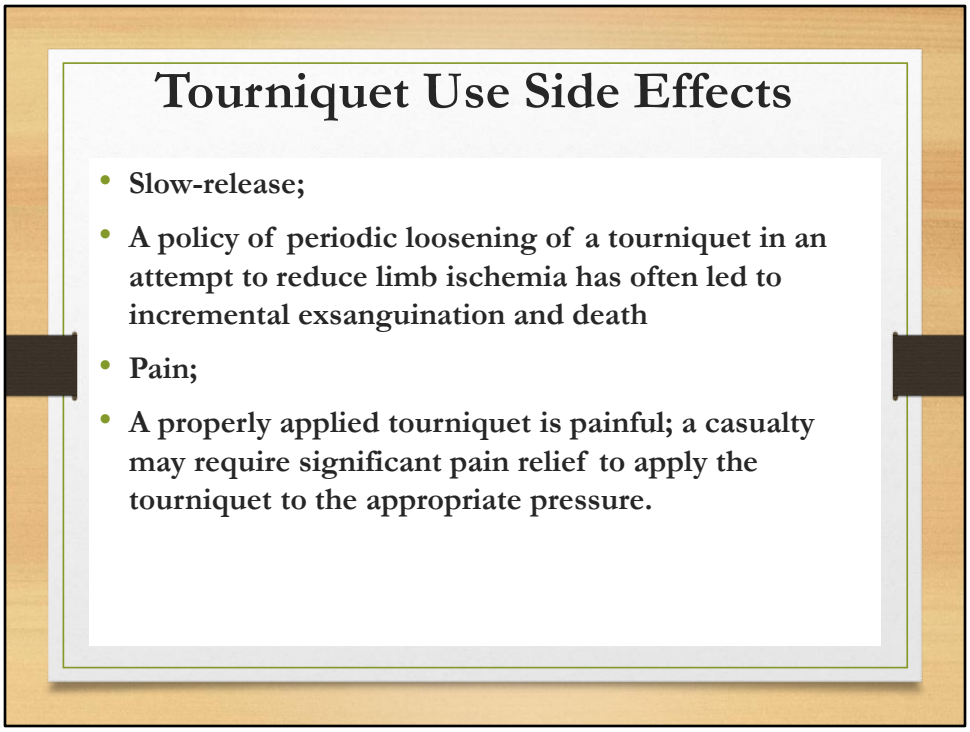
- **Ischemia;**
- **The obvious concern is tissue damage due to a loss of circulation. Continuous application for longer than 2 hours can result in permanent nerve injury, muscle injury, vascular injury and skin necrosis. Muscle damage is nearly complete by 6 hours**

Tourniquet Use Side Effects

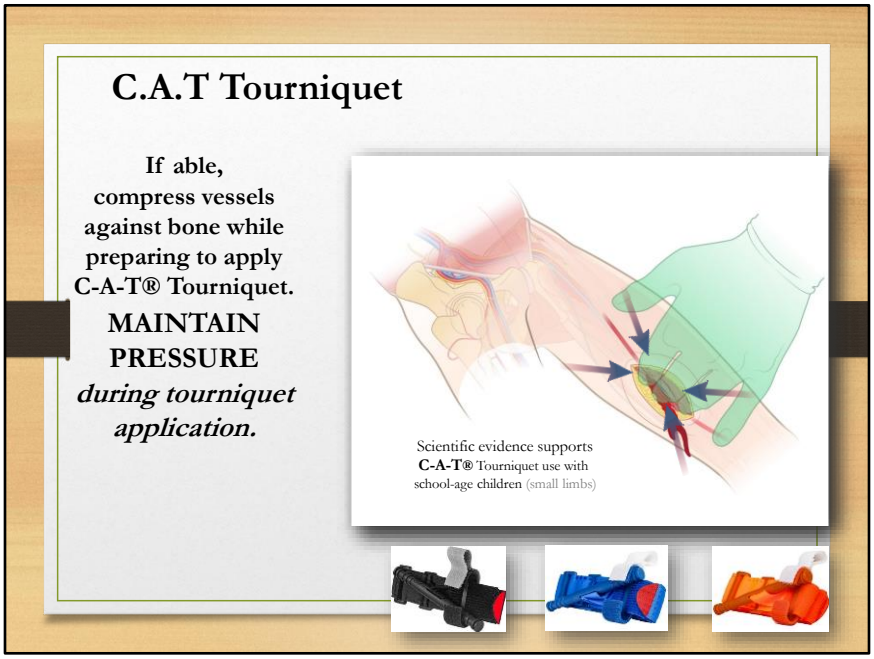
- Compartment syndrome;
- The more sinister - and less known - issue is compartment syndrome; a serious condition which can affect both life and limb. Raised pressure within the compartment such as the arm, leg or any enclosed space within the body and leads to nerve damage because of the lack of blood supply. Prolonged or inappropriate use of a tourniquet can lead to compartment syndrome, especially if venous blood flow is impeded but not arterial, thereby allowing arterial blood into an area but not allowing venous return.

Tourniquet Use Side Effects

- **Reperfusion Injury;**
- **Reperfusion injury is tissue damage caused when blood supply returns to the tissue after a period of ischemia or lack of oxygen. The absence of oxygen and nutrients from blood during the ischemic period creates a condition in which the restoration of circulation results in inflammation and oxidative damage through the induction of oxygen rather than restoration of normal function**



In other words – it HURTS



Tourniquets have been <u>scientifically proven</u> to be safe and effective when used to control life-threatening bleeding from small limbs.

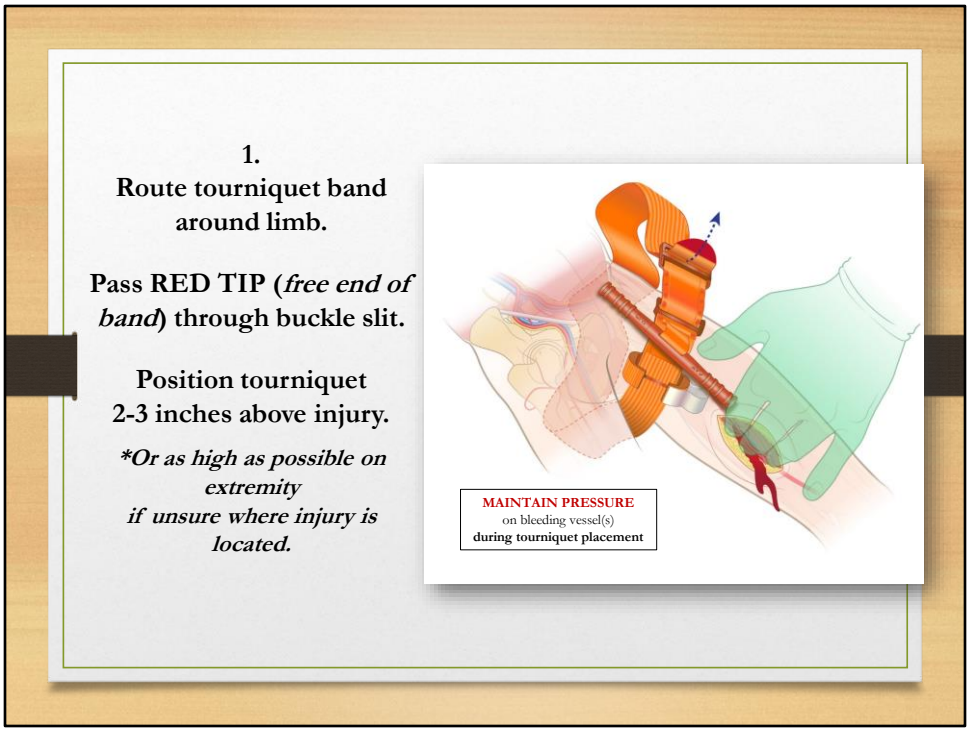
This means that C-A-T® Tourniquets **CAN be effectively applied to any age group**.

KEY POINT: If the resting circumference of the limb is less than eight (8) inches you may need to modify the application process. This could include:

1. Circumferentially wrapping a dressing (or similar item) around the extremity (thus increasing the extremity's diameter) and then applying the tourniquet.
2. Placing a firm bulky dressing (or similar item) under the tourniquet, yet over the artery, before tightening the rod.

When a situation warrants the application of a tourniquet, important steps must be taken (eight (8) steps are described in the following slides)**:**

1. Attempt to identify the source of bleeding AND maintain direct or digital pressure on the wound.



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Important steps:

1. **Attempt to identify the source of bleeding AND maintain direct or digital pressure on the wound.**
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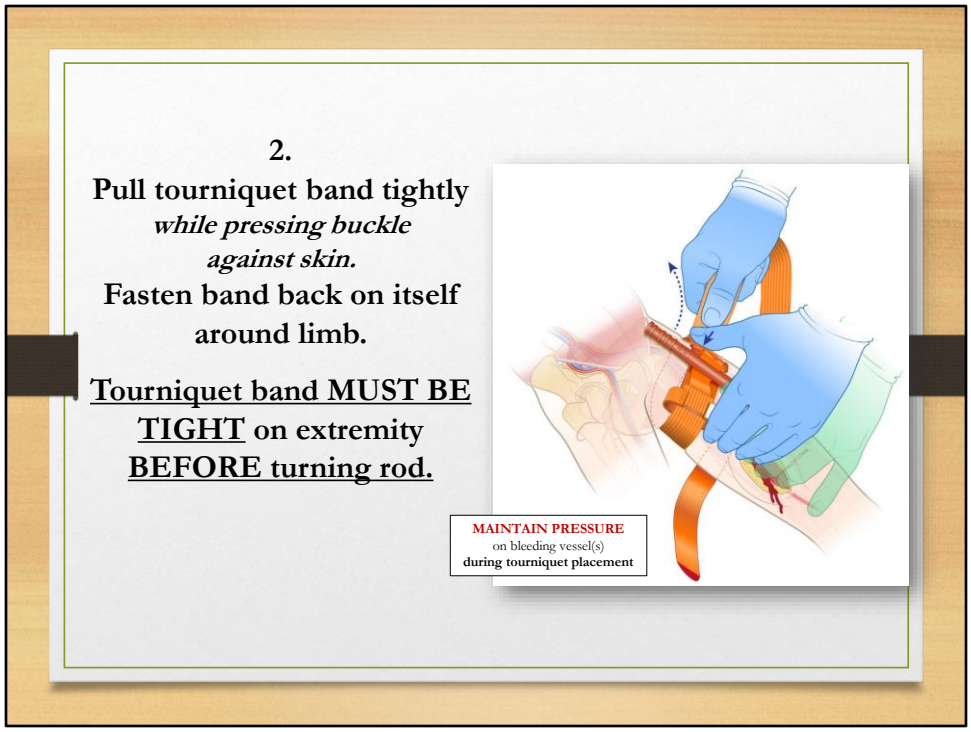

Tourniquets have been scientifically proven to be safe and effective when used to control life-threatening bleeding from small limbs.

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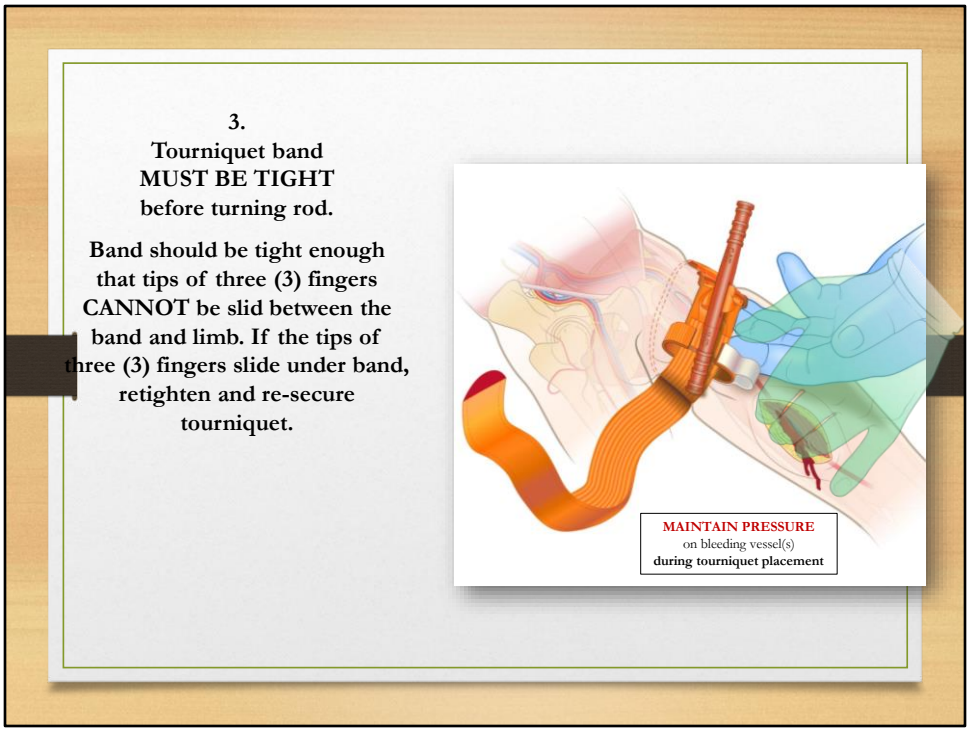

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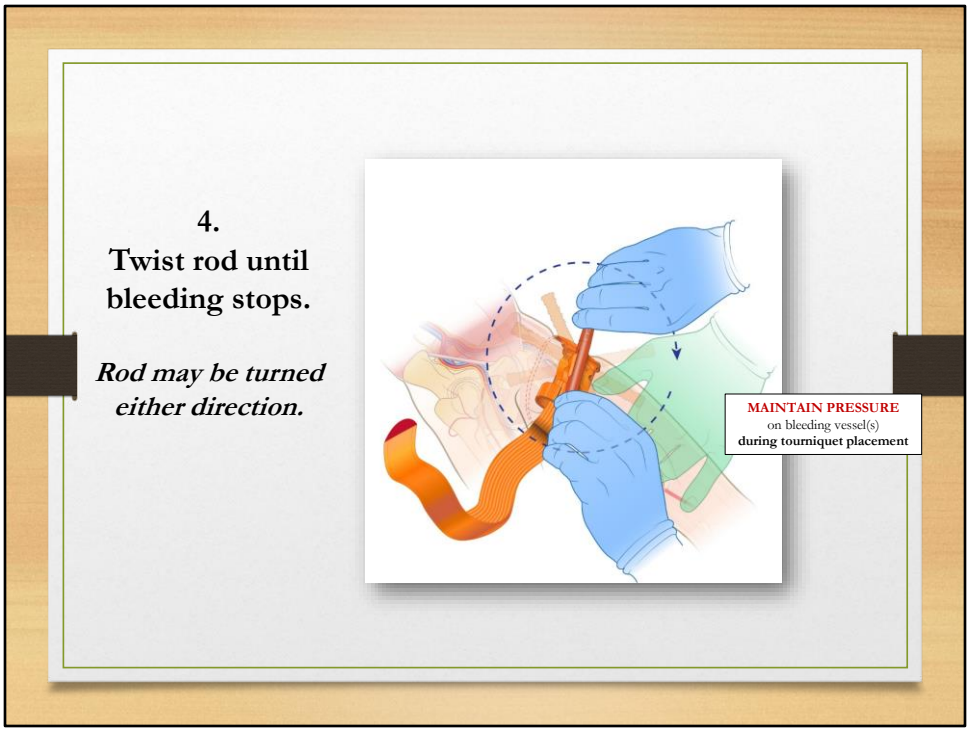

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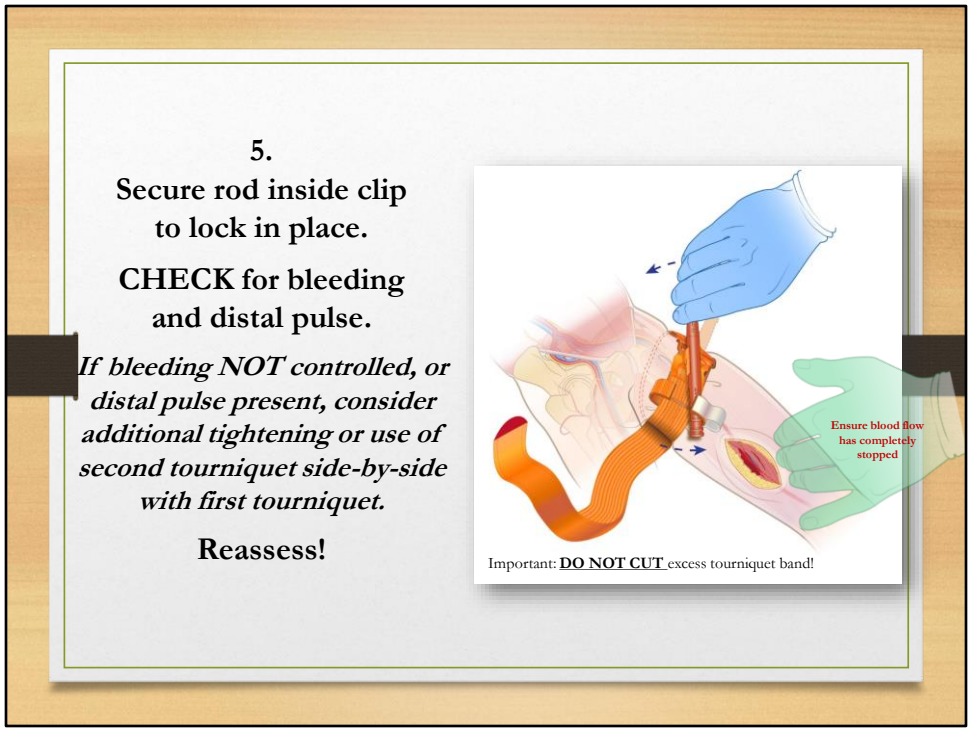

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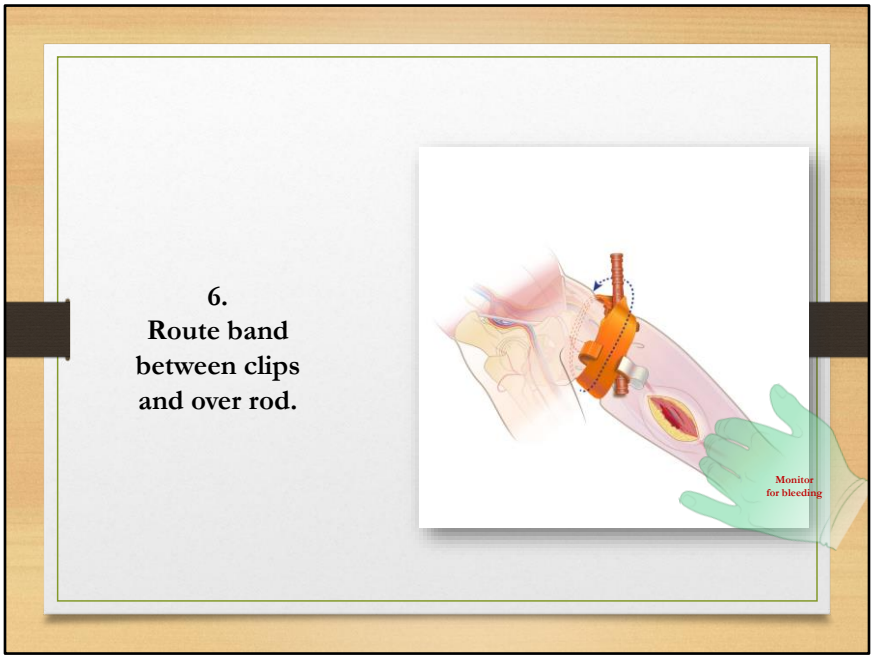

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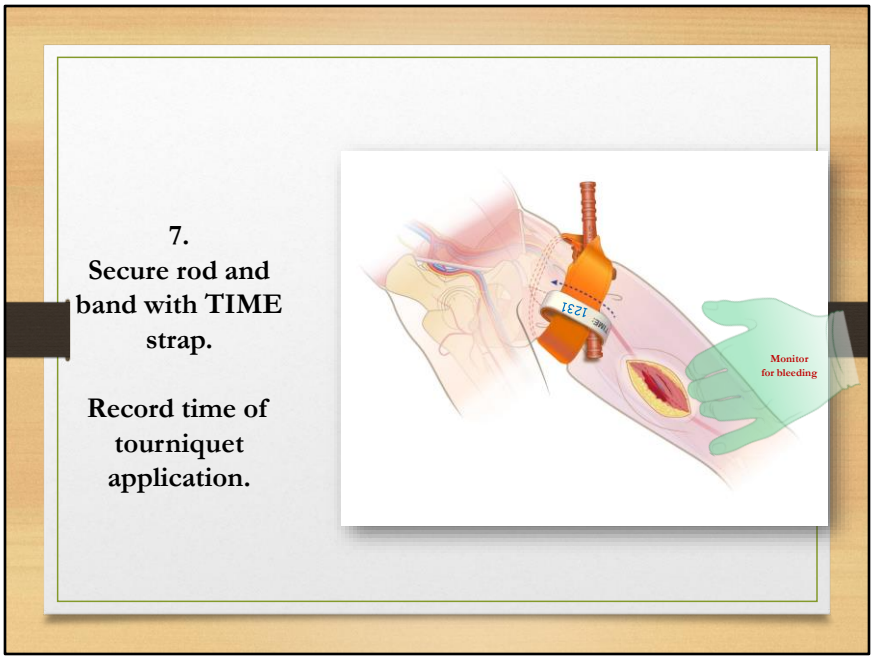
6. **Route band between clips and over rod** (to ensure band does not inadvertently detach)**.**

Important: DO NOT CUT Tourniquet Band!



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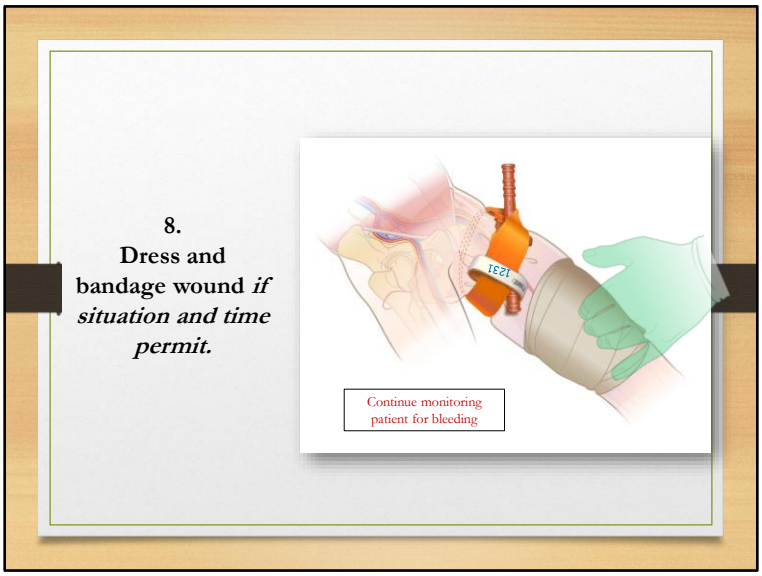
6. **Route band between clips and over rod** (to ensure band does not inadvertently detach).
7. **Secure rod and band with TIME strap. Record time of tourniquet application (this can be written on the tourniquet or the patient). Monitor patient for bleeding.**



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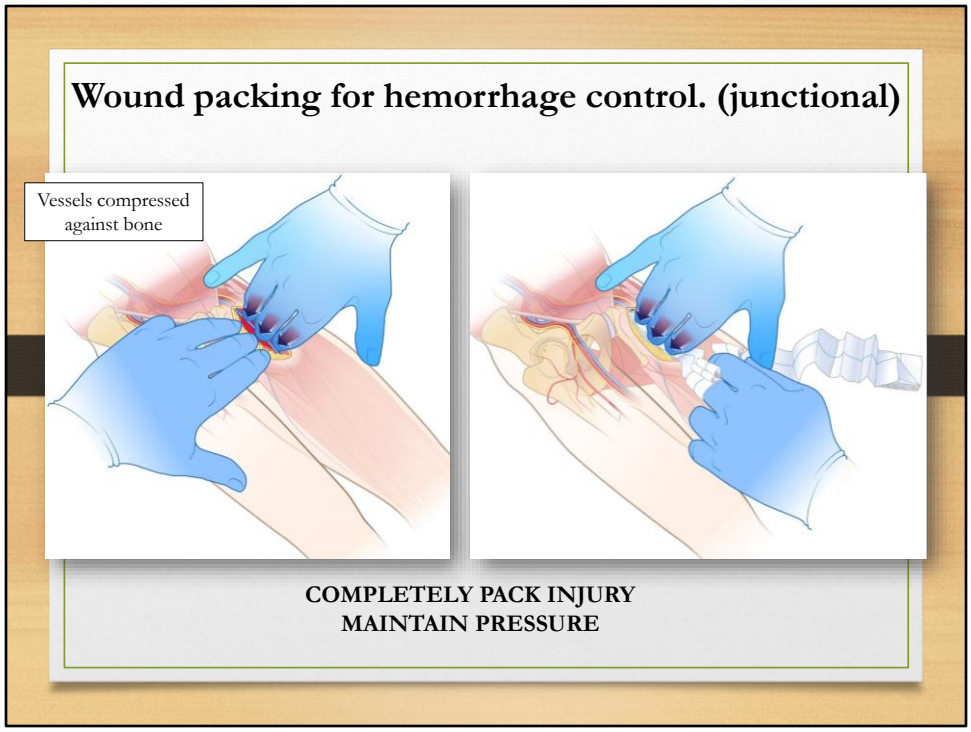
7. **Secure rod and band with TIME strap. Record time of tourniquet application (this can be written on the tourniquet or the patient). Monitor patient for bleeding.**
8. **If situation and time permit, pack wound and apply pressure dressing. As able, assess extremity for "breakthrough" bleeding.**

Hemostatic Dressing



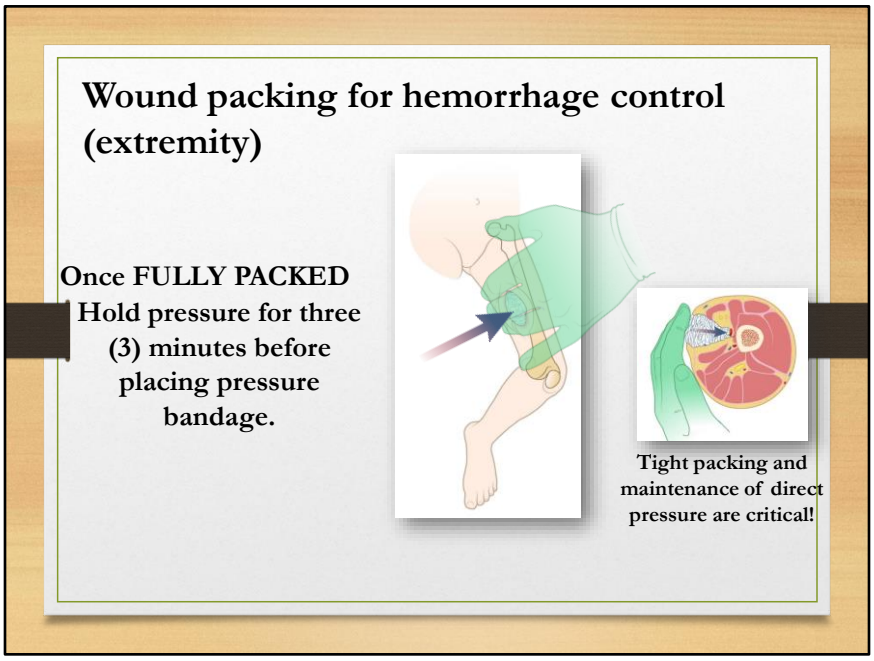
A junctional wound in the groin (shown here), armpit or neck (not shown) may be life-threatening.

Bleeding in these regions CANNOT be controlled with a tourniquet (*simply because the area cannot be circumferentially compressed*).

Steps to control bleeding in this region include:

1. Sweep blood out of the way as needed.
2. Manually open the wound to identify the source of bleeding.
3. Digitally compress bleeding vessels against bony structures.
4. Pack the wound with sterile gauze.
    - Packing a wound is a process accomplished by maintaining pressure (with fingertips) WHILE "systematically pushing gauze under fingertips and on top of bleeding vessels."
    - This packing process is continuously repeated – while maintaining pressure – until the ENTIRE WOUND CAVITY IS COMPLETELY FULL and wound packing material is overflowing above the wound.

KEY POINT: Wound packing is EFFECTIVE ONLY IF ENTIRE WOUND CAVITY IS COMPLETELY FULL AND PRESSURE IS MAINTAINED ON VESSELS!



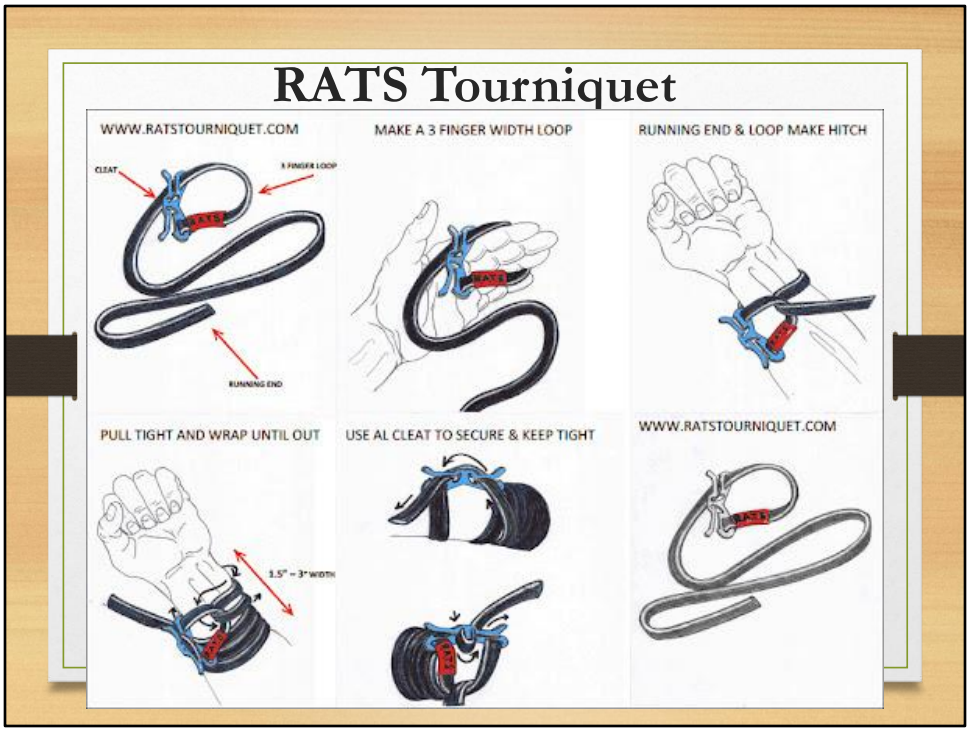
Important: *Serious injuries may occur in locations where tourniquets* ***can and likely should, be applied****. In these situations* ***it may be life-saving to immediately apply a tourniquet*** *and then consider other options.*

A wound of the lower extremity (cross-section of mid-thigh shown here) or upper extremity (not shown) may be life-threatening.

Steps to control bleeding in this region include:

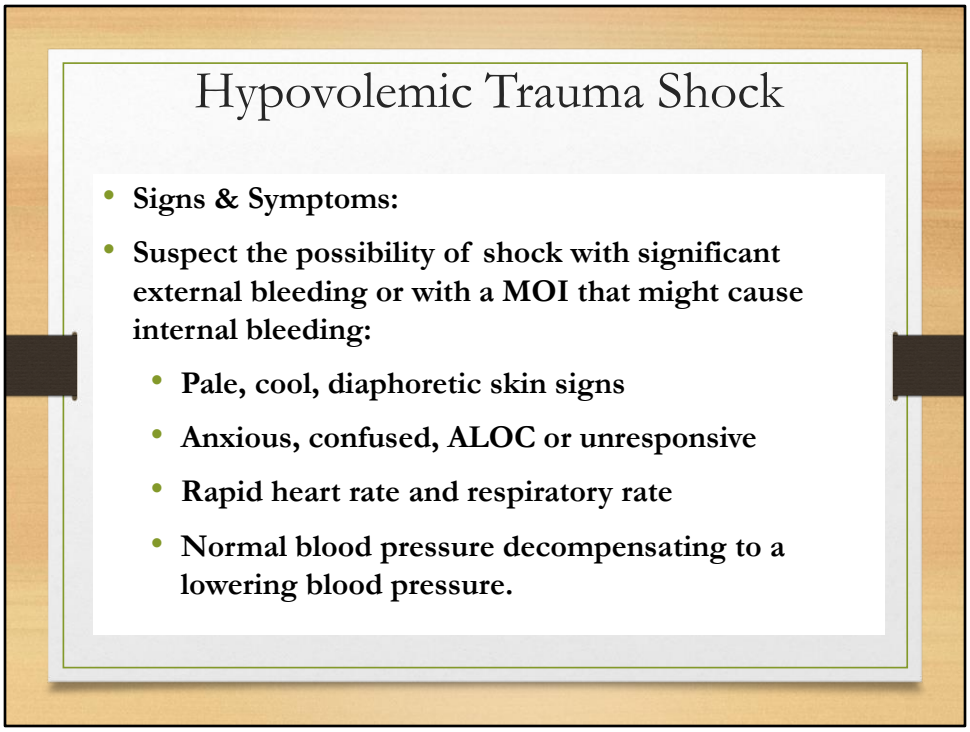
1. Sweep blood out of the way as needed.
2. Manually open the wound to identify the source of bleeding.
3. Digitally compress bleeding vessel(s) against bony structures.
4. Pack the wound with sterile gauze.
    - Packing a wound is a process accomplished by maintaining pressure (with fingertips) WHILE "systematically pushing gauze under fingertips and on top of bleeding vessels."
    - This packing process is continuously repeated – while maintaining pressure – until the ENTIRE WOUND CAVITY IS COMPLETELY FULL and dressing materials is overflowing above the wound.
5. Once wound cavity has been completely packed – **HOLD PRESSURE for at least three (3) minutes** before placing pressure bandage into positioning.

KEY POINT: Wound packing is EFFECTIVE ONLY IF ENTIRE WOUND CAVITY IS COMPLETELY FULL AND PRESSURE IS MAINTAINED ON VESSELS!



The RATS (Rapid Application Tourniquet System) does not rely on Velcro, and can be applied to any size limb (including pediatric)

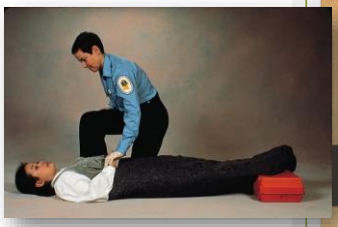
Hypovolemic Shock Treatment



Remember these signs & symptoms! Why is it so important to recognize it in the field? Because we really cannot treat it in the field

General Treatment for Shock

- **Maintain patient's ABCs**
- **Control bleeding**
- **Maintain body temperature**
- **Position patient correctly-**
  - **Raise legs if no injury**

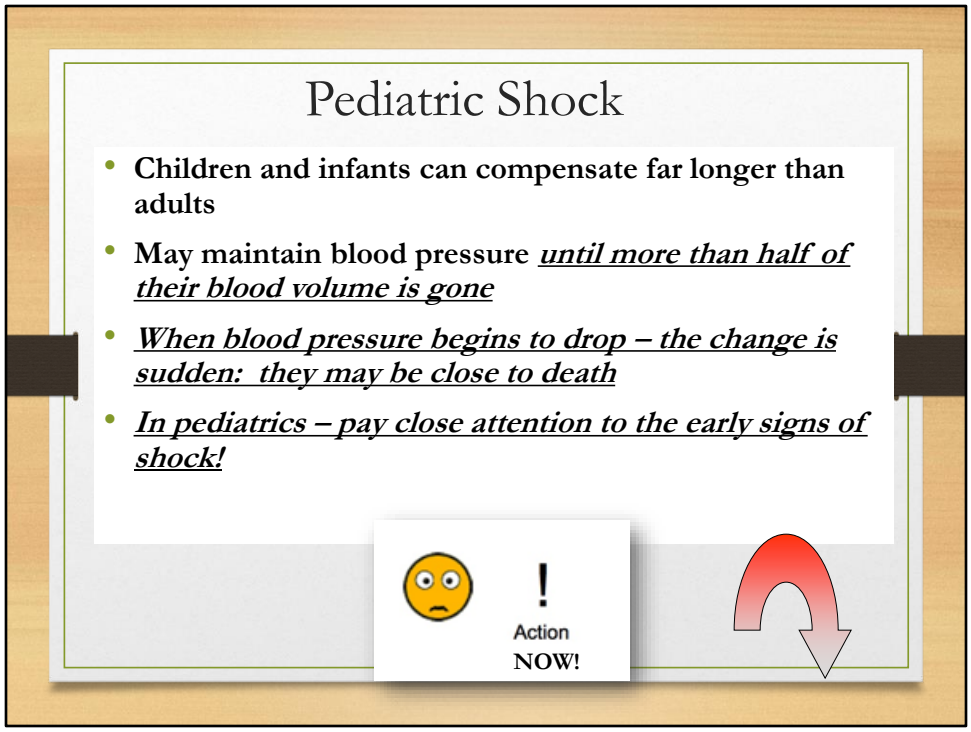


- **Do not give anything to eat or drink**
  - **Patient may complain of thirst**
- **Provide oxygen, full flow if indicated by pulse ox**
- **Arrange for immediate and prompt transport.**

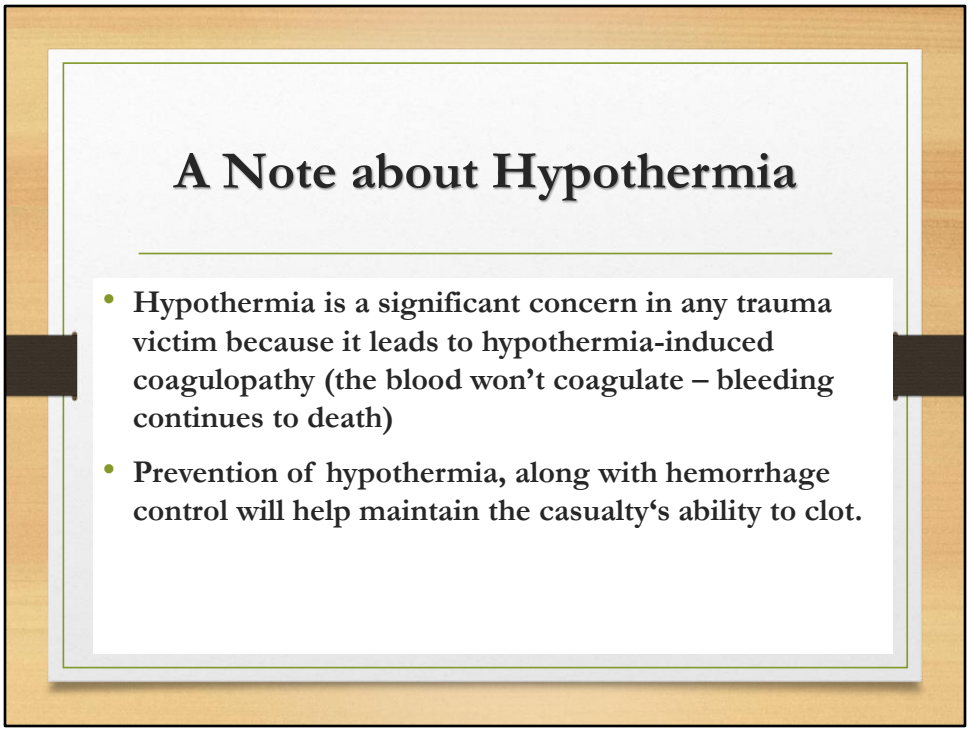
Oxygen even if not indicated – the pulse ox may not be accurate when in hypovolemia – so if you think they are in shock, give them oxygen

General Treatment for Shock

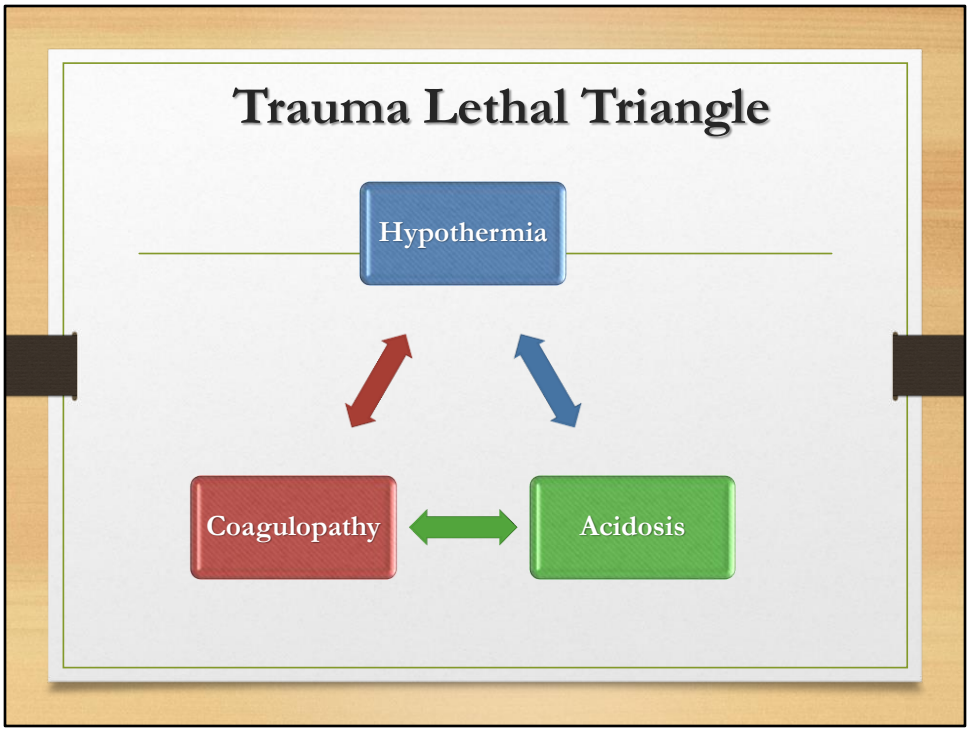
This shows another way to do the Trendelenburg position – not a good idea because now we have to worry about increasing pressure to the head/brain



In any kind of pediatric trauma your OS meter should already be pegged at the OH SH>>>>! Stage.



Coagulopathy kills by both decreasing platelet function and slowing enzyme activity in the coagulation cascade


Trauma Lethal Triangle
Hypothermia
Coagulopathy
Acidosis

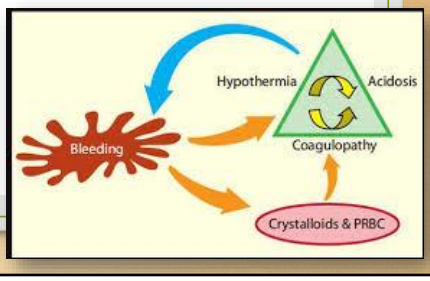
Hypothermia

- Normal human body temperature is 35.6–37.8 °C with hypothermia being defined as a core temperature < 35 °C (95 °F)
- In one study of 71 trauma victims, a core temperature < 32°C (89.6°F) was associated with 100% mortality *independent of the presence of shock, injury severity or volume of fluid resuscitation.*

So it didn't matter here – shock or fluids or not – they ALL died if their body temperature was less than 89.6

Acidosis

- As a trauma patient's perfusion worsens, lactic acid rapidly accumulates in the tissues
- This causes the body's pH to drop, resulting in a severe metabolic acidosis
- It's important to note that this process frequently occurs in the presence of <u>normal or only slightly abnormal vital signs.</u>



Normal vitals here? We cannot tell in the field if they are in acidosis! Acidosis causes coagulopathy…

Coagulopathy

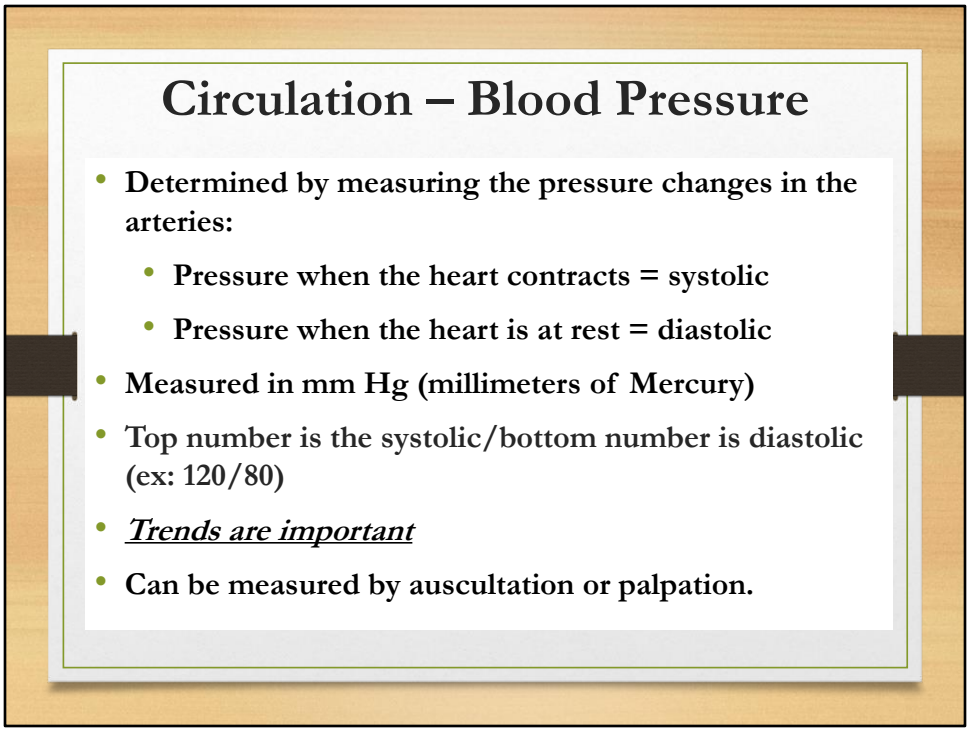
- In one study, the function of the coagulation system was reduced by 55–70% when the pH dropped from 7.4 to 7.0
- For the trauma patient, one of the most harmful effects is that their coagulation system can become severely impaired
- So this means that the patient's bleeding just continues.

The acidosis from hypothermia causes the coagulation functions to be reduced – they will just continue to bleed because their own body cannot clot the blood.

What Does This Mean *For Us?*

Patients can and will become hypothermic in conditions you consider warm: Prioritize limiting a patient's exposure to the environment, especially during prolonged extrications – put covers on them

Blood Pressure



But remember: this is a rather late-changing sign

Measuring Blood Pressure

Auscultation:

- **Expose Patient's arm:**
  - **Support Patient's arm at heart level**
  - **Do Not move arm if spinal injury is suspected**
  - **Use Only uninjured arm**
- **Select Correct-Size Blood Pressure Cuff.**

"auscultation" means you hear it – need the stethoscope for this one
Demonstrate the technique of obtaining a blood pressure by auscultation.

Measuring Blood Pressure

Auscultation

- Apply BP Cuff around upper arm with lower border one inch above the crease in the elbow
- Center of the bladder over the brachial artery
- Prepare Stethoscope.

Measuring Blood Pressure

Auscultation

- **Locate Brachial Artery.**

The brachial artery is towards the midline at the elbow joint

Measuring Blood Pressure

Auscultation

- Place Diaphragm (or Bell) of Stethoscope on Pulse.

Measuring Blood Pressure

Auscultation

- Close Valve and Inflate Cuff
- Above 180 mmHg (Adult)
- Above 120 mmHg (Children).

Measuring Blood Pressure

Auscultation

- **Open Valve and Deflate 2-3 mmHg per Second -**

  While watching the pressure gauge.

Measuring Blood Pressure
Auscultation

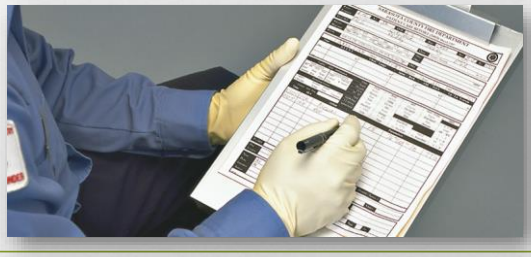
- Listen for start of sound (Systolic)
- Listen for sound to stop (Diastolic).

For some it is easier to take the diastolic when the sound stops – whatever way it is important for only one person to take a set of vitals

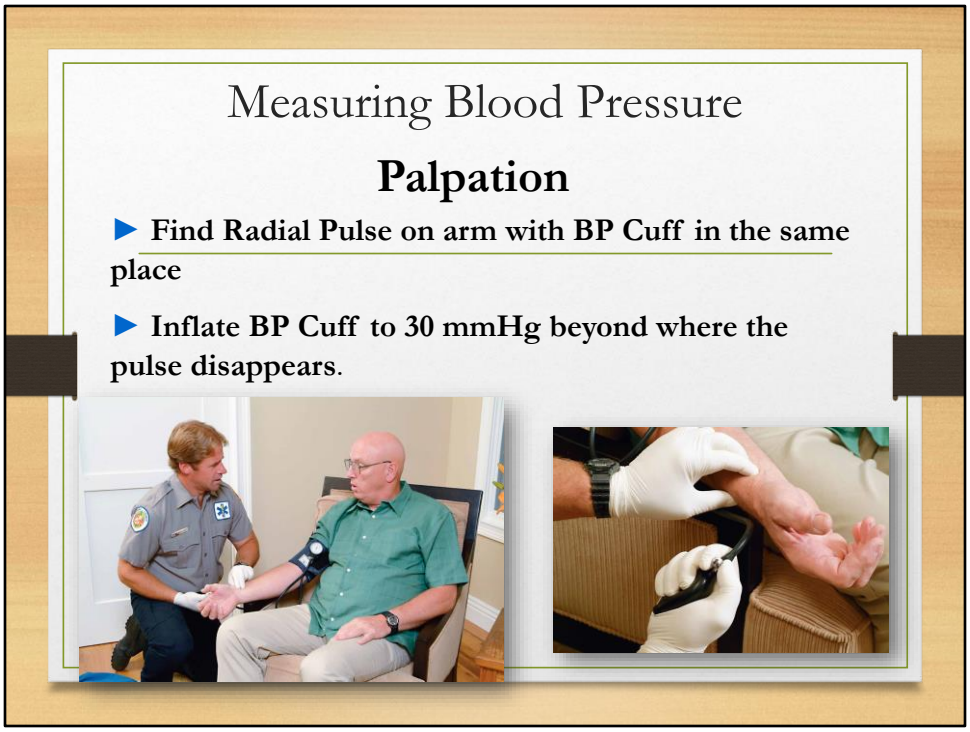
Measuring Blood Pressure

Auscultation

- Immediately release all pressure in the cuff
- Document Time, and Blood Pressure (use even numbers).



Be sure to try to get this done quickly – it is essentially a tourniquet here – occluding the brachial artery – and it HURTS. So be kind to your patient and release the pressure ASAP

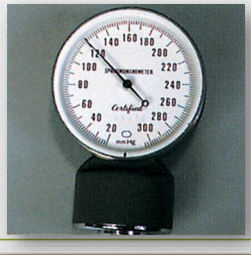


What about a noisy environment? Or maybe you just can't hear the pulse (weak) but you can feel a radial pulse? You need a quick-and-dirty way of getting some kind of reading. This is by palpation (you feel it)
Demonstrate the technique of obtaining a blood pressure by palpation.

Measuring Blood Pressure

Palpation

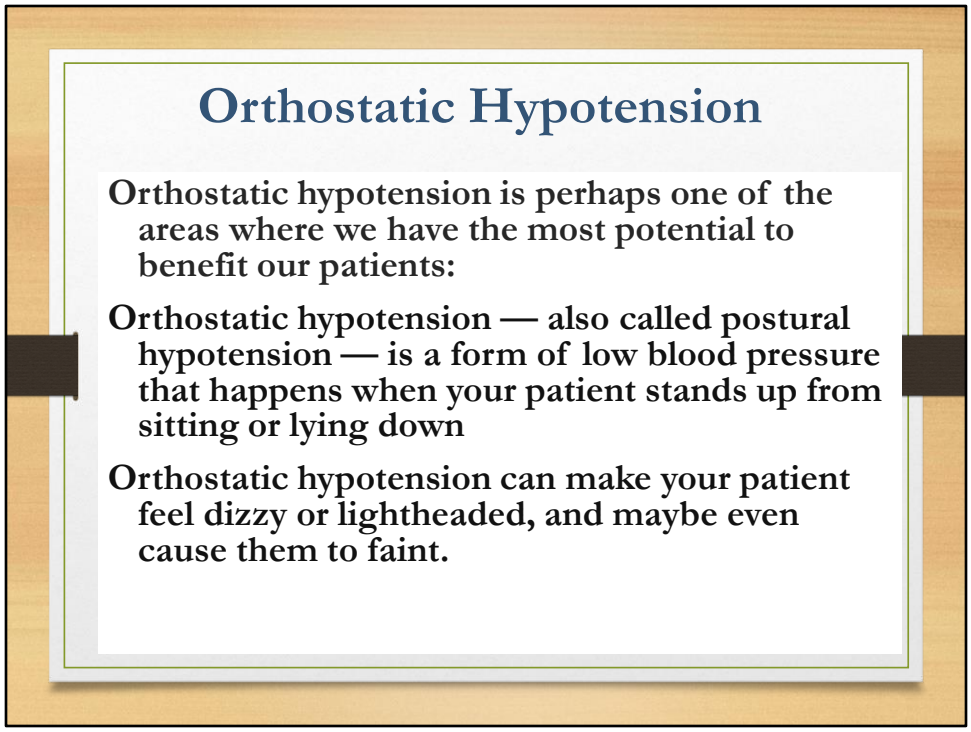
- **Slowly Deflate BP Cuff**
- **Note Reading when you first feel the pulse return (only the Systolic is obtained by this method).**



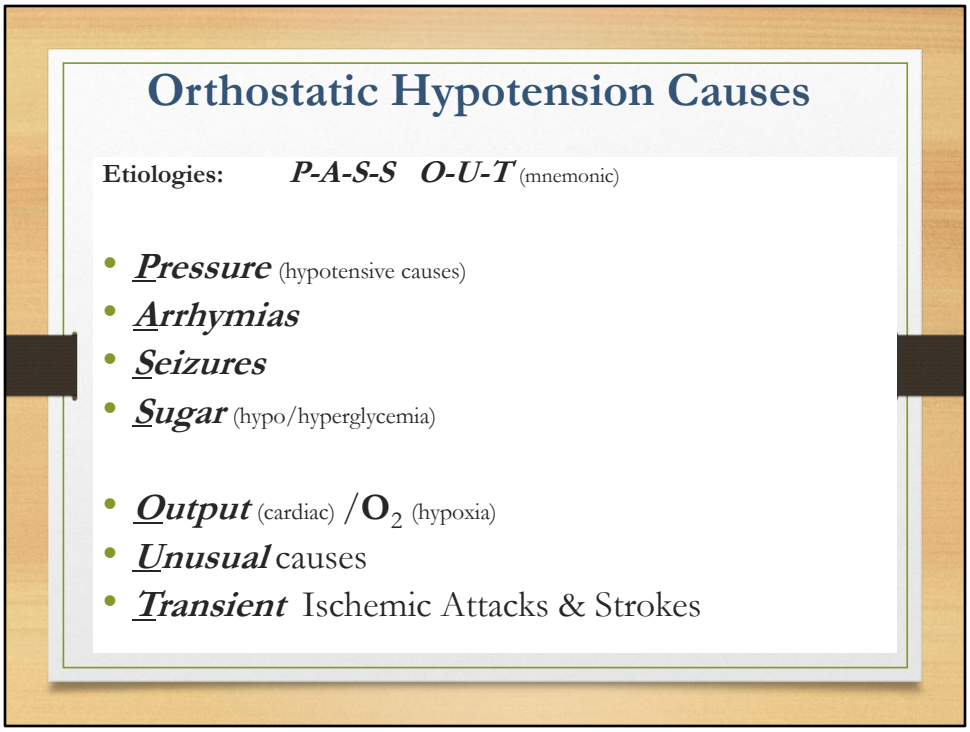
Measuring Blood Pressure

Palpation

- **Document Time, Patient Position if necessary, and Systolic Pressure**
- **Make sure to specify that pressure was obtained by Palpation: 120/P.**



Orthostatic hypotension is perhaps one of the areas where we have the most potential to benefit our patients. First, we must look for correctable causes. The mnemonic here gives you a differential for syncope, of which orthostatic hypotension is a major cause. You can review more on syncope in the Syncope module. The next slides will review the topic of orthostatic hypotension.



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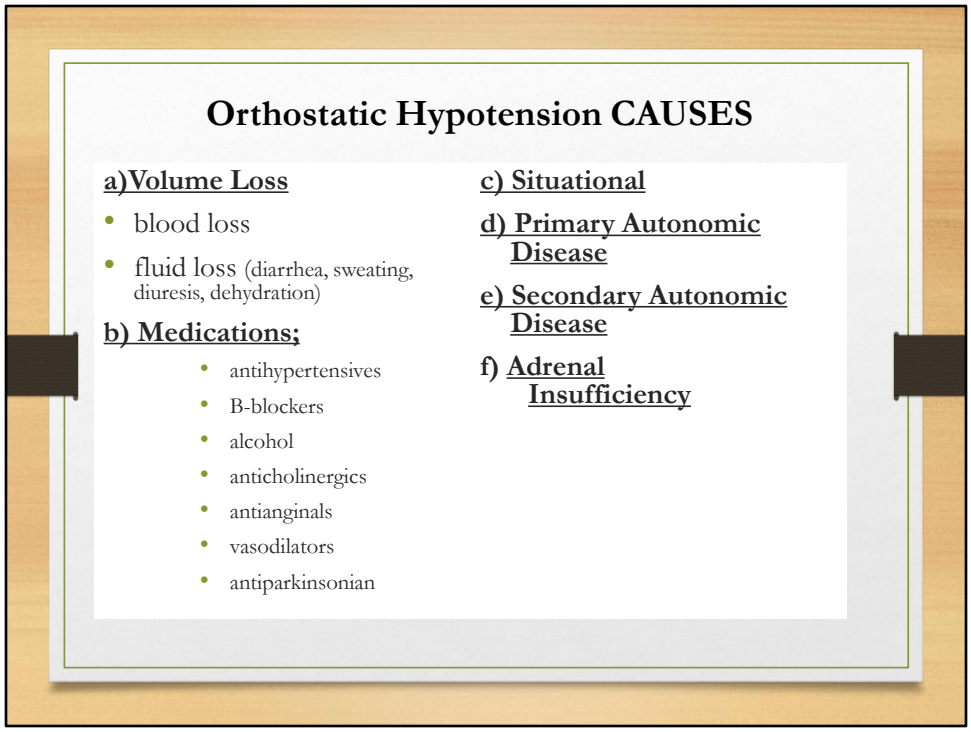
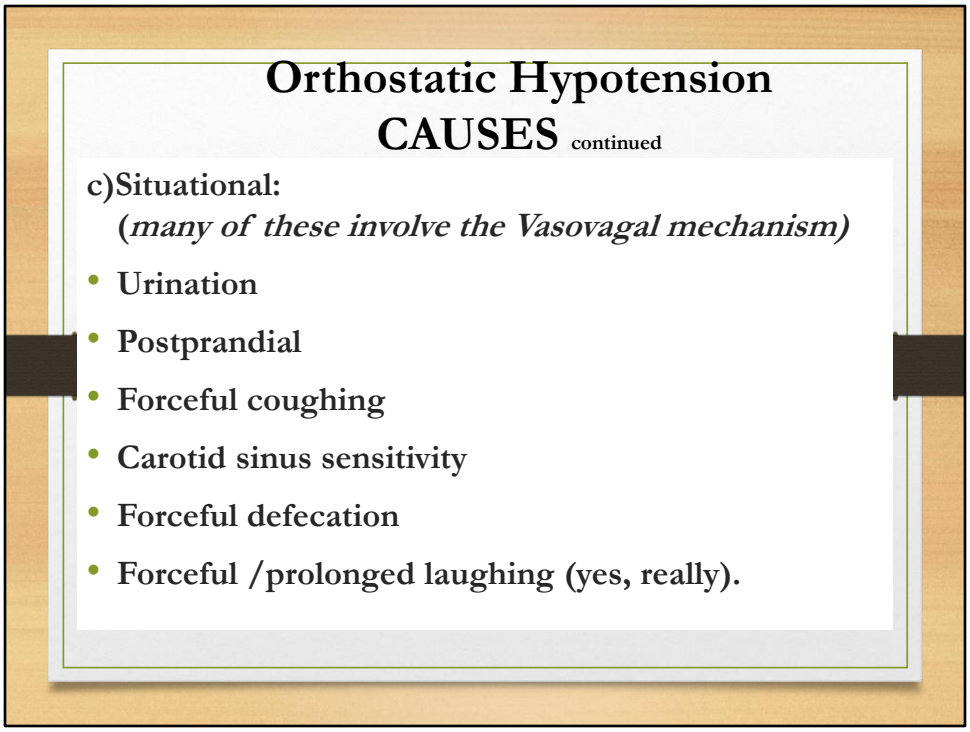


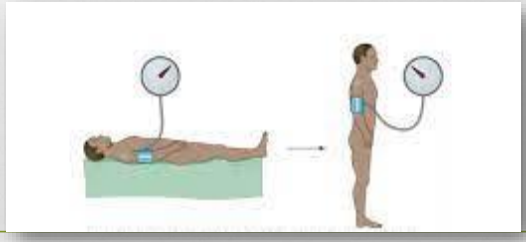
The list of orthostatic causes is quite long. However, the clinician can quickly sort through these. Certainly volume loss is often quite apparent. Medications, which we've covered before, are the same list of common offenders that would either affect blood pressure through direct vasodilatation or impaired cardiac output.



Situational causes, mostly mediated through vasovagal mechanisms will include micturition, postprandial, cough, carotid sinus sensitivity, defecation, and laughing. Note that up to 30-40% of elderly nursing home population will show orthostatic blood pressure changes after meals, but only 2% are symptomatic from it.

Measuring Orthostatic Blood Pressure

- **Have the patient lie down for 5 minutes;**
- **Measure blood pressure and pulse rate**
- **Have the patient stand;**
- **Repeat blood pressure and pulse rate measurements after standing for 1 minute and repeat at 3 minutes.**



Measuring Orthostatic Blood Pressure

- **A drop in systolic BP of ≥20 mm Hg, or in diastolic BP of ≥10 mm Hg, or experiencing lightheadedness or dizziness is considered abnormal.**

Thank You!

Please take the related exam for CEU credit.