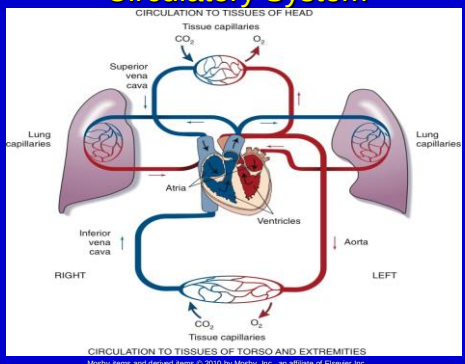
Chapter 11

Bleeding, Soft Tissue Wounds, and Shock Management

Circulatory System

- Responsible for transporting O_2 and other nutrients to all tissues of the body while also removing CO_2 and other waste products
- Basic components
  - Heart (Pump)
  - Blood vessels (Pipe)
  - Blood (Fluid)

Circulatory System



Circulatory System

- Blood vessels
  - Arteries
    - Vessels that carry blood away from heart
    - Transport blood that contains high levels of O_2
    - Composed of smooth muscles and are constantly changing in size to become either wider or narrower in response to body's blood pressure needs
    - Pressure usually higher than pressure in venous system

Circulatory System

- Blood vessels
  - Veins
    - Vessels that carry blood back toward heart
    - Usually carry blood with low levels of O_2 and wastes from cells
    - Not as muscular as arteries
    - Fluid is typically under lower pressure
    - Largest veins in body direct blood low in oxygen and high in waste back into heart
      - Superior vena cavae
      - Inferior vena cavae

Circulatory System

- Blood vessels
  - Capillaries
    - Smallest type of blood vessels
    - Connect arteries to veins
    - Site of gas exchange in lungs and other body tissues
    - O_2 and nutrients are exchanged for CO_2 and other wastes in blood

Circulatory System

- Blood
  - Fluid transported by blood vessels
  - Consists of several elements:
    - Red blood cells (RBC)
    - White blood cells (WBC)
    - Platelets
    - Plasma

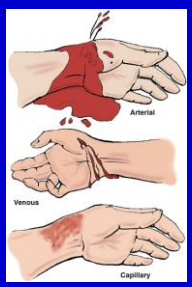
Types of Bleeding

- Bleeding
  - Loss of blood; also called hemorrhage
  - Body protects against blood loss in two main ways
    - Producing blood clots
    - Constricting blood vessels
  - Uncontrolled bleeding leads to shock and death
  - Goal
    - Stop or limit amount of blood loss
  - Blood loss can occur
    - Outside body
    - Inside body

Types of Bleeding

- External bleeding
  - Occurs outside body and can be seen
  - Easier to detect, identify source, and control
  - Arterial bleeding
    - Most severe type of hemorrhage
    - Most likely to quickly lead to
    - Most difficult to control
    - Blood will spurt from open artery with each beat of heart

Types of Bleeding



Types of Bleeding

- Venous bleeding
  - Blood escaping from veins
  - Blood has already delivered O_2 to body tissues
    - Appears darker red
  - Generally blood does not spurt out
    - Under lower pressure
  - Blood flows steadily out of wound
  - Bleeding can be heavy
  - Easier to control than arterial bleeding

Types of Bleeding

- Capillaries
  - Microscopic blood vessels between arteries and veins
  - Vessels so small blood merely oozes out
  - Blood is darker red
- Capillary bleeding
  - Typically insignificant
  - Clots spontaneously
  - Requires little intervention

Types of Bleeding

- Assessment
  - Safety and PPE
  - Scene Size Up
  - General Impression
  - Initial Assessment (ABC's)
  - Control ABC's and perform physical exam
  - Ongoing assessment when indicated

Types of Bleeding

- Bleeding control
  - Direct pressure while elevating extremity
    - First step to control bleeding–apply direct pressure on wound
    - Applied by placing flat pads gloved fingers and applying fingertip pressure directly on point of bleeding

Types of Bleeding

- Bleeding control
  - Pressure points
    - Used to control bleeding if direct pressure, pressure dressings, and elevation do not work
    - Used only when a tourniquet is not readily available
    - Any place in extremity where artery can be compressed against bony surface–can be used as pressure point
    - Pressure point should be located at site between trunk of body and bleeding wound

Types of Bleeding

- Bleeding control
  - Tourniquets
    - Used to control life-threatening bleeding not controlled by other measures
    - If tourniquet must be used
      - Application is limited to control of bleeding from patient's arms and legs

Types of Bleeding

- Bleeding control
  - General rules for applying tourniquet include:
    - Use as wide a piece of material as possible
    - Apply material just above injury
    - Wrap material twice around site
    - Tie a knot in material
    - Place stick or other solid object on tip of knot
    - Try another knot over the placed object
    - Turn object to tighten material until bleeding is controlled – You may not be able to completely stop bleeding

Types of Bleeding

- Bleeding control
  - Note time tourniquet was applied
    - Write TK on patient's forehead along with time tourniquet was applied
    - Report presence of tourniquet to arriving EMS crew
    - Never release tourniquet once it has been placed
    - Once bleeding is controlled dress wound to prevent further contamination
    - Treat patient for shock

Skill 11-1 Control Bleeding

- Practice the steps to control external bleeding
  - Direct pressure
  - Elevation
  - Tourniquet
  - Bandage wound

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Types of Bleeding

- Internal bleeding
  - Blood loss that occurs inside the body
  - Harder to identify and control
  - Causes range from tears in blood vessels to injured organs to musculoskeletal trauma
  - Minimal to life threatening
  - Be able to suspect internal bleeding based on
    - Mechanism of injury
    - Associated signs and symptoms
  - Should be suspected with any mechanism of injury involving blunt/penetrating trauma

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Types of Bleeding

- Internal bleeding
  - Indicators of internal bleeding
    - Painful, swollen abdomen or extremity
    - Discolored
    - Tender
    - Swollen
    - Hard tissues

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Types of Bleeding

- Internal bleeding
  - Symptoms of shock
    - Increased pulse rate
    - Increase respiratory rate
    - Pale, cool, moist skin
    - Altered mental status
    - Nausea and vomiting
    - Bleeding from any body orifice
    - Blood-tinged vomit or feces
    - "Coffee ground" vomit
    - Dark, tarry stool
    - Abdominal distention
    - Abdominal rigidity or tenderness

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Shock

- Condition that results from decreased volume of circulating blood
  - Decreased supply of O_2 being delivered throughout body
    - If enough cells are deprived of an adequate amount of O_2, tissue becomes damaged
    - If enough tissue is damaged, whole organs cannot function properly and internal organs begin to fail
    - Organ failure can progress rapidly to failure of one or more of the body's systems
    - Eventually entire body shuts down in response to system failure–death quickly follows

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Shock

- Condition that develops over time
  - Time depends on extent and rate of circulatory failure
- Compensation
  - Attempt by body to stop shock from progressing

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Shock

- Signs and symptoms
  - Restlessness and anxiety
  - Altered mental status
  - Pale, cool skin
  - Increased respiratory rate
  - Increased pulse rate
  - Nausea and vomiting
  - Thirst

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Skill 11-2
Signs and Symptoms of Shock

- Review the progression of shock
  - Obtain vital signs
  - Level of consciousness
  - Skin condition
  - Nausea & Vomiting
  - Progression of their vital signs and level of consciousness

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Shock

- Treatment
  - Position the patient
    - Supine position
    - Elevate feet no more than 12 inches off ground
    - Keep them warm!

Maintain airway, breathing, and circulation
* Repeat assessment every 5 minutes
* Provide high-flow oxygen at 10 LPM or more
* Ensure external bleeding is controlled
* Treat additional injuries as needed
* Keep them calm

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Soft Tissue Wounds

- Interruption of skin or underlying tissue
- Priority
  - Control bleeding
  - Prevent further injury
  - Reduce chance of contamination or infection until physician can see patient

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Soft Tissue Wounds

- Closed wounds
  - No break in skin and no associated external bleeding
  - Contusion
    - Injury in which tissue under skin is damaged and blood vessels are torn
    - Generally an area of discoloration
    - Often associated with swelling and pain

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Soft Tissue Wounds

- Closed wounds
  - General management
    - May be nothing at all
    - Wound larger–can be treated with application of ice and elevation of body

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Soft Tissue Wounds

- Open wounds
  - Skin has been broken–associated bleeding
  - Abrasion
    - Most common
    - Generally a superficial soft tissue injury
    - Abrasion occurs when outermost layer of skin is damaged by something scraping against it
    - Usually painful

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Soft Tissue Wounds

- Open wounds
  - Laceration
    - Break in skin of varying depth and length
    - Can occur by itself or together with other lacerations or types of soft tissue injuries
    - Severity can range from paper cut to life-threatening wounds
    - Usually results from forceful impact with sharp object
    - Bleeding can be severe and may be either internal or external

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Soft Tissue Wounds

- Open wounds
  - Penetration or puncture
    - Generally caused by sharp, pointed object
    - May be little or no external bleeding
    - Internal bleeding may be severe
    - May not be detected until patient is exhibiting signs and symptoms of shock
    - Entrance and exit wounds need to have bleeding control

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Soft Tissue Wounds

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Soft Tissue Wounds

- Open wounds
  - Avulsion
    - Type of wound that occurs when piece of skin or soft tissue is partially torn loose or pulled completely off
    - Can be found anywhere on body
    - May be associated with other types of soft tissue wounds

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Soft Tissue Wounds

- Open wounds
  - Amputation
    - Separation of body part from rest of body
    - May involve large amount of bleeding

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Soft Tissue Wounds

- Open wounds
  - Management
    - Always protect yourself from exposure to body substances
      - Gloves
      - Eye protection
      - Face mask
      - Gown

Soft Tissue Wounds

- Open wounds
  - Management
    - Steps for treating open soft tissue wounds
      - Expose wound and control bleeding
      - If bleeding is mild or stops, prevent wound from further contamination and cover with sterile dressing and bandage it securely in place

Soft Tissue Wounds

- Open wounds
  - Management (dressing and bandaging)
    - Dressing
      - Protective/supporting covering that is placed on injured body part
    - Bandage
      - Holds dressing in place
    - Functions of dressings and bandages
      - Help stop bleeding
      - Prevent further damage to wound
      - Reduce contamination
      - Decrease risk of infection

Soft Tissue Wounds

- Open wounds
  - Dressings are available in many forms
    - 4 × 4-inch gauze pads
    - Abdominal pads
    - Adhesive dressing
    - Occlusive dressings

Soft Tissue Wounds

- Open wounds
  - Bandages also available in many forms
    - Self-adherent bandages
    - Gauze rolls
    - Triangular bandages
    - Adhesive tape

Soft Tissue Wounds

- Open wounds
  - Management (dressing and bandaging)
    - General principles of dressing and bandaging:
      - Expose injured area
      - Place sterile dressing over entire injury
      - Maintain direct pressure to control any bleeding
      - Use bandage to secure dressing with some pressure
      - Do not remove bottom dressing in contact with wound

Skill 11-3
Dressings and Bandages




Skill 11-3
Dressings and Bandages

- An eye injury
  - Note that both eyes are covered for an eye injury to prevent further damage



Soft Tissue Wounds

- Special considerations
  - Chest injuries
    - Injury to front, back, or side of chest between neck and upper abdomen
    - Require special treatment
    - Sucking chest wound
      - Hear air escaping from wound
      - See bubbles in blood outside wound

Soft Tissue Wounds

- Special considerations
  - Occlusive dressing
    - Apply over chest wound
    - Dressing should not be sealed
    - Place patient on injured side or in semisitting position
    - Assess and treat patient for signs of shock

Soft Tissue Wounds

- Special considerations
  - Eviscerations
    - Deep laceration through abdominal muscle wall that allows internal organs to protrude from abdomen
    - Organs may protrude from an opening in abdominal wall a small or large amount
    - Evisceration and skin around it typically do not bleed
    - Do not attempt to replace protruding organs inside abdomen

Abdominal Evisceration


Soft Tissue Wounds

- Special considerations
  - Impaled objects
    - May be both an entry and exit wound, or just entry wound
    - Leave object in wound and complete assessment
    - Expose wound area as much as possible without disturbing object
    - Control bleeding
    - Manually secure object
    - Assess and treat for signs of shock

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Soft Tissue Wounds

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Soft Tissue Wounds

- Special considerations
  - Amputations
    - Body may be able to control bleeding by clotting and contracting blood vessels
    - If amputation part is bleeding control bleeding using
      - Direct pressure and Elevation
      - Pressure dressing
      - Tourniquet
    - Once bleeding is controlled
      - Apply dressings and bandages to help prevent further contamination

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Soft Tissue Wounds

- Special considerations
  - Amputations
    - If amputated part can be located without compromising patient care
      - It should be preserved and sent with patient to hospital
      - Part should be rinsed, but not saturated with water
      - Part should be placed in sealed plastic bag by itself
      - Second bag/container should be filled with water and a few cubes of ice
      - Bag with amputated part should be placed into second bag/container holding water and ice
      - Never allow amputated body part to be submersed in water or placed directly on ice

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Soft Tissue Wounds

- Special considerations
  - Nosebleeds
    - Typically result of trauma
    - Most can be controlled with simple techniques
    - If patient is conscious and there is no indication of spinal injury
      - Have patient sit upright and lean slightly forward
      - Pinch nostrils together with gloved hand
      - Do not allow patient to sniffle or blow nose

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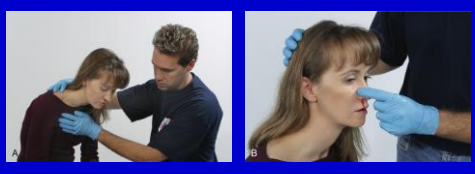
Soft Tissue Wounds



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Soft Tissue Wounds

- Special considerations
  - Ear wounds
    - If there is soft tissue wound to external ear
      - Apply dressings over ear and not in ear
      - Bandage dressings in place
      - Bleeding from ear should be considered a sign of head injury
      - Any fluid draining from ear may be cerebrospinal fluid

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Soft Tissue Wounds

- Special considerations
  - Eye wounds
    - Cover both eyes even if only one is injured
    - Foreign body in eye
      - Dirt
      - Dust
      - Chemicals
      - Metal
      - Wood shaving

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Soft Tissue Wounds

- Special considerations
  - Eye wounds
    - Patient may complain of :
      - Pain
      - Increased tearing
      - Blurred vision
      - Loss of vision

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Soft Tissue Wounds

- Special considerations
  - Eye wounds
    - Before treatment
      - Ensure environment is safe
      - Ensure you are utilizing appropriate PPE
    - If no indication of spinal injury
      - Place patient in supine position with head slightly lower
      - Turn patient's head toward affected side
      - Using gloved hand–hold affected eye open with your fingers placed above and below eyelids
      - Flush eye for 15 minutes with sterile water
      - If object cannot be flushed out–bandage both eyes

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Soft Tissue Wounds

- Burns
  - Classified according to depth of burn in skin and other tissue
    - Superficial burn
      - Involves only outer layer of skin
    - Partial-thickness burn
      - Involves outer and middle layers of skin
      - Cause deep, intense pain–nerve endings involved
      - Skin is reddened and usually has blisters
      - Patient will feel considerable pain

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Soft Tissue Wounds

- Burns
  - Full-thickness burns
    - Involve areas of charred or blackened skin, areas of redness, and blisters
    - Pain free–nerve endings in layers of skin have been destroyed
    - Generally associated with partial-thickness or superficial burns

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Which is superficial, partial and full-thickness?

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Soft Tissue Wounds

- Burns
  - Extent of burn
    - Rule of nines–assessment tool that allows quick calculation of extent of burn
      - Body divided into segments that account for approximately 9% of total body surface area
      - Combining regions that are burned–estimate of extent of burn can be reached

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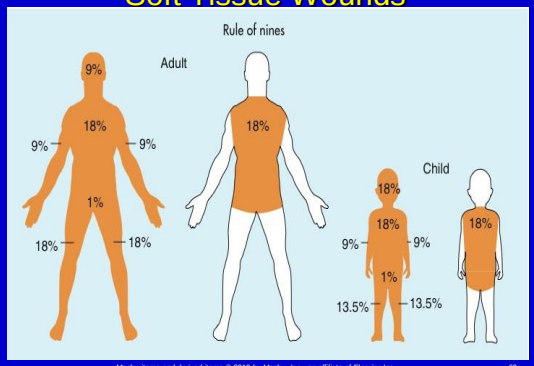
Soft Tissue Wounds



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Soft Tissue Wounds

- Burns
  - Critical burns
    - Burns are determined to be critical or noncritical depending on
      - Type
      - Extent
      - Location
      - Depth

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Soft Tissue Wounds

- Burns
  - Critical burns
    - Require immediate transport to burn center and include
      - Any burns involving the respiratory system
      - Partial-thickness burns over greater than 10% of body
      - Full-thickness burns
      - Burns that involve face, hand, feet, genitalia, major joints
      - Electrical burns
      - Chemical burns

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Thermal Burns

- Burns
  - Thermal burns
    - Initial treatment
      - Stop the burning process
      - Continually monitor airway to ensure it remains open
      - Hoarseness, shortness of breath, or any trouble breathing may indicate life-threatening injury
      - Prevent further contamination

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Thermal Burns

- Burns
  - Thermal burns
    - If a hand or foot is burned:
      - Separate fingers or toes with dressings
      - Ensure patient receives prompt transportation to hospital

Chemical Burns

- Chemical burns
  - Consider all possible dangers when you arrive on the scene
  - Ensure safety of the scene before entering
  - Wear gloves and eye protection or other special clothing based on chemical involved

Chemical Burns

- Chemical burns
  - Immediately brush any dry powder from patient
    - Flush area with large amounts of water for at least 10 minutes
    - Cover burned area with dry, sterile dressing
  - Splash injuries often involve eyes
    - Flush patient's eye with copious amounts of water for at least 20 minutes
    - Direct flow of water to outer corner of eye
    - Cover both eyes with dressing and bandage

Electrical Burns

- Electrical burns
  - Ensure scene safety before approaching patient
  - Turn off electrical source
  - Never run to patient
  - Patient's internal injuries are often much worse than external injuries
  - Anticipate irregular heartbeat
  - Monitor patient closely for respiratory or cardiac arrest
  - Keep AED close to patient
  - Check for exit wound and entry wound

Special Populations

- Burn
  - Infants and children
    - Must be treated as pediatric patients
    - Pediatric patients have greater surface area compared to their total body volume
    - Keep environment warm–when possible
    - Consider possibility of child abuse
    - Evidence of possible abuse
      - Give to responding EMS crew and privately share your suspicions
      - Do not be confrontational with any patient, family member, or bystander on the scene

Questions?

