



Trauma Alert Step 2 Additions

- MANGLED, DEGLOVED OR PULSELESS EXTREMITY
- PELVIC INJURY WITH HIGH-RISK MECHANISM OF INJURY

Many thanks to Paramedic FTO Justin Bramlette for assembling this training presentation

Step 2 Trauma Alert criteria – NEW

Additions

Anatomic Criteria

- ▶ All penetrating injuries to head, neck, torso and extremities proximal to the elbow or knee
- ▶ Chest wall instability or deformity (i.e. flail chest)
- ▶ Two long bone fractures-proximal to elbow or knee
- ▶ Mangled, degloved or pulseless extremity
- ▶ Open or depressed skull fracture
- ▶ Paralysis
- ▶ Pelvic injury with high-risk mechanism of injury

These additions are being made consistent with CDC recommendations for Step 2 Trauma Triage Criteria



Mangled, Degloved or Pulseless
Extremity

Mangled, Degloved or Pulseless Extremity

- **Mangled Extremity = high-energy transfer or crush injury resulting in possible injuries to any combination of the 4 systems:**
 - Vascular
 - Nervous
 - Soft tissues
 - Bone and tendons
- **May include lacerations, crush injuries, mangled extremities, amputations or open fractures**



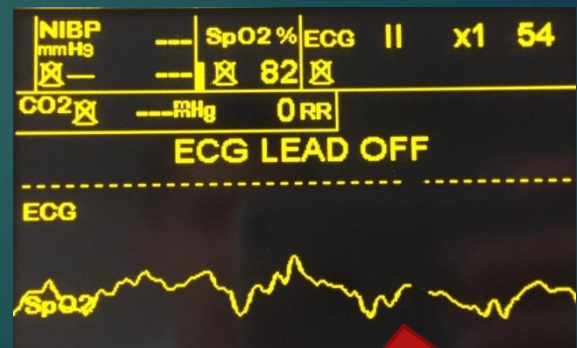
Mangled, Degloved or Pulseless Extremity

▶ Management

- ▶ Peripheral nervous assessment
 - ▶ Alterations in motor or sensory
- ▶ Skin color assessment
- ▶ Palpated pulse presence?
 - ▶ Mark pulses with pen if noted to be present
- ▶ Utilize SpO₂ if possible to determine presence of pulse
 - ▶ Place SpO₂ on each digit
 - ▶ Look for presence of reading and pleth waveform



Low amplitude = possibly poor perfusion



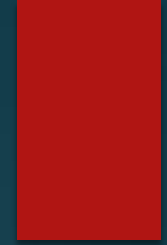
Unreliable pleth = poor perfusion

Mangled, Degloved OR Pulseless Extremity

- ▶ Correct tourniquet use creates a “pulseless extremity”
 - ▶ Tighten a tourniquet until uncontrolled bleeding stops
 - ▶ If the application of a tourniquet to control bleeding results in an extremity becoming pulseless, this now meets Step 2 Trauma Activation due to traumatic “pulseless extremity.”

Procedure #706

Tourniquets/ Hemostatic Dressings



Proceed directly to tourniquet if direct pressure fails to control bleeding

- 1-2 inches proximal to injury
- Don't apply over joint or fracture
- Enough pressure to stop bleeding/distal pulses
- Hemostatic dressing
 - If tourniquet unsuccessful, or can't be used
 - Location not amenable to tourniquet use
 - *High thigh/groin*
 - *Shoulder/axillae/clavicular area*
 - *Neck*
 - Use per manufacture directions
- Tourniquet Removal - ALS Skill, base consult

HEMORRHAGE CONTROL/TOURNIQUET/HEMOSTATIC DRESSINGS	
ADULT	PEDIATRIC (≤34 KG)
BLS	
<ul style="list-style-type: none">• Universal Protocol #601• Hemorrhage control<ul style="list-style-type: none">○ Direct Pressure○ Tourniquet application – see notes below○ Hemostatic dressing – for uncontrolled hemorrhage after all above measures fail	
BLS Optional	
Pulse Oximetry – O2 administration per Airway Management Protocol #602	
ALS Standing Orders	
Hypotension – See General Trauma Protocol # 660	
Base Hospital Orders Only	
<ul style="list-style-type: none">• Tourniquet removal – see notes below• As needed	
Notes	
<ul style="list-style-type: none">• Indications for tourniquet application<ul style="list-style-type: none">○ Life threatening, persistent hemorrhage that cannot be controlled by other means• Contraindications for tourniquet use<ul style="list-style-type: none">○ Non-extremity hemorrhage○ Proximal extremity (junctional) locations where tourniquet application is not practical• TOURNIQUET APPLICATION - BLS<ul style="list-style-type: none">○ Visually inspect injured extremity and avoid placement of tourniquet over joint, angulation or open fracture, stab/penetrating or gunshot wound sites○ Assess and document circulation, motor and sensation distal to injury site○ Apply approved tourniquet proximal to wound (usually 2-4 inches) per manufacturer recommendations○ Tighten tourniquet rapidly to least amount of pressure required to stop bleeding and/or distal pulses are affected○ Cover wound with appropriate clean/sterile dressing/bandage○ DO NOT cover tourniquet – keep visible○ Re-assess and document absence of bleeding distal to tourniquet○ Remove any improvised tourniquets that may have been applied after approved tourniquet is applied○ Document time of placement ON the tourniquet device○ Inform receiving facility and personnel of tourniquet placement and time of placement• TOURNIQUET REMOVAL – ALS with Base Hospital consult only	

Mangled, Degloved, or Pulseless Extremity

Uncontrolled bleeding

- ▶ Tourniquet application (may include B/P cuff)
 - ▶ Placement documentation
 - ▶ Time documentation
 - ▶ Utilization until bleeding stops
 - ▶ Utilize serial tourniquets if needed



Serial Tourniquets – note, these were applied as examples, they are not TIGHT enough!

Mangled, Degloved, or Pulseless Extremity


Pain Management

- ▶ Morphine use as needed for pain of injury
- ▶ Morphine use as needed for pain of tourniquet placement
 - ▶ Tourniquet induced vascular injury and ischemia will likely be painful
 - ▶ Consider base orders as needed for pain management



Mangled, Degloved, or Pulseless Extremity

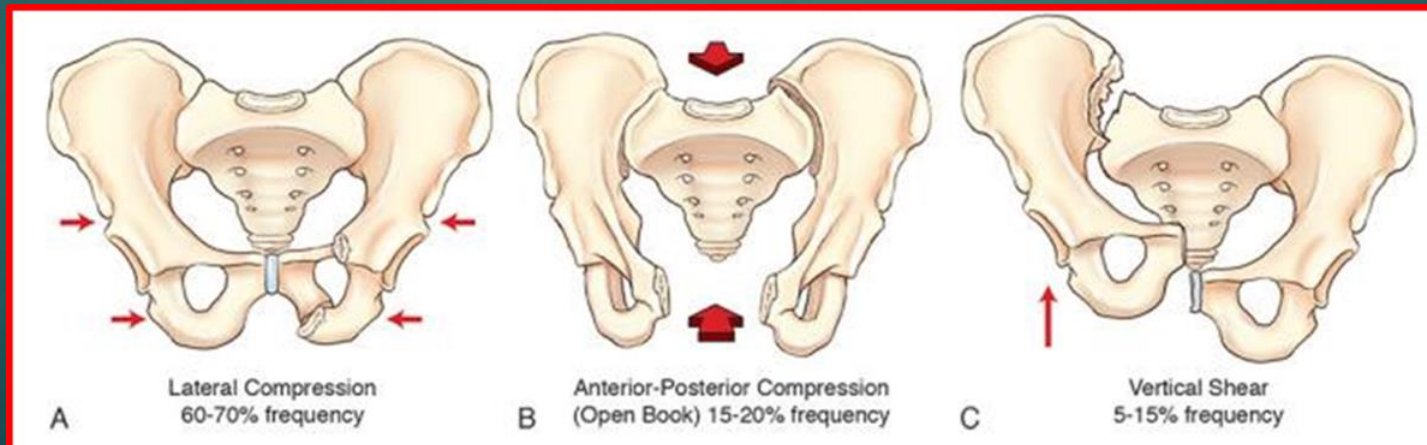
- ▶ Significant vascular injury (including that potential caused by tourniquet placement) can require surgical or Interventional Radiology, available at Trauma Center
 - ▶ When making base contact ensure clear communications are given, including mechanism of injury and method of hemorrhage control
 - ▶ Be cognizant of anticoagulant use:
 - ▶ warfarin (Coumadin)
 - ▶ enoxaparin (Lovenox)
 - ▶ rivaroxaban (Xarelto)
 - ▶ apixaban (Eliquis)
 - ▶ edoxaban (Savaysa)



Pelvic Injury With High-Risk Mechanism of Injury

Pelvic Injury With High-Risk Mechanism of Injury

- ▶ Pelvic injury assessment for a Step 2 Trauma Activation is based on the same principles as assessment for pelvic binder use
 - ▶ Identify likely PELVIC RING vs. HIP fractures
 - ▶ Pelvic/low back/groin area pain
 - ▶ Frequently associated with significant ecchymosis of perineal area, sacrum and flanks
 - ▶ “High-risk mechanism of injury” same criteria as for Pelvic Binder placement



Pelvic Injury With High-Risk Mechanism of Injury

- ▶ **MOI (High-Risk) These DO meet Step 2 criteria**
 - ▶ Fall from height
 - ▶ MVA with PSI into patient's space
 - ▶ Unenclosed vehicle accidents
 - ▶ Pedestrian vs. vehicle- (typically acetabular fx or pelvic ring fx)
- ▶ These are often associated with proximal femur fractures and will still likely have shortening, rotation. This DOES NOT preclude binder placement or Step 2 Triage
- ▶ Keep in mind elderly may suffer pelvic ring fractures with lower than anticipated MOI



Pelvic Injury With High-Risk Mechanism of Injury

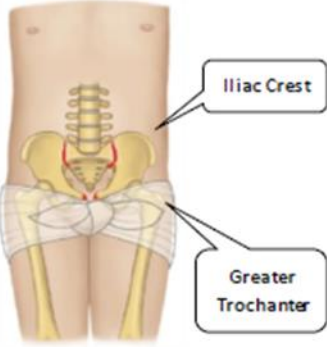
- ▶ MOI (Low-Risk) **These DO NOT meet Step 2 criteria**
 - ▶ Ground level falls or low force MOI
 - ▶ Falls onto sacral/gluteus typically result in fracture of the spine or pubic rami
 - ▶ Falls laterally typically result in hip fracture
 - ▶ These do not meet Step 2 criteria- Treat with comfort immobilization and SMR assessment

Pelvic Injury With High-Risk Mechanism of Injury

Suspected Pelvic Injury associated with High-Risk MOI

- ▶ Can be associated with hypotension and hypovolemic shock
 - ▶ If associated with hypotension, use hypotension protocol and pelvic binder if indicated
 - ▶ Include SMR assessment
 - ▶ Step 1 Trauma Activation if Hypotensive (systolic BP <90 mmHg at any time)

Procedure #713 Pelvic Binder

PELVIC BINDER APPLICATION	
ADULT	PEDIATRIC (≤34 KG)
BLS Procedures	
<ul style="list-style-type: none"> • Universal Protocol #601 • Indications – High risk mechanism with: <ul style="list-style-type: none"> ◦ Pelvic, low back or groin pain and SBP < 90 mmHg or pediatric age specific hypotension • Application <ul style="list-style-type: none"> ◦ Remove clothing ◦ Identify greater trochanters ◦ Place sheet or binder under the patient with center at the level of the greater trochanter ◦ Tighten per manufacturer instruction. With sheet binder, tighten by twisting and secure to maintain tension 	
BLS Optional Scope	
Pulse Oximetry – O2 administration per Airway Management Policy # 602	
ALS Procedures	
None indicated	
Base Hospital Orders Only	
Binder Removal	
As needed	
Notes	
Assess for distal pulse before and after application	
Contraindications: <ul style="list-style-type: none"> • Isolated neck of femur fracture • Suspected traumatic hip dislocation Pelvic fractures are associated with high risk mechanisms of injury, including: <ul style="list-style-type: none"> • Motor vehicle collisions – especially if the patient was in the front seat with a head-on or there was a lateral impact on the patient side • Auto vs pedestrian accidents • Motorcycle collisions • Fall from heights Patients ≥ 65 have a greater likelihood of pelvic fractures even with low energy mechanism	
Possible signs and symptoms of a pelvic fracture: <ul style="list-style-type: none"> • Any pain at pelvis or lower back/groin/hips <ul style="list-style-type: none"> ◦ DO NOT rock or “spring” the pelvis ◦ Use scoop or multi-person lift when moving • Hypotension/shock associated with pelvic injury • Deformity, bruising or swelling over bony prominences, pubis, peritoneum or scrotum • Leg length discrepancies/rotations • Wounds over the pelvis, bleeding from the rectum, vagina or urethra 	
 <p>The diagram shows a posterior view of the human pelvis. Two callout boxes are present: one labeled 'Iliac Crest' pointing to the upper curved part of the hip bone, and another labeled 'Greater Trochanter' pointing to the bony prominence on the side of the femur (thigh bone).</p>	

If patient meets Step 2 criteria for activation based off suspected Pelvic injury, that is:

- ▶ Pelvic/low back/groin area pain
- ▶ HIGH-RISK mechanism

AND patient is hypotensive

- ▶ Pelvic binder should be considered

- ▶ Tamponades bleeding blood vessels
- ▶ Decreases volume to bleed into
- ▶ Stabilizes fracture
- ▶ Apply centered over greater trochanters
- ▶ Tighten per manufacture instructions, or not past rotating knees to midline
- ▶ Base Station consult prior to removing