PERFORMANCE OBJECTIVES
Demonstrate proficiency in controlling external venous and/or arterial bleeding.

CONDITION
Assess and control external venous and/or arterial bleeding by appropriate methods. Necessary equipment will be adjacent to the manikin or brought to the field setting.

EQUIPMENT
Manikin or live model, bag-valve-mask device, O₂ connecting tubing, oxygen source with flow regulator, stethoscope, blood pressure cuff, pen light, timing device, 4”x4” dressings, roller gauze, 6” absorbent gauze roll, elastic wraps, commercial tourniquet, 2” non-elastic band and dowel, triangular bandage, tape, clipboard, pen, goggles, masks, gown, gloves.

PERFORMANCE CRITERIA
- Items designated by a diamond (♦) must be performed successfully to demonstrate skill competency.
- Items identified by double asterisks (**) indicate actions that are required if indicated.
- Items identified by (§) should be practiced.

### PREPARATION

<table>
<thead>
<tr>
<th>Skill Component</th>
<th>Key Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ Take body substance isolation precautions</td>
<td>• Mandatory personal protective equipment – gloves at all times</td>
</tr>
<tr>
<td>♦ Assess scene safety/scene size-up</td>
<td>• Situational - long sleeves, goggles, masks, gown as needed</td>
</tr>
<tr>
<td>** Consider spinal injury precautions - if indicated</td>
<td>• Spinal immobilization should be initiated when spinal trauma is suspected by taking bystander information and mechanism of injury into consideration.</td>
</tr>
<tr>
<td>♦ Remove enough clothing to expose entire wound</td>
<td>• Arterial bleed – bright red and gushing or spurting – difficult to control with pressure, may need tourniquet</td>
</tr>
<tr>
<td>♦ Assess type of bleeding:</td>
<td>• Venous bleed – dark red and flows steadily – controlled with direct pressure</td>
</tr>
<tr>
<td>• Arterial</td>
<td>• Capillary blood – dark or intermediate red and slowly oozing – controlled easily with dressings</td>
</tr>
<tr>
<td>• Venous</td>
<td>♦ Evaluate additional BSI needs</td>
</tr>
<tr>
<td>• Capillary</td>
<td>• Situational - long sleeves, goggles, masks, gown</td>
</tr>
</tbody>
</table>

### PROCEDURE

<table>
<thead>
<tr>
<th>Skill Component</th>
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<tbody>
<tr>
<td>♦ Manage bleeding by applying direct pressure to wound</td>
<td>• Direct pressure may involve just the finger tips or may require hand pressure.</td>
</tr>
<tr>
<td>♦ Manage uncontrollable bleeding by:</td>
<td>• Tourniquets (TQ) may be applied as soon as it is determined that the arterial or venous bleeding cannot be controlled with direct pressure.</td>
</tr>
<tr>
<td>• Apply a tourniquet 2-3 inches or width of hand above the injury using:</td>
<td>• Blood loss reduces perfusion and oxygen to tissue therefore, supplemental oxygen is essential. However, never delay bleeding control while setting up oxygen.</td>
</tr>
<tr>
<td>- commercial device</td>
<td>• A tourniquet should be used when it is determined that direct pressure will not control bleeding.</td>
</tr>
<tr>
<td>OR</td>
<td>• Tourniquets can either be a commercial product, 1½-2 inches, wide folded triangular bandage, or a non-elastic band and a dowel (rod)</td>
</tr>
<tr>
<td>- inflated blood pressure cuff</td>
<td>• DO NOT apply tourniquet over a joint, but as close to the injury as possible.</td>
</tr>
<tr>
<td>OR</td>
<td>• The application of a tourniquet causes intense pain in the awake patient. If ALS is on scene, pain management should be considered.</td>
</tr>
<tr>
<td>- 1½-2” wide folded triangular bandage or non-elastic band and dowel</td>
<td>• Apply a tourniquet when injury consists of amputations or mangled extremities since the initial vasospasm response may decrease over time and bleeding may start.</td>
</tr>
</tbody>
</table>
### Skill Component

- Tighten the tourniquet until:
  - Bleeding ceases
  - Distal pulse disappears

### Key Concepts

- A tourniquet should be secured tightly but should not cut into the skin and underlying tissue.
- Tissues remain saturated with oxygen for up to four (4) hours in the absence of a distal pulse. Therefore, the priority of care is to control bleeding.
- If a blood pressure cuff is used, check pressure frequently and re-inflate to maintain consistent pressure. Blood pressure cuffs often leak air and thus may be ineffective.
- Air splints and constricting bands do not provide enough pressure to control an arterial bleed.
- Once a tourniquet is applied, it should NOT be loosened or removed without physician approval since this may disrupt the bleeding control obtained and release toxins into the blood stream.

**Note:** Caution must be taken to prevent potential damage to nerves, muscles, blood vessels, and soft tissue which may result in the loss of the extremity.

- Manage continued bleeding control by using any of these additional methods depending on injury:
  - Elevate extremity in conjunction with direct pressure - if indicated
  - Apply additional dressing – if indicated
  - Apply pressure dressing - if indicated
  - Splint extremity - if indicated
  - Apply a second tourniquet - if indicated

### Shock Management

#### Skill Component

- Institute shock management measures:
  - Administer high flow oxygen (12-15 Liters/minute)
  - Position patient - as indicated
  - Initiate steps to prevent heat loss
  - Initiate immediate transportation if ALS is delayed

### Key Concepts

- Elevation of an extremity may be used in conjunction with direct pressure.
- Continue to reinforce dressing if bleeding does not stop. DO NOT remove original dressing since this may increase bleeding if clot formation has started.
- Splinting fractures will reduce tissue damage and bleeding associated with a fracture.
- If bleeding is not controlled with the 1st tourniquet, apply a 2nd tourniquet proximal to the injury. DO NOT remove the 1st tourniquet.

#### Shock management:

- Place patient in a supine position or as indicated for pregnancy > 20 weeks, difficulty breathing, vomiting, etc.
- Remove wet clothing
- Cover with blanket to maintain body temperature; hypothermia interferes with the clotting process.
- Initiate immediate transport if ALS ETA is greater than 10 minutes
- DO NOT administer oral fluids
- Shock position is generally not effective and is no longer recommended in Los Angeles County. However, if utilized, it is accomplished by elevating the legs 6“-12” on a firm surface.
- Trendelenburg position is accomplished by raising the foot of the backboard 6“-12”, but it is also discouraged in Los Angeles County. Not proven to be effective in hypotensive patients.
  - May cause increased intracranial pressure due to blood expanding the brain.
  - May cause or increase breathing difficulty due to pushing abdominal organs against the diaphragm.
### REASSESSMENT
(Ongoing Assessment)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>♦ Reassess the patient every 5 minutes or earlier</td>
<td>♦ This is a priority patient who must be re-evaluated at least every 5 minutes.</td>
</tr>
<tr>
<td>• Primary assessment</td>
<td></td>
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<tr>
<td>• Relevant portion of the secondary assessment</td>
<td></td>
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<tr>
<td>• Vital signs</td>
<td></td>
</tr>
<tr>
<td>• Tourniquet - if applied</td>
<td></td>
</tr>
<tr>
<td>♦ Evaluate response to treatment</td>
<td>♦ Evaluate changes after any treatment initiated, medication administered, or condition changes.</td>
</tr>
<tr>
<td>♦ Evaluate reassessment results and note any changes in patient's condition and vital signs</td>
<td>♦ Comparing results assists in recognizing if the patient is improving, responding to treatment or condition is deteriorating.</td>
</tr>
<tr>
<td>&quot;Manage patient condition as indicated.&quot;</td>
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</table>

### PATIENT REPORT AND DOCUMENTATION

<table>
<thead>
<tr>
<th>Skill Component</th>
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</tr>
</thead>
<tbody>
<tr>
<td>§ Verbalize/Document:</td>
<td></td>
</tr>
<tr>
<td>• Mechanism of injury</td>
<td>• The approved abbreviation for tourniquets is TQ.</td>
</tr>
<tr>
<td>• Description of injury</td>
<td>• Documentation must be on either the Los Angeles County EMS Report form or Provider Patient Care Record.</td>
</tr>
<tr>
<td>• Treatment provided</td>
<td>• Documenting reassessment information provides a comprehensive picture of patient’s response to treatment.</td>
</tr>
<tr>
<td>• Pulse/Circulation before and after treatment</td>
<td>• Documenting the time of application of the tourniquet allows the physician to determine optimal treatment.</td>
</tr>
<tr>
<td>• Motor movement before and after treatment</td>
<td>• Last reassessment information (before patient care is transferred) should be documented in the section of the EMS form that is called &quot;Reassessment after Therapies and/or Condition on Transfer&quot;.</td>
</tr>
<tr>
<td>• Sensation before and after treatment</td>
<td></td>
</tr>
<tr>
<td>• Time tourniquet was applied</td>
<td></td>
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</tbody>
</table>

**Developed 1/02  Revised 9/04, 10/05, 6/06, 1/10, 4/10, 7/13, 6/14**

### SPECIAL CIRCUMSTANCES

The use of hemostatic dressings and/or “wound packing” requires additional training and prior approval by the EMS Agency.
CIRCULATION EMERGENCY
BLEEDING CONTROL

Supplemental Information

DEFINITION:
- **Dowel** - stick, rod, or any object that can be inserted under loop of the improvised tourniquet and used to twist tourniquet tight

TYPES OF BLEEDING:
- Blood loss from a pelvic fracture may be as much as 3,000 ml (1/2 of total blood volume), femur fracture 1,500 – 3,000 mL, from tibia and fibula 500 – 750 mL, and humerus up to 800 mL.

**Arterial**
- Blood is bright red in color and oxygen rich.
- Arterial bleeding is the most difficult to control due to the pressure that is within the arteries.
- Blood spurts from the wound, but as the blood pressure drops, the spurting becomes less forceful.
- Intervention – direct pressure and/or a tourniquet.

**Venous**
- Blood is dark red in color and oxygen poor.
- Venous bleeding is easier to control than arterial bleeding due to lower venous pressure.
- Blood flows at a steady stream and may be minor or profuse depending on the size of the vessel.
- Intervention – may only require direct pressure and elevation, but if uncontrollable will require tourniquet.

**Capillary**
- Blood is dark red in color; site of oxygen and carbon dioxide gas exchange.
- Blood oozes from capillaries and usually clots spontaneously.
- Intervention – only requires a dressing.

TOURNIQUET FACTS:
- A tourniquet should be applied as soon as it is deemed necessary. Caution must be taken to prevent cutting into the skin and causing damage to underlying tissue, nerves, muscle, blood vessels, and soft tissue that could lead to loss of the extremity.
- Narrow tourniquets only apply narrow pressure to blood vessels and are not as effective as wider tourniquets.
- Ensure tourniquet is tight against the skin and then tighten further using a windlass or ratchet.
- The larger the muscle, the tighter the tourniquet must be to be effective.
- DO NOT apply tourniquet over a joint.
- Avoid the use of tourniquets on a dialysis shunt – place the tourniquet proximal to the shunt and not on the shunt.
- If the initial tourniquet does not control bleeding or there is still a distal pulse:
  - tighten tourniquet
  - apply a 2nd tourniquet proximal to the 1st –
  - use as many tourniquets as needed to stem the bleeding or obliterate the pulse.
- The wider the tourniquet the more effective it is
- Apply tourniquet 2-3 inches or the width of hand above the injury
- Use a 1½- 2” wide band and secure tightly
- Once a tourniquet is applied, DO NOT or remove without physician approval
- Mark the time the tourniquet was applied (on the tourniquet).

INDICATIONS FOR TOURNIQUET USE:
- Uncontrolled extremity bleeding – unresponsive to direct pressure.
- Amputated or mangled extremity – initial vasospasm response may decrease with time and the injury may start to bleed.
- Isolate penetrating extremity trauma with shock – resuscitation efforts and administration of fluids may lead to bleeding

ADDITIONAL CONSIDERATIONS FOR TOURNIQUET USE
- Times when it is not possible to apply direct pressure
- When scene is unsafe and rapid extrication is needed
- When resources are overwhelmed

TOURNIQUET APPLICATION USING A 2-4 INCH WIDE BAND AND DOWEL or TRIANGULAR BANDAGE
- Pad skin by wrapping 6-8 layers of a 4” bandage around the extremity twice.
- Place a 2-4” wide band loosely around extremity or triangular bandage and secure
- Make an over-hand knot, place dowel over knot then make a square knot over dowel
- Rotate the dowel (to tighten tourniquet) until the bleeding stops.
- Secure the dowel in position.
• Document the time the tourniquet was applied on the PCR and give a verbal when transferring care of the patient. The physician must know how long the tourniquet has been in place to determine priorities of care.

COMMERCIAL TOURNIQUET APPLICATION
• Apply in accordance with manufacturer’s directions.

NOTES:
• Direct pressure may involve using the finger tips, hand pressure or a pressure dressing.
• Elevation of an extremity may be used secondary to and in conjunction with direct pressure.
• Continue to reinforce dressing if bleeding does not stop. DO NOT remove original dressing since this may increase bleeding if clot formation has started.
• If bleeding is not controlled with the 1st tourniquet, apply a 2nd tourniquet proximal to the injury. DO NOT remove the 1st tourniquet.
• Pressure points for bleeding control have not proven to be effective and only delay bleeding control.
• Splinting fractures will reduce tissue damage and bleeding associated with a fracture.
• Pneumatic pressure devices include air splints, blood pressure cuff, and the pneumatic antishock garment (PASG). Air splints do not have enough pressure to control an arterial bleed. Blood pressure cuffs often leak air and thus may be ineffective.
• For major bleeding around an impaled object, apply direct pressure on both sides. Do NOT remove or put pressure on the object.