Tactical Combat Casualty Care for Medical Personnel
03 June 2016

Tactical Field Care #1
OBJECTIVES

• **STATE** the common causes of altered states of consciousness on the battlefield.

• **STATE** why a casualty with an altered state of consciousness should be disarmed.

• **DESCRIBE** airway control techniques and devices appropriate to the Tactical Field Care phase.
OBJECTIVES

- DEMONSTRATE the recommended procedure for surgical cricothyroidotomy.
- LIST the criteria for the diagnosis of tension pneumothorax on the battlefield.
- DESCRIBE the diagnosis and initial treatment of tension pneumothorax on the battlefield.
OBJECTIVES

• DEMONSTRATE the appropriate procedure for needle decompression of the chest.
• DESCRIBE the progressive strategy for controlling hemorrhage in tactical field care.
• DEMONSTRATE the correct application of a CoTCCC-recommended hemostatic dressing.
• DEMONSTRATE the correct application of a CoTCCC-recommended junctional tourniquet.
OBJECTIVES

• DEMONSTRATE the appropriate procedure for initiating a rugged IV field setup.
• STATE the rationale for obtaining intraosseous access in combat casualties.
• DEMONSTRATE the appropriate procedure for initiating an intraosseous infusion.
OBJECTIVES

• **STATE** the tactically relevant indicators of shock in combat settings.

• **DESCRIBE** the pre-hospital fluid resuscitation strategy for hemorrhagic shock in combat casualties.

• **DESCRIBE** the management of penetrating eye injuries in TCCC.

• **DESCRIBE** how to prevent blood clotting problems from hypothermia.
OBJECTIVES

• **DESCRIBE** the appropriate use of pulse oximetry in pre-hospital combat casualty care.

• **STATE** the pitfalls associated with interpretation of pulse oximeter readings.

• **LIST** the recommended agents for pain relief in tactical settings along with their indications, dosages, and routes of administration.

• **DESCRIBE** the rationale for early antibiotic intervention in combat casualties.
OBJECTIVES

• LIST the factors involved in selecting antibiotic drugs for use on the battlefield.
• DISCUSS the management of burns in TFC.
• EXPLAIN why cardiopulmonary resuscitation is not generally used for cardiac arrest in battlefield trauma care.
• DESCRIBE the procedure for documenting TCCC care with the TCCC Casualty Card.
OBJECTIVES

• **DESCRIBE** the three ISAF categories for evacuation priority

• **LIST** the nine items in a MEDEVAC request

• **DISCUSS** the rules of thumb for calling for Tactical Evacuation and the importance of careful calculation of the risk/benefit ratio prior to initiating the call

• **DESCRIBE** the appropriate procedures for providing trauma care for wounded hostile combatants.
Tactical Field Care

• Distinguished from Care Under Fire by:
  – A reduced level of hazard from hostile fire
  – More time available to provide care based on the tactical situation
• Medical gear is still limited to that carried by the medic or corpsman or unit members (may include gear in tactical vehicles)
Tactical Field Care

- May consist of rapid treatment of the most serious wounds with the expectation of a re-engagement with hostile forces at any moment, or
- There may be ample time to render whatever care is possible in the field.
- Time to evacuation may vary from minutes to several hours or longer.
Battlefield Priorities in the Tactical Field Care Phase

• This section describes the recommended care to be provided in TFC.
• This sequence of priorities shown assumes that any obvious life-threatening bleeding has been addressed in the Care Under Fire phase.
• If this is not the case – address the massive bleeding first.
• After that – care is provided in the sequence shown. This sequence is compatible with the MARCH algorithm found in the USSOCOM Tactical Trauma Protocols.
MARCH

- **Massive hemorrhage** – control life-threatening bleeding.
- **Airway** – establish and maintain a patent airway.
- **Respiration** – decompress suspected tension pneumothorax, seal open chest wounds, and support ventilation/oxygenation as required.
• **Circulation** – establish IV/IO access and administer fluids as required to treat shock.

• **Head injury/Hypothermia** – prevent/treat hypotension and hypoxia to prevent worsening of traumatic brain injury and prevent/treat hypothermia.
Tactical Field Care Guidelines

1. Casualties with an altered mental status should be disarmed immediately.
Disarm Individuals with Altered Mental Status

• Armed combatants with an altered mental status may use their weapons inappropriately.
• Secure long gun, pistols, knives, grenades, explosives.
• Possible causes of altered mental status are Traumatic Brain Injury (TBI), shock, hypoxia, and pain medications.
• Explain to casualty: “Let Smith hold your weapon for you while I check you out.”
2. Airway Management
   a. Unconscious casualty without airway obstruction:
      - Chin lift or jaw thrust maneuver
      - Nasopharyngeal airway
      - Place casualty in recovery position
2. Airway Management
   b. Casualty with airway obstruction or impending airway obstruction:
      - Chin lift or jaw thrust maneuver
      - Nasopharyngeal airway
      - Allow casualty to assume any position that best protects the airway, to include sitting up.
      - Place unconscious casualty in recovery position.
2. Airway Management

c. If the previous measures are unsuccessful, perform a surgical cricothyroidotomy using one of the following:

- Cric-Key technique (preferred option)
- Bougie-aided open surgical technique using a flanged and cuffed airway cannula of less than 10 mm outer diameter, 6-7 mm internal diameter, and 5-8 cm of intra-tracheal length
- Standard open surgical technique using a flanged and cuffed airway cannula of less than 10 mm outer diameter, 6-7 mm internal diameter, and 5-8 cm of intra-tracheal length (least desirable option)
- Use lidocaine if the casualty is conscious.
Nasopharyngeal Airway

- The “Nose Hose,” “Nasal Trumpet,” “NPA”
- Excellent success in Afghanistan and Iraq
- Well tolerated by the conscious patient
- Lube before inserting
- Insert at 90 degree angle to the face NOT along the axis of the external nose
- Tape it in
- Don’t use an oropharyngeal airway (‘J’ Tube)
  - Will cause conscious casualties to gag
  - Easily dislodged
Nasopharyngeal Airway:
(Note that the NPA is positioned at a 90° angle to the front plane of the face.)

- Lubricate!
- Insert along floor of nasal cavity
- If resistance met, use back-and-forth motion
- Don’t Force – Use other nostril
- If patient gags, withdraw slightly
What’s wrong with this NPA insertion?
• Casualties with severe facial injuries can often protect their own airway by sitting up and leaning forward.
• Let them do it if they can!
Airway Support

Place unconscious casualties in the recovery position after the airway has been opened.
The Need for Cricothyroidotomy

- 4,596 battlefield fatalities in Operation Iraqi Freedom and Operation Enduring Freedom combat casualties from October 2001 to June 2011
  - 87.3% of all injury mortality occurred in the prehospital environment (n = 4013)
  - Of the prehospital deaths, 24.3% were deemed potentially survivable. (n = 976)
  - The second most common cause (8%) of potentially preventable deaths was upper airway obstruction due mostly to direct injury to the airway structures of the face and neck. (n = 78)

Battlefield Cricothyroidotomy

• “Military medics have a 33% failure rate when performing this procedure.”*

• This is the most technically difficult procedure we ask medics, Corpsmen, and PJs to do.

Video: An Actual Cricothyroidotomy Using Standard Open Surgical Technique

Courtesy Dr. Peter Rhee,
Univ. of Arizona
Preferred Surgical Airway Technique

• Cric-Key evaluation
  – Fifteen military medics with minimal training performed one Cric-Key technique and one open surgical technique on cadavers.
    • Medics were able to insert the Cric-Key in significantly less time (34 sec vs 65 sec.)
    • Though not statistically significant, there were three failures with the open surgical technique, and none with the Cric-Key.

Cric-Key

- The Cric-Key introducer is curvilinear, with an overall length of 19 cm, and an anteriorly directed distal tip.
- Designed to guide insertion of a 5.0 cuffed Melker cricothyroidotomy airway cannula.
- Combines the functions of a tracheal hook, stylet, dilator, and bougie when incorporated with the Melker airway.
Cricothyroid Membrane
Surface Landmarks for Cricothyrotomy

- Top of thyroid cartilage
- Bottom of thyroid cartilage
- Cricothyroid membrane
- Cricoid cartilage
- Thyroid prominence – Adam’s apple usually visible only in males
Beneath the Surface

Landmarks

- Hyoid Bone
- Thyroid prominence (Adam’s apple) - usually visible only in males
- Thyroid cartilage
- Cricothyroid membrane
- Cricoid cartilage
- Thyroid gland
Locating the Cric Skin Incision with a Dotted Line


Cric-Key Technique

1. Identify the cricothyroid membrane (CTM) between the thyroid cartilage and the cricoid cartilage.
2. Grasp and hold the trachea, stabilizing the airway.
Cric-Key Technique

3. Make a vertical skin incision down to the cricothyroid membrane using a #10 scalpel.
4. Dissect the tissues to expose the membrane.

Cric-Key Technique
5. Make a horizontal incision through the cricothyroid membrane.
Cric-Key Technique

6. Insert the Cric-Key with the Melker airway.
7. Confirm placement by feeling the tracheal rings and looking for skin tenting.
8. Remove the Cric-Key leaving the airway in place.
9. Inflate the cuff with 10cc of air.
Cric-Key Technique

10. Connect a bag and valve, and ventilate the casualty. Check for breath sounds bilaterally. Secure the airway.
Video: Surgical Airway Using the Cric-Key

Video courtesy Pulmodyne®
Repetition and Realism in Cric Training

To prepare for scenarios like this one, combat medics should perform cricothyrotomy at least five times during training on an anatomically realistic model.
Questions

Airway Practical
Nasopharyngeal Airway
Surgical Airway
3. Breathing

a. In a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax and decompress the chest on the side of the injury with a 14-gauge, 3.25-inch needle/catheter unit inserted in the second intercostal space at the midclavicular line. Ensure that the needle entry into the chest is not medial to the nipple line and is not directed towards the heart. An acceptable alternate site is the 4th or 5th intercostal space at the anterior axillary line (AAL).
3. Breathing

b. All open and/or sucking chest wounds should be treated by immediately applying a vented chest seal to cover the defect. If a vented chest seal is not available, use a non-vented chest seal. Monitor the casualty for the potential development of a subsequent tension pneumothorax. If the casualty develops increasing hypoxia, respiratory distress, or hypotension and a tension pneumothorax is suspected, treat by burping or removing the dressing or by needle decompression.
3. Breathing
   
c. Casualties with moderate/severe TBI should be given supplemental oxygen when available to maintain an oxygen saturation > 90%.
Tension Pneumothorax

- Tension pneumothorax is another common cause of preventable death encountered on the battlefield.
- Easy to treat.
- Tension pneumo may occur with entry wounds in abdomen, shoulder, or neck.
- Blunt (motor vehicle accident) or penetrating trauma (GSW) may also cause it.
A pneumothorax is a collection of air between the lung and chest wall due to an injury to the chest and/or lung. The lung then collapses as shown.
A tension pneumothorax is worse. Injured lung tissue acts as a one-way valve, trapping more and more air between the lung and the chest wall. Pressure builds up and compresses both lungs and the heart.
Tension Pneumothorax

- Both lung function and heart function are impaired with a tension pneumothorax, causing respiratory distress and shock.
- Treatment is to let the trapped air under pressure escape.
- Done by inserting a needle into the chest.
- 14 gauge and 3.25 inches long is the recommended needle size.
Tension Pneumothorax

• Question: “What if the casualty does not have a tension pneumothorax when you do your needle decompression?”
• Answer:
  – If he has penetrating trauma to that side of the chest, there is already a collapsed lung and blood in the chest cavity.
  – The needle won’t make it worse if there is no tension pneumothorax.
  – If he DOES have a tension pneumothorax, you will save his life.
Location for Needle Entry

- 2nd intercostal space in the midclavicular line
- 2 to 3 finger widths below the middle of the collar bone
Warning!

- The heart and great vessels are nearby
- Do not insert needle medial to the nipple line or point it towards the heart.
Needle Decompression – Enter Over the Top of the Third Rib

- This avoids the artery and vein on the bottom of the second rib.
Alternate Site for Needle Decompression

- An acceptable alternate site is the 4\textsuperscript{th} or 5\textsuperscript{th} intercostal space at the anterior axillary line.
- The 5\textsuperscript{th} intercostal space is located at the level of the nipple in young, fit males.
- The AAL is located at approximately the lateral aspect of the pectoralis major muscle.
Remember!!!

• Tension pneumothorax is a common but easily treatable cause of preventable death on the battlefield.

• Diagnose and treat aggressively!
Needle Decompression Works

Video courtesy Dr. Oleksandr Linchevskyy
Medical Director, Patriot Defence
Ukraine
Needle Decompression

- After decompression of a tension pneumothorax with a 14-gauge, 3.25” needle/catheter unit:
  - Remove the needle
  - Secure the catheter in place
Needle Decompression Practical
Sucking Chest Wound (Open Pneumothorax)

Takes a hole in the chest the size of a nickel or bigger for this to occur.
Open Pneumothorax
Management of Open Pneumothorax

• Input from the USCENTCOM/JTS assessment of prehospital trauma care in Afghanistan questioned the use of unvented chest seals in the treatment of open pneumothorax.

• New animal research from both USAISR and Naval Medical Center Portsmouth has shown that vented chest seals work reliably to prevent a tension pneumothorax in the presence of an open pneumothorax and an ongoing air leak from the lung, but non-vented chest seals do not.
Sucking Chest Wound

• May result from large defects in the chest wall and may interfere with ventilation

• **Treat by applying a vented occlusive dressing completely over the defect at the end of one of the casualty’s exhalations.**

• Monitor for possible development of subsequent tension pneumothorax.

• Allow the casualty to adopt the sitting position if breathing is more comfortable.
Key Point: If signs of a tension pneumothorax develop – lift one edge of the seal and allow the tension pneumothorax to decompress (“burping” the seal). Alternatively, remove the seal for a few seconds to accomplish the decompression, then re-apply.
Video: Sucking Chest Wound
Video: Sucking Chest Wound (Treated)
Questions?
4. Bleeding

a. Assess for unrecognized hemorrhage and control all sources of bleeding. If not already done, use a CoTCCC-recommended limb tourniquet to control life-threatening external hemorrhage that is anatomically amenable to tourniquet use or for any traumatic amputation. Apply directly to the skin 2-3 inches above wound. If bleeding is not controlled with the first tourniquet, apply a second tourniquet side-by-side with the first.
4. Bleeding

   b. For compressible hemorrhage not amenable to limb tourniquet use or as an adjunct to tourniquet removal, use Combat Gauze as the CoTCCC hemostatic dressing of choice.

Alternative hemostatic adjuncts:

  – Celox Gauze or
  – ChitoGauze or
  – XSTAT (Best for deep, narrow-tract junctional wounds)
4. Bleeding

b. (continued)

Hemostatic dressings should be applied with at least 3 minutes of direct pressure (optional for XSTAT). Each dressing works differently, so if one fails to control bleeding, it may be removed and a fresh dressing of the same type or a different type applied.

If the bleeding site is amenable to use of a junctional tourniquet, immediately apply a CoTCCC-recommended junctional tourniquet. Do not delay in the application of the junctional tourniquet once it is ready for use. Apply hemostatic dressings with direct pressure if a junctional tourniquet is not available or while the junctional tourniquet is being readied for use.
4. Bleeding

c. Reassess prior tourniquet application. Expose the wound and determine if a tourniquet is needed. If it is, replace any limb tourniquet placed over the uniform with one applied directly to the skin 2-3 inches above wound. Ensure that bleeding is stopped. When possible, a distal pulse should be checked. If bleeding persists or a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet side-by-side with the first to eliminate both bleeding and the distal pulse.
4. Bleeding

d. Limb tourniquets and junctional tourniquets should be converted to hemostatic or pressure dressings as soon as possible if three criteria are met: the casualty is not in shock, it is possible to monitor the wound closely for bleeding, and the tourniquet is not controlling bleeding from an amputated extremity. Every effort should be made to convert tourniquets in less than 2 hours if bleeding can be controlled with other means. Do not remove a tourniquet that has been in place more than 6 hours unless close monitoring and lab capability are available.
Tactical Field Care Guidelines

4. Bleeding

   e. Expose and clearly mark all tourniquet sites with the time of tourniquet application. Use an indelible marker.
1. Expose the wound(s) and place a second tourniquet 2-3 inches above the most proximal bleeding site.

2. Loosen the “high-and-tight” tourniquet.
3. If needed for hemorrhage control or to eliminate distal pulses, a “high-and-tight” tourniquet can be moved to a position side-by-side with the second tourniquet and tightened there.
Tourniquets: Points to Remember

• Damage to the arm or leg is rare if the tourniquet is left on for less than two hours.

• Tourniquets are often left in place for several hours during surgical procedures.

• In the face of massive extremity hemorrhage, it is better to accept the small risk of damage to the limb than to have a casualty bleed to death.
Tourniquets: Points to Remember

- Every effort should be made to convert tourniquets in less than 2 hours if bleeding can be controlled with other means. If bleeding remains controlled with Combat Gauze, leave the loosened tourniquet in place. If the bleeding is not controlled with Combat Gauze, re-tighten the tourniquet until bleeding stops.
- Restoring blood flow to the limb by transitioning to Combat Gauze at the 2-hour mark will minimize the chance of ischemic damage due to the tourniquet.
Tourniquet Conversion

1. Expose the wound(s)
2. Apply Combat Gauze and a pressure dressing
3. Loosen “high-and-tight” tourniquet and move it down to just above the pressure dressing. (Leave it loose here just in case it’s needed later.)

4. Monitor for re-bleeding.
Tourniquets: Points to Remember

- If the transition to Combat Gauze at 2 hours failed, try again at 6 hours using the steps outlined in the previous slides.
- Do not release the tourniquet after 6 hours of application unless close monitoring and lab support are available to evaluate for metabolic complications of prolonged tourniquet use.
Tourniquets: Points to Remember

• All unit members should have a CoTCCC-approved tourniquet at a standard location on their battle gear.
  – Should be easily accessible if wounded – DO NOT bury it at the bottom of your pack

• Tourniquets should be left in their protective packaging until needed to treat casualties.
  – Harsh environments may contribute to tourniquet failure if not left in packaging
Tourniquets: Points to Remember

- Training tourniquets should never be used as mission tourniquets!
- Repetitive applications of a tourniquet may cause it to fail.
Tourniquets: Points to Remember

• When a tourniquet has been applied, DO NOT loosen it intermittently to allow circulation to return to the limb.
  – Causes unacceptable additional blood loss
  – This HAS happened in the past, and was responsible for at least one near fatality.
Tourniquets: Points to Remember

Tightening the tourniquet enough to eliminate the distal pulse will help to ensure that all bleeding is stopped, and that there will be no damage to the extremity from blood entering the extremity but not being able to get out.
Tourniquets: Points to Remember

**Do not convert the tourniquet if:**

- The casualty is in shock.
- You cannot closely monitor the wound for re-bleeding.
- The extremity distal to the tourniquet has been traumatically amputated.
- The tourniquet has been on for more than 6 hours.
- The casualty will arrive at a medical treatment facility within 2 hours after time of application.
- Tactical or medical considerations make transition to other hemorrhage control methods inadvisable.
Tourniquets: Points to Remember

• Only medics, physician assistants, or physicians should re-position or convert tourniquets.
Questions?
CoTCCC-recommended Hemostatic Agents
CoTCCC-Recommended Hemostatic Agents

- Combat Gauze
- Celox Gauze
- ChitoGauze
Combat Gauze

- Tested in the ISR safety model
- Widely fielded in the DoD
- Case series from the battlefield and the civilian sector:
  - CG is effective at stopping bleeding
  - No safety issues reported
- Recommended by CoTCCC as first choice for hemostatic dressing
Alternative Hemostatic Agents

• Celox Gauze
• ChitoGauze
  – May be used if Combat Gauze is not available
  – Active ingredient is chitosan, a mucoadhesive
    • Function is independent of coagulation cascade
    • There are case series that report that chitosan dressings have stopped bleeding in surgical patients with life-threatening bleeding and severe coagulopathy
    • Does not cause reactions in persons allergic to shellfish
Alternative Hemostatic Agents

• Celox Gauze and ChitoGauze are as effective as Combat Gauze at hemorrhage control in laboratory studies:
Alternative Hemostatic Agents

- Neither ChitoGauze nor Celox Gauze have been tested in the USAISR safety model, **but**
- Chitosan-based hemostatic dressings have been used in combat since 2004 with no safety issues reported.
CoTCCC-Recommended Hemostatic Agents

• For more information:
  – Combat Gauze
    • http://www.z-medica.com/military/Home.aspx
  – Celox Gauze
    • http://www.celoxmedical.com/usa/products/celox-gauze/
  – ChitoGauze
    • http://www.hemcon.com/Products/ChitoGauzeHemostaticGauzeOverview.aspx
Combat Gauze
NSN 6510-01-562-3325

- Combat Gauze is a 3-inch x 4-yard roll of sterile gauze impregnated with kaolin, a material that causes blood to clot.
- Found (in lab studies and actual use) to be safe and effective in controlling bleeding that would otherwise be fatal.
• Open clothing around the wound.
• If possible, remove excess pooled blood from the wound while preserving any clots already formed in the wound.
• Locate the source of the most active bleeding.
• Pack Combat Gauze tightly into wound and directly onto the source of bleeding.
• More than one gauze may be required to stem blood flow.
• Combat Gauze may be re-packed or adjusted in the wound to ensure proper placement.
Combat Gauze Directions (3)

Apply Direct Pressure

• Quickly apply pressure until bleeding stops.
• Hold continuous pressure for 3 minutes.
• Reassess to ensure bleeding is controlled.
• Combat Gauze may be repacked or a second gauze used if initial application fails to provide hemostasis.
Combat Gauze Directions (4)

Bandage over Combat Gauze

• Leave Combat Gauze in place.

• Wrap to effectively secure the dressing in the wound.

Although the Emergency Trauma Bandage is shown in this picture, the wound may be secured with any compression bandage, Ace wrap, roller gauze, or cravat.
• Do not remove the bandage or Combat Gauze.

• **Reassess frequently to monitor for recurrent bleeding**

• Transport casualty to next level of medical care as soon as possible.
Combat Gauze Video
Questions?
Direct Pressure

• Can be used as a temporary measure.
• It works most of the time for external bleeding.
• It can stop even carotid and femoral bleeding.
• Bleeding control requires very firm pressure.
• Don’t let up pressure to check the wound until you are prepared to control bleeding with a hemostatic agent or a tourniquet!
• Use for 3 full minutes after applying a hemostatic dressing.
• It is hard to use direct pressure alone to maintain control of big bleeders while moving the casualty.
Hemostatic Dressing Practical
XSTAT 30

• First-in-kind expanding wound dressing approved for internal use.
• Syringe-like applicator applies compressed mini-sponges into deep wounds.
• Mini-sponges rapidly expand on contact with blood – compressing the wound to stop bleeding.
XSTAT 30 Indications For Use

XSTAT 30 is a hemostatic device for the control of severe, life-threatening bleeding from junctional wounds in the groin or axilla not amenable to tourniquet application in adults and adolescents.
XSTAT 30 is a temporary device for use up to four hours until surgical care is acquired. It should only be used for patients at high risk for immediate life-threatening bleeding from hemodynamically significant, non-compressible junctional wounds when definitive care at an emergency care facility cannot be achieved within minutes.

XSTAT 30 is NOT indicated for use in: the thorax; the pleural cavity; the mediastinum; the abdomen; the retroperitoneal space; the sacral space above the inguinal ligament; or tissues above the clavicle.
XSTAT 30 is composed of compressed mini-sponges coated with chitosan – a compound designed to stop bleeding.

Upon contact with blood, the mini-sponges absorb blood and, expand to 10 - 12 times their compressed volume within approximately 20 seconds.

A radiopaque marker is embedded into each of the mini-sponges to make them detectable by X-ray.
XSTAT 30 Applicator

Main body holds approximately 92 mini-sponges.

Telescoping Handle

Bifurcated silicone tip allows sponges to exit.
XSTAT 30 Packaging

XSTAT 30 is available in single and triple packs. Having three applicators available at the point of injury is recommended by the manufacturer.
Open the package and remove the applicator.

Pull the handle out and away from the barrel until it stops and locks.
XSTAT 30 Instructions for Use

Place the tip of the applicator into the wound track as close to the bleeding source as possible.

Firmly depress the handle to deploy the mini-sponges. The sponges should flow freely into the wound.
DO NOT attempt to forcefully eject the material from the applicator. If resistance is met, pull the applicator back slightly to create additional packing space, then continue to depress the handle.

Use additional applicators as necessary to completely pack the wound with mini-sponges.

Pack XSTAT into the wound to the same density you would gauze. The higher the sponge density in the wound cavity, the higher the pressure exerted on the damaged vessel.
• Cover the wound with a pressure dressing.
• If bleeding persists, apply manual pressure until the bleeding is controlled.
• Never attempt to remove the mini-sponges from the wound. They must be removed by a surgeon after achieving proximal and distal vascular control.
XSTAT Removal Instructions

• The manufacturer includes a casualty card inside the XSTAT package.
• Instructions to the surgeon for removing the sponges from the wound are included on the back of the card.
• Record the use of XSTAT on the DD 1380, and forward these instructions along with it to the Medical Treatment Facility.
Warnings/Cautions

• XSTAT contains material derived from shellfish.
  – A mild pyrogenic response has been elicited in biocompatibility tests.
  – Monitor the casualty for fever, chills, hypotension, and shock.
Warnings/Cautions

• Segments of the applicator tip may break away during application and be left in the wound.

  – After injecting the mini-sponges, check the applicator tip for missing segments.
  – Do not attempt to retrieve missing segments from the wound.
  – Record the number of lost segments on the TCCC Casualty Card.
Junctional Hemorrhage

This term refers to bleeding from wounds to the:

– Groin
– Buttocks
– Perineum
– Axillae
– Base of the neck
– Extremities at sites too proximal for a limb tourniquet
Junctional Tourniquets

The recent conflicts in Afghanistan and Iraq went on for 13 years.

So why did it take until 2011 to add a junctional tourniquet to TCCC?
Dr. John Holcomb’s Brief to Defense Health Board 2011

Increasing Amputation Rates in the period Sep-Dec 2010
IEDS
Iraq vs Afghanistan

• Iraq
  – Large amount of explosives – recycled 155 shells
  – Command or vehicle-detonated
  – Designed to destroy vehicles

• Afghanistan
  – Smaller amount of explosives
  – Homemade explosives
  – Personnel pressure-detonated
  – Designed to maim
Dismounted Complex Blast Injury (DCBI)

- DCBI causes junctional hemorrhage.
- By 2011, junctional hemorrhage was the leading cause of death from external hemorrhage.
- The proximal thigh and the groin are the most common site of junctional hemorrhage.
Superficial Anatomy of the Groin

- Anterior Superior Iliac Spine
- Pubic Tubercle
- Inguinal Ligament
- Femoral Vessels
Anatomy of the Inguinal Region

- Anterior Superior Iliac Spine
- Femoral Artery
- External Iliac Artery
- Inguinal Ligament
- Internal Iliac Artery
- Pubic Tubercle
- Common Iliac Artery
Vascular Anatomy of the Abdomen and Groin

- Inguinal Ligament
- Ext. iliac a. passing under inguinal lig.
- Common femoral a. passing into the leg
- Common femoral vein passing into the leg
- Aorta posterior on the spine
- Int. iliac a. bifurcates from common iliac a.
- Ext. iliac a. rising out of pelvis
- Bifurcation of common femoral a. into superficial femoral a. and femoral profunda a.
TCCC Management of Junctional Hemorrhage

• The three CoTCCC-recommended junctional tourniquets are:
  – The Combat Ready Clamp (CRoC)
  – The Junctional Emergency Treatment Tool (JETT)
  – The SAM Junctional Tourniquet (SJT)
TCCC Management of Junctional Hemorrhage

Combat Ready Clamp

Junctional Emergency Treatment Tool

SAM Junctional Tourniquet

Training materials for all 3 devices are contained in separate modules in the TCCC curriculum.
Continued Reassessment!

• Once applied, the junctional tourniquet, as well as the casualty’s other hemorrhage control interventions, must be frequently reassessed to assure continued hemorrhage control.

–DO NOT EVER APPLY IT AND FORGET IT!
Junctional Tourniquet
Practical
Questions?