

Tactical Combat Casualty Care Training: The Need for a Standard



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Joint Trauma System
5 May 2015



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“The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Departments of the Army, Air Force, Navy or the Department of Defense.”



BLUF

- **Tremendous advances have been made in battlefield trauma care throughout OEF/OIF**
 - *These are captured in the TCCC Guidelines and the TCCC training curriculum*
- **BUT - TCCC training in the US Military is currently inconsistent; some course are of very poor quality**
- **Improper TCCC training has been directly associated with adverse outcomes**
- **TCCC courses as taught by NAEMT will greatly improve the quality of TCCC training - and at less expense to the DoD than vendor-taught courses**

Tactical Combat Casualty Care

The Prehospital Arm of the Joint Trauma System



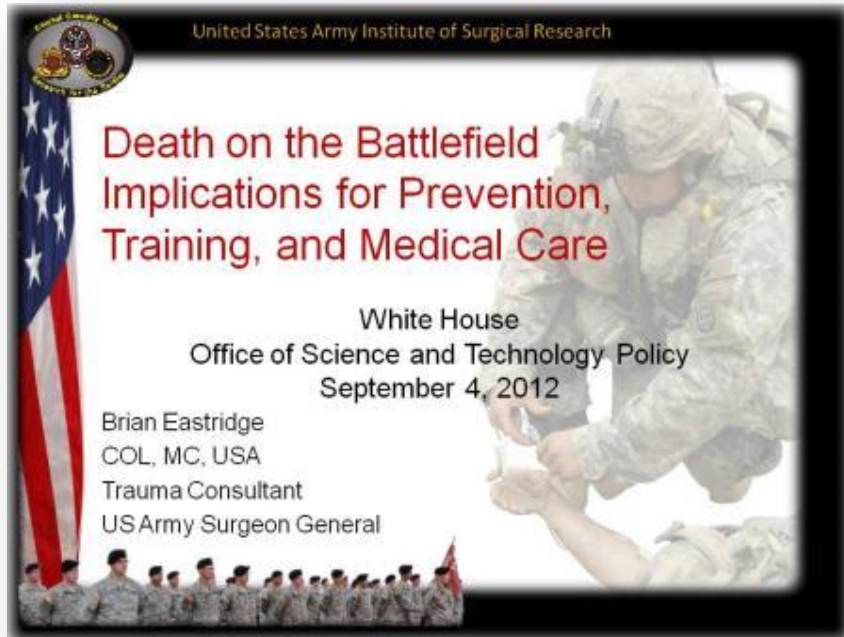
TCCC

- Medics, Corpsmen, PJs
- Combat Lifesavers
- All Combatant Self/Buddy Care
- Includes Tactical Evacuation Care



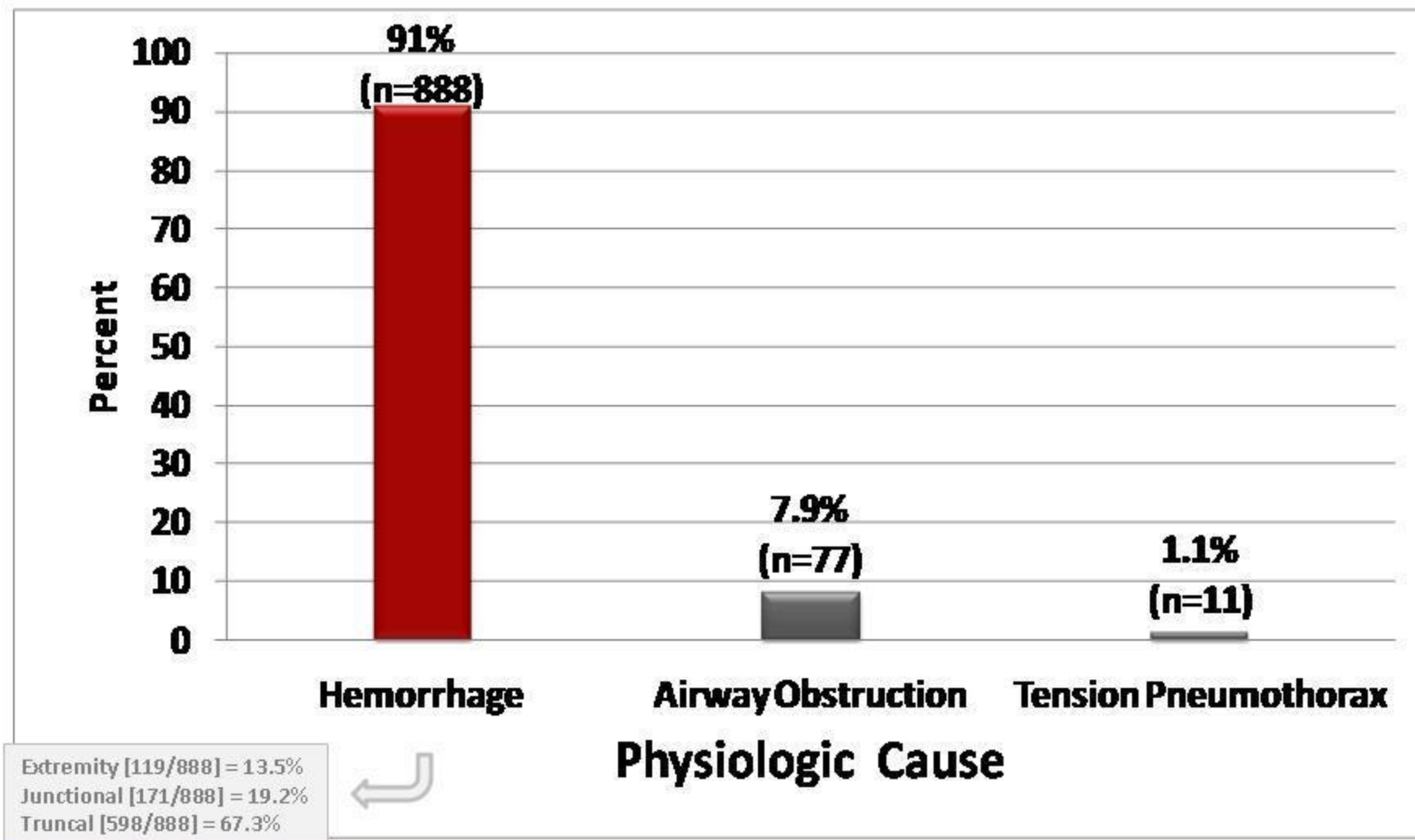
Preventable Death on the Battlefield: OEF and OIF

Eastridge 2012 Study



- **4,596** U.S. deaths
- **87%** of combat fatalities were pre-hospital
- **24%** of these deaths were **potentially preventable**

What is the Cause of Death?





Battlefield Trauma Care: 1970

“All seem uncertain regarding the best method to implement factual knowledge to the man most in need, the front line trooper.....citing our ineptness in the field of self-help and first aid” little if any improvement has been made in this phase of treatment of combat wounds in the past 100 years.”

***CAPT J.S. Maughon
Mil Med 1970***

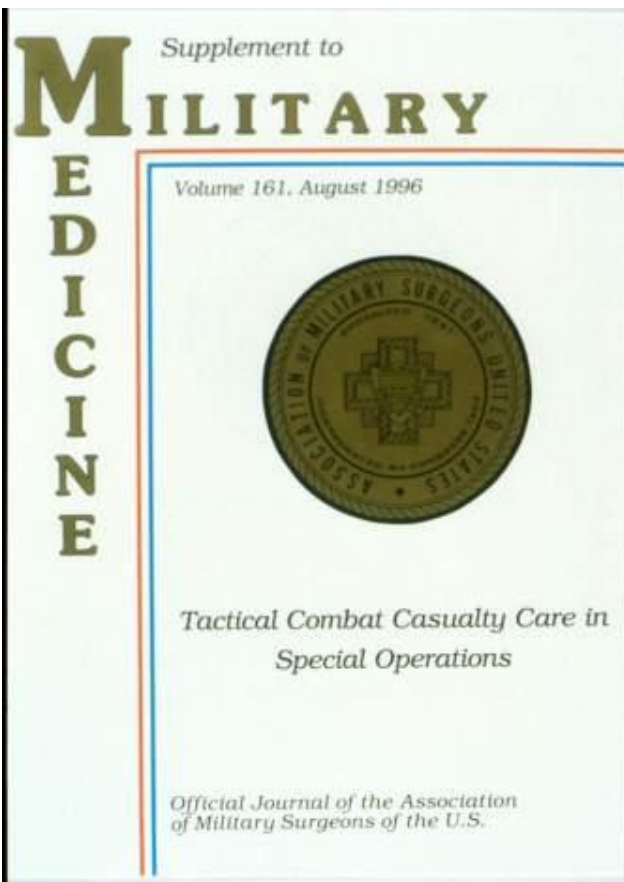


Battlefield Trauma Care: 2001

- Based on trauma courses NOT developed for combat
- **Medics were taught NOT to use tourniquets**
- **No hemostatic agents**
- **No junctional tourniquets**
- **Large volume crystalloid fluid resuscitation for shock**
- **2 large bore IVs on all casualties with significant trauma**
- **Civil War-vintage technology for battlefield analgesia (IM morphine)**
- **No focus on prevention of trauma-related coagulopathy**
- **No tactical context for care rendered**
- **Heavy emphasis on endotracheal intubation for prehospital airway management**



Tactical Combat Casualty Care in Special Operations



Military Medicine Supplement August 1996

***Trauma care guidelines
customized for the battlefield***



TCCC: A Brief History

- Original paper published in 1996
- First used by Navy SEALs, Army Rangers, and Air Force Pararescue in 1997
- Updates published in PHTLS manual since 1999
- ACS COT and NAEMT endorsement of PHTLS Manual
- USSOCOM adopted TCCC in 2005
- Now used throughout the U.S. military
- Also allied nations and civilian sector





Battlefield Trauma Care: Now

- **Phased care in TCCC**
- **Aggressive use of tourniquets in CUF**
- **Combat Gauze as hemostatic agent**
- Aggressive needle thoracostomy
- **Sit up and lean forward airway positioning**
- Surgical airways for maxillofacial trauma
- Hypotensive resuscitation
- IVs only when needed/IO access if required
- **PO meds, OTFC, ketamine as “Triple Option”
for battlefield analgesia**
- Hypothermia prevention; avoid NSAIDs
- Battlefield antibiotics
- **Tranexamic acid**
- **Junctional tourniquets**



Tourniquets in the U.S. Military - 2003





Lest we forget – most of the U.S. military went to war in Afghanistan and Iraq without tourniquets



Tourniquets in Vietnam: A Historical Perspective

“The striking feature was to see healthy young Americans with a **single injury of the distal extremity** arrive at the magnificently equipped field hospital, usually within hours, but **dead on arrival**. In fact there were **193 deaths** due to wounds of the upper and lower extremities, or two percent of the 2600.”

*CAPT J.S. Maughon
Mil Med 1970*



Tourniquets in TCCC

Mil Med 1996

“It is very important, however, to stop major bleeding as quickly as possible since injury to a major vessel may result in the very rapid onset of hypovolemic shock...Although ATLS discourages the use of tourniquets, they are appropriate in this instance because direct pressure is hard to maintain during casualty transport under fire. Ischemic damage to the limb is rare if the tourniquet is left in place less than an hour and tourniquets are often left in place for several hours during surgical procedures. In the face of massive extremity hemorrhage, in any event, it is better to accept the small risk of ischemic damage to the limb than to lose a casualty to exsanguination....The need for immediate access to a tourniquet in such situations makes it clear that all SOF operators on combat missions should have a suitable tourniquet readily available at a standard location on their battle gear and be trained in its use.”



A Preventable Death: 2003

This casualty was wounded by an RPG explosion and sustained a traumatic amputation of the right arm and a right leg wound. He bled to death from his leg wound despite the placement of three field-expedient tourniquets.

What could have saved him

CAT Tourniquet

**TCCC training for all
unit members**

***Note: Medic killed at
onset of action**





Tourniquet Use Early in the Iraq and Afghanistan Conflicts

- **NOT widely used at the start of the wars**
- **Increased use by both Special Operations and conventional units beginning in 2005**
- **NOT evolutionary – a series of discrete events**

The Drivers:

- Early reports of success with TCCC, especially TQs
- Holcomb study: “Causes of SOF Deaths 2001-2004”
- USAISR tourniquet study by Walters et al (2005)
- USSOCOM TCCC message - March 2005
- USSOCOM/ISR TCCC Transition Initiative (SFC Greydanus)
- USCENTCOM tourniquet and hemostatic dressing (HemCon) message 2005



Preventable Combat Deaths from Not Using Tourniquets

- Maughon – *Mil Med 1970*: Vietnam
 - 193 of 2,600
 - 7.4% of total combat fatalities
- Kelly – *J Trauma 2008*: OEF + OIF (2003/4 and 2006)
 - 77 of 982 (in both cohorts of fatalities)
 - 7.8% of total fatalities – no better than Vietnam
- **Tourniquets became widely used in 2005-2006**
- Eastridge – *J Trauma 2012*: OEF + OIF (to Jun 2011)
 - 119 of 4,596
 - **2.6% of total fatalities – a 67% decrease**



TCCC and Hemorrhage

External

Tourniquets
Combat Gauze
Junctional TQs

Non-Compressible

AAJT
Self-Expanding PU Foam
Pelvic Hemostatic Belt
REBOA

Both

Prehospital DCR
TXA
Hypothermia Prevention
Avoidance of NSAIDs
Triple-Option Analgesia



TCCC and Airway

Sit Up and Lean Forward Positioning

De-emphasize endotracheal intubation

Nasopharyngeal Airways

Surgical airways

CricKey



TCCC and Tension Pneumothorax

Revised indications

Chest tubes usually not needed

3.25 “ 14-gauge catheter

Lateral site

Bilateral NDC for loss of vital signs prehospital



TCCC: How Do We Know That it's Working?





TCCC: Success in Combat 3rd Infantry Division

“The adoption and implementation of the principles of TCCC by the medical platoon of TF 1-15 IN in OIF 1 resulted in **overwhelming success**. Over 25 days of continuous combat with 32 friendly casualties, many of them serious, we had 0 KIAs and 0 Died From Wounds, while simultaneously caring for a significant number of Iraqi civilian and military casualties.”

CPT Michael Tarpey

Battalion Surgeon 1-15 IN

AMEDD Journal 2005



TCCC in Canadian Forces

Savage et al: Can J Surg 2011

CONCLUSION

For the first time in decades, the CF has been involved in a war in which its members have participated in sustained combat operations and have suffered increasingly severe injuries. Despite this, the CF experienced the highest casualty survival rate in history. Though this success is multifactorial, the determination and resolve of CF leadership to develop and deliver comprehensive, multileveled TCCC packages to soldiers and medics is a significant reason for that and has unquestionably saved the lives of Canadian, Coalition and Afghan Security Forces. Further-



Eliminating Preventable Death on the Battlefield



- Kotwal et al – Archives of Surgery 2011
- All Rangers and docs trained in TCCC
- U.S. military preventable deaths: 24%
- Ranger preventable death incidence: 3%²⁵



Defense Health Board

9 March 2015



Defense Health Board

**Combat Trauma Lessons Learned
from Military Operations
of 2001-2013**

March 9, 2015



Defense Health Board

9 March 2015

Lesson 9: Effectively trained TCCC has a demonstrable effect on reducing potentially preventable causes of death on the battlefield.

Recommendation 9: TCCC shall continue to form the basis for battlefield trauma care and be integrated as the minimal accepted standard of training for all military members, initial enlisted medical training, and specialized enlisted **medical training**. In addition, TCCC sustainment training programs must occur on a regular basis, as the TCCC Guidelines are a “living” document and are regularly updated.



TCCC Training 2015: Two Major Issues

- 1) Incompletely Trained in the DoD**
- 2) Quality Assurance of TCCC Courses**

TCCC Training in the DoD

Incompletely Trained
Incompletely Executed





Saving Lives on the Battlefield I (2012) and II (2013)

- Surveys of prehospital care in Afghanistan
- Combined Joint Trauma System/USCENTCOM team
- Directed interviews with hundreds of physicians, PAs, and combat medical personnel in combat units
- COL Russ Kotwal (I)
- COL Samuel Sauer (II)

CENTCOM Commander Brief: Saving Lives on the Battlefield



CENTCOM Commander Brief: Saving Lives on the Battlefield (Part II) - One Year Later





Findings from the Two CENTCOM/JTS Prehospital Care Assessments

- TCCC is not being implemented evenly across the battle space
- These variations are not just SOF versus conventional forces difference
- Why is this happening?
- We teach physicians ATLS (maybe) and then assign them to operational units and expect that they can effectively supervise medics who have been taught battlefield trauma care based on TCCC concepts



Saving Lives on the Battlefield 1

- “Senior medical leaders cannot force individual physicians to provide medical care that they do not agree with.” (KAF Role I – 3rd Infantry Division)
- **Implication: An 0-3 Battalion Surgeon with no prehospital or trauma training can overrule any recommendation made by TCCC or the JTS.**
- “This underscores the need for physicians to be trained in TCCC and to be familiar with the evidence base for recommended TCCC interventions.” (CoTCCC Chairman)



The Mabry Question: Who Owns Battlefield Medicine?

- **The U.S. military has four armed services, six Geographic Combatant Commands, and the U.S. Special Operations Command, each of which operates autonomously unless directives are issued by the Secretary of Defense (SecDef).**
- **Lacking direction in the form of SecDef policy and Joint Staff doctrine, there is no assurance that lessons learned in trauma care will be used reliably or consistently across the U.S. military.**
- **The SENIOR LEADER in the chain of command who steps up on this issue effectively owns battlefield medicine for his or her AOR.**



The Mabry Question: Who Owns Battlefield Medicine?

- **All 3 SGs have endorsed TCCC training for medics**
- **Both the Defense Health Board and the Assistant Secretary of Defense for Health Affairs have recommended TCCC training for everyone (to include physicians and PAs) assigned to deploying combat units – twice.**
- **BUT – battlefield trauma care in combat units is owned by the unit commanders.**
- **Neither the DHB nor ASDHA are in their chain of command.**
- **For TCCC to be effectively incorporated into combat units, it must be an integral part of their warrior culture: shoot, move, communicate, AND care for your wounded buddies (75th RR Model).**



From a Senior Army Flight Surgeon

“During my Medical Corps career I received ZERO training from the AMEDD on pre-hospital care. There was no training about or concerning pre-hospital trauma care within the AMEDD Officer Basic Course, the AMEDD Officer Advanced Course, Command and General Staff College and even, realistically, the C4 course. The C4 course (in my era) started at the Role 1. There was some evacuation planning but no mention of actual hands on care standards. So, it is reasonable to expect that my peers who are now senior leaders got the exact same lack of pre-hospital care training. I am an "expert" because everything I learned about pre-hospital care was delivered by USASOC.”



JTS – SOUTHCOM

Telecon: 13 Nov 2014

Senior Enlisted SOF Medic

- TCCC courses used to train units deploying to SOUTHCOM often use an abridged and altered TCCC curriculum rather than the one found on the official TCCC websites. **The curriculum found on the official TCCC websites is often being modified at the unit level by physicians with little or no training in prehospital trauma care.**



E-mail 2014: HM2

Serving with the Marines

**“I personally de-issued the Morphine IM autoinjectors and issued solely Ketamine (Intranasal kits) and OTFC. One of my primary tasks was as the narcotics custodian that issued and de issued narcotics to providers and medics during the deployment
.....As of yesterday, I was given clearance by the Medical Officer who deployed with us (and oversaw the ketamine rollout to our line corpsman during the deployment) to write a short white paper about our ketamine program in Afghanistan. I will expound more on the above cases and I will most definitely send you a copy. ”**



CPT Nick Studer

Emails - Jan 15

USAF 4N Medic Training

- “....they are receiving a 1-2 hour exposure to TCCC during BMT, and not during the 4N tech school itself. After that is variable with no standardization from what I can tell”.”TCCC as a doctrine is not a part of the general 4N MTL nor a focus of the curriculum. The Navy/Air Force combined EMT course that starts 4N "tech school" is designed to get folks past the Nation Registry of EMT's testing in order to generate a civilian certification. “



Does This Make a Difference for Our Casualties?

- **YES!**
- The JTS and AFME have an ongoing trauma care Performance Improvement process.
- The intent is to identify potentially preventable deaths and adverse outcomes
- There are still preventable deaths and adverse outcomes being noted that could have been avoided by adherence to TCCC Guidelines and JTS Clinical Practice Guidelines.
- **The acceptable number of preventable deaths is: ZERO.**



Wall Street Journal

19 September 2014

U.S. News

**Prehospital – 24% of deaths
potentially survivable
(Eastridge 2012)**

Are U.S. Soldiers Dying From Survivable Wounds? Despite Advances in Care, the Military Failed to Save Some Troops in Iraq and Afghanistan From 'Potentially Survivable' Wounds

By
Michael M. Phillips



ELIMINATING ALL DEATHS FROM POTENTIALLY SURVIVABLE INJURIES



MG Thomas Brief
17 October 2014

Preventable Adverse Outcomes

Within the last 12 months:

- One Special Operations member suffered a leg amputation from prolonged tourniquet use
- The same member was put into pulmonary edema at a foreign medical facility from getting 9 liters of NS during resuscitation from hemorrhagic shock
- Another SOF Operator suffered shock from junctional hemorrhage – the unit had no junctional TQs

Proposed Actions

- 1. Commanders at every level in the U.S. military will establish TCCC as the standard of care and ensure that all combatants and medical personnel are trained in the current version of TCCC as posted on the Joint Trauma System (JTS) website and are directed to use these concepts to treat casualties on the battlefield.**
- 2. Combatant Commanders should adopt the JTS CPGs as the standard of care for military hospitals and evacuation platforms in their commands and require that all in-hospital and enroute care trauma care providers be trained in these CPGs prior to deployment as CENTCOM has done during this set of conflicts.**

Non-Standard TCCC Courses





TCCC Training

- **In the absence of a standard TCCC course with a professionally developed curriculum, "TCCC Training" in the DoD can wind up being an hour of Powerpoint slides or 11 days of inappropriate training - or anything in between.**
- **Who is responsible for assuring the content and quality of the course?**



Vendor-Taught TCCC: Butler Experience 2002

In 2002, I was working for the Naval Special Warfare Command and was preparing to deploy to Afghanistan with the Navy Special Missions Unit. I had already trained one of their squadrons in TCCC, but the command wanted me to go to a formal course that supposedly taught TCCC before I deployed. I went to a combat trauma course taught by a commercial vendor near Aquia, VA. The course lasted 11 days with two additional days of travel. The course fee was just over \$2000 per person and with TAD costs, **the total cost to the government for me to take this course was about \$5000. The course did not teach TCCC adequately and was largely a waste of time and money.**



Problems with Non-Standard TCCC Courses

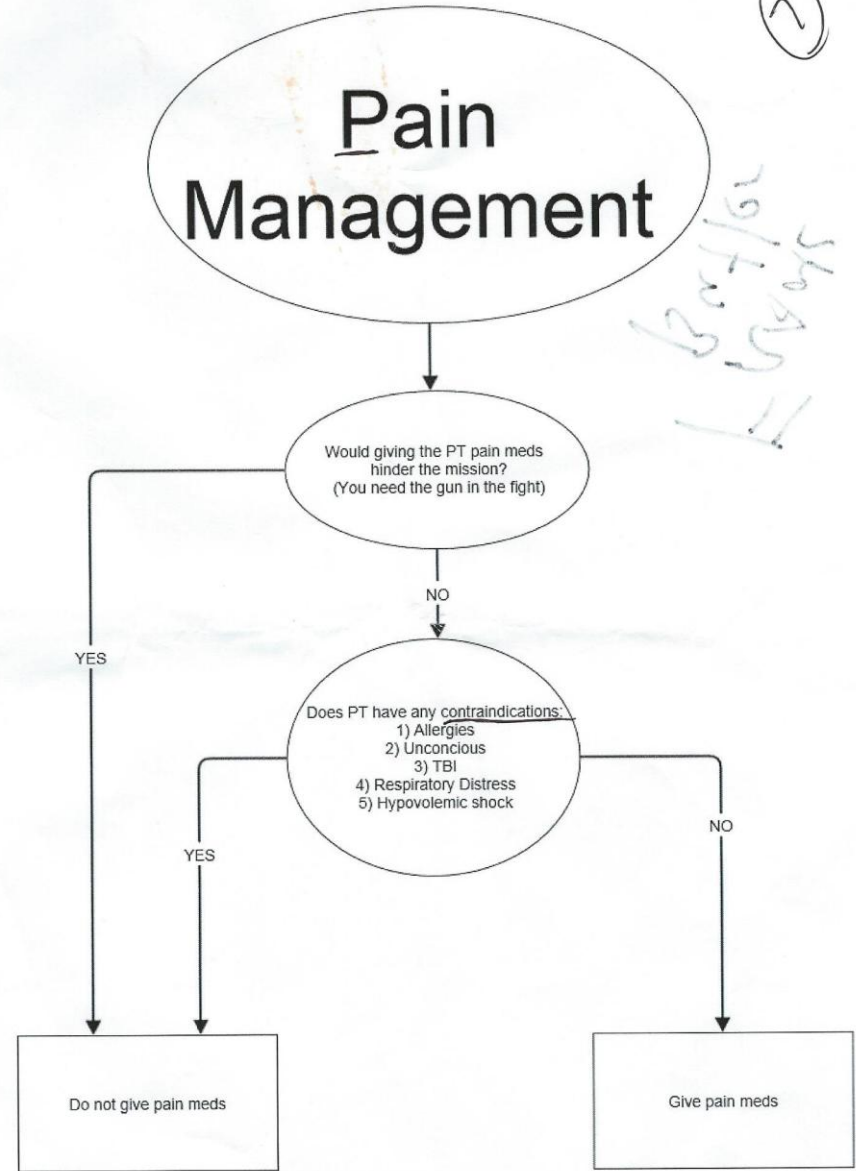
- **Incorrect messaging**
 - *Instructor drift*
 - *“Never take off a tourniquet in the field”*
- **Negative media coverage**
 - *Example 1*
 - *Example 2*
 - *Example 3*
- **Vendor-supplied training is expensive**
- **Inappropriate training**



TCCC Course 2015

Instructor Drift


- Wrong phase
- TBI not a CI for ketamine
- Shock – can use ketamine
- Allergies – not to both





Instructor Drift

Navy Active Shooter GMT



CNIC | TRAINING AND READINESS
THE ACTIVE SHOOTER

Introduction **Render Aid** Extended Incident Actions Question

RENDER AID

If you find yourself in a situation, rendering aid may be difficult, but make the best attempt you can. Try to get to a safe location. Identify the injuries. Do you have more than one person injured? Can other people help with aid?

In this order:

- Apply mouth-to-mouth resuscitation
- Apply direct pressure to wounds to stop bleeding, elevate the wound, and place a tourniquet on limbs, if necessary
- Treat the victim for shock; keep the victim lying down, warm, and elevate the legs

RENDER AID

1. Restore the breathing
2. Stop the bleeding
3. Treat for shock

As of the week of 27 April 2015

References Print/Save Glossary Help < Back Page 2 of 5 Next >



Inappropriate Training

- “Shock labs”
- “Cognition labs”
- Insertion of intraosseous devices on course attendee volunteers
- Regional nerve blocks by non-medical personnel
- Central venous catheter placement by prehospital providers
- Arterial blood draws



Special Ops Major Command Surgeon email: 24 April 2015

- Whole blood field transfusion practical lab here for medics as well as ketamine.
- It is all voluntary, consented and supervised.
- “Almost everyone has some experience with the usual opioids and the ability to walk, talk and obey directions. Ketamine is another matter. We found it very instructive for the non-medical line types to see what effect giving an operator 50 mg of ketamine IM will have on mission. LL: you have at least 2 people off the gun and probably more like 3. In a squad size element that is no small deal. I understand the above is controversial but to not do it can create a real world tactical problem as well.”



TCCC and PHTLS



- This logo was designed, approved and copyrighted by the CoTCCC
- Notice the text at the bottom



TCCC – PHTLS – NAEMT

The Beginning

In 1998, then-RADM Mike Cowan proposed that military medicine contribute a chapter to the Prehospital Trauma Life Support (PHTLS) textbook. PHTLS was led then (and now) by Admiral Cowan's friend, Dr. Norman McSwain, the Director of Trauma at Charity Hospital in New Orleans. The 1996 TCCC Guidelines were part of that first military chapter included in the Fourth Edition of the PHTLS textbook. TCCC has maintained a close and valuable working relationship with PHTLS since 1998. Dr. McSwain was previously a voting member of the Committee on TCCC and is currently the PHTLS liaison to the TCCC Working Group.

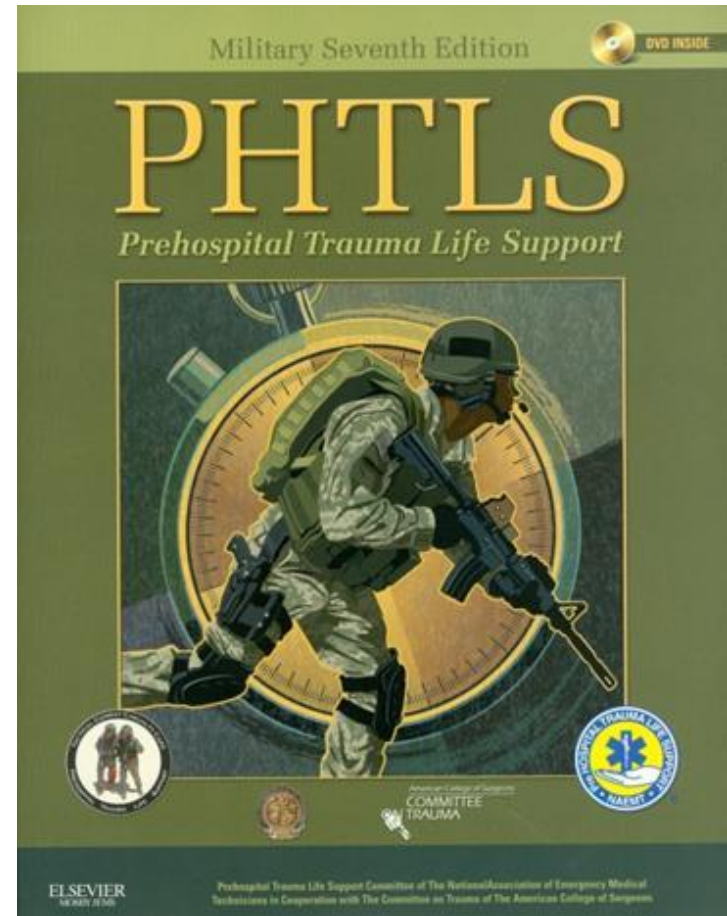


The PHTLS Textbook

- **There is now a separate version of the PHTLS textbook (the current version is PHTLS 8) called PHTLS Military with 13 chapters written by TCCC and other military authors.**
- **The PHTLS textbook carries the endorsement of both NAEMT and the American College of Surgeons Committee on Trauma.**



**TCCC Guidelines:
The *What***
**TCCC Curriculum:
The *How***
**MPHTLS Text:
The *Why***



“Military units that have trained all of their members in Tactical Combat Casualty Care have documented the lowest incidence of preventable deaths among their casualties in the history of modern warfare.”



All TCCC change papers are now published in the JSOM

Est. 2000



Summer 2017
Volume 12, Edition 7
ISSN 1553-9768

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TCCC Curriculum: MHS and NAEMT Websites



- Also direct mailings to DoD combat medical schoolhouses
- Note that the TCCC section on the MHS site is behind a CAC-card firewall



NAEMT TCCC Courses: Origin

How did NAEMT, a civilian organization, start teaching TCCC courses?

About five years ago, the Spanish Special Forces were preparing to deploy to Afghanistan in support of coalition military operations. They contacted me and asked if I would teach a TCCC course for their unit and I agreed to help. I had been working with the TCCC instructors at Naval Hospital Pensacola at the time. With the full support of the Commanding Officer at NH Pensacola, CAPT Maryalice Morro, we assembled a team of instructors and were preparing to travel to Spain to teach this course. The Spanish Special Forces were going to cover travel expenses associated with the trip. Shortly before we were scheduled to leave, however, BUMED officials informed CAPT Morro that NH Pensacola could not accept funds from a foreign government to reimburse travel by US military personnel. The course was subsequently cancelled.



NAEMT TCCC Courses: Origin (continued)

After this episode, knowing that PHTLS is dedicated to improving prehospital trauma care and teaches their PHTLS courses all over the world, **I approached them to see if they would be willing to train the Spanish Special Forces. They agreed, and have been conducting TCCC training for militaries all over the world ever since. They have also been teaching TCCC to law enforcement agencies in the United States and even to US military units, most recently Naval Medical Center, San Diego. Their interest and cooperation in teaching TCCC is well-established, and they use the standard TCCC curriculum as posted on both the the NAEMT and MHS websites, a key point.**



PHTLS/TCCC



- At present, PHTLS-taught TCCC courses are **UP AND RUNNING!**



NAEMT TCCC Courses:

Advantages

- **NAEMT courses use the TCCC-approved curriculum just as it is posted on the NAEMT and MHS websites.**
- **They QA their instructors.**
- **Have a system for establishing training sites that will work very well for the military.**
- **Much less expensive than commercial TCCC vendors.**
- **TCCC certification card at the end of the course.**
- **NAEMT registry of all who complete the course.**
- **NAEMT website is usually the first to have new TCCC curriculum posted**



NAEMT TCCC Courses: **Advantages (continued)**

- **They can also teach two different curricula - one for medics and one for non-medics, which the military needs.**
- **NAEMT TCCC courses do not require the use of live tissue with the associated expense and logistic burden.**
- **Courses are affiliated with both NAEMT and the ACS-COT – recognized leaders in trauma care.**
- **Effort is ongoing right now**



NAEMT TCCC Courses: Scope of Need

- **METC**
- **MTF-based training for physicians, nurses, PAs, and medics**
- **Combat-unit based training for non-medical combatants AND medical personnel**
- **Needs to include provisions for reserve component**



III Corps Surgeon Perspective

- **COL Jim Geracci phonecon 1 May 2015**
- **Agrees with NAEMT standardized TCCC courses – need a recognized card**
- **Emphasizes the need for a DoD funding stream for units to sponsor that course**
- **Just like ACLS, ATLS**
- **Emphasizes the need for unit surgeons to be privileged and credentialled to do TCCC**
- **Emphasizes the need for commander-imposed requirement to be current in TCCC training**



Points of Emphasis

- **After PHTLS establishes training sites at military commands, it will be UNIT personnel doing the TCCC training. They will be certified as NAEMT TCCC Instructors.**
- **The TCCC for All Combatants curriculum can be used as the foundation for Combat Lifesaver courses.**
- **The NAEMT TCCC courses are the baseline. Live tissue training and field exercises may be added by the military unit as desired to enhance the training.**
- **Commercial vendors can also provide NAEMT TCCC courses if certified to do that.**



USFOR-A FRAGO 14-067

21 March 2014

- All physicians, physician assistants, nurse practitioners, medics, corpsmen, parajumpers (PJs) and nurses in CJOA-A (Afghanistan) will be trained in TCCC
- **Training will be done in accordance with current TCCC Guidelines (found on the Joint Trauma System website)**
- Curriculum to support this training is found on the Military Health System website
- Training is reportable to the chain of command
- Units will field the equipment to perform TCCC



Recommendation to Army FORSCOM Surgeon: LTC Bob Mabry 14 Jan 15

FORSCOM Commander Directs

- 1. All physicians, physician assistants, nurse practitioners, and medics, assigned to FORSCOM will be trained in TCCC**
- 2. Training will be done in accordance with current TCCC Guidelines (found on the Joint Trauma System website)**



Questions?