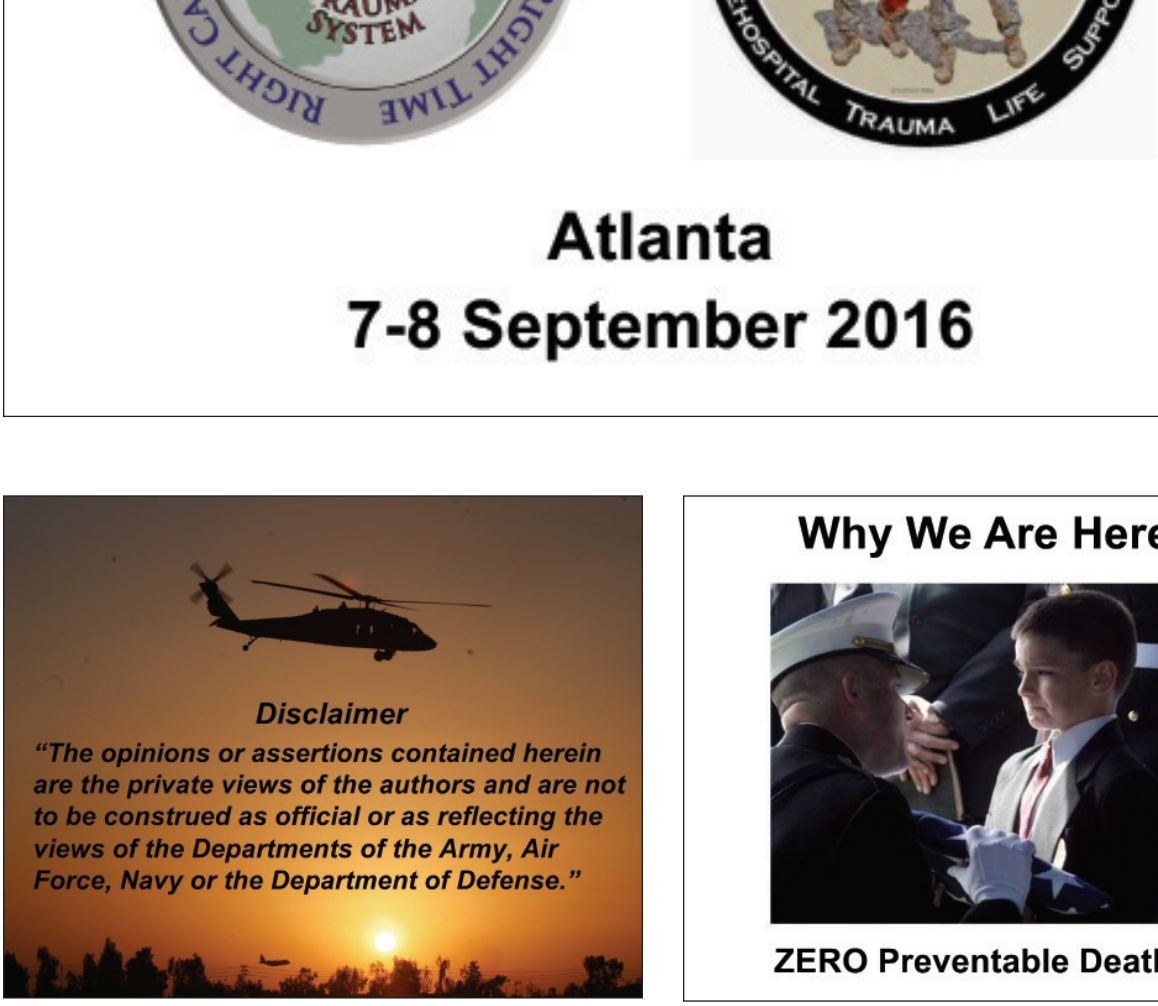
TCCC UPDATES

Committee on Tactical Combat Casualty Care

Atlanta

7-8 September 2016



Why We Are Here

Thanks: SFC (R) Dom Greydanus

ZERO Preventable Deaths!

Tourniquets: The Primary Driver for TCCC

"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, …… of the 2600."

CAPT J.S. Maughon
Mil Med 1970

* Extremity hemorrhage math in Vietnam:
193 of 2600 = 7.4% x 46,233 fatalities = 3,421 preventable US deaths from extremity hemorrhage

TCCC Special Award

- Dr. John Kragh
  USAISR

- Without COL (R) Kragh, we would still be arguing about whether or not to use tourniquets, rather than how best to use them.

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Tactical Combat Casualty Care

Photo – MSG (R) Harold Montgomery

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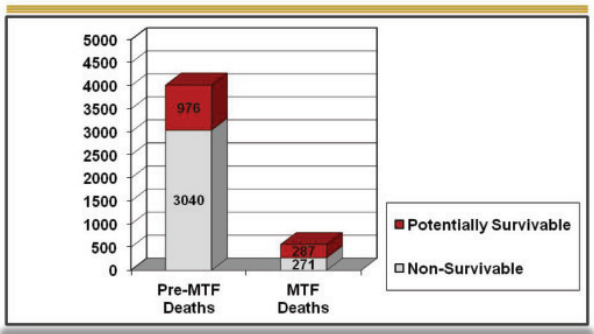
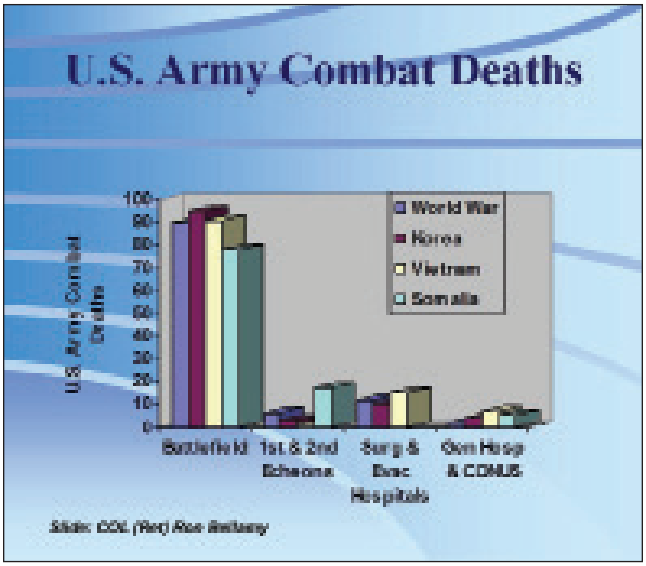
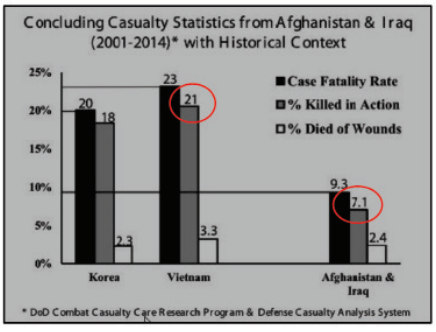
Where can we save the most lives?



Eastridge BJ, Mabry RL, Seguin PG, et al. Death on the battlefield (2001-2011): implications for the future of combat casualty care. Journal of Trauma, 2012. In press.
Eastridge BJ, Hardin M, Cantrell J, et al. Died of wounds on the battlefield: causation and implications for improving combat casualty care. Journal of Trauma, 2011. 71(Suppl 1):4-8.



Better Prehospital Care = Decreased KIAs



2016 IOM Report

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Battlefield Trauma Care: 2001

- Based on trauma courses NOT developed for combat
- Medics taught NOT to use tourniquets
- No hemostatic agents
- No junctional tourniquets
- Large volume crystalloid fluid resuscitation for shock
- Civil War-vintage technology for battlefield analgesia IM morphine)
- SOF medics – IV cutdowns for difficult venous access
- No tactical context for care rendered
- 2 large bore IVs on all casualties with significant trauma
- No focus on prevention of trauma-related coagulopathy
- Heavy emphasis on endotracheal intubation

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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 as needed for facial trauma
- Hypotensive resuscitation (with blood products if feasible)
- 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/XStat

TCCC Team 2016 CoTCCC/JTS PLUS

- Selected TCCC Subject Matter Experts
- Special Operations Medicine
- Prehospital Trauma Life Support/NAEMT
- Trauma and Injury Subcommittee – Defense Health Board
- Military Liaisons
  - Service Medical Departments
  - Combatant Commander Surgeons/reps
  - Office of the ASD for Health Affairs
  - Operational units
  - Combat Doctrine Development and Systems Commands
  - Armed Forces Medical Examiner System
  - Defense Health Agency MEDLOG
  - USAISR + other military medical research labs
  - Combat medical schoolhouses
- Allied Nation Liaisons
- Interagency Liaisons

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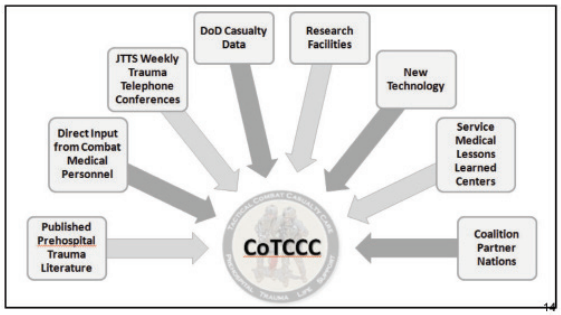
TCCC Lessons Learned

5. Maintain an Active Search for Good Ideas – Wherever They Can Be Found – and Process Them As Though Lives Depended on It

Because, indeed – they do.

Changes to the TCCC Guidelines



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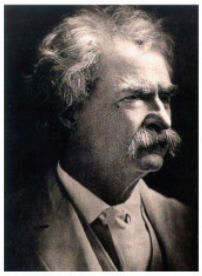
Slide: COL (R) Russ Kotwal

Intraosseous Devices: Direct Medic Input

- SFC Rob Miller – CoTCCC Meeting 2002
- Places an IO device on the table
- "Why aren't we using these things?"
- CoTCCC agreed – despite minimal use in prehospital trauma care at the time
- Now used universally in the US Military

TCCC Literature Review



"First get your facts; then you can distort them at your leisure."

Mark Twain

TCCC Journal Watch

TCCC Article Abstracts: Monthly focused PUBMED search of prehospital trauma literature

TCCC Distro List
- TCCC Change Notices
- TCCC Article Abstracts
- TCCC Info Items

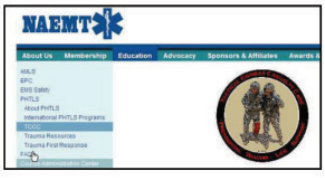
* To be added to the list: danielle.m.davis.civ@mail.mil

"Three Things I Would Change in TCCC" Talks

- Surg CAPT Steve Bree – February 2016
- Top recommendation – add pelvic binders
- TCCC Working Group agreed
- Proposed change on pelvic binders pending – Col Stacy Shackelford

All TCCC change papers are now published in the JSOM
- Searchable in PUBMED
- Permanent part of the published medical literature

TCCC Curriculum: MHS and NAEMT Websites



- Also SOMA and JSOM
- Also direct mailings to DoD combat medical schoolhouses
- Dr. Steve Giebner

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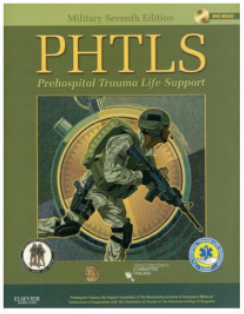
TCCC Guidelines:
The *What*
TCCC Curriculum:
The *How*
MPHTLS Text:
The *Why*
TCCC Change Papers
The *Detailed Why*



"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."

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

- Near universal DoD acceptance after 14 years of war
- 67% reduction in deaths from extremity hemorrhage
- Tarpey 2005: "Overwhelming Success" in 3rd ID
- Kragh: Estimated over 1000 lives saved with tourniquet use – in 2008
- Kotwal: Lowest incidence of preventable deaths ever documented by a combat unit
- Savage: Highest casualty survival rate in Canadian Military's history
- Acceptance by NAEMT/American College of Surgeons /Hartford Consensus/WH Stop the Bleed[2]

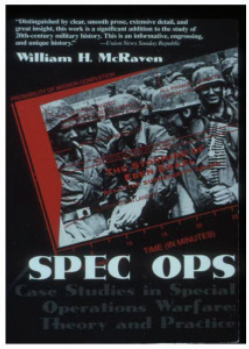
TCCC: The Tactical Imperative

How many lives and missions have been saved by tactically appropriate battlefield trauma care?

Care Under Fire

- If the firefight is ongoing - don't try to treat your casualty in the Kill Zone!
- Suppression of enemy fire and moving casualties to cover are the major concerns.
- The best medicine on the battlefield is Fire Superiority!

Then-Commander Bill McRaven



Raid on Entebbe

ADM Bill McRaven

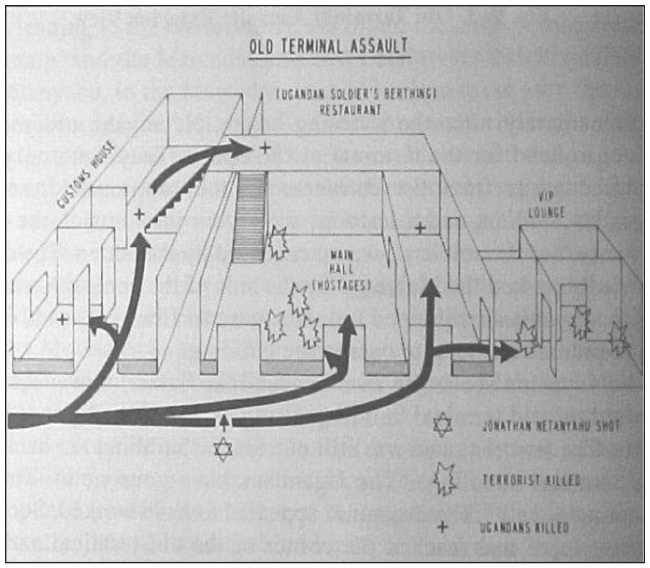
- 27 June 1976
- Air France Flight 139 hijacked
- Flown to Entebbe (Uganda)
- 106 hostages held in Old Terminal at airport
- 7 terrorists guarding hostages
- 100 Ugandan troops perimeter security
- Israeli commando rescue planned

Raid on Entebbe

ADM Bill McRaven

The Rescue: 4 July 1976

- Exit from C-130 in a Mercedes and 2 Land Rovers to mimic mode of travel of Idi Amin – the Ugandan dictator at the time
- Israeli commandos dressed as Ugandan soldiers
- Drove up to the terminal - shot the Ugandan sentry
- Assaulted the terminal through 3 doors



Raid on Entebbe

ADM Bill McRaven

- **LTC Yoni Netanyahu – the ground commander – shot in the chest at the beginning of the assault**
- **What should the medic do?**
  - **Disengage from the assault?**
  - **Start an IV?**
  - **Immediate needle decompression of chest?**

Raid on Entebbe

ADM Bill McRaven

"As previously ordered, the three assault elements disregarded Netanyahu and stormed the building."

"At this point in the operation, there wasn't time to attend to the wounded."

Do seconds really matter in combat?

Ma'a lot Rescue Attempt

ADM Bill McRaven

- **15 May 1974**
- **3 PLO terrorists take 105 hostages**
- **Schoolchildren and teachers**
- **When assault commenced, terrorists began killing hostages**
- **22 children killed, 56 wounded**
- **The difference between a dramatic success and a disaster may be measured in seconds.**

Recent Feedback from a TCCC Student

"I have never even heard of the Raid on Entebbe. Why do we need to learn about military history?"

There are only two times that you can plan for what to do in a tactical casualty situation....

SEAL Hostage Rescue Mission – Afghanistan 2012

- Quick-reaction hostage rescue
- Helicopter insert
- 4-hour patrol to target
- Point man shot in the head on building entry
- Do you stop and treat the casualty?
- Or do you rescue the hostage and neutralize the terrorists first?

SEAL Hostage Rescue – Afghanistan 2012

- Second assaulter killed one hostile
- Secured the hostage (an American physician)
- Held a second hostile by the throat until he could be neutralized by another team member
- Room cleared - hostage passed off
- THEN the second assaulter, a corpsman, began to treat the casualty

SCPO Ed Byers – The Second Assaulter

The Tactical Imperative: *Senior SOF Leader Quote*

"I watched with tremendous pain as the (*nation redacted*) failed in a mission because they stopped mid-assault to care for one of their wounded. It ended up costing them three more lives and a failed rescue attempt. We should never forget that you have to secure the target quickly so you don't lose more lives and you can then save the ones that are injured."

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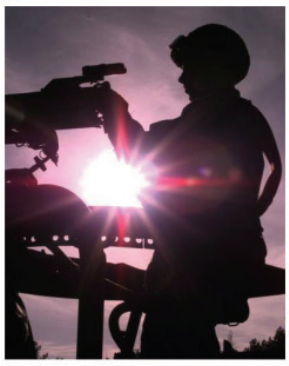
Meeting Overview



Agenda
7 Sept 2017 - AM

AM		
0800	Butler	Admin Remarks and Introductions
0830	McKenzie	Combat Medic Presentation
	Parrish	
	King	
0900	Brinsfield	Senior Leader Remarks
0930	Break	
0945	Talley	Senior Leader Remarks
1015	Stockinger	JTS Director Brief
1045	Murray	Antibiotics in TCCC
1115	Butler	TCCC Update
1145	Cordoni	Army TCCC Initiatives
1200	Lunch	

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Agenda
7 Sept 2017 - PM

PM		
1300	Kragh	Tourniquet Update
1330	Montgomery	TCCC Comprehensive Review Change
1400	Group	Discussion
1430	Break	
1445	Riesberg	Prolonged Field Care
1515	Baer	CCCRP Feedback - TCCC RDT&E Priorities
1545	Curnoles	BORSTAR Overview
1615	Miles/Conklin	75th Ranger Regt Whole Blood Program
1645	Finish	
1800	Dinner	

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Agenda
8 September 2016 - AM

AM		
0800	Butler	Administrative Remarks
0815	Decker	Combat Medic Presentation
0845	Cordts	Senior Leader Remarks
0915	Giebner	TCCC Curriculum 2016
0945	Break	
1000	Fang	Three Things I Would Change about TCCC
1030	Knapp	TCCC in the ATF
1100	Holcomb	NAS Trauma Care Report
1130	Eastman	TCCC in TEMS
1200	Lunch	

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Agenda
8 September 2016 - PM

PM		
1300	Zeber	DHA MEDLOG
1330	Barrigan	TCCC Mobile App/Website
	Montgomery	
	Group	TCCC Mobile App Discussion
1430	Break	
1445	Butler	Pelvic Binders
1515	Kotwal	Junctional Tourniquets
1545	Geracci	Current TCCC Issues in Theater
1615	Butler	Wrap-Up
1630	Finish	

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Dr. Frank Butler

TCCC Update

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TCCC Award

Outstanding Contributions to TCCC

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TCCC Award Previous Winners

2006	CAPT Frank Butler
2007	CAPT Steve Giebner
2008	Dr. Norman McSwain
2009	COL (R) John Holcomb
2010	MSG Harold Montgomery
2011	LTC Bob Mabry
2012	COL Russ Kotwal
2013	No award
2014	No award
2015	Mr. Don Parsons

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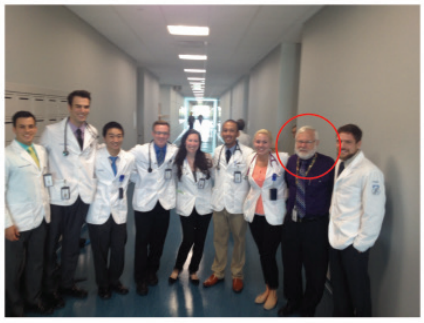
2016 TCCC Award



COL Warner (Rocky) Farr

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A Preventable Death: 2003

- RPG explosion
- Bled to death from his right knee wound despite three field-expedient tourniquets
- "A picture is worth 1000 words"
- This one was worth 1000+ lives

Holcomb et al
Annals of Surgery 2007

2016 TCCC Award

Col Stacy Shackelford

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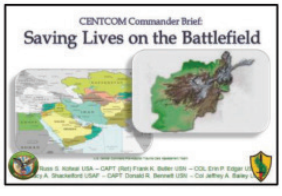
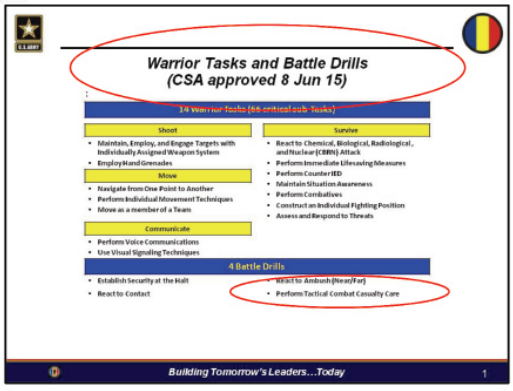
Saving Lives on the Battlefield I (2012)

- 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 Stacy Shackelford
- COL Erin Edgar
- COL Russ Kotwal (I)



Army Chief of Staff Approves TCCC as a Warrior Task



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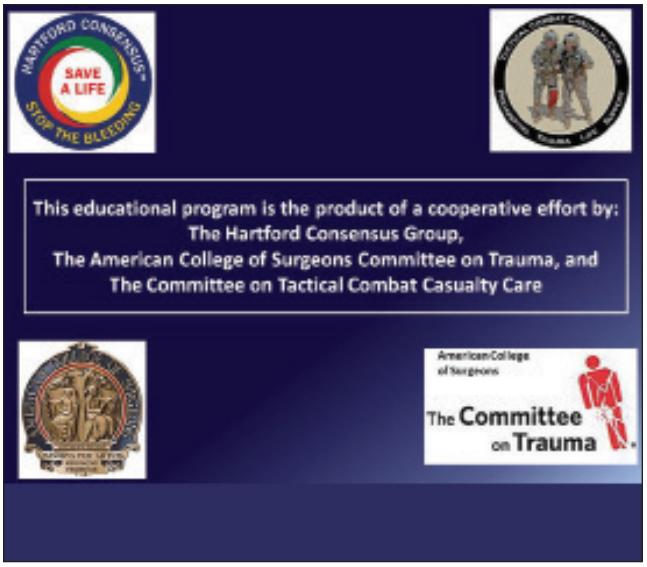
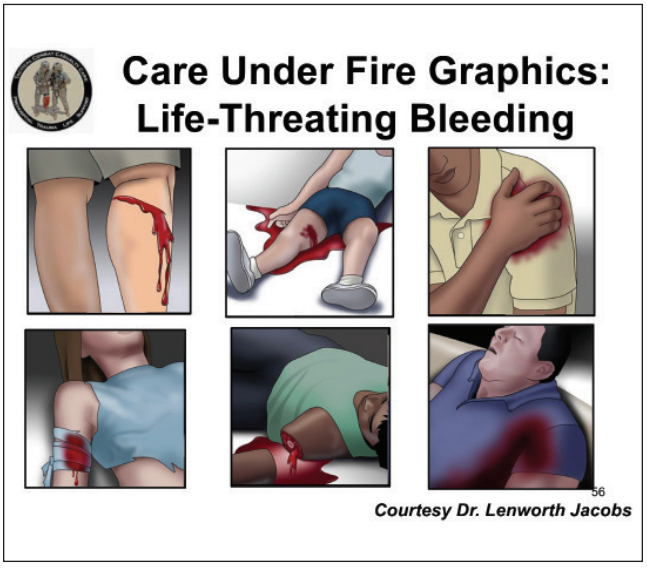
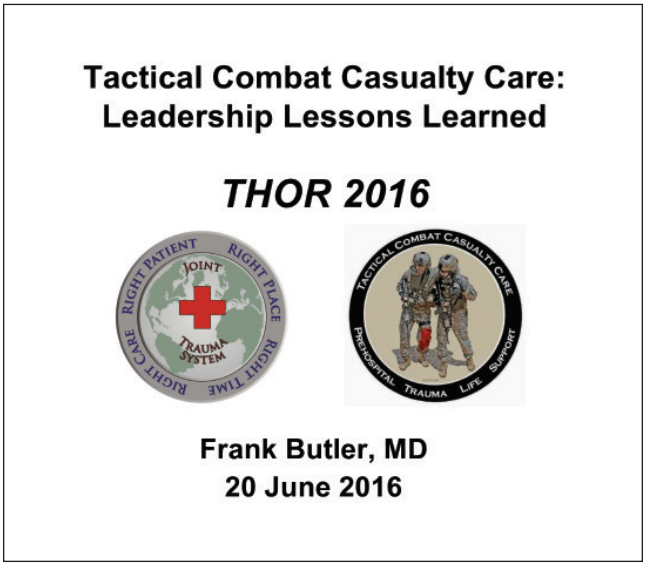
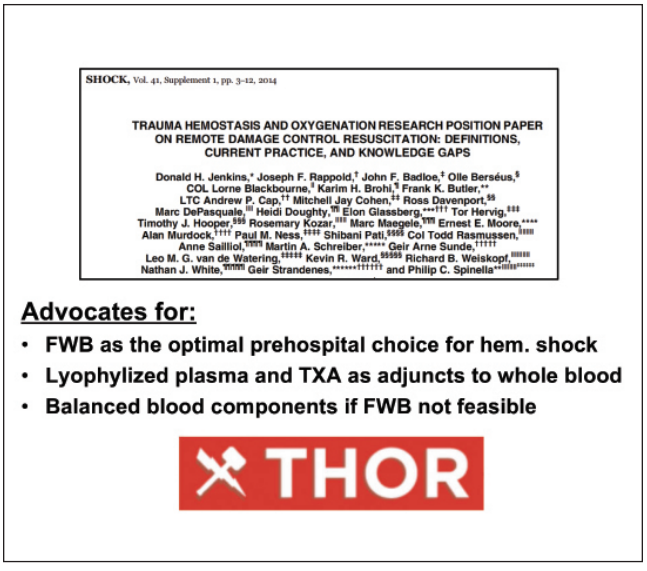




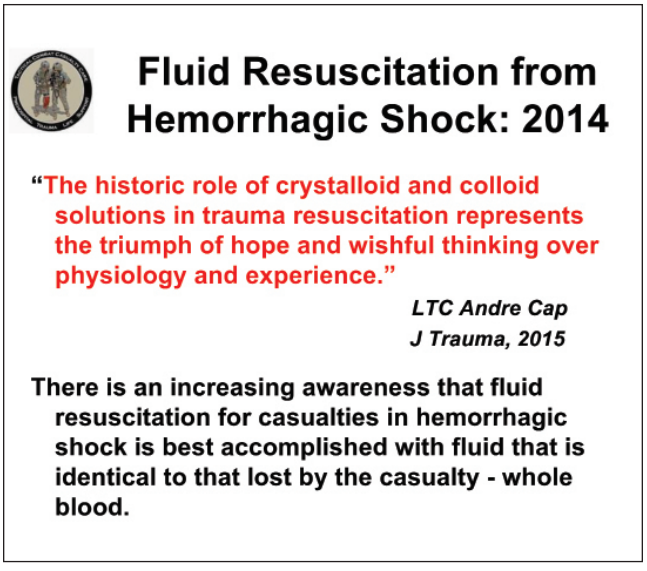




Advocates for:

- FWB as the optimal prehospital choice for hem. shock
- Lyophylized plasma and TXA as adjuncts to whole blood
- Balanced blood components if FWB not feasible

THOR



TCCC Fluid Resuscitation fm Hemorrhagic Shock: 2014

Fluid Resuscitation for Hemorrhagic Shock in Tactical Combat Casualty Care

TCCC Guidelines Change 14-01 – 2 June 2014

Frank K. Butler, MD; John B. Holcomb, MD; Martin A. Schreiber, MD; Russ S. Kotwal, MD; Donald A. Jenkins, MD; Howard R. Champion, MD, FACS, FRCS; F. Bowling; Andrew P. Cap, MD; Joseph J. Dubose, MD; Warren C. Dorlac, MD; Gina R. Dorlac, MD; Norman E. McSwain, MD, FACS; Jeffrey W. Timby, MD; Lorne H. Blackbourne, MD; Zsolt T. Stockinger, MD; Geir Strandenes, MD; Richard B, Weiskopf, MD; Kirby R. Gross, MD; Jeffrey A. Bailey, MD

2000 cc blood loss

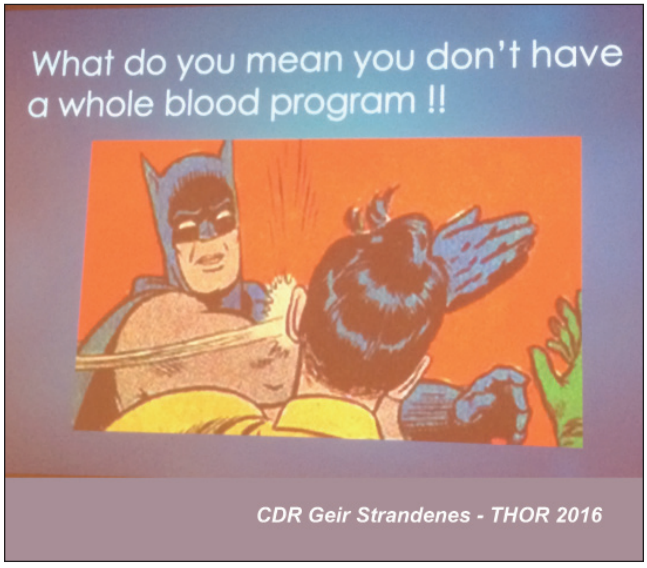
TCCC Fluid Resuscitation fm Hemorrhagic Shock: 2014

Updated Fluid Resuscitation Plan

Order of precedence for fluid resuscitation of casualties in hemorrhagic shock

1. Whole blood
2. 1:1:1 plasma:RBCs:platelets
3. 1:1 plasma and RBCs
4. (tie) Plasma (liquid, thawed, dried) or RBCs alone
8. Hextend
9. (tie) Lactated Ringers or Plasma-Lyte A

Butler et al – JSOM 2014



Reduced killed in action rate associated with pre-hospital blood product transfusion during air ambulance evacuation in combat operations in Afghanistan

MHSRS August 2016

Col Stacy Shackelford, Deborah J del Junco, PhD, LTC Nicole Powell-Dunford, LtCol Edward Mazuchowski, Jeffrey T Howard, PhD, COL (Ret) Russ S Kotwal, LTC Jennifer Gurney, CAPT (Ret) Frank Butler, COL Kirby Gross, CAPT Zsolt Stockinger

Joint Trauma System, U.S. Army Institute of Surgical Research
3698 Chambers Pass, Bldg 3611, Fort Sam Houston, TX 78234

Table 2. Medevac Study Population Post-treatment Characteristics & Outcomes

Unadjusted Post-treatment Between-Group Differences	Transfused Pre-hospital	Not Transfused Pre-hospital	*p* value*
*KIA (%)	2 (3.8%)	58 (20.3%)	0.003*
*Died (KIA + DOW) within 24 hours of MEDEVAC take-off from POI (%)	2 (3.8%)	64 (22.4%) 6-fold benefit	0.001*
*Died (KIA + DOW) within 30 days (%)	5 (9.4%)	77 (26.9%) 3-fold benefit, NNT ≤ 6	0.005*
*Tranexamic Acid [TXA] (%)	48 (90.6%)	144 (50.3%)	<0.001*
Documented shock [SBP<90, HR>120 or shock index >0.9] upon ED arrival (%)	N=52 39 (75%)	N=233 137 (63%)	0.110
*Massive Transfusion [>10 units/24hrs] (%)	40 (75%)	119 (42%)	<0.001*
ISS: Median (IQR)	29 (17, 36)	24 (17, 36)	0.179
AIS Score indicating torso hemorrhage (%)	22 (41.5%)	108 (37.8%)	0.646

*Statistically significant at <0.05 level by Fisher's exact test.

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TCCC Red/Green Chart: Opportunities to Improve

	Yes	No
Evidence-Based		
Continually Updated		
Strategic Messaging		
Medical Rapid Fielding Plan		
TCCC Training Standardized and Mandated		
Physician TCCC Training		
DoD-FDA Panel		
TCCC Documentation		

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TCCC Lessons Not Quite Learned - Yet

1. Medical Rapid Fielding Initiative

Saving Lives on the Battlefield 1 – Kotwal et al

"**8. Unit equipment sets and supporting medical logistics systems have not kept pace with evolving pre-hospital care TCCC guidelines.** Out-dated items remain within the supply chain and newly required items have not yet been incorporated into standard configurations."

Butler, Smith Carmona J Trauma 2015

SPECIAL REPORT

Implementing and preserving the advances in combat casualty care from Iraq and Afghanistan throughout the US Military

Frank K. Butler, MD, David J. Smith, MD, *and* Richard H. Carmona, MD, *San Antonio, Texas*

"The US Military had not effectively sustained many of the lessons learned from past conflicts and went to war in Afghanistan without wide availability of tourniquets, without modern battlefield analgesics, without prehospital plasma, and without trauma care guidelines designed specifically for use on the battlefield. Hemostatic dressings had not yet been developed and fielded. There was no military deployed trauma system, no Department of Defense trauma registry (DoDTR), no weekly worldwide trauma teleconferences to review treatments and outcomes for all casualties occurring in the preceding week, and no Committee on Tactical Combat Casualty Care (CoTCCC)."

Butler, Smith Carmona J Trauma 2015

6. No DoD-wide program exists at present to ensure that newly recommended technology, techniques, and medications in combat casualty care are quickly and reliably made available to those who care for our casualties. A medical Rapid Fielding Initiative program should be established to expedite delivery of newly recommended combat casualty care equipment and training to deployed and deploying forces and to gather feedback on the initial experience with this newly fielded equipment.

Red/Green Chart for New TCCC Equipment

	US Army	US Navy	US Air Force	USMC	SOF
Junctional Tourniquets	Yes	No	No	No	Partial Fielding
CricKey	No	No	No	No	No
XStat	No	No	No	No	No

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Preventable Adverse Outcomes

December 2013:

- SOF Operator suffered shock from junctional hemorrhage
- His unit did not field junctional tourniquets

Preventable Adverse Outcomes

Late 2015 – Somewhere in Theater:

- SOF unit on patrolling with host nation forces
- dIED attack with 5 casualties
- 1 died KIA from lower extremity junctional hemorrhage
- His unit did not field junctional tourniquets

Junctional Hemorrhage and Prehospital Time after Injury

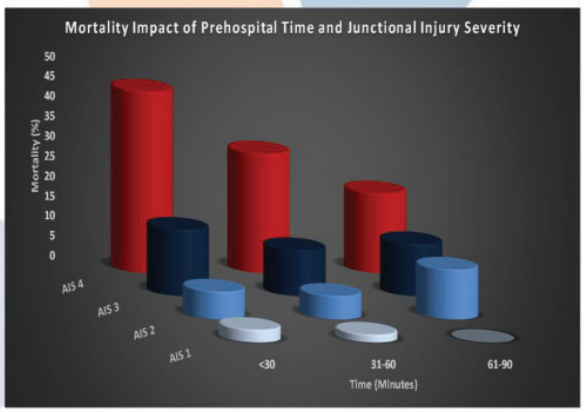
Highlighting the Need for Novel Strategies to Control Complex Sources of Hemorrhage and Temporize Survival to Definitive Care

Alarhayem, A, Johnson, M, Shackelford, S, Butler, F, Eastridge, B

WE MAKE LIVES BETTER
UT HEALTH SCIENCE CENTER
SAN ANTONIO

Background

- Exsanguination remains the leading cause of mortality after injury.
- With the widespread use of tourniquets, junctional hemorrhage surpassed extremity bleeding as the leading cause of death from external hemorrhage on the battlefield.

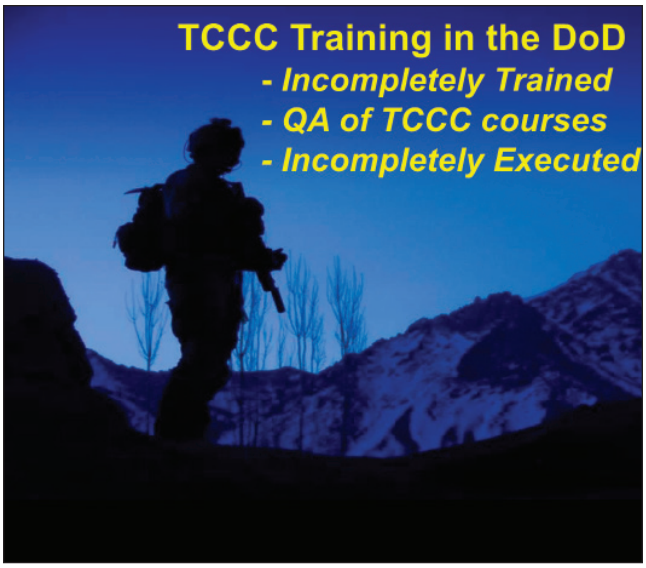


Key Findings

- Risk of death was increased with AIS injury grades of junctional injury
  - Increasing severity of anatomic disruption associated with more significant hemorrhage
- Patient mortality with high grade junctional injury was high even with prehospital times ≤ 30 minutes

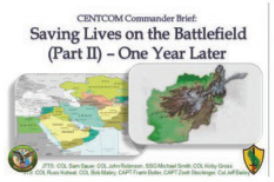
TCCC Lessons Not Quite Learned - Yet

2. TCCC Training Standard



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 Samual Sauer (II)



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.

Non-Standard TCCC Courses

- Many "TCCC" courses – aren't!
- Incorrect messaging
  - *Instructor drift*
  - *"Never take off a tourniquet in the field"*
- Incorrect messaging has been DIRECTLY associated with adverse outcomes
- Inappropriate training
- Vendor-supplied training is expensive

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Preventable Adverse Outcomes

December 2013:

- One Special Operations member suffered a leg amputation from prolonged tourniquet use – only amputation from tourniquet use in US forces
- Unit members had been told never to take off a tourniquet in the field at their "TCCC" course. Tourniquet was left on for over 8 hours.
- The same member was put into pulmonary edema at a foreign medical facility from getting 9 liters of NS during resuscitation from hemorrhagic shock – where are the JTS CPGs? (Non-CENTCOM AOR)

Do You Really Know What Your Medics Are Learning?

U.S. doctor sanctioned for 'abhorrent and abnormal' troop training

- "Shock Labs"
- "Cognition Labs"
- Arterial Blood draws
- Sternal IO insertion on volunteers
- Regional blocks by non-medics

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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?

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Joint Trauma System White Paper to Service SGs

DEPARTMENT OF THE ARMY
U.S. ARMY INSTITUTE OF SURGICAL RESEARCH
3698 CHAMBERS PASS
JBSA FORT SAM HOUSTON, TEXAS 78234-6315

REPLY TO ATTENTION OF

11 September 2015

LTG Patricia Horoho, Surgeon General, United States Army
VADM Matthew Nathan, Surgeon General, United States Navy
Lt Gen Mark Ediger, Surgeon General, United States Air Force
RDML David Lane, Medical Officer of the Marine Corps

SUBJ: Establishing a DoD Standard for TCCC Training

- Outlines the problem
- Documents the bad outcomes from nopn-standardized TCCC training
- Recommends that we use the JTS-developed TCCC curriculum as taught through NAEMT

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NAEMT Course Advantages

- They use the JTS curricula
- They QA their instructors.
- Have a system for establishing training sites
- Less expensive than commercial training vendors.
- Certification card at the end of the course.
- NAEMT registry of all who complete the course.
- Options: Bleeding Control
  Law Enforcement First Responder
  Tactical Combat Casualty Care – AC
  Tactical Combat Casualty Care - MP

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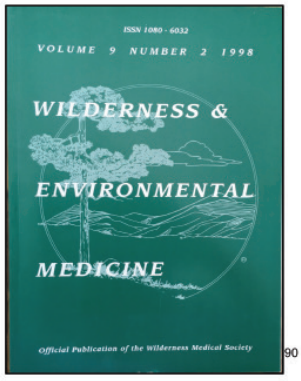
Tactical Combat Casualty Care: Beginnings

Wilderness Medical Society
TCCC Preconference
30 July 2016

Dr. Brad Bennett

Tactical Management of Wilderness Casualties in Special Operations

Wilderness and Environmental Medicine
1998
Butler and Zafren, eds



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TCCC Trademark Issues

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TCCC Trademark Issues

- Provisional trademark on "Tactical Combat Casualty Care "(TCCC"granted to private individual in 2012
- No association with JTS or CoTCCC
- Misrepresenting TCCC approval of equipment[92]

TCCC Trademark Issues

- Cease and desist letters to locations teaching NAEMT-taught TCCC courses

TCCC Trademark Issues

- The inappropriate "Tactical Combat Casualty Care (TCCC) trademark that was granted to a private sector individuals has now been surrendered after legal action.
- THANKS to MEDCOM and MRMC legal as well as private sector participants.

TCCC Knowledge Products

danielle.m.davis.civ@mail.mil

- TCCC Guidelines
- TCCC Curricula – Medical and All Combatant
- TCCC web sites – MHS/NAEMT/SOMA/JSOM
- TCCC Chapters in PHTLS 8 (Military)
- TCCC Change Papers
- TCCC Article Abstracts and Bibliography
- TCCC "Bulletized" - pending
- TCCC Mobile – pending
- TCCC Handbook - pending
- TCCC Section in Up-To-Date?

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TCCC Handbook PDF First – Then App

- TCCC Algorithms
- Abbreviated Guidelines
- Equipment lists
- DD 1380 and AAR Forms
- Triage Categories – JTS Examples
- Kotwal/Monty planning chapter - abbreviated
- Nine line
- Single page drug reference
- Videos on procedures
- Video of when to do the procedures

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An Eight Year Experience with Prehospital Tourniquets at a Civilian Level I Trauma Center

M. H. Scerbo MD, J. B. Holcomb MD, K. Gates MD, J. Mumm, MD, J.D. Love, DO, C.E. Wade, PhD, B.A. Cotton MD, MPH

From the Departments of Surgery and Emergency Medicine
The Center for Translational Injury Research
University of Texas Health Science Center
Houston, Texas

Results: TIMING

- Hypothesis 3: Pre-hospital placement decreases death from hemorrhagic shock

	Pre-hospital (n=252)	Trauma Center (n=29)	*P* value
Arrival Systolic BP	125 (100, 145)	101 (86, 123)	<0.01
Δ Systolic BP	1 (-12, 28)	-10 (-15, 26)	0.03
Arrival HR	98 (82, 115)	110 (90, 129)	0.10
Arrival GCS	15 (14, 15)	15 (3, 15)	0.17
% CAT+ (n)	34 (85)	55 (16)	0.02
Mortality			
All-cause	5%	14%	0.07
Hemorrhagic shock	3%	14%	0.01

Conclusions

- Tourniquets can be used safely for every day civilian trauma
- Pre-hospital application is beneficial
- Civilian guidelines should include early tourniquets for major limb trauma vs pressure dressings

**** FKB: Mortality from HS INCREASES BY 360% when indicated tourniquets are not applied until the trauma center***

Questions?

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TCCC Action Items

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TCCC Red/Green Chart: Opportunities to Improve

	Yes	No
Evidence-Based		
Continually Updated		
Strategic Messaging		
Medical Rapid Fielding Plan		
TCCC Training Standardized and Mandated		
Physician TCCC Training		
DoD-FDA Panel		
TCCC Documentation		

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Changes to the TCCC Guidelines

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TCCC Action Items: 2013

- TCCC Casualty Card
  - Kotwal
- Vented chest seals
  - Butler/CAPT Don Bennett
- Junctional tourniquets
  - Kotwal
- Triple-Option Analgesia
  - Butler

TCCC Action Items: 2014

- Alternate hemostatic dressings
  - Bennett
- Fluid resuscitation
  - Butler
- Updated tourniquet use guidelines
  - Shackelford

TCCC Action Items: 2015

- Zofran in for Phenergan
  - Onifer
- CricKey for Surgical Airways
  - Mabry
- Abdominal Aortic Junctional TQ
  - Not recommended
- XStat
  - Sims/Bowling

TCCC Action Items: 2016

- ITClamp
  - Not Recommended
- Pelvic Binders
  - Pending - Shackelford
- Comprehensive Review
  - Pending - Montgomery

TCCC Action Items: 2016

- iGel as SGA of choice in TCCC?
  - Otten
- Increase ketamine initial dose?
  - Fisher?

TCCC – Potential Action Items:

- Reword positioning for NDC (IA Partner)
  - Injured side up
  - Blood lower
- Foley balloon catheter treatment of head and neck bleeding (Weppner 2013)
  - XStat?
  - Hemostatic dressing plus iTClamp?

TCCC – Potential Action Items:

- Improved options for decompression of tension pneumothorax
  - Finger thoracostomy
  - Veres needle (Peter Rhee)
  - ThoraQuik
  - 10 Fr Vygon thoracic trocar (IDF)
  - Donaldson Needle
  - Other?

TCCC – Potential Action Items

- Manual compression of abdominal aorta for junctional hemorrhage if no junctional tourniquet is available and CG is not working?
- Review the use of c-collars and spinal immobilization in TCCC
- Traction splinting recommendations?
- What else?

Future Technology Items

<u>After FDA Approval and/or More Studies</u>

- ResQFoam
- Compensatory Reserve Index Monitor OR POI lactate monitoring OR tissue O2 sat

<u>After USAISR Testing</u>

- AAJT
- What else?

Changes to the TCCC Curriculum

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TCCC Curriculum 2017

- New material on the Raid on Entebbe – compare to the Byers MOH operation
- More emphasis on tightening the CAT encircling band?

TCCC Curriculum 2017

- Suggestions for TCCC training beyond the 2-day JTS course?

TCCC Training: Options

- 2-Day TCCC-MP Course: the Foundation
- Buddy training – anatomy demonstrations
- Trauma Lanes
- Battle Drills
- Trauma center rotations
- Part-Task Trainer (Airway Sim, etc)
- Cadaver training
- Live tissue training
- High-End Simulators
- Hyper-realistic Training
- Role players with cut suits
- Computer-Generated Scenarios

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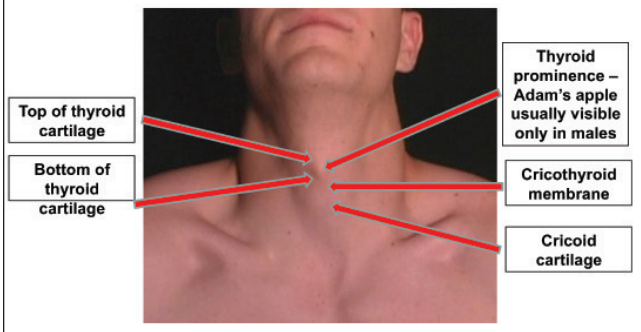
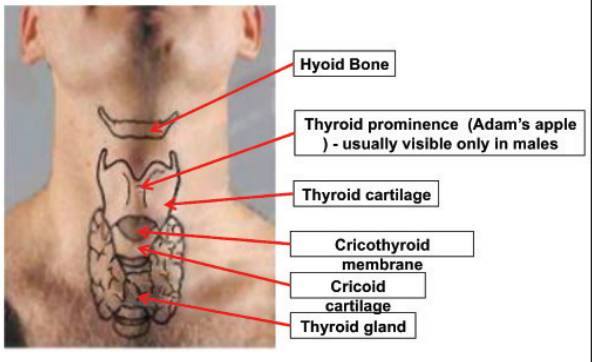
TCCC Curriculum 2017

- Anatomic demonstration of NDC sites using training buddies (as with cric incision)?

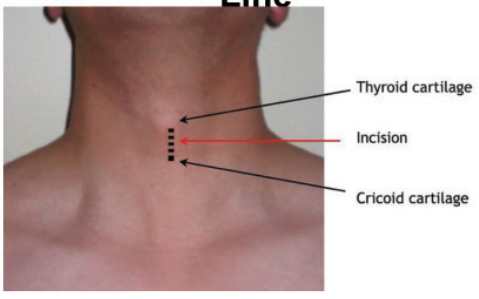
Surface Landmarks for Cricothyrotomy



Beneath the Surface Landmarks



Locating the Cric Skin Incision with a Dotted Line

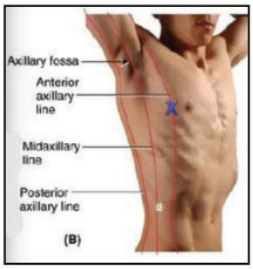


Macdonald JC , Tien HC. *Emergency Battlefield Cricothyrotomy.* CMAJ 2008;178:1133-1135

Bennett BL, Cailteux-Zevallos B, Kotora J. *Cricothyroidotomy bottom-up training review: battlefield lessons learned.* Mil Med. 2011 Nov;176(11):1311-9.

Alternate Site for Needle Decompression

- An acceptable alternate site is the 4th or 5th intercostal space at the anterior axillary line.
- The 5th 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.



TCCC Curriculum 2016

- **IV medication skill sheets and practical**
- **Voice-over presentations for JKO?**
  - **Engle/Gross**
- **What else?**

Finish

Thank You!

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The Special Operations Medical Association's Official Journal

JSOM

JOURNAL *of* SPECIAL OPERATIONS MEDICINE™

Fall 2016
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THE JOURNAL FOR OPERATIONAL MEDICINE AND TACTICAL CASUALTY CARE

Inside this Issue:

Dedicated to the Indomitable Spirit and Sacrifices of the SOF Medic

A Peer-Reviewed Journal That Brings Together the Global Interests of Special Operations' First Responders