TACTICAL COMBAT CASUALTY CARE: OVERVIEW

John V. Gandy, MD


I come as one, but stand as ten thousand.
-Maya Angelou

AGENDA

- Bottom Line Up Front
- Brief History of TCCC
- Current state of TCCC
- Opportunities for Improvement
- Peer to Peer
- Closing Thoughts

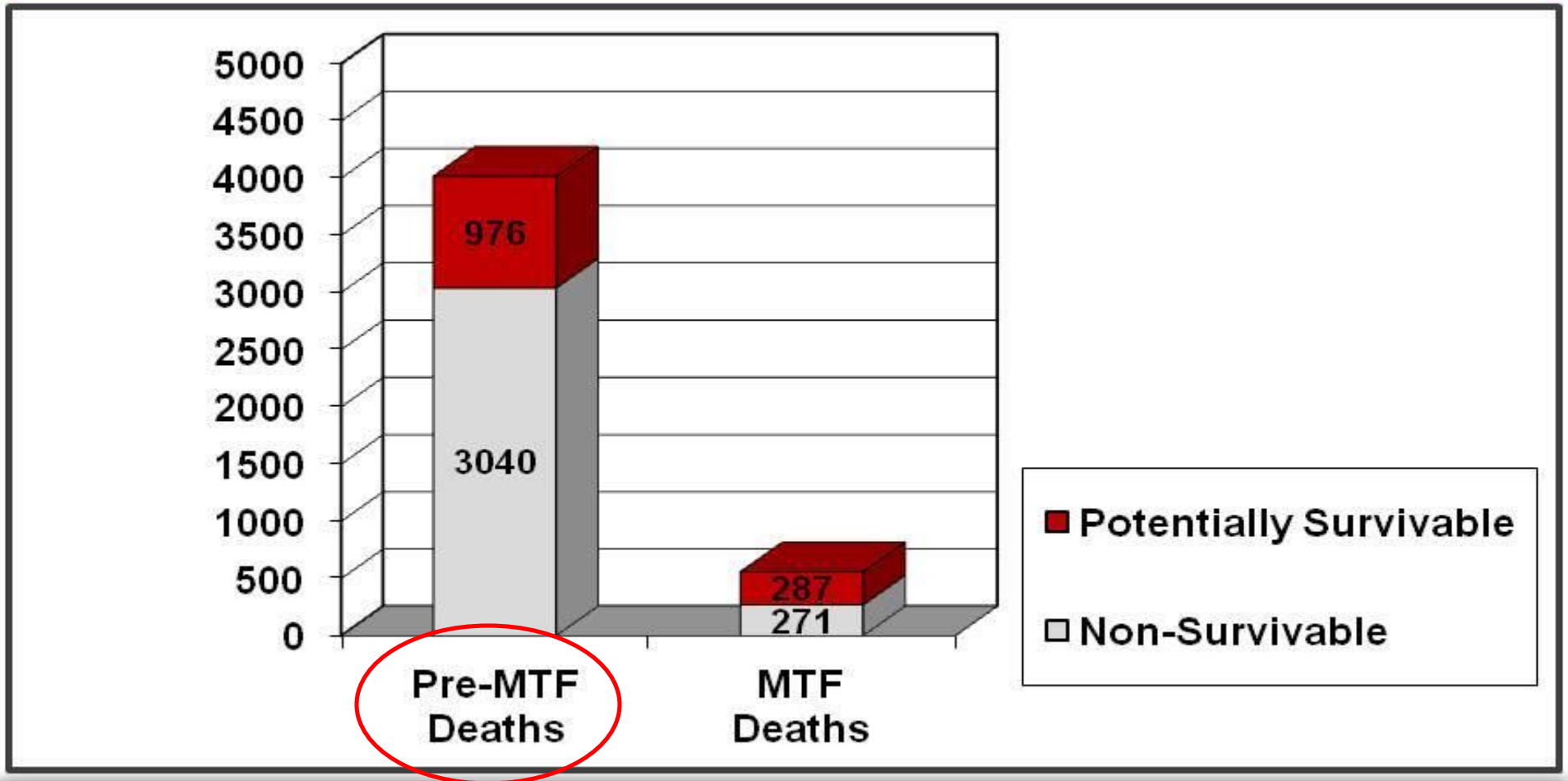
TCCC: FIRST ECHELON CARE

- Trauma care management strategies customized for the combat environment with the goal of eliminating preventable deaths on the battlefield
- Role 1
- Point of Injury (POI) to the first resuscitative surgical capability
- Self aid
- Buddy care
- Medics, Corpsmen, and Pararescuemen (PJ)
- Unit level Physician's Assistants and Physicians
- MEDEVAC
- CASEVAC

BOTTOM LINE UP FRONT

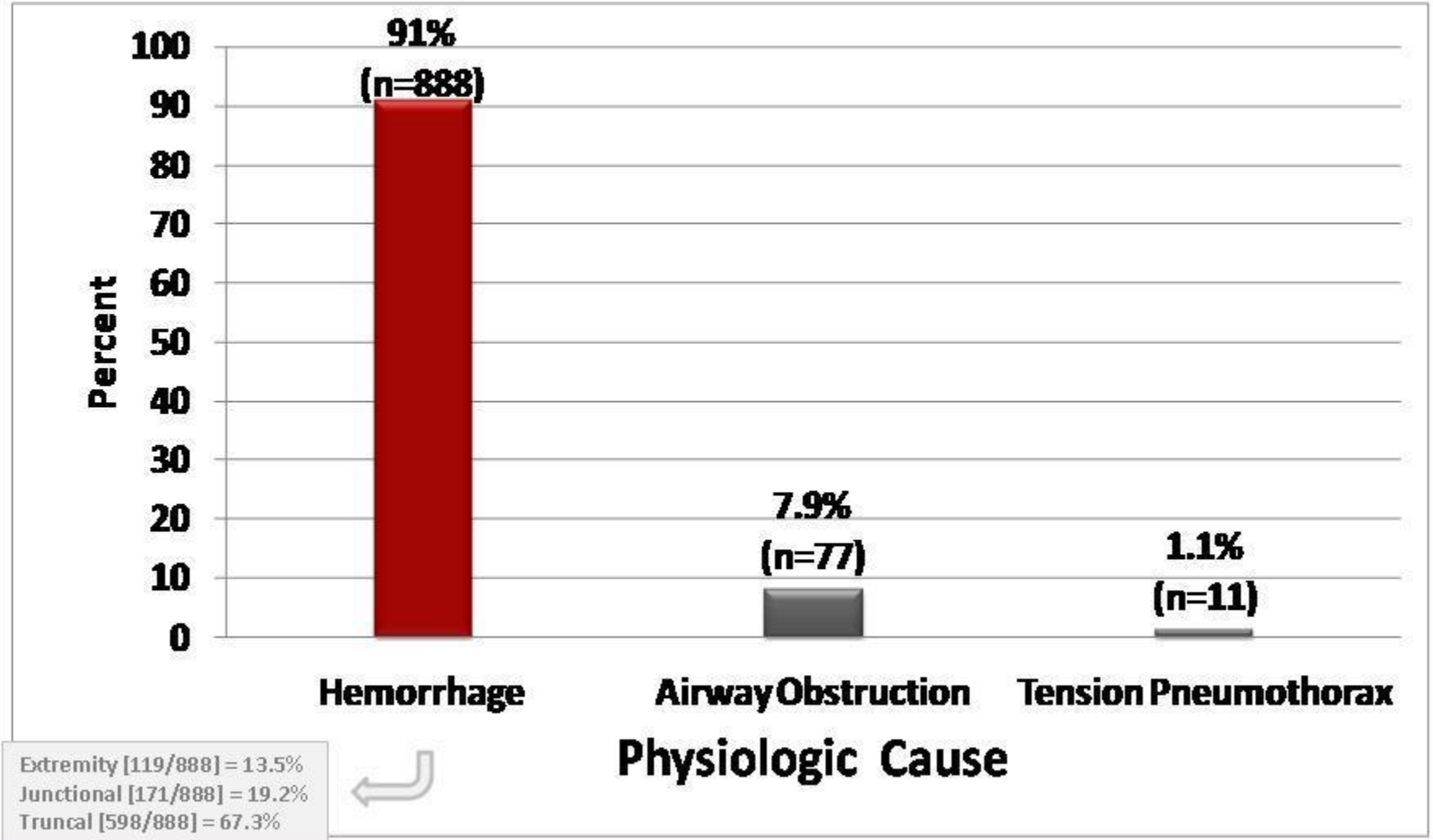
- 87% of combat deaths occur before ever reaching a MTF
- 24% of those deaths may be preventable

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.

What is the Cause of Death?



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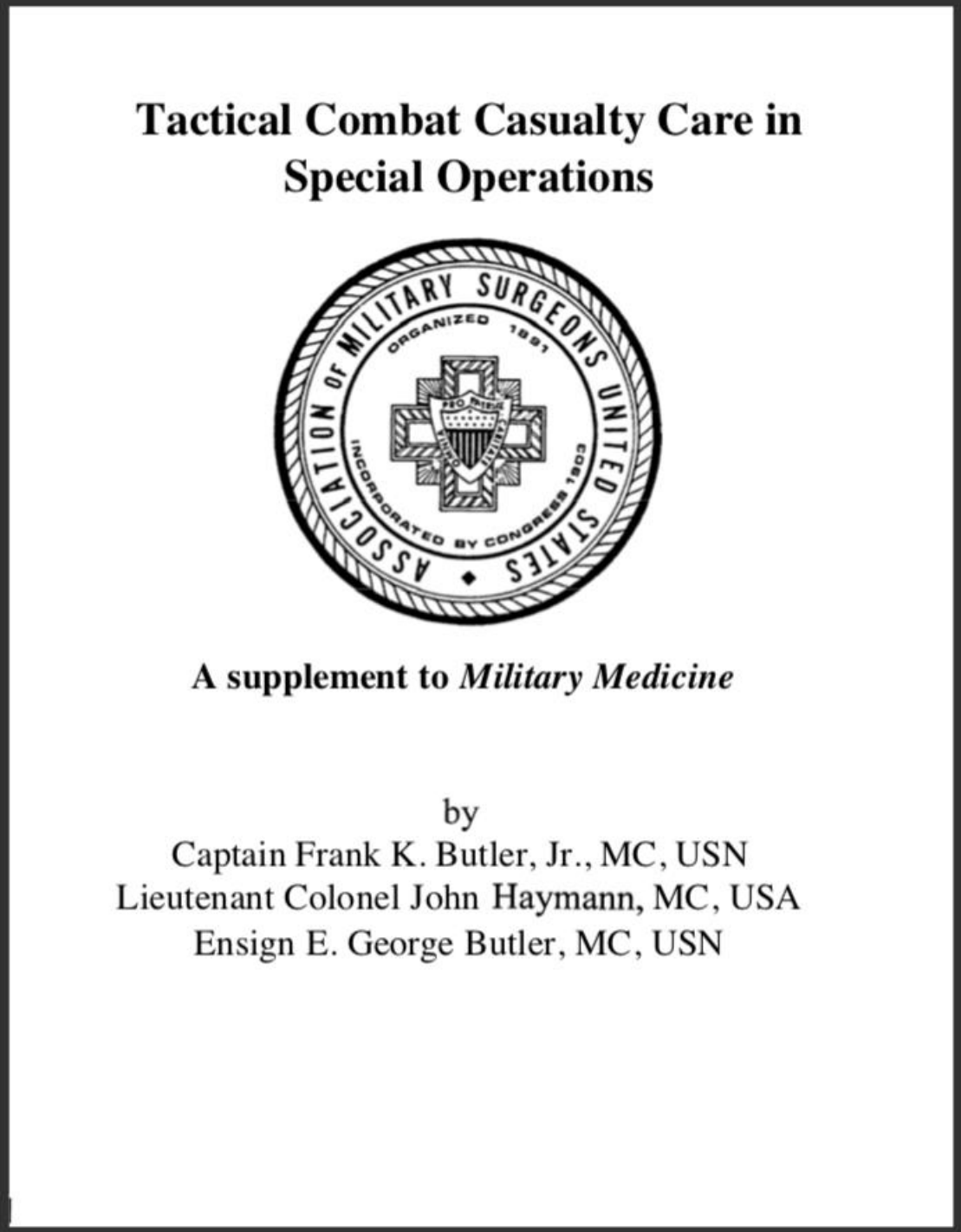


TCCC-HISTORY

- Published in 1996
- Questioned policy of civilian trauma training for battlefield application
- Outlined Phases of Care
- Encouraged Tourniquet use
- Limited crystalloid resuscitation
- Recommended Cricothyroidotomy as an airway option
- Antibiotics for penetrating wounds
- Changes implemented in some SOF units

STAGES OF TRUTH

"All **truth** passes through **three stages**:
First, it is ridiculed.

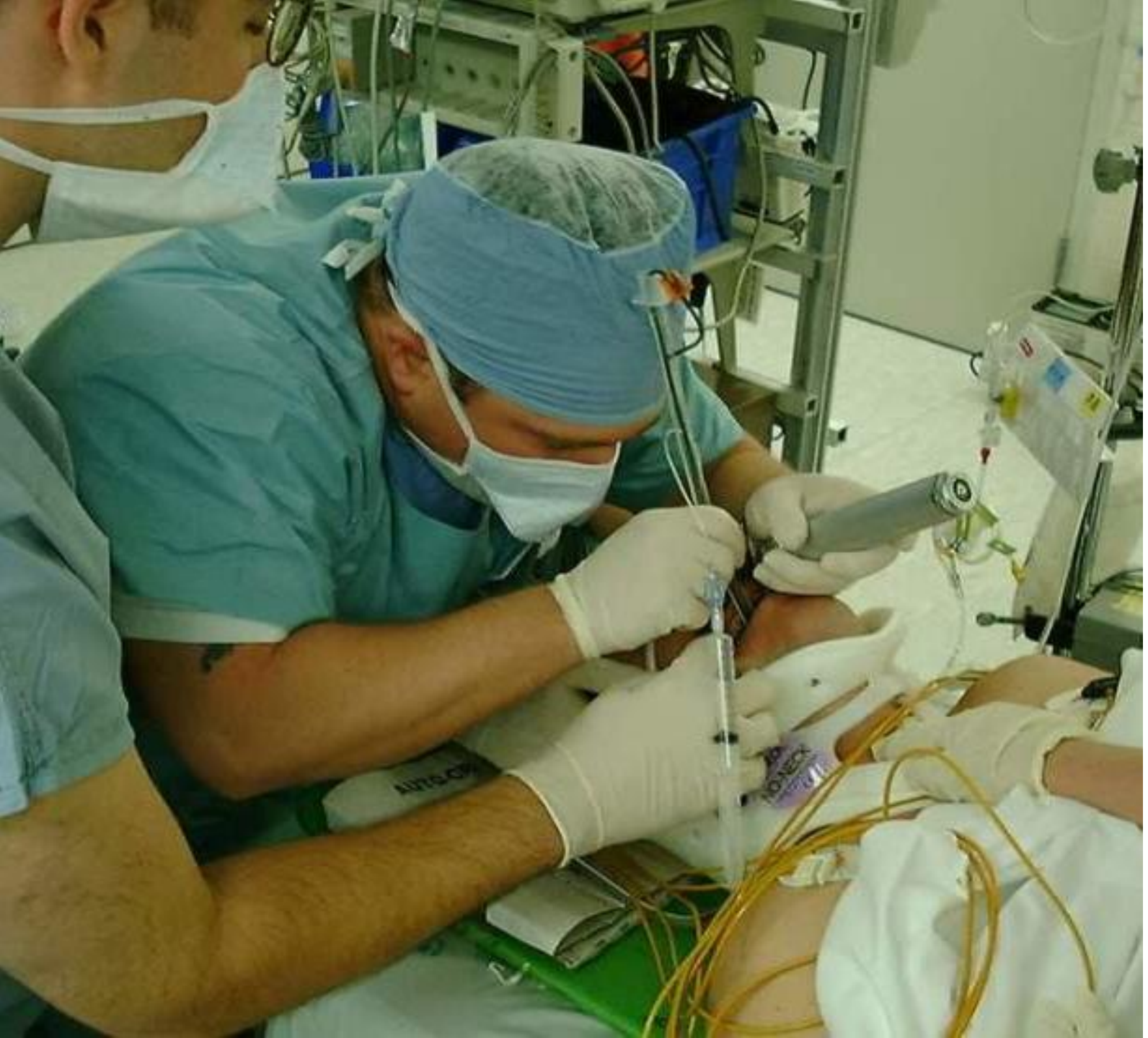
Second, it is violently opposed.

Third, it is accepted as self-evident."

-Arthur Schopenhauer

BATTLEFIELD TRAUMA CARE: 2001

- Training based on civilian trauma courses, not designed for combat.
- 2 large bore IV's with large volume crystalloid resuscitation.
- Medics taught tourniquets are a last resort to control extremity hemorrhage.
- SOF medics taught IV cut down techniques for difficult venous access.

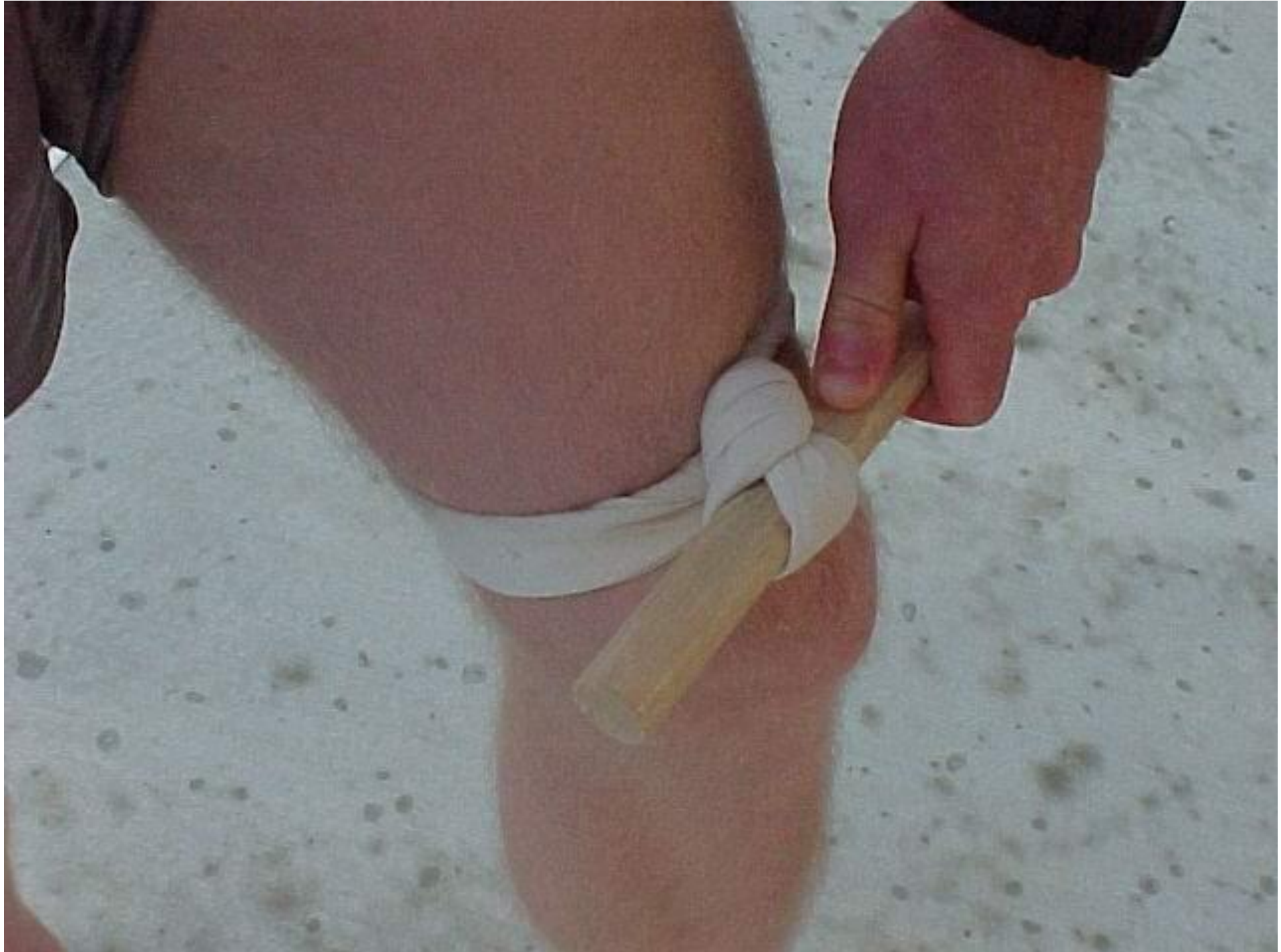


BATTLEFIELD TRAUMA CARE: 2001

- Civil war vintage battlefield analgesia (IM Morphine).
- Battlefield airway plan had heavy emphasis on endotracheal intubation.
- Little to no emphasis on hypothermia prevention.
- Backboards and C-collars for penetrating trauma.
- No tactical context for the care rendered.

How People Die In Ground Combat (From COL Ron Bellamy)

(Data based on the Wound Data Munitions Effectiveness Team (WDMET) during the Vietnam War between 1967 and 1969)



COMMITTEE ON TACTICAL COMBAT CASUALTY

- Initially by Special Operations, for Special Operations
- Recommendations made for:
  - Casualty Treatment Guidelines
  - Equipment
  - Training
  - Research Requirements

TCCC: Expanded to all Combatants

Improved casualty outcomes

Focused research

Agility in updating guidelines to respond to research and changing threats on the battlefield

TCCC: CURRENT GUIDELINES

- Phased Care within the Tactical Context
- Recommend tourniquet training and equipping for all military members
- Aggressive tourniquet use in CUF/TFC
- Hemostatic Dressings
- Junctional tourniquets
- Early TXA
- Damage Control Resuscitation/Whole blood is the resuscitation fluid of choice, limited role for crystalloids

TCCC: CURRENT GUIDELINES

- IV/IO only when needed
- Aggressively assess for and treat tension pneumothorax
- Ketamine and fentanyl lozenges for pain management
- Emphasis on hypothermia prevention
- Airway options to include positioning, supraglottic devices and cricothyroidotomy
- No spinal immobilization for penetrating trauma
- Oral and parenteral antibiotic options for penetrating wounds

MEDEVAC / CASEVAC

MILITARY MEDICINE, 178, 5:529, 2013

MEDEVAC: Survival and Physiological Parameters Improved With Higher Level of Flight Medic Training

CPT Seth R. Holland, SP USA; Amy Apodaca, PhD*; LTC Robert L. Mabry, MC USA**

ABSTRACT Objective: Determine if a higher level of Army flight medic (AFM) training was associated with improved physiological state on arrival to a combat support hospital (CSH). Methods: A retrospective study comparing casualties who were evacuated by two AFM units with only Emergency Medical Technicians-Basic (EMT-Bs) to an Army National Guard unit with Critical Care Flight Paramedics (CCFPs) in Afghanistan with an injury severity score >16 in different time periods looking at their 48-hour mortality, hematocrit (HCT), base deficit (BD), oxygen saturation (SpO_2), and physiological parameters on arrival to the CSH. Results: The CCFP group had better HCT [36.5 (8.8)] than the EMT-B group [33.1 (11.4); $p \leq 0.001$]. BD and SpO_2 were better in the CCFP group [−3.2 (4.7)]/[97.8 (4.8)] than the EMT-B group [−4.4 (5.5)]/[96.3 (10.9)] [$p \leq 0.014$]. The CCFP group had a 72% lower estimated risk ratio of mortality with an associated improvement in 48-hour survivability of 4.9% versus 15.8% for the EMT-B-group. Conclusions: There is a statistically significant improvement in the HCT, BD, SpO_2, and 48-hour survivability at the CSH in the cohort transported by the CCFP group when compared to the cohort transported by the EMT-B group.

TCCC: CURRENT STATUS

- Widely accepted in the US military and throughout the world as the standard for battlefield care.
- Many police, fire, EMS and federal agencies also use these guidelines.
- Recent DHA directive requiring TCCC training for all military members.

OPPORTUNITIES FOR IMPROVEMENT: TRAINING

- Standardized TCCC training for all military members.
- Refresher training must be accomplished prior to deployment.
- Training must have a robust "hands on" scenario based component.
- Physicians, Physician's Assistants, Nurse Practitioners must attend training and fully grasp the concepts and science behind the guidelines.
- Flight Medics/Interfacility Medical Evacuation crews must receive critical care level training AND experience.

OPPORTUNITIES FOR IMPROVEMENT: LEADERSHIP

- Clearly establish combat casualty care as a line commander responsibility with oversight at the appropriate level - the Chairman of the Joint Chiefs of Staff.
- The Service Chiefs should be clearly identified as having responsibility for TCCC training and equipping.
- Combatant Commanders should be clearly identified as responsible for ensuring that deploying forces are adequately trained and equipped to execute TCCC while deployed in support of combat operations.
- Combatant Commanders should be clearly identified as responsible for ensuring that battlefield trauma care is properly documented for all casualties and reported to the JTS to enable ongoing performance improvement in combat casualty care.

OPPORTUNITIES FOR IMPROVEMENT: FUTURE TECHNOLOGIES

- Advanced technologies to enable non-surgeon providers and medics to slow or halt truncal hemorrhage
- Shelf stable resuscitation fluids approaching whole blood capabilities
- Non-invasive or minimally invasive portable device to accurately diagnose and quantify shock on the battlefield

PEER TO PEER, NEAR PEER CONFLICTS

- The Golden Era of the Golden Hour response in Combat Casualty Care may never happen again.
- Lack of Air Superiority.
- Lack of surgical teams.
- New weapons with new wounding patterns.
- Tyranny of Distance.
- All may influence casualty care in future conflicts.

PEER TO PEER, NEAR PEER CONFLICTS

- Amplifies the importance of TCCC for every combatant and for Role 1 medical personnel to be highly trained and equipped with lifesaving hemorrhage control and resuscitation tools.

"IT IS NOT THE YOUNG MAN WHO MISSES THE DAYS HE DOES NOT KNOW. IT IS THE LIVING WHO BEAR THE PAIN OF THOSE MISSED DAYS."
-MARCUS AURELIUS