

# Tourniquets

## FIELD ASSESSMENT AND CONVERSION

1

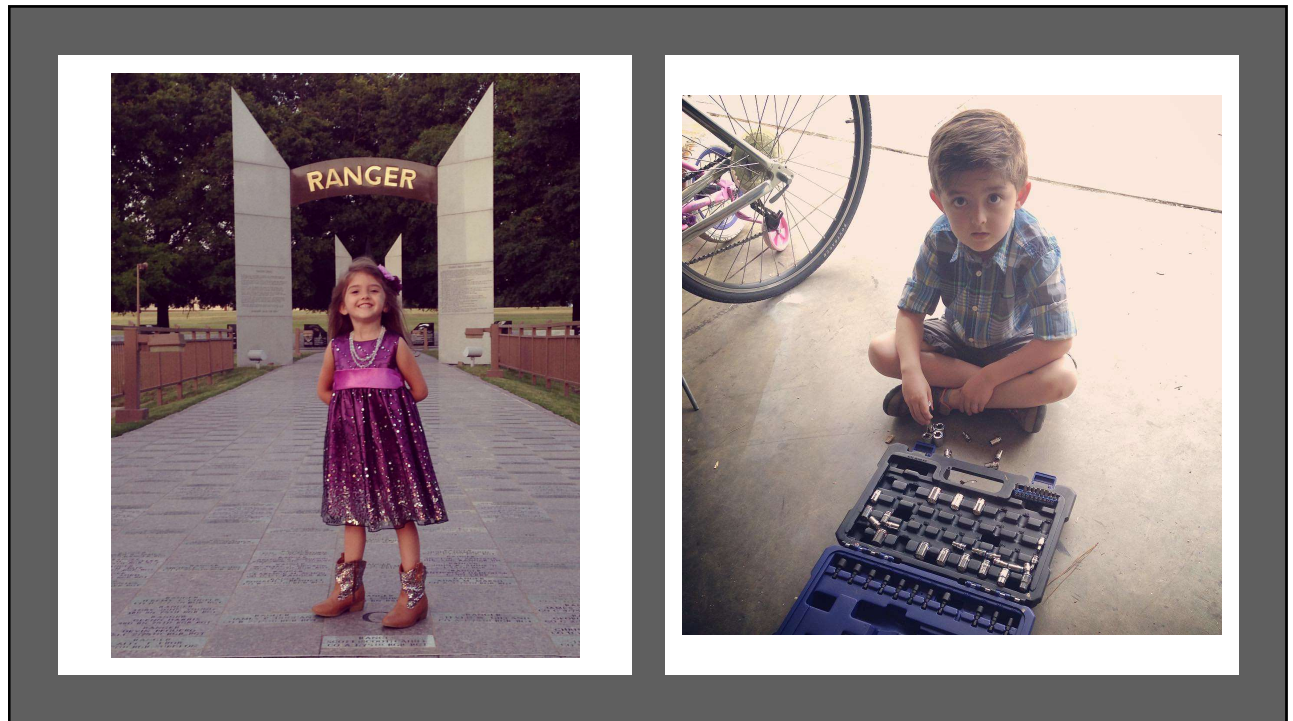
## Quick Agenda

- ▶ Intro
- ▶ Legends
- ▶ TQ - Then and Now
- ▶ Skill Sets
- ▶ Tourniquet Progression vs. Tourniquet Confirmation
- ▶ Final Words
- ▶ 118

2



3



4

Frank Butler



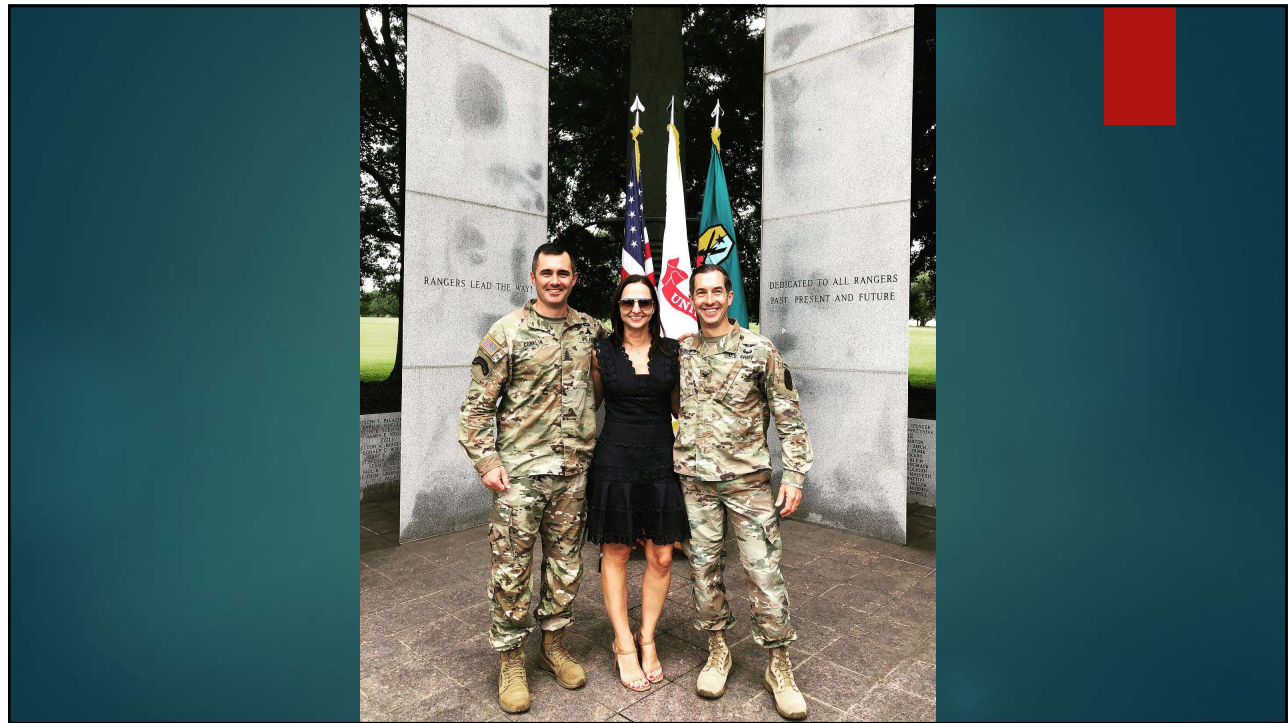
5



1986

6





7



8

“The Medical community must continue to improve its ability to utilize analyze, and distribute information, data, and trends in near-real time in order to optimize timeliness of performance improvement initiatives that save lives.”

COL (R) Bob Mabry from 1998

9

The screenshot shows the 'DEPLOYED MEDICINE' website. At the top, there is a search bar and navigation links for 'INSTRUCTORS', 'ABOUT', and 'CLASSES'. A main banner reads 'STANDARDIZED TCCC TRAINING ACROSS THE ENTIRE U.S. MILITARY' with four book covers: 'ASM TCCC ALL SERVICE MEMBERS', 'ELS TCCC COMBAT LIFESAVER', 'CMC TCCC COMBAT MEDIC/CORPSMAN', and 'CPM TCCC COMBAT PARAMEDIC/PROVIDER'. Below this is a 'FEATURED CONTENT' section with six items: 'Tourniquets & Tourniquet Conversion 2023' (highlighted with a red box), 'TCCC Guidelines 2021', 'Prolonged Casualty Care Guidelines', 'Consensus Statement', 'Canine/K9 Tactical Combat Casualty...', and 'TCCC Ukrainian український'. A large QR code is on the right, and the URL 'Deployedmedicine.com' is at the bottom.

10

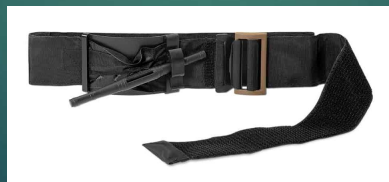




11

## Tourniquet – Then and Now

- ▶ Ratchet Tourniquet - literally a tie-down strap, feared and recommended as last resort
- ▶ CoTCCC Approved – Fast, single-handed application, Safe, effective!
- ▶ TECC and PHTLS



12



13

## TCCC Skills Sets by Provider Level


MASSIVE EXTERNAL HEMORRHAGE	ASM	CLS	CM/HM	CP	ARC
Recognize Life-Threatening External Hemorrhage	X	X	X	X	X
Control Massive External Hemorrhage in TCCC	X	X	X	X	X
Tourniquet Application	X	X	X	X	X
Hemostatic Dressing Application	X	X	X	X	X
Wound Packing with Hemostatic Dressing	X	X	X	X	X
Apply Direct Pressure	X	X	X	X	X
Pressure Dressing Application after Hemostatic Dressing	X	X	X	X	X
Junctional Device/Tourniquet Application			X	X	X
XStat Application			X	X	X

CIRCULATION / BLEEDING CONTROL	ASM	CLS	CM/HM	CP	ARC
Assessment and Treatment of Bleeding in TCCC		X	X	X	X
Pelvic Compression Device Application			X	X	X
Tourniquet Reassessment/Replacement			X	X	X
Tourniquet Conversion to Other Hemostatic Adjuncts			X	X	X
Insertion of Zone 1 REBOA					X*
Management of REBOA Balloon and Catheter					X*


14

## Life-Threatening Bleeding




MASSIVE BLEEDING


### HOW TO RECOGNIZE MASSIVE, LIFE-THREATENING BLEEDING




**BRIGHT RED BLOOD** is pulsing, spurting or steady bleeding from the wound




Overlying clothing or ineffective bandaging is becoming **SOAKED WITH BLOOD**



**AMPUTATION** of the arm or leg




**IMPORTANT!** Casualties with severe injuries can bleed to death in *as little as 3 minutes*



**BRIGHT RED BLOOD** is pooling on the ground


15


## Tourniquet APPLICATION



MASSIVE BLEEDING


### TOURNIQUET APPLICATION





A **TOURNIQUET** cuts off blood flow to an arm or leg past the application site; this is the best method to control massive bleeding

APPLY A TOURNIQUET AND STOP BLEEDING WITHIN




**WHEN AND HOW TO APPLY A TOURNIQUET (TQ):**

- CARE UNDER FIRE/THREAT**  
**HASTY TQ** "High and Tight" on the wounded extremity or when the bleeding source is uncertain
- TACTICAL FIELD CARE**  
**DELIBERATE TQ** applied 2-3 inches above the wound
- Apply a **SECOND TQ** if bleeding is not stopped with one properly applied TQ  
(Note: a severe bleeding wound to the thigh frequently requires a **SECOND TQ**)


**MARCH**

16






## COMMON TOURNIQUET ERRORS



- ✘ NOT using one when you should or waiting too long to put it on
- ✘ NOT pulling all the slack out before tightening
- ✘ NOT making it tight enough – the TQ should stop the bleeding **AND** eliminate the distal pulse
- ✘ NOT using a second TQ, if needed
- ✘ Using a TQ for minimal bleeding (However, *when in doubt*, apply a TQ)

- ✘ Putting it on too proximally if the bleeding site is clearly visible
- ✘ Loosening TQs for a period to allow recirculation of a limb
- ✘ Taking a TQ off **prematurely** when it is still needed for hemorrhage control
- ✘ **DON'T** put TQs over joints!



17

## TCCC Skills Sets by Provider Level

MASSIVE EXTERNAL HEMORRHAGE	ASM	CLS	CM/HM	CP	ARC
Recognize Life-Threatening External Hemorrhage	X	X	X	X	X
Control Massive External Hemorrhage in TCCC	X	X	X	X	X
Tourniquet Application	X	X	X	X	X
Hemostatic Dressing Application	X	X	X	X	X
Wound Packing with Hemostatic Dressing	X	X	X	X	X
Apply Direct Pressure	X	X	X	X	X
Pressure Dressing Application after Hemostatic Dressing	X	X	X	X	X
Junctional Device/Tourniquet Application			X	X	X
XStat Application			X	X	X

CIRCULATION / BLEEDING CONTROL	ASM	CLS	CM/HM	CP	ARC
Assessment and Treatment of Bleeding in TCCC		X	X	X	X
Pelvic Compression Device Application			X	X	X
Tourniquet Reassessment/Replacement			X	X	X
Tourniquet Conversion to Other Hemostatic Adjuncts	?	?	X	X	X
Insertion of Zone 1 REBOA					X*
Management of REBOA Balloon and Catheter					X*

18

# TCCC Skills Sets by Provider Level **NEW**

MASSIVE EXTERNAL HEMORRHAGE	ASM	CLS	CM/HM	CP	ARC
Recognize Life-Threatening External Hemorrhage	X	X	X	X	X
Control Massive External Hemorrhage in TCCC	X	X	X	X	X
Tourniquet Application	X	X	X	X	X
Hemostatic Dressing Application	X	X	X	X	X
Wound Packing with Hemostatic Dressing	X	X	X	X	X
Apply Direct Pressure	X	X	X	X	X
Pressure Dressing Application after Hemostatic Dressing	X	X	X	X	X
Junctional Device/Tourniquet Application			X	X	X
XStat Application			X	X	X

CIRCULATION / BLEEDING CONTROL	ASM	CLS	CM/HM	CP	ARC
Assessment and Treatment of Bleeding in TCCC		X	X	X	X
Pelvic Compression Device Application			X	X	X
Tourniquet Reassessment/Replacement		X	X	X	X
Tourniquet Conversion to Other Hemostatic Adjuncts		X	X	X	X
Insertion of Zone 1 REBOA					X*
Management of REBOA Balloon and Catheter					X*


19

## DURING LIFE-THREATENING

- M** MASSIVE BLEEDING #1 Priority
- A** AIRWAY
- R** RESPIRATION *(breathing)*
- C** CIRCULATION
- H** HYPOTHERMIA / HEAD INJURIES

**TFC MASSIVE HEMORRHAGE REASSESSMENT**

REASSESS any interventions performed in Care Under Fire

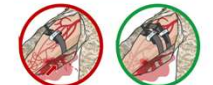


- ASSESS for effectiveness (bleeding has stopped and distal pulses are absent)
- APPLY direct pressure to control bleeding
- PLACE a deliberate tourniquet 2-3 inches above the wound directly on the skin

**Effective / Deliberate**

**TFC CIRCULATION-Bleeding REASSESSMENT**

REASSESS any interventions performed in CUF or TFC-Massive Hemorrhage




- If a tourniquet (TQ) was previously applied,
- ASSESS for effectiveness (bleeding has stopped and distal pulses are absent)
- If ineffective, apply a second tourniquet side-by-side with the first
- Can the tourniquet be converted to a pressure or hemostatic dressing?

**Effective / Progression**

20


### Tourniquet REPLACEMENT






#### TOURNIQUET REPLACEMENT INDICATIONS AND METHODS

**INDICATIONS for tourniquet replacement:**

- Tourniquets applied over the uniform
- Tourniquets applied too proximal on the extremity (>3" above the wound)
- >2 hours to surgery



Determine if a tourniquet replacement is indicated

Apply replacement tourniquet 2-3" proximal to wound directly on the skin

Slowly release original tourniquet, ensuring no rebleeding occurs

Slide original tourniquet down proximal to the newly placed tourniquet and annotate time

Annotate time of new tourniquet placement

### Tourniquet CONVERSION





#### TOURNIQUET CONVERSION INDICATIONS AND METHODS


**CONTRAINDICATIONS for tourniquet conversion:**

- Shock
- Inability to closely monitor for rebleeding
- Amputation

Also, consider not converting a tourniquet if:

- If the tourniquet has been in place more than 6 hours
- Tactical or medical considerations make transition inadvisable



Pack wound and hold pressure for 3 minutes

Apply pressure bandage

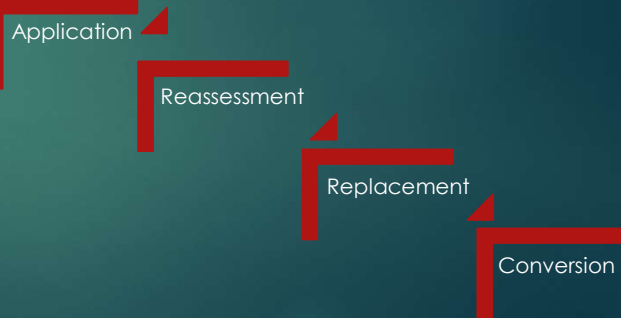
Slowly release tourniquet over 1 minute, ensuring no rebleeding occurs

Document all findings and treatments on a DD Form 1380 TCCC Casualty Card

**⚠ If tourniquet conversion does not control bleeding, revert back to a tourniquet**

**MAR 0 H**

# Tourniquet Progression



```

graph TD
    A[Application] --> B[Reassessment]
    B --> C[Replacement]
    C --> D[Conversion]
    
```

21

# Final Words

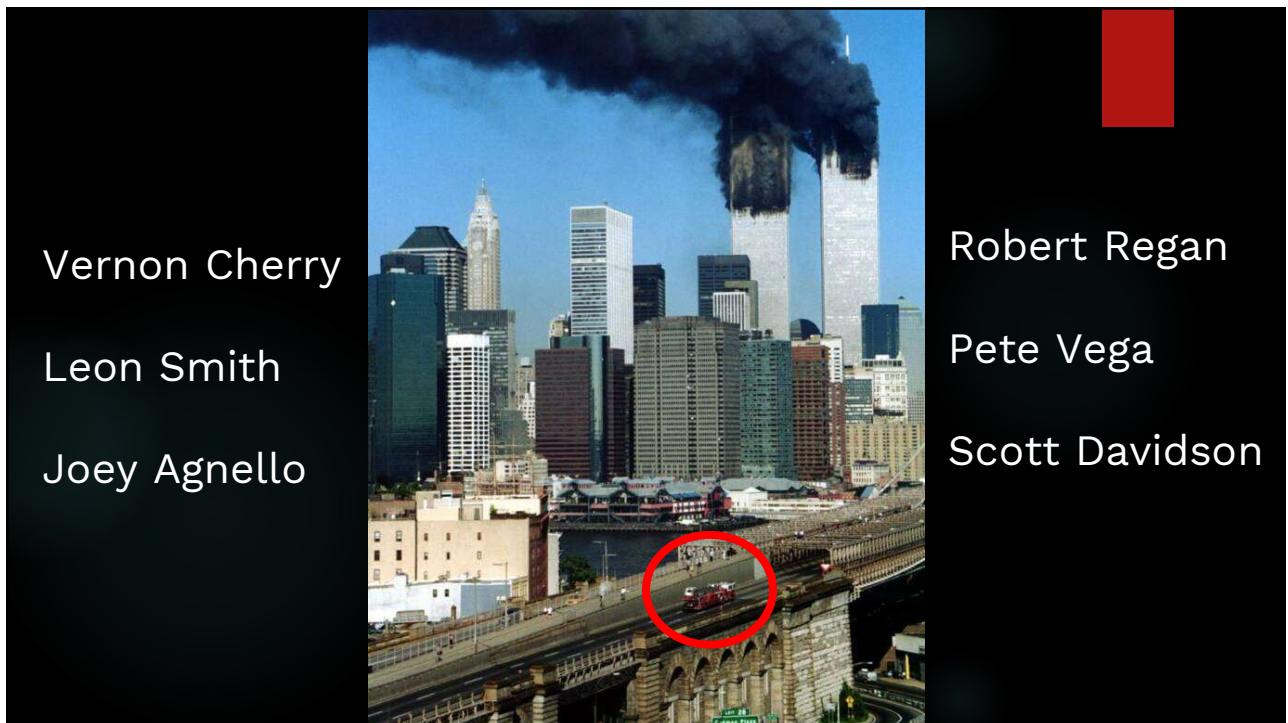
- ▶ Medical Directors
  - ▶ Assess Operational Environment – Use Guidelines – Make Decisions
  - ▶ Direct Training
- ▶ Tourniquet Confirmation Loop
  - ▶ Don't Get Stuck – We know the options
- ▶ Teach and Train Tourniquet Assessment Progression
  - ▶ 5 SOF Truths – Competent Special Operations Forces cannot be created after crisis occurs
- ▶ Tourniquets Work
  - ▶ Be Careful – Leaps ahead that we don't want to lose

22





23



24

# References

Shackelford SA, Butler FK Jr, Kragh JF Jr, et al. **Optimizing the use of limb tourniquets in Tactical Combat Casualty Care: TCCC guidelines change 14-02.** J Spec Oper Med. 2015;15:17-31.

Drew B, Bird D, Matteucci M, Keenan S. **Tourniquet Conversion: A Recommended Approach in the Prolonged Field Care Setting.** J Spec Oper Med. 2015 Fall;15(3):81-85.

Montgomery HR, Hammesfahr R, Fisher AD, Cain JS, Greydanus DJ, Butler FK Jr, Goolsby C, Eastman AL. **2019 Recommended Limb Tourniquets in Tactical Combat Casualty Care.** J Spec Oper Med. 2019 Winter;19(4):27-50.

Kragh JF, Walters TJ, Baer DG, et al. **Practical use of emergency tourniquets to stop bleeding in major limb trauma.** J Trauma. 2008;64(Suppl 2):S38-S50. doi:10.1097/TA.0b013e31816086b1.

Kragh JF, Walters TJ, Baer DG, et al. **Survival with emergency tourniquet use to stop bleeding in major limb trauma.** Ann Surg. 2009;249(1):1-7. doi:10.1097/SLA.0b013e31818842ba.

Lakstein D, Blumenfeld A, Sokolov T, et al. **Tourniquets for hemorrhage control on the battlefield: a 4-year accumulated experience.** J Trauma. 2003;54(Suppl 5):S221-225.

Butler FK, Holcomb JB, Giebner SG, McSwain NE, Bagian J. **Tactical Combat Casualty Care 2007: evolving concepts and battlefield experience.** Mil Med. 2007;172(Suppl 11):1-19.

Butler FK. **The US military experience with tourniquets and hemostatic dressings in the Afghanistan and Iraq conflicts.** Bull Am College Surg. 2015;100(Sept Suppl):60-65.

Weppner J, Lang M, Sunday R, Debiase N. **Efficacy of tourniquets exposed to the Afghanistan combat environment stored in Individual First Aid Kits versus on the exterior of plate carriers.** Mil Med. 2013;178:334-337.

Carey ME. **Analysis of wounds incurred by US Army Seventh Corps personnel treated in corps hospitals during Operation Desert Storm, February 20 to March 10, 1991.** J Trauma. 1996;40(Suppl 3):S165-S169.

Maughon JS. **An inquiry into the nature of wounds resulting in killed in action in Vietnam.** Mil Med. 1970;135(1):8-13.

Butler FK, Hagmann J, Butler EG. **Tactical combat casualty care in special operations.** Mil Med. 1996;161(Suppl):3-16.

25

## Special Features:

- Awarded as one of the "Top 10 Greatest Inventions" by the U.S. Army
- Official Tourniquet of the U.S. Army
- Used by both conventional and Special Operation forces
- Proven to be 100% effective in occluding blood flow in both upper & lower extremities by the U.S. Army's Institute of Surgical Research
- True, one-handed application tourniquet
- Quickly controls life-threatening extremity bleeding
- Recommended by the Committee on Tactical Combat Casualty Care
- Designed to perform in all weather conditions
- Small and cost-effective
- Protected by U.S. Patent Nos. 7,842,067 and 7,892,253

## Product Enhancements:

- NEW Single Routing Buckle** for faster application, decreased blood loss, effective slack removal, fewer windlass turns, and simplified training with single protocol application standards
- Reinforced windlass rod with increased diameter for enhanced strength and aggressive ribbing for improved grip
- Bilateral windlass clip for rapid windlass lock and bilateral buttress for added strength
- Enhanced windlass strap changed to tactical gray and sonic welded to clip for constant contact providing safe windlass security and a place to document the application time
- Reinforced stabilization plate with beveled contact bar
- Signature red elliptical tip (Red Tip Technology®) provides visual cue during application
- Patented free-moving internal band for true evenly distributed circumferential pressure

26