



HEMOSTATIC AGENTS

HEMORRHAGE CONTROL

WOUND CARE

MARY HART, LIEUTENANT, NRP

HEMOSTATIC AGENTS

- “An area of increasing concern is lethal hemorrhage from **sites that are not suitable for application of tourniquets or compression dressings.**”

- Hasan B. Alam. “Hemorrhage control in the battlefield: Role of new hemostatic agents”
Military Medicine, 170(1):63-69

CHARACTERISTICS OF AN IDEAL HEMOSTATIC AGENTS FOR PREHOSPITAL USE:

- Capability to stop large vessel arterial and venous bleeding within 2 minutes of application when applied to an actively bleeding wound through a pool of blood.
- No requirement for mixing or pre-application preparation;
- Simplicity of application by wounded victim, buddy, or medic;
- Lightweight and durable

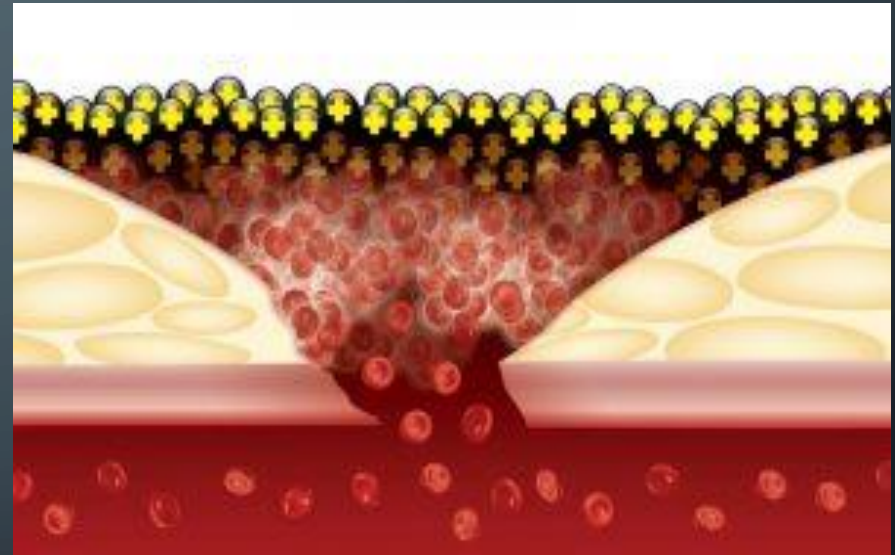
CHARACTERISTICS OF IDEAL HEMOSTATIC AGENTS

- Long shelf life in extreme environments;
- Safe to use with no risk of injury to tissues or transmission of infection;
- Inexpensive

	QC ACS	HemCon	Celox	WoundStat	Combat Gauze
Hemostatic efficacy	+	+	+++	++++	++++
Side effect	None	None	---	---	None
Ready to use	√	√	√	√	√
Training requirement	+	+	+	+++	++
Lightweight and durable	++	+++	+++	++	+++
2 yrs Shelf life	√	√	√	√	√
Stable in extreme condition	√	√	√	√	√
FDA approved	√	√	√	√	√
Biodegradable	No	No	Yes	No	No
Cost (\$)	~30	~75	~ 25	30- 35	~25

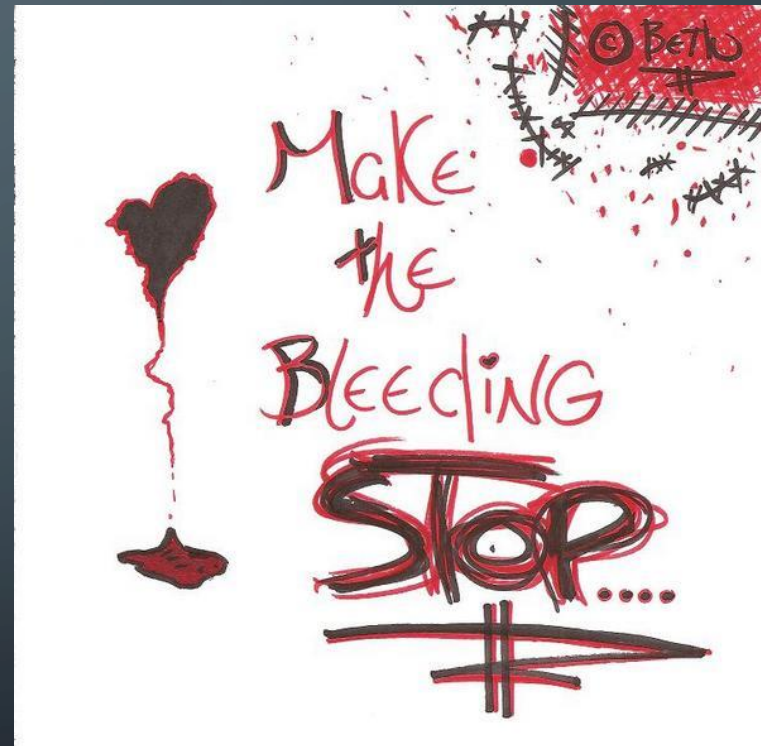
HOW BLOOD CLOTTING AGENTS WORK

- Blood clotting granules are actually very high surface area flakes. When they come in contact with blood, it swells, gels, and sticks together to make a gel like clot, without generating any heat. The Agents do not set off the normal clotting cascade, it only clots the blood it comes directly into contact with.



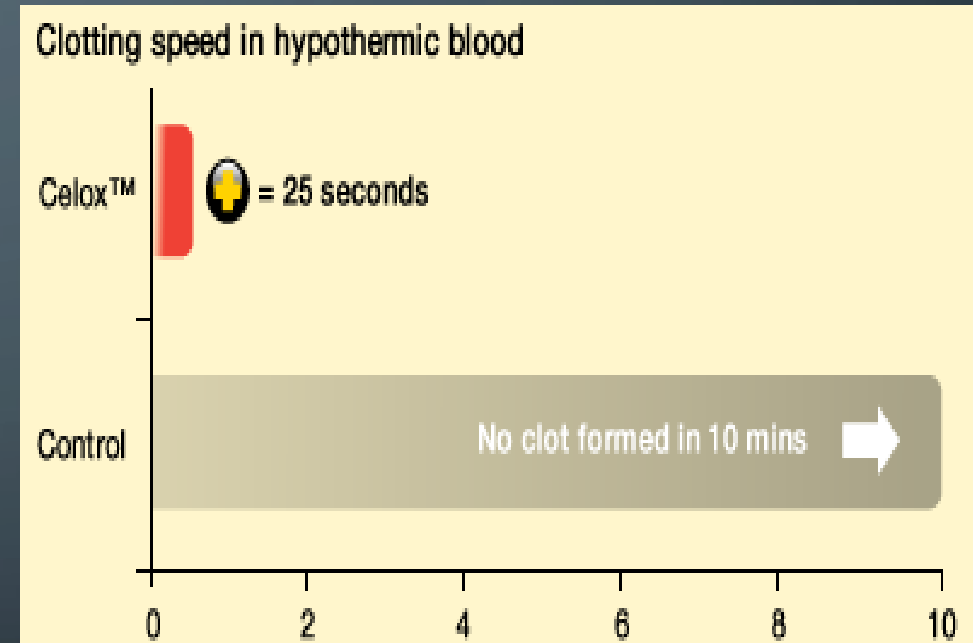
HOW BLOOD CLOTTING AGENTS WORK

- There are a number of major benefits:
 - Works in hypothermic conditions
 - Clots blood containing Heparin* or Warfarin (Coumadin)
 - No heat generated
 - Leftover material is naturally absorbed by the body.



HOW DO THEY WORK ON HYPOTHERMIC BLOOD?

- Severe traumatic blood loss quickly leads to the victim becoming hypothermic, irrespective of the outside temperature. Hypothermic blood is coagulopathic and so becomes harder to stop. The effectiveness of Celox blood clotting agents in hypothermic conditions has been tested independently.

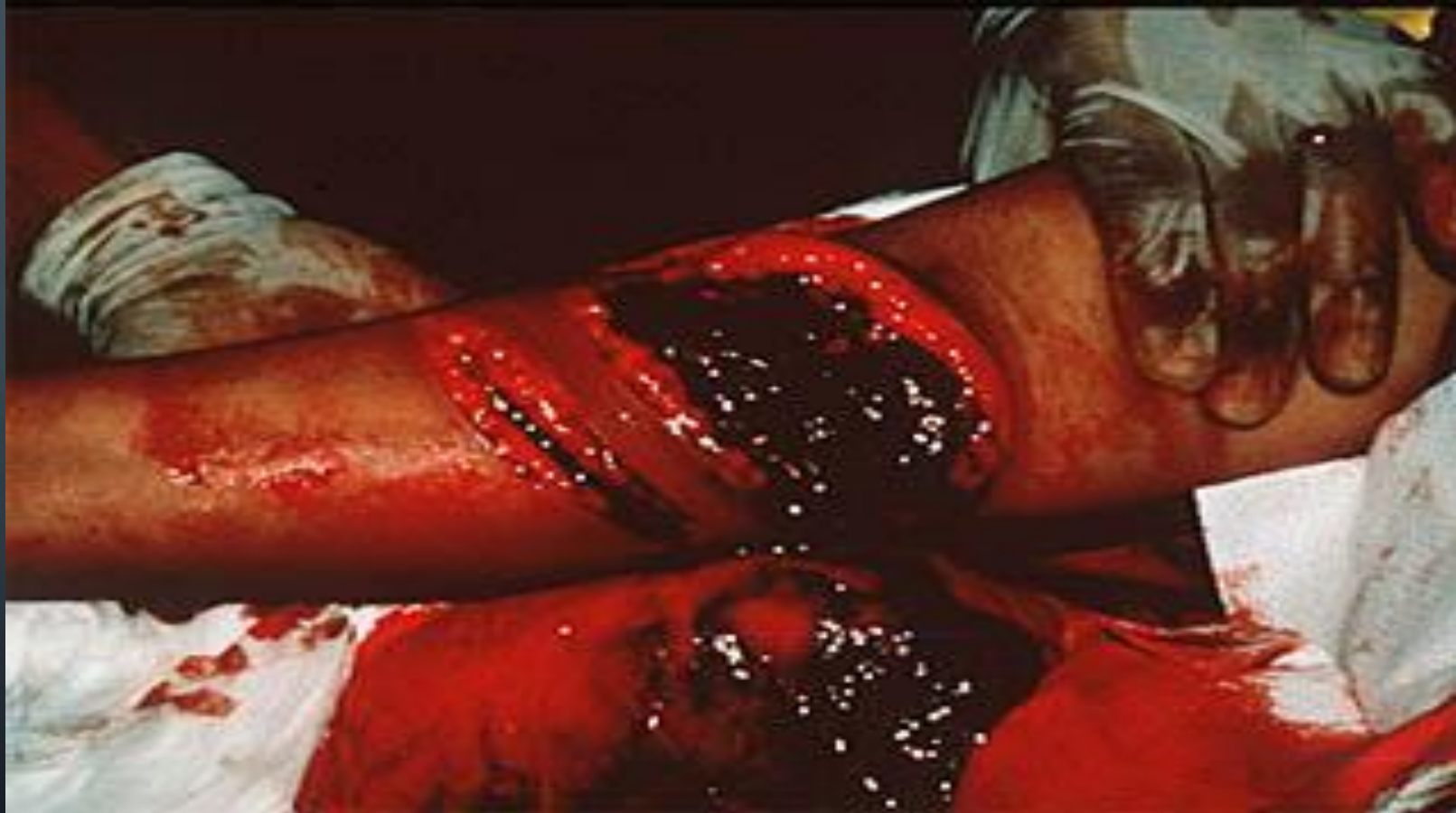


BLOOD THINNERS (ANTICOAGULANTS)

- The granules work even where there is Heparin or Warfarin in the blood. An increasing number of people are on anticoagulants, presenting an extra challenge if they are injured. The granules have been tested and shown to clot heparinized blood.



HEMOSTATIC AGENTS



NORMAL ADULT BLOOD VOLUME – 5 LITERS



CAN YOU FIND THE BLEEDER?



CAN YOU FIND THE BLEEDER? STEP 1



COMPRESSION - STEP 2

- Once bleeding source identified, apply direct pressure to tamponade flow
- Place a dressing on the wound when available (initially, use your gloved hand)
- Add dressings until bleeding stops
- Continue direct pressure until bleeding stops (at least 3 min, may need 10 min)

HEMOSTATIC DRESSING - STEP 3

- Elevation helpful
- Pressure points technically near impossible to properly apply
- Pressure dressings beneficial
- Hemostatic dressings **VERY** helpful



HEMOSTATIC AGENTS/DRESSINGS

- The latest and greatest surgical advance
- Continually evolving
- Including in PHTLS, ATLS, EMR, EMT and ITLS
- Available OTC

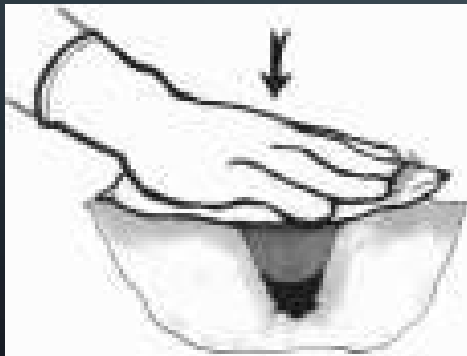
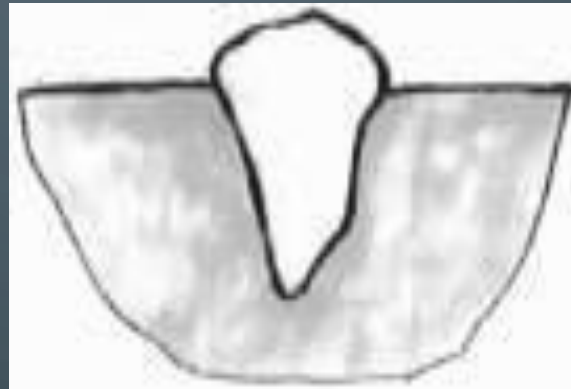
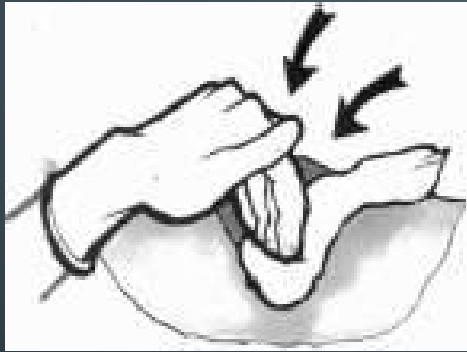


COMBAT GAUZE DIRECTIONS – APPLY DIRECT PRESSURE

- Apply pressure until bleeding stops
- Hold 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
- Wrap and tie bandage to maintain pressure.



COMBAT GAUZE DIRECTIONS – PACK WOUND COMPLETELY



COMBAT GAUZE™

- 3-inch x 4-yard roll of sterile gauze impregnated with kaolin. Activates clotting factors and platelets, absorbs water (increasing concentration of platelets and clotting factors at bleeding site) **REQUIRES TRAINING**



STEP 4 - TOURNIQUET

- May be placed immediately:
 - Short handed or alone
 - Adverse conditions (hostile fire...)
 - Multiple priorities (airway, breathing)
- Apply before s/s shock ensue
 - “first resort,” not “last resort”
 - 2 – 3” above wound, avoid joints

