

# Extremity Injuries Optimize Limb Salvage

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# Decreasing Military Case Fatality Rate

19.1 WW II



15.8 Viet Nam



9.4 Iraq/Afghanistan

- Improved battlefield medicine
- Improved transport time
- Improved clotting agents
- Improved transfusion fluids
- **Battlefield tourniquet**

# Battlefield Tourniquet



# Complications Associated with Tourniquet Use

- Battlefield tourniquets save lives
  - Up to 15% of preventable combat fatalities are due to hemorrhage from extremity wounds
- Prolonged use > 2 hours can cause reperfusion injuries
  - Loss of limb (local)
  - Loss of life (systemic)

# Ongoing Tourniquet Research at UNMC

- Work by EM and Vascular Surgery
  - Animal models
  - Human subjects
- Mitochondria play a central role in tourniquet induced injury

# Future Tourniquet Research at UNMC

- Limb cooling (hypothermia)
- Intermittent reperfusion of injured limb after tourniquet conversion in a semi-controlled setting (post-ischemic conditioning during air transport)
- Anti-ischemic drugs
  - Targeting mitochondrial dysfunction

## Why UNMC

- NIH and AHA funded, highly specialized laboratories for the study of mitochondrial physiology, proteomics, and cellular oxidative stress
- NIH funded, state of the art biomechanics laboratory
- One of the largest centers to enroll patients with blood flow problems
- >10 years of experience in evaluating limbs with no/low blood flow problems
- Seamless vascular care between front-line and back-end clinical departments

# Research in Emergency Medicine and Vascular Surgery

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**Thank You**