

**Despite major advances in modern civilian medicine, few have been made that have specific impact in combat casualty care.**

The unpredictability of the battlefield and the need for a new generation of adaptive tools and devices that can be deployed there are the cornerstones around which the Max Harry Weil Institute for Critical Care Research & Innovation developed its Combat Casualty Care Program.

## Sophisticated Care for Complex Situations

The complexity and severity of wounds incurred on the battlefield are beyond what we experience at home. Additionally, the **Golden Hour\*** concept developed and practiced by the civilian trauma community is significantly complicated on the battlefield due to issues with transport availability, terrain, weather, and active combat conditions.

These unique conditions make it imperative that researchers work to improve field treatment capability, and make sophisticated life-saving care readily available to the injured, despite their location.

## The Weil Institute Combat Casualty Program - Areas of Research

### Resuscitation and Tissue Salvage

Enhancing tissue survival and healing, reducing bleeding, preventing infection, and lessening pain in trauma and burns

### Acute Life Support

Exploring innovative technologies that support vital systems such as respiratory, cardiovascular, and renal

### Physiologic Monitoring and Clinical Decision Support Systems

Creating the next generation of deep physiological vital signs and monitors, as well as big data clinical decision support algorithms that will allow for precision diagnoses and care for the severely wounded

### Hemorrhage Control

Developing and testing new hemostatic strategies including tourniquets and external & internal compression devices

### Traumatic Brain Injury (TBI)

Leveraging new models, therapeutics, and devices to re-examine how TBI is diagnosed, monitored, and treated

### Acute Rehabilitation Engineering

Developing new approaches to automated and precision rehabilitation and other countermeasures that will leave patients stronger and reduce complications from prolonged immobilization

## Combat Casualties by the Numbers



Approximately 86% of all deaths in battle occur within the first 30 minutes after wounding



379,500+ service members have sustained a traumatic brain injury (TBI)

# #1

Traumatic hemorrhage is the number one cause of combat deaths for U.S. service members



Nearly 25% of combat deaths in Iraq and Afghanistan between 2001 and 2011 were "potentially survivable"

\* Trauma victims have the best chance of survival if they begin receiving care at a definitive trauma center within one hour of their injury.

Data provided by the U.S. Department of Defense and Centers for Disease Control and Prevention (CDC)

"We must attack these problems from every angle and with every conceivable resource in the same way medicine has attacked other problems such as cancer and heart disease. **Our service men and women and their families deserve nothing less.**"

- Dr. Kevin Ward, Weil Institute Executive Director



## The Weil Institute Solution

Weil's research is guided by the complexity of battlefield injuries, the challenges faced by first responders, and the echelons of care the wounded travel through before they reach a trauma center. This integrative research plays a significant role in developing strategies that will not only be effective on the battlefield, but will also become next generation products and services here at home.

**Our innovations in trauma and combat casualty care include:**



### "Stop the Bleed" Tourniquet

Research teams from the Departments of Emergency Medicine and Mechanical Engineering have created a tourniquet for civilian & military use that is more user-friendly and provides a less painful application. The "Stop the Bleed" tourniquet can also be applied with one hand.



### "GROA" Balloon

Severe internal hemorrhage is a major cause of death on the battlefield. Weil's "GROA" device is an inflatable balloon that compresses the aorta between the posterior wall of the stomach and the thoracic vertebral bodies just below the diaphragm.

It can be used to control abdominal hemorrhage at the point of impact.



### Trans-Ocular Brain Impedance

Traumatic brain injuries occur frequently on the battlefield. First responders must determine the extent of a TBI patient's initial injury as well as if there are any secondary injuries. TOBI is a wearable monitor that allows for rapid & continuous monitoring of the brain's autoregulatory processes, helping to inform diagnosis & treatment of TBI.

**For more information please contact development lead **Mark Clark** or visit the Weil Institute's website.**



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