

# ANATOMY OF A TOURNIQUET

## Effective Hemorrhage Control by Design...

The US Army Institute of Surgical Research (USAISR) conducted several evaluations of commercial tourniquet devices. The final evaluation identified three devices that were 100% effective. From this evaluation, the US Army selected the C-A-T® as the primary pre-hospital tourniquet. Numerous studies and combat after action reports from the current war theaters validate that organizational decision.

Although there are currently a multitude of tourniquets available on the commercial market, some of these tourniquets may or may not be effective. The challenge is to sort through all of the commercially available devices to identify the one best suited for your organization's requirements. The evaluation and selection should rely on established criteria that are measurable and reproducible.

When the U.S. Army studied tourniquet devices suitable for use by individual soldiers within the tactical operating environment, a consensus panel established criteria for device design. It was clear from the outset that a pneumatic tourniquet was not appropriate for this specific operational environment application.

The committee established **Seven Absolute Requirements for a Tourniquet:**

- 1 **Ample Capability**  
Occlusion of arterial flow in a thigh 26.7 inches in diameter
- 2 **Rapid Deployment**  
Easy application to either an upper or lower extremity in less than one minute with minimal familiarization
- 3 **Secure Application**  
Cannot slip towards wound during tightening or slip after tightening
- 4 **Easy Implementation**  
Capable of easy release and subsequent re-application
- 5 **Small Cube**  
Weigh less than 230 grams
- 6 **No Power Requirement**  
Must have no dependence on external power sources such as batteries and electricity
- 7 **Extended Storage**  
Must have a shelf life greater than 10 years



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The committee also listed an additional **Five Desirable Features\*** in Tourniquet design:

- 1 **Wider is Better**  
Not less than 1 inch wide
- 2 **Self Application**  
One-handed self-application to an upper extremity
- 3 **Open-ended Design**  
Capability of being applied to entrapped limbs
- 4 **Torque Control**  
Protection from over-tightening
- 5 **Low Cost**  
Large-scale production cost of \$25.00

### Step 1:

Insert the wounded extremity through the loop band and tighten

### Step 2:

Twist the Windlass Rod™ until the bleeding stops

### Step 3:

Secure the rod and band with the Windlass Strap™

\* Another critical design characteristic is **Device Security**. Once the tourniquet device is applied and hemostasis is achieved, it should not be able to be accidentally released during casualty movement. While some currently available devices achieve hemostasis, their inherent design allows easy inadvertent release, which can be catastrophic to patient outcome.



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