Windlass Tourniquets
External Hemorrhage Control

Background
External hemorrhage is a major cause of morbidity and mortality following severe injury. Military battlefield experience has provided evidence for the development of military guidelines for the use of tourniquets, which have been transitioned into civilian care. The 2007 National EMS Scope of Practice Model lists tourniquet use as a skill for emergency trauma care for EMTs and tourniquets have been included as BLS equipment in the Joint Policy Statement: Equipment for Ambulances. Additionally, the Hartford Consensus Conference document encourages wider civilian use of tourniquets for management of hemorrhage in active shooter events: a strategy which the Department of Homeland Security (DHS) promotes in its Stop the Bleed campaign.

In 2014, Evidence-based prehospital guidelines for control of external hemorrhage were published. One of the objectives of these guidelines was to help promote effective use of tourniquets in the civilian and EMS community. The guidelines were developed by an expert panel in collaboration with the US Agency for Healthcare Research and Quality, using rigorous methodology.

Current evidence-based recommendations for the management of extremity hemorrhage using tourniquets from the evidence-based guidelines are as follows:

1. The use of tourniquets in the prehospital setting for the control of significant extremity hemorrhage is recommended if direct pressure is ineffective or impractical.
2. Use commercially produced windlass, pneumatic or ratcheting devices that have been demonstrated to occlude arterial flow.
3. Do NOT use narrow, elastic or bungee-type devices.
4. Only use improvised tourniquets if no commercial device is available.
5. Do not release a tourniquet that has been properly applied in the prehospital setting until the patient has reached definitive care.

Training Recommendations (also from the evidence-based guidelines)

1. Tourniquets and topical hemostatic agents should be used under clinical practice guidelines following specific product training.
2. Hemostatic agent training for prehospital personnel should include proper wound packing and pressure application techniques.

3. Training and use of tourniquets and topical hemostatic agents should be expanded to include all prehospital personnel, including emergency medical responders in concordance with the Hartford Consensus Statement.

**Windlass Tourniquet Products available through AMR procurement:**
AMR currently offers the CAT windlass tourniquet (North American Rescue) in its procurement system. Shortly, the SAM XT windlass tourniquet (SAM Medical) will be added.

**TABLE**

<table>
<thead>
<tr>
<th>Brand</th>
<th>Manufacturer</th>
<th>Type</th>
<th>Notes on Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAT</td>
<td>North American Rescue</td>
<td>Windlass</td>
<td>Currently in use by most AMR operations using tourniquets</td>
</tr>
<tr>
<td>SAM XT</td>
<td>Windlass with ratchet</td>
<td>Ratcheting buckle may make tourniquet easier to tighten. With extreme pressure belt may come off track and make it difficult to line up with buckle.</td>
<td></td>
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</table>

**Features:**

- While both the CAT and the SAM XT are windlass type tourniquets that include a tab for documenting the time of application, the SAM XT has an additional feature of a ratcheting buckle.
- The ratchet and buckle feature makes it a bit easier to tighten the tourniquet, but with extreme pressure on the belt, it may become off kilter, making it difficult to align with the buckle prongs.

**Cost:**

- The cost for both brands is similar with the CAT being slightly more expensive at $1.99 more per tourniquet (see Table above)

**Equipment Evaluation Group Recommendation:**

While the Equipment Evaluation Group did not trial these two brands of tourniquets, we believe they are both well suited to the task of controlling external extremity hemorrhage.

- Stick with one type of tourniquet for your operation. This will prevent confusion during application.
• Ensure that all employees are familiar with the proper application (both to a patient, and self-application) for each type of tourniquet that is stocked by your operation. Training resources are provided in this document.
• Prior to stocking any new device, ensure that the crews have been trained to use the device, **BEFORE** its appearance in their equipment.
• **BEST PRACTICE:** consider issuing one tourniquet to each EMT/Paramedic and encourage them to wear it as a part of their uniform. When a tourniquet is used, the medic can request a new one by providing the run number of the case for which the tourniquet was used. In the longrun, this will decrease loss of tourniquets, and ensure that there are plenty of tourniquets that will be available at an event requiring multiple response vehicles (one on each person).

**Resources:**
• Tourniquet Nugget (Generic Use) (Currently available in AMR Success Factors)
• Stop the Bleed ([http://www.bleedingcontrol.org/](http://www.bleedingcontrol.org/))
  o Stop the Bleed is the American College of Surgeons’ Bleeding Control Basics <[http://www.bleedingcontrol.org/](http://www.bleedingcontrol.org/)> course. This is re-branded, and cut down version of NAEMT’s previously offered B-Con course (with origins at Denver Health with Peter Pons and James Robinson),
  o First Care Provider<[https://firstcareprovider.org/](https://firstcareprovider.org/), and
  o FEMA and HHS’s Until Help Arrives<https://community.fema.gov/until-help-arrives>
    Each of these programs have different criteria for becoming an instructor and gaining access to their educational content. Each course varies slightly in topics covered and length of course. AMR encourages our clinical leaders to become familiar with all of them and affiliate with any or all of them, as each audience is different.
  o There is also a Stop the Bleed video on tourniquet application [https://www.youtube.com/watch?v=dkb-Ddb8QFA](https://www.youtube.com/watch?v=dkb-Ddb8QFA). (5:50 time)
  o And a poster on tourniquet application, [https://www.dhs.gov/stopthebleed](https://www.dhs.gov/stopthebleed)
    The posters and the video are useful for ala carte skills teaching without going through a full course program.
• External Hemorrhage Evidence-Based Guidelines (2014)_
• Hartford Consensus Statement_
  [http://journals.lww.com/jtrauma/fulltext/2013/06000/improving_survival_from_active_shooter_events_3.aspx](https://journals.lww.com/jtrauma/fulltext/2013/06000/improving_survival_from_active_shooter_events_3.aspx), and, [https://www.facs.org/about-acs/hartford-consensus](https://www.facs.org/about-acs/hartford-consensus)
• SAM XT Tourniquet Usage: Manufacturers Videos: These videos are currently being added to AMRs Success Factors platform:
  o Self-Aid Upper Extremity: [https://www.youtube.com/watch?v=l_XQxLiLVAk](https://www.youtube.com/watch?v=l_XQxLiLVAk)
  o High and Tight Video: [https://www.youtube.com/watch?v=TnpvL6of6WY](https://www.youtube.com/watch?v=TnpvL6of6WY)
Partner Aid, Lower Extremity:  
https://www.youtube.com/watch?v=sOQ7_RTbkwA

References:


2. **Equipment for Ground Ambulances.** American Academy of Pediatrics, American College of Emergency Physicians, American College of Surgeons Committee on Trauma, Emergency Medical Services for Children, Emergency Nurses Association, National Association of EMS Physicians & National Association of State EMS Officials. Prehospital Emergency Care, 12014; 8:1, 92-97. To link to this article: [http://dx.doi.org/10.3109/10903127.2013.851312](http://dx.doi.org/10.3109/10903127.2013.851312)

3. **Improving Survival from Active Shooter Events: The Hartford Consensus.** Jacobs, Lenworth M. MD, MPH; McSwain, Norman E. Jr. MD; Rotondo Michael F. MD; Wade, David MD; Fabbri, William MD; Eastman, Alexander L. MD; Butler, Frank K. Jr MD; Sinclair, John; *on behalf of the Joint Committee to Create a National Policy to Enhance Survivability from Mass Casualty Shooting Events*. Journal of Trauma and Acute Care Surgery: June 2013 - Volume 74 - Issue 6 - p 1399–1400 doi: 10.1097/TA.0b013e318296b237

4. **Stop the Bleed Campaign:** Department of Homeland Security.  
[https://www.dhs.gov/stopthebleed#](https://www.dhs.gov/stopthebleed#)

5. **An Evidence-based Prehospital Guideline for External Hemorrhage Control: American College of Surgeons Committee on Trauma.** Eileen M. Bulger, MD, FACS, David Snyder, PhD, Karen Schoelles, MD, FACP, Cathy Gotschall, ScD, Drew Dawson, BA, Eddy Lang, MD, CM CCFP (EM) CSPQ, Nels D. Sanddal, PhD, NREMT, Frank K. Butler, MD, FAAC, FUHM, Mary Fallat, MD, FACS, Peter Taillac, MD, Lynn White, MS, CCRP, Jeffrey P. Salomone, MD, FACS, NREMT-P, William Seifarth, MS, NREMT-P, Michael J. Betzner, MD, FRCP, Jay Johannigman, MD, FACS, Norman McSwain, Jr., MD, FACS, NREMT-P. Prehospital Emergency Care 2014;18:163–173.  