TOURNIQUET TECHNIQUES

Anyone who attended an advanced first-aid course in the '80s or '90s was most likely instructed that tourniquets were not even a method of last resort because they risked permanently damaging major blood vessels and could result in the loss of a limb. The belief was that, since other options could usually stem the flow of blood from even serious lacerations, if tourniquets were taught as an option, they'd be used inappropriately.

But 10 years of war in Iraq and Afghanistan taught a different story. It not only became apparent that the use of a tourniquet could save the life of a patient when no other option was working but also demonstrated that even moderately trained individuals were smart enough to only apply a tourniquet when it was medically necessary.

A 2008 study reviewed tourniquet use in Iraq in 2006, where 232 patients had 428 tourniquets applied on 309 injured limbs. Researchers concluded that tourniquets were medically necessary in 97 percent of the cases, or in all but 12 of the 428 applied tourniquets. That same study addressed the concern that tourniquet use would result in the loss of limbs or that extended use of a tourniquet would damage nerves or cause blood clots, leading to the patient's death. The study found that the average tourniquet time was 1.3 hours, yet the researchers concluded that "no amputations resulted solely from tourniquet use." In one case, a tourniquet remained applied for 14 hours, yet that patient survived.

Modern tourniquets, such as the SOF Tactical Tourniquet - Wide (SOFTT-W), the Combat Application Tourniquet (CAT) and the Ratcheting Medical Tourniquet (RMT), are battlefield-proven and are each designed to be quickly deployed either by a rescuer or to be self-applied. The example below demonstrates how to properly apply the SOFTT-W on an upper extremity.

1 **Prepare and Position the Tourniquet**
Open the strap wide enough to fit the limb through it or disconnect the slip-gate buckle from the strap by twisting it free from the U-shaped clip, wrap it around the limb and reconnect the slip-gate to the strap. Place the tourniquet between the injury and the heart (not on a joint), and pull the strap tight.

2 **Twist Until Bleeding Stops**
Twist the aluminum windlass until the bleeding stops. Your patient may complain that the tourniquet is hurting him or her, but if the artery is continuing to bleed, it isn't tight enough.

3 **Lock the Windlass**
Lock the windlass in place using the triangular locking buckle.

4 **Record Time**
Note the time that you placed the tourniquet on the white tag, which will be valuable information for emergency room staff. Under no circumstances should you loosen or remove the tourniquet!

TOURNIQUET REVIEW

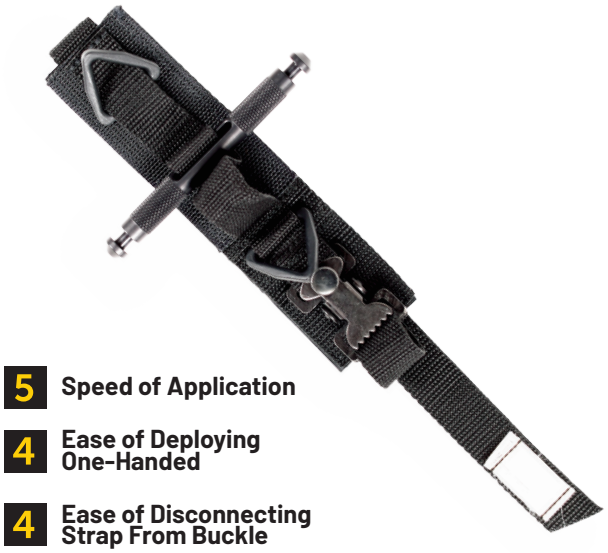
While a variety of commercial tourniquets are available, the four most popular include the SOFTT, the SOFTT-W, the CAT and the RMT. The overview below provides a bit more detail about how they work, as well as their pros and cons. We've also scored them from 1 to 5 (5 being the highest) on their ability to deploy easily and quickly, on their ability to be deployed one-handed (something that you'll find important if you're the one who has the severe arterial bleed and no one is around to help you), and on their ease of disconnecting the strap from the buckle, which is helpful when placing the tourniquet around a lower extremity and is required when the extremity is pinned under an immovable object.

4 Speed of Application

3 Ease of Deploying One-Handed

3 Ease of Disconnecting Strap From Buckle

Combat Application Tourniquet
Now in its 7th generation, the CAT has a proven track record that's tough to match (and most likely won't be matched until the U.S. finds itself in another armed conflict). The CAT is applied by loosening the Velcro strap (or removing the strap from the friction buckle), placing it in position and pre-tightening it by pulling the strap tight and reapplying the Velcro. To tighten, the windless is turned in either direction until the bleeding stops. To lock the windlass in place, drop it into the C-shaped cradle (the tension of the windlass will lock it in place). Cover the locking cradle with the white Velcro strip, which also doubles as a place to record the time of application. Deploying the CAT one-handed on a model prior to the 7th generation is troublesome unless it is preconfigured into one-handed mode, which involves routing the Velcro strap through just one of the buckle's two gates. That allows the operator to pre-tighten the CAT by pulling the strap straight out from the body before locking the Velcro strap back onto itself. The 7th generation solves that problem by using a buckle with a single, rather than a double, gate. Some users dislike the Velcro strap, which can occasionally lock onto itself at precisely the wrong moment (such as when trying to remove the strap from the friction buckle), and the windlass is plastic, which has been known to break.



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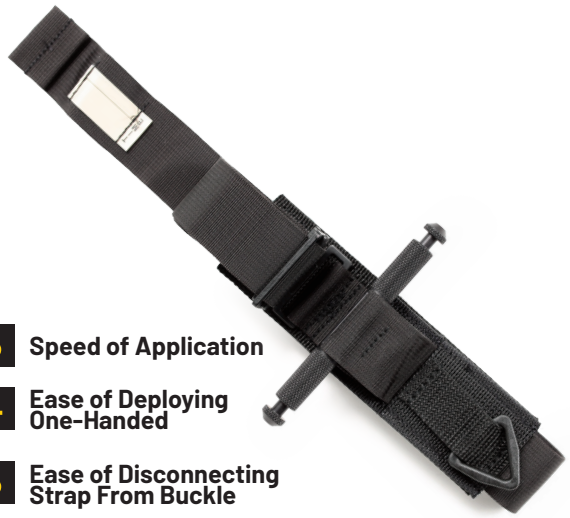
SOF Tactical Tourniquet

The SOFTT operates much like the CAT, but instead of using a Velcro strap to hold it in place as it's being pre-tightened, the SOFTT uses a toothed buckle and a tension thumbscrew that must be loosened to pre-tighten the strap and then screwed down to lock the strap in place (and to keep the strap from slipping when the windlass is turned). Like the CAT, the SOFTT is tightened by turning the windlass until the bleeding stops. To lock the windlass in place, one or both of the triangular buckles are locked over the end of the windlass. At the tag end of the strap is a white label, which is used to record the time of application. Unlike the CAT, there is no need to configure the SOFTT any differently for one-handed versus two-handed use since the strap will slip easily through the toothed buckle when self-applying on an upper extremity (assuming that the tension thumbscrew isn't locked down tight). The SOFTT also allows the strap to be completely freed from the toothed buckle by pressing the tension thumbscrew, which raises the teeth from the buckle, allowing the strap to be quickly pulled free.



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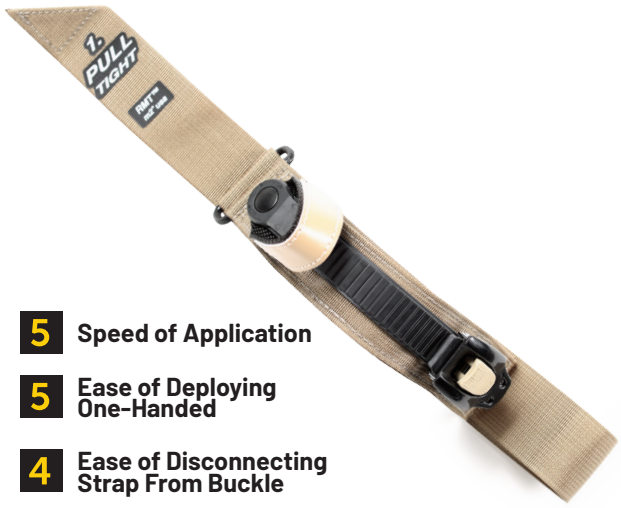
SOF Tactical Tourniquet - Wide

The SOFTT-W is an improvement on the already trusted SOFTT, with a strap that's 1.5 inches wide (compared to 1 inch on the SOFTT). The SOFTT-W also does away with the tension thumbscrew and replaces it with a slip-gate buckle. The SOFTT-W is applied by loosening the strap (if necessary) and placing it in position. Where the SOFTT-W really shines is in its simple ability to disconnect the slip-gate buckle from the strap by twisting it free from the U-shaped clip. This is a major benefit when sliding the tourniquet up an arm or leg is impractical or impossible. After placing the tourniquet in position, the slip-gate buckle is clipped back in place and the tag end of the strap is tightened. Like the CAT and SOFTT, the SOFTT-W is tightened by turning the windlass until the bleeding stops. The SOFTT-W has just a single triangular-shaped lock rather than the two on the SOFTT, but one is plenty. The time of application may also be recorded on the white tag on the end of the strap.



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Ratcheting Medical Tourniquet

The RMT is the most innovative tourniquet to hit the market in years and is gaining a huge following in law enforcement, EMS and the military. The application of the RMT will be immediately apparent to anyone who has slipped on a pair of roller blades or ski boots that are tightened with ratcheting straps. After positioning the tourniquet, it can be pre-tightened by grasping the "bite strap" with an index finger and pulling the tag end tight. If you're wondering why the bite strap is so named, it's because it aids in self-application on an upper extremity when it's necessary to apply the tourniquet one-handed. The operator simply slides the RMT into place, bites the "bite strap" and pre-tightens the strap by pulling it tight. To tighten the RMT, the operator simply lifts up on the black ratchet until the bleeding stops (you get to hear that satisfying "click" just like you'd expect). Since the ratchet (by design) is always locked in place, nothing further must be done. To release, lift up on the coyote-colored tab inside of the ratchet. The RMT is available with straps 1.5 or 2 inches wide, with other models designed specifically for pediatric and even K9 use.