

## RATCHET HOOK TOURNIQUET

### REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Provisional Application No. 61/090,042, filed Aug. 19, 2008; the contents of which are hereby incorporated by reference in their entirety.

### RIGHTS IN THE INVENTION

[0002] This invention was made with support from the United States Government and, specifically, the United States Army Medical Research & Materiel Command and, accordingly, the United States government has certain rights in this invention.

### FIELD AND BACKGROUND OF THE INVENTION

[0003] The invention is an improvement of the traditional ratchet tourniquet used to stop uncontrollable bleeding from gunshot wounds and blast injuries to the arms and legs. Disclosed is a device with a detachable flat metal hook, allowing the loop of the ratchet tourniquet to open up.

[0004] Currently, there are two commonly used types of tourniquets: the combat application tourniquet (CAT) (FIGS. 1A and 1B) and the ratchet tourniquet (FIGS. 2A and 2B). The CAT (FIGS. 1A and 1B) consists of a VELCRO™ (Velcro USA Inc., Manchester, N.H.) (aka hook-and-loop fastener) belt attached to a windlass assembly. By keeping the CAT with the belt fed partially through the friction buckle, the tourniquet can be applied by the injured person with one arm. In this one-handed configuration, the loop is fed over the end of the injured extremity, advanced up the injured limb and tightened with the windlass. A medic can also open the CAT and pass the belt under the extremity and fasten the tourniquet higher up on the extremity. This two-handed configuration avoids the need to pass the loop around and up the injured extremity. In this case, the free end of the belt must be fed under the injured extremity with one hand, retrieved by the other hand and then fed through a friction buckle before being tightened.

[0005] Although a medic can apply the one-handed configuration to an injured limb, the main disadvantage is the need to feed the loop over the injured limb and advance upward. This process can be quite difficult when passing the loop over disfiguring injuries of the limbs or in cramped places like vehicles or helicopters. While using the two-hand CAT method, feeding the cloth belt under the injured extremity can be difficult in noisy, cluttered or dark environments. In such situations, the belt can become twisted during passage under injured limb. Since the belt is made of cloth, the ability for the retrieving hand to differentiate between this cloth belt from the patient's clothing and equipment can be uncertain. Passage of the belt through the friction buckle is both time consuming and cumbersome with bloody hands in extreme situations. Furthermore, the VELCRO™ can be fouled with blood and dirt, lessening its adhesiveness and ability to maintain the loop integrity while tightening. Finally, the windlass assembly can be knocked loose during rough transport.

[0006] In order to get a more secure tourniquet placement, medics will often use the traditional ratchet tourniquet (FIGS. 2A and 2B). Similar to the CAT, this device forms a loop that must be fed over the injured limb and advanced upward past the injury before tightening high up on the limb. Unlike the

plastic and cloth assembly of the CAT, the metal ratchet mechanism of this tourniquet forms a strong bond that will not dislodge with even the roughest handling. However, similar to the one-handed configuration of the CAT, the main disadvantage is the need to pass the injured limb through the loop.

[0007] Therefore, there exists a need for an improved tourniquet device and method of application that allows for the rapid and secure application of the tourniquet not currently available in the art.

### SUMMARY OF THE INVENTION

[0008] A tourniquet device comprising: a flexible element with at least a first end and a second end; a fastening element integral with the first end of the flexible element, said fastening element comprising a flat hook; a locking element integral with the second end of the flexible element, said locking element being operative to removably relate to the fastening element; a tension producing mechanism operative to apply tension to said flexible element.

[0009] Current ratchet tourniquets incorporate a permanently sewn connection between the belt and the body of the ratchet, forming a loop that has to be advanced up the injured limb before being tightened (see FIGS. 2A and 2B). Since the injured limb must be fed through the loop, precious time is lost during this process, especially while applying a tourniquet in cramped places like vehicles or helicopters. Instead of a sewn connection, the preferred embodiment of the present invention employs a device that utilizes a flat metal hook that connects the belt to the body of the ratchet. This allows the tourniquet to open up and the free end to pass around the injured limb. Rather than passing the injured limb through a tourniquet loop, the opened tourniquet can be applied immediately above the injury and tightened without further disruption of the limb. This modified application method would allow faster and easier application of the tourniquet.

[0010] The disclosure describes an improved tourniquet to stop otherwise uncontrollable bleeding from limbs. The tourniquet would be used under conditions of severe extremity trauma, such as gunshot wounds or blast injury. The invention is specifically directed at improving the certainty of effective placement and the speed of application of the tourniquet in cramped environments such as vehicles, and when the limb has suffered severe disfiguring trauma. The preferred embodiment utilizes a detachable hook-and-pin attachment, the hooked end of the tourniquet belt can be manually fed around the limb, and re-attached to the ratchet and tightened, rather than requiring that the tourniquet belt be fed over the end of the limb and advanced to above the wound before tightening as is the case in the standard tourniquet configuration known in the art. Furthermore, the detachable hook configuration allows the belt to be fed cleanly around the limb and attached to the ratchet mechanism with less chance of twisting during application.

[0011] This application discloses a device that allows for the application of a tourniquet more rapidly than either of the other types of tourniquets previously discussed. With the CAT (FIGS. 1A and 1B) in the one-handed loop configuration, the injured extremity must be passed through the loop while the tourniquet is advanced up the limb until positioned properly. This action is quite difficult with mutilating injuries of extremities in cramped condition, such as responding to a vehicle hit by a roadside bomb or treating a patient in a helicopter. The two-handed CAT application loses valuable