

# Abstracts of Oral Presentations-WADEM Congress on Disaster and Emergency Medicine 2019

## TRAUMA

### Efficacy of Novel Commercial Tourniquet Systems in Extremity Hemorrhage Control - An Ultrasound and Generated Force Study

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**Introduction:** Tourniquets (TQ) save lives. Although military-approved TQ are more effective than improvised TQ in controlling exsanguinating extremity hemorrhage, their bulk may preclude every day carry (EDC) by civilian lay-providers.

**Aim:** The purpose of the current study was to compare the efficacy of 3 novel commercial TQ to a military-approved TQ.

**Methods:** A convenience sample of EM residents was utilized. Four different TQ were evaluated: Gen 7 Combat Application Tourniquet (CAT; control), Stretch Wrap and Tuck Tourniquet (SWAT-T), Gen 2 Rapid Application Tourniquet System (RATS), and Tourni-Key (TK). Popliteal artery occlusion was determined using a ZONARE ZS3 ultrasound. Steady-state maximal generated force was measured for 30 seconds with a thin-film force sensor (Singletract). Opinions were solicited at the conclusion of the study.

**Results:** Nine residents participated in the study (7 male, 2 female). Success rates for complete arterial occlusion were 89% CAT, 67% SWAT-T, 89% RATS, and 78% TK (H 0.89,  $p = 0.83$ ). Mean ( $\pm$  SD) times to achieve occlusion were  $10.4 \pm 1.7$  sec CAT,  $23.1 \pm 9.0$  sec SWAT-T,  $11.1 \pm 3.8$  sec RATS, and  $20.0 \pm 7.1$  sec TK (F 9.71,  $p < 0.001$ ). Steady-state maximal forces were  $29.9 \pm 1.2$  N CAT,  $23.4 \pm 0.8$  N SWAT-T,  $33.0 \pm 1.3$  N RATS, and  $41.9 \pm 1.3$  N TK. Participants felt that the CAT was easiest to apply (61%), followed by the RATS (33%). Participants were most likely to select the TK (44%) for EDC, followed by the RATS (33%).

**Discussion:** In this small convenience sampling, all novel TQ systems were non-inferior to the military-approved CAT TQ. Mean application times were less than 30 seconds. The size and unique nature of these novel TQs may make them more conducive to lay-provider EDC, thereby improving the response to high threat events.

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### Efficacy of Video-Based Instructions for Laypeople Bleeding Control Education

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**Introduction:** The Stop the Bleed campaign in the United States aims to teach bleeding control techniques, such as tourniquets, to the public. Educational consortium guidelines advocate using brief web- or video-based material. Another option is posters or flyers distributed at, for example, workplaces or public spaces.

**Aim:** The aim of the current study was to evaluate the relative efficacy between a flyer and a video to teach tourniquet application skills to members of the public in Sweden.

**Methods:** A total of 38 participants (27 male, 11 female) from the general public completed the study. Their ages ranged from 19 to 73 (M=32, SD=14). None had prior experience with tourniquet applications. One group (n=18) received tourniquet instructions on a flyer and one (n=20) received a 5-minute video instruction. Both groups completed pre- and post-questionnaires and a practical tourniquet application test.

**Results:** Independent samples t-tests showed that the video-based instructions resulted in fewer application errors (M=1.40 out of 10, SD=1.19) compared to the flyer group (M=3.61, SD=2.40),  $t(36)=3.651$ ,  $p=0.001$ , and higher post-task satisfaction (M=3.89 out of 5, SD=0.74 compared to M=3.39, SD=1.15). However, the flyer-group was faster (M=86.22 seconds, SD=27.28) compared to the video group (M=112.25, SD=42.22),  $t(36)=2.229$ ,  $p=0.032$ .

**Discussion:** Video instructions appear superior to flyers in terms of teaching correct tourniquet application to the general public. The longer total application time includes steps taken after bleeding control has been achieved (e.g. securing tourniquet straps and time notation), which may have contributed to the application time difference. The results support the educational guidelines that suggest video-based instructions for teaching basic tourniquet skills to laypeople are more effective.

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### A Framework for Planning for High-Volume High-Acuity Traumatic Mass Casualty Incidents

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