

Tourniquet application by schoolchildren-a randomized crossover study of three commercially available models

Alaa El Bashtaly, Elene Khalil, Francois Méthot, Lawrence Ledoux-Hutchinson, Jeffrey M Franc, Valérie Homier

J Trauma Acute Care Surg. 2021 Apr 1;90(4):666-672

Abstract

Background: Life-threatening hemorrhage is a major cause of preventable mortality in trauma. Studies have demonstrated the effectiveness and safety of commercial tourniquets when used by adult civilians. However, there are no data about tourniquet application by children. This study's goal is to determine which of three commercially available tourniquets is most effective when used by children.

Methods: A randomized crossover study was conducted in four elementary schools in Montreal to compare three commercially available tourniquets. The study population is primary school children aged 10 to 12 years (5th-6th grade). A total of 181 students were invited to participate; 96 obtained parental approval and were recruited. Participants underwent a short 7-minute video training on the use of three commercial tourniquets and were subsequently given a 2-minute practice period. Students were evaluated on their ability to successfully apply the tourniquet and the time to complete application. After applying all three tourniquets, the students selected their favorite model. The primary outcome is the proportion of successful applications per tourniquet model. Secondary outcomes include time to successful application for each tourniquet model and tourniquet model preference.

Results: The mechanical advantage tourniquet (MAT) outperformed the combat application tourniquet (CAT) and the stretch wrap and tuck tourniquet (SWATT) in terms of success rate (MAT, 67%; CAT, 44%; SWATT, 24%; $p < 0.0001$), time to application (MAT, 57 seconds; CAT, 80 seconds; SWATT, 90 seconds; $p < 0.0001$), and preference (MAT, 64%; CAT, 30%; SWATT, 6%; $p < 0.0001$).

Conclusion: In this study, the MAT performs better in terms of success rate, time to application, and preference when used by school-aged children. This study can be helpful when facilities are purchasing tourniquets for use by students.