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REF: Tourniquet Use in the Pediatric Population

“How small of a child can the CAT Tourniquet be used on” is a frequently asked question. There are actually two major considerations when deciding to apply a tourniquet to a child. First, is the tourniquet effectiveness. That is, will it stop life-threatening bleeding in an injured extremity. The second aspect is safety. This means will the tourniquet device itself cause unintended injury to extremity when it is applied. One of the confounding variables when discussing children is that the medical community refers to that population as “pediatric,” which is defined as an age under 18. This unfortunate definition means that a 17 year old starting lineman on a high school football team is often viewed in the same manner as the 17 month old toddler.

Unfortunately, there is a paucity of published studies concerning pre-hospital emergency tourniquet use in children. One recent study by Kragh et al¹ indicated that the CAT Tourniquet can be effective on limbs as small as 9.1cm in circumference – the mean thigh circumference for 2 month old infants. The authors stated that “Although the CAT Tourniquet may look odd if 30 inches of its 37 inch strap hangs out loose past the buckle on a 4 year old child’s arm, it can be entirely effective.” The authors also noted that “Given tourniquets of a set width and smaller limbs of children compared with those of adults, established science indicates that the mechanical effectiveness...is more likely in smaller limbs.” This is an important study in that it shows that using emergency tourniquets on children provides a clear survival benefit similar to that of adults.

Regarding safety, trauma registry data appears to be significantly limited in terms of evaluating safety in pre-hospital emergency tourniquets. While pneumatic tourniquets are commonly used in pediatric orthopedic surgery, little information exists to determine how long an emergency tourniquet can safely stay on a child’s limb or how much pressure is required to occlude arterial flow without injuring the underlying soft tissue or neurovascular bundles. There are no searchable studies that examine this issue, and much of the surgical literature seems to revolve around studies published in the ‘80s and ‘90s that were mostly a “consensus” approach to recommending tourniquet times/pressure for the pediatric population. Additionally, surgical tourniquets are applied within the operating room whilst the patient is sedated, so there is no mention of pain control within the pediatric population for pre-hospital tourniquet application.

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1. Kragh, John F., Arthur Cooper, James K. Aden, Michael A. Dubick, David G. Baer, Charles E. Wade, and Lorne H. Blackbourne. "Survey of Trauma Registry Data on Tourniquet Use in Pediatric War Casualties." *Pediatric Emergency Care* 28.12 (2012): 1361-365.

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