Tourniquets Outside the Goldilocks Zone

James G Vretis, DO
Medical Director
Center for Tactical Medicine
jvretis@c4tm.us
I have no conflicts of interest.
Nothing I say is official policy
Outside the Goldilocks Zone

Teenagers
Most adults
Morbidly obese
Pediatrics
Almost all commercially available tourniquets can be made work on almost all patients.
Pediatric Studies

Comparison of Commercial Tourniquets in a Pediatric Trauma Patient Model

Toddler Through Teen Manikin Tourniquet Trial

Toddler Through Teen Tourniquet Trial (5T)
Comparison of commercial tourniquets in a pediatric trauma patient model
Mankin arms made of 10% ballistic gelatin
Mankin arms diameters
1.5 – 4.0” at 0.5” increments
## Manikin arm sizes

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5”</td>
<td>2-5 month</td>
</tr>
<tr>
<td>2.0”</td>
<td>2 year</td>
</tr>
<tr>
<td>2.5”</td>
<td>7 year</td>
</tr>
<tr>
<td>3.0”</td>
<td>11 year</td>
</tr>
<tr>
<td>3.5”</td>
<td>14 year</td>
</tr>
<tr>
<td>4.0”</td>
<td>17 year</td>
</tr>
</tbody>
</table>
Water pressure
120 mm Hg
Failure to stop fluid flow 60 sec
Failure to be applied per manufacturer’s instructions
Recoil action
tourniquets
Stretch Wrap And Tuck SWAT-T
SWAT-T®

**STRETCH**

**WRAP**

**TUCK**

TOURQUET IF: OVALS = CIRCLES, STRIPS = DIAMONDS = SQUARES!

This multi-purpose tourniquet dressing is primarily a tourniquet. Wrap over gauze for pressure dressing.
Rapid Application Tourniquet System RATS
1. Insert the running end through the three finger loop.

2. Running end and loop make a hitch. Place on injured limb and begin wraps.

3. Pull tight and wrap until out of material.

4. Secure wrap by placing running end in cleat.

WWW.RATSTOURNIQUET.COM
Facebook: Rats Tourniquet LLC

Photo credit: Quinton D. Hapke Photography
TacMed K9
Tourniquet
TMK9
Mechanical advantage tourniquets
Combat Application Tourniquet CAT
SOF Tactical Tourniquet Wide SOFTT-W
SAM Medical
Extremity
Tourniquet
SAM-XT
Tactical
Mechanical
Tourniquet
TMT
Mechanical Advantage
Tourniquet
MAT
Child Ratcheting Medical Tourniquet CRMT
LESS THAN 120lbs
Results
All recoil action tourniquets worked on all manikin sizes
MAT failed on the 3” and smaller diameter manikins.
TMT failed on the 2.5” and smaller diameter manikins
CAT, SAM-XT and SOFTT-W all failed on the 2” and smaller diameter manikins
CRMT was the only mechanical advantage tourniquet to work on all manikin sizes.
<table>
<thead>
<tr>
<th></th>
<th>10.16 cm</th>
<th>8.89 cm</th>
<th>7.62 cm</th>
<th>6.35 cm</th>
<th>5.08 cm</th>
<th>3.81 cm</th>
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</thead>
<tbody>
<tr>
<td>CAT</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>6 (30%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>SAMXT</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>14 (60%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>TMT</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>SOFTTW</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>14 (60%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>CRMT</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
</tr>
<tr>
<td>MAT</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>14 (60%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>SWAT</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
</tr>
<tr>
<td>TMK9</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
</tr>
<tr>
<td>RATS</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
</tr>
</tbody>
</table>
100% of evaluators chose RATS as the tourniquet they would least like to carry for pediatrics.
100 % of evaluators chose CRMT as the tourniquet they would MOST like to carry for pediatrics
Toddler Through Teen Manikin Tourniquet Trial
3D printed molds for manikin arms
Manikin arms correspond to ages 1 – 12 year old
CAT, SOFTT-W and CRMT being tested
Toddler Through Teen Tourniquet Trial (5T)
Patients age 1 – 12 undergoing elective surgery
CAT, SOFTT-W and CRMT being tested
Multi-center Randomized for each age
One arm used
1000 Volunteers
Hospital IRB / ethics approval required
Parents must watch informed consent video
Exclusion criteria

Coagulopathies
Sickle-cell
Anticoagulant therapy
Hemophilia
Pregnant
Primary endpoint: Tourniquet worked or not
Secondary endpoints: Time to apply Ease of use
Tourniquet Trial on Morbidly Obese Adults 2TMOA
CAT, SOFTT-W, SAM-XT, TMT, SWAT-T and RATS being tested
Tourniquet application site: thigh at crotch level
Both thighs to be used (each side tourniquet randomized)
Multi-center Randomized 800 Volunteers
Hospital IRB / ethics approval required
Volunteers must watch informed consent video
Inclusion criteria:
BMI > 40
Age > 17
Exclusion criteria:
Known PVD
Known or Hx DVT
Pregnant
Primary endpoint: Tourniquet worked or not
Secondary endpoints: Time to apply Ease of use
Questions?
We are seeking coinvestigators for 5T and 2TMOA
James Vretis,
DO
830.431.1467
jvretis@c4tm.us