

# Tourniquets Outside the Goldilocks Zone

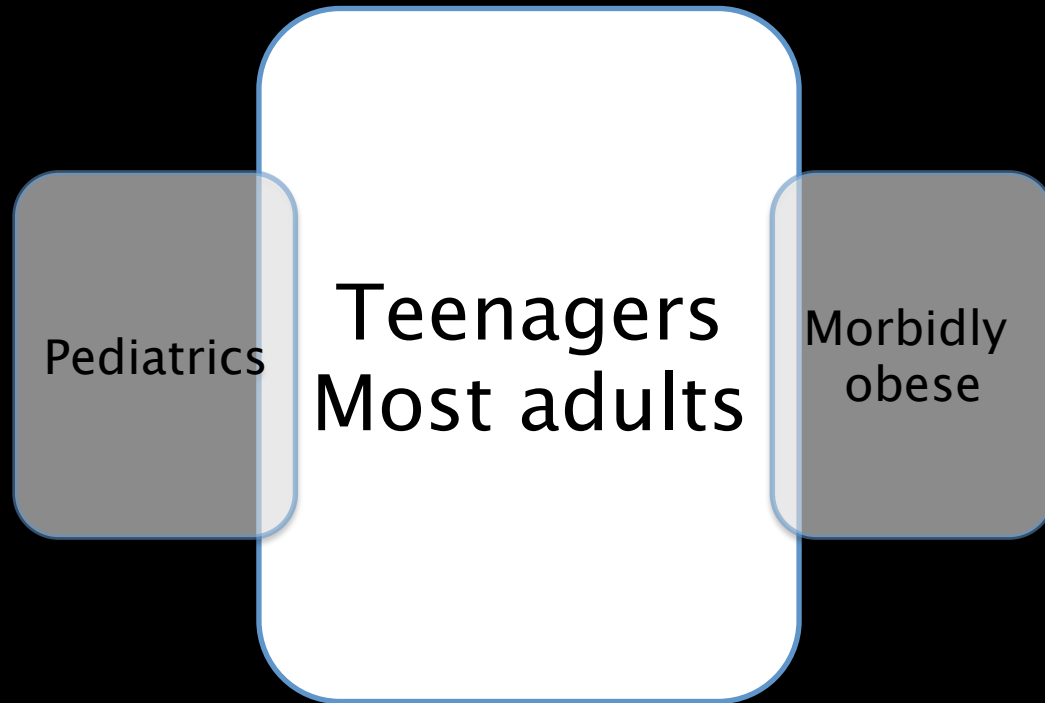
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I have no conflicts  
of interest.

Nothing I say is  
official policy



# Outside the Goldilocks Zone



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



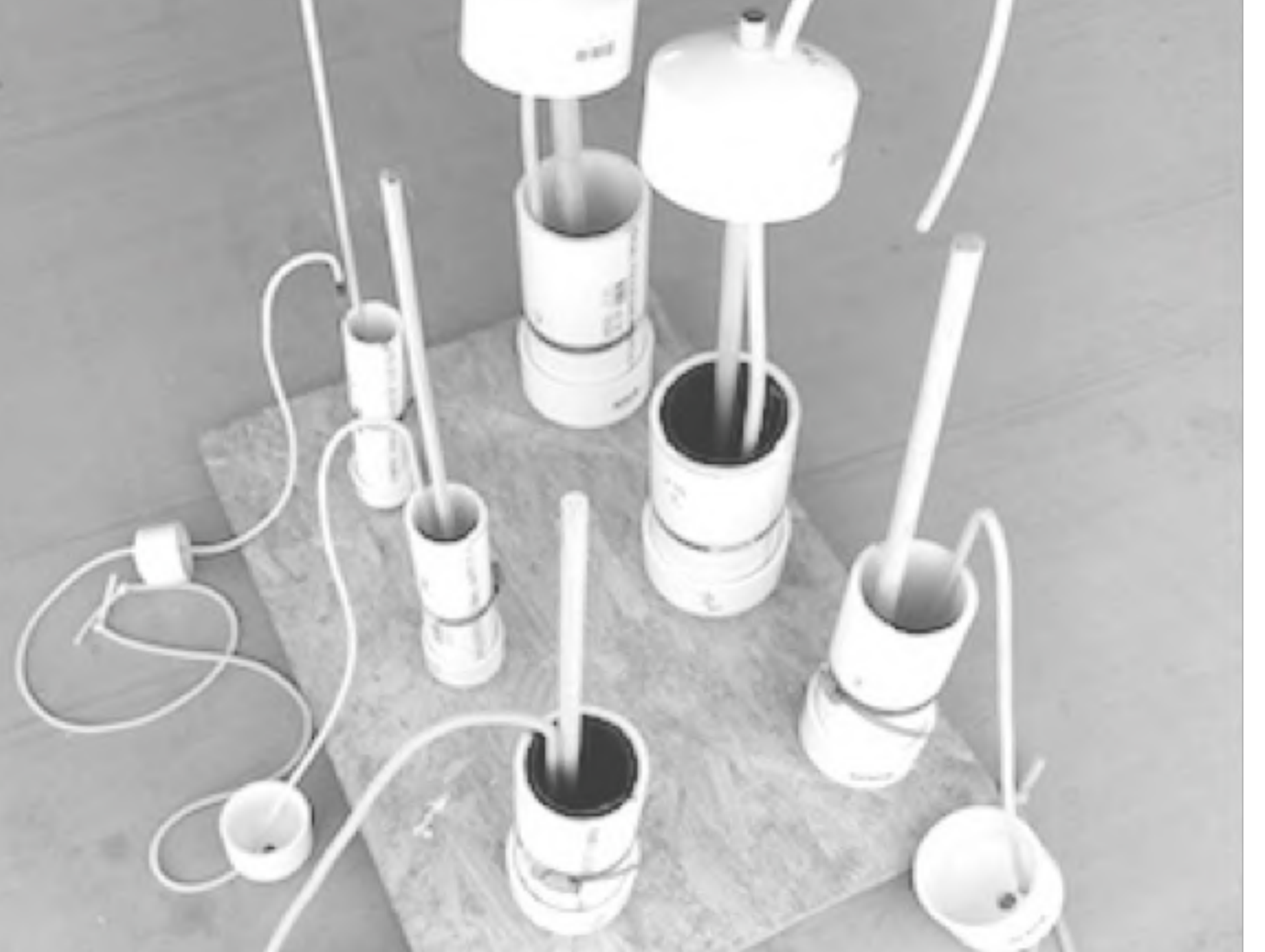
Mankin arms  
made of 10%  
ballistic gelatin

Mankin arms  
diameters

1.5 – 4.0” at 0.5”  
increments

# Manikin arm sizes

Diameter	Age
1.5"	2-5 month
2.0"	2 year
2.5"	7 year
3.0"	11 year
3.5"	14 year
4.0"	17 year



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



Rapid  
Application  
Tourniquet  
System  
RATS

 **RATS**  
Tourniquet



INSERT THE  
RUNNING END  
THROUGH THE  
THREE FINGER  
LOOP.

1

RUNNING END AND LOOP  
MAKE A HITCH. PLACE ON  
INJURED LIMB AND BEGIN  
WRAPS.



2

PULL TIGHT AND  
WRAP UNTIL OUT  
OF MATERIAL.



3

SECURE WRAP  
BY PLACING  
RUNNING END  
IN CLEAT.



4



[WWW.RATSTOURNIQUET.COM](http://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





TO RE-US  
2 PULL STRAP

APPLICABLE TIME

Child Ratcheting  
Medical  
Tourniquet  
CRMT



**LESS THAN 120lbs**

**120 lbs  
55 kg**

# Results

All recoil action  
tourniquets  
worked on all  
manikin sizes

MAT failed on the  
3" and smaller  
diameter manikins



RELENGE

APPLICATION TIME  
CA

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



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



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