

# Bedside Management of Pistol Projectile Wounds: The Limited Effects of Positive Pressure Irrigation on Contamination

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## Background

- There continues to be debate in the Orthopaedic literature on appropriate non-operative management of pistol caliber (PC) gunshot wounds (GSWs).
- Positive pressure irrigation is commonly practiced and well accepted in the scope of PC GSW management; however, the quantity of irrigation and the effects on gross contamination are vastly under-represented in the literature.

## Objective

- To examine the efficacy of bedside positive pressure irrigation at removing gross debris from pistol caliber gunshot wounds.

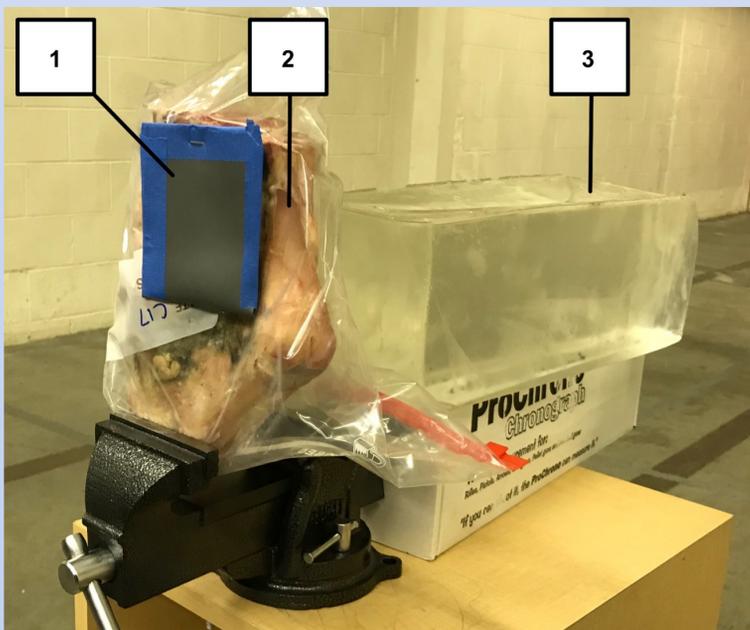


Figure 1: 1) Metal impregnated fabric. 2) Cow shank sample 3) Ballistics gel

## Methods

- Utilized fourteen bovine shanks that were shot with a nine-millimeter pistol (124 grain Federal HST jacketed hollow point) from three meters away.
- Metal impregnated fabric was placed in front of the impending impact zones on a standard group of cow shanks to mimic radio-opaque clothing-like material.
- Shank specimens were imaged three separate times with standardized computer tomography: immediately after impact, after 250 cubic centimeter (cc) irrigation, and after a total of 750cc of irrigation.
- The scanned images were examined for change in radio-opaque contamination at both the entry site and within the cavity of the wound



Figure 2: The author's technique used for irrigation: A 60cc syringe placed just outside of the entrance at a rate of 20cc per second.

## Results

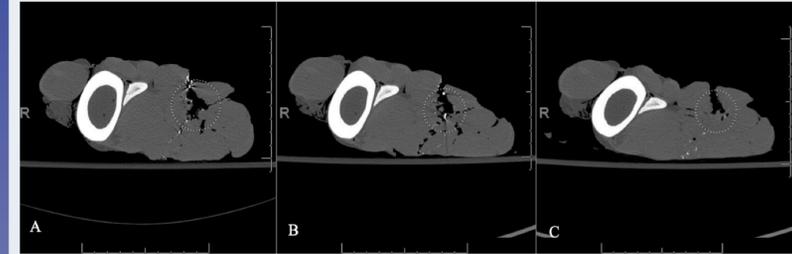


Figure 3: CT evaluation of contamination pre and post irrigation of specimen #14. A) Prior to the first irrigation with reference site annotation (circle) indicating largest wound cavity. B) After first irrigation at the same location demonstrating no appreciable decrease in metallic wound contamination. C) After third irrigation at the same location demonstrating decrease in intra-cavity air with shifting of metallic contaminants and no appreciable decrease in amount.

EFFECT OF IRRIGATION PER 250CC ON CONTAMINATION				
Superficial	# Samples Post 250cc Irrigation	% of Samples	# Samples Post 750cc Irrigation	% of Samples
No change	8	57.14%	8	57.14%
Decrease	5	35.71%	2	14.29%
Shift	1	7.14%	4	28.57%

Cavity	# Samples post 250cc Irrigation	% of Samples	# Samples Post 750cc Irrigation	% of Samples
No change	8	57.14%	3	21.43%
Decrease	0	0.00%	1	7.14%
Shift	6	42.86%	10	71.43%

## Conclusion

- Simple positive pressure irrigation has limited effect on the removal of gross debris within the cavity of pistol caliber gunshot wounds.
- There was a decrease in the contamination superficially, but this could just have easily been removed with a light brush.
- This study brings into question the use of PPI for the removal of debris from PC GSWs.