HIT ME WITH YOUR BEST SHOT

An Analysis of Soft Tissue Damage from Simulated Firearm Injuries

By: Kelsey Wofford
Anthropological Significance

• Forensic Anthropology: The application of the science of physical anthropology to the legal process.\(^1\)

• Evaluation of soft tissue damage relates to holistically reconstructing criminal context.
Ballistics in Forensic Anthropology

- Projectile patterns
- Commonality in legal cases
- 31,347 firearm deaths in 2009

Deaths by Firearms in 2009

- 60% Suicides
- 36% Homicides
- 4% Other

Data taken from http://www.fbi.gov/
Pigs as Models for Humans

• Pigs have a similar soft tissue, digestive system, and weight composition.
Research Questions

• Do different weapons produce visible differences when they are fired into soft tissue?
• Do the same weapons produce visible differences when they are fired from various distances into soft tissue?
Hypotheses

- The larger the caliber of the weapon the greater the damage will be in the soft tissue.
- The closer the distance the greater that the damage will be in the soft tissue.
Materials: Firearms

.22mm Pistol + ammunition

.38mm Revolver + ammunition
Materials: Specimens

- Pigs:
  - 12 soft tissue samples taken from shoulder
  - 3 specimens per distance and weapon
  - Skin was still attached
Methods

• Measurements
  • Entry wound
  • Exit wound

• Evaluate damage
Experiment Setup

- Calibrate distance
- Test firing
Results: Entry Wound

.22mm Pistol from 10 ft.  .38mm Revolver from 10 ft.
Results: Entry Wound

Entry Wound Diameter from 10ft

- **.22mm**
  - Shot 1: 3.96
  - Shot 2: 3.91
  - Shot 3: 3.91

- **.38mm**
  - Shot 1: 7.39
  - Shot 2: 7.16
  - Shot 3: 7.04

Diameter in millimeters
Results: Entry Wound

.22mm Pistol from 20 ft.

.38mm Revolver from 20 ft.
Results: Entry Wound

Entry Wound Diameter from 20ft

<table>
<thead>
<tr>
<th>Weapon</th>
<th>Shot 1</th>
<th>Shot 2</th>
<th>Shot 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>.22mm</td>
<td>4.17</td>
<td>3.02</td>
<td>3.51</td>
</tr>
<tr>
<td>.38mm</td>
<td>5.31</td>
<td>5.26</td>
<td>5.13</td>
</tr>
</tbody>
</table>
Results: Exit Wound

Exit Wound Diameter for 20 ft.

<table>
<thead>
<tr>
<th>Weapon</th>
<th>Exit Wound Diameter in millimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td>.22mm</td>
<td></td>
</tr>
<tr>
<td>Shot 1</td>
<td>28.56</td>
</tr>
<tr>
<td>Shot 2</td>
<td>8.74</td>
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<tr>
<td>Shot 3</td>
<td>20.9</td>
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<tr>
<td>.38mm</td>
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<tr>
<td>Shot 1</td>
<td>33.53</td>
</tr>
<tr>
<td>Shot 2</td>
<td>26.16</td>
</tr>
<tr>
<td>Shot 3</td>
<td>49.38</td>
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</tbody>
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Discussion

• Larger caliber
  • Larger entry wound

• Closer distance
  • Larger entry wound
Conclusion

• There are visible differences regarding the caliber of weapon and firing distance.

• This information can provide guidelines to help reconstruct crime scenes.
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