belonging to men suddenly missed in the nineties, suspected as victims of
the local criminal organization. The grave is now famous with the
name of cemetery of the Gargano’s realm.
Skeletal Remains, Ravine, Homocide

G95 Use of Multidetector Computed
Tomography (MDCT) in the Evaluation of
Gunshot Wounds
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After attending this presentation, attendees will understand the
process used by the Armed Forces Medical Examiner System (AFMES)
to integrate MDCT into the evaluation of gunshot wounds. Attendees
will be able to describe the advantages and limitations of utilizing
MDCT in the evaluation of gunshot wounds.
This presentation will impact the forensic science community by
detailing a novel approach to overcome the limitation of the visualizing
entrance and exit gunshot wounds with MDCT.
Postmortem forensic imaging is a critical tool in the evaluation of
gunshot wounds. Traditionally, fluoroscopy and digital planar film x-rays
have been utilized to document and locate bullets and bullet fragments in
cases of gunshot wounds. In the last several years, traditional imaging
techniques in conjunction with postmortem MDCT has made it possible
to obtain precise three-dimensional localization of bullets and bullet
fragments. In addition, this technique has been shown to be an effective
method for aiding in the documentation of gunshot wound paths and
evaluation of internal organ injury prior to autopsy.
One of the main limitations of utilizing MDCT in the evaluation of
gunshot wound paths is the inability of MDCT to precisely locate the
surface entry and exit wounds. Although the presence of gas in the soft
tissue and disruption of tissue surfaces may be helpful in the precise
location of these wounds, the collapse of the temporary cavities,
compression of soft tissue defects and the position of the of the body on
the scanning table can limit the detection of the entry and exit wounds.
In order to overcome this limitation, a novel technique was
developed utilizing radio-opaque markers. Briefly, the body is first
imaged by digital x-rays to identify any bullets or bullet fragments in
the body or clothing. Next, digital photographs of the body and gunshot
wounds are taken and the locations of the gunshot wounds are marked
with a 1.5 millimeter radiopaque marker. The body is then imaged with
MDCT. The resulting images are processed with imaging software to
produce a three-dimensional image of the body with the precise location
of the entrance and exit wounds on the skin surface. Reconstructed images
are manipulated to obtain any desired orientation of the body and wound
pathway. These images can then be used to demonstrate the gunshot
wound pathways in medicolegal proceedings. It must be noted that this
technique does not overcome the limitation of MDCT in distinguishing
entrance gunshot wounds from exit gunshot wounds. This distinction is
made by combining the postmortem forensic imaging with the findings
from the external inspection and internal dissection of the body.
Computed Tomography, Gunshot Wounds, Virtual Autopsy

G96 Gunshot Wounds Covered by Different
Textiles: Determination of GSR Through
Micro-CT Analysis
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Section of Legal Medicine and Forensic Toxicology, Via Falloppio 50,
Padua, 35121, ITALY; and Massimo Montesì, PhD, University of
Padua, Via Falloppio 50, Padova, 35121, ITALY.

After attending this presentation, attendees will have novel
information on the role of Micro-CT analysis of gunshot wounds for
estimating the firing range.
This presentation will impact the forensic science community by
adding new data on the estimation of the firing distance of intermediate-
ranged gunshot wounds in clothed victims, through a micro-CT analysis
of the gunshot residue.
Estimation of the firing range is often critical for reconstructing
gunshot fatalities, where the main measurable evidence consists of the
gunshot residue (GSR). Several techniques and methods have already
been used for characterizing GSR, such as Atomic Absorption
Spectroscopy, Neutron Activation Analysis, Autoradiography, Routine-
CT, Scanning Electron Microscopy, and Histochemistry. Recently, a
novel approach, based on the use of Micro-CT, proved to be an objective,
reliable, rapid, and inexpensive tool for estimating the firing range in
intermediate-range shots.
Aim of the Study: It is well known that the presence of clothes
covering the body heavily affects the distribution of GSR on the entrance
wound, hindering the estimation of the firing range on the basis of the
sole macroscopic inspection.
The goal of the present study was to evaluate the differential
distribution of GSR, with regard to the different kinds of textiles
covering the skin, by means of micro-CT analysis, with the final purpose
of reconstructing the firing distance.
Materials and methods: Human legs, surgically amputated, were
cleaned of dried blood and any other contaminants, and cut into sections
of approximately 6 cm in length.
A total of 60 sections were selected; each section was covered with
a single type of textile, chosen among cotton fabric (n = 15), jeans (n =
15), leather (n = 15), and waterproof synthetic fabric (n = 15). Bare skin
sections were used as controls (n = 15).
Firing was carried out perpendicularly at distances of 5, 15, and 30
cm, using a .32 pistol loaded with full-jacketed bullets. A total of 75
shots were performed (five replicates for each distance). After each
firing test, the gunshot wounds were photographed and formalin fixed.
The skin specimens, comprising the epidermis, dermis, and
subcutaneous fat, were cut into parallelepips (height 1 cm, side 1 cm)
with a lancet. Samples were scanned following standard processing
procedures, using a high resolution scanner.
The acquired raw data were reconstructed with reconciliation
software, which uses the back-projection algorithm to reconstruct axial
subsequent images saved as bitmap format. The bitmap images were
analyzed by a CT analysis software: the selected volume of interest
(VOI side of 1 cm and height of 3.8 mm) was focused in the centre of the
specimen in order to have the entire entry wound positioned in the
middle. All the samples were binarized using the same parameters.
The percentage of GSR deposit was calculated analyzing all
particles with a density higher than 1000 HU (particles with a density
lower than 1000 HU were excluded to reduce iron artefacts). The 3D
images were reconstructed through a Ct-Vox Software.
Results: The visual inspection of the skin did not allow the
estimation of the firing distance for the covered gunshot-wounds, the

* Presenting Author
The anthropologist was called in at the first recognition of skeletal trauma. At that point it was decided to remove all ribs, both clavicles, and vertebral C-7 through l-4 after extensive photographic documentation. These were processed free of obvious soft tissue, but preserved in an anatomical position to give a better idea of three dimensional relationships of the complicated trauma to bone.

Dry bone examination combined with faxitron radiographs indicate numerous rib fractures as listed in Table 1.

Table 1. Summary of rib fractures in 3-month-old infant.

<table>
<thead>
<tr>
<th>RIB FRACTURES</th>
<th>Acute</th>
<th>Chronic</th>
<th>Stable Chronic</th>
<th>Acute On Chronic</th>
<th>Other Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute*</td>
<td>5</td>
<td>6</td>
<td>10 (3 questionable)</td>
<td>2</td>
<td>1 (tissue bank)</td>
</tr>
</tbody>
</table>

*All rib head apex tears

As one would guess, the anthropological report documents and describes the 33 insults to bone that clearly point to non-accidental trauma, with the history as reported. However, from a medical examiner point of view, this case was everything but a clear case of child abuse.

It is ruled the death of this 3-month-old as attributed to probable cardiac dysrhythmia due to electrolyte abnormalities. Postmortem testing for calcium and vitreous sodium yielded abnormally low levels. Multiple blunt force injuries in the form of acute and chronic rib fractures were also noted at autopsy. No external signs of trauma are seen on the body. Differential diagnoses of the infant's abnormalities include natural and non-natural causes. Neglect and child abuse cannot be ruled out, however, nor can a natural cause such as a metabolic disorder be eliminated. To complicate issues, the infant had been taken to the pediatrician regularly and they were treating the low body weight. The last physician visit was 16 days before death. In view of these issues, the manner of death is best certified as "Undetermined."

Maybe the question in this case should be formulated, "Do diagnoses of probable cardiac dysrhythmia due to electrolyte abnormalities trump healing and acute rib fractures?" To the anthropologist perspective, this is an unsettling thought. To the medical examiner/coroner, while still unsettling, their responsibilities are medical interpretations of cause and manner of death, not simply biomechanic interpretations of bone fracture. The repercussions of a homicide ruling without a traumatic cause of death are immense. Thus, the debate goes on.

Child Abuse, Cachexia, Healing Rib Fractures

G98 The Identification of French Victims in the Massive Earthquake on January 12, 2010 in Haiti

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The goal of this presentation is to give attendees a clear understanding of France's structure and procedures in terms of identification of its nationals in the event of a major natural disaster and to demonstrate that the international response is as efficient and effective as it is at a national level.

This presentation will impact the forensic science community by showing the successful collaboration between a forensic scientist and a first response rescue team. To illustrate this, the French national team of identification was followed on site at Port-Au-Prince from January 13, 2010 until April 1, 2010. It also demonstrates that an early intervention is key to optimizing the effectiveness of the identification process and to achieving the overall success of the operation.

The earthquake that struck Haiti's capital Port-au-Prince caused more than 200,000 deaths. The major contributing factors to such high casualties were primarily its incredible strength and secondly the...
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