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TITLE: CONDUCTING THE INTERNAL EXAMINATION

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**Policy:** The Office of the Chief Medical Examiner (OCME) is assured adequate supporting services, equipment and facilities to perform autopsy examinations pursuant to DC Code § 5-1403 and 1409.

**Purpose:** To ensure proper post-mortem examination procedures in accordance with the mission of the Office of the Chief Medical Examiner. All tests conducted as a part of the forensic autopsy by or for the medical examiner/coroner office shall be performed per standard operating procedure.

**Scope:** The following procedures are to assist Medical Examiner physicians to perform proper post-mortem examinations in a safe and secure environment.

## **1. Postmortem examination procedures**

### **1.1. Examination Preparation**

1.1.1. The attending pathologist MUST personally examine all external aspects of the body in advance of dissection.

1.1.2. Body bags should be opened by or in the presence of the medical examiner.

1.1.3. Initial “First Round/As Is” photographs are taken of the body as received.

1.1.4. Ensure correct identification of the body by checking OCME and Hospital ID tags and bands and comparing name/ case number to the case list.

1.1.5. Collection of trace evidence from clothing or body

1.1.5.1. The medical examiner and/or members of the homicide unit of the appropriate Police department determine evidence collection.

1.1.6. The medical examiner collects the evidence, after photographic and written documentation, following appropriate forensic guidelines (labeled containers, chain of custody)

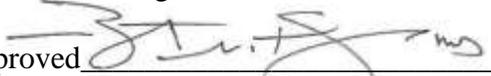
1.1.7. Removal of Clothing

1.1.7.1. Remove carefully, without unnecessary cut or tear.

1.1.7.2. Open all pockets and document photographically and in writing any found object.

1.1.7.3. Weapons and substance of abuse are submitted as evidence to the appropriate police unit.

1.1.7.4. Therapeutic drugs are transferred to the Toxicological Unit of OCME following chain of custody.

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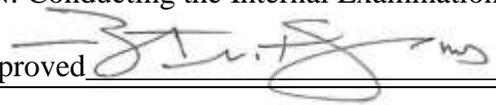
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- 1.1.8. All non-clothing properties are placed in the designated property safe in the autopsy suite. The ME or designee placing the evidence in the safe should sign the designated log. Retrieval of such property from the scene requires that the investigator retrieve in the presence of a witness with both the investigator and witness signing in the designated log.

## 2. Internal examination

- 2.1. Use safety precautions during all procedures.
  - 2.1.1. It is advisable to have one individual cutting at a time to avoid accidental injury.
  - 2.1.2. Efforts should be made to minimize exposure to airborne droplets.
  - 2.1.3. Do not recap needles.
- 2.2. All ex-situ dissections MUST be personally performed by the attending pathologist.
- 2.3. Assistance rendered by the autopsy assistant shall be performed in the physical presence and under the direct supervision of the attending pathologist
- 2.4. Open body using standard thoraco-abdominal (Y-shaped incision) and intermastoid incisions.
  - 2.4.1. When necessary, use minimal additional incisions that allow wide exposure, are hidden from view and facilitate subsequent reconstruction and suturing.
  - 2.4.2. Deepen the incision over the thorax down to the level of the rib cage and in the abdomen through the peritoneum into the peritoneal cavity.
  - 2.4.3. Open the chest cavity using the scalpel or shears along a line just medial to the costo-chondral junction up to and through the sterno clavicular junctions. -Lift the breastplate. Note any rush of air.
  - 2.4.4. Inspect the body cavities. Examine, collect and measure any fluid, describe adhesions.-Evaluate the position of the organs and their relationships. Note any malposition, twist, defect, and herniation.
  - 2.4.5. Obtain specimens for microbiological, chemical and toxicological examination as deemed appropriate
  - 2.4.6. Proceed with evisceration; use one of the classical techniques.
    - 2.4.6.1. Technique of Virchow: The organs are removed one by one.
    - 2.4.6.2. Technique of Rokitanski: In-situ dissection in part combined with removal of organ blocks.
    - 2.4.6.3. Technique of Ghon: The cervical, thoracic, abdominal organs and the urogenital system are removed en block.

- 2.4.6.4. Technique of Letulle: Cervical, thoracic, abdominal and pelvic organs are removed in one block (“en masse” removal)
  - 2.4.6.5. Dissection of neck organs always follows removal of the brain.
  - 2.4.7. Weight of all organs must be recorded
  - 2.4.8. Examine the skeleton after evisceration.
    - 2.4.8.1. As established by the attending pathologist - Strip the parietal pleura for better rib examination; incise the psoas for sacroiliac joints evaluation; examine pubic rami and articulation.
- 2.5. Head Dissection
- 2.5.1. Inspect sub-scalp tissues. Expose calvarium after reflecting the temporalis muscle bilaterally.
  - 2.5.2. Reflect scalp anteriorly up to about 3 cm above level of eyebrows. Reflect posterior scalp below occipital protuberance.
  - 2.5.3. Use the bone saw to enter the calvarium
  - 2.5.4. Measure the volume of any blood present, and its consistency; epidural, subdural, and subarachnoid spaces
  - 2.5.5. Evaluate adherence of subdural blood to the dura.
  - 2.5.6. Strip dura from calvarial and basilar surfaces to expose any fractures.
  - 2.5.7. Removal of the brain MUST occur in the presence of the attending pathologist.
  - 2.5.8. Remove brain reaching as far down the spinal canal as possible. The brain can be examined fresh or after fixation.
  - 2.5.9. Examine the sella turcica and the pituitary gland.
    - 2.5.9.1. Removal of the sella turcica is at the discretion of the attending pathologist
- 2.6. Neck Dissection
- 2.6.1. Dissect the anterior neck in a layer-by-layer fashion, in situ. Remove neck organs including the tongue and continue the dissection.
  - 2.6.2. The layer-by-layer neck dissection MUST be performed on ALL cases suspicious of asphyxia by the following causes:
    - 2.6.2.1. Hanging
    - 2.6.2.2. Ligature and Manual Strangulation
    - 2.6.2.3. Positional
    - 2.6.2.4. Smothering
    - 2.6.2.5. Overlay
  - 2.6.3. Posterior neck dissection is suggested in all cases neck trauma is suspected
    - 2.6.3.1. Examine the cervical spine for hyper mobility/fracture



## 2.7. Wounds/Injury

- 2.7.1. All body surfaces should be examined for the presence of injuries. It is also at time necessary to document their absence.
- 2.7.2. Detailed description is done. Attempts at correlating perforations of clothing and wounds should take into account fashion trends
- 2.7.3. Injuries are described according to fixed landmarks on the body. Note anatomic location, size, color, shape using pertinent diagrams as needed. Probing of wounds is done with caution and mainly for the purpose of documentation.
- 2.7.4. All wound tracks should be dissected and all evidence retrieved with mention of location. Presence and type of hemorrhage or absence of hemorrhage along the path should be noted.
- 2.7.5. Photographic Documentation of all injuries and wound tracks should occur liberally

## 2.8. Wounds Caused By Firearms

- 2.8.1. Identify “entrance” and “exit” wound.
  - 2.8.1.1. Identify their location by anatomic location and by measurements from fixed anatomic landmarks, for example the top of the head, the top of the shoulders, the sole at the heels, and the sagittal midline
  - 2.8.1.2. Describe the shape, the size, and the dimensions of the wound
- 2.8.2. Describe any marginal abrasion, noting their color and their shape; and recognizable muzzle imprint
- 2.8.3. Record the presence of soot and stippling and the pattern of distribution the measurement of radius out from center of wound
- 2.8.4. Describe the path of the wound, the organs and tissues injured, evidence retrieved along and at the end of the path, associated hemorrhage or absence thereof.
  - 2.8.4.1. Indicate the track of the wound according to normal anatomic position.
- 2.8.5. Projectiles should be recovered with non-metallic instruments to avoid any damage. They should be described using broad terminology (i.e. small, medium, large caliber copper jacketed OR lead projectile).
  - 2.8.5.1. The projectile cleaned, photographed, labeled, packaged and surrendered to the appropriate evidence personnel who should sign the Evidence Release Form generated from FACTS
- 2.8.6. Photographic Documentation of all injuries and wound tracks should occur liberally

2.9. Wounds Caused By Sharp Instruments

- 2.9.1. Document the anatomic location as indicated by Section 3.5.1 of this document
- 2.9.2. Describe and identify the type of wound: stab wound, cut/incision, chop wound.
- 2.9.3. Describe the shape and orientation of the wound on the skin surface with or without natural skin tension.
  - 2.9.3.1. For stab wounds indicate whether single or double-edged, serrated, and/or presence of any marginal abrasion.
  - 2.9.3.2. Identify the square margin vs. sharp margin and provide full description of its orientation (i.e. square margin at the 3 o'clock position and sharp margin at 9 o'clock)
- 2.9.4. Describe the path of the wound, the organs and tissues injured, evidence retrieved along and at the end of the path, associated hemorrhage or absence thereof.
  - 2.9.4.1. Indicate the track of the wound according to normal anatomic position.
  - 2.9.4.2. Provide estimated of the depth of wound penetration
- 2.9.5. Photographic Documentation of all injuries and wound tracks should occur liberally

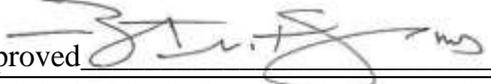
2.10. Wounds Caused By Blunt Impact

- 2.10.1. Describe the distribution, the type, the shape/ pattern of the wounds, their color, and the presence of any foreign objects.
- 2.10.2. External injuries should be correlated to internal findings.
- 2.10.3. Photographic Documentation of all injuries and wound tracks should occur liberally

2.11. Asphyxia Due to Manual Strangulation

- 2.11.1. This type of case is the most frequent of the “unsuspected” homicides. One must always be vigilant for the subtle findings to point in this direction. Additionally, manual strangulation, particularly of a female subject, is frequently associated with sexual assault of the decedent. Therefore, recognition should lead one to the appropriate tests for sexual assault.
- 2.11.2. Examine the body and clothing for trace evidence, if feasible.
- 2.11.3. Recover, photograph, and preserve clothing as described above.
- 2.11.4. Collect fingernail scrapings and clippings as described.
- 2.11.5. Obtain a complete “sexual assault kit”, if indicated.

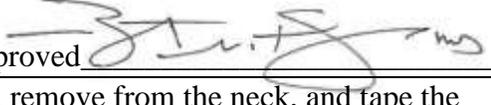
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- 2.11.6. Diagram and photograph all cutaneous neck injuries, including views of the neck in an extended position with the head block placed under the shoulder of the decedent.
  - 2.11.7. Document and photograph the presence or absence of petechial hemorrhages in the palpebral or bulbar conjunctivae, skin of the neck/face, and in the oral mucosa.
    - 2.11.7.1. There may be petechial hemorrhage within the sphenoid sinus as well
  - 2.11.8. Proceed next to removal of the brain, before examination of the neck. In this fashion, cervical blood vessels will be decompressed so that any hemorrhage within the neck muscles, or within the fascial planes of the neck, will not be artifactual drainage from the head or chest/abdomen.
  - 2.11.9. Examine the anterior and posterior cervical muscles in a layer wise fashion, photographically documenting each layer of muscles (photographing the presence and absence of contusions as may be identified).
  - 2.11.10. The laryngeal cartilages and hyoid bone, along with the upper trachea, should be removed en bloc then carefully examined for the presence of fractures of the hyoid, thyroid or cricoid cartilages.
  - 2.11.11. A fracture should not be interpreted as ante-mortem in the absence of surrounding associated hemorrhage.
  - 2.11.12. The layer wise examination of neck structures and removal of the neck structure must be done in the presence of the attending pathologist.
    - 2.11.12.1. The potential for production of artifactual fractures during this procedure is high.
    - 2.11.12.2. Fractured neck structures are usually preserved in formalin.
    - 2.11.12.3. The use of the Forensic Anthropologist is encouraged in all cases where neck structures are presumed to be fractured
  - 2.11.13. Remove the tongue only after palpating the hyoid/thyroid bones
  - 2.11.14. Place the body prone and examine the posterior neck muscles in a layer wise fashion, again documenting the presence of any contusions in the muscles or blood extravasation in the fascial plane(s).
  - 2.11.15. Consider un-roofing the sphenoid sinus to examine the mucosa of the floor of the sinus for the presence of petechial hemorrhages.
- 2.12. Asphyxia Due to Hanging/Ligature Strangulation
- 2.12.1. The approach to this type of case is the same as for manual strangulation with the following modifications/additions:

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- 2.12.1.1. Cut the ligature away from the knot, remove from the neck, and tape the cut ends together. This procedure allows you to maintain the knot intact and maintain the orientation of the ligature about the neck.
  - 2.12.1.2. Measure the diameter of the ligature, the type of knot, type of material and photograph the ligature.
  - 2.12.1.3. Document, diagram, describe and photograph the length, width and depth of the ligature furrow and its location on the neck, noting particularly whether the ligature mark is circumferential and horizontal or incomplete.
    - 2.12.1.3.1. Note the position and location of the apex of the furrow. Shave the back of the head as necessary to expose the entire ligature furrow and photograph.
  - 2.12.1.4. Document and describe any patterns, if present, within the ligature furrow (“weave pattern” “ribbed pattern” of any electrical cord, etc.), and other injuries adjacent to the furrow such as nail marks and/or contusions.
  - 2.12.1.5. Examine the anterior and posterior cervical muscles in a layer wise fashion, photographically documenting each layer of muscles (photographing the presence and absence of contusions as may be identified).
    - 2.12.1.5.1. The laryngeal cartilages and hyoid bone, along with the upper trachea should be removed en bloc and examined for the presence of fractures of the hyoid, thyroid or cricoid cartilages.
    - 2.12.1.5.2. A fracture should not be interpreted as ante-mortem in the absence of surrounding associated hemorrhage.
- 2.13. Motor Vehicle Crashes
- 2.13.1. Document, describe and photograph external injuries, including abrasions, contusions and lacerations.
    - 2.13.1.1. Note particularly characteristic injuries such as diagonal abrasion/contusion across the abdomen suggesting a lap belt injury, and short, jagged and angled incised wounds (“dicing” injuries) on the face suggesting injuries produced by impact with fragmented tempered glass.
  - 2.13.2. Document, measure and describe any blood within the body cavities and any injuries of the internal organs.
  - 2.13.3. Document and describe any fractures of the ribs, pelvis, vertebral column, skull and extremities.
  - 2.13.4. Document any injuries of the atlanto-occipital joint, atlanto-axial joint and associated injuries of the cervicomedullary junction and/or pronomedullary junction with exposure of the spinal cord, as necessary.

2.13.5. Document the character and type of injuries of the brain (indicators of diffuse injury vs. focal or multi-focal injury).

2.14. Motor Vehicle/Pedestrian Crashes:

2.14.1. The approach in these types of cases is similar to motor vehicle crashes, but in this type of case, the pattern of injuries may be used to correlate to the type of vehicle(s), direction of vehicle(s) and/or the speed of the vehicle(s).

2.14.1.1. Fail to Stop and Render Aid (FSRA)/hit-and-run cases may require the inspection of:

2.14.1.1.1. Clothing, hair, and body for trace evidence in order to potentially link a vehicle(s) to the subject.

2.14.1.1.2. Consider examining clothing for the presence of trace evidence, particularly paint chips and glass fragments before undressing or undue manipulation.

2.14.1.1.3. Consider separately photographing clothing and retaining clothing as evidence.

2.14.1.1.4. When warranted by circumstances, obtain a sample of head hair and preserve as described above.

2.14.1.2. Carefully inspect the hair and the depths of wounds for foreign objects such as glass and paint chips.

2.14.1.3. When documenting injuries, pay particular attention to injuries of the legs (“bumper injuries”), noting the presence of contusions, abrasions, lacerations on the backs, sides and/or anterior aspects of the legs, and whether bilateral.

2.14.1.3.1. Measure the height of injuries of the legs from the soles of the feet.

2.14.1.3.2. If the shoes are available, take a measurement with the shoes on.

2.14.1.3.3. Make note of the type of shoes, particularly if the soles add significant height.

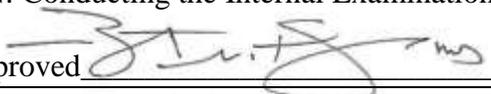
2.14.1.3.4. Surgical dissection of the backs of the legs to document the presence of deep contusions/impact sites is strongly encouraged.

2.14.1.3.5. Although X-rays can be performed to document the presence of lower leg fractures, they are not to replace the pathological dissection.

2.15. Suspected Acute Drug Toxicity/Overdose and Poisoning

2.15.1. The procedure for suspected drug toxicity cases is similarly to the protocol followed for any natural death with additional specimens

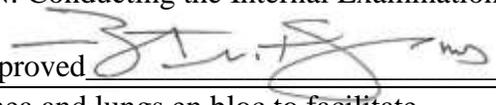
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- 2.15.2. During external examination, pay particular attention to the hands, wrists, forearms and legs for the presence of old needle puncture marks (needle tracks), or recent puncture wounds (fresh injection sites); document photographically.
  - 2.15.3. Nasal septum and nares should be checked for the presence of white powder (e.g., cocaine) and ulcers, perforations or inflammation (suggestive of chronic nasal insufflations).
  - 2.15.4. If fresh injection sites are identified, incise to document recent subcutaneous hemorrhage photographically.
    - 2.15.4.1. Submit a sample of the injection site for histology, if required
    - 2.15.4.2. Submit a sample of the hemorrhagic injection site tissue to toxicology in sodium fluoride preservative, if required
  - 2.15.5. Circular to oval shallow scars of the extremities should be noted, as these may represent “skin popping” scars due to subcutaneous injections.
  - 2.15.6. Preserve entire gastric contents, or an aliquot of blended gastric contents as described above; document; count; photograph, separately preserve and submit to toxicology any recognizable pills within the gastric contents.
  - 2.15.7. In suspected poisonings, also consider collecting samples of abdominal fat tissue and preserve for potential analysis of lipid soluble toxins as well as a hair sample
- 2.16. Fire Deaths/Smoke Inhalation
- 2.16.1. The case should be approached via the appropriate category when the type of case is determined. Additional procedures, which should be considered in all burn cases, are listed below.
  - 2.16.2. Take full body X-rays, in cases of charred bodies, to evaluate for projectiles, or other fragments of weapons (broken knife blades, etc.), and to evaluate for potentially unique orthopedic characteristics for the purpose of identification.
  - 2.16.3. Clothing remnants may be retained in appropriate evidence containers.
  - 2.16.4. On external examinations, make special note of the presence of “cherry red lividity” that may be present on preserved skin surfaces; be sure this is photographically documented.
  - 2.16.5. During internal examination, make special note of the presence or absence of “cherry red” discoloration of the internal organs, indicating the presence of carboxyhemoglobin.
    - 2.16.5.1. Request analysis of STAT carboxyhemoglobin from the toxicology laboratory if indicated.
  - 2.16.6. Document and photograph soot in the oropharynx, larynx and trachea.
    - 2.16.6.1. Note whether the anterior trachea is exposed and/or charred.

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- 2.16.6.2. Consider removing the larynx, trachea and lungs en bloc to facilitate examination.
  - 2.16.6.3. Consider un-roofing the sphenoid sinus to examine the mucosa of the floor of the sinus for the presence of soot.
  - 2.16.6.4. Photograph the larynx and trachea for the presence or absence of findings.
- 2.17. Skeletonized and Severely Decomposed (partially skeletonized and mummified) remains
- 2.17.1. The autopsy examination of skeletonized mummified remains is similar to other cases in that the purposes of the examination include identification of the remains as well as the documentation of injuries to determine the cause and manner of death.
  - 2.17.2. With skeletonized remains, it is often the case that even identification is accomplished with difficulty. However, a thorough examination of the remains can often reveal much.
  - 2.17.3. The Forensic Anthropologist **MUST** be involved in the examination of such remains. The following steps should be performed in all cases.
    - 2.17.3.1. Photograph and document the remains as they are received in the laboratory.
    - 2.17.3.2. Take X-rays of the remains in sections so that all of the material submitted is X-rayed.
      - 2.17.3.2.1. This is not only for the location of bullets or other weapons, but can also help to localize personal effects retrieved with the remains or any old skeletal injuries that may subsequently aid in identification.
      - 2.17.3.2.2. When possible, X-ray the chest, abdomen and head in a direct anterior to posterior position, the hands in anatomic position and the feet with the toes placed laterally.
      - 2.17.3.2.3. Clear radiographs of skeletal structures are crucial for antemortem/postmortem X-ray comparison.
  - 2.17.4. For mummified remains, open the chest cavity to remove and examine remnants of any organs, if possible, examine and collect remnants of the brain through the foramen magnum.
    - 2.17.4.1. Maintaining the skull intact until after craniometric analysis increases the accuracy.
    - 2.17.4.2. Collect toxicology and DNA samples if available