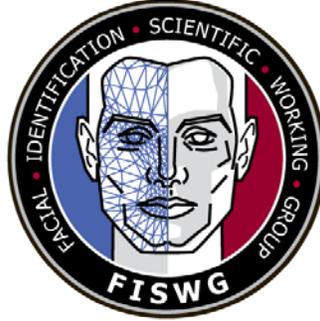


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## Guidelines for Postmortem Facial Image Capture

### Warning - Graphic Content

Readers are cautioned that this document includes graphic images and descriptions depicting deceased persons.

### Purpose

The purpose of this document is to provide guidelines for capturing postmortem facial images of unidentified human remains in controlled (morgue) and semi-controlled (field) settings to facilitate facial recognition (FR) searches or facial comparison that may contribute to determining the identity of the unidentified person. This document is intended to supplement the Forensic Autopsy Performance Standards established by the National Association of Medical Examiners (NAME) for proper postmortem examination procedures (NAME, 2014).

### Introduction

Standards exist for photographing a decedent's face at autopsy for identification purposes (NAME 2014); however, those protocols do not always result in the capture of facial images that can be used for FR searches or facial comparison when the identity of the deceased is in question. It is not always feasible to collect fingerprints from decedents (in disaster situations or when a decedent is decomposed, for example), and DNA and radiograph (medical or dental) comparison require at least a presumptive identification of remains so appropriate comparative DNA samples or antemortem radiographs can be obtained to confirm the identification. Facial recognition searches can often assist in generating potential candidates and investigative leads for the identification of unidentified remains, but in order for the FR systems to operate properly, the images submitted must meet certain criteria.

This document provides an overview of the optimal processes and techniques for the capture of postmortem facial images of human remains in order to maximize their utility in FR searches and facial image comparisons.

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It is advisable to follow the guidelines presented in this document even when not all facial components are present as even incomplete facial images may assist FR and facial identification processes, especially through more accurate recording of minute facial details.

For the purposes of facial capture, there are various perimortem and/or postmortem conditions that can degrade the usable quality of any facial images captured:

- Evidence of trauma (e.g., entry/exit wounds, lacerations, bruising, missing components, etc.)
- Obscuring matter (e.g., blood, fluids, dirt, debris, hair, clothing accessories, etc.)
- Decomposition and other postmortem changes (e.g., bloating, mummification, skeletonization, evidence of insect or scavenger activity, etc.)

Before any attempt is made to clean or alter the subject for the FR appropriate facial image capture, NAME standards and/or other agency protocols should be followed so the alterations do not affect forensic evidence collection, documentation, or chain of custody.

## Section 1: Facial Image Capture in a Controlled Environment

This section addresses the image capture process and techniques as they relate to a controlled environment, such as a morgue, where all or most variables and decisions can be controlled by the photographer, including equipment, the photographic environment (e.g., camera position, lighting, distance, background, and resolution), and the pose and positioning of the subject.

Medical Examiners (ME) or Coroners (C) and morgue personnel (e.g., investigators, autopsy technicians, residents, volunteers, etc.) should take the following factors into consideration when making decisions for the capture of postmortem facial images, especially when the images are intended to be used for FR searches and/or facial comparisons.

Recommendations are presented under the assumption that all proper medicolegal investigation procedures have been followed and the body can be prepared and repositioned as needed.

Note: Facial recognition is highly dependent on automated detection of the eyes and withdrawing vitreous fluid may alter the eye shape. Therefore, the extraction of vitreous fluid may have a substantial negative effect on the usable quality of facial imagery. If possible, the extraction of vitreous fluid from the eyes should be delayed until after all facial imagery for FR purposes is captured.

### 1.1—Controlled Acquisition

The subject should be positioned and suitable equipment should be available to maximize the quality of the imagery. The subject environment should be arranged to provide ideal illumination and minimize shadows on or behind the face. This section outlines the optimal environmental conditions for capturing postmortem facial images. The camera-to-subject distance should be great enough to minimize distortion of the face in the resulting image. Camera placement that is too close to the subject may result in an apparent change in facial

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proportions where the ears are no longer visible and the mid-face region appears to artificially wide and forward-projecting.

For supplemental information on best practice for image capture, refer to the FISWG document: "Capture and Equipment Assessment for Facial Recognition Systems," excerpts from Revision 1.0 (2011.05.05) which are presented below:

**Lighting**

Lighting shall uniformly illuminate the subject and the background. Hot spots, reflections and shadows shall be minimized.

**Camera Position**

The camera shall be parallel to the front of the face with the lens pointing toward the nose. The camera shall be positioned about two meters (approximately 6.5 feet) from the subject. Images taken closer than two meters introduce perspective distortion that can decrease facial recognition search accuracy.

**Background**

When possible, the background should be a uniform, smooth, flat, non-reflective surface.

The imaging conditions listed in the document excerpt (above) are in the context of an ideal controlled environment. While it may not be possible in all ME/C offices to conform exactly to the specifications listed above, especially with regard to the camera position, it is recommended that all attempts be made to approximate these conditions to the best of the photographer's ability. With increasing discrepancies between the ideal environment and the actual image capture environment there will be a decrease in the usable quality of the facial image for FR searching and image comparison.

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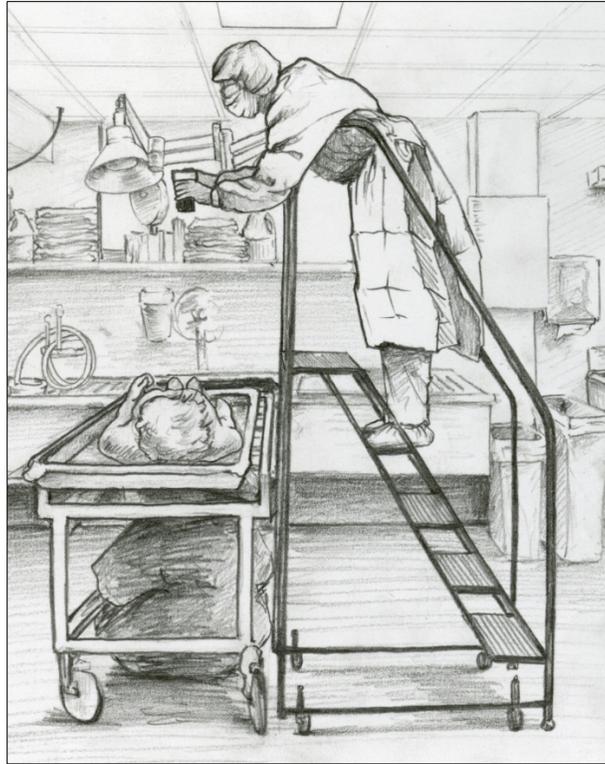


Figure 1: Photographic Environment in ME Office

Figure 1 provides an example of the photographic environment in a ME office with positioning of the camera directly over the decedent's face and a camera-to-subject distance appropriate for minimizing distortion. At a minimum, if a decedent is on a gurney, it is recommended to use a stepladder or other means for elevating the photographer to ensure proper camera-to-subject distance. Standing beside the gurney and reaching over the decedent's face is not recommended. When possible it is recommended to utilize a fixed camera mount to provide stability and reduce the potential for distortion.

## 1.2—Subject Body Preparation

This section outlines the optimal subject positioning and appearance for capturing a postmortem facial image. While the information pertains mainly to frontal images, it may also apply to other potential images that could be captured (e.g., right/left profile and angled images). See section 3.3 *Non Frontal Images*.

### 1.2.1 Head Position

The head should be adjusted to face directly toward the camera with no more than +/- 5 degrees variance from frontal in pitch (head tilted up or down), roll (head tilted side-to-side), and/or yaw (head turned side-to-side). For example, the position of the head and face should appear as they would in a driver's license or passport photo. For more information on facial position for FR appropriate image capture, see the International Organization for Standardization document on face image data (ISO/SC37 19794-5).

Visual cues that can assist with determining "forward orientation" are:

1. Both eyes are level on an imaginary horizontal line (zero roll angle).
2. Both ears are equally visible if unobstructed by hair and nose is forward (zero yaw angle).
3. The chin is neither elevated nor dropped (zero pitch angle). In the postmortem setting, a body block may be used under the back of the neck to adjust the angle of the head and face (See Figure 2).



Figure 2: Placement of the body block to adjust head position for capturing frontal image from above.

In Figure 2, the image on the left shows the decedent's head position prior to the insertion of a body block. The head has a noticeable upward pitch (the head is tilted back). The image on the right shows the change in head position with the insertion of a body block beneath the head/neck. The decedent's face is now facing directly toward the camera.

### 1.2.2 Head Coverings and Accessories

Any item which obscures the hairline, chin/jawline, and ears (e.g., hats, scarves, jewelry, etc.) should be removed so the full face and ears are displayed. Operational processes regarding piercings should be agency defined.

### 1.2.3 Shoulder Position

The top of the shoulders and neck should be included in the image frame.

## 1.3—Subject Face Preparation

This section outlines the optimal facial conditions for a postmortem image for facial recognition purposes. Obscuring matter (e.g., blood, particles, dirt, etc.) or hair on the face, large open wounds, closed eyes, and eyeglasses may adversely affect FR searches and facial comparisons, limiting the potential for determining the identity of the unidentified

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individual. If a scale (ruler) is used during the facial image capture, the scale must not cover or obstruct any portion of the head or face.

FISWG recommends addressing the following issues to maximize the usable quality in a postmortem facial image capture.

There are situations where multiple images may be helpful in improving the usable quality of the postmortem facial imagery. If any of the situations below apply, then *before* and *after* images should be captured.

### 1.3.1 Obscuring Matter

The face should be cleaned of blood (or other fluids), dirt, debris, make-up and other foreign matter or obstructions.



Figure 3: Obscuring Matter. Evidence of resuscitation efforts or other medical intervention, as shown in this illustration, may also obstruct portions of the face.

In figure 3, the image on the left shows an obstruction over the face; the image on the right shows the obstruction removed.

### 1.3.2 Hair

When capturing both frontal and profile images, the subject's hair shall be moved to reveal the full face and ears. If excessive facial hair obscures facial components then it should be repositioned to approximate a natural condition and the line of growth should be made visible.

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Figure 4: Hair.

In Figure 4, the image on the left shows hair covering portions of the face and ears; the image on the right shows the hair moved away from important facial components.

### 1.3.3 Wounds or Fragments

Images should be acquired after reconstructive or repositioning efforts to approximate natural facial conditions with the mouth closed.

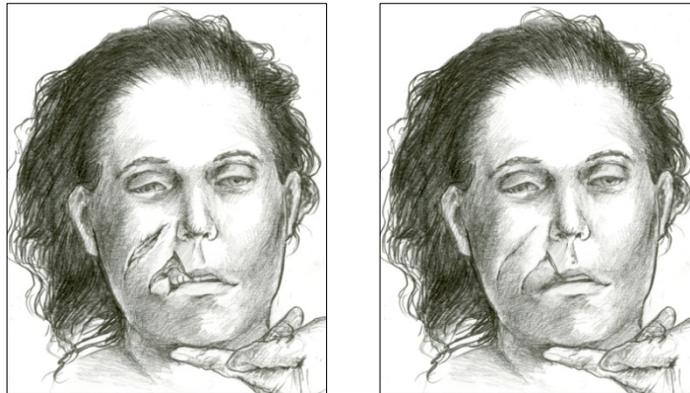


Figure 5: Wounds or Fragments.

In Figure 5, the image on the left shows injuries to the right side of the patient's face; the image on the right shows an attempt was made to minimize the appearance of the facial trauma. In this illustration, a hand is shown holding the mouth closed. Introduction of additional potentially obscuring objects, such as the hand in this image, should be avoided when possible.

### 1.3.4 Mouth

If the mouth is open, the subject's mouth should be closed. If the mouth does not remain closed after manual positioning, it may have to be held in place. If the presence of a hand in the image is necessary for proper pose, the visibility of the hand should be minimized and should not obscure any portion of the face.

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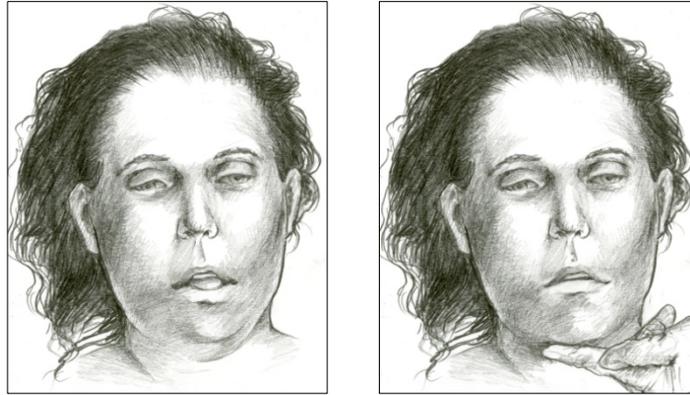


Figure 6: Mouth.

In Figure 6 the illustration on the left shows a decedent with an open mouth; the illustration on the right shows a hand holding the mouth in place. The hand in this illustration is placed below the jaw so that the decedent's entire chin and jawline are visible and unobstructed.

### 1.3.5 Eyes

FR searches are highly dependent on finding the locations of the eye sockets. If needed, translucent tape may be used to tape open eyelids when they will not stay open after manual positioning. Efforts should be made to avoid covering eyebrows with the tape. Two images should be taken: one with the eyes closed and one with the eyes taped open.

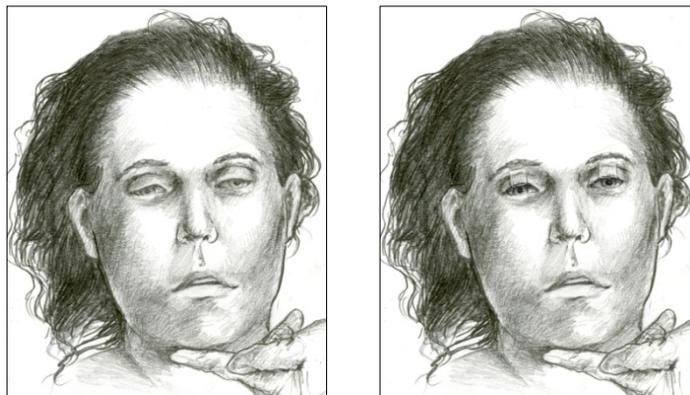


Figure 7: Eyes.

In Figure 7, the illustration on the left shows the decedent's eyes half-closed; the illustration on the right shows clear tape holding the decedent's upper lids in an open position.

### 1.3.6 Eyeglasses

If glasses are present, at least one frontal image should be captured with glasses and one image without glasses. Glare from eyeglasses should be avoided. Sunglasses or glasses with lenses that obscure the eye (e.g., tinted lenses) should always be removed.

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Figure 8: Eyeglasses.

In Figure 8 the illustration on the left shows the decedent with her glasses in place; the illustration on the right shows the decedent with her glasses removed.

### 1.3.7 Prosthetics

If the condition of the decedent suggests use of a prosthetic that would complete facial features and was likely to have been regularly worn (e.g., artificial eye, dentures, etc.), and the device is present at the time of autopsy, it is recommended to photograph the decedent's face with the prosthetic in place.

## Section 2: Facial Image Capture in a Semi-Controlled Environment

Semi-controlled acquisition refers to when only some aspects of the environment or subject can be controlled, but not all aspects of both (e.g., disaster recovery or other humanitarian purposes).

In a semi-controlled environment, follow the above ME/C facility guidelines wherever possible. When not possible, use the following priorities:

- Remove occlusions to fully expose the face and ears:
  - Clean blood, dirt and debris from face
  - Remove head coverings and body accessories
  - Move hair away from face and ears
- Remove glasses if present
- Attempt a frontal pose and open eyes
- Attempt illumination while minimizing side-to-side shadows:
  - Camera flash
  - Flashlight
- Optimize the camera-to-face distance to eliminate distortion (refer to section 1.1)

## Section 3: Additional Information

### 3.1 Video

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The use of video imaging to supplement still photos may be desirable to complete or finalize the image capture. After the still images are completed, a short video may capture details absent from still images due to reflections, occlusions or other factors.

If this is done, video should be continuously captured by steadily moving the camera in two separate arcs:

- Beginning at the nose, the camera should move to the ear on one side, back over the nose, and to the ear on the other side.
- Beginning at the nose, the camera should move to the top of the head, back over the nose, and to the bottom of the chin.

### 3.2 Scars, Marks, Tattoos (SMT)

Agency policies will dictate how SMT imagery should be taken and catalogued. As referenced in the NAME *Forensic Autopsy Performance Standards* (NAME, 2014) scars, marks, and tattoos (SMTs) shall be photographed and described for record keeping and decedent identification purposes.

If the intent of this documentation is to support future work in automated searching and recognition of SMTs, then the Annex E of the American National Standards Institute/National Institute of Standards and Technology (ANSI/NIST) ITL-2011: UPDATE 2013, NIST Special Publication 500-290 Version 2 [2013] should be referenced. This document provides current textual descriptions for cataloguing of SMTs.

### 3.3 Non-Frontal Images

If profile images and/or angled images are captured for facial comparison purposes they should be acquired by turning the head or adjusting the camera position. More information for clarification can be found in Annex E of the American National Standards Institute/National Institute of Standards and Technology (ANSI/NIST) ITL-2011: UPDATE 2013, NIST Special Publication 500-290 Version 2 [2013].

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