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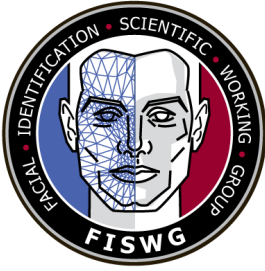
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Standard Guide for Postmortem Facial Image Capture

1. Scope

1.1 The purpose of this document is to provide guidelines for capturing postmortem facial images of human remains in controlled (e.g., morgue) and semi-controlled (e.g., field) settings to facilitate facial recognition system (FRS) searches or manual facial comparisons that could contribute to forensic investigations.

2. Referenced Documents

2.1 *ASTM Standard*¹:

E2916 Terminology for Digital and Multimedia Evidence Examination

2.2 *Other Standards*:

ANSI/NIST-ITL-1-2011 Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information²

ISO/IEC 19794-5 Biometric data interchange formats—Part 5: Face image data³

FISWG Standard Guide for Capturing Facial Images for Use with Facial Recognition Systems⁴

3. Terminology

3.1 *Definitions*:

¹ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

² Available from http://ws680.nist.gov/publication/get_pdf.cfm?pub_id=910136

³ Available from <https://www.iso.org/standard/38749.html>

⁴ Available from: <https://fiswg.org/documents.html>

3.1.1 *Facial Image Capture, v*—in facial identification, the process of collecting a biometric sample from an individual via a sensor.

3.2 *Acronyms*

3.2.1 *CODIS—Combined DNA Index System*

3.2.2 *DNA—Deoxyribonucleic acid*

3.2.3 *FBI—Federal Bureau of Investigation*

3.2.4 *FRS—Facial recognition system*

3.2.5 *ME/C—Medical examiner or coroner*

3.2.6 *SMT—Scars, marks, and tattoos*

4. Summary of Guide

4.1 FRS searches can assist in generating potential candidates and investigative leads for the identification of unidentified remains or connecting decedents to image galleries. For the FRS to operate properly, the images submitted must meet certain criteria. This guide provides an overview of the best practices and techniques for the capture of postmortem facial images of human remains to maximize their utility in FRS searches and manual facial image comparisons.

4.2 This guide is intended to supplement internal, agency-specific postmortem examination procedures and forensic autopsy performance standards, such as those required for accreditation in the United States by medical examiners and coroners (ME/C).

5. Significance and Use

5.1 Protocols for photographing a decedent's face at autopsy for identification purposes do not always result in the capture of facial images that are well suited for FRS searches or manual facial comparisons. It is not always feasible to collect fingerprints from decedents (e.g., in disaster situations or when a decedent is in a state of advanced decomposition), and radiograph (medical or dental) comparison requires at least a presumptive identification of remains so appropriate comparative antemortem radiographs can be obtained to confirm the identification. If the decedent's DNA or appropriate family reference DNA profiles are not already stored within a DNA repository (e.g., the FBI's CODIS), a DNA association will also require the presumptive identification of a decedent to ensure that appropriate samples are collected for comparison/association.

5.2 It is advisable to follow the guidelines presented in this guide even when not all facial components are present. Incomplete facial images can assist FRS and manual facial comparison processes, especially through more accurate recording of minute facial details.

5.3 For the purpose of facial image capture, there are various perimortem or postmortem conditions, or both, that can degrade the usability of facial images captured:

5.3.1 Presence of trauma (e.g., entry/exit wounds, lacerations, bruising, missing components),

5.3.2 Obscuring matter (e.g., blood, fluids, dirt, debris, hair, clothing accessories), and

5.3.3 Decomposition and other postmortem changes (e.g., bloating, mummification, skeletonization, evidence of insect or scavenger activity).

5.4 Before any attempt is made to clean or alter the decedent for facial image capture, nationally accepted standards, agency protocols, or both should be followed so the alterations do not affect forensic evidence collection, documentation, or chain of custody.

6. Image Capture

6.1 Facial Image Capture in a Controlled Environment

6.1.1 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 decedent.

6.1.2 ME/C and morgue personnel (e.g., investigators, autopsy technicians, residents, volunteers) 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 FRS searches, manual facial comparisons, or both.

6.1.3 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.

6.1.4 More information can be found at:

6.1.4.1 For forensic image capture, please refer to Annex E of ANSI/NIST-ITL-1-2011 and

6.1.4.2 For controlled image capture guidance, please refer to FISWG’s “Standard Guide for Capturing Facial Images for Use with Facial Recognition Systems.”

6.2 Controlled Acquisition

6.2.1 This section outlines the ideal environmental conditions for capturing postmortem facial images.

6.2.2 The imaging conditions listed in this section 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, 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. The photographer should be aware that with increasing discrepancies between the ideal environment, and the actual image capture environment there will be a decrease in the quality of the facial image for FRS searching and image comparison.

6.2.3 Figure 1 provides an example of the photographic environment in a ME/C office with positioning of the camera directly over the decedent’s face and a camera-to-subject distance appropriate for minimizing distortion (i.e., the “fishbowl effect” resulting from capturing a facial image too close to the face). When possible, it is recommended to use a fixed camera mount to provide stability and reduce the potential for 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.

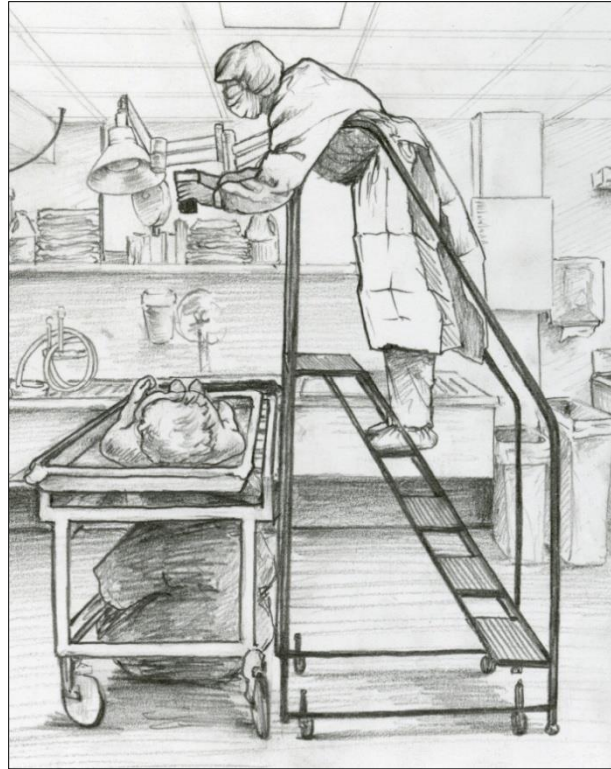


Figure 0.1: Photographic environment in an ME/C office using a stepladder to position the camera directly over the decedent's face, while ensuring a camera-to-subject distance appropriate for minimizing distortion.

6.2.4 The following suggestions for the image capture environment should be considered:

6.2.4.1 Decedent position—The decedent should be positioned and suitable equipment should be available to maximize the quality of the imagery. Optimal position of the body for facial image capture is to have the head in a vertical position with the jaw closed to allow the face morphology to be as close to the antemortem reference images with which it will be compared. This will likely require the body to be positioned so that the decedent is seated.

6.2.4.2 Lighting—Lighting should uniformly illuminate the decedent. Hot spots, reflections, and shadows on the face and in the background should be minimized.

6.2.4.3 Camera position

- (1) 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 decedent can result in an apparent change in facial proportions in which the ears are no longer visible and the mid-face region appears to be artificially wide and forward projecting.

- (2) The camera should be directed to the front of the face with the lens in line with the nose and should ideally be positioned 1.2 m to 2.5 m (4 ft to 8 ft) from the decedent. The width of the face should fill approximately 50% of the horizontal image width.

6.2.4.4 Background—The background should be a uniform, smooth, flat, nonreflective surface with a neutral shade creating a contrast between the facial features of the decedent and background.

6.3 Decedent Body Preparation—This section outlines the optimal decedent positioning and appearance for capturing a postmortem facial image. While the information pertains mainly to frontal images, it should also apply to other captured images (e.g., right/left profile and angled images).

6.3.1 Head Position for Frontal Images

6.3.1.1 Sitting Position

6.3.1.2 In a sitting position, the forces of gravity will act in such a way that the soft tissues of the face are distributed in a more lifelike way, as opposed to falling backward and causing the appearance of increased thickness surrounding the posterior aspects of the cheeks and jaw and decreased thickness in the lips and anterior aspects of the cheeks and mouth areas. In this position, the decedent's mandible will likely need to be elevated (e.g., by using a gloved finger to hold it in place) so the mouth can be closed. When the decedent is seated, the camera should be affixed to a tripod or otherwise stabilized to ensure a camera angle that is directly perpendicular to the subject's face.

6.3.1.3 The decedent's head should be adjusted to face directly toward the camera with no more than $\pm 5^\circ$ variance from frontal in pitch (head tilted up or down), roll (head tilted side-to-side), 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 FRS appropriate image capture, see ISO/IEC19794-5 on face image data.

6.3.1.4 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); and
- (3) The chin is neither elevated nor dropped (zero pitch angle).

6.3.2 Supine position

6.3.2.1 As with the sitting position, the head should be adjusted to face directly toward the camera with no more than $\pm 5^\circ$ variance from frontal in pitch (head tilted up or

down), roll (head tilted side-to-side), 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 FRS appropriate image capture, see ISO/IEC39794-5 on face image data.

6.3.2.2 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); and
- (3) The chin is neither elevated nor dropped (zero pitch angle). In the postmortem setting, a body block can be used under the back of the neck to adjust the angle of the head and face (see Figure 2).

6.3.2.3 In Figure 2, the image on the left shows the decedent's head position before 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.

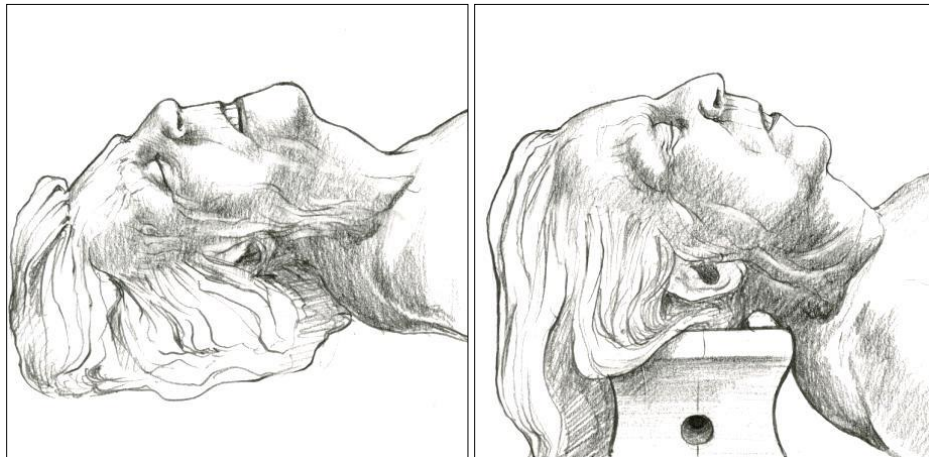


Figure 0.2: Placement of a body block to adjust head position for capturing frontal image from above.

6.3.3 Head Position for Non-Frontal Images

6.3.3.1 It is highly recommended to capture non-frontal images for each side of the face at a 90° angle (profile image) and a 45° angle (three-quarter profile image). If non-frontal images or angled images or both are captured for facial comparison purposes, they can be acquired by adjusting the camera position. Turning the head is not preferable but acceptable.

6.3.3.2 More information for clarification on non-frontal image capture can be found in Annex E, of ANSI/NIST-ITL-1-2011.

6.3.4 Head Coverings and Accessories—Any item that obscures the hairline, chin/jawline, and ears (e.g., hats, scarves, jewelry, etc.) should be removed so the full face and ears are displayed, unless removal risks damaging the face. If the decedent has facial piercings and the piercing jewelry is available, at least one frontal image should be captured with the jewelry in place and one image after the jewelry has been removed.

6.3.5 Shoulder Position—The neck should be included in the image frame, and if possible, the top of the shoulders.

6.4 Decedent Face Preparation

6.4.1 This section outlines the optimal facial conditions for a postmortem image for FRS and comparison purposes. Obscuring matter (e.g., blood, particles, dirt) or hair on the face, large open wounds, closed eyes, and eyeglasses can adversely affect FRS searches and facial comparisons, limiting the usefulness of the images.

6.4.2 If a scale (ruler) is used, efforts should be made to place the ruler in the same plane as the face and it should not cover or obstruct any portion of the head or face.

6.4.3 There are situations in which multiple images at each pose angle can be helpful in improving the usable quality of the postmortem facial imagery for facial comparison.

6.4.4 For all situations, facial comparison recommends that the face be fully exposed and in a natural position. For forensic reasons, it is advisable to take images before and after any alterations to increase the usefulness of the images.

6.4.5 Obscuring Matter

6.4.5.1 The face should be cleaned of blood (or other fluids), dirt, debris, makeup, and other foreign matter or obstructions. In Figure 3, the image on the left shows an obstruction over the face; the image on the right shows the obstruction removed.

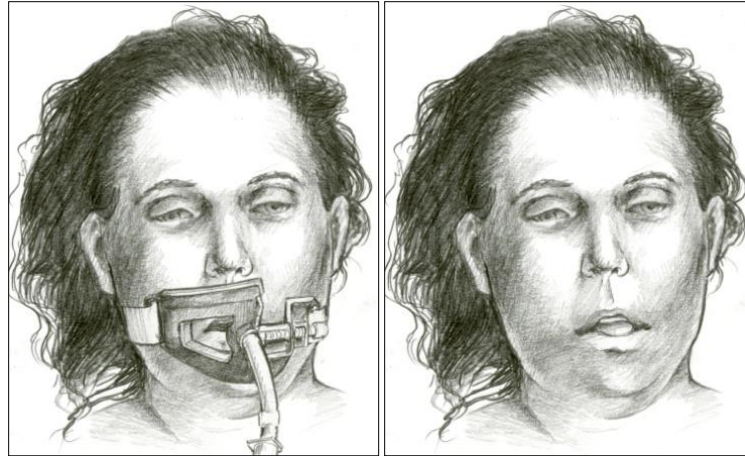


Figure 0.3: Obscuring matter, such as evidence of resuscitation efforts or other medical intervention, as shown in this illustration on the left can also obstruct portions of the face. On the right, the obstruction has been removed.

6.4.6 Hair

6.4.6.1 When capturing both frontal and profile images, the decedent's hair should 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. 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.

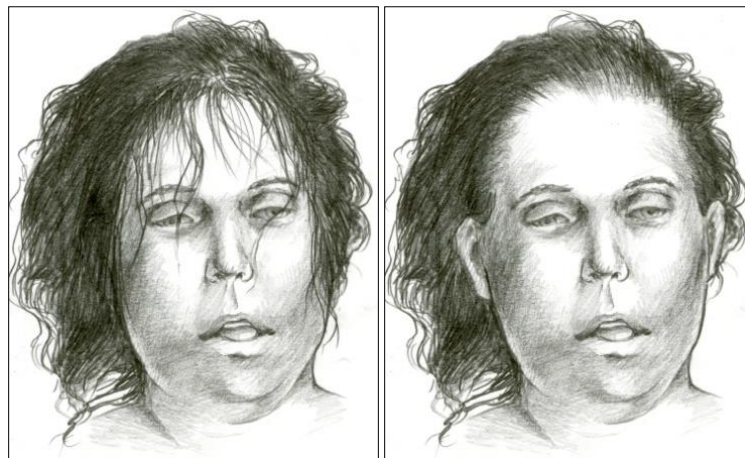


Figure 0.4: Hair covering parts of the face, as seen on the left illustration, should be removed.

6.4.7 Wounds or Fragments

6.4.7.1 In Figure 5, the image on the left shows injuries to the right side of the decedent'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.

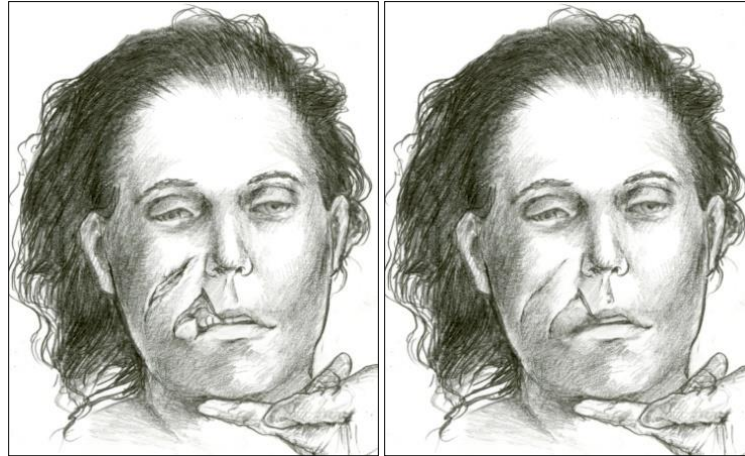


Figure 0.5: The illustration on the left shows injuries to the right side of the face, while the right illustration shows an attempt to minimize the appearance of the injuries.

6.4.8 Mouth

6.4.8.1 If the decedent's mouth is open, it should be closed. If the mouth does not remain closed after manual positioning, it might 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. 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.

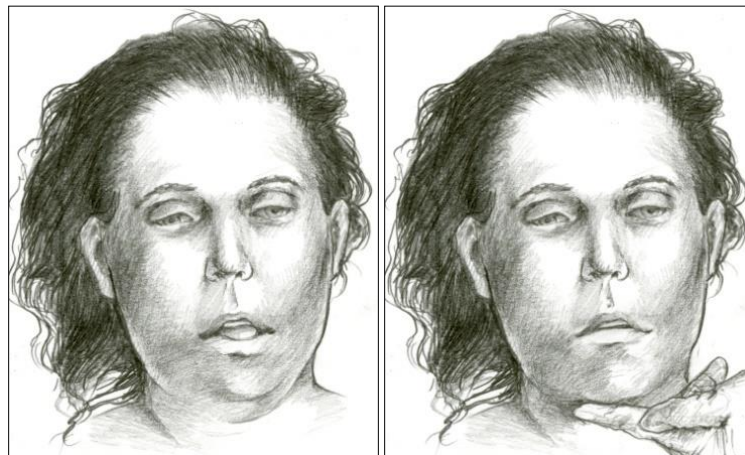


Figure 0.6: The illustration on the left shows the decedent with an open mouth, while the illustration on the right shows a hand holding the mouth in place.

6.4.9 Eyes

6.4.9.1 FRS are dependent on facial features including the eye area and pupils. If needed, translucent tape can 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. 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.

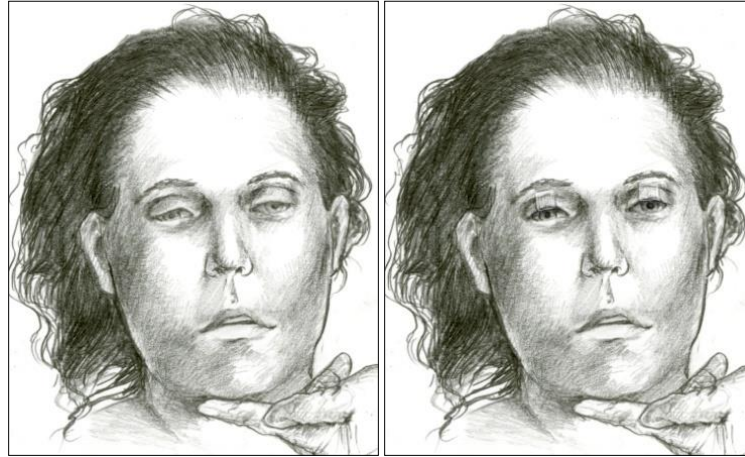


Figure 0.7: The illustration on the left shows the decedent's eyes half closed, while the eyes have been taped to an open position in the right illustration.

6.4.9.2 The extraction of vitreous fluid can have a substantial negative effect on the usability of the facial imagery. If possible, the extraction of vitreous fluid from the eyes should be delayed until after all facial imagery is captured.

6.4.10 Eyeglasses

6.4.10.1 If it is known that the decedent normally wears glasses and the glasses are available, 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. 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.

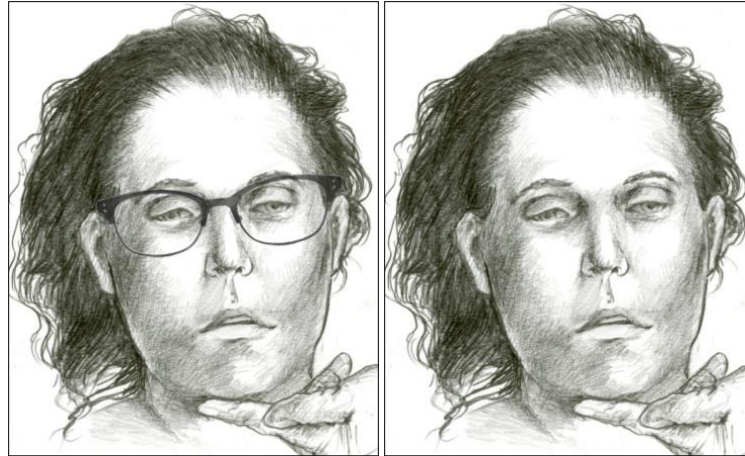


Figure 0.8: The illustration on the left shows the decedent with eyeglasses in place, while they have been removed in the illustration on the right.

6.4.11 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., false eye, dentures), and the device is present at the time of postmortem processing, it is recommended to photograph the decedent’s face with the prosthetic in place.

6.5 Facial Image Capture in a Semi-Controlled Environment

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

6.5.2 In a semi-controlled environment, follow the controlled environment guidelines in Sections 6.2 through 6.4 wherever possible. When not possible, a facial image should be captured while attempting the following (without damaging the decedent or face):

6.5.2.1 Remove obstructions to expose the face and ears fully:

- (1) Clean blood, dirt, and debris from face;
- (2) Remove head coverings and body accessories; and
- (3) Move hair away from face and ears;

6.5.2.2 Remove glasses if present;

6.5.2.3 Capture with a frontal pose with the eyes open;

6.5.2.4 Capture an image with two profile poses with ears exposed; and

6.5.2.5 Illuminate while minimizing side-to-side shadows with the use of the following:

- (1) Camera flash,
- (2) Flashlight, and
- (3) Capture with 1.2 m to 2.5 m (4 ft to 8 ft) camera-to-subject distance to eliminate distortion.

6.6 Additional Information

6.6.1 Video

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

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

- (1) 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 and
- (2) 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.

6.6.2 Scars, Marks, and Tattoos (SMT)

6.6.2.1 Agency policies will dictate how and under which circumstances SMT imagery should be taken and catalogued.

6.6.2.2 To support future work in FRS searching and recognition of SMTs, Annex E of ANSI/NIST-ITL-1-2011 should be referenced. This document provides current textual descriptions for cataloguing of SMTs.

7. Keywords

7.1 coroner; facial recognition; medical examiner

FISWG documents can be found at www.fiswg.org