

Disclaimer:

As a condition to the use of this document and the information contained herein, the Facial Identification Scientific Working Group (FISWG) requests notification by e-mail before or contemporaneously to the introduction of this document, or any portion thereof, as a marked exhibit offered for or moved into evidence in any judicial, administrative, legislative, or adjudicatory hearing or other proceeding (including discovery proceedings) in the United States or any foreign country. Such notification shall include: 1) the formal name of the proceeding, including docket number or similar identifier; 2) the name and location of the body conducting the hearing or proceeding; and 3) the name, mailing address (if available) and contact information of the party offering or moving the document into evidence. Subsequent to the use of this document in a formal proceeding, it is requested that FISWG be notified as to its use and the outcome of the proceeding. Notifications should be sent to: chair@fiswg.org

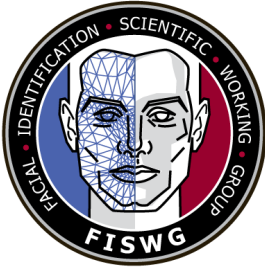
Redistribution Policy:

FISWG grants permission for redistribution and use of all publicly posted documents created by FISWG, provided that the following conditions are met:

Redistributions of documents, or parts of documents, must retain the FISWG cover page containing the disclaimer.

Neither the name of FISWG, nor the names of its contributors, may be used to endorse or promote products derived from its documents.

Any reference or quote from a FISWG document must include the version number (or creation date) of the document and mention if the document is in a draft status.



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 automated facial recognition (FR) 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

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

12 ISO/IEC 19794-5 Biometric data interchange formats—Part 5: Face image data³
13 FISWG Standard Guide for Capturing Facial Images For Use with Facial
14 Recognition Systems⁴

15 **3. Terminology**

16 3.1 *Definitions:*

17 3.1.1 *Facial Image Capture*—in facial identification, the process of collecting a
18 biometric sample from an individual via a sensor.

19 3.2 *Acronyms*

20 3.2.1 *CODIS*—*Combined DNA Index System*

21 3.2.2 *DNA*—*Deoxyribonucleic acid*

22 3.2.3 *FBI*—*Federal Bureau of Investigation*

23 3.2.4 *FR*—*Facial recognition*

24 3.2.5 *ME/C*—*Medical examiner or coroner*

25 3.2.6 *SMT*—*Scars, marks, and tattoos*

26 **4. Summary of Guide**

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

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

27 4.1 FR searches can assist in generating potential candidates and investigative
28 leads for the identification of unidentified remains or connecting decedents to image
29 galleries. For the FR systems to operate properly, the images submitted must meet
30 certain criteria. This guide provides an overview of the optimal processes and
31 techniques for the capture of postmortem facial images of human remains to maximize
32 their utility in automated FR searches and manual facial image comparisons.

33 4.2 This guide is intended to supplement internal, agency-specific postmortem
34 examination procedures and forensic autopsy performance standards that medical
35 examiners and coroners (ME/C) must meet for accreditation in the United States.

36 **5. Significance and Use**

37 5.1 Protocols for photographing a decedent's face at autopsy for identification
38 purposes do not always result in the capture of facial images that are well suited for
39 automated FR searches or manual facial comparisons. It is not always feasible to
40 collect fingerprints from decedents (e.g., in disaster situations or when a decedent is in
41 a state of advanced decomposition), and radiograph (medical or dental) comparison
42 requires at least a presumptive identification of remains so appropriate comparative
43 antemortem radiographs can be obtained to confirm the identification. If the decedent's
44 DNA or appropriate family reference DNA profiles are not already stored within a DNA
45 repository (e.g., the FBI's CODIS), a DNA association will also require the presumptive
46 identification of a decedent to ensure that appropriate samples are collected for
47 comparison/association.

48 5.2 It is advisable to follow the guidelines presented in this guide even when not all
49 facial components are present as even incomplete facial images can assist automated
50 FR and manual facial comparison processes, especially through more accurate
51 recording of minute facial details.

52 5.3 For the purpose of facial image capture, there are various perimortem or
53 postmortem conditions or both that can degrade the usability of any facial images
54 captured:

55 5.3.1 Presence of trauma (for example, entry/exit wounds, lacerations, bruising,
56 missing components, etc.),

57 5.3.2 Obscuring matter (for example, blood, fluids, dirt, debris, hair, clothing
58 accessories, and so forth), and

59 5.3.3 Decomposition and other postmortem changes (for example, bloating,
60 mummification, skeletonization, evidence of insect or scavenger activity, etc.).

61 5.4 Before any attempt is made to clean or alter the decedent for facial image
62 capture, nationally accepted standards, or agency protocols or both should be followed
63 so the alterations do not affect forensic evidence collection, documentation, or chain of
64 custody.

65 **6. Image Capture**

66 6.1 Facial Image Capture in a Controlled Environment

67 6.1.1 This section addresses the image capture process and techniques as they
68 relate to a controlled environment, such as a morgue, where all or most variables and
69 decisions can be controlled by the photographer, including equipment, the photographic
70 environment (e.g., camera position, lighting, distance, background, and resolution), and
71 the pose and positioning of the decedent.

72 6.1.2 ME/C and morgue personnel (e.g., investigators, autopsy technicians,
73 residents, volunteers) should take the following factors into consideration when making
74 decisions for the capture of postmortem facial images, especially when the images are
75 intended to be used for automated FR searches or manual facial comparisons or both.

76 6.1.3 Recommendations are presented under the assumption that all proper
77 medicolegal investigation procedures have been followed and the body can be prepared
78 and repositioned as needed.

79 6.1.4 More information can be found at:

80 6.1.4.1 For forensic image capture, please refer to Annex E of ANSI/NIST-ITL-1-
81 2011 and

82 6.1.4.2 For controlled image capture guidance, please refer to FISWG's "Standard
83 Guide for Capturing Facial Images for Use with Facial Recognition Systems."

84 6.2 Controlled Acquisition

85 6.2.1 This section outlines the optimal environmental conditions for capturing
86 postmortem facial images.

87 6.2.2 The imaging conditions listed in this section are in the context of an ideal
88 controlled environment. While it may not be possible in all ME/C offices to conform
89 exactly to the specifications listed, especially with regard to the camera position, it is
90 recommended that all attempts be made to approximate these conditions to the best of
91 the photographer's ability. The photographer should be aware that with increasing
92 discrepancies between the ideal environment and the actual image capture environment
93 there will be a decrease in the quality of the facial image for FR searching and image
94 comparison.

95 6.2.3 Figure 1 provides an example of the photographic environment in a ME/C
96 office with positioning of the camera directly over the decedent's face and a camera-to-
97 subject distance appropriate for minimizing distortion (i.e., the "fishbowl effect" resulting
98 from capturing a facial image too close to the face). When possible, it is recommended
99 to use a fixed camera mount to provide stability and reduce the potential for distortion.
100 At a minimum, if a decedent is on a gurney, it is recommended to use a stepladder or
101 other means for elevating the photographer to ensure proper camera-to-subject
102 distance. Standing beside the gurney and reaching over the decedent's face is not
103 recommended.



104

105 *Figure 1: Photographic environment in an ME/C office using a stepladder to position the camera directly over the decedent's*
106 *face, while ensuring a camera-to-subject distance appropriate for minimizing distortion.*

107

108 6.2.4 The following suggestions for the image capture environment should be
109 considered:

110 6.2.4.1 Decedent position—The decedent should be positioned and suitable
111 equipment should be available to maximize the quality of the imagery. Optimal position
112 of the body for facial image capture is to have the head in a vertical position with the jaw
113 closed to allow the face morphology to be as close to the antemortem reference images
114 with which it will be compared. This will likely require the body to be positioned so that
115 the decedent is seated.

116 6.2.4.2 Lighting—Lighting should uniformly illuminate the decedent. Hot spots,
117 reflections, and shadows on the face and in the background should be minimized.

118 6.2.4.3 Camera position

119 (1) The camera-to-subject distance should be great enough to minimize
120 distortion of the face in the resulting image. Camera placement that is too
121 close to the decedent can result in an apparent change in facial
122 proportions in which the ears are no longer visible and the mid-face region
123 appears to be artificially wide and forward projecting.

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

128 6.2.4.4 Background—The background should be a uniform, smooth, flat,
129 nonreflective surface with a neutral shade creating a contrast between the facial
130 features of the decedent and background.

131 6.3 Decedent Body Preparation—This section outlines the optimal decedent
132 positioning and appearance for capturing a postmortem facial image. While the
133 information pertains mainly to frontal images, it should also apply to other captured
134 images (for example, right/left profile and angled images).

135 6.3.1 Head Position for Frontal Images

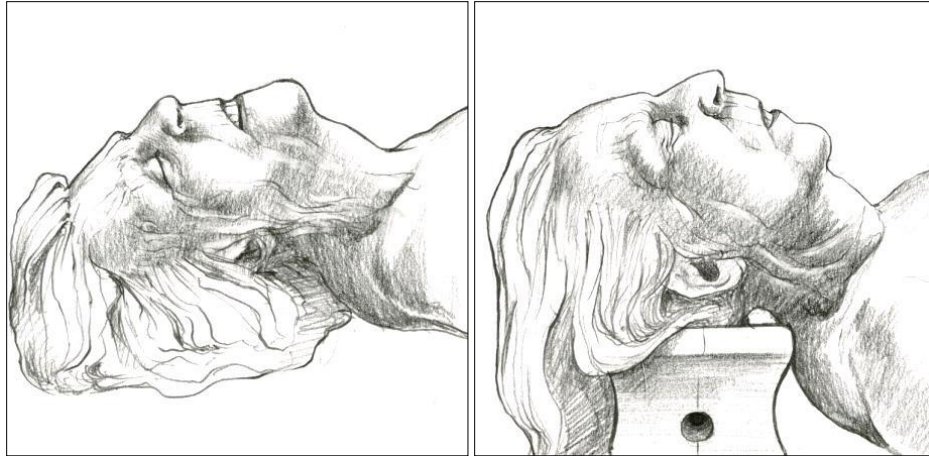
136 6.3.1.1 *Supine position*

137 (1) The head should be adjusted to face directly toward the camera with no
138 more than $\pm 5^\circ$ variance from frontal in pitch (head tilted up or down), roll
139 (head tilted side-to-side), and/or yaw (head turned side-to-side). For
140 example, the position of the head and face should appear as they would in
141 a driver's license or passport photo. For more information on facial
142 position for FR appropriate image capture, see ISO/IEC19794-5 on face
143 image data.

144 (2) Visual cues that can assist with determining "forward orientation" are:

- 145 (a) Both eyes are level on an imaginary horizontal line (zero roll angle);
- 146 (b) Both ears are equally visible if unobstructed by hair and nose is
147 forward (zero yaw angle); and
- 148 (c) The chin is neither elevated nor dropped (zero pitch angle). In the
149 postmortem setting, a body block can be used under the back of
150 the neck to adjust the angle of the head and face (see Figure 2).

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



156

157 *Figure 2: Placement of a body block to adjust head position for capturing frontal image from above.*158

6.3.2 Sitting Position

159 6.3.2.1 In a sitting position, the forces of gravity will act in such a way that the soft
 160 tissues of the face are distributed in a more lifelike way, as opposed to falling backward
 161 and causing the appearance of increased thickness surrounding the posterior aspects
 162 of the cheeks and jaw and decreased thickness in the lips and anterior aspects of the
 163 cheeks and mouth areas. In this position, the decedent's mandible will likely need to be
 164 elevated (for example by using a gloved finger to hold it in place) so the mouth can be
 165 closed. When the decedent is seated, the camera should be affixed to a tripod or
 166 otherwise stabilized to ensure a camera angle that is directly perpendicular to the
 167 subject's face.

168 6.3.2.2 As with the supine position, the decedent's head should be adjusted to face
 169 directly toward the camera with no more than $\pm 5^\circ$ variance from frontal in pitch (head
 170 tilted up or down), roll (head tilted side-to-side), and/or yaw (head turned side-to-side).
 171 For example, the position of the head and face should appear as they would in a

172 driver's license or passport photo. For more information on facial position for FR
173 appropriate image capture, see ISO/IEC19794-5 on face image data.

174 6.3.2.3 Visual cues that can assist with determining "forward orientation" are:

175 (1) Both eyes are level on an imaginary horizontal line (zero roll angle);

176 (2) Both ears are equally visible if unobstructed by hair and nose is forward
177 (zero yaw angle); and

178 (3) The chin is neither elevated nor dropped (zero pitch angle).

179 6.3.3 Head Position for Non-Frontal Images

180 6.3.3.1 It is highly recommended to capture non-frontal images for each side of the
181 face at a 90° angle (profile image) and a 45° angle (three-quarter profile image). If non-
182 frontal images or angled images or both are captured for facial comparison purposes,
183 they can be acquired by adjusting the camera position. Turning the head is not
184 preferable but acceptable.

185 6.3.3.2 More information for clarification on non-frontal image capture can be found
186 in Annex E, of ANSI/NIST-ITL-1-2011.

187 6.3.4 Head Coverings and Accessories—Any item that obscures the hairline,
188 chin/jawline, and ears (for example, hats, scarves, jewelry, etc.) should be removed so
189 the full face and ears are displayed. If the decedent has facial piercings and the

190 piercing jewelry is available, at least one frontal image should be captured with the
191 jewelry in place and one image after the jewelry has been removed.

192 6.3.5 Shoulder Position—The top of the shoulders and neck should be included in
193 the image frame.

194 6.4 Decedent Face Preparation

195 6.4.1 This section outlines the optimal facial conditions for a postmortem image for
196 FR and comparison purposes. Obscuring matter (e.g., blood, particles, dirt) or hair on
197 the face, large open wounds, closed eyes, and eyeglasses can adversely affect FR
198 searches and facial comparisons, limiting the usefulness of the images.

199 6.4.2 If a scale (ruler) is used, efforts should be made to place the ruler in the same
200 plane as the face and it should not cover or obstruct any portion of the head or face.

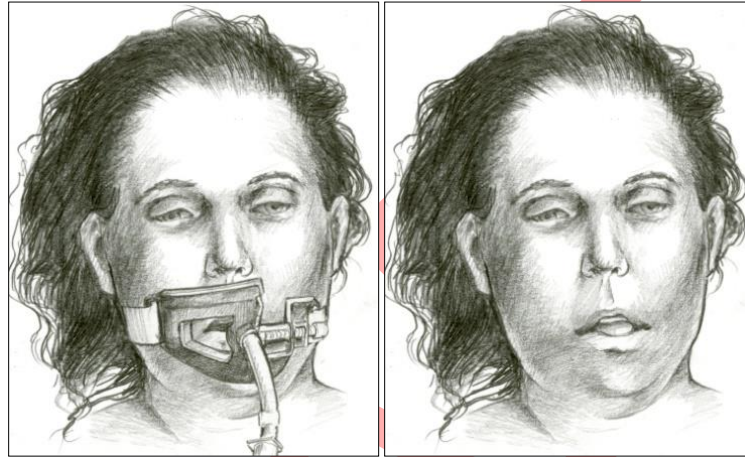
201 6.4.3 There are situations in which multiple images at each pose angle can be
202 helpful in improving the usable quality of the postmortem facial imagery for facial
203 comparison.

204 6.4.4 For all situations, facial comparison recommends that the face be fully exposed
205 and in a natural position. For forensic reasons, it is advisable to take images before and
206 after any alterations to increase the usefulness of the images.

207 6.4.5 Obscuring Matter

208 6.4.5.1 The face should be cleaned of blood (or other fluids), dirt, debris, makeup,
209 and other foreign matter or obstructions.

210 6.4.5.2 In Figure 3, the image on the left shows an obstruction over the face; the
211 image on the right shows the obstruction removed.



212
213 *Figure 3: Obscuring matter, such as evidence of resuscitation efforts or other medical intervention, as shown in this illustration*
214 *on the left can also obstruct portions of the face. On the right, the obstruction has been removed.*

215 6.4.6 Hair

216 6.4.6.1 When capturing both frontal and profile images, the decedent's hair should
217 be moved to reveal the full face and ears. If excessive facial hair obscures facial
218 components, then it should be repositioned to approximate a natural condition and the
219 line of growth should be made visible.

220 6.4.6.2 In Figure 4, the image on the left shows hair covering portions of the face
221 and ears; the image on the right shows the hair moved away from important facial
222 components.

223



Figure 4: Hair covering parts of the face, as seen on the left illustration, should be removed.

224

225

226

6.4.7 Wounds or Fragments

227

228

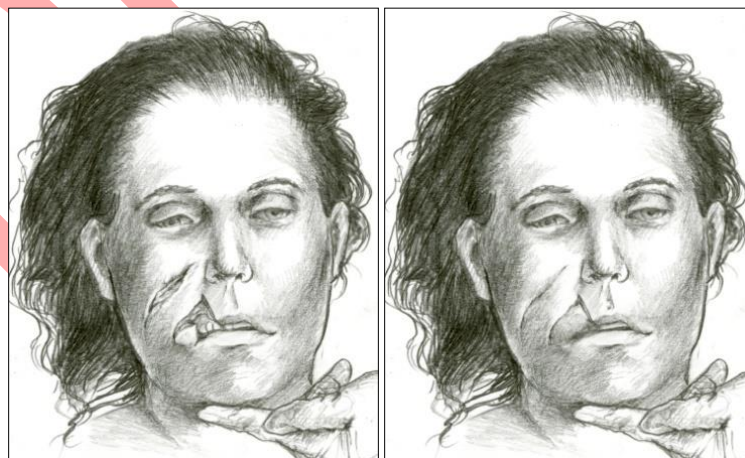
229

230

231

232

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.



233

234

235

236

Figure 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.

237 6.4.8 Mouth

238 6.4.8.1 If the decedent's mouth is open, it should be closed. If the mouth does not
239 remain closed after manual positioning, it might have to be held in place. If the presence
240 of a hand in the image is necessary for proper pose, the visibility of the hand should be
241 minimized and should not obscure any portion of the face.

242 6.4.8.2 In Figure 6, the illustration on the left shows a decedent with an open mouth;
243 the illustration on the right shows a hand holding the mouth in place. The hand in this
244 illustration is placed below the jaw so that the decedent's entire chin and jawline are
245 visible and unobstructed.



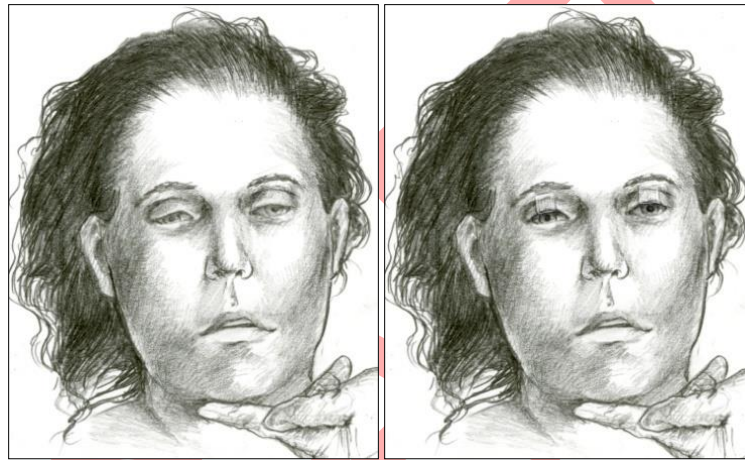
246
247 *Figure 6: The illustration on the left shows the decedent with an open mouth, while the illustration on the right shows a hand*
248 *holding the mouth in place.*

249 6.4.9 Eyes

250 6.4.9.1 FR systems are dependent on facial features including the eye area and
251 pupils. If needed, translucent tape can be used to tape open eyelids when they will not
252 stay open after manual positioning. Efforts should be made to avoid covering eyebrows

253 with the tape. Two images should be taken: one with the eyes closed and one with the
254 eyes taped open.

255 6.4.9.2 In Figure 7, the illustration on the left shows the decedent's eyes half closed;
256 the illustration on the right shows clear tape holding the decedent's upper lids in an
257 open position.



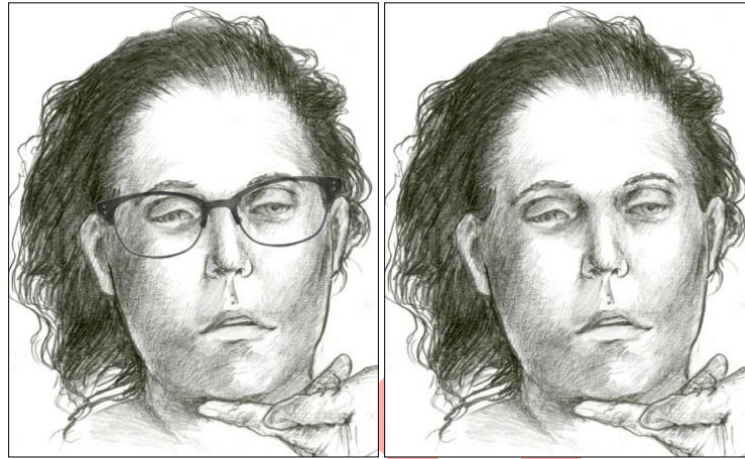
258
259 *Figure 7: The illustration on the left shows the decedent's eyes half closed, while the eyes have been taped to an open position in*
260 *the right illustration.*

261 6.4.9.3 The extraction of vitreous fluid can have a substantial negative effect on the
262 usability of the facial imagery. If possible, the extraction of vitreous fluid from the eyes
263 should be delayed until after all facial imagery is captured.

264 6.4.10 Eyeglasses

265 6.4.10.1 If it is known that the decedent normally wears glasses and the glasses are
266 available, at least one frontal image should be captured with glasses and one image
267 without glasses. Glare from eyeglasses should be avoided. Sunglasses or glasses with
268 lenses that obscure the eye (for example, tinted lenses) should always be removed.

269 6.4.10.2 In Figure 8, the illustration on the left shows the decedent with her glasses
270 in place; the illustration on the right shows the decedent with her glasses removed.



271
272 *Figure 8: The illustration on the left shows the decedent with eyeglasses in place, while they have been removed in the*
273 *illustration on the right.*

274 6.4.11 Prosthetics—If the condition of the decedent suggests use of a prosthetic that
275 would complete facial features and was likely to have been regularly worn (e.g., false
276 eye, dentures), and the device is present at the time of postmortem processing, it is
277 recommended to photograph the decedent's face with the prosthetic in place.

278 6.5 Facial Image Capture in a Semi-Controlled Environment

279 6.5.1 Semi-controlled acquisition refers to when only some aspects of the
280 environment or decedent can be controlled but not all aspects of both (for example,
281 disaster recovery or other humanitarian purposes).

282 6.5.2 In a semi-controlled environment, follow the controlled environment guidelines
283 in Sections 6.2 through 6.4 wherever possible. When not possible, a facial image should
284 be captured while attempting the following (without damaging the decedent or face):

285 6.5.2.1 Remove obstructions to expose the face and ears fully:

286 (1) Clean blood, dirt, and debris from face;

287 (2) Remove head coverings and body accessories; and

288 (3) Move hair away from face and ears;

289 6.5.2.2 Remove glasses if present;

290 6.5.2.3 Capture with a frontal pose with the eyes open;

291 6.5.2.4 Capture an image with two profile poses with ears exposed; and

292 6.5.2.5 Illuminate while minimizing side-to-side shadows with the use of the
293 following:

294 (1) Camera flash,

295 (2) Flashlight, and

296 (3) Capture with 1.2 m to 2.5 m (4 ft to 8 ft) camera-to-subject distance to
297 eliminate distortion.

298 6.6 Additional Information

299 6.6.1 Video

300 6.6.1.1 The use of video imaging to supplement still photos is desirable to complete
301 or finalize the image capture. After the still images are completed, a short video can

302 capture details absent from still images because of reflections, occlusions, or other
303 factors.

304 6.6.1.2 If this is done, video should be continuously captured by steadily moving the
305 camera in two separate arcs:

306 (1) Beginning at the nose, the camera should move to the ear on one side,
307 back over the nose, and to the ear on the other side and

308 (2) Beginning at the nose, the camera should move to the top of the head,
309 back over the nose, and to the bottom of the chin.

310 6.6.2 Scars, Marks, and Tattoos (SMT)

311 6.6.2.1 Agency policies will dictate how and under which circumstances SMT
312 imagery should be taken and catalogued.

313 6.6.2.2 To support future work in automated searching and recognition of SMTs,
314 Annex E of ANSI/NIST-ITL-1-2011 should be referenced. This document provides
315 current textual descriptions for cataloguing of SMTs.

316 7. Keywords

317 7.1 coroner; facial recognition; medical examiner

318

319
320
321
322
323
324
325
326
327
328
329
330
331

FISWG documents can be found at www.fiswg.org

DRAFT