

FINGERNAIL SAMPLE EXAMINATION**27.1 PURPOSE:**

To collect and/or prepare a sample from fingernail samples for DNA analysis, typically for touch DNA in Sexual Assault or Homicide cases.

27.2 RESPONSIBILITY:

Forensic Science Examiners (however titled) from the Division of Scientific Services who have been trained in the discipline of Sexual Assault Evidence Collection Kit handling and examination according to FB SOP-26 (Training Manual and Checklist), GL-4 (LIMS) and GL-13 (General Evidence Handling).

27.3 SAFETY:

Use appropriate measures for the proper handling of biohazardous materials and chemicals according to GL-2 (Safety Manual).

27.4 DEFINITIONS:

- A. LIMS: Laboratory Information System
- B. QRW(s): Quality Record Worksheet(s) (Appendix 1)
- C. SAECK: Sexual Assault Evidence Collection Kit

27.5 PROCEDURE:

- A. Before examining the fingernail samples review and consider the case information as necessary.
- B. Fingernail samples will be examined in a contained area, such as a hood, that creates a barrier to prevent loss of sample.
- C. Before collecting a sample, examine the contents of the submission/item macroscopically and stereoscopically, if necessary.
 - 1. Document the contents on the appropriate QRW. Contents may include fingernail clippings, swabs, wooden stick(s), reddish-brown debris, nail clippers, tissue-like material, and/or other trace material. Hair-like fibers may also be present.
 - 2. If the contents are examined stereoscopically, record the stereoscope used on the appropriate QRW.
 - 3. Record the lot number of the dH₂O used on each appropriate QRW.

- D. Designate/sub-itemize the samples collected on the appropriate QRW(s) according to GL-4 (LIMS). See sections 27.5.1 through 27.5.8 below for detailed examples.
- E. Examiners will account for all samples collected according to sections 1.5.4.R and 1.5.4.S in FB SOP-01 (Physical Evidence Examination).
- F. All samples collected and retained will be verified for correct labeling and contents according to section 1.5.4.U in FB SOP-01 (Physical Evidence Examination).
- G. For Sexual Assault Evidence Collection Kit "Fingernail Swab and Clippings": If the case warrants, prepare the submitted swab(s) for DNA analysis according to FB SOP-03 (Guidelines for Collecting and Forwarding Samples for DNA Analysis, section 3.4.1.C). Send these swabs for DNA analysis prior to examining the remaining contents of the sample envelope, if warranted.

27.5.1 Fingernail Clippings:

- A. For samples that are collected from each hand and packaged separately (i.e. two envelopes labeled "Left hand", "Right hand") or samples that are collected from each hand and packaged together (i.e. one envelope received labeled as "Fingernails"):
 - 1. Photo-document the entire contents of the envelope.
 - 2. Assess the clippings and select those which are suitable to be swabbed for touch DNA.
 - a. Whole clippings with discernable leading edges are generally better suited than small nail clippings/fragments.
 - b. Clippings with no or little reddish-brown staining are generally better suited than heavy reddish-brown stained clippings.
 - 3. Collect a swabbing from the leading edges of the selected clippings (avoiding reddish-brown staining) onto one (1) swab and sub-itemize the swabbing according to GL-4 (LIMS).

Examples of sub-itemization descriptions:

- | | | |
|----|------------------|--|
| a. | Item | Envelope with "Left Fingernails" |
| b. | Sample from item | Swabbing of "left fingernails" - unstained areas |
| c. | Item | Fingernail scrapings/clippings (or swab and clippings) - "left hand" |
| d. | Sample from item | Swabbing of fingernail clippings - "left hand" - unstained areas |

4. Note on the worksheet if the collected swab is reddish-brown stained. Generally, to conserve sample, do not test.
5. If reddish-brown staining is noted on the touch DNA selected clippings, then one stained clipping may be tested.
6. When warranted, collect a separate swabbing of the reddish-brown staining from the selected touch DNA clippings onto one (1) or two (2) swabs and sub-itemize the swabbing according to GL-4 (LIMS).

Examples of sub-itemization descriptions:

- | | | |
|----|------------------|--|
| a. | Item | Envelope with "Left Fingernails" |
| b. | Sample from item | R/B staining on "left fingernails" |
| c. | Item | Fingernail scrapings/clippings (or swab and clippings) - "left hand" |
| d. | Sample from item | R/B staining on fingernail scrapings/clippings (or swab and clippings) - "left hand" |

7. When sample collection from the touch DNA selected clippings is complete, separately package and label these as the touch DNA swabbed clippings. No additional sub-itemization is necessary. Return this package to the original packaging.
8. If reddish-brown staining is noted **only on** the remaining (i.e. not chosen for touch DNA) **clipping(s)**, then one stained clipping may be tested. Return this clipping to the original packaging.

9. If warranted, conduct screening test(s) for blood according to FB SOP-08 (Screening Tests for Blood).
10. If the contents consist of small nail fragments or clippings with no discernable edges, then a swabbing of the entire collection may be necessary. Collect onto one (1) swab and sub-itemize the swabbing according to GL-4 (LIMS).

Examples of sub-itemization descriptions:

- | | | |
|----|------------------|---|
| a. | Item | Envelope with "Left Fingernails" |
| b. | Sample from item | Swabbing - "left fingernails" |
| c. | Item | Fingernail scraping/clippings (or swab and clippings) - "left hand" |
| d. | Sample from item | Swabbing of fingernail clippings - "left hand" |

- B. For a sample collected from each finger and packaged separately (i.e. ten envelopes received labeled as "L1", "L2", "L3", "L4", "L5", "R1", "R2", "R3", "R4" and "R5"):
1. Photo-document the entire contents of each envelope.
 2. Assess the clippings from each envelope. Before collecting any samples, determine which clippings are suitable to be swabbed for touch DNA as described in section 27.5.1.A.2 above. (Example: "L1", "L4" and "R2").
 3. Collect a swabbing from the leading edges of these selected clippings (avoiding reddish-brown staining) as one sample onto one (1) swab.
 4. Document which fingernail collection(s) were sampled for touch DNA and sub-itemize the swabbing appropriately. See step 7 below.
 5. Note on the worksheet if the collected swab is reddish-brown stained. Generally, to conserve sample, do not test.
 6. If reddish-brown staining is noted on the touch DNA selected clippings, then one stained clipping from one collection may be tested.

7. When warranted, collect a separate swabbing of the reddish-brown staining from these clippings onto one (1) or two (2) swabs and sub-itemize the swabbing according to GL-4 (LIMS).

Examples of sub-itemization descriptions:

- | | | |
|----|---------------------|---|
| a. | Item | Envelope with "Fingernails" - "L1" |
| b. | Item | Envelope with "Fingernails" - "L2" |
| c. | Item | Envelope with "Fingernails" - "L3" |
| d. | Item | Envelope with "Fingernails" - "L4" |
| e. | Item | Envelope with "Fingernails" - "L5" |
| f. | Item | Envelope with "Fingernails" - "R1" |
| g. | Item | Envelope with "Fingernails" - "R2" |
| h. | Sample from item(s) | Swabbing of "fingernails" - "L1", "L4" & "R2" |
| i. | Sample from item(s) | R/B staining on "fingernails" - "L1", "L4" & "R2" |

8. When sample collection from the touch DNA selected clippings is complete, return these clippings to their original packages.
9. If reddish-brown staining is noted **only on** the remaining (i.e. not chosen for touch DNA) **collection(s)**, then one stained clipping from one collection may be tested. Return this clipping to the original packaging.
10. If warranted, conduct screening test(s) for blood according to FB SOP-08 (Screening Tests for Blood).
11. If the contents of each envelope consist of small nail fragments or clippings with no discernable edges, then one (1) swabbing of all the contents may be necessary. Collect onto one (1) swab and sub-itemize the swabbing according to GL-4 (LIMS).

Examples of sub-itemization descriptions:

- | | | |
|----|------|------------------------------------|
| a. | Item | Envelope with "Fingernails" - "L1" |
| b. | Item | Envelope with "Fingernails" - "L2" |
| c. | Item | Envelope with "Fingernails" - "L3" |
| d. | Item | Envelope with "Fingernails" - "L4" |
| e. | Item | Envelope with "Fingernails" - "L5" |

- | | | |
|----|---------------------|---|
| f. | Item | Envelope with "Fingernails" - "R1" |
| g. | Item | Envelope with "Fingernails" - "R2" |
| h. | Sample from item(s) | Swabbing of "fingernails" - "L1" through "R2" |

27.5.2 Wooden Stick(s) (when warranted):

A. For samples that are collected from each hand and packaged separately (i.e. two envelopes labeled "Left hand", "Right hand"), samples that are collected from each hand and packaged together (i.e. one envelope received labeled as "Fingernails") or for samples collected from each finger and packaged separately (i.e. ten envelopes received labeled as "L1", "L2", "L3", "L4", "L5", "R1", "R2", "R3", "R4" and "R5"):

1. Document the appearance of the end(s) of each stick. Generally, if reddish-brown stained, to conserve sample, do not test.
2. Collect a swabbing from the appropriate end(s) onto one (1) swab and sub-itemize the swabbing according to GL-4 (LIMS).

Examples of sub-itemization descriptions:

- | | | |
|----|------------------|--|
| a. | Item | Envelope with "Left Fingernail scrapings" |
| b. | Sample from item | Swabbing of "left fingernail scrapings" – ends of wooden stick |
| c. | Item | Fingernail scrapings/clippings (or swab and clippings) - "left hand" |
| d. | Sample from item | Swabbing of fingernail scrapings (or swab and clippings)- "left hand" - ends of wooden stick |

3. Note on the worksheet if the collected swab is reddish-brown stained. Generally, to conserve sample, do not test.
4. If warranted, conduct screening test(s) for blood according to FB SOP-08 (Screening Tests for Blood).

5. When sample collection is complete, it may be necessary to separately package these sticks and label them as having been swabbed. No additional sub-itemization is necessary. Return this package to the original packaging.

27.5.3 Reddish-brown debris (when warranted):

- A. If there is sufficient quantity, test a portion of the reddish-brown debris according to FB SOP-08 (Screening Tests for Blood).
- B. A sample of the reddish-brown debris may be collected onto one (1) or more swab(s) or placed directly into a tube and sub-itemized according to GL-4 (LIMS).

Examples of sub-itemization descriptions:

- | | | |
|----|------------------|--|
| a. | Item | Envelope with "Left Fingernail scrapings/clippings" |
| b. | Sample from item | R/B debris on/from "left fingernails" |
| c. | Item | Fingernail scrapings/clippings (or swab and clippings)- "left hand" |
| d. | Sample from item | R/B debris on/from fingernail clippings (or swab and clippings)- "left hand" |
- C. The reddish-brown debris may be re-packaged separately from other contents, if necessary. No additional sub-itemization is necessary.

27.5.4 Nail Clipper (when warranted):

- A. While not typically examined, a sample may be collected from the blades of the clipper onto one (1) swab and sub-itemized according to GL-4 (LIMS).

Examples of sub-itemization descriptions:

- | | | |
|----|----------------------|---|
| a. | Item | Envelope with "Left Fingernail scrapings/clippings" |
| b. | Sub-item | White paperfold containing clippings and debris |
| c. | Sub-item | Nail clipper |
| d. | Sample from sub-item | Swabbing of nail clipper – blades |

- B. Note on the worksheet if the collected swab is reddish-brown stained. Generally, to conserve sample, do not test.
- C. If reddish-brown staining is noted on the clipper, a portion may be tested.
- D. If warranted, conduct screening test(s) for blood according to FB SOP-08 (Screening Tests for Blood).

27.5.5 Tissue-like material and/or other trace material:

- A. When possible, test a portion of the tissue-like material according to FB SOP-08 (Screening Tests for Blood).
- B. The tissue-like material and/or the other trace material may be collected onto one (1) or more swabs or placed directly into a tube and sub-itemized according to GL-4 (LIMS).

Examples of sub-itemization descriptions:

- a. Item Envelope with "Left Fingernail scrapings/clippings"
- b. Sample from item Tissue-like material from "left fingernail scrapings/clippings"
- c. Item Fingernail scrapings/clippings (or swab and clippings) – "left hand"
- d. Sample from item Tissue-like material from fingernail scrapings/clippings (or swab and clippings)- "left hand"

27.5.6 Hair-like fibers:

If hair-like fibers are observed, see FB SOP-02 (Sexual Assault Evidence Collection Kit Examination, section 2.5.6) and/or FB SOP-19 (FB SOP-19 (Trace Evidence Collection/Hair-like Fiber Examination).

27.5.7 Entire contents and Packaging (when warranted):

- A. As a final effort and after previous swabbings/testing have been exhausted (i.e. cold case) a swabbing of the entire contents and interior surface of the innermost packaging maybe collected onto one (1) or two (2) swabs for DNA analysis. Sub-itemize according to GL-4 (LIMS).

B. Examples of sub-itemization:

- | | | |
|----|------------------|---|
| a. | Item | Envelope with "Left Fingernail scrapings/clippings" |
| b. | Sample from item | Swabbing - "left fingernail scrapings/clippings" |
| c. | Item | Fingernail scrapings/clippings (or swab and clippings) - "left hand" |
| d. | Sample from item | Swabbing - Fingernail scrapings/clippings (or swab and clippings) - "left hand" |

27.5.8 LIMS Notes

- A. Appropriate information will be entered into LIMS notes.
- B. Summarization of the FB examination of the fingernail scrapings/clippings will be entered into LIMS Notes.

Examples of LIMS notes:

- | | |
|------------------|--|
| Item | Envelope labeled "Left fingernails" |
| | Notes: 1 swab touch from larger unstained fingernails = sub-item of sample from item |
| | Other small unstained frags NT |
| | Other R/B clippings - 1 tested KM+ |
| Sample from item | Swabbing of "Left fingernails" |
| | Notes: 1 swab touch from larger unstained fingernails |

27.5.9 Forward/Retain

Generally, fingernail scrapings/clippings are retained after examination.

- A. Forward the appropriate samples for DNA analysis:
- No Suspect/Suspect (no arrest): No consumption issue.
 - Suspect (arrested): Consumption issue.

Notify the DNA Unit and Case Management Unit of consumption issues prior to analysis.

- LIMS notes
- DNA Request for Analysis: choose 'DNA-Consumption'

B. Retain in Freezer Storage - Further Analysis Samples:

- a. Sexual Assault Evidence Collection Kit samples per Public Act No. 15-207
- b. OCME submission(s) and appropriate collected samples

27.5.10 Report Writing

A Forensic Biology report may be written regarding the fingernail scrapings/clippings examination. If no Forensic Biology report is generated, then it will be addressed in the DNA report.

27.6 REFERENCES

- A. GL-2 (Safety Manual)
- B. GL-4 (LIMS)
- C. GL-13 (General Evidence Handling).