

Standard Operating Procedures for Processing Human Remains

1 Scope

These procedures are provided to assist personnel who record friction ridge prints from deceased individuals. This document does not preclude the use of variations of listed procedures for recording prints from deceased individuals. Laboratory resources, technological change, and examiner preference (within the bounds of good laboratory practice and quality control) determine what examination procedures are appropriate and/or acceptable for certain circumstances. The document covers techniques associated with processing human remains in the Laboratory as well as at an off-site location. See the Friction Ridge Discipline Operations Manual, Standard Operating Procedures for Processing Unknown Deceased for examination of the recovered prints and administrative requirements for Laboratory processing.

2 Equipment/Materials/Reagents

Adhesive Lifters

Ammonium Hydroxide/Sodium Bicarbonate Rehydrating Mixture

Bleach (or appropriate cleaning agent)

Boiling Pots (or hot plate and suitable container)

Butane Lighter

Casting Material

Cutting equipment (saws, shears, scalpels)

Digital Capture Device

Dishwashing Liquid

Duct Seal

Embalming Chemicals (conditioner, preservative, restorative)

Fingerprint or Foam Brushes

Fingerprint/Palm Print/Footprint Cards/Strips

Fingerprint Ink

Fingerprint Magnifier

Fingerprint Powder

Isopropyl Alcohol

Leather Conditioner

Sodium Hydroxide Solution (1% to 3%)

Syringes

Tissue Builder

3 Procedures

3.1 Deceased Processing

All human remains should be treated as infectious material and universal precautions should be exercised.

When personnel process human remains, they should:

1. Clean and evaluate the remains.
2. Recondition compromised friction skin, as appropriate.
3. Record prints from remains.

When processing at a non-Laboratory location, any actions that would drastically change the remains or could be misinterpreted as a wound (e.g., removal of digits or cutting tendons) will require permission from the Medical Examiner or other appropriate Medicolegal Authority.

3.1.1 Processing at FBI Laboratory

Human remains will be stored in the refrigerator, freezer, or stainless steel hood in a Biohazard Examination Room, as applicable. The evidence will be properly sealed unless reconditioning techniques are being performed. Any evidence undergoing reconditioning will have a label with the Laboratory number and personnel contact information clearly associated with items in the process of exams.

3.2 Clean and Evaluate Remains

The first step in deceased processing is to clean and evaluate the remains as follows:

- The individual will use care when handling remains, especially charred remains, as the skin may be fragile and easily damaged.
- The individual will gently clean the remains. The individual may use a soft toothbrush or sponge and warm, soapy water or other cleaning solutions (such as bleach) to remove contaminants from the hands or feet.
- Mild or severe rigor may require the individual to forcefully straighten or flatten the remains. Manipulation of the joints will loosen rigor. The individual may also cut the tendons in order to relax the remains.
- The individual will examine the human remains for damage to the friction skin. The type of event will often be a good indicator of the type of damage observed on the remains. If damage exists, the individual will recondition the friction ridge skin.

3.3 Reconditioning Techniques

3.3.1 Macerated Human Remains

Maceration involves damage to the skin through prolonged exposure to moisture. This type of damage may cause swelling and broadening of the friction ridges as well as wrinkling of the skin. Maceration may also cause the separation of the epidermis (outer skin) from the dermis (inner skin) (See Section 3.5.3). This separation is often referred to as “gloving”. The following procedures should be considered when reconditioning macerated friction skin:

- The individual may pinch or stretch the skin to remove wrinkles.
- If the skin is intact, the individual may use tissue builder. The tissue builder is injected into the end joint of the finger by passing the needle through the first joint or medial phalange. Other parts will be processed with tissue builder in a manner to best preserve the friction ridge skin.
- The individual may use the boiling technique. (See Section 3.3.4)
- If gloving has occurred and the epidermis has not completely separated from the dermis, the individual can carefully remove the epidermis (utilizing scissors or scalpels) to facilitate printing. The individual may place the detached epidermis over the individual’s gloved finger or hand to assist in printing.
- If gloving has occurred and the epidermis has separated completely from the dermis, the individual should print both the dermis and epidermis to ensure they are from the same individual. This is especially important in disaster situations with mass casualties.

3.3.2 Desiccated Human Remains

Desiccated or mummified remains are often difficult to work with because the skin is extremely dehydrated, often with severe wrinkling. The following procedures should be considered when reconditioning desiccated friction skin:

- The individual can soak the remains in one of the following solutions:
 - Dishwashing liquid (may be diluted slightly with warm water)
 - Ammonium hydroxide/sodium bicarbonate solution
 - Sodium hydroxide solution
 - Leather conditioner
- Rehydration can take days or weeks depending on the extent of the dehydration and the rehydration solution used. Some solutions (e.g. sodium hydroxide) can be destructive to remains depending on condition and amount of exposure. Individuals should employ extreme caution when using the rehydration techniques.
- To remove wrinkles after rehydration and restore the remains to the approximate natural size/shape, the individual should try to stretch the skin and may inject the finger with tissue builder using a disposable syringe. Tissue builder is injected into the end joint of the finger by passing the needle through the first joint or medial phalange. Other parts will be processed in a manner to best preserve the friction ridge skin.
- If soaking does not soften the skin, the individual may cast the remains using Accutrans or equivalent casting material.
- If friction ridge detail is not visible or the skin has become saturated, the individual may use the boiling technique (See Section 3.3.4) after rehydration.

3.3.3 Burned or Charred Human Remains

The thermal modification of human remains often results in brittle friction ridge skin that can be further damaged through excessive handling. When an individual is burned to death, the body will usually exhibit clenched hands. Clenching of the hands is a natural reaction that tends to protect the friction ridge detail on the fingers and interdigital area of the palm. The following procedures should be considered for reconditioning burned or charred friction skin:

- Instead of forcing the fingers or toes to open, the individual will cut the tendon on the inside of the fingers or toes to gently straighten. Alternatively, and if necessary, the individual will remove the fingers or toes from the hand for better processing. Make sure to obtain permission in the appropriate situations. The individual will carefully remove hardened or partially loose skin by twisting or cutting. Removed skin should be gently cleaned with warm water (which should soften skin).

- Photography is recommended to capture the friction ridges after the skin is cleaned and before any potential further damage is done. However, the individual could attempt other recording methods prior to photography.
- Depending on the condition of the detached skin, the individual may print the underside of the epidermis. It should be noted that the resulting record will be in reverse position and may be in reverse color.
- The individual should remove damaged epidermal skin to allow access to the dermal layer. (See Section 3.5.3)
- The individual may use the boiling technique (See Section 3.3.4) as a last resort to clean the hand and enhance the presence of friction ridge detail.

3.3.4 Boiling Technique

The boiling technique is used in conjunction with the information in Sections 3.3.1 through 3.3.3.

- The individual will dip the remains into boiling water for approximately five to ten seconds.
- The individual will remove the remains from the boiling water and examine the condition of the friction ridge detail.
- The individual will repeat as necessary, but no more than three times due to increased chance of destroying the friction ridge skin.
- Alternately, when there is abrasion trauma to the skin, the individual could indirectly apply the hot water to the hand, such as with a sponge, to reduce the chance of additional trauma to the skin.
- The boiling method can be attempted on the epidermis and the dermis, but is designed to enhance dermal ridges and may cause the epidermis to blister.

3.3.5 Drying Techniques

Prior to recording prints from the skin, the individual must ensure the skin is dry. The following drying techniques may be used as warranted by the condition of the remains. The individual could:

- Blot the remains dry using low lint absorbent wipes or cloth towels.
- Apply isopropyl alcohol to the remains and blot with low lint absorbent wipes or cloth towels.
- Use a blow dryer on low heat to dry the remains.
- Use the flame technique which involves moving the flame from a butane lighter across the skin for several seconds until dry (taking care not to char the skin). Care should be taken when applying this technique as it may damage the skin.

3.4 Recording Postmortem Prints

Initially, the individual may record as few friction ridge prints as necessary from the remains and attempt to identify. If the individual is not identified, an attempt must be made to record all friction ridge skin detail on the hands, to include palms. It is at the individual's discretion whether to record all detail ahead of time to attempt identification or to record the minimum necessary to attempt identification. The individual may print the feet as dictated by the circumstances. These parts will be handled similarly as described for friction ridge prints from the hand listed above.

The individual will place physical postmortem print record(s) obtained directly from human remains in a sealable storage bag, and be labeled appropriately for bio-hazard.

3.4.1 Digital Scanning Device

Images of friction ridge skin may be captured digitally using a scanning device or software (e.g., ARES software). The friction ridges will be captured by placing or rolling the finger directly on the device to digitally record the ridges. Direct captures are in correct position and may be in reverse color.

3.4.2 Lifting or Casting

The recommended analog method involves the use of black powder and white adhesive lifters. The adhesive lifters can be commercial products or any type of product with a sufficient adhesive to lift the print without damaging the skin. Each part is processed separately as follows:

- The individual will lightly coat the ridges with the powder using a camel or squirrel hair fingerprint brush (or equivalent) or a foam brush, as appropriate.
- The individual will place the part on an adhesive lifter cut to the approximate size of the remains. Duct seal or equivalent may be used to assist with the capture of the print.
- The individual will affix the recorded impression to the back of a transparent fingerprint card or other transparent material. A transparent fingerprint card can be created by photocopying a standard fingerprint card onto transparency film.
 - Prints should be in correct position and in correct color.

Alternatively, the individual could use casting materials or ink and a traditional card. All prints should be in correct position and in correct color.

3.4.3 Camera Capture of Friction Ridges

Recordings of friction ridge skin may be captured via camera. Proper selection of lighting schemes or the use of oblique lighting may enhance the friction ridge detail. A scale or other measurable item should be included in the image if the capture is not already 1:1. Direct captures of friction ridge skin will be in reverse position and may be in reverse color. Individuals may wish to capture images of friction ridges before and/or after techniques are applied.

3.4.4 Required Information for Postmortem Records

Each resulting postmortem record captured by an individual in the Friction Ridge Discipline will contain the following information:

- Available biographical or physical information of the deceased.
- Signature of individual(s) recording prints.
- Date the prints were recorded.
- Any additional information deemed necessary (e.g., Medical Examiner number).
- A Laboratory number, if applicable.
- The source of each postmortem print(s) (e.g. finger number), if known.
- Notations if any parts (i.e., fingers or palms) are missing, damaged, or unable to be printed.

3.5 Additional Deceased Processing Considerations

3.5.1 Detached Digits

When the hand is received intact and the fingers need to be disarticulated, the individual will remove the fingers and place each finger in separately labeled containers bearing the finger number and include the Laboratory number or remains number, as applicable. When working in the field, the individual will obtain permission from the chief Medicolegal Authority prior to removing clothing or body parts. When working in the Laboratory, the individual may process as he or she deems necessary.

When fingers are received detached, the individual will place each finger in an appropriately labeled container (add finger number, if known, and include the Laboratory number or remains number, as applicable).

The same concept can be used with feet and toes.

3.5.2 Gloved Skin

When printing gloved skin, the individual should use either adhesive lifts or ink and card strips, as described above. Casting materials and photography may also be used to capture the friction ridges. Depending on the quality, it is also possible to record the underside of the epidermis; however, the resulting prints will be in reverse position and may be in reverse color.

Detached skin may be retained in original container with the associated part or be placed in a separate appropriately labeled container (origin of skin (e.g., finger number), if known, and include Laboratory number or remains number, as applicable).

3.5.3 Dermal Skin

In certain circumstances, when the epidermis is damaged or lost, the dermal skin may be recorded. All reconditioning techniques may be used on dermal skin. The resulting prints may have either 1) a double row of dermal papillae, 2) single rows created by two semi-fused rows of dermal papillae, or 3) a combination of double rows and single fused rows, all of which represent a single epidermal ridge. The individual must account for this when comparing or searching the print.

3.6 Disposition of Human Remains

Human remains are not to be destroyed, even when requested by the contributor.

For FBI Laboratory cases, the following procedures will be followed:

- Ensure biohazard labels are on evidence container(s).
- Ensure that the remains are in leak proof primary and secondary containers.
- Return the remains to the contributing agency.

4 Safety

The following safety procedures will be followed as applicable:

- Conduct work in a Biohazard Examination Room or area.
- Utilize universal precautions for control measures.
- Use barrier protection at all times (gloves, masks, eye wear, disposable lab coat/apron).
- Always remove protective barriers prior to leaving a Biohazard Examination Room or area and place disposable barriers in a biohazard disposal container.
- Use double gloves when there may be hand contact with blood or other potentially infectious materials.
- Change gloves when contaminated, torn, punctured, or when their ability to function as a barrier is compromised.

- Wear goggles or glasses with face shields or full face shields to protect from splashes, sprays, spatters, droplets of blood, or other potentially infectious materials.
- Use a disposable lab coat and/or apron for splash protection or replace lab coats after use.
- Wash hands after removal of gloves or other personal protective equipment.
- Place contaminated needles/sharps in appropriate puncture-resistant container.
- Reduce the use and handling of needles and sharp instruments as much as possible.
- Avoid bending, recapping, removing, or otherwise handling contaminated needles or other sharps.
- If necessary, accomplish recapping or needle removal through the use of a mechanical device or a one-handed technique. Use disposable needles whenever possible.
- Minimize spills and splatters.
- Decontaminate all surfaces and devices after use (10% bleach solution, alcohol, or other disinfectant cleaning solution).
- Wash surfaces and devices with water after decontamination.
- Use biohazard labels as required.
- Use leak proof primary and secondary containers during collection, handling, processing, storage, transport, or shipping of biohazard material.
- Dispose of infectious waste in a biohazard bag.
- Maintain the biohazard bag in a rigid container.
- Refer to the FBI Laboratory Safety Manual for guidance on safety polices and chemical disposal. Any questions will be referred to the Health and Safety Group.

5 Standards and Controls

Not applicable.

6 Sampling

Not applicable.

7 Calculations

Not applicable.

8 Measurement Uncertainty

Not applicable.

9 Limitations

Not applicable.

10 References

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Friction Ridge Discipline Operations Manual, Standard Operating Procedures for Digital Images, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Friction Ridge Discipline Quality Assurance Manual, Procedures for Case Acceptance, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

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Uhle, A.J., and R.L. Leas. "The Boiling Technique: A Method for Obtaining Quality Postmortem Impressions from Deteriorating Friction Ridge Skin". JFI. 57 (3):358-369.

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Rev. #	Issue Date	History
1	10/02/17	Updated for Biometrics Analysis Unit. Section 5.1, changed “he/she” to “they”. Section 5.3.4, removed “also” and “both” in last bullet. Section 5.4.1.3, title modified. Section 5.4.2, last sentence, clarified.
2	04/17/20	Latent Print Units changed to Friction Ridge Discipline throughout document as well as other appropriate changes with similar terms. Minor wording, grammar, reorganization of material, and punctuation changes in document. Changed examiner to individual throughout document. Reorganized sections and renumbered appropriately. Streamlined information in sections. Added clarification to Section 1. Section 2, limited list to primary chemicals and equipment, eliminated peripherals, added new chemical, and combined similar types. Section 3.1, added “as appropriate” to number 2 and added last paragraph. Section 3.1.1, generalized location of information. Section 3.2, reorganized information in section for better flow. Section 3.3.2, added notice on destruction with solutions and removed comment on container. Section 3.3, clarified area of protection and added warning on permission and damage. Section 3.3.4, added epidermis warning. Section 3.3.5, added warning. Section 3.4, added first paragraph and second moved from other location in document. Section 3.4.1, title changed and information updated. Section 3.4.2, consolidation and updating of information. Added Section 3.4.3. Section 3.5.1, title changed and contents streamlined. Section 3.5.2, added last paragraph. Section 4, updated.

Redacted - Signatures on File

Approval

Friction Ridge Discipline
Technical Leader

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Latent Print Operations
Unit Chief

Date: 04/16/2020

Acting Latent Print Support
Unit Chief

Date: 04/16/2020

Acting Scientific and
Biometrics Analysis Unit Chief

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