

TECHNICAL NOTE

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A Technique to Enhance Fingerprinting of Mummified Fingers

REFERENCE: Haglund, W. D., "A Technique to Enhance Fingerprinting of Mummified Fingers," *Journal of Forensic Sciences*, JFSCA, Vol. 33, No. 5, Sept. 1988, pp. 1244-1248.

ABSTRACT: This report details a fingerprinting technique for softening mummified fingers and hands using Metaflow and Restorative, a fluid for rehydration of desiccated tissue. This procedure has proven successful in cases of extreme desiccation and has allowed for good fingerprint detail to be developed.

KEYWORDS: criminalistics, human identification, fingerprints, mummification

Postmortem fingerprinting as a method of confirming identity is well known. Extremely mummified fingers present the identification technician with a basic problem: softening of tissue and thus eliminating wrinkles and crevices created by dehydration. Hypodermic injection of tissue builder or other fluids into supporting soft tissues to eliminate wrinkles and crevices is routinely practiced [1-4]. However, most methods used for softening mummified fingers either fail to soften tissues adequately or are highly destructive of ridge detail [5]. Destruction of ridge detail, as a result of swelling and breaking up of the epidermis, is a particular problem caused by commonly used softening solutions that contain caustic potash or fabric softener [1-4, 6-8]. A review of techniques and problems inherent in obtaining readable fingerprints from mummified fingers is presented by Richards and Kade [9]. Zugibe and Costello claim excellent results using disodium ethylenediamine tetracetic acid in a pH adjusted detergent solution [5]. Potential drawbacks to all the foregoing methods for softening mummified fingers are the need for constant monitoring, solution preparations, pH adjustments, and/or dissection of finger pads.

By contrast, the technique described in this report uses two commercially available chemical mixtures, Metaflow and Restorative. This mixture has proven to be minimally destructive to ridge detail, and does not require excessive monitoring or complicated solution preparation.

Methods

The tissue to be softened is submerged in a 1:1, full strength mixture of Metaflow and Restorative. Submersion of the complete hand is recommended, permitting inked palm

Received for publication 30 Oct. 1987; revised manuscript received 13 Jan. 1988; accepted for publication 14 Jan. 1988.

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prints to be taken. Using a complete hand eliminates the need to tie off fingers to retain injected fluids as well as the possibility of mixing up severed fingers.

The tissue is soaked until it becomes pliant. Softening can be accelerated by direct injection of the softening mixture into the tissue. The time period of soaking may be from hours to several days, depending on the extent of tissue desiccation. Periodic checks are necessary to determine the progress of softening; however, leaving the tissue in the solution beyond the point when they have become soft does not appear to impair the quality of ridge detail. Before printing, the tissue is rinsed in cold running water to remove excess fluid. Once the technician can move the softened tissue with moderate finger pressure, the tissue to be printed may be injected with the same softening solution, using a 1.5-in. (4-cm) 20-gauge needle. Injection of the fingertips should progress from a point proximal to the last digit. Once the fingers attain the desired fullness they can be inked in the standard fashion and either rolled or taped to obtain the print.

Metaflow

Metaflow is an embalming preinjection fluid used to restore permeability to the cell membrane.

Restorative

Restorative is a biopolymer based fluid used to rehydrate desiccated tissue. (Both are manufactured by the Dodge Chemical Company, Cambridge, Massachusetts.)

Results

A case example is that of a 14-year-old female whose remains were recovered from a rural wooded area. The body was in stages of advanced decomposition and profusely infested by fly maggots. Her skull, upper thorax, and shoulder areas were fully skeletonized with the arms disarticulated from the body. She had disappeared during the first part of August and was discovered in the last part of September for an elapsed postmortem exposure time of seven weeks. Atmospheric temperatures for the period ranged from daily average highs of 77°F (25°C) to nightly average lows of 54°F (12.2°C).

Upon discovery, fingers of the right hand were extended while those of the left hand were clenched (Fig. 1). The epidermis of the left thumb and little finger was absent and dermal



FIG. 1—*Left hand of the deceased before treatment.*

ridges were not apparent. The remaining fingers of the left hand were extremely desiccated, with the epidermis in various stages of loosening and deterioration. The clenched fingers of the right hand retained their epidermis and were moderately to severely mummified. The moderately mummified right thumb with well-defined prints is shown in Fig. 2.

Palms and fingertips of both hands were submerged and left to soak overnight in a 1:1 mixture of Metaflow and Restorative. After a 20-h period, the fingertips were softened enough to be hypodermically injected (Fig. 3). Classifiable prints were obtained from all fingers, including dermal prints of the left thumb and little finger. Figure 4 represents the dermal print of the left thumb and epidermal print of the right thumb. The above procedure has been used in ten cases ranging from moderate to severely mummified tissue with excellent results.

Conclusion

This is a simple technique which is easily mastered and taught. The solutions are readily available and easy to use. There is no artifactual disruption of tissue and consequently finger ridge detail is preserved. Good quality fingerprints can easily be achieved.

Acknowledgments

The author wishes to thank Bill Martin, Dodge Chemical Company representative, for furnishing products; Donald T. Reay, M.D. and John Howard, M.D. for their editorial comments; Tim Taylor of the Washington State Patrol Identification Section for sharing experience with the technique; Marsha Jackson, Senior Identification Technician, Seattle Police Department; Marilyn Hattori, Identification Supervisor, King County Police Department; Paul Moskvina and Sylvia Miller for figure preparation and photography; and Patricia Luckman for preparation of the manuscript.



FIG. 2—Right thumb before treatment.

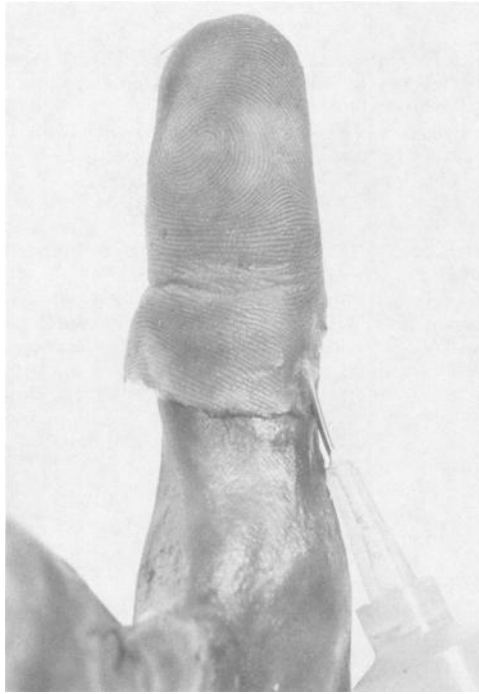


FIG. 3—Injection of the right thumb after treatment. Note injection with a small gauge needle from a point proximal to the area to be printed.

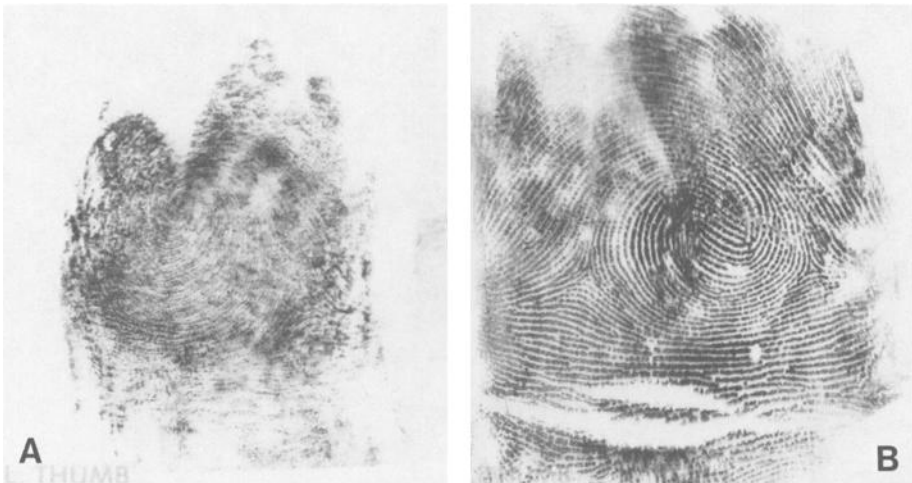


FIG. 4—Dermal print obtained from the left thumb (a) and epidermal print obtained from the right thumb (b).

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