Creating Techniques to Enhance the Effectiveness and Quality of Latent Fingermark Development by Superglue Fuming

Robert Hillman*

Department of Analytical, Environmental and Forensic Sciences, King's College London, Stamford Street, London, UK

Introduction

One of the main goals of criminal and civil investigations is to find people, especially victims and suspects, as well as the owners of various items and the authors of relevant papers. Fingerprint matching is one of the most well-known and frequently used methods of personal identification. A layer of corrugated skin covers the palmer surface of the hands to improve grip and prevent slippage. These elevations on the palmer surfaces are called friction ridges, and the troughs that form between the ridges are called furrows or grooves. The study of friction ridge structures, such as fingerprints, is known as dactyloscopy, and ridgeology is the study of ridge analysis for fingerprint research. Pore openings that let sweat out are scattered throughout the friction ridges. Most of the sweat is water with very trace amounts of salt chloride, organic acids urea, and albumin [1].

Description

A fingerprint is an imprint that a human finger's friction ridges leave behind. If the two fingerprints are those of the person in issue, it is unquestionably possible to identify them. Fingerprint evidence is crucial for personal identification. A distinct pattern allows for fingerprint identification. However, only the patterns do not cause it. The pattern and the ridge details, or minutiae, work together to produce fingerprint identification [2].

The traces of an impression from the friction ridges on any surface of a human or other primate hand are called fingerprints. Friction ridges may also be seen as a print from the foot's sole. Since criminals frequently touch or handle objects when they enter a crime scene, many of their fingerprints are sure to be left there unintentionally. "Chance prints" are the kind of fingerprints the offender left at the crime scene. A person may occasionally pick up a glass or plastic bottle with his hand and place it in a different location. The superglue method is a great way to create latent fingerprints. It is one of the greatest ways to gather one of the most significant kinds of physical evidence. It can be used as the main technique for creating latent fingerprints. A visible, sticky white substance that appears along the ridges of the fingerprint is created when superglue reacts with the latent fingerprint's protein, lipid acid, and amino acid traces as well as the moisture in the air. An image of the full latent fingerprint is the outcome [3].

Our initial experiments in this area were completed to document the impact of lowering the temperature of the superglue fuming process on the growth of poly(ethyl cyanoacrylate) from aged latent prints. These results show

that lowering the temperature does improve the polymerization of ECA when applied to aged prints as it does to fresh prints. Notably the molecular weight of the grown polymer approaches that which is found in un-aged fumed prints, indicating that the change in initiation and chain growth with temperature is similar for aged and un-aged print and is not affected by degradation or loss of mass of a print during aging. These results therefore suggest that lowering the temperature may improve the quality of the aged print [4].

In many forensic investigations, the recovery and identification of latent fingermarks are vital in recreating a crime scene. A standard, cost-effective, and straightforward method for developing these latent marks from a nonporous substrate is the cyanoacrylate fuming method. This method involves the exposure of a latent mark to the fumes of ethyl cyanoacrylate (ECA), more commonly known as superglue. The most effective procedure for fuming latent marks using ECA involves the rapid heating of the superglue, which causes the heated glue to turn into a white vapor. This vapor then reacts with the fingermark residue it contacts and begins growing polymer along the mark ridges. The result is a fixed and durable, visible coating of the fingermark friction ridges. Throughout this report, the term fingermark will primarily be used, but due to long-term habits, the term 'print' will occasionally be used, and should be viewed as equivalent to the term 'fingermark' [5].

Conclusion

Thyroid nodules are becoming more and more common. Thyroid nodules are the most common indication for the use of FNAC or FNNAC. Not only is such testing disruptive, but it also needs to be carried out repeatedly on a large number of patients. Ultrasound is a cost-effective, non-invasive, and easily accessible alternative to FNNAC. However, prior to the introduction of TIRADS, thyroid nodules lacked uniformity and reproducibility. The use of TIRADS is a useful strategy for reducing the number of unnecessary invasive procedures. The TIRADS classification brings uniformity to reporting and eliminates ambiguity in patient management. TIRADS categorization and HPE diagnosis are strongly linked, according to our study. TIRADS are a valuable device for forestalling futile intrusive tasks.

Acknowledgement

None.

Conflict of Interest

None.

References

1. Papini Enrico, Rinaldo Guglielmi, Antonio Bianchini and Anna Crescenzi. "Risk of Malignancy in Nonpalpable Thyroid Nodules: Predictive Value of Ultrasound and Color-Doppler Features." *J Clin Endocrinol Metabol* 87 (2002): 1941-1946.

2. Koike Eisuke, Shiro Noguchi, Hiroyuki Yamashita and Tsukasa Murakami. "Ultrasonographic Characteristics of Thyroid Nodules: Prediction of Malignancy." *Arch Surg* 136 (2001): 334-337.

3. Kim Eun Kyung, Soo Park Cheong, Youn Chung Woung and Keun Oh Ki. "New Sonographic Criteria for Recommending Fine-Needle Aspiration Biopsy of Nonpalpable Solid Nodules of the Thyroid." *Am J Roentgenol* 178 (2002): 687-691.

4. Nam-Goong, Il Seong, Ha Young Kim, Gyungyub Gong and Ho Kyu Lee. "Ultrasonography-Guided Fine-Needle Aspiration of Thyroid Incidentaloma: Correlation with Pathological Findings." *Clin Endocrinol* 60 (2004): 21-28.

5. Stavros A Thomas, David Thickman, Cynthia L Rapp and Mark A. Dennis. "Solid breast nodules: Use of Sonography to Distinguish between Benign and Malignant Lesions." *Radiology* 196 (1995): 134.

How to cite this article: Hillman, Robert. "Creating Techniques to Enhance the Effectiveness and Quality of Latent Fingermark Development by Superglue Fuming." J Forensic Res 13 (2022): 528.