

■ REVIEW ARTICLE

# Latent Fingerprint Impressions Visualisation on Different Surfaces Using Burnt Paper Powder

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## ABSTRACT

A fingerprint is a unique impression left by the friction ridges from fingers of our hand. The type of fingerprints at a crime scene is an important evidence in the field of forensic science. Many unique characteristics of the human body are like the fingerprints: our DNA, palm print, iris pattern, voice etc. So a fingerprint is a unique characteristic of the human body and every human has different fingerprint. This is true even in identical twins. Mayer, a German doctor and anatomist, was the first to write that friction ridge skin is unique. The fingerprint is the most important evidence at crime scenes for identification of the criminal. It offers clinching evidence in the criminal justice system. For latent/invisible fingerprint impressions recovery, we used mainly five types of Burnt Paper Powders to easily recover the impression by using this new method. Fine powder of burnt paper combined with fatty-acid and oil present in the sweat of a fingerprint even latent fingerprint patterns can be seen using burnt paper powder on the surface. Studies show that it delivers perfect results on various surfaces with clear fingerprint impression and ridges.

**KEYWORDS** | Fingerprint, Burnt Paper, powder, human, surfaces, developed

## INTRODUCTION

French scientist Edmond Locard gives us the “principle of exchange”. Whenever two entities come in contact, mutual exchange of traces takes place. Based on this principle, finding invisible fingerprint impression is one of the most important hidden types of evidence at crime scenes. A fingerprint is an imprint left by the friction ridges of the human finger. Dermatoglyphics is a branch of Forensic science that deals with the analysis of skin ridge impressions.<sup>1-3</sup> The surface layer of human skin is protected by a variety of natural substances secreted by the eccrine, apocrine, and sebaceous glands. The main discharge from these glands is water. However, equally inorganic and organic substances are also secreted. We all know that the unique characteristics in our human body such as

our DNA, fingerprint, voice, iris, etc. The most important thing about fingerprint is it is unique. In the criminal justice system, fingerprint evidence is primary evidence at the crime scene.<sup>4-7</sup> The fingerprint features like unique, permanent, universal, classifiable. Fingerprints of twins are also different. Fingerprint can be used in personal identification system. The idea was first proposed in 1858 by the District Magistrate of Hooghly District of Bengal, Sir William Herschel. Later, Dr Henry Fades found that criminals could be discovered from latent prints found at the crime scene and came to the conclusion that two fingerprints cannot be the same. Fingerprint examination has been the keystone of forensic examination for over 100 years. Three main types of fingerprint may be found at the crime scene:

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1) Visible or patent, 2) Invisible or latent, and 3) 3D fingerprint.<sup>8,9</sup>

The crime scene investigators often follow a 2-stage process when searching for fingerprints at the crime scene. In the first stage, they look for Visible or 3D prints. If they are not visible, a flashlight is often used for this. The second stage involves a blind search for Latent prints.<sup>10-15</sup> The Latent print impression recovery at crime scene is one of the most challenging parts of Forensic science because that invisible physical evidence can often help in the reconstruction of the scene. Nowadays, every forensic expert in India uses chemical, physical and instrumental method for the detection of Latent fingerprint impression. Basically, we invented a new method to detect latent fingerprint impression at the crime scene.<sup>16-19</sup>

#### METHOD & MATERIALS

In the present study, the latent or invisible fingerprint impression of nine samples were collected and developed to the various porous and non-porous surfaces i.e., plywood, paper, plastic box, door, marble tiles and on-porous plastic surface like non-porous wooden surface, iron, non-stick utensil, leather, mirror, stainless steel. The following surfaces developed by the burnt papers powder. We used four different types of burnt paper powders:

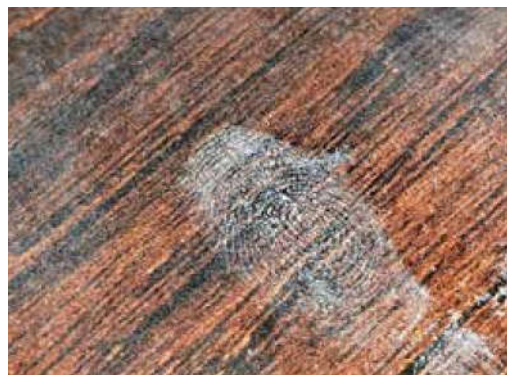
1. The one 200 × 210 mm of thick white paper and powder is formed light grey colour.
2. The one 200 × 210 mm of thick white sheet and powder is formed dark grey colour.
3. The one 420 × 594 mm of thin printed newspaper and powder is formed dark black colour.



4. The one 420 × 596 mm of thick printed newspaper and powder is formed ash colour

This technique was used in the development of invisible or Latent fingerprint impression with the use of above-mentioned burnt paper powder. Then we used the most commonly applied technique for the secrets of latent prints which is “powder dusting method”. The method is used on the suspected area and then the fingerprint powder is sprinkled over the suspected area and the powders attached to the oils and other constituents of the sweat left in a fingerprint. So based on the Locard principle, the burnt powders have very fine particles to put on the suspected area at crime scene. We used camel hair brush to develop the Latent fingerprint sample. After developing the fingerprint impression, Forensic photography was taken and a cellophane tape was put on the various contrast area and fingerprint pattern is clearly visible which type of print is there, it's clearly identified and preserved the using powder sample. The fine particles of the powder adhere to the print, hence the ridge characteristics are clearly visible.<sup>20-25</sup>

The results of the present study show nine samples of invisible fingerprints impression



which easily show the positive results developed in different porous or nonporous surfaces with the help of burnt paper powder. Due to very small and smooth fine particles of the burnt papers powder, pattern and ridge characteristics are clearly observed and identify the fingerprint impression pattern and their ridge features can be seen in figures.<sup>1-7</sup> The four burnt paper powder is used on the surfaces, for black surface we can use light colour and for white surfaces we can use dark colour, then the fingerprint impression is clearly visible. The fingerprint impression identified, and examination is positively done with the burnt paper powder. Related to these burnt paper powders of different parts, it states that it provides better results on opposite surfaces with testing the powder.

After developing the fingerprint impression by using burnt papers, the impression remains visible up to 72 hours. This research paper is based on the findings of Latent fingerprints which use a physical technique based on the behavior of fingerprint powder adjoining with fatty acid and oily component present on the sweat are deposited

on the fingerprints and ridges. These results indicate a new way of identifying latent fingerprint impressions on different surfaces using burnt paper powder.

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#### CONCLUSION

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For the current research, any paper available at places like home, school, college, office, etc., can be used. So, we used burnt paper powder to develop latent fingerprints. In this process, nothing is high cost. In many cases, forensic experts do not have latent fingerprint development powder when they reached the crime scene. So, burnt paper powder can be used to develop latent fingerprint to solve major crimes. By using the burnt powder the result is developed on various surfaces during crime scene investigations. This type of research work has not been reported previously and can provide useful information to the investigators in case of unavailability of systematic traditional fingerprint development powder. This kind of powder can easily help visualize latent fingerprint impressions at the scene of crime. [IJFMP](#)



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