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Development of Latent Prints By Using Human Hair Powder

[1]MANIBHAVADHARANI A P, [2]MEENAMBIGAI R,

[1]Student, [2]Student,

[1]Department of Forensic science,

[1]G T N Arts College, Dindigul, Tamil Nadu.

Abstract: Latent prints is an impression of the friction skin of the fingers or palm of the hands, sole of the foot and lips that has been transferred to another surface. Latent prints are vital & unique to identify an individual.

Our invention relates to a latent prints powder. The currently available latent prints are usually ineffective if the latent print left is not within first week after placing the latent. The latent print visualization by using chemicals are toxic and potential health hazards. To overcome this problem it is provided that the Human hair are made into a powder form for the development of latent print powder for better visualization. The powder will adheres to the residue deposited from the fingers, palm, sole and lips on to the surface. Our powder method, which is simple, non toxic to human health, cheap in nature, available in black color, and as well can be utilized for the development of latent prints on various surface. This will plays a significant role in identifying the criminals in crime scene by analyzing old prints.

Index Terms *- Forensic science, Latent print development, Human hair, Powder methods.*

I. INTRODUCTION

For many years, latent print has been regarded as one of the most important kinds of physical evidence for identifying criminals at crime scenes. These are typically 4 types of latent print evidence at a crime site. It is whether a print of finger or palm ,sole and lip .Latent prints need to be developed or enhanced in some way in order to seen because they are invisible to the naked eye .The word latentmeans **hidden or unseen.** Latent print are undetectable until brought out with a physical or chemical process designed to enhance latent print residue [1].

It is the mixture of some or all of the secretion excreted from the three types of glands that are available in the skin. When the complex secretion deposited on the surface which is nearly 99% of the print is water, It will evaporate rapidly from the deposit, and then the print will dry. This process begins to alter certain reagent ability to visualize the print. Therefore, latent print powder is developed to visualize the latent prints and it is the most common and widely used techniques for latent print or powdering method .When the powder is sprinkled over an affected area the powder adheres to the oil , sweat or other materials left in a print of finger or palm ,sole.

Fingerprints are unique; they are used to identify people. In forensic science, we think of fingerprint as being used primarily to help locate, identify, and eliminate suspects in criminal cases. Finger prints may be thought of as one member of a class of biometric identifiers that would also include retina or iris patterns, face thermo graphy and some others. The two features finger prints is most important for their use as of personal identification are that every fingerprint is unique and fingerprints do not change during a lifetime[2] .

Palm print is an image of a palm area of the hand that are permanent until death. In palm print recognition process two unique features are used in analyzing palm print, namely friction ridges and the palmar flexion creases (discontinuities in epidermal ridge pattern).Personal identification based on palm

prints in the context of forensic science is paramount importance because 30% of latent print recovered from crime scenes are from palms (Jain and feng 2009)[3].

Latent foot prints/Sole prints are the prints which are not visible to the naked eye and are generally found on smooth surfaces. They can be located with powders and chemicals. The oblique lighting techniques is also used to find such prints. Powders are used to create contrast so that it eases its visibility while photographing. They are then recovered by using lifting tapes. The presence of humps is an important characteristic feature in foot print that can be used for inclusion or exclusion process during 38 criminal investigation[4]

Latent lip prints is one of the pattern of wrinkles on the lips has individual characteristics like finger prints. The wrinkles and grooves on the labial mucosa (called sulci labiorum) form a characteristic pattern called lip prints. The lip crease pattern is on the vermilion border of the lip , which quite mobile and lip prints may vary in appearance according to the pressure ,direction and method used in making the print[5].

HISTORY (Powder method)

The use of fingerprint powders dates back to the last decade of the 19th century. Sir Edward Richard Henry (1850), who devised the finger-print classification formula, recommended the use of Mercury-based and Graphite- based powders. The former formulation, called Hydragyrum cum creta, was composed of one part of mercury and two parts of chalk, by weight. The powder was suitable for developing latent prints on non-absorbent surface such as glass and dark-painted or lacquered utilities. However, the formula was withdrawn in 1967 because the mercury content could be a health hazard. Moreover, it was ineffective for developing prints on gold ornaments as mercury reacted with gold and marred its surface. The graphite- based powder was very useful for development imprints on silver-painted objects. However, even this powder was withdrawn since it was messy to use, particularly if the examination was to be carried out in open and high wind was blowing.

IMPORTANCE

LATENT PRINT

The identification of criminals through was the first importance break-through in the scientific investigation of crime. As usual, the judiciary and the public took believe in the utility of latent print as the scientific aid to recognized an individual throughout the world [5].The presence of latent prints is important to a criminal investigation because it can link a suspect to a crime scene, provide proof of contact, and identify people that may not previously have been known [6].

POWDER METHOD FOR LATENT PRINT

The powder technique for detecting latent prints involves the application of a finely divided formulation to the latent mark impression, generally with a glass-fiber or a camel hair brush. The powder gets mechanically adhered to sweat residue defining the ridge pattern. The furrows which are devoid of the fingerprint residue, do not adhere the ridge pattern. The furrow which are devoid of the fingerprint residue, do not adhere the powder onto them. The final outcome is that the powder formation sticks to the ridges, but is easily blown off the furrows .Since the powder is normally colored, the ridge pattern becomes visible and the latent print is said to have developed.

II. OBJECTIVES

- To develop a cost effective fingerprint developing powder.
- To develop a latent print powder is non toxic and simple method.
- To develop latent prints from chosen surfaces.
- To develop latent prints by using human hair powder.
- To develop the effectives of proposed latent prints on various surfaces.

III. MATERIALS

APPARATUS

Hand gloves, Fingerprint brush, Mask, Magnifying lens, Camera, Heat source as Lighter / Match box, Ultra violet light source, Filter as cloth, Mortar pestle.

POWDER

Human hair powder

SURFACES (Chosen surface)

POROUS (Paper, Cardboard)
SEMI-POROUS (Human Skin, Leather, Cement Floor)
NON-POROUS (Plastic, glass as beer bottle, Steel as utensil)

IV. METHODOLOGY

4.1 Preparation of human hair powder

Large amount of human hair was collected from the saloon shop. The collected hair samples were washed to remove the unwanted dust particles. And then dried under Sun light source, after that use the fire source as lighter or match box to fire the dried hair, to make it like charcoal. After then, crushed the fired hair by using hand. After crushing process, we use motar pestle to grind the samples until it become into powder (5 minutes). After that using cloth to filter the powder (5 or 6 time). Finally we got Fine human hair powder. The powder was stored in air-tight container at room temperature until further use.

A. Human hair was collected from the saloon shop.

B. In the stage of partially grinded human hair.

C. In the stage of finely grinded Human hair powder.

4.2. Detection of latent prints

Latent prints were collected on 8 different chosen surface which include porous, non-porous, semi-porous . The test prints were collected with sebum mainly from finger, palm, sole and lips. First, The donor hand was cleaned with water and soap. Next the prints of skin was allowed to dry for 10 minutes before deposition. After deposition of latent print on the surface, The human hair powder is sprinkled over a surface and then by brushing method is used to visualize the latent print. The technique is used by brushing in the direction of any ridge that begin to appear until latent print reaches point of sufficient clarity. Lastly, The latent prints were photographed by using camera (using flash light, using ultra violet). Finally observe the development (fully develop / partially develop / not develop) of photographed prints.

V. DISCUSSION

The results of the latent prints development using human hair powder on 8 different surfaces are shown in figures below(1-14). Latent prints present on majority of the surfaces can be examined successfully with Human hair powder.

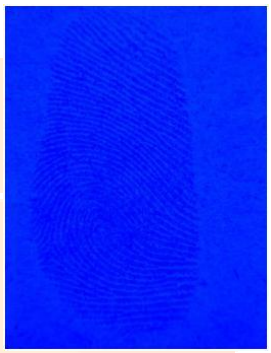
In this paper, development of latent print is employed on porous, semi-porous& non-porous surfaces .The surfaces used which were porous (Paper, cardboard), Semi porous (Human skin , Leather and Cement floor) and Non porous (Plastic water bottle, Utensil and glass(beer bottle)) give a clear latent print ridges and this proves that the development of latent print using Human hair powder could be successfully done which were evident from the figures(1-14) .

The latent prints can be developed with Human hair powder can help to catch theft in our daily lives. Personal belonging such as plastic water bottle and utensil were proven to be effective surfaces for the visualization of latent print using Human hair powder and this can help in personal identification in theft cases. Besides, the human hair powder in non toxic, therefore ,it will not harm the user or the personal belonging such as which can Paper, Glass which can still be used after visualization.

It is suggest that further studies on the development of finger prints using Human hair powder under various conditions and comparative evaluation with the existing fingerprint powder to show the effectiveness of Human hair powder.

VI .RESULTS

LATENT FINGERPRINT DEVELOPMENT

S.no	Picture	Name
1		Development of latent finger print with the help of human hair powder on paper surface (porous) (without using light source).
2		Development of latent finger print with the help of human hair powder on paper surface (porous) (using UV light source).
3		Development of latent finger print with the help of human hair powder on cardboard surface (porous) (using light source).
4		Development of latent finger print with the help of human hair powder on human skin (semi-porous) (using light source).

5		**Development of latent finger print with the help of human hair powder on human skin (semi-porous) (using UV light source).**
6		**Development of latent finger print with the help of human hair powder on cement floor surface (partially developed) (using light source).**
7		**Development of latent finger print with the help of human hair powder on steel surface (non-porous) (using light source).**

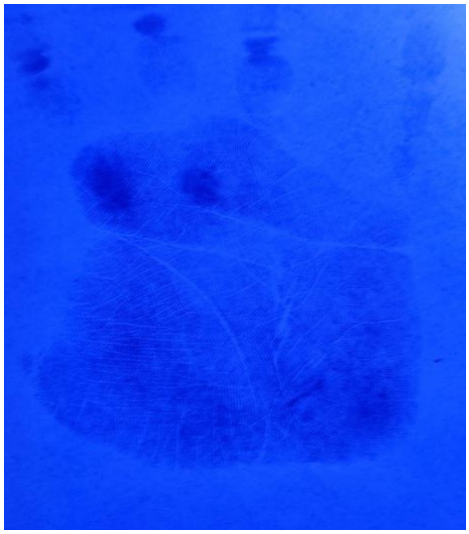
LATENT FOOOTPRINT DEVELOPMENT

S.NO	PICTURE	NAME
8		**Development of latent foot print with the help of human hair powder on paper surface (porous) (using light source)**

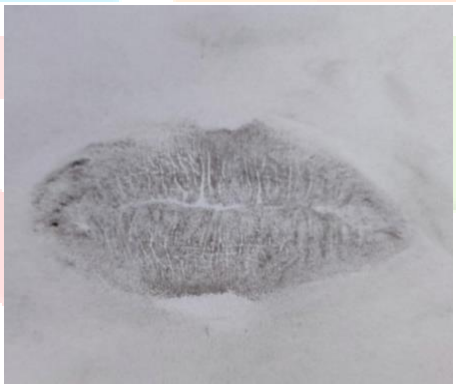
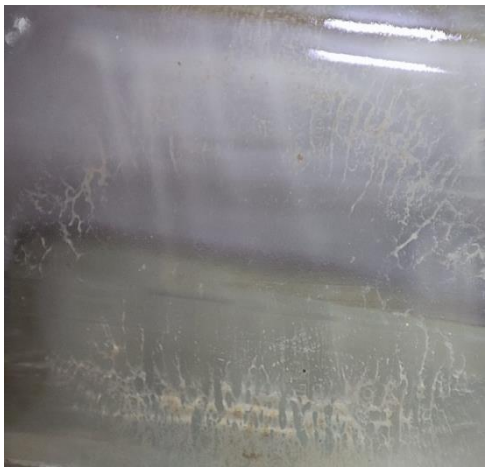
9		Development of latent foot print with the help of human hair powder on paper surface (porous) (using UV light source).
10		Development of latent foot print with the help of human hair powder on plastic surface (non-porous) (using light source).

LATENT PALM PRINT DEVELOPMENT

11		Development of latent palm print with the help of human hair powder on paper surface (porous) (using light source).

12		**Development of latent palm print with the help of human hair powder on paper surface (porous) (using UV light source).**

LATENT LIP PRINT DEVELOPMENT

13		**Development of latent lip print with the help of human hair powder on paper surface (porous) (using light source).**
14		**Development of latent lip print with the help of human hair powder on glass surface (non porous) (using light source)**

VII . CONCLUSION

Our research study is basically a preliminary observation, aimed to bring forth effectiveness of organic powder like Human hair powder for the development of latent prints on various surfaces. We concluded that the human hair powder can be successfully used on various surfaces for the development of latent prints. Through comparison between commercial powders and organic powder (Human hair powder) shows some similar results. It effectively and successfully proves its usefulness in forensic latent print development.

FUTURE PERSPECTIVE :

The current study focuses on the use of HUMAN HAIR for manufacturing the fingerprints powder ,which will be further used for latent prints development .The scope of the current study might be extended to check its working on uneven surfaces as well .Since this study focuses solely at fresh prints ,subsequent studies should consider aged prints too .Examining the generated prints robustness is yet another prerequisite.

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