Fingerprints (2)

Detecting Fingerprints

There are devices that can help detection without chemicals or powder.
Device : Reflected Ultraviolet Imaging System (RUVIS) or other alternate light sources

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Developing and enhancing prints

Development and enhancement of a deposited fingerprint is depended on two factor :
1) Type of secretion
2) Type of substrate print is deposited on

Type of secretions

Glands :

1) Eccrine Sweat glands – high density on the palms and soles of your feet : controlled by the autonomic nervous systems, so not consciously controlled
   ➔Sweat : Water : 98.5% to 99.5% ➔Solids 0.5% to 1.5%
   ➔Solids are 1/3 to ½ inorganic salts and ½ to 2/3 organic substances
   ➔Amino acids and fatty acids affect the development

2) Sebaceous glands – secretes 'sebum'
   ➔consists of saturated fats, waxes, squalene
   ➔found in hair covered area and not friction ridges

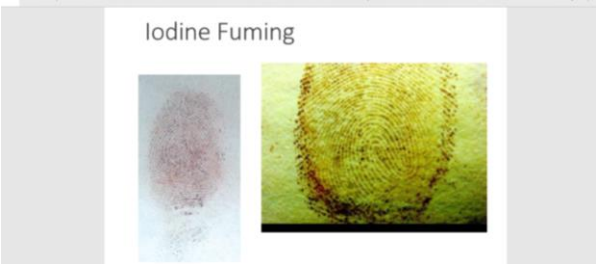
Two types of substrate : (1) Porous (2)Non-porous

Enhancement techniques depends on substrate type

➔Powders : Black Powder for light surface
: White/grey powder for dark surface
: Fluorescent powders for surfaces where no color will suitably contrast he background
: Magnetic powder – porous and non-metallic surfaces

Chemical Developers

1) Iodine Fuming : we can make it blue and keep it that way for couple weeks(starch experiment in school). On Porous surfaces.
   ➔Applied in a fuming chamber
   ➔Optimal on fresh prints up to 2 weeks old
   ➔prints fade immediately when removed from fumes



2) Ninhydrin : reacts with amino acids present in latent prints to produce a purple blue color
➔a question about this is what gland produces amino acids?
➔can also be used as post treatment with other chemical developers
➔applied by spraying, painting, or dipping

3) Cyanoacrylate Fuming (super glue) :
➔used on non-porous surfaces-glass, plastic, metal, polished wood
➔super glue is 98 to 99 % this substance that interacts with and visualises a latent fingerprints

➔techniques : chamber
➔include Rhodamine 6G to allow visualisation with fluorescent light sources.

3) Crystal Violet : used to enhance prints on <u>adhesive</u> side of virtually any type of tape.

Physical Developers

Silver nitrate : 'fatal'. Be careful, not to be inhaled, absorbed by skin.
➔develop prints when other chemical methods are ineffective – reacts with sebaceous secretions.

➔cab be used on porous surfaces.

Molybdenum Disulphide or SPR(Small particle Reagent)

SPR-used on non-porous surfaces, less effective on wet or that have been dried after being wet surfaces.

➔sprayed onto wet vehicle exterior then rinsed off with water.
➔mixed with a detergent and distilled water

➔sprayed onto surface

DETECTING PRINTS
➔treated with light sources-because of high sensitivity of fluorescence serves as the underlying principle.
➔Once the latent print has been visualized, it must be permanently preserved for future comparison and for possible use as court evidence.
➔after visualisation, must be permanently preserved for future reference. Photograph must be taken before future attempts at preservation are made.

PRESERVING PRINTS
➔If object small enough to be transported without destroying the print, preserve it in its entirety
➔On immovable objects-powders, tape("lifting")
➔Prints on large immovable objects that have been developed with a powder can best be preserved by "lifting" with a broad adhesive tape. Then, the tape is placed on a properly labeled card that provides a good background contrast with the powder.

DIGITAL IMAGING
➔picture converted to digital computer file.
➔pulled up on screen to do comparisons, so very useful.

WHY preservation?
➔TO present in court.
➔Comparisons with known prints
➔Loss or destruction of print

HOW MANY

➔4 pictures of overall print

➔May need more close-up pictures for more than one print. (close up scale pictures)

WHAT needed?

➔Affix a scale

➔Label, with examiners initials and date.

Recovery or retention

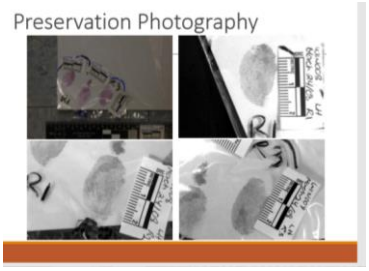
➔"lifting"

➔Place tape over the print

➔Smooth over tape to minimize air bubbles

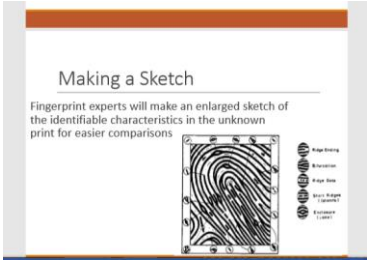
➔Remove tape

➔Place tape on card (dark prints on white, light prints on dark)



Making a sketch

➔by Fingerprints experts-for easier comparisons



THREE POSSIBLE OUTCOMES OF FINGERPRINT COMPARISON

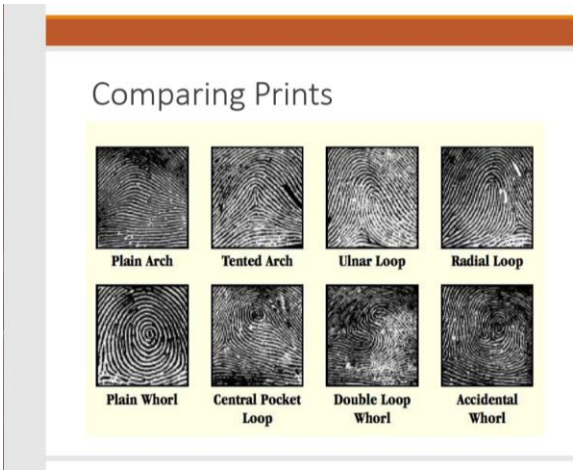
1. The two prints cannot be excluded as having the same source

2. The two prints are excluded as being derived from the same source

3. There is insufficient ridge detail to make a comparison

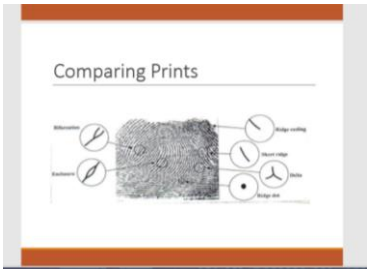
Comparing Prints

#Preliminary Screening
➔first level detail
➔whorl, loop, aches-prints are grouped according to there presence



While comparing prints we need to remember that partial prints may appear a pattern when in fact they are another pattern.
So partial prints don't necessarily give correct pattern.

#Second level detail
➔Type and placement of ridge characteristics
➔use 1)magnifying glass 2)ridge pointers
➔narrow down possible matches, which share several of the same identifiable characteristics



#Third level details
➔the actual shape of ridge characteristics or ridge path deviations.
➔place the two prints side to side with same orientation
➔set up a magnifying glass over each print
➔look through both magnifying glasses simultaneously

<u>Comparison Prints</u>
➔Using two ridge pointers, place one ridge point characteristic in one print and hold it there.
➔Then search for the same characteristic in the other print, same located place
➔One by one, move the first ridge pointer to the next characteristic, nothing direction and the number of intervening ridges you crossed to get to the next identifiable characteristic.
➔Again, hold the ridge pointer there while you compare it to the next ridge characteristic on the other print.
➔If no matching characteristic in the new location, then don't stop but go back to the starting point to the unknown impression and move in a different direction.
➔Having done several times, without matches you can be sure that you do not have a matching impression and can move on to the next suspect.