

A REVIEW ON THE IDENTIFICATION METHOD -DACTYLOGRAPHY

Dr. Priya Popatrao Shinde
 Reader Agadtantra Department
 Jupiter Ayurved Collage
 Nagpur, Maharashtra, India

ABSTRACT

Dactylography is one of the identification methods. Dactylography is also known as Finger print study, Dactyloscopy, Dactyloglyphics, Galton's system of identification, Henry-Galton system of identification etc. Dactylography is the impression on a surface of the curves formed by the ridges on a fingertip; especially, such an impression made in ink and used as a means of identification. Dactyloscopy is the technique of comparing fingerprints, typically those found at the setting of a crime and those of a suspect. The article highlights about identification method, Finger print study, Types, etc

Keywords: Dactylography, Identification Method, Principle, Medico-Legal Application.

INTRODUCTION

Definition1

Dactylos = finger, graphein = to write

The papillary or epidermal ridges on the tips of thumb and fingers form a specific pattern. The Study of this pattern is labelled as finger print study. On any item touched, a finger print is Produced due to sweat which also contains fat.



- Finger prints were discovered by an I.C.S. officer Sir William Herschel (1858), Study was systematized by Sir Francis Galton (1892) and was further improvised by Sir Edward Henry, it is the best system of identification till date and is labelled as the single confirmatory Criterion for identification.

Types of fingers prints 2,3

Galton classified finger prints into four types

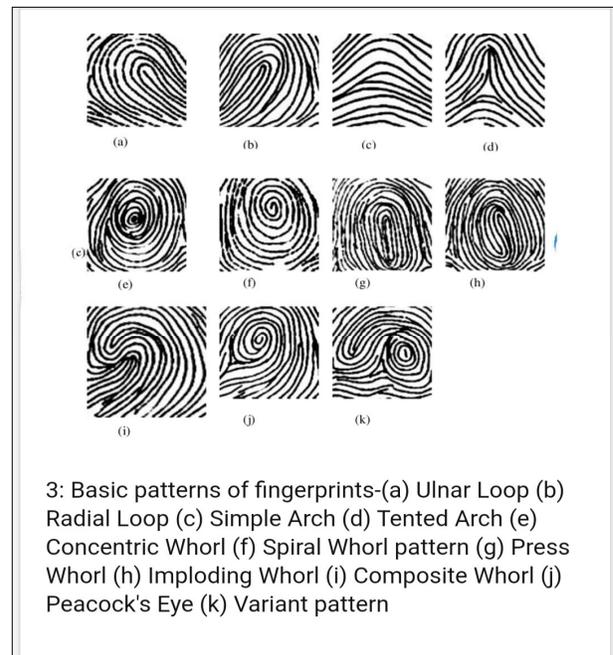
Arch	6-7%
Loop	65-67 %
Whorl	20-25 %
Composite /compound	5-10%

1) Arch

- Incidence of arch is 6-7% In arch,
- ridges start from one side and go to the opposite, and there is a slight thrust in the middle.
- Variation - An abnormally high media thrust, causes the print to be tented arch
- Arch is included in loop and composite in whorl.

2) Loop

- It is the commonest type of finger print incidence being 65-67 %
- In the loop printRidges come back to the same direction.



3: Basic patterns of fingerprints-(a) Ulnar Loop (b) Radial Loop (c) Simple Arch (d) Tented Arch (e) Concentric Whorl (f) Spiral Whorl pattern (g) Press Whorl (h) Imploding Whorl (i) Composite Whorl (j) Peacock's Eye (k) Variant pattern



Cover Page



DOI: http://ijmer.in.doi./2021/10.11.36

- The center of the print is like a hail pin.
- The whole print is slanting downwards,

Depending upon the direction of the slant loop is of 2 types

- Ulnar loop-** The print is slanting towards little finger. About 95% loops are ulnar.
- Radial loop -** The print is slanting towards radial side [thumb). Each loop has one core and one delta. Core is the central terminus.

The ridgest of core may be free at top-known as rods. or may be united at top- known as staple. Delta is the outer terminus, and is formed i by either sudden divergence of a ridge

Variations of loop may be

- Twinned loop-Le., a twin of loops is present.
- Lateral pocket loop-i.e., on the lateral aspect of the loop, there is a small pocket of ridges present.
- Central pocket loop-A pocket of ridges is present in the centre of the loop.

3) Whorl

The incidence is 20-25 % The ridges are present in circular fashion. Whorl may be

- Spiral-The whole print is formed by a single ridge twisted spirally. Depending upon the direction, it may be clockwise or anticlockwise spiral whorl.
- Circular/oval/elliptical whorl - The whorl is composed of multiple concentric circles. Each whorl has one core and 2 deltas.

4) Compound/Composite

Incidence is 5-10%

- When two or more of the earlier finger prints coexist, it is labeled as compound.

Principle:4

Fingerprints are impressions of patterns formed by the papillary or epidermal ridges of the fingertips. The ridge pattern of fingers appears between 12 to 16 weeks of intrauterine life and be the formation is completed by 24 weeks. At birth a dle fine pattern of ridges is seen on the skin of the bulbs of the fingers and thumbs, parts of the palms and the soles of the foot.

Taking of finger prints.5

The fingertip is cleaned with soap and water and then using printer's ink, the print is taken on a clean surface. The print may be -

- Plain-** the smeared fingertip is plainly pressed on the surface.
- Rolled -** the smeared fingertip is rolled from one to other side. The print obtained is much larger and more detailed than plain.

The police department commonly maintains a record of rolled finger prints of all 10 fingers of habitual criminals.

- Similarly rolled prints are taken unidentified dead bodies.

In illiterate, left thumb impression is taken in place of signatures,

- Visible Print -** If the fingertip is smeared with blood, grease, ink or sweat, print left on the surface touched.
- Latent print-**print which is not visible to naked eye e.g., left on cloth. paper, glass etc.
- Plastic print -** print left on soft surface e.g., soap, cheese, butter, water, freshly painted surface etc.

Storage of finger prints 6

Only whorl is given points as-16.8.4.20 depending upon, whether it exists in 1, IInd, IIIrd, IVth or Vth pair. Pairs are:

1 st Pair	Rt. index and Rt.thumb.
2 nd Pair	Rt. ring and Rt middle
3 rd Pair	Lt. thumb and Rt. little.
4 th Pair	Lt. middle and Lt. index IV
5 th Pair	Lt. little and Lt. ring

Total the scores of numerators and denominators.

Add 1 to each (numerators and denominators)

Fraction obtained - is classification number pin hole number (may be 1/32 or 32/1 to 32 32)

Multiply numerator with denominator - total score (max 32 x 32 i.e.,1024)

Fingerprint Sensor 7

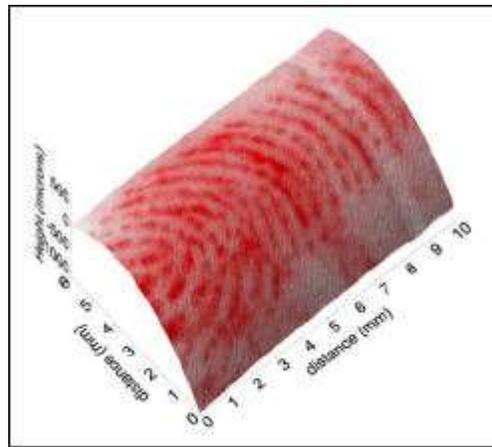
A fingerprint sensor is an electronic device used to capture a digital image of the fingerprint pattern. The captured image is called a live scan. This live scan is digitally processed to create a biometric template (a collection of extracted features) which is stored and used for matching. Many technologies have been used including optical, capacitive, RF, thermal, piezoresistive, ultrasonic, piezoelectric and MEMS.[88]

- Optical scanners take a visual image of the fingerprint using a digital camera.
- Capacitive or CMOS scanners use capacitors and thus electrical current to form an image of the fingerprint.
- Ultrasound fingerprint scanners use high frequency sound waves to penetrate the epidermal (outer) layer of the skin.
- Thermal scanners sense the temperature differences on the contact surface, in between fingerprint ridges and valleys

Crime scene investigations 8 9



A fingerprint on a cartridge case



A Kelvin probe scan of the same cartridge case with the fingerprint detected. The Kelvin probe can easily cope with the round surface of the cartridge case.

The application of the new scanning Kelvin probe (SKP) fingerprinting technique, which makes no physical contact with the fingerprint and does not require the use of developers, has the potential to allow fingerprints to be recorded whilst still leaving intact material that could subsequently be subjected to DNA analysis. A forensically usable prototype was under development at Swansea University during 2010, in research that was generating significant interest from the British Home Office and a number of different police forces across the UK, as well as internationally. The hope is that this instrument could eventually be manufactured in sufficiently large numbers to be widely used by forensic teams worldwide.

Comparison of finger prints. 10

For comparison matching of the finger prints found on weapon or some of crime, with those of suspect, it is not sufficient to just compare the type of print in America, Japan & Australia -12 & in India, UK. & France-10, corresponding points in the two finger prints are matched.

Destruction of a finger print

The finger print may be destroyed by leprosy burns, electrical injury, deep injury dermatitis eczema or radiations involving the fingertip,

Revealing latent finger prints 11

- 1) If epidermis is destroyed. print can be studied from dermis.
- 2) If fingertip shrivelled-soak in 20% acetic acid.



- 3) fingertip mummified-inject Equid paraffin formaline.
- 4) If fingertip hardened - soak in alkaline solution.
- 5) On a colored surface-if light by dusting powders eg charcoal powder (Light powder e.g. aluminium dust if surface is dark.
- 6) By oblique lighting.
- 7) On cloth or wood-treat with 5 % silver nitrate and develop with sodium thiosulphate (hypo).
- 8) On paper-develop with ninhydrin, iodo vapours or osmium tetroxide vapours then photograph.
- 9) On varnished surface-by aluminium powder
- 10) Auto radiography-e..Exposure to formaline vapours and then counting radioactivity of carbon.
- 11) Electron auto-radiography-i.e., exposure to X-rays to irradiate lead dust.
- 12) Scanning electron microscope to see latent prints on metal or glass.

Medico-legal Application 12

1. Identification of criminals whose fingerprints were found at scene.
2. Identification of fugitive through fingerprint comparison
3. Exchange of criminal identifying information with identification bureau of foreign countries in cases of mutual interest
4. Identification of unknown deceased person, persons suffering from amnesia, missing persons and unconscious patient.
5. Identification in disaster work.
6. Identification in case of accidental exchange of newborn infants.
7. Identification of licensing procedure for automobile, firearm, aircrafts, etc.
8. Problems of mistaken identity and detection of bank forgeries.
9. Electronic fingerprint readers have been introduced for security applications such as log-in authentication for the identification of computer users. Fingerprint sensors gained popularity in the notebook PC market.
10. Electronic registration and library access: Fingerprints can be used to validate electronic registration, cashless catering and library access. This conventional biometrics' is routinely practiced in some schools in the UK, US, Belgium, France and Italy replacing library cards. However, privacy issues are of concern since children are fingerprinted by schools, often without the knowledge or consent of their parents.
11. The police department in Canada has advised parents to fingerprint their children, if they apprehend kidnapping.

CONCLUSION

This article was concluded that dactylography is one of the best identification methods. Dactyloscopy is the technique of comparing fingerprints, typically those found at the setting of a crime, the article highlights the point like types of types, principal method of fingerprint and its medico legal aspect.

REFRANCE

- 1) Singhal's toxicology at a glance, the nationalbook deport, ninth edition, reprint 2020, p.72
- 2) Review of forensic medicine and toxicology, Gautam biswas, jaypee brother medical publisher ,new delhi, third edition 2015 ,p.85
- 3) Singhal's toxicology at a glance, the nationalbook deport, ninth edition, reprint 2020, p.72
- 4) The essential medicine and toxicology, K.S.Narayan Reddy^{et all}, jaypee Brother Medical Publishers, New Delhi ,2014, p.85
- 5) Singhal's toxicology at a glance, the nationalbook deport, ninth edition, reprint 2020, p.73
- 6) Singhal's toxicology at a glance, the nationalbook deport, ninth edition, reprint 2020, p.73
- 7) Wasserman, Philip (December 26, 2005). "Solid-State Fingerprint Scanners – A Survey of Technologies" (PDF). Archived from the original (PDF) on January 17, 2016. Retrieved October 18, 2015.
- 8) Ward, Mark (April 2006). "Fingerprints hide lifestyle clues". BBC. Archived from the original on September 9, 2007. Retrieved March 17, 2010.
- 9) "Bombers Tracked by New Technique". SkyNews. April 2006. Archived from the original on October 14, 2007. Retrieved March 17, 2010.
- 10) Singhal's toxicology at a glance, the nationalbook deport, ninth edition, reprint 2020, p.73
- 11) Singhal's toxicology at a glance, the nationalbook deport, ninth edition, reprint 2020, p.73
- 12) Review of forensic medicine and toxicology, Gautam biswas, jaypee brother medical publisher ,new delhi, third edition 2015 ,p.88