

FINGERPRINTS

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A fingerprint is an impression of the friction ridges on all parts of the finger. A friction ridge is a raised portion of the epidermis on the palmar or digits or plantar skin, consisting of one or more connected ridge units of friction ridge skin. These are sometimes known as "epidermal ridges", which are caused by the underlying interface between the dermal papillae of the dermis and the interpapillary pegs of the epidermis. These. Epidermal ridges Serve to amplify Vibration Regard when fingertips Brush across an uneven surface, Better transmitting the signal to sensory nerves involved in fine texture perception. The ridges do not assist in gripping objects Sometime in fact reducing griping to as much as 30% compared to completely smooth finger pads. Fingerprint may be deposited in natural secretion from the eccrine glands present in friction ridge skin. Or they may be made by ink or other contaminants transferred from the peak of friction skin reduce to a relatively smooth surface. Such as a fingerprint card. The term fingerprint normally referred to impression transferred from the pad on the last joint of finger and thumbs, through the fingerprints card. Also typically record portion of lower joint areas of the finger. Any ridged area of the hand or foot may be used as identification. However, finger impressions are preferred to those from other parts of the body because they can be taken with a minimum of time and effort, and the ridges in such impressions form patterns (distinctive outlines or shapes) that can be readily sorted into groups for ease in filing. The fingerprint ridges formed during foetal period do not change their course or alignment throughout the life of an individual. Out of many blood grouping systems available, ABO and Rh systems are the most important and are considered for the present study. Fingerprints are classified in a three-way process: by the shapes and contours of individual patterns, by noting the finger positions of the pattern types, and by relative size, determined by counting the ridges in loops and by tracing the ridges in whorls. The information obtained in this way is incorporated in a concise formula, which is known as the individual's fingerprint classification.

Fingerprint are classified into 3 types – 1. Latent prints-Chance impressions, or what is more commonly known as latent fingerprints, are the oftentimes invisible patterns made by fingerprints that are usually left at crime investigations or on objects recovered from crime scenes, and forensically analyzed by latent fingerprint experts with the application of chemical

or physical 3 methods. The use of fingerprinting as a means to identify criminals spread throughout Europe and North America during the early twentieth century after British police officer Sir Edward Richard Henry introduced the use of fingerprints to solve crimes in the 1890s. As scientists studied fingerprint identification in more detail, they discovered that the ridge arrangement of fingerprints is unique and permanent, unless accidentally or intentionally altered. As crime-detection methods improved, law enforcement officers discovered that any hard, smooth surface touched by hands could produce fingerprints made by the oily secretions found on skin. When these so-called latent fingerprints were dusted with powders or chemically treated, the resultant pattern (or impression) could be observed, photographed, and stored for later use. Latent fingerprints, which today are important pieces of forensic evidence, are created either artificially, naturally, or as a combination of the two. They are artificially created when fingers become covered with a foreign residue such as grease or oil. Latent fingerprints are naturally created when very small sweat pores on friction skin (that is, the top of skin ridges located on the inner surface area of fingers and hands) excrete perspiration. This perspiration, along with oils from touching other parts of the body and hair or from contact with external substances, remain on these ridges, so when an object is touched by a finger a duplicate recording of these characteristics is usually left on the surface. These hidden (or latent) impressions can be made visible when latent print examiners apply chemicals, lasers and other light sources, powders, or other physical means.

2. Patent prints These are friction ridge impression of unknown origin which are obvious to the human eye and are caused by transfer of foreign material on the finger, onto a surface. Because they are already visible they need no enhancement, and all are generally photographed instead of being lifted in the same manner as latent prints. Finger deposits can include materials such as ink, dirt, or blood onto a surface.

3. Plastic prints A plastic print is a friction ridge impression from a finger or palm deposited in material that retains the shape of the ridge detail. Commonly encountered examples are melted candle wax, putty removed from the perimeter of window panes and grease deposits on car parts. Such prints are already visible and need no enhancement, but investigators must not overlook the potential that invisible latent print deposited by accomplice's may also be on such surfaces. After photographically recording such prints, attempts should be made to develop other non-plastic impressions deposited at natural finger/palm secretions or contaminants.

Pattern of fingerprints Most of us might have wondered how criminal investigation agencies identify murderers with the help of their fingerprints and what the process entails. To put it simply, they look at the patterns of fingerprints. These patterns are little ridges on the end of an individual's fingers and thumb that are arranged in a pattern of spirals and loops. Nature has evolved these patterns in such a manner that it helps humans to grip and hold onto things. Moreover, the texture prevents things from slipping and sliding that would have naturally happened if the skin was smooth. Edward Henry recognized that fingerprints could be described as having three basic patterns: arches, loops, and whorls. These shapes and contours were later sub-divided into eight basic patterns and are used by the FBI till today. Arches These occur in about 5% of the encountered fingerprints. The ridges of the finger run continuously from one side of the finger to the other and make no backward turn. Normally, there is no delta in an arch pattern but if it exists, there must be no re-curving ridge that intervenes between the core and delta points.

There are two sub-types of arch patterns. Plain arch In this pattern a consistency of flow can be observed. It starts on one side of the finger and the ridge then slightly cascades upward. This almost resembles a wave out on the ocean and then the arch continues its journey along the finger to the other side. The plain arch pattern is the simplest of the fingerprints to discern.

Tented arch the similarity between this pattern and the plain arch is that it starts on one side of the finger and flows out to the other side in a similar pattern. However, the difference is that the tented arch lies in the ridges in the Centre and is not continuous like the plain arch. They have significant up thrusts in the ridges near the middle that arrange themselves on both sides of an axis. The adjoining ridges converge towards this axis and thus appear to form tent Loops these can be seen in almost 60 to 70% of the fingerprints that are encountered. The ridges make a backward turn in loops but they do not twist. This backward turn or loop is distinguished by how the loop flows on the hand and not by how the loop flows on the card where the imprint is taken. This imprint on the fingerprint is similar to the reverse image that we see when we look at ourselves in the mirror. A loop pattern has only one delta. There are three sub-categories of loops.

Radial loops these loops are named after a bone in the forearm known as radius that joins the hand on the same side as the thumb. The flow of these loops runs in the direction of the radius bone i.e. the downward slope of the radial loop is from the little finger towards the thumb of the hand. These loops are not very common and most of the times will be found on the index fingers.

Ulnar loop these are named after a bone in the forearm called ulna. This bone is on the same side as the little finger and the flow of this pattern runs from the thumb towards the little finger of the hand.

Double loop this pattern consists of two distinct and separate loop formations. It has two distinct and separate shoulders for each core, two deltas and one or more ridges that make a complete circuit. There is at least one re-curving ridge within the inner pattern area between the two loop formations that gets touched or cut when an imaginary line is drawn.

Whorls these can be found in about 25 to 35% of the fingerprints that are encountered. Some of the ridges in a whorl make a turn through at least one circuit. Therefore any pattern that contains two or more deltas will be a whorl.

There are three sub-groups of whorls. Plain whorl the ridges in these whorls make a turn of one complete circuit with two deltas and are therefore circular or spiral in shape. This is the simplest form of whorl and also the most common.

Central pocket loop whorl these whorls consist of at least one re-curving ridge or an obstruction at right angles to the line of flow with two deltas and if an imaginary line is drawn in between then no re-curving ridge within the pattern area will be touched or cut. These whorl ridges make one complete circuit and may be oval, circular, spiral or any variant of a circle.

Accidental whorl the composition of the pattern in accidental whorl is derived from two distinct types of patterns that have at least two deltas. Therefore whorls containing ridges that match the characteristics of a particular whorl sub-grouping are referred to as accidental whorls.

Classification of pattern Pattern are classified into two parts.

Delta A point on a ridge at, or in the front of, and nearest the centre of the divergence of ridges. It may be a bifurcation, an abrupt ending ridge, a dot, a short ridge or a meeting of two ridges. The delta can take a triangular or tripodic form.

Core the approximate innermost centre of the fingerprint also known as the 'inner terminuses.

Classification of ridges

The five most common Special Ridge Characteristics are: ISLAND, SHORT RIDGE, RIDGE ENDING, BIFURCATION, and ENCLOSURE. The appearance of these Special Ridge Characteristics can be seen in the "Special Ridge Characteristics" page that follows.

Ridge Dots- An isolated ridge unit whose length approximates its width in size.

Bifurcations- The point at which one friction ridge divides into two friction ridges.

Trifurcations- The point at which one friction ridge divides into three friction ridges.

Ending Ridge- A single friction ridge that terminates within the friction ridge structure

Ridge Crossing- A point where two ridge units intersect.

Enclosures- A single friction ridge that bifurcates and rejoins after a short course and continues as a single friction ridge.

Islands- Friction ridges of varying lengths.

Spurs- A bifurcation with one short ridge branching off a longer ridge.

Bridges- A connecting friction ridge between parallel running ridges , generally .

Material and Method

In the wake of getting clearance from institutional ethics committee, this planned investigation was done over a time of two months among restorative understudies of Dyal singh college, Karnal. Complete 100 understudies (male and female) having a place with the no age group took an interest in the investigation. Students with permanent scars on their fingers or thumbs, with any hand deformations because of damage, birth imperfection or infection, those having worn fingerprints, additional, webbed or bandaged fingers, were avoided from the examination. Each subject was approached to wash his hands completely with cleanser, water, and dry them utilizing a towel. He was then approached to squeeze his fingertip on the stamp pad and afterward to the paper to move the fingerprint impression. A similar technique was rehashed for every one of the fingers of two hands. Along these lines, the plain fingerprints of all the ten digits were taken independently on the particular squares on a similar sheet of paper. Care was taken to abstain from sliding of fingers to forestall smearing of the print. After the fingerprints were obtained, subtleties, for example, name, sex and age were noted. The subtleties of their blood group were noted from their school character cards. Each subject was appointed a sequential number. The fingerprint patterns were considered with the assistance of an amplifying focal point and were recognized as: Loops, Whorls and Arches dependent on the appearance of ridgelines. As per Henry's arrangement of characterization. This framework assigns each finger a number as indicated by the request where is it situated in the hand, starting with the correct thumb as number one and completion with the left little finger as number 10. The distribution of dermatoglyphic fingertip patterns in two hands of people and its association with gender and distinctive ABO and Rh blood groups was assessed and broke down statistically.

Result and Discussion

In present study, whorls were found to be predominantly present in both, females and males followed by plain whorls. In females, 14 % of ulnar loop pattern was observed and in males it was 8%. Following this plain whorl was observed as 20 % in females and in males it was about 11 %. The order to ulnar loop in males are in 14 % in females and 8% in males in present .in Plain Whorl was found to be plain whorl predominant pattern found in male and females. In females, both thumb digit and ring digit takes over 48 % followed by index digit 30 %, little finger 18 % and middle finger 16 %. On the other hand, in males, ring finger have plain whorl in high percentage i.e. 58 % followed by thumb (46%), index (36%), middle (30%) and little finger (22%) digit. Radial Loop were found more number in more equally in both females and males. In both Tented arch ,central pocket loop,twin loop are found in less quantity as compared to whorl and radial loop In males, tented arch was observed as 2 % while in females it was 5%. Conversely, radial loop was found to be 12.9 % in females and 10.6 % in males. All the fingerprints were analysed accurately for identification of pattern. The pattern identified were noted and percentage of different pattern were estimated. The gender wise fingerprint pattern identification was carried out and the patterns are tabulated in Table 1 and Table 2.

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