Fingerprint Principles

According to criminal investigators, fingerprints follow 3 fundamental principles:

- A fingerprint is an individual characteristic; no two people have been found with the exact same fingerprint pattern.
- A fingerprint pattern will remain unchanged for the life of an individual; however, the print itself may change due to permanent scars and diseases.
- Fingerprints have general characteristic ridge patterns that allow them to be systematically identified.

Fingerprint Classes

Fingerprints can be classified into three different groups based on the pattern of the ridges.

**Arches**
Ridges enter on one side & exit on the other side.

- Plain Arch
- Tented Arch

**Loops**
Ridges enter on one side & exit on the same side

- L - Radial Loop
- R - Ulnar Loop

- L - Ulnar Loop
- R - Radial Loop

**Whorls**
Consists of circles, more than one loop, or a mixture of pattern types

- Plain Whorl
- Central Pocket Whorl
- Double Loop Whorl
- Accidental Whorl

Did you know?

Dactyloscopy is the study of fingerprint identification. Police investigators are experts in collecting “dactylograms”, otherwise known as fingerprints.

Can you identify each pattern?

A  
B

C  
D  
E

Fingerprint Factoid

Approximately 60% of people have loops, 35% have whorls, and 5% have arches.
**Ridge Characteristics**
Fingerprints also have minutiae points, which are points where the ridge structure changes. These are useful in matching a fingerprint to a specific person.

![Fingerprint Image](http://www.dkfz.de/tbi/projects/bmcv/images/iu_it246_04s_fingerprint1.jpg)

- Core
- Ending Ridge
- Short Ridge
- Dot or Island
- Fork or Bifurcation
- Hook
- Eye
- Delta
- Bridge
- Enclosure
- Specialty
- Crossover

---

**The Automated Fingerprint Identification System (AFIS)** is a computerized system capable of reading, classifying, matching, and storing fingerprints for criminal justice agencies. It uses computer algorithms to mark all minutiae points, cores, and deltas on the print, which are used to find possible matches with fingerprints in the database.

**Did you know?**

*Camel hair is the most common animal hair used to make fingerprint brushes. Now many brushes are made out of fiberglass.*

---

**Latent Prints**

**Latent prints**: Impressions left by friction ridge skin on a surface, such as a tool handle, glass, door, etc.

Prints may be collected by revealing them with a dusting of **black powder** and then lifted with a piece of **clear tape**.

Some investigators use **fluorescent** powder and UV lights to help them find latent prints on multi-colored or dark surfaces.

**Magnetic** powder can also be used to reveal latent prints and works on shiny surfaces or plastic baggies or containers.

The **cyanoacrylate** fuming method (super glue method) is a procedure that is used to develop fingerprints on a variety of objects.

**Ninhydrin** is a chemical that bonds with the amino acids in fingerprints and will produce a blue or purple color. It works well on paper or cardboard surfaces.