Fingerprint Types

1. Introduction

Fingerprint Identification is the method of identification using the impressions made by the minute ridge formations or patterns found on the fingertips. No two persons have exactly the same arrangement of ridge patterns, and the patterns of any one individual remain unchanged throughout life. Fingerprints offer an infallible means of personal identification. Other personal characteristics may change, but fingerprints do not.

2. Fingerprint Pattern Type

There are three main fingerprint patterns:

2.1. Loop Patterns:

In a Loop pattern, the ridges will flow in one side, recurve, (loop around) touch or pass through an imaginary line drawn from the delta to the core, and exit the pattern on the same side from which it entered.

*A loop pattern has only one delta.
*There are two types of loop patterns:

a) Ulnar loop
b) Radial loop

2.2. Whorl Patterns:

A whorl pattern consists of a series of almost concentric circles.

* A whorl pattern has two deltas
*There are four types of whorl patterns:

a) Plain whorl,
b) Central Pocket Loop whorl,
c) Double Loop whorl,
d) Accidental whorl

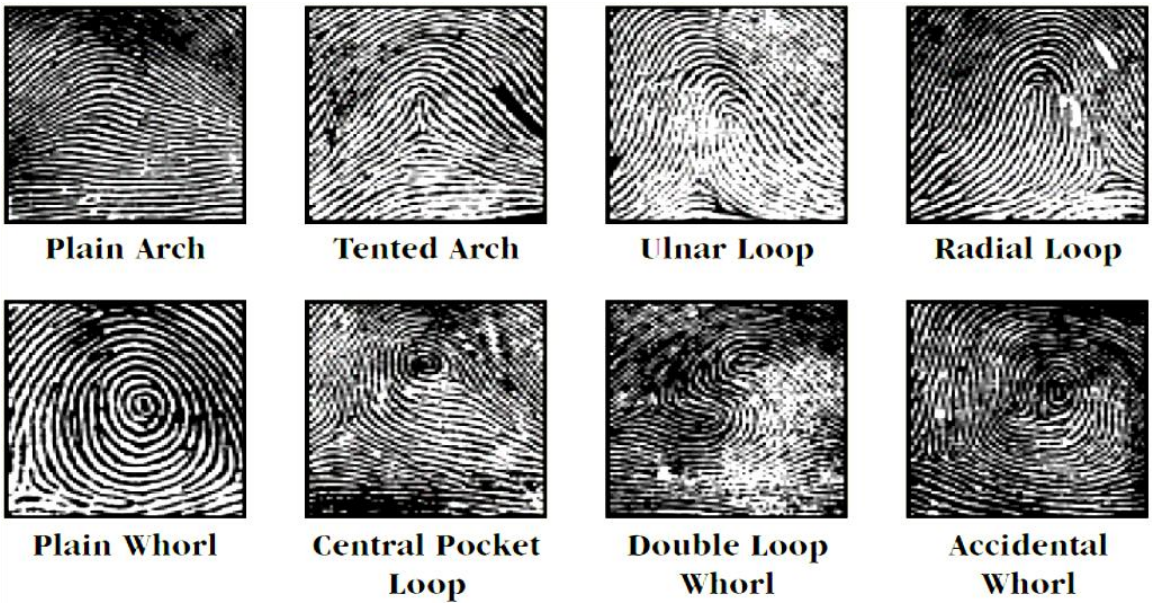
2.3. Arch Patterns:

In an arch pattern, ridges flow in one side and flow out the opposite side. There are no deltas in an arch pattern.

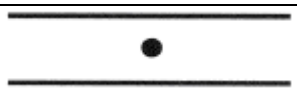
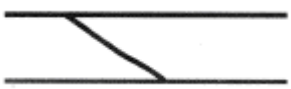
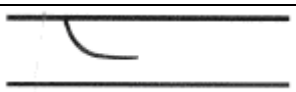
*There are two types of arch patterns:

a) Plain arch,

b) Tented arch



3. Fingerprint ridge details

Fork	
Double Fork	
Triple Fork	
Delta	
Dot	
Bridge	
Hook	

Eye	
Short Ridge	
Ending Ridge	

One of the fundamental aspects of the process of identification through fingerprints is the comparison of the *minutiae* between the finger mark obtained at the scene of the crime and the suspect's corresponding finger. There is no scientific basis in this process that allows the use of numerical standards, such as those kept in different countries, to obtain the identification. The recent mistakes made in the field of dactyloscopy, together with the growing rigor and scrutiny that forensic evidence undergoes in the legislative and scientific areas have resulted in the need to reconsider some of the basic principles that support this discipline. A probabilistic estimation of the evidential value is especially necessary; therefore, it is indispensable to know and quantify the variability of the features used in the identification process.

The sample studied for this research was obtained from 100 Caucasian men and 100 Caucasian women from the Spanish population, which amounts to a total of 2000 fingerprints. The different types of *minutiae* were located, identified, and quantified visually on the fingerprint, in four sectors, and inside and outside of a circle, whose radius cut, perpendicularly, fifteen ridges starting from the center cut of the axes that defined the sectors. According to the results obtained in this study, through dactyloscopy identification, the weight of the evidence of a *minutia*, such as the ridge endings, with frequencies between **55% and 65%**, according to the area and gender evaluated, cannot be the same as that of a bifurcation or convergence, with frequencies of **13–18%** or those of other *minutiae* that show frequencies lower than **3%**. The significant differences found in the topological distribution of the endings, bifurcations, and convergences show the need to take into account, for its demonstrational value, the finger area in which they are evaluated. The significant association observed between the types of *minutiae* and the different fingers revealed a greater frequency of endings on the thumb and index fingers, and bifurcations and convergences on the middle, ring, and little fingers.

Mintiae details of Slovak Republic

Minutiae name	Shape	Frequency of occurence in % (Slovak population)
Bifurcation		43,02
Ending		35,94
Short ridge		6,94
Lake/Eye		3,67
Overlap		3,29
Point		2,84
Break		2,76
Bridge		0,84
Crossbar		0,78
Opposite bifurcations		0,17
Dock		0,13
Trifurcation		0,07