CHAPTER I

INTRODUCTION
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The fingerprints are used for personal identification from many years due to their uniqueness, permanency and frequent occurrence at the scene of crime in different types of cases weather it be burglary, theft or homicide. The skin which covers the anterior surface of human hand (palm and fingers) and planter surface of the foot is different in appearance than the skin, which covers the rest of body. The skin has creases which are interpreted by the astrologers as life line, heart line, luck line, sun line, and line of brilliance etc. on the palmer surface. Beside these the ridges and furrow were also recorded on the tips of the fingers, These are known as friction ridges and due to the presence of these frictional ridges a man is able to hold the objects and sets his foot. These portions are completely free from hairs; however there are present sweat glands. The study of the skin pattern on finger, palms, soles and toes are classed together under the DERMATOGLYPHICS. The fingerprint develops in the prenatal period of life i.e. from 12th to 16th week of embryonic developments.

Basic Principles of Fingerprints:

1. A fingerprint is an individual characteristic-No two fingers have yet been observed to possess identical ridge characteristics.

2. A fingerprint will remain unchanged during an individual’s lifetime.
3. Fingerprints have general ridge patterns that permit them to be systematically classified.

The identification from fingerprints is based on individual characteristics found in the form of epidermal ridge minutiae; these characteristics make fingerprints specific and important for personal identification. A person can change his appearance, voice etc. but he can’t change his fingerprints, which are developed in prenatal period and remain permanent throughout the life of an individual and thus form an important clue material for identification of an individual as these are frequently present on the crime scene, since it is impossible for a person to perform an activity without touching or handling the objects at the scene of occurrence.

The characteristics of fingerprints make them unique. Besides the main pattern, there occurs a numbers of minutiae or ridge characteristics, which do not occur in their correlation position when the prints are from different fingers of the same individual or from different individuals.

The prints at the crime scene are rarely found in sequence and often incomplete as a consequence of which it takes too much time for analysis, as in the routine work the print is first developed and then compared one by one with all the ten digits of the suspects. Therefore, a lot of time is consumed in comparison of prints in order to accelerate the analysis of fingerprints. It is also important to know the sex of an individual involved. If it is known beforehand the sex of an individual from which these prints
have originated will further reduce the time of analysis and narrow down the investigation. Hence there is a dire need to work on this problem. Since there is hardly any work done on setting the standards to allow the investigators to specifically determine the sex from which a particular fingerprint has come. Therefore, it has been thought highly desirable to undertake the present investigation to determine the criteria on the basis of highly significant parameters, which will be quite helpful.

At the crime scene an investigating officer or Fingerprint expert usually comes across three types of fingerprints i.e.

**Visible Prints:** The visible fingerprints are those, which are visible to naked eye in the ordinary light and are formed when the person touches a surface with wet hands or hand soaked with blood, ink, paint or any other type of contaminants. Examples are blood prints, inked prints, paint prints etc. These prints may or may not have identification values depending upon the non-distinctive characteristics of friction ridges.

**Plastic prints:** These are the impressions of epidermal ridges on some semisolid material such as wax, soap, butter, soft putty, tar, grease and recently painted surfaces etc. Such prints should be photographed with the help of direct or side lighting, which enhances the furrows to show up the shadows in the photograph.

**Latent prints:** These are the fingerprints, which are formed on the surface of objects when they are touched barehanded due to the secretion of the
sweat and other oily substances from the sweat pores, that are present on the frictional surface of hands and feet. These oily substances from sweat glands get transferred to the surfaces of objects, which come in contact. But these fingerprints are not visible to the naked eye in ordinary light and can be made visible only after spraying some suitable powders /chemicals etc. or by observing it under UV light and after development these fingerprints have to be lifted for making permanent record.

The fingerprints can be categorized as follow on the basis of the area of the fingers, which is being touched on the surface.

**Chance Prints:** Which are produced as the result of touching the objects by chance and generally does not cover the whole pattern area but in most of the cases the tip of the finger or some other part of the pattern area are formed.

**Plain prints:** These are produced when a part of pattern area comes in contact with the surface, if one puts the finger horizontally on to the surface once and it covers only the middle part of pattern area.

**Rolled Prints:** These are produced when fingers are rotated into radio-ulnar direction. These prints contains the whole friction area from one side of nail to the other and thus cover the whole area bearing the ridges, such prints are taken specially for studying fingerprints in detail (c.f. Nath, 1984).

At crime scene we mostly get partial or smudged fingerprints. In the routine work, these prints are developed and then analyzed for
identification purpose by comparing with fingerprints of suspects, which at times may be large in number. This procedure takes too much time due to which investigation of cases may be delayed.

In some cases the police may catch number of suspects and by knowing the distribution of epidermal ridge minutiae and determining the sex of the fingerprints it may be possible to eliminate the individuals within a short span of time. Since not much systematic information is available on the type, location, distribution of epidermal ridge minutiae and determination of sex of an Individual from fingerprints in different populations, particularly with reference to Indian context, and there is no standard technique available so far in this regard.

In the present study an attempt has been made to determine the distribution of epidermal ridge minutiae and sex of Individual from single fingerprints that will help the investigating agencies in crime detection and identification in forensic cases.
INTRODUCTION TO POPULATIONS STUDIED

The present study is based on the four populations namely: Jat Sikhs, Rajputs, Brahmins and scheduled caste.

Brahmins: (Indian Priestly caste) These are the members of highest ranking varn of the four varnas in Hindu, India. The elevated position of the Brahmins goes back to the late vedic periods when the Indo-European speaking settlers in Northen India were already divided in to brahmans or priests. Since then there is no fundamental change in their relative position and the Brahmins still enjoy great prestige and many advantages, though their claim to tangible privileges is no longer officially admitted. The ritual priority of Brahmins is maintained through the observance of numerous taboos, many of which relate to diet and contact with lower caste. Most Brahmins caste are strictly vegetarian and their member abstain from certain occupations. They may not plow or handle any impure material, such as leather or hides but they may farm and do such agricultural work as does not violate though specific restriction. They may also accept employment as domestic servants, many well to do Hindus have Brahmins cooks, who are valued because members of all caste may eat the food that they prepare. The Brahmins are divided into ten main territorial divisions, five of which are associated with the northern group which includes Sarsvati, Gauda, Kannauj, Maithil and Uthkal Brahmins where as southern group includes
Maharashtra, Andhra, Dravida, Karnata and Molabar. (New Encyclopedia Britannica, 1994 Vol-2)

**Jat:** These are member of peasant caste of northern India and Pakistan. In 1960 the Jat constituted about 20% of the population of Punjab, nearly 10% population of Balochistan, Rajasthan and Delhi and from 2-5% population of Sindh, northwest frontiers and Uttar Pradesh. They generally are cultivators or perform the agricultural work. (New Encyclopedia Britannica, 1994 Vol-6)

**Rajputs:** (From Sanskrit Raja Putra) Son of a King among the Land owners organized in a patrilineal clons and located mainly in central and northern India especially in former Rajputana (Lands of Rajputs). The Rajputs regards themselves as descendants or members of Khashtriya class, but they actually vary greatly in status from princely lineages, such as Guhilot and Kachwaha, to simple cultivator. Their estos includes intense pride of their ancestry and a mettle some regard to personal honor. They seek hypergamous marriages (i.e. bride marrying in to a social group higher than her own). Rajputs are divided between the solar and lunar races. They are in the habit of taking meat except beef and other traits suggest both foreign and aboriginal origin. (New Encyclopedia Britannica, 1994 Vol-9)

**Scheduled caste** (Sudra) : The fourth and lowest caste of the traditional varnas or social classes of Hindus, India. Traditionally artesian and labourers. The term does not appear in the earliest Vedic literature. In its
first application it probably includes all concurred peoples of Indus civilizations as they were assimilated as menials. They are not permitted to perform the Upanayana. The Sudras Varna includes a wide spectrum of endogamous status group with dominating land owning group of one end of the scale and near untouchable at the other. They include washer men, tanners, shoemakers, sweepers and scavenges. As evidence group mobility in caste system some observers have pointed that many castes claiming Kashatriya and Vaishya status gradually emerge from the Sudra. (New Encyclopedia Britannica, 1994 Vol-11)

AIMS AND OBJECTIVES:

1. To determine the most significant site on the fingerprint to study the fingerprint characteristics.

2. To find out the most important and commonly present epidermal ridge minutiae.

3. To determine the gender difference in fingerprints.

4. The parameter examined will help the fingerprint experts to understand the important characteristics, location, distribution and sex of individual from the fingerprints for comparison and elimination of the individual within a short span of time.