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Finger prints patterns in population: A forensic study

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Abstract

Background: Dactylography or Dactyloscopy is the study of finger prints identification. The present study was conducted to evaluate the finger print pattern among population.

Materials & methods: The present study was conducted on 140 subjects of both genders. Finger prints of all fingers were taken on paper. All patterns were examined by using magnifying glass following classification given by- Michael and Kucken into 4 types- Arches, Loops, Whorls and composite.

Results: Age group 20-25 years had 25 males and 30 females and age group 25-30 years had 45 males and 40 females and 30-35 years had 20 males and 15 females. Different finger print patterns among patients was whorl in 60%, loop in 25%, arch in 10% and composite in 5%. Loops were seen in 55% in males and 65% in females, whorls were seen in 35% males and 15% females, composite patterns were seen in 4% males and 6% females and arch was seen in 6% males and 14% females. The difference was non-significant ($P > 0.05$).

Conclusion: Finger print assessment is considered best method of human identification.

Keywords: Finger print, Human, Identification

Introduction

Dactylography or Dactyloscopy is the study of finger prints identification. The word Dactylography is derived from two Greek words, daktylos meaning 'finger' and graphein meaning 'to write' ^[1]. It is the study of the impressions of patterns formed by the papillary ridges on the bulbs of fingers and thumbs. It is taken with the help of printer 's ink on unglazed paper.

Fingerprint patterns are genotypically determined and remain unchanged from birth till death. Fingerprints collected at a crime scene can be used to identify suspects, victims and other persons who touched the surface, fingerprint scans can be used to validate electronic registration, cashless catering and library access especially in schools and colleges ^[2].

The peculiar factor regarding fingerprints is that no two person can have same finger prints. Even to identical twins can have same finger print patterns. This makes identification of suspect useful especially in crime scenes. This pattern remains uninfected by any disease process. Different fingers of same individual can have any pattern and that is unique for that finger ^[3].

The ridges have small pores, which exude perspiration. It spreads all over the surface. The evaporation of the perspiration concentrates its non-volatile constituents, notably, the common salt, oil, and the albumins. Whenever the epidermis comes in contact with a surface, they are left there on in small quantities. The deposits take the pattern of the ridges. The mark is latent due to the colourless nature of the perspiration residues. But it can be developed to give a visible print. The rough and the fibrous surfaces do not give decipherable patterns. The prints are visible when the surface of hand is smeared with coloured powders or liquids ^[4]. The present study was conducted to evaluate the finger print pattern among population.

Materials & methods

The present study was conducted in the department of forensic medicine. It consisted of 145 subjects of both genders. All subjects were informed about the study and written consent was taken. Ethical clearance was obtained prior to the study.

Data such as name, age, sex etc was recorded in performa. Finger prints of all fingers were taken on paper. All patterns were examined by using magnifying glass following classification given by- Michael and Kucken into 4 types- Arches, Loops, Whorls and composite. Results thus obtained were studied. P value < 0.05 was considered significant.

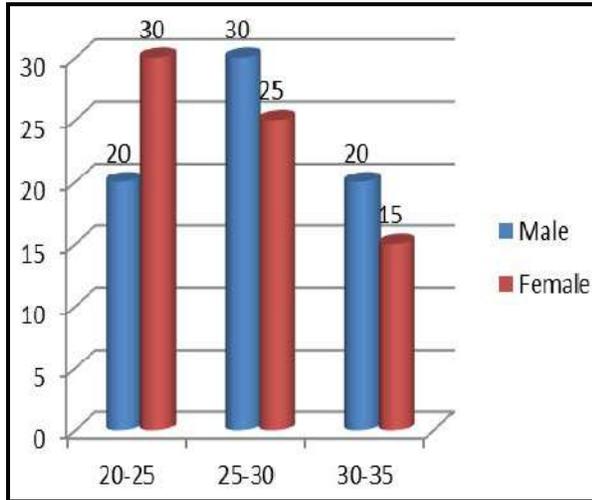
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Results

Table I: Age & gender wise distribution

Age group (Years)	Male	Female
20-25	20	30
25-30	30	25
30-35	20	15

Table I, graph I shows that age group 20-25 years had 25 males and 30 females and age group 25-30 years had 45 males and 40 females and 30-35 years had 20 males and 15 females.

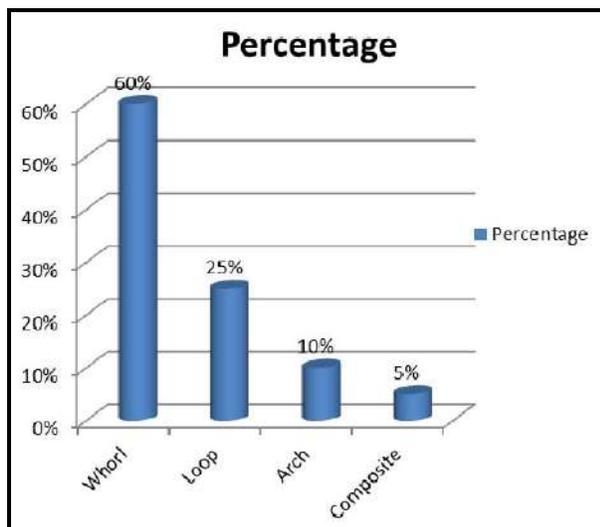


Graph I: Age & gender wise distribution

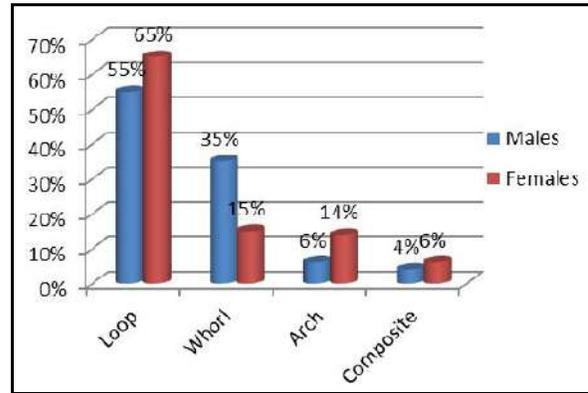
Table II: Different finger print patterns

Finger print patterns	Percentage	P value
Whorl	60%	0.05
Loop	25%	
Arch	10%	
Composite	5%	

Table II, graph II shows that different finger print patterns among patients was whorl in 60%, loop in 25%, arch in 10% and composite in 5%.



Graph II: Different finger print patterns



Graph III: Distribution of finger print patterns in both genders

Graph II shows that loops were seen in 55% in males and 65% in females, whorls were seen in 35% males and 15% females, composite patterns were seen in 4% males and 6% females and arch was seen in 6% males and 14% females. The difference was non- significant ($P > 0.05$).

Discussion

All individuals and hence all criminals carry this medium of identification. The finger and toe digits and palmer surfaces of the hands and the feet carry the friction ridges. The fingers have more intricate patterns. They allow easier individualization and. Classification [5]. A criminal uses his hands in the commission of crime. He leaves marks at the scene of occurrence or on objects, which come in contact with the hands in the commission of crime. There are, therefore, fair chances of occurrence of finger prints in all types of crime [6]. The present study was conducted to evaluate the finger print pattern among population.

In present study, age group 20-25 years had 25 males and 30 females and age group 25-30 years had 45 males and 40 females and 30-35 years had 20 males and 15 females. We found that different finger print patterns among patients was whorl in 60%, loop in 25%, arch in 10% and composite in 5%.

Harsha *et al.* [7] in their study found that out of the 1142 loop patterns obtained in this study, 1089 were ulnar loops (95.36%) and 53 were radial loops (4.64%). Similar distribution was observed in both males and females. Out of the 607 whorl patterns, 61.6% were spiral whorl, 25.4% were circular, 7.9% were whorl. In present study we observed that loops were seen in 60% males and 50% females, whorls were seen in 25% males and 35% females, composite patterns were seen in 7% males and 3% females and arch was seen in 8% males and 12% females.

We found that loops were seen in 55% in males and 65% in females, whorls were seen in 35% males and 15% females, composite patterns were seen in 4% males and 6% females and arch was seen in 6% males and 14% females. The difference was non- significant ($P > 0.05$). Sam *et al.* [8] in their study found that each finger print is unique; loops are the most commonly occurring fingerprint pattern while arches are the least common. Males have a higher incidence of whorls and females have a higher incidence of loops. Loops were predominant in blood group A, B, AB and O in both Rh positive and Rh negative individuals except in O negative where whorls are more common.

Srilakha *et al.* [9] conducted a study during 2000-2001 on 300 medical students with different ABO blood groups in

Rajasthan which revealed that individuals with blood group A have more of loops, while that of blood group AB had more of whorls. Arch can be of two types, plain Arch and tented arch. In plain arch, the ridges run from one side to the other making no backward turn. There is usually no delta. But when delta appears, no ridge must intervene between the inner terminus and outer terminus. In tented Arch, the ridges near the middle may have an upward thrust, arranging themselves as it were on both sides of an axis towards which adjoining ridges converge. The ridges thus converging give to the pattern the appearance of a tent in outline, hence the name tented arch^[10].

Conclusion

Finger print assessment is considered best method of human identification.

References

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