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Role of Finger Print Pattern in Relationship with Blood Group and Gender

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Abstract
Introduction: *Dermatoglyphics refers to the branch of science in the study of the pattern of skin ridges present on the fingers, palm and the soles of human. In 1788 JC Mayer was the first to write out basic tents of finger print analysis.*
Importance of finger print in modern world is not restricted to the field of forensic and criminals application only. Dermatoglyphicsis a relatively new science, which involves the study of fine patterned dermal ridges on digits, palms and soles. Cummins and Midlo in 1926 coined the term dermatoglyphics (derma-skin; glyphic-carvings), for the scientific study of ridges.
Fingerprints are impression of pattern formed by papillary or epidermal ridges and the pattern of fingers do not change during life time or till death of the individual. Due to its effectiveness particularly in forensic medicine, the study of finger print pattern was carried out in relation between gender and blood group.
Material and Methods: *In the present study 250 first year MBBS students were participated, out of which 125 were males and 125 were females in the department of anatomy, BRD Medical College Gorakhpur. Their blood groups were recorded. The finger prints of both the hands were taken on A4 size white paper using blue stamp pad. Fingerprints pattern were observed by powerful magnifying lens and recorded.*
Results: *In our study results shows loops are the most common pattern while arches are the least common. Loops occur more frequently in females while male have higher incidence of whorl.*
Loop is predominantly found in blood group B while fingerprint pattern whorl is predominantly found in blood group O.
Conclusion: *According to our study we may conclude that prediction of gender and blood group of a person may be possible with the study of fingerprints methods which may help in forensic medicine to identify victims and diseases.*
Keywords- *Fingerprints pattern, Blood groups, Gender.*

Introduction

The term dermatoglyphics has its origin from Greek words “derma” means skin and “glyphics” means carving. The dermatoglyphics study was first performed by Cummins. About three thousand years ago several works was done on dermatoglyphics in China .Herschel used fingerprints for personal identification in India.(1) Fingerprints are impression of pattern formed by papillary or epidermal ridges of the fingertips and the pattern in finger. (2)

A finger ridges is a raised portion of the epidermis on the digits or on the palmer and planter skin, made up of one or more connected ridge units of friction ridge skin. The ridges pattern depends upon cornified layer of epidermis as well as dermal papillae. once the ridge is formed during fetal period it will not change throughout life, until the skin was destroyed by burn ,chemicals, cuts and diseases affecting the skin..Finger print pattern are genotypically determined and remain unchanged from birth till death.[3] Two person have identical finger prints is about one in 64 thousand millions [4].

Four types of finger prints patterns observed in fingers are, Loops, Whorls, Arches, and mixed or Composites. [5] The arches are the simplest pattern and loop is the most common of all the pattern. the term composite is used for combination of pattern that does not fit in to any of the above classification.[6] Finger print are now a day's used in many purposes-It can be used to validate electronic registration in many offices and educational institutions. The characteristics patterns of epidermal ridges are differential in their definitive form during 3rd and 4th month of intra uterine life.[7]

The type of finger print is unique and is based on genetic characters of each individual .The secretion in the fingerprints contains residues various chemicals and their metabolites. which can be used for the forensic purpose to identify the suspected victims. [8]

Blood group system was discovered by Karl Landsteiner, in 1901. 19 major groups have been identified which vary in their frequency of distribution amongst various races of mankind .Clinically, only 'ABO'and 'Rhesus' groups are of major importance, 'ABO' system is further classified as A, B, AB, O blood group types according to presence of corresponding antigen in plasma.[9]

The genetics of blood groups is complicated by gene linkage with other characters which may be of some clinical importance eg-duodenal ulcer show a higher incidence in those with blood group O than in general population and gastric cancer in blood group A [8-10].

In the present study we are trying to find out the correlation between palmer dermatoglyphics, gender and blood group.

Dermatoglyphics offers at least two major advantages as an aid to the diagnosis of medical disorders.

The epidermal ridge patterns on hands and soles are fully developed after birth and thereafter remain unchanged for life.

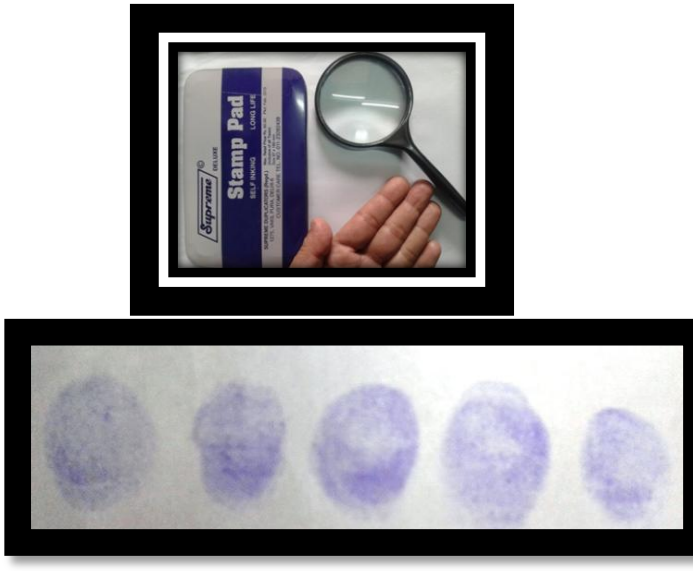
Scanning of ridge patterns or recording their permanent impressions can be accomplished rapidly, inexpensively and without any trauma to the patient.

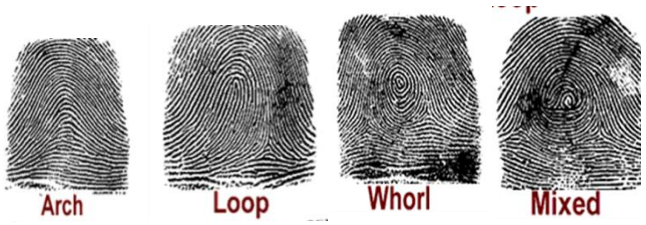
Material and Methods

The present study was carried out over a period of 1 year 6 month in anatomy department of BRD Medical CollegeGorakhpur.250 first year MBBS students (150 male & 150 females) were participated in the study voluntarily and their finger print were taken by using blue color stamp pad a supreme company size- 97×160mm.

It is necessary to remove oil, dirt, and sweat from the skin.The hand was washed with soap and water and humidity clean off with sprit. After drying the hands, ink pad used for the impression of fingerprint patterns.

The plain white paper of A4size was kept on the table .The subject was asked to press their fingers on the blue color stamp pad and then the finger (palmer side) areas were carefully and uniformly placed on the white sheet paper .After obtaining the fingerprint patterns (Loop, Arch, Whorl, composites) were observed with the help of a powerful magnifying lens and recorded in a specially prepared format.In our study the digits were classified according to Henry's system.





Results and observations

In the present study 250 students were participated out of which 125 were males and 125 were females. majority of the subject belonged to blood group B,(41%) followed by blood group A,(23.2%),O (23.2%) and AB,(12%) respectively. (Table-1)

Table 1 shows distribution of blood groups according to gender ,blood group B frequency is higher in female than male and blood group A is higher in male than females ,while female have equal ratio of blood group A & O.

Table-1 Distribution of blood groups in male and females

Blood group	Male		Female		Total	
	No.	%	No.	%		
A	38	30.4	28	22.4	58	23.2
B	50	40	54	43.2	104	41.6
AB	15	12	15	12	30	12
O	30	24	28	22.4	58	23.2
Total	125		125		250	

Table 2 shows frequency of loops is higher in females (63.68%) than males (35.84%).Whereas whorls were more in male (54.4%) comparison to females (25.92%).10.4% of arches found in females and 9.76% in males.

Table-2 Distribution of finger print patterns of all the fingers among male and female

Types of finger tip pattern	Male		Female	
	No.	Percentage	No.	Percentage
Loops	448	35.84%	796	63.68%
Whorls	680	54.4%	324	25.92%
Arches	122	9.76%	130	10.4%

Total no of loops found in both gender in all the digits (both hand) were 1244 (49.76%).followed by whorls 1004(40.16%).while arches were present in a low frequency 252 (10.8 %).this table clearly shows that loops are more frequently found followed by whorls and Arches.(Table 3)

Table 3 Distribution of fingerprints patterns in male and female.

Finger print Patterns	Male	Female	Total	Percentage
Loop	448	796	1244	49.76%
Whorls	680	324	1004	40.16%
Arches	122	130	252	10.8%
Total	1250	1250	2500	

Table 4 shows in blood group B loops are most common pattern in blood group B (76.61%) while arches are the least common. while higher no of whorl is seen in blood group O(65.76%).male have higher incidence of whorl. Whereas arches are the least common in blood group AB(29.79%) and A(15.52).Loops are predominantly found in blood group B while whorls are predominantly found in blood group O.

Table 4 Distribution of fingerprint pattern among different blood groups.

Types of pattern	Blood group A		Blood group B		Blood group AB		Blood group O	
	NO	%	No	%	No	%	No	%
Loop	305	53.79	675	76.61	59	15.28	205	30.78
Whorls	174	30.68	180	20.43	212	54.92	438	65.76
Arches	88	15.52	26	2.95	115	29.79	23	3.45
Total	567		881		386		666	

Discussion

The present study shows an association between distribution of fingerprint pattern, gender and blood groups. Majority of subject in our study belonged to blood group B (41.6%), Followed by O & A (23.2% & 23.2%), AB(12%) groups. Percentage of loops were highest in blood group B(76.61%)and lowest in AB group (15.28%) and percentage of whorls were highest in O blood group (65.76%)whereas percentage of Arches in AB blood group was highest (29.79%)and lowest in O blood group (3.45%) which was similar to the findings of Mahajan et al (1986) and Kshirsagar et al (2001) , [11-12] who observed higher percentage of Loop in B and AB blood groups respectively, higher percentage of whorls in O blood group and lowest in AB blood group and percentage of Arches is highest in AB blood group. While lower percentage in O'blood group. similar to study done by Bhardwaja,[7] Prateek and Gowada & Rao, there is high frequency of loop moderate of whorls and low of arches in blood group A,B and O. [13 ,14] Similar to Prateek et al, in our study also found that frequency of loops is greater in females (63.68%) as compared to a higher frequency of whorls (54.4%) in males. similar to Sharma et al [15] the general distribution pattern of fingerprints in our study showed high frequency of loops in blood group B in female 796 (63.68%).comparison to male ;448 (35.84%). While the whorls is higher in blood group O in male 680(54.4%) than female 324(25.92%). and of arches is nearly equal in blood group A &AB in female 130(10.45), male 122(9.76%).Table 4 shows Loops were highest in B blood group (76.61%)the frequency of Whorl is highest in blood group O(65.76%) which is similar with study of Bharadwaja [7] and arches were of higher frequency in blood group AB (29.76%) and least O(3.45%) group..

Conclusion

The present study shows that there is an association between fingerprint patterns, blood group and gender. The majority of subjects in our study belonged to blood group B. Higher number of loops is seen in blood group B in female and whorl were highest in blood group O in males. According to our study we may conclude that prediction of gender and blood groups of a person may be possible with the study of fingerprints methods which may help in forensic medicine to

identify victim's .Through this study more lives can be saved due to early detection of diseases.

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