



## CORRELATION OF DERMATOGLYPHICS, BLOOD GROUP AND GENDER – A J&amp;K BASED OBSERVATIONAL STUDY

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## ABSTRACT

**Background:-** Dermatoglyphics is considered as best tool for recognition and forensic exploration and it is a scientific method for identification of an individual as it remains constant throughout life.

**Objective:-** The objective of present study is a) To study distribution of fingerprint pattern among the subjects having different ABO & Rh blood groups. b) To correlate any relation between pattern of fingerprints and blood groups. **Method:-** The present study was carried out in Department of Anatomy, Government Medical College Anantnag on 100 students of different blood groups with Male: Female ratio of 1:1. Fingerprints were obtained by Ink method and obtained fingerprints were classified into three primary fingerprint patterns (Loop, Whorl & Arches) **Result:-** The general distribution pattern of fingerprint showed high frequency of Loops (56%) followed by Whorls (33.7%) and Arches (10.3%). Majority of subjects in present study were of blood group O followed by blood group A, B & AB in Rh positive individuals. In Rh negative subjects majority of blood group were of O followed by B, A & AB. Loops and whorls were highest in both Rh positive and Rh negative subjects of ABO blood groups followed by arches. In our study thumb, index, middle and little finger of blood group AB & O show high frequency of Loops where as blood group AB show high frequency of whorls. **Conclusion:** This study shows the association between distribution of dermatoglyphics, ABO, Rh blood group and gender.

**KEYWORDS :** Dermatoglyphics, Blood groups, Whorl, Arches, Loops.

## INTRODUCTION

Human identity is a basic requisite for personal, social and legal grounds. Human identification can be done by many methods such as anthropometry, dermatoglyphics, DNA finger typing, segregation by blood groups, sex determination, iris imaging, lip prints and post-mortem information. Among all dermatoglyphics is considered as the good method for identification of individual. [1-6]. Dermatoglyphics is the study of the epidermal ridges and their configuration on the volar aspect of fingers, palms and soles. The term Dermatoglyphics was coined by Cummins [Cummins, H. 1926]. It includes anthropologic, genetic and Egyptologic of studying fingerprints [7]. According to Galton classification the fingerprints were classified into three primary pattern as Loops, Whorls and Arches [8]. The development of fingerprint started from 12<sup>th</sup> to 16<sup>th</sup> week of intrauterine life and were accomplished by the end of 20<sup>th</sup> week. [9]. ABO blood group system was discovered by Australian Scientist Karl Lansteiner. ABO and Rh blood group systems are of major importance as compared to other systems [10]. ABO is further classified into four principal types: A, B, AB and O. There are two antigens and two antibodies responsible for ABO type. Rh blood group is one of the most complex blood groups in humans. It is further classified into Rh positive and Rh negative due to presence or absence of D antigen. [11]. The aim of this study is to find correlation between ABO and Rh blood group with dermatoglyphic pattern in human beings.

## AIMS AND OBJECTIVES

- To study distribution of fingerprint pattern among the subjects having different ABO and Rh blood groups
- To correlate any relation between pattern of fingerprints and blood groups.

## MATERIAL AND METHOD

The present study was carried out in Department of Anatomy at Government Medical College Anantnag. 100 students were selected for the study. Ink Method suggested by Cummins was used for taking dermatoglyphics. Korea camel duplicating ink was spread over inking slab with the help of roller. A 15" × 6" sized plain glass was used as inking slab. A durable plain

paper laid down on pressure pad was smeared by palm & fingers of both hands. Primary patterns (Loops, Whorls & Arches) were observed with the help of powerful hand lens.

## OBSERVATION :

## Sex And Blood Group (Table 1)

In this study Male:Female ratio is 1:1. Majority of cases 44 (44%) in this study belonged to Blood group O followed by blood group B, A & AB which were 24 (24%), 22 (22%) & 10 (10%) respectively.

## Rh Blood Group (Table 2)

80 (80%) cases in this study had Rh positive factor which belongs to Blood group O (33%), followed by blood group A, B (19%) & AB (9%). 20% cases in the study had Rh negative factor which belongs to Blood group O (11%) followed by B (5%), A (3%), AB (1%) respectively.

## Type of Fingerprint (Table 3)

In this study the most common pattern were of Loops (56%) followed by Whorls (33.7%) & Arches (10.3%).

## Pattern of Fingerprints In Different Fingers (Table 4)

In our study the Thumb, Index, Middle & Little fingers of Blood group A, B & O showed high frequency of Loops i.e. Blood group A (T-28%, I-24%, M-21%, L-26%), Blood group B (T-44%, I-36%, M-21%, L-54%), Blood group O (T-44%, I-24%, M-50%, L-55%), Blood group AB presented more whorls (T-9%, I-8%, R-9%) where as their middle & little fingers have more Loops i.e. 20% & 13% respectively. Arches were least in majority of cases but index finger of blood group A & B showed comparatively high frequency of Arches.

## Pattern Of Fingerprints In Different Blood Groups (table 5)

In this study frequency of Loops & whorls were highest in both Rh positive & Rh negative subjects of ABO Blood groups followed by Arches. Incidence of Loops varied between 5% (in B negative) to 66.6% (in A negative) subjects. However, the incidence of Loops among ABO positive blood group varied between 81.77% (in B positive) to 44.29% (A positive). The frequency of Whorls in Rh negative subjects of ABO Blood

groups ranged between 22.22% (in A negative) to 50% (in AB negative). The frequency of whorls in Rh positive subjects ranged between 50.8% (in B positive) to 50.5% (in A positive) subjects. The frequency of Arches ranged between 4.7% (in O negative) to 25% (in AB negative) subjects followed by 3.84% (in AB positive) to 13.92 (in O positive) subjects respectively.

**Table 1: Distribution of cases according to sex and blood groups.**

Sex	Blood Group				Total
	A	B	AB	O	
MALE	11	9	4	26	50
FEMALE	11	15	6	18	50
TOTAL	22	24	10	44	100

**Table 2 : Distribution of cases according to Rh factor.**

Blood group	Rh positive	Rh Negative
A	19	3
B	19	5
AB	9	1
O	33	11
TOTAL	80	20

**Table 3 : General Distribution of primary fingerprint pattern in both hands.**

Pattern of fingerprints	Total	Percentage
Loops	560	56%
Whorls	337	33.7%
Arches	103	10.3%
Total	1000	100

**Table 4: Distribution of pattern of fingerprints in different fingers of both hands of subjects**

Individual	Blood Group											
	A			B			AB			O		
Finger	L	W	A	L	W	A	L	W	A	L	W	A
Thumb	28	12	3	44	24	4	7	9	0	44	26	6
Index	24	13	6	36	25	16	5	8	2	24	30	21
Middle	21	6	5	47	14	12	20	9	1	50	20	4
Ring	11	20	1	24	24	6	6	9	1	21	48	7
Little	26	5	1	54	17	2	13	3	0	55	15	5
Total	110	56	16	205	104	40	51	38	4	194	139	43

**Table 5: Distribution of pattern of fingerprints among students of A,B,O & Rh groups (n= 1000).**

Type of fingerprint	Blood Group							
	A		B		AB		O	
	Rh +	Rh -	Rh +	Rh -	Rh +	Rh -	Rh +	Rh -
Whorl	146 (50.51%)	2 (22.2%)	12 (50.8%)	2 (33.3%)	34 (43.5%)	2 (50%)	132 (36.7%)	6 (28.5%)
Loop	128 (44.29%)	6 (66.6%)	193 (81.7%)	3 (50%)	41 (52.5%)	1 (25%)	176 (49.0%)	12 (57.1%)
Arches	15 (5.19%)	1 (11.1%)	31 (13%)	1 (16.6%)	3 (3.84%)	1 (25%)	50 (13.9%)	1 (4.7%)
Total	289	9	236	6	78	4	359	21

**DISCUSSION**

The present study reveals that the incidence of blood group O was highest followed by blood group B, A, AB (Table 1) which is similar with the results found by Bharadwaja et al., Rastogi et al., and Sudhikshya et al., (11,2,13) and differs from studies of Khalid et al., Ghasemi et al., and Mehta et al.,(14,16,17) in which blood group B was maximum followed by blood group O,A and AB. The present study exhibited a high incidence of Rh positive (80%) subjects as compared to Rh negative (20%) subjects (Table 2). Similar results were found by Bharadwaja et al., Rastogi et al., Sudhikshya et al.,(11,2,13). The frequency

of Loops in present study were high followed by Whorls & Arches which is in harmony with previous studies of researchers Bharadwaja et al., Rastogi et al., Sudhikshya et al., Khalid et al., & Mehta et al.,( 1 1 , 2 , 1 3 , 1 4 , 1 7 ). Table 3 depicted there is predominance of Loops in all blood groups ranging from 81.77% in blood group B Positive to 44.29% in blood group A positive which is similar to studies of researchers ( 13,17,). It was observed that the percentage of Whorls were more in blood group A followed by blood group AB,O & B. The incidence of Arches were highest in blood group AB followed by blood group B,O & A which differs from Jaff et al., (18).

Table 5 represents high frequency of Loops in Rh positive (81.77%) than Rh negative (66.6%) which correlates with findings of Bharadwaja et al., & Mehta and Mehta (11,17). The percentage of Whorls were more in Rh positive (50.51%) than Rh negative (50%). The Arches were more in Rh negative (16.66%) than Rh positive (13.92%) which is similar to Bharadwaja et al., & Mehta & Mehta (11,17).Table 4 shows the Distribution pattern in individual fingers had high frequency of Loops & Arches in Thumb,Index,Middle & Little Finger and more of Whorls in Ring Finger which is contrary to result of Sudhikshya et al.,(12).

**CONCLUSION**

The main aim of the present study was to substantiate the correlation between various fingerprint patterns and ABO blood groups and Rh blood types in the first year MBBS students of Govt Medical College Anantnag, Jammu & Kashmir. As we are well aware of the fact that fingerprints are never identical nor they change from birth till death. Therefore , an effort was made to relate fingerprints with gender, different blood groups and Rh blood types in order to authenticate these patterns in the identification and forensic medicine. In our study it was observed that Loops (56%) are the most common and Arches (10.3%) are least common types of fingerprint pattern. Majority of subjects in present study were of blood group O in both Rh positive & negative subjects. The least common being AB blood group in both Rh positive & negative subjects. The present study concluded that the general distribution of the primary pattern of fingerprints is not related to gender, ABO blood group, Rh blood type and individual digits of both hands. In order to get more accurate results , such type of studies need to be conducted on different ethnic groups of people.

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