

## A study of Dermatoglyphics in relation with blood groups among first year MBBS students in Malabar Medical College

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### Abstract

**Objective:** To study the relationship between finger print patterns and blood groups among first year MBBS students in Malabar Medical College.

**Materials and Methods:** Finger prints were collected from the subjects after obtaining their informed consent. A total of 140 first year MBBS students of the Malabar Medical College, Kozhikode, Kerala participated in the study. Fingerprints of both hands were taken using the violet stamp pad of Camlin company size 15.7cm X 9.6cm. Blood groups of all the candidates were also noted down. The data were tabulated and analysed using descriptive statistics.

**Results:** Majority of subjects belonged to blood groups 'O' positive followed by 'A' positive, 'B' positive and 'AB' positive. Blood group 'O' was predominantly found in females. Total number of loops found in all the digits were 884 (63.14%). Similarly number of whorls in all the digits of both the hands were 333 (23.78%) and number of arches were 183(13.07%). Frequency of loops, whorls and arches were found to be higher in females as compared to males.

**Conclusion:** Loops were the most commonly found fingerprint patterns and arches were least common. Blood group 'O' positive was most common, followed by 'A' positive and 'B' positive. 'O' negative, 'B' negative and 'A' negative were rarest. Loops, whorls and arches were highest in females as compared to males.

**Keywords:** Blood groups, Dermatograph, Finger print.

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### Introduction

Human identification is based on certain characteristic features. Few of the methods include DNA analysis, BMI, Cheiloscopy and dactylography.<sup>1</sup> The skin on hand and sole have wrinkles with friction ridges in between. These are called finger prints or dactylograph. The word dactylograph was first put forward by anatomist Harold Cummins.<sup>2</sup> These patterns extend from tip of the finger/toes to the nearest joint. Finger print pattern appears first during 12<sup>th</sup>-16<sup>th</sup> week of gestation and is completed by 20<sup>th</sup> week of intrauterine development. It remains uniform and static in its physical characteristic throughout the individual's life.<sup>3</sup> Every finger has three basic patterns-Arch, Loop and Whorl.<sup>4</sup> There are two types of arch - tented (radial, ulnar) and loop (radial, ulnar) and 5 types of whorls - simple, central packed loop, twinned loop, lateral packed loop and accidental. Finger prints are

useful in personal identification, catching criminals and for diagnosis of certain inheritable diseases.<sup>5</sup> Recently, it has found new avenues as tool of identification in government offices, corporate and educational institutes to record the presence of the individual.

ABO blood group system was first explained by Landsteiner.<sup>6</sup> Few diseases are common in certain blood groups viz, gastric ulcer in blood group 'A', duodenal ulcer in blood group 'O'.<sup>7,8</sup> As blood group system and dermatoglyphics have genetic inheritance, few studies have shown association between finger print pattern and blood group.<sup>9,10</sup> This study was aimed to further strengthen the association between dermatoglyphic pattern and type of blood group.

### Materials and Methods

The study was carried out in Malabar Medical College, Kozhikode, Kerala. 140 medical students (106 female and 34 male) belonging to the age group 17-20 yrs were randomly selected for the study. Written informed consent was taken from all the students. Ethical clearance was obtained from Institutional Ethics Committee. Fingerprints were taken using the violet stamp pad of Camlin company size 15.7cm X 9.6cm. Palms and fingers were smeared with ink and prints were taken on a durable white paper which consisted of ten different blocks for ten fingers of right and left hand respectively. Basic details such as name, age, sex were

noted. Blood groups of all the candidates were also noted down. Subjects with scars on fingers, with deformities were excluded from the study. Primary fingerprint patterns (loops, whorls, arches) were observed with the aid of powerful hand lens. Variables were tabulated and analysed by descriptive analysis using SPSS 20.

## Results

140 medical students were randomly selected for study. Among 140 students, 106 were female and 34 were male. Table 1 shows the distribution of blood groups according to gender. Majority of subjects belonged to blood groups 'O' positive followed by 'A' positive, B positive and 'AB' positive. Blood group 'O' was predominantly found in females but in males 'A', 'B' and 'O' blood groups were almost in equal ratio.

Table 2 shows the distribution of subjects according to Rh factors. Among 140 subjects 128

belong to Rh positive whereas 12 were Rh negative. Out of 128 Rh positive subjects, majority belonged to blood group 'O' (42.96%), blood group 'A' (28.12%), blood group 'B' (25.78%) followed by blood group 'AB' (3.12%). Among Rh negative subjects 'A', 'B' and 'O' blood group showed same percentage (33.33%).

Table 3 shows distribution of fingerprint patterns of all the fingers in both the hands. Total number of loops found in all the digits were 884 (63.14%). Similarly no of whorls in all the digits of both the hands were 333 (23.78%) and number of arches were 183 (13.07%).

Table 4 shows the distribution of fingerprint patterns among both the genders. Frequency of loops, whorls and arches were found to be higher in females as compared to Table 5 shows the distribution of fingerprint patterns among ABO blood groups in all the fingers.

**Table 1: Distribution of subjects according to blood group and gender**

Blood Group	Male(34) N=34(%)	Female N=106(%)	Total N=140 (%)
A+ve	10(29.41%)	26(24.52%)	36(25.71%)
B+ve	11(32.35%)	22(20.75%)	33(23.57%)
O+ve	11(32.35%)	44(41.50%)	55(39.28%)
AB+ve	1(2.94%)	3(2.83%)	4(2.85%)
A-ve	1(2.94%)	3(2.83%)	4(2.85%)
B-ve	0	4(3.77%)	4(2.85%)
O-ve	0	4(3.77%)	4(2.85%)

**Table 2: Distribution according to Rh factor of blood group**

Blood group	Rh positive	Rh negative
A	36 (28.12%)	4(33.33%)
B	33(25.78%)	4(33.33%)
AB	4(3.12%)	0
O	55( 42.96%)	4(33.33%)
Total	128	12

**Table 3: Distribution of primary fingerprint patterns of all fingers in both hands**

Fingerprint patterns	Total number	Percentage %
Loops	884	63.14%
Whorls	333	23.78%
Arches	183	13.07%
Total	1400	100%

**Table 4: Number of fingerprint patterns among males and females**

Fingerprint pattern	Male	Female
Loops	192(60.37%)	692 (63.95%)
Whorls	87(27.35%)	246 (22.73%)
Arches	39(12.26%)	144 (13.30%)
Total	318	1082

**Table 5: Distribution of different blood group patterns in different blood groups**

	<b>A+ve</b>	<b>A-ve</b>	<b>B+ve</b>	<b>B-ve</b>	<b>O+ve</b>	<b>O-ve</b>	<b>AB+ve</b>	<b>AB-ve</b>	<b>Total</b>
<b>Loops</b>	68+168	26	63+156	24	61+268	24	26	0	884
<b>Whorls</b>	24+62	8	32+48	10	29+99	11	6	0	333
<b>Arches</b>	8+24	6	13+18	6	18+75	05	8	0	183

## Discussion

In our study, most common blood groups were ‘O’ positive and ‘A’ positive followed by ‘B’ positive, ‘AB’ positive, ‘B’ negative, ‘O’ negative and ‘A’ negative were rare. Loops are most commonly obtained finger prints (63.14%) followed by whorls (23.78%) and arches (13.07%). This is in accordance with the study done by Patel et al<sup>6</sup> and Bhardwaja.<sup>11</sup>

Frequency of loops, whorls and arches were found to be higher in females as compared to males in accordance with the study done by Margi et al.<sup>12</sup>

More number of loops were found in blood group ‘O’ followed by blood group ‘A’ and ‘B’. Incidence of whorls were found to be predominant in ‘O’ followed ‘A’ and ‘B’ blood groups. Arches were least commonly found in all the blood groups which is supported by the study done by Roy et al<sup>13</sup> and Wang et al<sup>14</sup>.

## Conclusion

This study was conducted to analyse and correlate fingerprint patterns with gender and blood group of an individual. It is known fact that fingerprints are unique for every individual and never change from birth till death. This study was an attempt to correlate fingerprint patterns with gender and blood group, so that it may increase the authenticity of fingerprints in identification of individuals.

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