**Original article:**

# Study of association of interdigital patterns and ABO blood groups

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**Abstract**:

Dermatoglyphics, the study of palm prints are the patterns of the ridged skin of the digits, palms & soles, which are constant and individualistic. Dermatoglyphic study of finger tip & palmer patterns had been done extensively in various genetic and metabolic disorders. The present study is carried out to see the co-relation between the interdigital patterns and ABO blood groups. The study included 785 medical students of the age between 18 to 22 yrs. The palm prints were taken by using the kores duplicating ink. Parameters studied were patterns in interdigital areas as Thenar I1 area, I2 area, I3 area, I4 area and Hypothenar area. In the present study frequency of I2 patterns in males and females of blood group A & O when compared shows insignificant ($P > 0.05$ ) statistical difference while frequency of I2 patterns in males and females of blood group B & AB when compared shows significant ($P < 0.05$ ) statistical difference

**Key words**: dermatoglyphics, blood group, interdigital patterns.

**Introduction**

The human body never ceases to be a wonder. Being endowed with innumerable gifts , man is above the rest in the animal kingdom. The skin on the fingertips , pal mar surface and plantar surfaces of man shows interesting features. It has ridges which form configurations, that are unique to every individual.(Harold Cummins (1926)[1]. The ridges are differentiated in their definitive form during third and fourth month of fetal life and once formed remain permanent and never change throughout the life except in the dimension in proportion to the graph of an individual (Cummins H & Midlo, 1943)[2]. Nobel Lauriate Landsteiner L. (1900) described for the first time the ABO blood group system. Since dermatoglyphics and blood groups both show ethnic and genetic variations, a correlative study between dermatoglyphics and blood groups may reveal the genetic interdependence. However there are very few studies on correlation between dermatoglyphics and blood groups. (Otto and Bozoti, 1980[3]; Nayak and Patel, 1973[4], Eswaraiah G, Bali R S 1977)[5].Therefore the study was under taken to find correlation between ABO blood group system and various dermatoglyphic patterns.

**Material and method**

The present study has been carried out on 785 healthy individuals (534 males and 251 females). Medical students of age in between (18 – 22 years) were randomly chosen, students suffering from certain disorders or ill were excluded from the study on the basis of history. The ethical committee permitted to carry out the work using the medical student as subjects with written permission from each individual .The ABO blood group was selected for the study and individuals were grouped into four blood groups i.e. A, B, AB & O.

Dermatoglyphic prints were taken by the "INK METHOD "as described by CUMMINS (1936)[6] and CUMMINS and MIDLO (1961)[7] .The materials used were Kores duplicate ink., plain glass with smooth surface, Ball with handle for uniform application of ink, White paper with

glazed surface ,Magnifying lens, Pencil , Pen. The prints were analyzed for the following parameters.

Patterns in the Interdigital areas

i ) Thenar I 1 area

ii ) I2 area

iii) I3 area

iv) I 4 are and

v) Hypothenar area

The data was tabulated according to four blood groups and sex. And was analyzed statistically.

**Results**

The dermatoglyphic patterns on right and left hand of a total 785 individuals (534 males, 251 females) of different blood groups were obtained, compared and analyzed.

Table – 1. Number of male and female individuals of different blood groups in the present study.

| Blood Group | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | NO | % | NO | % | NO | % |
| A | 163 | 30.52 | 41 | 16.33 | 204 | 25.98 |
| B | 136 | 25.47 | 80 | 31.87 | 217 | 27.64 |
| O | 194 | 36.33 | 89 | 35.46 | 283 | 36.05 |
| AB | 41 | 07.68 | 41 | 16.33 | 81 | 10.31 |
| Total | 534 | --- | 251 | ----- | 785 | ---- |

From table -1. It is evident that blood group' O' is most common in general population and blood group AB the least.

Table – 2 .Distribution of interdigital patterns of both hands in A, B, O and AB blood group.

| Type of interdigital Pattern | Percentage of interdigital patterns in blood group | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | A | | B | | O | | AB | |
| | Male | Female | Male | Female | Male | Female | Male | Female |
| I1 | 9.20 ( 15 ) | 4.86(2) | 11.02(15) | 3.74(3) | 10.30(20 ) | 5.60(5) | 12.18(5) | 4.86(2) |
| I2 | 2.44 ( 4 ) | 2.42(1) | 7.34(10) | 2.50(2) | 7.20(14) | 3.36(3) | 7.30(3) | 2.42(1) |
| I3 | 39.86(65) | 43.50(18) | 21.32(29) | 20.0(16) | 41.22(80 ) | 41.56(3 7) | 47.46(19) | 39.02(16) |
| I4 | 37.42(61) | 39.02(16) | 35.24(48) | 41.24(33) | 33.50(65 ) | 42.68(3 8) | 34.14(14) | 36.58(15) |
| Hypothen ar | 20.24( 33) | 34.14(14) | 22.78(31) | 30.00(24) | 20.10(39 ) | 31.46(2 8) | 20.94(9) | 34.14(14) |



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1. Frequency of I1 patterns in males and females of different blood groups are compared and show statistical significant difference (P< 0.05)

2. Frequency of I3, I4 and Hypothenar patterns in males and females of different blood groups are compared and also shows statistical significant difference (P< 0.05)

3. Frequency of I2 patterns in males and females of blood group A & O when compared shows insignificant (P > 0.05 ) statistical difference while frequency of I2 patterns in males and females of blood group B & AB when compared shows significant (P < 0.05 ) statistical difference.

**Discussion**

The present study reveals that there is an association between distribution of fingerprint pattern and blood groups. In the present study blood group O is found to be the commonest (36.05%) and AB the least common (10.31%). Similar findings has been reported by Agte,A.V.(1973).However Dapson(1946) found higher incidence of blood group O & A in British population.

In the present study when the different interdigital area patterns are compared , the Thenar / I1,I2and I3 patterns are more frequent in males than in females, while the I4 and hypothenar patterns are more common in females than males.

Blanka ( 1976 )[8] noted that females were having higher frequency of the patterns in I4 and hypothenar area and the lower pattern frequency in thenar / I1 , I2 and I3 areas in his study on North American Individuals ( 142.90 in male and 120.40 in female )

The frequency pattern in interdigital area is studied by many workers. Even though the studies have been conducted in different countries and amongst the different racial groups, the interdigital area patterns hardly show variations. The percentage frequency of I2 the pattern varies from 1.39 % to 8.80 %. Similarly the percentage frequency of pattern in I3 area amongst the various workers is with the range of 34.80 % to 49.20 %. From this finding it appears that the interdigital area pattern is not much influenced by the genetic constituents.

In the present study there was significant difference within and between the blood groups in Thenar / I1, I2, I3 and Hypothenar area patterns. While in I2 area pattern, females have lower number of I2 pattern (2.79 %) as compare with males (5.90 %). This difference is statistically insignificant. In males frequency of pattern is (2.44 %) in blood group A while rest of the blood groups shows more frequency of pattern. In females blood group O shows highest frequency (3.36 %) of pattern, while rest of the blood groups shows lower frequency of pattern. This variation in blood groups in male and female is insignificant for the I2 pattern (P > 0.05)

**Conclusion**

The present work was undertaken to find co-relation between ABO blood group system and dermatoglyphic patterns in the interdigital areas. Frequency of I2 patterns in males and females of blood group A & O when compared shows insignificant (P > 0.05 ) statistical difference while frequency of I2 patterns in males and females of blood group B & AB when compared shows significant (P < 0.05 ) statistical difference.

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