

## **A DERMATOGLYPHIC STUDY OF IRANIAN MUSLIMS PART I: FINGER PATTERNS AND RIDGE - COUNTS**

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### **ABSTRACT**

Finger Patterns and ridge-counts in a random sample of Iranian Muslims consisting of 100 males and 100 females are described. The most common finger patterns found were loops, having a frequency of 54.4% U.L., 3.4% R.L. in males and 51.2% U.L. and 4.8% R.L. in females. The frequencies of arches and whorls in both sexes were 4% and 38.5% respectively. Bimanual and sex differences were indistinct.

A Pattern type index of 11.85 and a pattern intensity index of 13.39 were found in both sexes combined. The mean total finger ridge-count observed is 166.54 in males and 160.93 in females. A significant sex difference of mean ridge-count was observed for digit numbers L3, L4, R2 and also for the total finger ridge-count. Again there was a significance in the mean ridge-count with regard to bimanual difference for digit 2 in males and for digit 3 in females.

The interpretation of the noted observations is discussed.

### **INTRODUCTION**

Finger patterns are very variable in type. According to the simplest classification given by Galton 1892 (1), the patterns could be classified into three main classes: Arches, Loops and Whorls. An arch has no triradius, a loop has one and a whorl has two or three triradii.

Dermatoglyphics have been useful in the study of physical anthropology, disputed paternity and clinical genetics.

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Until now more than 1000 populations from different parts of the world, especially from Europe, have been investigated.

Muslims constitute the majority of the Iranian population and have been referred to on occasion as Iranid, Aric or orientamid. No major study of ridge-counts has hitherto, of 185 Persians living in Germany, has been reported (2). Also, there is a report on the Parsi community who fled to India in the seventh century (3) and an investigation on the Iranian Moslems (4).

## MATERIAL AND METHOD

Finger Prints were volunteered by 100 males and 100 females from Teheran. All individuals were unrelated and healthy. The Prints were taken by graphite and these film and the finger patterns were classified by the method of Penrose (5). The t-test was used for statistical analysis.

## RESULTS AND DISCUSSION

### a. Digital Patterns:

The differences between the percentage frequency of digital patterns in the hands of males and females are given in Table 1. The frequency of whorls for the males is 38.30% and for the females 38.70%. The frequency of whorl pattern given for the Parsi community (3) is 35.8% for males and 33.5% for females. However, the values published in another investigation (2) for Persian males (34.23%) and females (24.65%) are less than in the Iranian Muslims in the present investigation. It is noted that the frequency of whorls increases as one moves from western Europe to Asia.

The frequency of whorls observed in the present investigation confirms that this is so. The bimanual difference of whorls, loops and arches in the Iranian males is not distinct. In the females, contrary to the situation for whorls and arches, the right hand shows more loops than does the left hand. (Table 1).

As shown in Table 1, the sex difference in the total percentage frequency of digital patterns is indistinct. Contrary to the loops, arches are found to be more frequent in females. Generally, it is seen that the frequency of whorls and radial loops is in each instance less in females (6). However, in this survey the frequency of whorls is similar in both sexes, whereas the radial loops frequency is higher in females (Table 1).

The distribution of different patterns on each digit is shown in Table 1. Again this Table, with a few exceptions,

shows similarity between the present results and those in other investigations carried out. The most frequent pattern found among Iranian Muslims is the whorl on the first finger, except in the males where it is found on the fourth finger of the left hand.

The frequencies of arches and radial loops in the present sample resemble those in other reported populations and were found to be most common on finger 2. The bimanual and sex differences were indistinct.

For population comparisons, the pattern intensity index

$$\left(\frac{A \times 100}{W}\right) \text{ and the pattern type index } \left(\frac{L + 2W}{10}\right) \text{ were used (7).}$$

The indices found in the present survey, Parsis (3), and the Persians carried out before (2) are shown in Table 2. Figure 1 presents the percentage of arches and whorls along with the pattern type index found in various European populations. It is observed that the pattern intensity index in the European lies between 10.10 and 14.67. Also it is noted that a geographic gradient exists from north to south in Europe and from western Europe eastward to Asia. Likewise a geographical gradient showing an increase in the pattern index from west to east was reported by Schwidetzky (8).

#### b. Ridge-Count

The finger ridge-counts in the male and female Iranian Muslims are presented in Table 3. The fingers 1 and 4, which have most whorl patterns, have the higher ridge-counts, and lowest ridge-count was on finger 2 which commonly has arches and radial loops.

The mean total finger ridge-count is 166.54 for males and 160.93 for females (see Table 3). Comparison of the total finger ridge-count of Iranian Muslims and Parsis (males 139.8 and females 135.9) shows that the mean total ridge-count in the former is higher because of their higher frequency of whorl patterns.

The most frequent ridge-counts on digits one to five of the males were 22, 0, 19, 23, 20 in the left hand and 22, 18, 15, 23, 17 in the right hand, whereas in the females the left and right hands were 18, 16, 19, 20, 19 and 19, 0, 19, 18, 14 respectively. However, the ridge-count of each digit, either in Iranian Muslims or in Parsis, showed the highest mean on finger 1 and the lowest mean on finger 2 (see Table 3).

The sex difference of mean ridge-count exhibited by the Iranian Muslims for digit numbers left 3 ( $P < 0.01$ ), left ( $P < 0.05$ ), right ( $P < 0.01$ ) and also for total finger ridge-count

( $P < 0.05$ ) were statistically significant, contrary to the results for the Parsi community of India (3).

The bimanual difference of mean ridge-count is found to be significant for digit 2 ( $P < 0.01$ ) in the males and for digit 3 ( $P < 0.01$ ) in the females. However, the results reported by Mavalwala for the Parsis are not distinct.

Table 4 and Figure 2 present the distribution of total finger ridge-count in Iranian Muslims. The total count ranged from 11 to 280 in the males and females (Table 4). The lower counts, i.e., less than 100 in the Iranian Muslim females, were numerous but it does not hold true for the Parsis in India. Further, Figure 2 shows that there is no significance in the distribution of total ridge-count with regard to sex difference and the most frequent total ridge-count found either in the males or the females is between 170 and 180.

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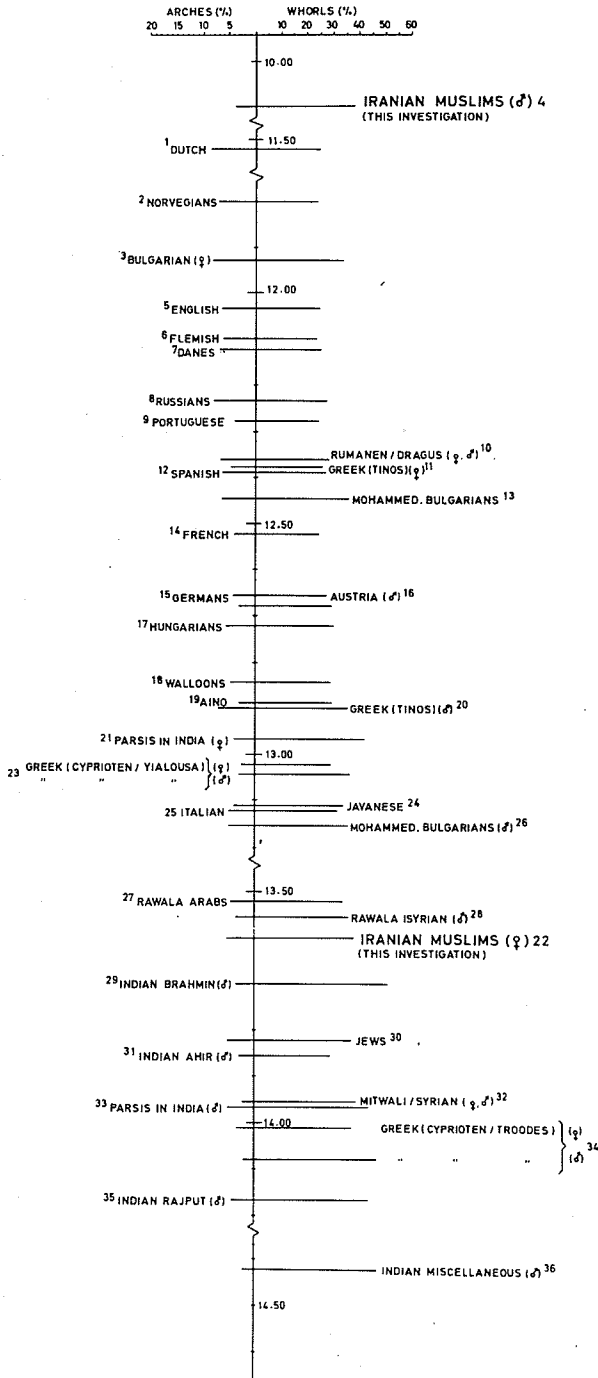
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Fig. 1.

Frequency (%) of Whorl and arches in order of increasing pattern intensity index in different Europid population.



Sources of reference numbers in the graph:  
 1-2, 5-9, 12, 14-15, 17-19, 24-25, 27, 30 (9); 28 (10);  
 11, 20, (11); 32 (12); 35-37 (13); 10 (14); 23-24 (15); 3,  
 13, 26 (16); 16 (17); 21, 23 (3); 4, 22 (this investigation)

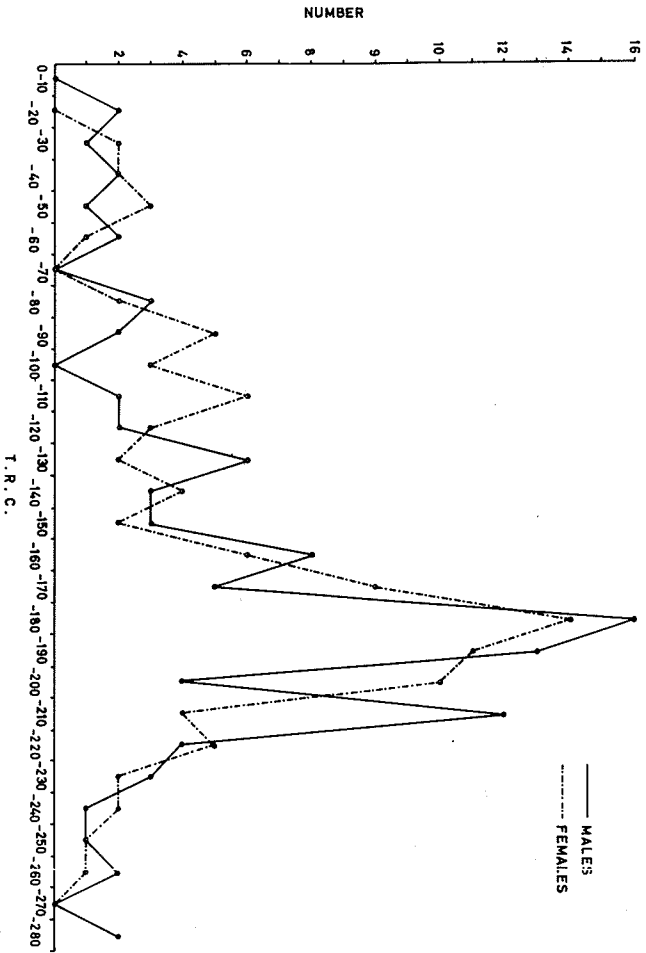


Fig. 2:  
Distribution of total finger riding count (T.R.C.) in Iranian Muslims (100 M., 100F.)

Table 1: Frequency (%) of digital patterns in Iranian Muslims (100 Males, 100

Females) A: Arch, U: Ulnar loop, R: Radial loop, W: Whorl

Finger	Left hand					Right hand					Left hand	Right hand	Both hands		
	1	2	3	4	5	1	2	3	4	5					
Males															
A	6	7	4	4	1	2	11	3	1	-	4	40	3	40	3
U	49	36	70	39	83	46	36	66	47	72	55	40	53	40	54
R	-	14	-	2	-	1	16	-	1	-	3	20	3	60	3
W	45	43	26	55	16	51	37	31	51	28	37	00	39	60	38
Females															
A	3	11	10	-	2	4	12	6	4	1	5	20	5	40	5
U	42	31	59	47	80	38	31	65	44	75	31	80	50	60	51
R	1	14	2	3	1	3	18	3	2	1	4	20	5	40	4
W	54	44	29	50	17	55	39	26	50	23	38	80	38	60	38



Table 2: Pattern type index and pattern intensity index in Iranian and Parsi communities

	Pattern intensity index <sup>1</sup>			Pattern type index <sup>2</sup>		
	M.	F.	M.+F.	M.	F.	M.+F.
Parsi Community (Mavalwala, 1963)	13.97	12.97	13.50	13.08	12.92	13.00
Iranian (Bajatzadeh & Bernhard, 1969)	-	-	-	12.99	11.74	12.70
Present investigation	10.10	13.60	11.85	13.44	13.34	13.39

1  $A/W \times 100$  (Dankmeijer, 1938)

2  $\frac{L + 2W}{10}$  (Cummins and Steggerda, 1935)

Table 3: Mean ridge-count for each finger and total finger ridge-count (T.R.C.) in Iranian Muslims (100 Males, 100 Females)

Digit	Males		Females	
	Mean	S.D.	Mean	S.D.
L1	19.01	5.39	18.62	5.13
L2	13.40	5.57	14.40	7.43
L3	15.12	5.19	16.68	6.08
L4	18.65	4.60	16.79	6.12
L5	16.20	5.27	15.22	5.25
R1	19.07	6.28	19.31	6.68
R2	15.76	5.46	13.81	5.82
R3	14.80	6.27	13.73	6.90
R4	18.24	6.60	16.98	6.32
R5	16.29	4.54	15.39	4.91
T.R.C.	166.54	19.83	160.93	19.23

(T.R.C.) in Iranian Muslims (100 Males, 100 Females)

Total ridge count	Males	Females	Both sexes
0-10	-	-	-
11-20	2	-	2
21-30	1	2	3
31-40	2	2	4
41-50	1	3	4
51-60	2	4	3
61-70	-	-	-
71-80	3	2	5
81-90	2	5	7
91-100	-	3	3
101-110	2	6	8
111-120	2	3	5
121-130	6	2	8
131-140	3	4	7
141-150	3	2	5
151-160	8	6	14
161-170	5	9	14
171-180	16	14	30
181-190	13	11	24
191-200	4	10	14
201-210	12	4	16
211-220	4	5	9
221-230	3	2	5
231-240	1	2	3
241-250	1	1	2
251-260	2	1	3
261-270	-	-	-
271-280	2	-	2