STUDY OF DERMATOGLYPHICS IN DERMATOSIS

NAND KISHORE SHARMA,* R. C. SARIN * AND B. R. PRABHAKAR ‡

Summary

Dermatoglyphic patterns and total ridge count have been studied in 100 Punjabees. These included 25 each of controls, patients with psoriasis, alopecia areata and ichthyosis. No definite single pattern was indicative of any of the diseases studied. However a decreased TRC observed in males with psoriasis was found to be statistically significant.

The study of dermal ridges and the patterns formed by them is known as dermatoglyphics[1]. The ridge patterns get established in the third and fourth month of intrauterine life[2]. These ridge configurations are formed by the elevated parallel rows each about 1/2 mm in breadth of sweat gland orifices[3]. Once the ridge pattern is established it is never altered throughout life[2].

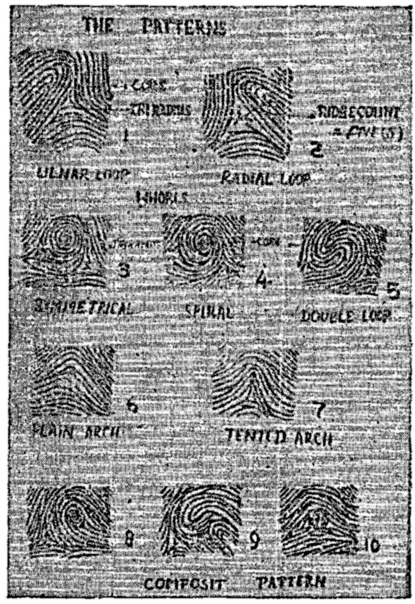
Dermatoglyphics have been classified by Galton[4] based on the recognition of triradius and this classification is being still followed. Triradius is a meeting place of three lines or spokes delineating three regions each containing a system of almost parallel lines[5]. These patterns are classified into three main types — loops, whorls and arches. A fourth type is also known as composite where two or more of the main types happen to appear together in a single impression (Patterns 8, 9, 10). Quantitatively they are studied by ridge counting, which is done by counting the number of ridges transected by an imaginary straight line drawn from the core of the pattern to its triradius. (pattern 2)

* Department of the Skin & V.D., Medical College / Shri Guru Tegh Bahadur Hospital, Amritsar.

‡ Department of Pathology, Medical College, Amritsar.

Received for publication on 11—12—1976

Patterns



Any disturbance, hereditary or environmental, at the time of ridge formation in intrauterine life may alter the normal configuration.

Dermatoglyphics studies have been well documented in diseases with chromosomal anomalies such as mongolism, Turner's syndrome, Down's syndrome and Klinefelter's syndrome and in some systemic disorders such as coronary heart disease, leukemia, etc.

Of special interest is the disturbance in the arrangement of the epidermal ridges that occurs in patients with dermatological disorders, such as, Anonychia, Anhidrotic ectodermal dysplasia, psoriasis, Alopecia areata etc.

The present study has been undertaken to detect any qualitative or quantitative difference in the dermatoglyphics pattern in cases of psoriasis, Alopecia areata and Ichthyosis as compared to a normal Punjabee population.

Material & Methods

A total of 100 cases were studied. All were Punjabees and selected at random from the Skin and S. T. D. Outdoor department of Shri Guru Tegh Bahadur Hospital, Amritsar during the year 1976.

The cases were grouped as follows:

Group	Female	Male	Total
Controls	12	13	25
Psoriasis	8	17	25
Alopecia areata	12	13	25
Ichthyosis	5	20	25
Total	37	63	100

Controls were those cases who were not suffering from any inherited or congenital ailment or any other skin trouble. Diagnoses of psoriasis and Ichthyosis were confirmed on histopathological examination whereas Alopecia areata was diagnosed on clinical basis only.

Rolled type of prints of all ten fingers were taken one by one with the help of printer's ink.

Observations — Patterns

Females:

In females, decreased incidence of arch, and composite patterns and increased incidences of whorl patterns were seen in all the three diseases; Loops were increased in psoriasis and decreased in Alopecia areata and Ichthyosis. These deviations from normal patterns in females were found to be statistically significant in all the three diseases.

Males:

In males, in Alopecia areata loops were increased and other three patterns decreased. On the other hand, in Ichthyosis loops were decreased and other three patterns increased. Further, in Ichthyosis arch pattern on first finger was present in 6 instances (3%). In psoriasis increased incidences of loops and arches, and decreased incidences of whorl and composit were seen. Statistically these changes were significant in males suffering from psoriasis and Ichthyosis, but not in those suffering from Alopecia areata (Table 1).

Total ridge count:

In females total ridge count was increased in all the three diseases, maximum being in psoriasis. In males it was increased in cases of Alopecia areata, whereas it was decreased in cases of psoriasis and Ichthyosis. Further, in psoriasis reversal phenomenon occurred i.e. total ridge count was higher in females as compared to males (Table 2). Statistically the changes were not significant except in males suffering from psoriasis.

Discussion

Control subjects:

In the present study among Punjabees the loop pattern was detected to be the commonest in 62.4% of fingers followed by whorls (22.8%) composite (8.4%) and arches (6.4%) respectively. Cummins and Midlo[6], and Verbov[1] have

TABLE 1
Showing dermatoglyphic patterns

	Loop			Whorls			Arches			Composite		
	F	M	T	F	M	T	F	M	T	F	M	T
	%	%	%	%	%	%	%	%	%	%	%	%
Normal	68.4	56.9	62.4	9.1	35.4	22.8	9.1	3.84	6.4	13.3	3.84	8.4
Psoriasis	75	64.1	67.6	23.75	31.8	29.2	1.25	4.1	3.2	0	0	0
Alopecia areata	62.5	60.77	61.6	31.61	34.61	33.2	4.1	3.0	3.67	1.66	1.54	1.6
Ichthyosis	62	44.5	48	36	39	38.4	6	11	8.8	2	5.5	4.8

TABLE 2
Showing ridge count

	Female			Male		
	Right hand	Left hand	Total	Right hand	Left hand	Total
Normal	60.41	54.69	115.1	75.4	77.4	152.8
Psoriasis	73.25	72.12	145.37	66.41	67.29	133.7
Alopecia areata	65.0	65.83	130.83	78.30	80.70	159.0
Ichthyosis	68.2	64.6	132.8	75.15	74.45	149.6

reported loop pattern 70%, whorls 25% and arch 5%. Further Cummins and Midlo[6] have reported ulnar loop in 64%, radial loops in 6%. In the present series ulnar loop in normal Punjabees were 59.6% and radial loops in 2.8%. Different races have different dermatoglyphic patterns as has been pointed out by Rook and Wilkinson[7]. This is why the patterns in Punjabees is different from those reported by Cummins and Meldo[6] and Verbov[1].

Ridge counts have also been reported differently in different races, but on an average, total ridge count (TRC) in males is higher than in females[8]. Holt[9] detected in the French population an average TRC of 132.3 in males and 121.3 in females. Verbov[1] found an average TRC of 145 in males and 127 in females. In a mixed Indian population Seksena and Mathur[10] have reported an average TRC of 133 in males and 118 in females. While Kumar et al[11] have found average TRC of 148.2 in males and 134.2% in females. In the present study among Punjabees average TRC in males has been 152.8% and in females 115%.

Psoriasis:

Verbov[12] detected an increased incidence of whorls on the 4th finger particularly over right hand, whereas Gibbs and Warhurton[13] stated an increased incidence of whorls on all the ten fingers in cases of psoriasis. A similar preponderance of whorls has also been described by Saha[14] from India.

In the present series of psoriasis patients the whorls pattern was increased in females (23.75%) as compared to the control females (9.1%), but the incidence was a little less in males (31.8%) as compared to the normal (35.4%). On the other hand an increase in loop pattern was seen in both the sexes (67.6%) as compared to the normal (62.4%). Composite pattern was not seen in either sexes. No particular finger was observed to be more prone to get whorl patterns in psoriasis; but it was seen that in males the 3rd finger had less incidence of whorls (5.6%) as compared to normal.

Alopecia areata :

Verbov[12] has reported a decreased incidence of ulnar loop on the 2nd digit in both the sexes of patients with alopecia areata. Saha[14] commenting upon a single case of alopecia totalis detected no abnormal finding. In the present series, though loop pattern was seen less commonly in females it was higher in males than in the control group whereas whorl pattern was increased in females.

No finger was more prone to any particular pattern in any of the diseases studied, except the 2nd finger which had an increased incidence of whorls pattern in the females. A decreased incidence of loop pattern was observed in second finger in both the sexes of the present series, as was also shown by Verbov[12].

Ichthyosis :

Dermatoglyphic studies have not been done extensively in this entity. Saha[14] from India has reported the presence of loop in the 3rd interdigital space. In the present series of 12 cases, among 21, (57%) had loops in the 3rd interdigital space. Loop pattern was the commonest in both sexes, though the incidence was less than in the normals. Incidence of whorl pattern was higher than normal in both sexes. Arch pattern was not seen in females whereas it was increased in males. In females 2nd finger had more whorls as compared to normal and in males, arch pattern on first finger was present in 6 instances against none in the normal.

Total ridge count :

A decrease in total ridge count observed in psoriatic males was found to be statistically significant. In other diseases variation in TRC was not significant.

REFERENCES

1. Verbov JL : A review of dermatoglyphics, J Invest Dermat. 54 : 261, 1970.
2. Walker NF : The use of dermal configurations in the diagnosis of mongolism. Paediat Clin N Amer, 5 : 537, 1958.
3. Penrose LS : Medical significance of finger prints and related phenomenon, Brit Med J, 2 : 321, 1968.
4. Galton F: Finger prints. Macmilton & Co. London 1892, p. 216.
5. Penrose LS: The distal triradius 't' on hands of parents and sibs of Mongole imbecilas, Ann Hum Genet, 19: 10, 1954.
6. Cummins H and Midlo C : Finger prints, palms and soles An introduction to dermatoglyphics, Dover Publication, New York 1961, p 319.
7. Rook A and Wilkinson DS and Ebling FJG : Text Book of Dermatology 2nd Ed. Blackwell Scientific Publications, Oxford, London 1972 p 12-14.
8. Penrose LS: Finger prints, palms and chromosome. Nature, Lond, 197 : 639, 1963.
9. Holt SB: Genetics of dermal ridge, Charles C. Thomas, U.S.A. 1968 p. 9-27, 55 : 80-83.
10. Seksena PN and Mathur, P : Evaluation of dermatoglyphics in mental deficiency, Ind Paediat, 9 : 629. 1972.
11. Kumar S, Mangal BD and Kumar N: Dermatoglyphics in healthy Indian children, Ind J Peci at 41 : 249, 1974.
12. Verbov, JL : Dermatoglyphics and other findings in alopecia areata and psoriasis, Brit J Clin Pract, 22 : 257, 1968.
13. Gibbs. RC and Warhurton D : A study of dermatoglyphics in psoriasis, Finger prints and palm prints in patients with psoriasis, J Invest Derm, 51 : 259, 1968.
14. Saha, KC : Preliminary observation on dermatoglyphics in genodermatosis, Ind J Derm, 14 : 118, 1969.