

## STUDY OF DERMATOGLYPHICS IN DERMATOSES

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## Summary

Dermatoglyphic patterns and total ridge count were studied in 100 random selected Indian Army Personnel of mixed Indian population. They include 25 males each of controls, psoriasis, alopecia areata and vitiligo. Increase in the loops and decrease in whorls were significant in psoriasis. In alopecia areata there was significant increase in whorls and decrease in arch patterns. Radial loops and arches were completely absent on right hands. In vitiligo there were maximum ulnar loops over third and fifth digits of each hand and radial loops were completely absent over digits of left hand. No significant change was observed in total ridge count in these three dermatoses.

KEY WORDS: Dermatoglyphics, Psoriasis, Alopecia areata, Vitiligo.

## Introduction

The term "Dermatoglyphics" was introduced by Cumins and Middle<sup>1</sup> in 1926 to describe the grooves and ridges in the epidermis. The ridge patterns once established never are altered throughout life. These patterns are classified into three main types - loops, whorls and arches. Loops are ulnar or radial, whorls are symmetrical, spiral or double loop and arches may be simple or tented. Quantitatively they are studied by ridge counting, which is done by counting the number of ridges transected by a straight line drawn from the Core of the pattern to its delta or triradius (Fig. 1). Any disturbance, hereditary or environmental, at the time of ridge formation in intrauterine life may alter the normal

configuration. A number of dermatoglyphic studies have been conducted on psoriasis, vitiligo and alopecia areata. The present study was undertaken in these diseases among the Indian Army Personnel.

## Material and Methods

Twenty five male patients each of psoriasis, alopecia areata and vitiligo were selected at random from the skin department. Control group consisted of 25 males from para medical staff without previous or present evidence of these diseases. Both groups were matching in all aspects. Rolled finger prints were collected by the ink method (Fig. 2). Patterns and ridge count were recorded in each case (Table 1).

## Observations

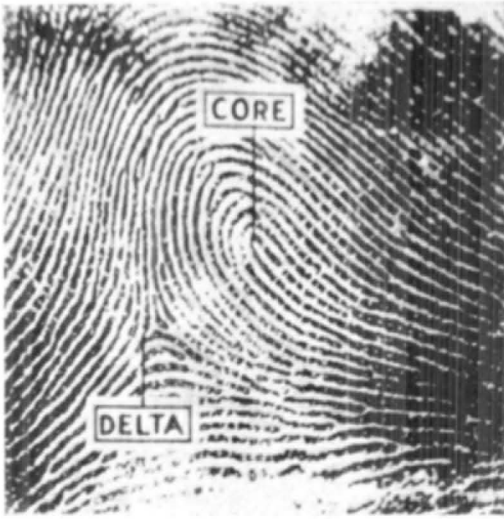
## Controls :

(a) Loop pattern was observed in 141 (56.4%) of digits consisting of 134 (ulnar) and 7 (radial) followed by whorls 98 (39.2%) and arches 11 (4.4%).

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**Fig. 1**

Ulnar loop pattern, ridges enter, recurve and leave off at ulnar side. Pattern possesses single delta (triradius) and a core. Both points are joined together with a line and the ridges are counted across the line.

(b) Loop pattern was more over first, second and fourth digits of each hand.

(c) Whorls were present more over first, second and fourth digits of each hand.

(d) There were 4 and 7 arches over right and left hand respectively. Six (54.6%) out of 11 arches were present over the second digits (3 on either). Third digits also showed arches bilaterally but none was noticed on the first digit of either hand.

(e) Range of the ridge count was from 55 to 187 and the total ridge count (TRC) was 142.3 on an average.



**Fig. 2**

Ulnar loop over right thumb with 21 ridges.

**Psoriasis :**

(a) Loop pattern was seen in 162 (64.8%) consisting of 154 (ulnar) and 8 (radial) followed by whorls 77 (30.8%) and arches 11 (4.4%). Increase in loops and decrease in whorls were statistically significant.

(b) Loop pattern was more over third and fifth digits of each hand and first digits of left hand.

(c) Maximum whorls were noticed over first digit of right and fourth digits of each hand.

(d) Distribution of arches was almost similar to that found in controls.

TABLE I  
Dermatoglyphic Patterns

	Loops			Whorls			Arches			Grand Total
	Right hand	Left hand	Total	Right hand	Left hand	Total	Right hand	Left hand	Total	
	No(%)	No(%)	No(%)	No(%)	No(%)	No(%)	No(%)	No(%)	No(%)	No(%)
Controls	69 (27.6)	72 (28.8)	141 (56.4)	52 (20.8)	46 (18.4)	98 (39.2)	4 (1.6)	7 (2.8)	11 (4.4)	250 (100)
Psoriasis	74 (29.6)	88 (35.2)	162* (64.8)	45 (18.0)	32 (12.8)	77* (30.8)	6 (2.4)	5 (2.0)	11 (4.4)	250 (100)
Alopecia areata	53 (21.2)	68 (27.2)	121 (48.4)	72 (28.8)	56 (22.4)	128** (51.2)	—	1 (0.4)	1** (0.4)	250 (100)
Vitiligo	57 (22.8)	67 (26.8)	124 (49.6)	63 (25.2)	53 (21.2)	116 (46.4)	5 (2.0)	5 (2.0)	10 (4.0)	250 (100)
Statistical evaluation	*		**							

**Alopecia Areata :**

(a) Loop pattern was noticed in 121 (48.4%) consisting of 118 (ulnar) and 3 (radial) followed by whorls 128 (51.2%) and arches 1 (0.4%). Decrease in loops was not statistically significant.

(b) Complete absence of radial loops over digits of right hand was observed though this was present in 3 controls.

(c) Loops were observed more over second, third, fifth digits of right and first, third and fifth digits of left hands.

(d) Maximum whorls were present over first and fourth digits of right and fourth digit of left hand. The increase in whorls pattern was statistically significant.

(e) Only one arch was noticed over second digit of left hand and the decrease in arch pattern was found to be statistically significant.

**Vitiligo :**

(a) There were loops in 124 (49.6%) consisting of 123 (ulnar) and 1 (radial), whorls in 116 (46.4%) and arches in 10 (4.0%). Decrease in loops and increase in whorls were statistically insignificant.

(b) There was complete absence of radial loops over the digits of left hand though one was present over the second digits of right hand. Ulnar loops were observed more over third and fifth digits of each hand.

(c) Maximum whorls were present over the first, second and fourth digits of each hand.

(d) Arches were seen only over second and third digits of each hand.

(c) There was no statistical difference in all the patterns except the difference in the distribution of ulnar loops and decrease in radial loops.

#### *Total Ridge Count (TRC)*

Range of ridge count was 16-238 and TRC 139 in psoriasis; 102 to 218 and TRC 148 in alopecia areata; 50 to 216 and TRC 148 in vitiligo. Variation in TRC was not significant ( $p > 0.05$ ) in all the three dermatoses.

#### **Discussion**

##### **Psoriasis :**

There was statistically significant increase in loop pattern (64.8%) with an increase in incidence over the third and fifth digit of each hand and first digit of left hand in this series. Sharma<sup>2</sup> et al also observed an increase in loops but did not specify the digits. We noticed decrease in the whorls (30.8%) which was of statistical significance. Sharma<sup>2</sup> et al and Verma<sup>3</sup> et al also stated slight decrease in their male patients but other workers observed an increase in incidence<sup>4,6</sup>. The distribution of whorls was maximum over the first and fourth digit of each hand in our cases but<sup>4,6</sup> they observed only on the right fourth fingers. Gibbs<sup>7</sup> et al stated an incidence of whorls on all the ten fingers.

##### **Alopecia areata :**

There was decrease in loop pattern (48.4%) but the difference was not statistically significant. Sharma<sup>2</sup> et al noticed slight increase in incidence of loops. Ulnar loops were mostly distributed over third and fifth digits of each hand and radial loops were not noticed at all over the right digits. Decrease in incidence of ulnar loops was observed over the second digit but fourth digit was also having the maximum of loops in our series. Whorls were 51.2% and the increase was statistically significant. The maximum incidence was noticed over the first and

fourth digits of right and fourth of left hands. Only one arch (0.4%) of statistical significance was observed over second left digit by us. Sharma<sup>2</sup> et al and Verma<sup>3</sup> et al did not observe any difference both in whorls and arches in their male cases. Saha<sup>5</sup> detected no abnormal findings in his solitary case. Dzuibo<sup>8</sup> et al did not find any statistically significant difference in the occurrence of patterns over digits in 91 male cases of alopecia areata but Verbov<sup>4</sup> reported less number of ulnar loops over second digits and increased frequency of whorl pattern in males.

##### **Vitiligo :**

There was statistically insignificant decrease in the frequency of loops and increase of whorls in our series. Verma<sup>9</sup> et al found slight decrease in incidence of loops and whorls pattern but Sahasrabuddhe<sup>10</sup> et al observed significant decrease incidence of whorls on both the hands. There was complete absence of radial loops over the digits of left hand and one was present over the second digit of right hand in our cases. On the other hand Verma<sup>9</sup> et al and Sahasrabuddhe<sup>10</sup> et al observed increase in incidence of radial loops on the second fingers. We did not notice any difference in the arch pattern but both<sup>9,10</sup> of them reported higher frequencies. Only agreement in findings with the studies of Verma<sup>9</sup> et al and Sahasrabuddhe<sup>10</sup> et al is the increased incidence of ulnar loops on the fifth digit, though third digit was also having equally more loops in our cases.

No significant change in total ridge count was observed in all the three dermatoses except a slight variation on either side of the controls. This was also in agreement with the observations of other workers<sup>3,9,10</sup> but Sharma et al reported statistically significant decrease TRC in psoriatic males.

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