

Comparison of Dermatoglyphics Pattern among Vitiligo Patients and Normal Controls: Qualitatively and Quantitatively

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ABSTRACT

Introduction: Abnormality in genes would alter the dermatoglyphic pattern in individuals. Dermatoglyphics which deals with epidermal ridges can be useful in early diagnosis of Vitiligo. The present study has been undertaken to study qualitative and quantitative dermatoglyphic patterns in cases of Vitiligo and comparison with the Controls.

Materials and Methods: The present study was carried among clinically diagnosed 30 cases of vitiligo and 30 controls age and sex matched individuals without present or previous evidence of this disease. Dermatoglyphic printing has been done using older and fairly good "Indian Ink Method".

Results: In Vitiligo it was seen that there was statistically extremely significant increase in frequency of Loop with P value 0.0009. Comparing whorls of controls vs vitiligo, P value came out as 0.270 thus making it statistically not significant. Ulnar loop were observed more over third, fourth and fifth digit of each hand. Radial loop were completely absent in third, fourth and fifth digit of each hand. Maximum whorls were present in fourth digit of each hand. Complete absence of arches over fourth and fifth digit of each hand was observed in Vitiligo Patients.

Conclusion: The dermatoglyphic features of this study can be of help as a diagnostic tool to point towards the provisional diagnosis and person at risk, but it still requires more elaborate study in large number of patients. The findings may be used to add advantage in dermatology, as they point towards a probable diagnosis. Therefore it is advisable to incorporate dermatoglyphic examination in routine practice.

Keywords: Dermatoglyphics; Genetics; Vitiligo.


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INTRODUCTION

Dermatoglyphics is a scientific study of epidermal ridges and their configuration on the volar aspect of hands, fingers, feet and toes.¹ Skin of palm & sole is specialised. Basal layer shows more pronounced undulations & pattern known as ridges & furrows which produce finger prints & palm feet & toes prints. This ridge structure is never influenced by age or environmental factors. Abnormality in genes would alter the dermatoglyphic pattern in individuals. This fact dermatoglyphic in study of medical genetics.² There are diseases known to be caused by the genetic abnormalities e.g. Down's syndrome which has some characteristic dermatoglyphic patterns.¹ Vitiligo is a common acquired idiopathic disease characterized by one or more patches of depigmented skin due to degeneration or disappearance of cutaneous melanocytes.³ It is a disorder of pigmentation where complete or partial loss of melanocytes in the skin and or hair occurs.¹

Dermatoglyphics which deals with epidermal ridges can be useful in early diagnosis of Vitiligo.³ Dermatoglyphic patterns is a simple

& inexpensive tool for determining genetic abnormality & can be used as supportive diagnosis for definitive diagnosis.⁴ The present study has been undertaken to study qualitative and quantitative dermatoglyphic patterns in cases of Vitiligo and comparison with the Controls.

MATERIALS AND METHODS

The present cross sectional observational hospital based study was conducted in the department of Anatomy, SMS Medical College, Jaipur over a period of one year. Sample size is estimated at 80% study power α level 0.05 & β 0.2, assuming the percentage of whorls in vitiligo 46.4% & controls 39.2%, the study size thus obtained is 20 cases in each group. Finally it is decided to take 30 cases in each group. Inclusion Criteria was patients who were clinically diagnosed of vitiligo with age ranged from 30-60 years and were cooperative as well as capable of understanding the procedure. Selection of controls were from attendant of cases who were not first degree relative of patient.

Controls were age and sex matched individuals without present or previous evidence of this disease. Patient with diseases affecting dermatoglyphics pattern like, leprosy, burn cases, bronchial asthma, celiac disease, CHD; professionals destroying the normal dermatoglyphics like welders, chemical factory workers as well as patient / control who have lesion of diseases on palmar surface of hand were excluded from the study. Dermatoglyphic printing has been done using older and fairly good "Indian Ink Method" (Cummins and Midlo, 1961).⁵ The hands were washed with soap and water and the humidity was removed with the help of ether which also removes the greasy material. A small dab of printer's ink was squeezed out on inking slab and spread with the help of a roller into a thin film. Palm was carefully smeared uniformly with inked roller to cover the whole area of palm to be printed for examination. Paper was set over the round bottle and the partly open fingers and palm were successively rolled over with some pressure, permitting the bottle and paper to move forward, so that whole of the palm and plain or dab finger prints are properly obtained. Plain or dab prints in Cummins method have been recorded separately without rotation of digits by contact of ball of finger. The rolled finger prints were taken by rotation of the fingers both in inking and printing in order to obtain complete impression of finger tips (ball).

The paper was laid edge to edge, upon rigid plain surface of smooth table top of glass sheet. Inking was completed by placing the edge down on the ink film and rolled till the opposite margin comes in contact with surface of inking slab, Next the finger is

pressed edge down against paper margin and rolled to opposite edge in a manner, similar to that in inking.

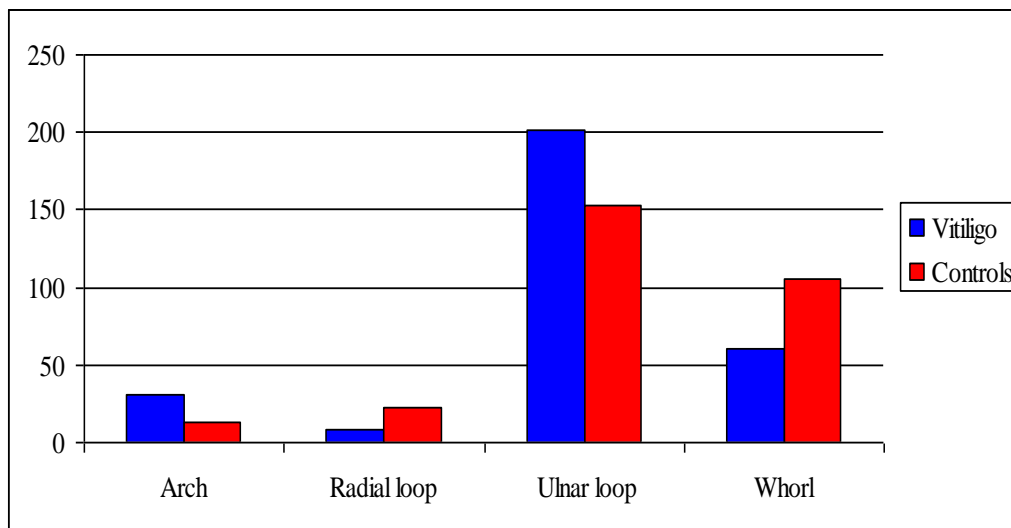
The knowledge of anatomical adaptation to rotation of hand and arm is applied to minimise awkward manipulations. Thus, thumb has to be placed with the ulnar edge downward and rolled toward the body and other digits are placed with the radial edge downward and rolled away from the body. This method enables us to record the complete imprints of palm including Palmar surfaces of all five digits in one attempt.

Dermatoglyphic Patterns: The epidermal ridges form definite local design on the terminal segments of digits and inconsistent sites on the palm and sides. There are four types of patterns:

- (a) Arch
- (b) Whorl
- (c) Loop
- (d) Composite

The dermatoglyphic features of this study can be of help as a diagnostic tool to point towards the provisional diagnosis and person at risk but it still requires more elaborate study in large number of patients.

If p value >0.05 result: Difference is not statistically significant and the two groups compared are not statistically different, hence null hypothesis accepted. If p value <0.05 Result: Difference is statistically significant and the two groups compared are statistically different, hence null hypothesis rejected. For p<0.01 Difference is statistically very significant. For p<0.001 Difference is statistically extremely significant.



Graph 1: Comparative graph of finger print pattern of Vitiligo and Control group

Table 1: Dermatoglyphic patterns of right hand patients of Vitiligo

	Right Hand					Total
	Th	I	M	R	L	
A	4	9	2	0	0	15
C	0	0	0	0	0	0
RL	2	2	0	0	0	4
UL	19	13	24	22	30	108*
W	5	6	4	8	0	23
Total	30	30	30	30	30	

UL: Ulnar loop; RL: Radial loop; A: Arch; W: Whorl; Th: Thumb; I: Index Finger; M: Middle Finger; R: Ring Finger; L: Little Finger

Table 2: Dermatoglyphic patterns of left hand patients of Vitiligo

Left Hand						
	Th	I	M	R	L	Total
A	7	7	2	0	0	16
C	0	0	0	0	0	0
RL	2	2	0	0	0	4
UL	14	15	22	18	24	93*
W	7	6	6	12	6	37
Total	30	30	30	30	30	150

Table 3: Dermatoglyphic patterns of right hand patients of Controls

Right Hand						
	Th	I	M	R	L	Total
A	0	4	0	0	0	4
C	0	0	0	0	0	0
RL	3	5	1	3	1	13
UL	26	18	17	9	26	83
W	4	8	13	21	4	50
Total	30	30	30	30	30	150

Table 4: Dermatoglyphic patterns of left hand patients of Controls

Left Hand						
	Th	I	M	R	L	Total
A	0	9	0	0	0	9
C	5	0	0	0	0	5
RL	5	5	0	0	0	10
UL	16	8	17	8	21	70
W	4	8	13	22	9	56
Total	30	30	30	30	30	150

Table 5: Total loops (Right hand +left Hand)

Parameters compared	P value	Results
Control v/s Vitiligo (RL and UL)	0.0009	Extremely Significant

Table 6: Total Whorls (Right hand +left Hand)

Parameters compared	P value	Results
Control v/s Vitiligo	0.2705	Not Significant

RESULTS

Graph 1 shows comparison of finger print pattern of Vitiligo and controls. Table 1 and 2 shows dermatoglyphic patterns of patients of Vitiligo. There were Loops in 209 (69.66%) consisting of 201(67%) ulnar and 8 (2.67%) were radial, and whorls in 60(20%) and arches in 31 (10.33%). Increase in Loop was statistically significant. Ulnar loop were observed more over third, fourth and fifth digit of each hand. Radial loop were completely absent in third, fourth and fifth digit of each hand. Maximum whorls were present in fourth digit of each hand. Complete absent of arches over fourth and fifth digit of each hand. Composite were completely absent unlike controls.

Table 3 and 4 shows dermatoglyphic patterns of patients of Controls. Loop pattern was observed in 153 (51%) of digits consisting of 70 (ulnar) and 23 (radial) followed by whorls 106 (35.33%) and arches 13 (4.33 %). Loop point was more over first, second and fifth digits of each hand. Whorls were present more over first, third and fourth digit of each hand. There were four arches in right hand and nine in left hand. Range of ridge count was 55-187 (total ridge count was 142.3 on an average). Range of ridge count was 50 to 216 and TRC 148 in vitiligo. Variation in TRC was not significant (p > 0.05) in all the three dermatoses. Total loops control v/s vitiligo (RL and UL) showed extremely significant (table 5).

DISCUSSION

Vitiligo may be inherited and supposed to have genetic basis.⁶ Worldwide distribution of vitiligo is 1- 4%⁷ while in India is as high as 8.8%,⁸ in states like Gujarat, Rajasthan its prevalence is epidemic affecting all races & sexes.⁹ In the present study, there was statistically extremely significant increase in frequency of Loop observed with P value 0.0009. Comparing whorls of controls vs vitiligo, P value came out as 0.270 thus making it statistically not significant. The difference in preponderance when compared to our study may attribute to the different type disease study, small series of patients and ethnic variation in Indian subcontinent.

Verma et al¹⁰ found slight decrease in incidence of Loops and whorls patterns but Sahasrabuddhe et al¹¹ observed significant decrease in incidence of whorls on both hands. There was complete absence of arches on fourth and fifth digit of each hand. There was complete absence of radial loop over third, fourth and fifth digit of each hand. On the other hand Verma et al¹⁰ and Sahasrabuddhe et al¹¹ observed an increase in incidence of radial loop on the second finger.

No difference was noticed in arches pattern but both of them reported high frequency. Only agreement with findings of Verma et al¹⁰ and Sahasrabuddhe et al¹¹ is increase in incidence of ulnar loop on fifth digit though third digit was also having equally more loops in cases undertaken. Iqbal S et al¹² studied one hundred probands of vitiligo for palmar dermatoglyphics, both qualitatively and quantitatively, and were compared with those of 100 phenotypically normal control subjects. Ulnar loop pattern was the most common digital pattern observed in both probands and controls. An increased incidence of whorls and arches in men and women probands, respectively, was found to be statistically significant when compared with those of controls.

In Vitiligo patients Ulnar loop were observed more over third, fourth and fifth digit of each hand. Interestingly radial loops were completely absent in third, fourth and fifth digit of each hand. Kumar P et al¹³ reported that in vitiligo there was an increased incidence of ulnar loops on the 5th digit as compared to controls. Earlier a study carried out by Kapur TR et al¹⁴ to correlate the specific dermatoglyphic pattern in the three dermatoses, viz Psoriasis, Vitiligo and Alopecia areata and control. They found significant changes in dermatoglyphic pattern in three diseases with that of controls. Dermatoglyphic patterns are affected by various factors. Racial and genetic factors play important roles in deciding the qualitative and quantitative patterns of dermatoglyphics. Our aim was to find out a definite correlation between dermatoglyphics and Vitiligo. We cannot label one factor as a single absolute factor, so it is difficult to find out absolute and independent correlation with the disease but nevertheless a corroborative value is of concordant important.

CONCLUSION

The present study concluded that in vitiligo it was seen that there was statistically extremely significant increase in frequency of Loop with P value 0.0009. Comparing whorls of controls vs vitiligo, P value came out as 0.270 thus making it statistically not significant. Ulnar loop were observed more over third, fourth and fifth digit of each hand. Radial loop were completely absent in third, fourth and fifth digit of each hand. Maximum whorls were present in fourth digit of each hand. Complete absence of arches over fourth and fifth digit of each hand was observed in Vitiligo

Patients. The dermatoglyphic features of this study can be of help as a diagnostic tool to point towards the provisional diagnosis and person at risk, but it still requires more elaborate study in large number of patients. The findings may be used to add advantage in dermatology, as they point towards a probable diagnosis. Therefore it is advisable to incorporate dermatoglyphic examination in routine practice.

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