



THE STUDY OF PALMAR DERMATOGLYPHICS IN PSORIASIS.

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ABSTRACT

Dermatoglyphics is the scientific study of epidermal ridges on palms and soles. It is one of the recent and advancing of medical science. If there is any abnormality in the genetic make-up of parents it is inherited to the children and is reflected in dermatoglyphic pattern. This study is undertaken to find out correlation between dermatoglyphics and psoriasis. Psoriasis has been regarded as the "expression of disturbed environment and adaptation as between the patient and his environment." Various dermatoglyphic palmar patterns of psoriatic patients are studied. The present study is carried with an aim to study the dermatoglyphic trait in psoriasis in Maharashtra and compared them with the controls. The sexual and digital differences in dermatoglyphic patterns of psoriatics and controls are also seen. The present study is carried out in the department of anatomy, NKP SIMS, Nagpur. It consists of 600 subjects (300 psoriatics and 300 controls) whose palmar prints are collected from department of skin and venereal diseases. Prints are taken on maplitho paper by using printing ink and studied with magnifying lens. Various parameters of dermatoglyphics like finger tip patterns, palmar patterns, triradii, atd angle and a-b ridge count are analyzed by using Statistical calculations to find out the mean, standard deviation, coefficient of variation and chi-square test. After complete analysis it is concluded from the study that there is definitely a statistically significant difference in the dermatoglyphic patterns of psoriatics and controls. There is no regional difference but differences are found in the male and female subjects.

KEY WORDS : Dermatoglyphics, Psoriasis, Palmar prints, Analysis.



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INTRODUCTION

Dermatoglyphics is the scientific study of epidermal ridges and their configurations on the palmar region of hand and fingers and plantar region of foot and toes. Dermatoglyphics is one of the recent and advancing of medical science which depends upon the cornified layer of epidermis and dermal papillae. It is studied and used in the predictions of genetic disorders (*Cummins and Midlo 1926*)¹. The epidermal ridges are differentiated in their definitive forms during third and fourth month of foetal life, hence they are the significant indicators of conditions existing several months prior to the birth of individual (*Cummins and Midlo 1943*)². Similarities of dermal patterns are seen among relatives specially usually between monozygotic twins (*Mollar Essen 1937-39*)³, but still there are distinct variations between unrelated individuals as well as members of different races and between different sexes (*Banerjee 1970*⁴, *Ashizawa 1972*⁵ and *Thowa 1974*)⁶. There are thousands of diseases known to be caused by abnormal genes. If there is any abnormality in the genetic make-up of parents it is inherited to the children and is reflected in dermatoglyphic pattern (*Walkar 1964*)⁷. Hence the study of dermatoglyphics proves to be very useful in predicting the hereditary diseases in patients. Abnormal dermatoglyphic patterns are known to occur with genetic disorders (*Cummins H. 1936*⁸, *Penrose 1963*⁹ and *Lindsten H. J. 1964*)¹⁰.

In the near future due to recent advancement in the field of dermatoglyphics it will be possible to a large extent to predict whether an individual is suffering or will suffer in future from a genetic disease by the study

of dermatoglyphics. Efforts are being made to predict even at birth whether a newborn is suffering from or will suffer from any genetic disorder. Dermatoglyphics is also used in the branch of forensic science for individual identification. This study was undertaken to find out correlation between genetic predisposition of dermatoglyphics and psoriasis. Psoriasis is a common familial skin disease. It is a disease of unknown aetiology having an incidence of 1 to 3% throughout the world (*Sutton 1948 and Bereston 1950*)¹¹. Psoriasis from its mode of inheritance appears to have both genetic and environmental etiologic components (*Farber E. M. and Vanscott E. J. 1979*)¹². Psoriasis is inherited by a single dominant gene on chromosome number '6' (*Marks Ronald 1963*)¹³. The phenotypic concordance was found to be 70% in homozygous twins as compared to 23% concordance in dizygotic twins (*Farber et al 1974*)¹⁴. Psoriasis has been regarded as the "expression of disturbed environment and adaptation as between the patient and his environment". The aim of the present study is to study the dermatoglyphic traits in patients of psoriasis and compare them with the non-affected general population. It is to establish sexual and digital differences in dermatoglyphic patterns of psoriasis.

MATERIAL AND METHODS

The present study is carried out in the Department of Anatomy, NKP Salve Institute of Medical Sciences and Research Centre, Digdoh Hills, Nagpur. Dermatoglyphic patterns of 600 subjects were studied on both the sides.

Subject	Males	Females
Psoriatics	150	150
Controls	150	150

The palmar prints of psoriatic patients were collected from the Department of Skin and

Venereal Disease, NKP Salve Institute of Medical Sciences and Research Centre, Digdoh

Hills, Nagpur. The palmar prints of 300 normal healthy individuals were collected to serve as controls. The present study was approved by the institutional ethical committee and after that the work was started. The dermatoglyphic prints were taken by the "INK METHOD" described by *Cummins and Midlo (1961)*¹⁵. The prints of both the hands were taken on Map Litho paper and then they are subjected for detailed dermatoglyphic analysis with the help of magnifying hand lens and ridge counting was done with the help of sharp needle.

5 parameters were applied for the study.

- i) Finger Tip Patterns.
- ii) Palmar patterns.
- iii) Total number of palmar triradii.
- iv) 'atd' angle.
- v) 'a – b' ridge count.

Parameters were analyzed to find out mean, SD, Coefficient of variation, & SE. Parameters were confirmed by applying test of significance like 't' test or 'x²' test. Statistical calculations were done by using the formulae like mean, standard deviation etc. Sex differentiation was also done by using various parameters.

Observations

Table No. 01

Percentagewise digital distribution of finger tip patterns among psoriatics and controls.

DIGITS	FTP	MALES						FEMALES					
		RIGHT		LEFT		TOTAL		RIGHT		LEFT		TOTAL	
		Pt	Co.	Pt	Co.	Pt	Co.	Pt	Co.	Pt	Co.	Pt	Co.
I	L	92	75	97	75	189 (63%)	150 (50%)	99	96	82	99	180 (60%)	195 (67%)
	W	56	66	49	57	105 (35%)	123 (41%)	51	42	63	36	114 (38%)	78 (26%)
	A	02	09	04	18	06 (2%)	27 (9%)	00	12	05	09	05 (1.6%)	21 (7%)
II	L	89	69	88	69	177 (59%)	138 (46%)	54	75	69	61	123 (41%)	136 (47%)
	W	44	69	47	60	91 (30%)	129 (43%)	90	66	69	89	160 (53.3%)	155 (45%)
	A	17	12	15	21	32 (11%)	33 (11%)	06	09	12	15	17 (5.6%)	24 (8%)
III	L	113	114	112	105	225 (75%)	219 (73%)	76	120	65	81	141 (47%)	204 (68%)
	W	30	24	33	33	63 (21%)	57 (19%)	72	24	77	54	149 (49.6%)	78 (26%)
	A	07	12	05	12	12 (4%)	24 (8%)	02	06	08	12	10 (3.3%)	18 (6%)
IV	L	86	78	92	75	178 (59%)	153 (51%)	45	51	45	48	90 (30%)	99 (33%)
	W	62	63	58	66	120 (40%)	129 (43%)	104	90	97	89	201 (67%)	129 (59.6%)
	A	02	09	00	09	02 (1%)	18 (6%)	01	09	08	09	09 (3%)	18 (6%)
V	L	114	114	124	114	238 (79%)	228 (76%)	91	105	95	99	186 (62%)	204 (68%)
	W	33	33	26	30	59 (20%)	63 (21%)	57	42	52	42	109 (36.3%)	84 (28%)
	A	03	03	00	06	03 (1%)	09 (3%)	02	03	03	07	05 (1.6%)	12 (4%)

Table No. 02

Percentagewise and areawise distribution of palmar patterns among psoriatics and controls.

INTERDIGIT AL AREAS	SUBJECT	MALES				FEMALES			
		PP		TOTAL	%	PP		TOTAL	%
		RIGHT	LEFT	R + L		RIGHT	LEFT	R + L	
THENAR	CONTROL	11	09	20	6.6	19	15	34	11.3
	PATIENT	03	15	18	6.0	12	08	20	6.6
ID1	CONTROL	08	06	14	4.6	05	04	09	3.0
	PATIENT	08	07	15	5.0	07	08	15	5.0
ID2	CONTROL	10	09	19	6.3	04	05	09	3.0
	PATIENT	14	10	24	8.0	10	08	18	6.0
ID3	CONTROL	61	65	126	42.0	42	49	91	30.3
	PATIENT	88	70	158	52.6	70	36	106	35.3
ID4	CONTROL	62	63	125	41.6	79	90	169	56.3
	PATIENT	56	52	108	36.0	87	103	190	63.3
HYPOTHEN AR	CONTROL	18	26	44	14.6	29	35	64	21.3
	PATIENT	33	31	64	21.3	25	28	53	17.6

Table No. 03

Frequency distribution of palmar triradii (M+F) in psoriatics and controls.

NUMBER OF PALMAR TRIRADII	SUBJECT	RIGHT		LEFT		RIGHT + LEFT	
		NO.	%	NO.	%	NO.	%
3	PATIENT	06	2.0	05	1.6	11	1.8
	CONTROL	04	1.3	05	1.6	09	1.5
4	PATIENT	31	10.3	52	17.3	83	13.8
	CONTROL	37	12.3	53	17.6	90	15.0
5	PATIENT	247	82.3	230	76.6	477	79.5
	CONTROL	234	78.0	217	72.3	451	75.1
6	PATIENT	16	5.3	13	4.3	29	4.8
	CONTROL	25	8.3	25	8.3	50	8.3

Table No. 04
Statistical calculations for 'atd' angle.

SUBJECT	SEX	SIDE	\bar{X}	S.D.	S.E.of \bar{X}	C.V in %
P S O R I A T I C S	M	R	41.30	5.32	0.434	12.881
		L	40.69	5.37	0.438	13.197
	F	R	43.24	5.82	0.475	13.459
		L	42.40	5.54	0.452	13.066
	M + F	R	42.27	5.57	0.321	13.177
		L	41.54	5.45	0.314	13.119
		R + L	41.90	5.51	0.224	13.150
C O N T R O L S	M	R	45.60	6.84	0.558	15.000
		L	45.48	7.57	0.618	16.644
	F	R	44.70	9.83	0.802	21.991
		L	45.42	8.44	0.689	18.582
	M + F	R	45.15	8.33	0.480	18.449
		L	45.45	8.00	0.461	17.601
		R + L	45.30	8.16	0.333	18.013

Table No. 05
Statistical calculations for 'a - b' ridge count.

SUBJECT	SEX	SIDE	\bar{X}	S.D.	S.E.of \bar{X}	C.V in %
P S O R I A T I C S	M	R	39.22	4.10	0.133	10.453
		L	37.52	3.89	0.317	10.367
	F	R	35.75	3.45	0.281	9.658
		L	35.81	3.36	0.274	9.382
	M + F	R	37.47	3.77	0.217	10.061
		L	36.66	3.62	0.209	9.874
R + L		37.06	3.69	0.150	9.956	
C O N T R O L S	M	R	40.84	2.26	0.184	5.533
		L	40.72	2.26	0.184	5.550
	F	R	40.96	2.43	0.198	5.932
		L	41.08	2.30	0.187	5.598
	M + F	R	40.90	2.34	0.135	5.721
		L	40.90	2.28	0.131	5.574
R + L		40.90	2.31	0.094	5.647	

DISCUSSION

In this study various dermatoglyphic parameters were studied in psoriatic patients and compared with different authors.

Finger Tip Patterns

Arch Pattern

In this study 3.6% of arches are found in psoriatic males and 7.4% in control males. In psoriatic females percentage of arches is 3.1% and 6 % in control females. This means percentage of arch pattern is decreased in psoriatics than controls.

Loop Pattern

In psoriatic males the loop pattern is 63 % on the first digit and 59% on the fourth digit, while in control males it is 50 % on the first digit and 51% on the fourth digit which shows significant difference. In rest of the digits the percentage of arches is insignificantly increased. In case of female psoriatics the loop pattern is 48 % than controls 55.6% which is not significant.

Whorl Pattern

The whorl pattern shows significant increase in female psoriatics mainly on the first digit (38%) than control females (26%). The overall whorl pattern is increased in female psoriatics (48.8%) than controls (38.2%). The percentage of whorls in psoriatic males (29.2%) is decreased than that in control males (33.4%). The above findings coincide with observations shown by *Verbov J. L. (1968)¹⁶; Kreiger (1934)¹⁷; Sardari Lal (1977)¹⁸ and Singh P. K. (1983)¹⁹.*

Palmar Patterns

In male psoriatics the percentage of palmar patterns is 52.66% in the third interdigital area and 21.33% in the hypothenar area, whereas in control males it is 42% in third interdigital area and 14.66% in hypothenar area. The percentage of total palmar patterns in psoriatic males is 21.5% and in control males is 19.3%. In female psoriatics the percentage of palmar patterns is 5% in ID1, 6% in ID2, 35.33% in ID3

and 63.33% in ID4 areas, while the percentage of palmar patterns is 3% in ID1, 3% in ID2, 30.33% in ID3 and 56.33% in ID4 areas in female controls. Hence in female psoriatics the percentage of palmar patterns is 22.3% and in control females it is 20.8%. The findings coincide with observations found by *Kreiger (1934)¹⁷; Verbov J. L. (1968)¹⁶; and Singh G. (1983)¹⁹.*

Total number of palmar triradii

In psoriatic patients the frequencies of '3' palmar triradii is increased by 0.3%, '5' palmar triradii by 4.4% and '6' palmar triradii by 3.5%. It also shows decrease of 1.2% in '4' palmar triradii in psoriatics than controls. This means significant differences are seen in '6' palmar triradii in psoriatics and controls. The above findings coincide with the study done by *Singh P. K. and Pandey S. S. (1983)¹⁹.*

'atd' angle

The mean values for 'atd' angle are decreased in psoriatic males (R-41.30 and L-40.69) than control males (R-45.60 and L-45.48). Similarly mean values are decreased in psoriatic females (R-43.24 and L-42.40) than that of control females (R-44.70 and L-45.42). The male and female combined series show lower mean values in psoriatics (41.90) than controls (45.30). So there is significant decrease in the 'atd' angle in psoriatics than controls. The findings coincide with observations of *Singh P. K. (1983)¹⁹.*

'a-b' ridge count

There is decrease in the mean values of 'a-b' ridge count in psoriatic males (R-39.22 and L-37.52) than that of controls males (R-40.84 and L-40.72). Similarly mean values for psoriatic females (R-35.72 and L-35.81) than that of control females (R-40.96 and L-41.08).

In combined series mean values are decreased in psoriatics (37.06) than controls (40.90). This means there is significant decrease in 'a-b' ridge count in psoriatics than

controls. The findings coincide with the study of Laha N. N. (1981)²⁰ and Singh G. (1983)¹⁹.

Summary

- 1) Loop patterns are significantly increased in male psoriatics on the first and fourth digits, whereas female psoriatics shows significant increase in whorl patterns mainly on the first digit. Arch patterns are significantly reduced in both the sexes.
- 2) Palmar patterns are significantly increased in psoriatics males chiefly in the third interdigital and hypothenar areas, while in female psoriatics they show increased patterns on all palmar areas except thenar and hypothenar areas.
- 3) No significant differences are seen in total number of palmar of triradii.
- 4) 'atd' angle shows significant decrease in the mean values in psoriatic males and females.

- 5) 'a-b' ridge count is significantly decreased in psoriatic males and females.

CONCLUSION

The present study concludes that

- 1) There is no regional variation in psoriatic dermatoglyphic patterns in subjects of Maharashtra as compared to those of other regions.
- 2) There is definitely a statistically significant difference in the dermatoglyphic pattern in psoriatic patients as compared to non affected general population.
- 3) There is statistically significant difference in dermatoglyphic patterns of male and female subjects affected by psoriasis.
- 4) There is statistically significant variation in dermatoglyphic patterns of different digits of the same individual affected by psoriasis.

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