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A COMPARATIVE STUDY OF THE FINGER DERMATOGLYPHICS OF NORMAL AND ASTHMATIC PATIENTS (MALE JAT SIKHS)

Correlation between dermatoglyphics and certain diseases has nowadays opened new diagnostic avenues. The epidermal ridges and their configurations have only lately acquired a new significance for the diagnosis and even prediction of certain disease (Mutalik and Lokhandwala, 1969). The value of dermatoglyphics in clinical medicine proved to be of greater significance particularly in the hereditary and congenital disease due to chromosomal and teratogenic effects in early foetal life. The clinical significance of skin ridge patterns in certain developmental and chromosomal defects has been searched for with encouraging results by a number of workers, Penrose (1963), Holt (1951, 1964), Saxena et al. (1966), Kumar and Kumar (1971), Terry et al. (1970), Saxena (1968). The fact, that an inherent tendency to certain types of illnesses can even produce variation in these patients, has made a need for scientific analysis of finger and palm prints in diseased states more important.

Sex chromosome abnormalities like Turners, Klinefelters' and poly 'x' syndromes have been found to produce variation in ridge counts. Saha (1969) observed that uniovular and biovular twins can often be differentiated by quantitative variation in ridge counts. As chromosomal analysis may not be possible in all cases, dermatoglyphics may be used as a screening test to select the few abnormalities expecting an abnormal karyotype. The study of dermatoglyphics may help to distinguish between hidden translocation and mosaic mongols with a low frequency of trisomic cells in certain unresolved cases of Mongolism (Penrose, 1965).

Kumar N. R. et. al (1971) have reported their observations on the dermatoglyphic patterns in 5

cases of thalassemia major and in 15 cases of thalassemia minor. They stated that the dermatoglyphic features observed in their cases were not diagnostic of thalassemia but they were very significant like those of so many other characteristic findings reported in the literature in such cases. According to them the presence of abnormal dermatoglyphics is not related to the severity of the disease.

While reporting on the dermatoglyphics in patients with cancer and control patients without cancer Chorlton (1969) found that there was no reason to associate the arch pattern with any specific disease.

Menser (1969), Dubovitz (1969), Verbov (1969) and (1970), Wertilecki (1969) and Willwer (1970), have reported peculiar finger patterns in patients of leukemia.

From the literature available it is observed that many workers have tried to find out if there exists any relationship between the Finger ball configurations and any type of disease. These studies have not only shown relationship between some pathological or physiological trait with dermatoglyphics, but has also discovered relationship between dermatoglyphic patterns and mental diseases and with other genetical abnormalities.

When the available literature (under limited access to the literature) on this field of dermatoglyphics i.e., dermatoglyphics in relation to abnormalities including diseases, was consulted, the author failed to find any study where the finger patterns have been compared with the asthmatic patients. This aroused our interest to explore the possibilities of finding a relationship, if existed at all, between these two characters. Hence the present investigation was undertaken. These observations, it is hop-

TABLE I *The general Distribution of the three principal pattern types (whorls, loops and arches) on both hands collectively in both groups*

Pattern types	Absolute No.		Percentage	
	Asthmatic patients	Normal males	Patients n = 666	Normals n = 795
whorls	270	281	40.590	35.346
loops	347	474	52.102	59.623
arches	49	40	7.358	5.031

$\chi^2 = 0.4$ $p = > .02$ and $< .01$

ed, will open up a new and fruitful field of studies for other students for whom we submit this paper as a humble and preliminary guide line.

MATERIAL AND METHODS

The study comprised of 73 patients suffering from bronchial asthma. They were all Jat sikhs — an endogamous group of Punjab & Northern State of India. These patients were either studied in local Hospital or at the Clinic of one of the local Medical Practitioners. The diagnosis of bronchial asthma was confirmed by a competent medical doctor. Only those cases who had unequivocal evidence of bronchial asthma were taken for study.

A controlled group consisting of 87 normal healthy males was also studied for comparison with the patients suffering from bronchial asthma. The sample consisting of male jat sikhs (endogamous group) was from Patiala city and its suburbs. Their age varied from 29—90 years. The higher age individuals were taken because the onset of asthma usually occurs in the first four decades of life. A detailed history was taken for any allergic condition in the individual as well as in his family members. A thorough clinical examination was carried out to exclude any possibility of any allergic disorder and any systemic disease, by a competent doctor.

The method of taking finger prints and their analysis as described by Cummins and Midlo (1961) was followed in the present study.

OBSERVATIONS & ANALYSIS

In the present study a comparison has been made for various features of finger dermatoglyphics between the asthmatic patients and the controlled sample. Table I shows the general distribution of the three principal pattern types (W. L. A.) on both hands collectively in both groups. When the three major pattern types of both the groups are compared collectively, it has been found that they show statistically significant differences between the two groups. However, when these three types are

considered separately it has been found that the statistical difference is due to the loops and whorls present in the two groups, as the differences for arches are of non-significant degree. The value of 'd' as calculated on the basis of 'Hypothesis of equality' as described by Bailey (1964) for the presence of whorls in the two groups is of 200 which is statistically significant. Similarly the value of this statistical variable as calculated between the two groups, regarding the presence of loops is equal to 3.621, which is again highly significant. However, in regards to the arches, there has not been found any statistically significant difference. The difference between the percentages of the arches of the two groups is only of 2.287 percent. So it becomes quite clear that there does not exist a statistically significant difference between the two patterns of configuration, as arches do not show any difference.

While comparing the various sub-types of three major patterns of the two groups (Table II) it has been found further that there does not exist any significant difference between the various sub-types of whorls, arches and composites but the composites of the two groups, when grouped together show a statistically significant difference, the value of 'd' being 3.687. As regards the loops it has been found that there is a statistically significant difference between the values of ulnar loops, for the two groups the value of 'd' being 2.815. The frequency of radial loops has been found to be almost equal in both groups.

TABLE II *The general Distribution of the various types of three major patterns in relation to each other in both groups*

Pattern types	Absolute No.		Percentage	
	Asthmatic patients	Normal males	Patients n = 666	Normals n = 795
Whorls	270	281	40.570	35.346
Wcc.	6	8	0.901	1.006
Wss.	120	136	18.018	17.107
WDS.	62	86	9.309	10.818
Composites	82	51	12.312	6.415
WLP.	21	9	3.153	1.132
WTL.	22	9	3.303	1.132
WLP.	34	29	5.105	3.648
Acc.	3	4	0.450	0.503
dw.	2	0	0.300	0
Loops	347	474	52.102	59.623
L ^u	327	450	49.099	56.604
L ^r	20	24	3.003	3.019
arches	49	40	7.358	5.031
A.	31	31	4.655	3.899
T.	18	9	2.703	1.132

TABLE III

The Distribution of various subtypes of three major patterns on individual digits of both hands Combined in both groups

PATTERN TYPES	I				II			
	Patients		Normals		Patients		Normals	
	Abs. No.	% n = 135	Abs. No.	% n = 164	Abs. No.	% n = 134	Abs. No.	% n = 161
WHORLS:	82	60.741	83	50.610	50	37.312	56	34.782
W. C. C.	1	0.741	2	1.220	1	0.746	1	0.621
W. S. S.	17	12.593	28	17.073	20	14.925	28	17.391
W. D. S.	27	20.000	29	17.683	11	8.209	21	13.043
COMPOSITS	37	27.407	24	14.634	18	18.433	6	3.727
W. C. P.	4	2.963	0	0	5	3.731	1	0.621
W. T. L.	16	11.852	7	4.628	4	2.985	1	0.621
W. L. P.	16	11.852	13	7.927	9	6.716	4	2.285
Acc.	1	0.741	4	2.439	0	0	0	0
dw.	0	0	0	0	0	0	0	0
LOOPS:	49	36.296	80	48.780	64	47.761	86	53.416
L ^u	49	36.296	79	48.171	44	32.836	68	42.236
L ^r	0	0	1	0.609	20	14.925	18	11.180
ARCHES:	4	2.963	1	0.609	20	14.925	19	11.801
A	4	2.963	1	0.609	9	6.716	16	9.938
T	0	0	0	0	11	8.209	3	1.863

III				IV				V			
Patients		Normals		Patients		Normals		Patients		Normals	
Abs. No.	% n = 134	Abs. No.	% n = 166	Abs. No.	% n = 132	Abs. No.	% n = 151	Abs. No.	% n = 131	Abs. No.	% n = 153
42	31.343	40	24.096	71	53.788	75	49.669	25	19.084	27	17.647
1	0.746	2	1.205	3	2.273	3	1.987	0	0	0	0
25	18.657	16	9.639	49	37.121	49	32.450	9	6.870	15	9.804
6	4.478	16	9.639	9	6.818	14	9.272	9	6.870	6	3.922
10	7.462	6	3.614	10	7.576	9	5.960	7	5.343	6	3.922
3	2.239	2	1.205	3	2.273	5	3.311	6	4.580	1	0.654
2	1.493	1	0.602	0	0	0	0	0	0	0	0
4	2.985	3	1.851	4	3.030	4	2.649	1	0.763	5	3.268
1	0.746	0	0	1	0.758	0	0	0	0	0	0
0	0	0	0	2	1.515	0	0	0	0	0	0
75	55.970	112	67.570	56	42.424	72	47.682	103	78.626	124	81.046
75	55.970	110	66.265	56	42.424	70	46.358	103	78.626	123	80.392
0	0	2	1.205	0	0	2	1.324	0	0	1	0.654
17	12.686	14	8.434	5	3.787	4	2.649	3	2.290	2	1.307
10	7.462	10	6.024	5	3.787	3	1.987	3	2.290	1	0.654
7	5.223	4	2.410	0	0	1	0.662	0	0	1	0.654

TABLE IV

The general Distribution of various sub-types of the three major patterns in the two hands separately in both the groups

Pattern type	Left hand		Right hand	
	Patients n = 337	Normals n = 400	Patients n = 329	Normals n = 395
WHORLS	120 (35.608)	136 (34.000)	150 (45.539)	145 (36.709)
W.C.C.	2 (0.593)	3 (0.750)	4 (1.216)	5 (1.267)
W.S.S.	45 (13.363)	68 (17.000)	75 (22.796)	68 (17.215)
W.D.S.	29 (8.605)	40 (10.000)	33 (10.030)	46 (11.645)
COMPOSITES	44 (13.026)	25 (6.250)	38 (11.550)	26 (6.582)
W.C.P.	8 (2.374)	6 (1.500)	13 (3.951)	3 (0.759)
W.T.L.	14 (4.154)	4 (1.000)	8 (2.432)	5 (1.267)
W.L.P.	19 (5.638)	14 (3.500)	15 (4.559)	15 (3.797)
Acc.	1 (0.267)	1 (0.250)	2 (0.608)	3 (0.759)
dw.	2 (0.593)	0	0	0
LOOPS	188 (55.786)	238 (59.500)	159 (48.328)	236 (59.747)
L ^u	180 (53.412)	228 (57.000)	147 (44.681)	222 (56.203)
L ^r	8 (2.374)	10 (2.500)	12 (3.647)	14 (3.544)
ARCHES	29 (8.308)	26 (6.500)	20 (6.079)	14 (3.544)
A	19 (5.638)	23 (5.750)	12 (3.647)	8 (2.025)
T	10 (2.967)	3 (0.750)	8 (2.432)	6 (1.519)

Comparison of the distribution of various sub-types of three major patterns on individual digits of both hands combined between the two groups (Table III) have shown that total whorls, concentric whorls, double spiral whorls, accidentals and de-generated whorls do not show any significant differences in their frequencies on all the digits of both the groups. Single spiral whorls show statistically significant differences in their frequencies on the third digit while the difference in their values on first, second and fourth digits is non-significant. The value of 'd' for the presence of single spiral whorl on the third digit is 2.308. These are absent on the fifth digit of both the groups. The difference in the value of twin loops on first digit between the two groups is statistically significant. The value of 'd' for their presence in the two groups is 2.400. The difference in the values of twin loops on second and third digits are non-significant. Twin loops are absent on fourth and fifth digits in the two groups. The central pocket whorls show statistically significant differences on the fifth finger, the value of 'd' being 2.053. The differences in the values of lateral pocket loops in the two groups are on the verge of being significant, the value of 'd' being 1.956.

There is a significant difference in the value of total loops on first and third fingers, the value of 'd' being 2.125 for first digit and 2.091 for second digit. Out of the loops, only ulnar loops show a high statistical probability of being significant on first digit, no marked differences in the frequencies of ulnar loops are observed on the second, third, fourth and fifth digit in the two groups. Radial loops show non-significant differences on all digits in both groups.

As regards arches, only tented arches show statistically significant differences on the second and

third digits. There are no noticeable differences in the frequencies of plain arches on the fourth and the frequencies of tented arches. Tented arches are found fifth digits in both groups. Tented arches are found to be absent on first digit in the two groups.

On the left hand there is no significant difference in the frequencies of the various sub-types of the three major patterns in both groups (Table IV) except total composites where the differences are statistically significant, the value of 'd' being 2.923. The difference between the values of total loops on right hand in both groups are again statistically significant, the value of 'd' being 2.923. On right hand only ulnar loops show statistically significant difference. The value of 'd' for presence of ulnar loops on the right hand of both groups is 3.000.

While comparing the differences of the various pattern types on individual digits on the two hands separately (Table V), remarkable differences in the frequencies of single spiral whorls are observed on first, second, fourth and fifth digits of left hand and third and fourth digits of right hand in both groups. There is not much difference in the incidence of concentric whorls on all the fingers of both hands in the two groups. There is noticeable difference in the frequency of double spiral whorls in the first digit of left hand and first, second, third and fifth digits of right hand in both groups. Twin loops are more on the first digit of both hands in patients than in the normals. There are insignificant differences in the frequencies of lateral pocket loops on all the digits of both hands in the two groups except in the second digit of right hand where these are considerably more frequent in patients than in the normals. The frequency of ulnar loops is greater in the first, second, third and fourth digits of both hands and fifth digit of the right hand in normals and of the left hand in the patients. The incidence of plain arches does not show any noticeable difference in all the digits of both hands in the two groups except in the second digit of the left hand where these are considerably more frequent in normals than in the patients. Tented arches show significant difference on the second digit of both hands and on the third digit of left hand in both groups. These show higher incidence in patients than in the normals.

The pattern intensity and Dankmeijer's indices in both groups (Table VI), do not show much differences. The value of Furu-hata's index in patients is much higher as compared to that in the normals. It clearly shows that the frequency of loops is smaller in patients than in the normals.

TABLE VI *Different indices in asthmatic patients and normal males*

INDEX	Patients	Normals
Pattern Intensity	13.318	13.025
Dankmeijer's	18.148	14.235
Furu-hata's	77.810	59.283

TABLE V

The differences in the frequencies of various sub-types on individual digits on both hands separately in the two groups

PATTERN TYPES	I				II			
	Left		Right		Left		Right	
	Patients n = 69	Normals n = 82	Patients n = 66	Normals n = 82	Patients n = 68	Normals n = 82	Patients n = 66	Normals n = 79
WHORLS								
W. C. C.	0	1.220	1.515	1.220	0	0	1.516	1.266
W. S. S.	7.246	12.195	18.182	21.951	11.765	18.293	18.182	16.456
W. D. S.	13.043	17.073	27.273	16.293	10.294	10.975	8.824	15.190
COMPOSITS								
W. C. P.	2.893	0	3.030	0	2.941	1.220	4.545	0
W. T. L.	14.493	4.878	9.091	3.659	4.412	0	1.515	1.266
W. L. P.	13.043	8.536	10.606	7.317	5.882	2.439	7.576	2.531
Acc.	0	1.220	1.515	3.659	0	0	0	0
dw.	0	0	0	0	0	0	0	0
LOOPS								
L ^u	46.377	53.658	25.758	42.682	36.765	41.464	28.788	43.038
L ^r	0	0	0	1.220	1.765	10.975	0	11.392
ARCHES								
A	2.899	1.220	3.030	0	8.824	13.195	4.545	6.629
T	0	0	0	0	7.353	1.220	9.090	2.531

III				IV				V			
Left		Right		Left		Right		Left		Right	
Patients n = 68	Normals n = 83	Patients n = 66	Normals n = 83	Patients n = 68	Normals n = 77	Patients n = 64	Normals n = 74	Patients n = 64	Normals n = 76	Patients n = 67	Normals n = 77
1.471	1.205	0	1.205	1.471	1.299	3.125	2.703	0	0	0	0
13.235	12.048	24.242	7.229	32.353	32.467	42.188	32.432	1.563	10.526	11.940	9.090
8.824	7.229	0	12.048	7.353	10.390	6.250	8.108	3.125	3.947	10.488	3.896
0	2.409	4.545	0	2.941	3.396	1.563	2.703	3.125	0	5.970	1.299
1.471	0	1.515	1.205	0	0	0	0	0	0	0	0
4.412	1.205	1.515	2.409	2.941	1.299	3.125	4.054	1.563	3.947	0	2.597
0	0	1.515	0	1.471	0	0	0	0	0	0	0
0	0	0	0	2.941	0	0	0	0	0	0	0
52.941	65.060	59.091	67.470	44.118	45.454	40.625	47.297	89.063	80.263	68.657	80.519
0	0	0	2.409	0	1.299	0	1.351	0	0	0	1.299
10.294	9.638	4.545	2.409	4.412	2.597	3.125	1.351	1.563	1.316	2.985	0
7.353	1.205	3.030	3.614	0	1.299	0	0	0	0	0	1.299

SUMMARY

In the present study an attempt has been made to compare the frequency of finger ball patterns of the normal male yats with the patients suffering from bronchial asthma.

For this purpose the finger prints of 73 patients suffering from bronchial asthma (all male yat Sikhs) and 87 healthy normal males were analysed (also yat Sikhs).

While comparing the three major patterns (loops, whorls and arches), it has been found that the differences between the two examined groups are highly significant. But it has been seen that this difference is due to the presence of larger number of loops in the normals than in the patients and larger number of whorls in the patients than in the normals. It has been further observed that the group of normal males exhibit more often the ulnar

type of loops than the group with bronchial asthma and this difference has been found to be of statistical significance. The asthmatic patients exhibit more often composites than the groups of normal males and the difference is statistically significant. No significant differences have been observed in the two hands of individuals of both groups when treated separately regarding the presence of various dermatoglyphic pattern-types except in ulnar loops, which are significantly more frequent on the right hand of the asthmatic patients and in composites which are significantly more frequent on both the hands of the asthmatic patients than in the normal males. There is not much difference in the values of various indices calculated for the two groups. Important difference is found only in the value of Furuhashi's index which is due to the presence of a greater number of loops in the normal males than in the asthmatic patients.

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