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PALMAR DERMATOGLYPHICS OF SCHIZOPHRENIC PATIENTS IN DELHI (*)

by

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Introduction

Association of specific dermatoglyphic features with schizophrenia attracted the attention of specialists from as early as 1928 (BLÜMEL and POLL), even though the genetic nature of this mental abnormality was little known till then. Many recent workers are, however, unanimous about its polygenic mode of inheritance, with environmental and other genetic factors modifying the expression and penetrance of one major gene (HUXLEY *et al.*, 1966). Many authors in the past have tried to investigate the association of this disease with finger print patterns (POLL, 1935 ; DUIS, 1937 ; MØLLER, 1937). Recently, authors like BECKMAN and NORRING (1963), SINGH (1967) and SANK (1968) have tried to investigate the association of dermatoglyphics with schizophrenia. Their results were mostly non-significant when compared with normals. In India, BISWAS and BARDHAN (1966) for the first time attempted to find an association of dermatoglyphics with schizophrenia. The results were negative.

In view of the fact that no significant palmar configurational characteristics were noted by the earlier authors, it was thought worthwhile to study some of the parameters tried out recently along with the conventional ones. This will enable us to check the lack of association with the traits already used and to establish the role of dermatoglyphics in the determination of schizophrenia, which by now is already in disfavour.

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Material and Method

Bilateral prints of 60 male individuals were collected from the Psychiatric Department of All India Institute of Medical Sciences, New Delhi, during April-June, 1970. The sample was selected at random from patients coming to the clinic for treatment. The diagnosis of the schizophrenia was done by the psychiatric methods. The present series includes only those declared to have classic schizophrenic symptoms. No homogeneity with respect to the caste of the patients, their community and religion could be maintained because of their small number. Broadly speaking, the subjects include only North Indian populations from numerous endogamous caste groups. The control sample of 50 males was also drawn with the same amount of heterogeneity with respect to their caste, community and religion. The analysis of the data has been done in accordance with the methods prescribed by CUMMINS and MIDLO (1962).

Results and Discussion

The three principal main line formulae are sorted out in Table 1. The most conspicuous points is the lower incidence of the 11.9.7. formula in the patients. It is especially low in their left hands (contrary to the findings of SNEDEKER (1948) in mongoloid imbeciles). A similar fall in the incidence of the formula 7.5.5. is also noted in this group (similar to Snedeker's findings). These changes are, however, compensated by an increase of the "other" formulae. Thus it will appear that in the schizophrenics there is an increase in the occurrence of different types of formulations with a simultaneous decrease in the principal main line formulae. These differences were, however, statistically nonsignificant.

RIFE (1969) examined for the first time the possibility of taking C-line terminations as a better ethnic marker. Subsequently PLATO (1970) modified it by enunciating certain groups in which these termination areas could be fruitfully expressed. BHATTACHARYA further modified the termination areas into three types, viz., all ulnar terminations as I, all radial terminations as II and abortive and missing C-lines as III. In the present study these ter-

mination types have been used (Table II). The frequency of the three groups in the patients shows a statistically significant difference from the controls ($.02 < P < .01$), the proportion of type III being much increased at the expense of types I and II.

MEYER-CORDING's (1955) suggestion that D-line terminations at 11 and 7 are more directly inherited than those at 9 has been used by KIMURA (1962) in the ratio between termination type 11 and 7. This test has been applied in the present analysis : the values are 0,42 for the controls and 0,29 for the patients (Table III).

Pattern occurrence in the palmar areas of the patient group consistently shows the peculiarity of broken and transversely aligned ridges with V-types occurences. However, when the incidence of total pattern type is computed (Table IV), it is observed that in the patient group pattern occurrence is considerably increased in the hypothenar and II interdigital areas of both hands (similar to SNEDEKER's findings, 1948), but the X^2 tests show no statistically significant difference.

Occurence of the simian crease has often been found to be predominant in many kinds of congenital anomalies (LANGDON-DOWN, 1909; SARKAR, 1961; CHAKRAVARTTI, 1967). In the present sample it has been attempted to standardise the simian crease concept by MEYER HEYDENHAGEN's (1934) method viz., measuring the perpendicular distance of the two lateral digital triradii *a* and *d* from their nearest flexion creases. The triradius *d* has the distal transverse flexion crease as the nearest one in both groups (Table V). The only significant point that emerges here is the relatively larger percentage of triradius *a* being closer to the distal transverse crease in the patient group as compared to the controls. This will indirectly mean that though typical simian creases were not noted in the patients, yet a tendency towards increased transversality and extension of the distal flexion crease is quite evident in this group. In other words, a tendency towards a transitional stage in the formation of simian crease appears to be associated with the disease. However, this difference is statistically non-significant. It was felt that the distance of these two triradii from their nearest flexion crease can be better estimated by counting the ridges cut by the perpendicular from the former on the latter. The mean of the ridge counts shows (Table VI) an increase in the distance of the triradius *a* from its nearest flexion crease in the patient group. On

comparing the mean values of these ridge counts in the patients with those of the controls, it appears that both hands independently and also when pooled show statistically significant differences between the two groups ; while differences between right and left hands are non-significant in both groups (t values being of 0,01 to 1,0).

Conclusion

The schizophrenic patients studied here show some deviation from the normals in their palmar configurational characteristics. The significant deviations can be listed as follows :

1) The patients show an appreciable increase in the occurrence of abortive or missing C-triradius.

2) The area termination of D-line is narrower in patients than in controls. The relative occurence of the terminations of this line at 7 as compared to the position 11 shows a smaller value in patients than in controls.

3) The distance of both the triradii *a* and *d* from their nearest flexion crease, as measured in ridge counts, shows a significant increase in the patients.

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TABLE 1.

Occurence of the principal main line formulae

Main Line Formulae	Right		Left		Right + Left	
	Controls (n = 50)	Patients (n = 60)	Controls (n = 50)	Patients (n = 60)	Controls (n = 50)	Patients (n = 60)
11.9.7.	15(30%)	16(26,67%)	10(20,00%)	5(8,33%)	25(25,00%)	21(17,50%)
9.7.5.	5(10%)	4(6,67%)	4(8,00%)	8(13,33%)	9(9,00%)	12(10,00%)
7.5.5.	5(10%)	2(3,33%)	3(6,00%)	2(3,33%)	8(8,00%)	4(3,3%)
Other	25(50%)	38(63,33%)	33(66,00%)	45(75,00%)	58(58,00%)	83(69,2%)
	X^2_3 = 3,2636 0,5 > P > 0,3		X^2_3 = 4,2026 0,3 > P > 0,2		X^2_3 = 4,8030 0,2 > P > 0,1	

TABLE II

Occurence of C-line termination types

Termination types	Controls (n = 50)	Patients (n = 60)
III abortive or missing	9 (9,0%)	25 (20,8%)
II radial	53 (53,0%)	57 (47,6%)
I ulnar	38 (38,0%)	38 (31,6%)

X^2_2 = 9,1599 0,02 > P > 0,01

TABLE III

Modal values of line-D and the proportion at terminations 11 to 7

Line Type	Controls (n = 50)	Patients (n = 60)	X^2_2
Type 7 (7,8, x, 5)	20(20,00%)	16(13,33%)	
Type 9 (9, 10)	32(32,00%)	50(41,66%)	2,95
Type 11(11, 12, 13)	48(48,00%)	54(45,00%)	non signif.
$\frac{\text{Type 7}}{\text{Type 11}}$	0,42	0,29	

TABLE IV

Pattern occurrence in the palmar areas

Palmar areas	Right		Left		Right + Left	
	Controls (n = 50)	Patients (n = 60)	Controls (n = 50)	Patients (n = 60)	Controls (n = 50)	Patients (n = 60)
Hypothenar	20(40,00%)	33(55,00%)	21(42,00%)	29(48,33%)	41(41,00%)	61(50,50%)
Thenar + interdig I.	11(22,00%)	8(13,33%)	12(24,00%)	16(26,67%)	23(23,00%)	24(20,00%)
II. Interdig.	12(24,00%)	20(33,33%)	3 (6,00%)	9(15,00%)	15(15,00%)	29(27,50%)
III. Interdig.	32(64,00%)	42(70,00%)	25(50,00%)	30(50,00%)	57(57,00%)	72(60,00%)
IV. Interdig.	33(66,00%)	36(60,00%)	36(72,00%)	47(78,33%)	69(69,00%)	83(69,20%)

The 15 values of X^2 between controls and patients are non-significant

TABLE V

The flexion crease nearest to the triradii a and d in the patient and control groups

Flexion crease	Triradius a		Triradius d	
	Controls (n = 50)	Patients (n = 60)	Controls (n = 50)	Patients (n = 60)
Right hand				
D.T.C.	6(12,00%)	10(16,67%)	50(100,00%)	60(100,00%)
P.T.C.	41(82,00%)	50(83,33%)	—	—
L.R.C.	3 (6,00%)	—	—	—
Left hand				
D.T.C.	2 (4,00%)	5(8,33%)	50(100,00%)	60(100,00%)
P.T.C.	46(92,00%)	52(86,67%)	—	—
L.R.C.	2 (4,00%)	3(5,00%)	—	—

(D.T.C. = distal transverse crease — P.T.C. = proximal transverse crease — L.R.C. = longitudinal radial crease).

TABLE VI

Distance in ridge counts of a and d triradii from their nearest flexion crease.

	Controls (n = 50)		Patients (n = 60)		t Patients vs. Contr.	Probability
	m ± s.e.	s.d. ± s.e.	m ± s.e.	s.d. ± s.e.		
Right hand						
a	18,80 ± 0,761	5,38 ± 0,538	21,87 ± 0,733	5,68 ± 0,521	2,907	0,01 > P > 0,001
d	22,08 ± 0,622	4,40 ± 0,440	23,66 ± 0,536	4,12 ± 0,379	1,924	0,1 > P > 0,05
Left hand						
a	19,20 ± 0,712	5,04 ± 0,504	21,88 ± 0,649	5,03 ± 0,461	2,780	0,01 > P > 0,001
d	21,12 ± 0,735	5,20 ± 0,52	23,00 ± 0,506	3,92 ± 0,359	2,107	0,05 > P > 0,02
Both hands						
a	19,00		21,87		4,020	0,001 > P
d	21,60		23,33		2,850	0,01 > P > 0,001
Right vs Left						
a	t = 0,383 (n.s.)		t = 0,01 (n.s.)			
d	t = 1,0 (n.s.)		t = 0,895 (n.s.)			