PALMAR DERMATOGLYPHICS OF THE PATIENTS WITH KLINEFELTER'S SYNDROME (47,XXY)

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Summary The frequency of palmar patterns and triradii of the palm prints of sixty-five 47,XXY Klinefelter's syndrome patients was compared with that of normal male and female subjects. There was no significant variation in the frequency of palmar pattern elements between the Klinefelter's syndrome group and the controls, except for the axial triradius of the Klinefelter's group, which was more distally located.

INTRODUCTION

There have been several studies concerning palmar patterns in 47,XXY Klinefelter's syndrome. In the palmar patterns of this syndrome, no characteristic findings, such as the increased hypothenar patterns associated with an ulnar triradius seen in the XXYY type (Shiono *et al.*, 1977), have been noted (Schaumann and Alter, 1976). On the other hand, the frequencies of several palmar pattern elements in the XXY type were reported to be different from those of normal male and female subjects (Holt, 1968; Cushman and Soltan, 1969; Penrose and Loesch, 1970). The purpose of this study is, therefore, to clarify these contradictory findings.

MATERIALS AND METHODS

The palm prints of sixty-five patients with 47,XXY Klinefelter's syndrome, on which some other dermatoglyphic traits were reported previously (Komatz and Yoshida, 1977), and 100 normal male and 100 normal female subjects were studied. Pattern elements on the palm prints were classified according to the method proposed by Penrose and Loesch (1970) to compare the frequencies of loops and triradii in the patients and the controls. The palmar pattern intensity was expressed as the mean number of loops per palm in each group (Penrose and Loesch, 1970).

RESULTS

The occurrence of loops was examined in the hypothenar area for H , $\hat{H}$ and H^2 , in the area I for I and I^2 and in the interdigital areas for II, III, III^2 , IV and IV^2 in

both the patient and control groups. No significant differences were observed between them in the frequencies of these traits. However, radial loops H^r , which were not seen among the controls, were found in the hypothenar area of the right palm of two patients (Table 1).

Regarding triradii, the frequency of t' was significantly greater in the Klinefelter's syndrome group than in the male ($\chi^2=11.7$, d.f.=1, $P<0.001$) and female controls ($\chi^2=15.5$, d.f.=1, $P<0.001$), if both palms were combined. No significant difference was noted among the three groups in the frequency of hypothenar triradii

Table 1. Frequencies and distribution of palmar patterns in Klinefelter's syndrome and control males and females.

	Males n=100				Females n=100				Klinefelter's n=65 syndrome			
	L	R	L+R	%	L	R	L+R	%	L	R	L+R	%
I	0	0	0	0.0	1	0	1	0.5	2	1	3	2.3
I ^r	13	2	15	7.5	5	2	7	3.5	4	1	5	3.8
II	0	2	2	1.0	2	1	3	1.5	0	2	2	1.5
III, III ^T	22	41	63	31.5	17	33	50	25.0	10	22	32	24.6
IV, IV ^T	82	66	148	74.0	83	66	149	75.5	56	39	95	73.1
H	2	5	7	3.5	3	3	6	3.0	0	0	0	0.0
$\hat{H}$	23	21	44	22.0	26	20	46	23.0	17	16	33	25.4
H ^r	0	0	0	0.0	0	0	0	0.0	0	2	2	1.5
Total	142	137	279	139.5	137	125	262	131.0	89	83	172	132.3

Table 2. Frequencies and distribution of palmar triradii in Klinefelter's syndrome and control males and females.

	Males n=100				Females n=100				Klinefelter's n=65 syndrome			
	L	R	L+R	%	L	R	L+R	%	L	R	L+R	%
<i>e, f</i>	11	2	13	6.5	6	2	8	4.0	5	2	7	5.4
<i>t</i>	58	55	113	56.5	51	47	98	49.0	20	17	37	28.5
<i>t'</i>	56	51	107	53.5	51	50	101	50.5	45	49	94	72.3
<i>t''</i>	0	0	0	0.0	0	1	1	0.5	0	0	0	0.0
<i>t^b</i>	23	20	43	21.5	26	21	47	23.5	17	18	35	26.9
<i>t^r</i>	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
<i>t^u</i>	1	1	2	1.0	0	0	0	0.0	0	0	0	0.0
<i>z</i>	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
<i>z'</i>	11	2	13	6.5	10	6	16	8.0	8	6	14	10.8
<i>z''</i>	1	0	1	0.5	0	0	0	0.0	0	1	1	0.8
Total	161	131	292	145.0	144	127	271	135.5	95	93	188	144.6

Table 3. Palmar pattern intensity in Klinefelter's syndrome and control males and females.

Klinefelter's syndrome n=130	1.323±0.067
Male controls n=200	1.395±0.045
Female controls n=200	1.310±0.039

t^b , t^u , triradii lying in area I e , f and interdigital triradii z' and z'' (Table 2). The palmar pattern intensity represented by the number of loops per palm showed no significant difference between the patients and the control males and females (Table 3).

DISCUSSION

Cushman and Soltan (1969) stated that hypothenar patterns and accompanying triradii were more abundant in XXY than in normal males, whereas Penrose and Loesch (1970) reported that they tended to be less frequent in XXY patients than in normal male and female controls. In the present study, no particular tendency was observed in the patients with Klinefelter's syndrome. Holt (1968) and Cushman and Soltan (1969) reported that the frequency of the patterns in the thenar/first interdigital area (area I) was higher in the control than the patient group. Such findings could not be confirmed in the present materials. It was often reported that the axial triradius was located more proximally in the case of XXY than in normal males and females, but recently many reports pointed out that it is located rather distally (Komatz and Yoshida, 1976). The present result revealed also the distal dislocation of the axial triradius in the Klinefelter's syndrome. Higher frequencies of the interdigital triradii z' and z'' were reported in Klinefelter's syndrome as well as in other sex chromosomal aberrations (Penrose and Loesch, 1970). In the present study, however, no significant difference was found among patient and normal materials. Though it has been observed that the palmar pattern intensity generally decreases with the increase in number of sex chromosomes (Penrose and Loesch, 1970; Saldana-Garcia, 1973 and 1975), the present data failed to reveal a significant decrease in this trait in the XXY group. Thus, the dermatoglyphic deviation of the Klinefelter's syndrome from the normal males and females was less remarkable in our subjects.

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