

Poland anomalad: dermatoglyphic study in seven cases

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A dermatoglyphic study was made in seven patients with Poland anomalad. The ipsilateral hand showed great variability of the defect. The patterns were typical when the hand was synbrachydactylic. When there was only brachydactyly, there were peculiar configurations. Though the hand on the side of the defect may seem normal, some patterns are infrequent and on the "normal" hand on the other side, rare dermatoglyphic types were found.

The clinical features of seven cases of Poland anomalad have been reported previously [3]. In this study, the dermatoglyphics of these patients are described. The variability of defects found in the hands led us to look for special patterns in cases with apparently normal hands or in hands with brachydactyly only and also to verify if the alterations described in syndactyly were present.

MATERIAL AND METHODS

Finger and palm prints of seven patients with Poland anomalad [3] were recorded by the standard ink method. The data studied were fingerprint pattern, finger ridge count, pattern intensity index, configurations in the thenar/I, hypothenar and interdigital areas II, III and IV, width of the Δ angle, position of the axial triradius [12] modal types of the C and D lines [4, 10] main line terminations, main line index, a—b ridge count and presence of simian crease or Sydney line.

The general morphology of the hand was also studied as well as the size of the affected hand compared with the normal one.

RESULTS

In three patients with apparently normal hands (Figs 1, 2, 3) the dermatoglyphic traits were as follows. In two patients, the axial triradius was in position t^1 and in one (Case 1) no axial triradius was found. In two, the modal type of line C was intermediate; the modal type of line D was 11 in two and 9 in the third child. There was a transversality of the ridges in two patients, a Sydney line was observed in one and a simian crease in another (Tables I and II). In all the three patients there was a medial displacement of the triradius d and in one case a distal one of the triradius b. In the girl with isolated brachydactyly (Fig. 4) four arches

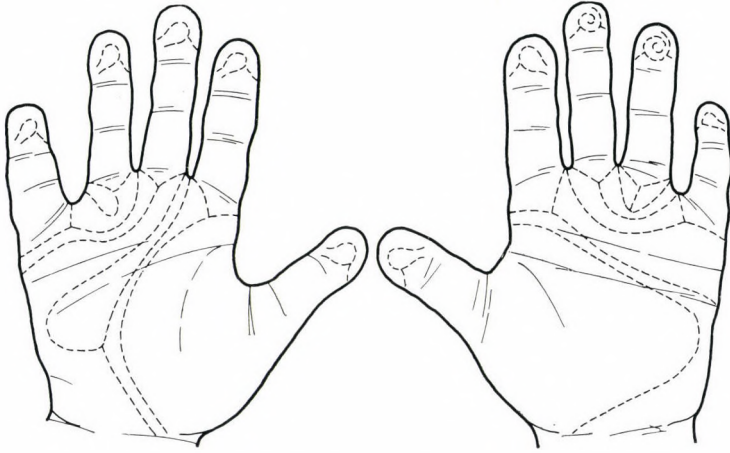


FIG. 1. Case 1. Slight webbing between fingers 2—3

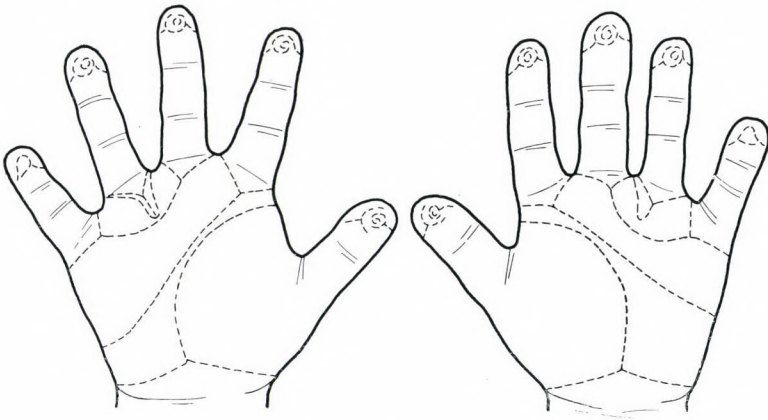


FIG. 2. Case 2

were seen on the fingers, there was an axial triradius t^1 and a low finger ridge count. The pattern intensity index was 1 and a simian crease was present. There was displacement of the subdigital triradii: medial for triradius d and distal for triradius b (Tables I and II).

Among the three patients with brachysyndactyly, in two (Cases 5

and 6) there was a zygodactylous pattern with a triradius in the third interdigital space. In Case 5, another interdigital triradius was below the first and two of the radiants formed a distal loop in the fourth interdigital space; the triradius d was displaced medially and the triradius a was absent. In Case 6, we had difficulty in locating the subdigital triradii

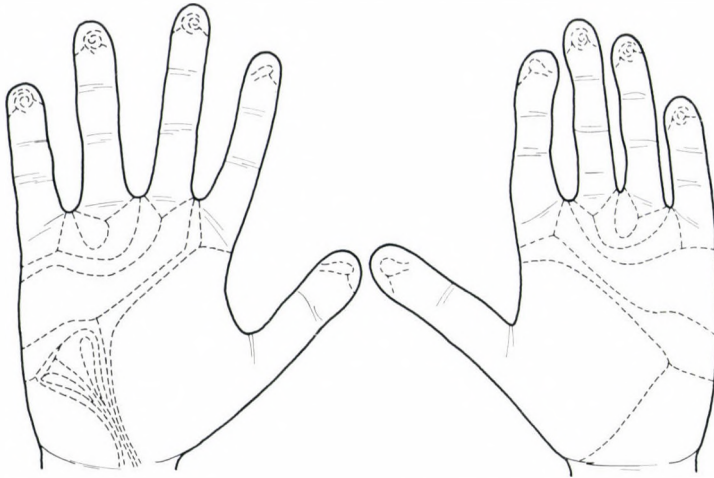


FIG. 3. Case 3. Membranous webbing between fingers 2-5 of both hands

because the child had been operated upon, and there were scars in these areas but a bc triradius was observed and triradius d was absent. Both these cases had the axial triradius in a distal position t^l and t^{ll}, true pat-

terns in the thenar/I area and arches in the fingers with low pattern intensity index and low finger ridge count. A simian crease was also present in one (Figs 5a, 5b and 6). The other child (Case 7) with a brachydactylic

TABLE I
Dermatoglyphics of the ipsilateral hand

Case No.	Digital patterns					Atd angle	Position of t	Thenar area	Hypothenar area	Interdigital		
	I	I	III	IV	V					II	III	IV
<i>Right hand</i>												
1	U	U	W	W	U	—	—	0	A ^r	0	0	0
3	U	U	W	W	W	52°	t'	0	A ^u /A ^c	0	L	0
5	A	A	A	U	U	—	t'	L ^p	A ^u /A ^c	0	t	L
7	U	W	U	W	W	43° 48° 44°	t t' t'	0	L ^c /I ^u	0	0	0
<i>Left hand</i>												
2	W	W	W	W	U	50°	t'	0	A ^u /A ^c	0	0	V
4	A	A	A	A	U	54°	t'	0	A ^u /A ^c	0	0	L
6	A	A	A	U	A	—	t''	L ^p /L ^d	A ^u /A ^c	0	t	0

TABLE II
Dermatoglyphics of the ipsilateral hand

Case No.	RC	PII	a-b ridge count	Modal type of line C	Modal type of line D	MLI	Main lines formula	Simian crease	Sydney line
<i>Right hand</i>									
1	98	7	45	intermediate	11	10	11.X.7.4	0	X
3	92	8	43	radial	11	10	11.9.7.4	X	0
5	13	2	—	—	11	—	13.0id0.0	0	0
7	73	8	45	—	—	9	1.1.1.13	X	0
<i>Left hand</i>									
2	93	9	43	intermediate	9	8	10.X.6.3	0	0
4	11	1	35	ulnar	9	5	9.7.5".1	X	0
6	11	1	—	—	—	—	0.0id0.5"	X	0

small hand had a triradius t^l with two other triradii in a proximal position: one forward in relation to the radial border, t, with a parathenar pattern and another on the cubital border t^l with a hypothenar true figure. The main line A ran a vertical course and seemed to end in position 13, whereas the main lines B, C, D seemed to end in 1. The subdigital

triradii a, b, c were displaced distally and triradius d was displaced toward the third interdigital space. A simian crease was seen and the contracted fingers 4 and 5 had no interphalangeal flexion creases. No metacarpophalangeal creases were present on fingers 2—5 (Fig. 7).

On the hand on the unaffected side, the axial triradius was in posi-

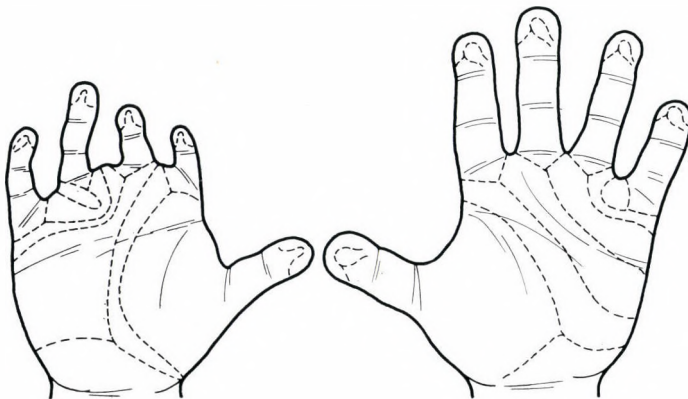


FIG. 4. Case 4. The only girl in this series. Small left hand with brachydactyly

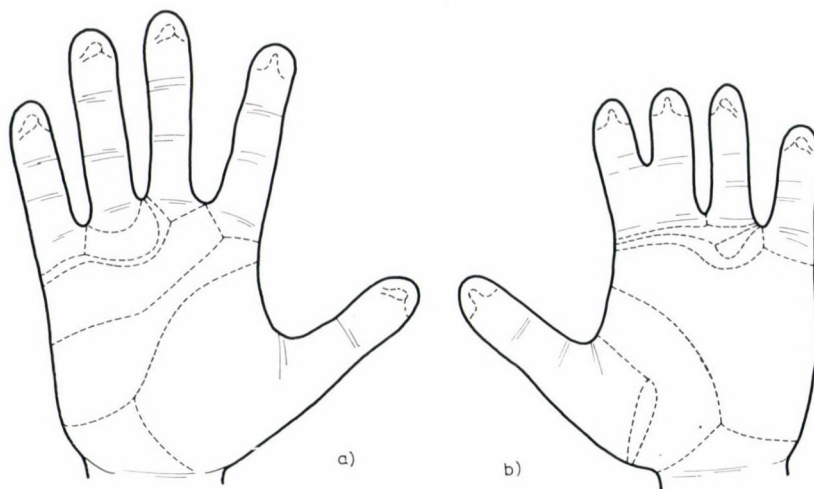


FIG. 5a. Case 5. Left hand

FIG. 5b. Case 5. Right hand with brachysyndactyly and zygodactylous pattern

tion t^I in 5 cases and in t^{II} in 1. This case had a rare pattern on the hypothenar area, $L^c/V/A^c$. The a—b ridge count was within normal limits compared with our controls in all but one child; this patient had a high count of 52.

(In 200 male controls the mean a—b ridge count was, on the left hand, 40.86 ± 5.59 ; on the right hand, 40.18 ± 10 . In 150 female controls the mean a—b ridge count was, on the left hand, 41.74 ± 5.52 ; on the

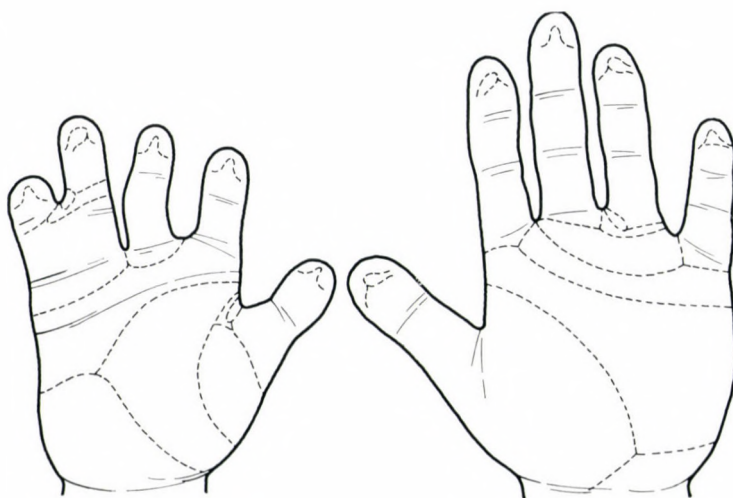


FIG. 6. Case 6. Brachysyndactyly and zygodactylous pattern

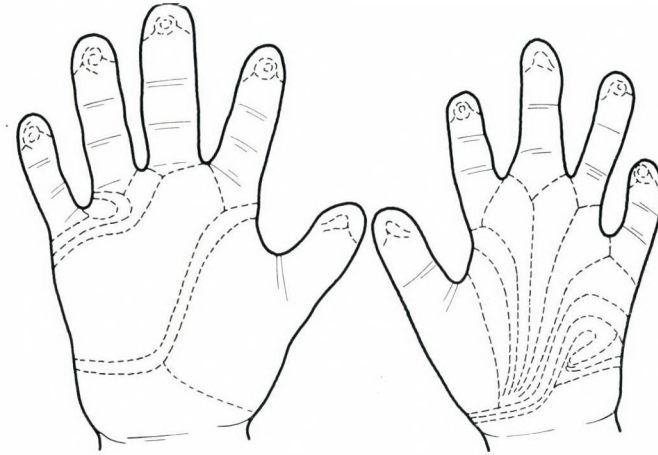


FIG. 7. Case 7. The affected hand is small, brachysyndactylic and some fingers are contracted

right hand, 40.94 ± 5.65 .) In one, the modal type of line C was absent. The pattern intensity index was high respectively low in two children each. The main line index was low in 4. The main line A ended in 1 in 2 cases; there was a Sydney line in 1 and a simian crease in another case (Tables III and IV). Medial displacement of the triradius subdigital d was found in 4; the triradius b was more distal in 2 and the triradius c more distal in 1.

DISCUSSION

The first dermatoglyphic study in the Poland anomalad seems to have been made by David [5] and Freire-Maia et al. [7]; in David's 10 cases the dermatoglyphics of the unaffected hand were entirely normal. Freire-Maia et al. described a distal axial triradius, a simian crease and an

interdigital triradius in two patients with four-finger synbrachydactyly (as in our Case 6) and another case with two arches on the fingers, a distal triradius t^1 , a subdigital triradius d by itself and a simian crease.

In these cases there was a distinct pattern with syndactyly and apart from the well-known zygodactylous pattern, mention must be made of the distal position of the axial triradius, the presence of arches and of a simian crease or a Sydney line. None of our patients had radial loops on the thumb as observed by David and Saad [6].

In cases without syndactyly, dermatoglyphic abnormalities [6] which seem to be characteristic of the Poland anomalad have been infrequent, especially on the 1st and 5th digits where in 400 controls they never occurred. In addition, there was a distal or medial displacement of the subdigital axial triradius. These peculiar features

TABLE III
Dermatoglyphics of the normal hand

Case No.	Digital patterns					Atd angle	Position of t	Thenar area	Hypothenar area	Interdigital		
	I	II	III	IV	V					II	III	IV
<i>Right hand</i>												
2	W	W	W	W	U	50°	t'	0	A ^u /A ^c	0	L	V
4	U	U	U	U	U	47°	t'	0	A ^u /A ^c	0	0	L
6	U	R	A	U	U	42°	t	0	A ^u	0	L	0
<i>Left hand</i>												
1	U	U	U	W	U	54°	t'	0	L ^f /A ^c	0	0	L
3	U	U	W	W	W	87°	t'' t'	0	L ^c /V/A ^c	0	0	L
5	A	U	U	U	U	46°	t'	0	A ^u /A ^c	0	0	0
7	W	W	W	W	W	45°	t'	0	A ^u /A ^c	0	0	L

TABLE IV
Dermatoglyphics of the normal hand

Case No.	RC	PII	a-b ridge count	Modal type of line C	Modal type of line D	MLI	Main lines formula	Simian crease	Sydney line
<i>Right hand</i>									
2	94	9	39	radial	9	10	10.9.6.5'	0	0
4	—	5	36	ulnar	7	5	7.5."5'.3	0	0
6	51	4	38	radial	11	11	11.9.7.5'	0	X
<i>Left hand</i>									
1	90	6	47	ulnar	9	5	9.7.5."1	0	0
3	92	8	39	ulnar	9	5	9.7.5."1	0	0
5	51	4	52	absent	9	9	9.0.5."5'	0	0
7	69	9	43	ulnar	7	5	7.5."5".3	X	0

were present in our cases with brachydactyly and in that with brachysyndactyly and finger contracture. As a slight membranous webbing is easily overlooked, studies of the dermatoglyphics are needed in cases with little webbing because the patterns in our cases were similar as those reported by David and Saad [6].

The "normal" ipsilateral hand of our patients also displayed some abnormalities. In a report of two patients lacking only the pectoralis major muscle, Armendares [1] mentioned an axial triradius in t^I and t^{II} in one and the equivalent of a simian crease in the other; these cases may have been Poland anomalads. The great

variability of the hand defect has repeatedly been noted [7, 9] and not all the published cases have had the typical synbrachydactyly described for the first time by Poland [11]. When the hand on the side of the muscle defect seems normal, a dermatoglyphic study may reveal peculiarities similar to those observed in our cases and it is reasonable to assume that these are valuable clues in the diagnosis of the anomalad.

Summing up, the special dermatoglyphic pattern observed in the Poland anomalad are the presence of arches or radial loops on the fingers, low pattern intensity index, low ridge count, distal displacement of the palmar (the axial and the subdigital) triradii, zygodactylous pattern or medial displacement of the subdigital triradii, their absence, a simian crease or a Sydney line. Recently, some papers [1, 2, 8, 9] have mentioned the association of Poland anomalad with leukaemia. It is interesting that the latter patients and their sibs have more Sydney palmar flexion creases than their parents or the controls [13]. We found a Sydney line in two of our 7 patients, but until now none of them had developed leukaemia.

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