

Dermatoglyphic features in diabetes mellitus

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Dermatoglyphic features of 290 children and 180 adults with diabetes mellitus were investigated. W_D occurred significantly more frequently on the fingers, and pattern intensity was low in certain interdigital areas in these patients. A high TRC value was more frequent in both girls and boys with diabetes mellitus than in the controls.

The hereditary character of diabetes mellitus has been proven but opinions differ as to its mode of inheritance. Both dominant and recessive heredity have been suspected but the multifactorial origin seems to have the greatest probability. Since the clinical picture of juvenile and adult type diabetes mellitus shows differences, the dermatoglyphic features have been investigated in both types.

METHODS

Examinations were carried out in 290 diabetic children and 180 adults. The

disease had manifested itself between 1-15 and 20-75 years of age. The control group consisted of 1000 children 8-18 years of age. Evaluation was carried out according to Cummins and Midlo [2] as well as Penrose and Loesch [11].

RESULTS

Fingers

The mean TRC value did not significantly differ in juvenile diabetes from that found in adult type diabetes (Table I).

The distribution of TRC in both sexes was different from the control.

TABLE I
Mean TRC value found in juvenile and adult type diabetes

	Control	Type	
		Juvenile	Adult
Female	124.3±44.1	129.8±47.4	124.1±45.5
Male	137.5±44.0	144.2±48.6	137.4±47.2

High values for TRC (>190 in girls and >200 in boys) were significantly more frequent than in the controls. Such differences were not found in the adult diabetics (Figs 1, 2) in agreement with our previous observations [1]. The frequency of W_D was higher on the fingers of diabetic patients than of the controls. Significant differences were found on the first finger on the left side in girls ($p < 0.01$) and the first finger on the right side in boys ($p < 0.001$), and on the first, third and fifth fingers

($p < 0.05$) of the right hand of adult males. Adult females did not show any differences in respect to the frequency of the finger-pattern (Tables II, III).

Palm

Exit of the main lines and position of the axial triradius did not display any significant difference between the diabetic and control groups. The pattern intensity was significantly lower in the 3rd interdigital

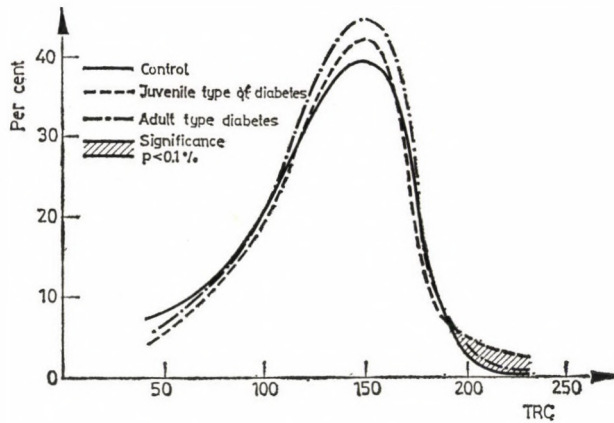


FIG. 1

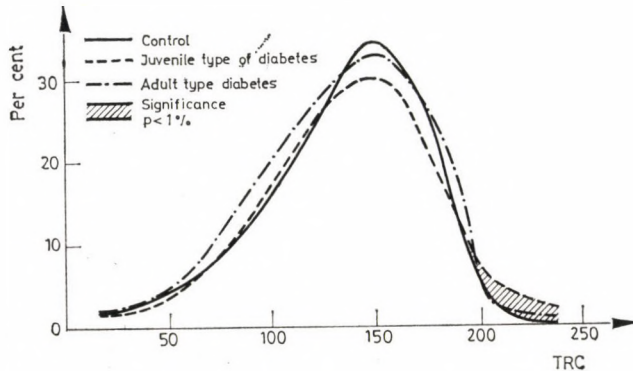


FIG. 2

TABLE II
Double loop on fingers

	Right hand					Left hand				
	1	2	3	4	5	1	2	3	4	5
Girls	-	-	-	-	-	++	-	-	-	-
Boys	+++	-	-	-	-	-	-	-	-	-
Adult females	-	-	-	-	-	-	-	-	-	-
Adult males	+	-	+++	-	+++	-	-	-	-	-

+ p < 5%; ++ p < 1%; +++ p < 0.1%

TABLE III
Palm patterns

	Right hand					Left hand				
	th	II	III	IV	hyth RH	th	II	III	IV	hyth RH
Girls	-	-	-	-	-	-	-	++	-	-
Boys	-	-	-	-	-	-	-	++	-	-
Adult females	-	-	-	-	-	-	-	-	-	+
Adult males	-	-	+++	-	-	-	-	-	-	+

+ p < 5%; ++ p < 1%; +++ p < 0.1%

area on the left side in both sexes with juvenile diabetes and on the right side in males with diabetes of adult type. Females and males with adult type diabetes showed less L_R in the hypothenar region on the left side.

DISCUSSION

Characteristic dermatoglyphic patterns are well-known to occur in chromosome aberrations [9]. The extreme breadth of hands of patients with 21-trisomy involves many special features. Fetal oedema in XO chromosome aberration is associated

with a high total ridge count whereas a low TRC value is found in X-poly-somy [7].

Dermatoglyphics were investigated in diabetes mellitus by Verbov [13] and Knusmann [8]. In contrast to our results, Verbov did not find any differences in TRC, while the frequency of whorls was lower in his diabetic material than in the control population of Holt [5]. In Knusmann's patients the value for TRC did not differ from the control [8]. Whorls and arches were more frequent on the fingers, while the pattern was significantly less frequent in the 3rd interdigital area and on

the thenar of females than in the control groups; such differences did not appear in the males. Verbov examined the dermatoglyphic features of patients whose diabetes had manifested between 20–40 years of age. In Knusmann's material juvenile type and adult type diabetics were not differentiated. In view of these differences our results could not be compared to those of the above quoted authors.

The dermatoglyphic features, especially TRC, are inherited multifactorially. Beside the genetical determination it must be taken into consideration that the hydrodynamic conditions of the amniotic fluid and teratogenic damages may affect the formation of finger and palm ridges.

Also, in subjects with Turner, Klinefelter or Down syndrome, carbohydrate metabolism often tends toward the diabetic form [3, 6, 10] while fetopathies have a high frequency in diabetics.

From the above observations we may conclude that there are differences in dermatoglyphic features not only between diabetic children and adults, but also between female and male diabetics. The heredity of diabetes is not sex-linked, but its heredity is certainly influenced by sex, diabetes being more frequent among females than males [7]. On the other hand, there is no sex difference in juvenile type diabetes.

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