DERMATOGLYPHICS IN HEALTHY INDIAN CHILDREN*
An analysis of Finger Prints, Palm Prints, Axial Triradii and ‘atd’ Angle, Sole and Toe Prints
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The word dermatoglyphics (derma—skin, glyphe-curve) first proposed by Cummins and Midlo (1926) is literally descriptive of patterned traceries of fine ridges on fingers, palms and soles. Flexion creases and other secondary folds are not included in dermatoglyphics.

In spite of immense interest in the subject for centuries there is widespread but unjustified belief that the role of dermatoglyphics lies only in personal identification. The configurations are formed in early foetal life and once formed except for the change in size, they do not change in the remaining intrauterine period and after birth.

A correlation between dermatoglyphics and certain diseases was suggested 30 years ago, almost half a century after Sir Francis Galton had linked dermatoglyphics with genetics. However, the prints do not establish a diagnosis by themselves but as Dr. Archs had emphasized, they should “prompt the physician to make a more thorough examination than usual to find out any hidden abnormality”.

There are also normal variations which represent hereditary differences between different ethnic groups and even within the same family. Variations have also been noted in the two sexes, among different constitutional types and in the same individual between the right and the left hands. The present study was undertaken to find out the pattern of dermatoglyphics in the North Indian population.

The present study comprised two thousand apparently normal Indian children seen at the G.M. and Associated Hospitals, Lucknow, Willingdon Hospital and Nursing Home, New Delhi and Irwin Hospital, New Delhi.

Methods

In this study, a slight modification of the India ink method described by Cotterman (1951) was used. A little amount of the ink paste was squeezed out from the tube on a board and the roller was impregnated with this ink by to and fro movements. This paste was gently applied on the neat and dry palm or sole. The hand and foot was then gently put on the paper fixed on the wooden board and an even pressure was applied on the dorsum of the hand or foot.

1. Finger prints

These were taken by rolling the fingers on shiny smooth paper and studied for four basic types of pattern found on the distal phalanges of the digits—arches (A), loops (L), whorls (W) and composites. Arches were classed into simple (A) or tented (T-Tr or Tr) according to their direction.
towards the radial or ulnar side respectively). Loops may open towards the ulnar (Lu) or radial (Lr) side of the hand. Whorls included concentric (Wc) and spiral (Ws) patterns. Composites are compound patterns in which two or more designs are combined. They are of four main types: Central pocket loops (CP) being CPr or CPu according to their direction of opening; twin loops (TL) are two interlocked loops each coursing to the opposite side and lateral pocket loops (LP) which are also 2 interlocked loops but each coursing to the same side (radial or ulnar).

Bonnevie's technique (1924) of ridge counting was applied. A single value for an individual was obtained, consisting of a quantitative assessment of the patterns on the ten fingers. The ridge count or number of ridges between the core of a pattern and the triradius at its periphery is zero for an arch and twice as much for a whorl as for a loop of comparable size (Fig. 1a and b).

3. Axial triradii and "atd" angle

The following criteria as detailed by Cummins and Midlo (1943), Hale et al. (1961) and Penrose (1961) have been used (Fig. 2).

2. Palm prints

For convenience, the palm was divided into six configurational zones as detailed by Wilder (1903); hypothenar, thenar, and four interdigital zones. Various configurations observed in each zone ranged from whorls, loops, arches and vestiges (V) to an absence of patterns or plain structures called open field (O). Vestiges are disarranged epidermal ridges, which may resemble a true pattern or an open field.