

Palmar Main Line Index – A New Methodological Approach

H.K. Kumbnani

The epidermis of the palmar and plantar surfaces of the human hands and feet are covered with the skin that is different from the skin of the other parts of the body. It is corrugated with the ridges and the configurations. These features of dermatoglyphics are formed during the thirteenth week of the growing embryo and remain unchanged thereafter throughout the life of an individual except the dimensions related to the growth of the body. These features have been found to be permanent, variable and are inherited. For these amazing qualities they play a very crucial and important role in the personal identification, crime detection, twin diagnosis, racial variation and have applied values in various diseases and syndromes. Herschel (1858) made first attempt to use finger prints in the personal identification.

Generally speaking there are four triradii located in the distal part of the palm proximal to the digits II, III, IV and V, just below the metacarpophalangeal creases of these respective digits and are termed as a,b,c and d. The proximal radii of these triradii when traced as per rules advocated by Cummins (1943), form the main lines and are designated with capital A,B,C and D. The terminations of these main lines are from 1 to 13 (Fig.1).

For the purpose of the main line index only the main lines D and A have crucial role to play for they control the alignments of the ridges in the palm. The ridges do not interrupt, intersect or cross and hence it is mandatory for the main lines C and B to remain confined within the limits. Of all the metric parameters the main line index is the most significant feature. Conventionally the index is the ratio of two metric measurements in terms of percentage, viz., the cephalic index is the ratio of the breadth verses length. For the palmar prints Cummins offered a unique connotation to the main line index of the palm. He imparted the emphasis to the terminations of the main lines D and A, for only these two main lines control the alignments of the ridges in the palm, while the main lines C and B are in a way redundant and have no role to play in this index. Cummins defined this index as an expression of the direction of the neutral

line and its inclination is determined by the courses of the main lines D and A. It is the summational value of these two main lines and it expresses the transversality of the ridges in the palm.

For the consideration of the index the openings of the main line A at positions 1 through 5 are taken as their respective values with the only exception of value 6 assigned to the position 5" as depicted in the figure 1.

It is evident that the openings to these positions express the progressive shift from the longitudinal to the transversal alignment of the ridges. Similarly, for the main line D the terminations to positions 6 to 13 are given the corresponding values 1 to 8, which are essentially equivalent to the values given to the main line A. There is a great variation in the numerical value of the main line index from palm to palm as it depends on the point of terminations of the main lines D and A as for example the formula $11_ _ .5$ and substituting the respective values the index is $6+5=11$. This is called the observed value of the index.

Scanning the scientific literature so far published, only the observed value of the index has been notified and no thought has been given



Fig. 1. The terminations of main lines D and A

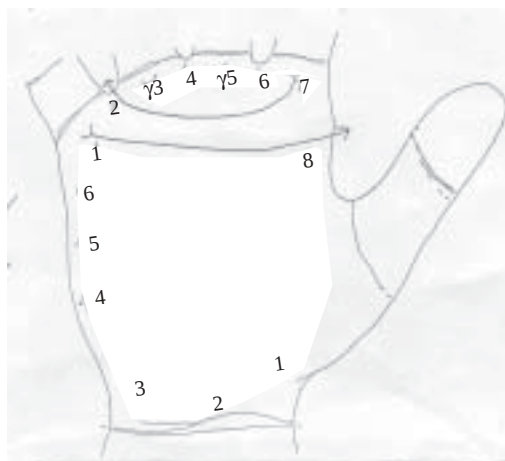


Fig. 2. The terminations of main lines D and A at their maximum 13 and 7. The index is the sum of the corresponding values $8+7=15$

to the maximum value called the expected value of the index, which happens to be the value of main lines D and A opening to their highest positions as 13 and 7, respectively. In such a palm the maximum expected value of the index computed would be $8+7=15$. Cummins was well aware of such a rare, unusual and uncommon situation (Fig. 2).

The author has been pondering over this issue and after a very serious thinking and consideration proposes a simple, nonetheless logical, convincing, workable and useful hypothesis. In simple words it emphasises on the terminations of the main lines D and A at their maximum positions, which have been observed to be 13 and 7, respectively. As stated earlier they are rare and not so common. In such a palm the value of this index would be $8+7=15$ and the palm would show the transversality to its maximum. It is this phenomenon which elucidates the importance of the proposed hypothesis as it takes into consideration of the observed and expected maximum values of the index. The high light of this postulate is to evaluate as to what extent the observed value of the index deviates from the maximum expected value. For better illustration consider the following examples:

Analysing the value of the index as per the observed and maximum expected value as

D...A	Value	MLI	Observed -x100 Expected
13...7	8+7	15	15/15 x 100
11...5	6+5	11	11/15x100
9...5	4+5	9	9/15 x 100
7...5	2+5	7	7/15 x 100
7...3	2+3	5	5/15 x 100
in Apes			
1...1	1+1	2	2/15 x 100

suggested by the author, it is noticed that the values are maximum when both the main lines D and A terminate at the highest positions. The value takes a plunge downwards as the terminations open at the lower positions.

In the palms of the apes the longitudinal course of the ridges are found and the main line index is $1+1=2$. It is mainly due to the longitudinal alignment of the ridges, unlike the transverse alignments, as found in Homo sapiens. This shift from longitudinal to the transverse alignment of the ridges expressed in the high value of the Index may be attributed to the evolutionary trend.

ACKNOWLEDGEMENTS

I am thankful to Miss Kavita, who from time to time have been motivating, encouraging and helping in the publication of the observations and the results of this work.

KEYWORDS Dermatoglyphics. Main Lines. Terminations

ABSTRACT The main line index of the palm is an expression of the direction of the neutral line whose inclination is determined by the courses of the main lines D and A. It is the summational value of these two main lines and it expresses the transversality of the ridges in the palm. The highest terminations of these main lines have been observed to be 13 and 7, respectively and hence the maximum value of the index is to be $8+7=15$. In order words the palm shows the maximum degree of the transversality of the ridges. The proposed innovative hypothesis offered for the first time is to consider the maximum expected value as well as the actually observed value of the index. The highlight of this hypothesis is to evaluate the extent to which the observed value differs from the expected value.

REFERENCES

- Cummins, H. and Midlo, C.: *Finger Prints, Palms and Soles- An Introduction to Dermatoglyphics*. Dover Publications, New York (1943).
- Herschel, W.: *Use of finger prints for identification* (1856).

Author's Address: Dr. H.K. Kumbnani, Professor, Department of Anthropology, University of Delhi, Delhi 110 007, India