161. Genetic Investigation of Five Generations of One Family (Second Case). III. Palm Patterns

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The results of the genetic investigations of blood groups and types and fingerprint patterns of members of five generations of one family were reported previously.^{1,2)} The present report concerns the observations on the inheritance of palm patterns of the same family.

Palm patterns are classified according to the Cummins-Midlo's³⁾ method (1929).

Cummins divided a palm into 13 parts in order to show the procedure and the end points of main lines.

The thenar part is designated by 1, and carpus part 2. The ulnar part is divided into two portions: a proximal part designated by 3; a middle point by 4, and distal part by 5. 5 is further divided into two: the proximal part is designated 5', and distal part 5''. The bases of the little, ring, middle, and index fingers are designated by 6, 8, 10, and 12 respectively. Intervals of each finger are designated by 7, 9, 11, and 13 (Fig. 1).

At the bases of index, middle, ring, and little fingers there are deltas. Each delta is the center of three radiating lines. Two of them run up to the sides of the finger and the third is more extensive and runs over the palm. The latter is a main line, and as one such proceeds from each digital delta, they are four in number, and are

Fig. 1. Diagram of a right palm, giving the numerical values of the 13 different parts according to the Cummins-Midlo's method
Formula: 11·9·7·3

Fig. 2. A family line of ARIMOTO (handprints)

Generation	Name	Age	Sex	Handprints	
				Left hand	Right hand
F _I	2 Nao ARIMOTO	90	♀	7.5''-5''-3.t-Au.O/O.O.O.L	9.7.5''-3.t-Au.O/O.O.O.L
	2 Shin ARIMOTO	69	♀	9.7.5''-3.t-Lr.O/O.O.O.L	9.7.5''-3.t-Au.O/O.O.O.L
	7 Eiji TADOKORO	58	♂	7.5''-5''-3.t-Au.O/O.O.O.L	9.7.5''-3.t-Au.O/O.O.O.l
F _{II}	8 Yoshi TADOKORO	57	♀	9.7.5''-1.t-Au.O/O.O.O.L	11.7.7.3.t-Au.O/O.O.O.l
	12 Yoichi KIKUCHI	48	♂	7.5''-5''-3.t-Au.O/O.O.O.l	9.7.5''-3.t-Au.O/O.O.O.l
	13 Chiyoiko KIKUCHI	42	♀	7.5''-5''-1.t-Au.O/O.O.O.l	7.5''-5''-3.t-Au.O/O.O.O.l
	14 Masao ARIMOTO	45	♂	9.7.5''-3.t-Au.O/O.O.O.L	9.9.5''-3.t-Lr.O/O.O.O.l
	15 Kiyo ARIMOTO	43	♀	7.5''-5''-3.t-Au.O/O.O.O.L	7.5''-5''-3.t-Au.O/O.O.O.L
F _{III}	1 Senju ARIMOTO	47	♂	7.5''-5''-3.t-Au.O/O.O.O.l	7.5''-5''-3 ^h .t-Lr.O/O.O.O.L
	2 Tsuru ARIMOTO	46	♀	11.9.7.3 ^h .t-Lr.L/O.O.l	11.9.7.3 ^h .t-Lr.O/O.O.O.L
	8 Shinobu TADOKORO	36	♂	9.7.5''-3.t-Au.O/O.O.O.l	11.9.7.5'.t'-Au.O/O.O.O.l
	9 Yukiko TADOKORO	31	♀	11.X.7.3.t-Au.O/O.O.O.O	9.X.5''-3.t-Au.O/O.O.O.O
	11 Shigeru TADOKORO	32	♂	9.7.5''-3.t-Au.O/O.O.O.l	9.7.5''-3.t-Au.O/O.O.O.l
	12 Katsumi TADOKORO	25	♀	9.9.5''-3.t-Au.L/O.O.O	11.9.7.5'.t'-Au.O/O.O.O.l
	16 Hisako TADOKORO	22	♀	7.5''-5''-3.t-Au.O/O.O.O.l	11.9.7.3 ^h .t-Lr.O/O.O.O.L
	17 Yoshimaru TADOKORO	18	♂	9.7.5''-3.t-Au.O/O.O.O.L	7.5''-5''-3.t-Au.O/O.O.O.L
	18 Masako TADOKORO	14	♀	7.5''-5''-3.t-Au.O/O.O.O.L	9.7.5''-3.t-Au.O/O.O.O.L
	19 Mineko KIKUCHI	14	♀	11.7.7.3.t-Au.O/O.O.O.l	11.9.7.3.t-Au.O/O.O.O.l
	20 Itsuko KIKUCHI	9	♀	7.5''-5''-3.t-Au.O/O.O.O.L	7.5''-5''-3.t-Au.O/O.O.O.L
F _{IV}	21 Kazue KIKUCHI	8	♀	7.5''-5''-1.t-Au.O/O.O.O.L	7.5''-5''-3 ^h .t-Lr.O/O.O.O.L
	22 Katsuko KIKUCHI	5	♀	7.5''-5''-3.t-Au.O/O.O.O.l	9.7.5''-3.t-Au.O/O.O.O.l
	23 Masanori ARIMOTO	1	♂	0.5''-5''-3.t-Au.O/O.O.O.O	7.5''-5''-3.t-Au.O/O.O.O.L
	1 Ichio ARIMOTO	25	♂	7.5''-5''-3 ^h .t-Lr.O/O.O.O.D/l	7.5''-5''-3.t-Au/Lr.O/O.O.O.L
	2 Mitsuko ARIMOTO	22	♀	9.7.5'.4.t-Lr.O/O.O.O.l	11.9.7.5'.t-Lr.O/O.O.O.l
	4 Hisashi SATO	24	♂	7.5''-5''-3.t-Au.L/O.O.O.l	9.7.5''-3.t-Au.L/O.O.O.l
	5 Eiko SATO	21	♀	7.5''-5''-1.t-Lr.O/O.O.O.L	7.5''-5''-3 ^h .t-Lr.O/O.O.O.L
F _V	8 Kunio ARIMOTO	9	♂	9.7.5''-3.t-Au.O/O.O.O.L	11.9.7.3.t-Au.O/O.O.O.L
	9 Kazuo TADOKORO	9	♂	7.5''-5''-3.t-Au.O/O.O.O.L	9.7.5''-3.t-Au.O/O.O.O.l
	10 Miwako TADOKORO	5	♀	9.7.5''-5'.t-Au.O/O.O.O.l	11.9.7.5'.t'-Au.O/O.O.O.l
	11 Tsutomu TADOKORO	7	♂	9.7.5''-3.t-Au.O/O.O.O.l	9.9.5''-4.t'-Au.O/O.O.O.l
	12 Ryujiro TADOKORO	5	♂	9.7.5''-3.t-Au.O/O.O.O.l	11.X.7.3.t-Au.O/O.O.O.O
F _V	13 Michiko TADOKORO	2	♀	7.5''-3.1.t-Au.O/O.O.O.L	7.5''-5''-3.t'-Au.O/O.O.O.L
	1 Takayuki ARIMOTO	2	♂	7.5''-5''-3.t-Au.O/O.O.O.l	7.5''-5''-3.t-Au.O/O.O.O.L
	2 Hideo SATO	3	♂	7.5''-5''-1.t-Au.O/O.O.O.L	7.5''-5''-3 ^h .t-Au/Lr.O/O.O.O.L

designated by the capital letters A, B, C, and D.

The ceasing areas of main lines are designated by lines D, C, B, and A in order. It is not always the usual case that all four main lines exist in one person's palm. When one of the main lines is absent it is designated by 0 and immaturity is represented by X.

Observing the hand formula of this family both right and left shows $7 \cdot 5'' \cdot 5' \cdot 3$ ($7 \cdot 5'' \cdot 5'' \cdot 3$) or $9 \cdot 7 \cdot 5' \cdot 3$ ($9 \cdot 7 \cdot 5'' \cdot 3$).

Observations are made on each area of main line's end point.

Main lines

D	7 (44.12%)	9 (35.29%)	11 (19.12%)	
C	5'' (45.59%)	7 (33.82%)	9 (16.18%)	
B	5'' (51.47%)	5' (27.94%)	7 (19.12%)	
A	3 (70.59%)	3 ^h (10.29%)	1 (8.82%)	5' (7.35%)

Observation of hypothenar pattern shows that half of the head family members in Nasu-machi (II-2, III-1, III-2, IV-1, IV-2, IV-5, V-2) possess in both hands a loop, which opens to the radius. It is called "L^r". The hypothenar pattern (loop) is dominantly inheritable.

The third interdigital pattern (loop) is found in 3 members of the head family in Nasu-machi (III-2, IV-2, IV-8); and 6 in the branch family in Tokyo (II-14, III-8, III-12, III-19, IV-10, IV-11).

The fourth interdigital pattern (loop) is found on both hands of members of this family. These interdigital patterns seem to be dominantly inheritable.

The axial triradii and thenar pattern do not show anything of importance.

For information there are literatures on palm patterns of heredity 4), 5), 6), 7) in references.

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