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DERMATOGLYPHICS OF THE KOCH OF DIBRUGARH DISTRICT, ASSAM

ABSTRACT — This paper deals with the dermatoglyphic features of the Koch, an endogamous caste of Assam. The present data were evaluated for type and frequency of digits, indices, total ridge count, monomorphism, main line index, C line termination and Wilder's main line formulae. The results are presented for right and left hand separately.

KEY WORDS: Dermatoglyphics — Koch — Dibrugarh town — Assam — India.

INTRODUCTION

The Koch is a major detribalized caste group of Assam (See *Anthropologie* **25**, 1 : 87 — 89, 1987 and **25**, 2 : 171—173, 1987a). The present paper reports the Dermatoglyphic pattern distribution among the Koch caste of Dibrugarh town, Assam (India).

MATERIALS AND METHODS

Materials consists of bilateral inked impressions of finger and palm prints of 54 Koch individuals from Dibrugarh district, Assam. Methods devised by Cummins and Midlo (1961) were strictly followed in analyzing the data. Bimanuals have been constructed after the method of Poll (1928). Following

TABLE 1. *Digitwise distribution of papillary patterns*

Hand	Digit	Whorl					Loop		Arch	
		True	LPL	TL	CPL	Accidental	Ulnar	Radial	Simple	Tented
Right	I	3.15	0.93	1.85	0.19	—	3.89	—	—	—
	II	3.33	0.37	0.93	0.19	—	4.63	0.37	0.19	—
	III	2.22	0.19	0.19	0.56	—	6.67	—	—	0.19
	IV	5.93	—	—	0.56	—	3.33	0.19	—	—
	V	3.33	0.19	—	1.30	0.19	5.00	—	—	—
	I—V	17.96	1.67	2.96	2.78	0.19	23.52	0.56	0.19	0.19
Left	I	2.22	0.19	1.30	0.37	—	5.74	0.19	—	—
	II	3.33	0.37	0.93	0.56	—	3.89	0.74	0.19	—
	III	2.04	0.56	0.74	0.37	—	6.30	—	—	—
	IV	5.37	0.19	—	1.11	—	3.33	—	—	—
	V	2.96	—	0.19	0.93	—	5.93	—	—	—
	I—V	15.93	1.30	3.15	3.33	—	25.19	0.93	0.19	—
R + L	All	33.89	2.96	6.11	6.11	0.19	48.70	1.48	0.37	0.19

Volotzkoy (1936) monomorphic hands have also been calculated. Finger ridge count was obtained according to Holt (1949). Modal types of C line terminations were evaluated according to the guidelines of Plato (1970).

RESULTS AND DISCUSSION

In *Table 1* the digitwise distribution of the papillary pattern frequencies among the Koch population of Dibrugarh district has been presented. In the distribution of whorl pattern the digit IV has the highest incidence, while it is the lowest in digit III. Ulnar loop occur mostly in digit III and V, of which the digit III displays the highest incidence. Evidence of radial loop pattern is more frequent in digit II and completely absent in digits III and V.

TABLE 2. *Comparative digitwise (right + left combined) distribution of papillary patterns*

	Pattern types	I	II	III	IV	V	I–V
Koch (N = 54)	Whorl	50.93	50.00	34.26	65.74	45.37	49.26
	Ulnar loop	48.15	42.59	64.81	33.33	54.63	48.70
	Radial loop	0.93	5.56	0	0.93	0	1.48
	Arch	0	1.85	0.93	0	0	0.56

The arch configuration seems to concentrate on digit II only. The right hand shows a comparatively high occurrence of whorl and arch but lesser in the manifestation of loops. However, the chi-square test of significance fails to record any significant result in respect of bimanual variation (Chi-square value = = 1.1556, d.f. = 2). The Koch of the present study demonstrate a whorl — loop ratio approximating 50 : 50 (whorl — 49.53 : loop — 50.47).

In *Table 3* indices of pattern type in fingers have been illustrated. All the indices of the right hand are comparatively higher than their counterparts. The present sample is characterised by high whorl loop index (98.15) and low arch whorl index (1.13). In connection with the high incidence of whorls in right hand, the pattern intensity index is slightly higher than in their counterparts. However the above bilateral dimorphism is not statistically pronounced (t value = 0.5226, d.f. = OC).

TABLE 3. *Indices of pattern type in fingers*

	Side	Furuhata's index	Dankmeijer's index	Poll's index	Index of pattern intensity	
					Mean ± S.E.	S.D.
Koch (N = 54)	Right	106.15	1.45	1.54	7.52 ± 0.23	1.71
	Left	90.78	0.78	0.71	7.35 ± 0.23	1.67
	R+L	98.15	1.13	1.11	14.87 ± 0.42	3.10

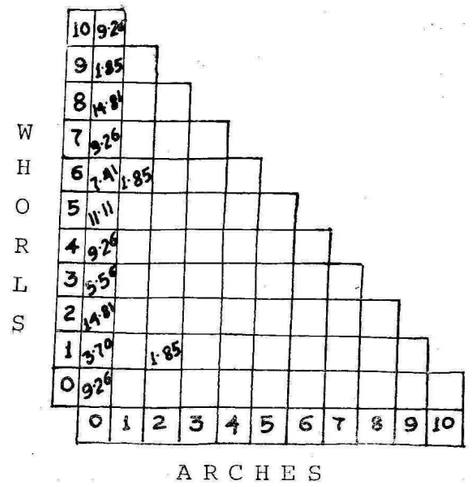

FIGURE 1. *Bimanual distribution of finger print patterns.*

The bimanual of the present sample (*Figure 1*) revealed two equally high peaks occuring at 2W8L and 8W2L, the percentage of both being 14.81. Laterally the peaks lie at 2A1W7L (1.85%). The present Koch sample have slightly greater proportion of monomorphic whorls than loops and the right hand is more monomorphic than the left one (*Table 4*). The total ridge count for each individual is obtained by the ridge counts of the ten fingers. The range of variation lies between 93 to 228 ridges. The mean ridge count is 152.77 ± 4.82 (S.D. = 31.97).

TABLE 4. *Percentage distribution of Monomorphic hands*

	Type	Right	Left	R + L	Both
Koch (N = 54)	Loop	12.96	12.96	12.96	9.26
	Whorl	20.37	12.96	16.67	9.26
		33.33	25.92	29.63	18.52

It is apparent from the *Table 5* that the type 'b' is predominant in the present sample (right + + left). Qualitative aspect of the main line formulae reveals that in general types 'a' and 'b' occur most frequently in right palm, whereas type 'c' in the left one. The bilateral assymmetry statistically speaking is significant (Chi-square value = 13.0015, d.f. = 2, 0.01 > p > 0.001).

The mean value of the main line index in the present sample has been calculated 7.45 ± 0.26. The right hands tend to have more transverse alignments of ridges and consequently have a higher main line index (8.90 ± 0.26) than the left hands (6.00 ± 0.34). The bimanual difference as expressed by R/L ratio is 148, thus, transversality in the right palm is 48.33%. Test of significance also records significant bimanual variation in them (t value = = 6.775, d.f. = 60, 0.001 > p).

TABLE 5. *Percentage frequency of main line formulae of palm*

	Hand	a			b			c
		11.9.7	1. × .7	11.0.7	9.7.5	9. × .5	9.0.5	7.5.5.
Koch (N = 49)	Right	30.61	2.04	0	38.77	0	2.04	12.24
	Left	12.24	2.04	0	10.20	6.12	2.04	36.73
	R + L	21.43	2.04	0	24.49	3.06	2.04	24.49

With regard to C line termination the radial type is observed to be associated more with the right palm whereas ulnar and proximal types are associated more with the left palm. This bilateral variation, however, is not statistically significant (Chi-square value = 2.5856, d.f. = 3).

Regarding the origin of Koch of Brahmaputra Valley it is now a well known fact that the people of different tribal groups like the Rabha, Garo, Kachari, Lalung, Mikir etc after conversion to Hinduism are known as Koch population and are given a place in the caste complex of the Hindu society (Sengupta: 1987, 1987a). Keeping in view the above observation, now let us see how much the present Koch sample deviates from the so-called ancestral tribal population and what is its position with respect to the population groups of almost equivalent caste status according to few finger dermatoglyphic features.

TABLE 6. *Percentage distribution of modal type of palmar main line C*

	Hand	Ulnar	Radial	Proximal	Absent
Koch (N = 49)	Right	55.10	40.82	2.04	2.04
	Left	59.18	30.61	8.16	2.04
	R + L	57.14	35.71	5.10	2.04

Percentage distribution of papillary patterns and indices of Koch and other population groups are set out in *Table 7*. The Koch of Dibrugarh are conspicuous in having almost 1 : 1 whorl — loop ratio. Chakravarty (1959) has shown that the whorl and loop occur in the ratio of 50 : 50 among the Mongoloid people. The lower caste populations remain apart by their lowering of whorl and raising of loop. It is also evident from the *Table 7* that the pattern intensity index and whorl — loop indices decrease from tribal populations to lower castes through Koch. The arch whorl index on the other hand increases from Koch to lower castes through tribal populations. The pattern intensity index of the populations under consideration shows almost equal consistency.

TABLE 7. *Percentage distribution of papillary patterns: The Koch and other population groups (males)*

Population	No	Whorl	Loop	Arch	Dankmeijer's index	Furahata's index	Pattern intensity index	Source
Koch	54	49.26	50.19	0.56	1.13	98.15	14.87	Present study
Pati Rabha	107	49.34	50.10	0.56	1.13	98.48	14.88	Das 1960
Maitori Rabha	107	49.34	48.32	2.34	4.74	102.11	14.70	Das 1960
Rangdani Rabha	78	54.31	43.89	1.80	3.31	123.74	15.25	Das 1960
Rabha	132	38.06	55.12	6.82	17.92	69.06	13.12	Chakravarty and Mukherjee 1961
Pooled Rabha	424	46.84	50.02	3.14	6.70	93.64	14.37	—
Plains Garo	94	47.96	48.96	2.98	6.21	97.91	14.48	Das 1959
Hill Garo	76	50.76	47.48	1.74	3.42	106.90	14.90	Das 1959
Garo	134	41.90	55.50	2.50	6.05	75.54	13.94	Chakravarty and Mukherjee 1961
Pooled Garo	304	46.02	51.51	2.47	5.36	89.34	14.36	—
Boro Kachari	109	54.66	43.41	1.84	3.36	125.91	15.27	Das 1960a
Boro Kachari	138	55.22	43.62	1.61	2.89	126.57	15.41	Chakravarty and Mukherjee 1961
Mech Kachari	72	40.28	57.22	2.50	6.21	70.39	13.78	—
Pooled Kachari	319	51.55	46.56	1.89	3.67	110.70	14.97	—
Lalung	52	50.19	47.50	2.31	4.59	105.66	14.79	Das et al 1980
Lalung	106	51.04	47.45	1.51	2.96	107.55	14.96	Chakravarty and Mukherjee 1961
Pooled Lalung	158	50.76	47.47	1.77	3.49	106.93	14.90	—
Mikir	108	53.98	43.89	2.13	3.95	122.99	15.19	Deb 1979
Pooled Tribe	1,313	48.85	48.71	2.44	4.98	100.28	14.62	—
Hira	155	50.30	47.60	2.10	4.24	105.56	14.80	Das et al 1986
Jogi	209	43.70	53.80	2.50	5.69	81.32	14.07	—
Kumar	110	38.70	54.10	7.20	8.54	71.60	13.30	—
Kaibarta	295	40.70	56.50	2.80	6.82	72.15	13.75	—
Pooled Lower Caste	769	43.20	53.70	3.10	6.21	81.30	13.98	—
Ahom	56	46.61	51.25	2.14	4.59	90.94	14.48	Das et al 1985

A chi-square analysis (*Table 8*) reveals that the differences between the Koch of Dibrugarh on one hand and pooled sample of each of the populations under consideration on the other hand are statistically significant. The only nonsignificant chi-square value is associated with Lalung. The above variation is also near the limit of significance. A comparison of the present sample with those of Ahom (a major Tai mongoloid population of Dibrugarh district) has also been made. It is observed that this sample is mutually undifferentiated from the Ahom (Chi-square value = 5.5474, d.f. = 2).

TABLE 8. *Comparison of the Koch with other population groups for papillary patterns*

Groups compared	Chi-square value (d.f. = 2)
Koch × Rabha	11.8171+
Koch × Garo	9.8853*
Koch × Kachari	6.6202*
Koch × Lalung	4.8726
Koch × Mikir	10.1959+
Koch × Lower caste	17.0402+

* indicates statistically significant at 5.0% level of probability
\+ indicates statistically significant at 1.0% level of probability.

The present study points to the necessity of taking further systematic studies on other biological characters to elucidate the origin of Koch and their affinity with Garo, Kachari, Rabha, Lalung etc.

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