Anthropometric and Dermatoglyphic Study of the Juangs in Orissa, India

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RÉSUMÉ

Cet article nous livre les résultats d'une étude anthropométrique de soixante hommes de la tribu des Juangs, Inde.

INTRODUCTION

The Juangs, one of the primitive tribes of the Orissa state, India, inhabit the central region of the state in the districts of Dhenkanal and Keonjhar. The data on Anthropometry finger and palm prints was collected by the author in December 1959 from the village of Sansailo. Measurements were taken on 60 adults of male sex only on a random sample basis. The finger and palm prints were collected on 50 adults of male sex of the same group leaving some subjects whose prints were not clear.

METHODS

The conventional methods adopted by Martin were followed for anthropometric study and the methods adopted by Cummins

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and Midlo (1943) were followed for the analysis of the finger and pramar dermatoglyphic study of the Juangs. The following measurements and the indices have been worked out.

Stature (height vertex), sitting height (vertex), head length, head breadth, head height, minimum frontal diameter, bizygomatic breadth, bigonial diameter, nasal height, nasal breadth, morphological facial length and morphological superior facial length.

Cephalic index, breadth-height index, length-height index, total face index, upper face index, and nasal index.

RESULTS

Table 1

Classification of Stature (in cms.)

Class	Range	Absolute No.	Percentage
Very short	130.0–149.0	3	5.00%
Short	150.0–159.9	40	66.66%
Below medium	160.0–163.9	7	11.66%
Medium	164.0–166.9	5	8.33%
Above medium	167.0–169.9	4	6.66%
Tall	170.0–179.9	1	1.66%

The mean stature of the Juang people is 158.4 ± 0.77 cms., the maximum being 171.8 cms., and the minimum 147.8 cms. Short stature (66.66%) appears to be the predominating character among the Juangs. Below medium class is 11.66% which is followed by medium (8.33%), above medium (6.66%) and very short (5%) respectively. Only one tall statured individual occurs in the entire group.

The following table gives the statistical constants of the measurements taken and the indices of the 60 Juang males.

Table 2

Measurement	Max.	Min.	Range	Mean+S.E.	S.D.+S.E.
1) Stature (ht. vertex)	171.8	147.8	24.0	158.4 ± .77	5.8 ± .53
2) Sitting (ht. vertex)	87.2	76.4	10.8	80.9 ± .29	2.27 ± .20
3) Head length	20.2	16.8	3.4	18.5 ± .20	1.55 ± .14
4) Head breadth	14.6	12.8	1.8	14.1 ± .30	2.25 ± .18
5) Min. frontal diameter	11.2	9.0	2.2	10.37 ± .26	2.05 ± .18
6) Bizygomatic breadth	13.2	10.2	3.0	10.8 ± .42	3.20 ± .29
7) Bigonial breadth	10.8	8.8	2.0	10.46 ± .20	2.35 ± .21
8) Nasal height	5.5	3.9	1.6	4.63 ± .20	1.57 ± .14
9) Nasal breadth	4.5	3.5	1.0	4.31 ± .26	1.99 ± .18
10) Morph. facial length	11.8	9.5	2.3	11.03 ± .30	2.26 ± .20
11) Morph. super fac. length	7.2	5.2	2.0	6.33 ± .28	2.14 ± .19
12) Head height	13.4	11.0	2.4	11.46 ± .33	2.56 ± .23
13) Cephalic index	86.92	66.42	20.50	74.28 ± .49	3.80 ± .35
14) Lt-ht index	86.34	58.41	27.93	65.90 ± .56	4.38 ± .40
15) Br-ht index	96.91	72.76	24.65	85.98 ± .74	5.76 ± .53
16) Total face	105.80	78.50	27.30	91.29 ± .78	6.10 ± .56
17) Upper face	60.04	46.02	14.02	52.93 ± .54	4.22 ± .38
18) Nasal index	100.00	74.06	25.04	91.59 ± .84	6.56 ± .60

The mean cephalic index is 74.28 ± .49 with the maximum 86.92 and minimum of 66.42. Dolicocephaly appears to be most common in 45% and mesocephaly and brachycephaly occurs in 40% and 5% respectively as seen from the table given below.

Table 3

Class	Range	Absolute No.	Percentage
Hyper dolicocephalic	X –69.9	6	10%
Dolicocephalic	70.0–75.9	27	45%
Mesocephalic	76.0–80.9	24	40%
Brachycephalic	81.0–85.4	3	5%
Hyperbrachycephalic	85.5– X	–	–

The mean head length and head breadth of the Juangs are 18.5 ± .20 and 14.1 ± .30 respectively. Head length varies from 20.2 to 16.2 cms., and head breadth from 14.6 to 12.8 cms.

The mean length-height index of the Juangs head is 65.9 ± .56 and the range of variation between 86.34 to 58.41 as seen from the Table 3.

Table 4

Class	Range	Absolute No.	Percentage
Chamaecephalic	X –57.6	1	1.66%
Orthocephalic	57.7–62.6	7	11.66%
Hypsicephalic	62.7– X	52	86.66%

Hypsicephaly being the highest in 86.66% cases of heads while orthocephalic and chamaecephalic heads are in 11.66% and 1.66% respectively. The mean head height is 11.45 ± .33 and it varies from 13.4 to 11.0 cms.

The mean breadth-height index of the Juangs head is 85.98 ± .74 ranging from 96.91 to 72.76 as seen from the Table 4.

Table 5

Class	Range	Absolute No.	Percentage
Tapeinocephalic	X –78.9	6	10.00%
Metriocephalic	79.0–84.9	17	28.33%
Acrocephalic	85.0– X	37	61.66%

Acracephaly being largest in 61.66% of the heads and metriocephaly and tapeinocephaly are in 28.33% and 10% cases respectively. The mean total face index is 91.29 ± .78 and varies from 105.80 to 78.50. The mean total facial height (morphological facial length) is 11.03 ± .30 the maximum being 11.8 cms. and the minimum 9.5 cms.

Table 6

Class	Range	Absolute No.	Percentage
Hypereuryprosopic	X –78.9	2	3.33%
Euryprosopic	79.0–83.9	6	10.00%
Mesoprosopic	84.0–87.9	10	18.33%
Leptoprosopic	88.0–92.9	17	28.33%
Hyperleptoprosopic	93.0– X	25	41.66%

Hyperleptoprosopic type of faces is most common (41.66%) among these people, and leptoprosopic, mesoprosopic and euryprosopic appear in decreasing order, namely in 28.33%, 18.33% and 10% respectively. The mean bizygomatic breadth is 10.8 ± .42 cms. varying from 13.2 to 10.2 cms. The mean upper face index is 52.93 ± .54 and varies from 60.04 to 46.02.

Table 7

Class	Range	Absolute No.	Percentage
Hypereuryne	X –42.9	–	–
Euryene	43.0–47.9	8	13.33%
Mesene	48.0–52.9	23	38.33%
Leptene	53.0–56.9	20	33.33%
Hyperleptene	57.0– X	9	15.00%

It is observed that among the Juang faces mesene and leptene are common, appearing in 38.33% and 33.33% respectively, while hyperleptene appears in 15% and euryene in 13.33%. The mean upper facial-height (morphological superior facial length) is 6.33 ± .28 cms. varying from 7.2 to 5.2 cms. The mean nasal index is 91.59 ± .84 having maximum of 100.00 and a minimum of 74.06.

Table 8

Class	Range	Absolute No.	Percentage
Leptorrhine	55.0–69.9	1	1.66%
Mesorrhine	70.0–84.9	12	20.00%
Platyrrhine	85.0–99.9	42	70.00%
Hyperplatyrrhine	100.0– X	5	8.33%

Among the Juangs the platyrrhine type of nose is common occurring in 70%. Mesorrhine type appears in 20%, hyperplatyrrhine in 8.33% but leptorrhine is negligible.

The mean nasal height and nasal breadth are 4.63 ± .20 cms. and 4.31 ± .26 cms. respectively. The range of variation of nasal height is from 3.9 to 5.5 cms., and in nasal breadth it is from 3.5 to 4.5 cms.

Finger prints:

The following table gives the frequency of the finger print patterns of the 500 finger prints of the 50 Juang males that were analysed.

Table 9

Frequency of the Finger Print Patterns

Digit	Hand	Loops				Arches
		Whorl	Ulnar	Radial	Total	
I	R	56.86	43.11	–	43.11	–
	L	50.00	48.00	2.00	50.00	2.00
	R + L	53.43	45.55	1.00	46.55	1.00
II	R	54.90	41.17	3.91	45.08	–
	L	52.00	38.00	8.00	46.00	2.00
	R + L	53.46	39.58	5.95	45.53	1.00
III	R	34.00	66.00	–	66.00	–
	L	46.00	50.00	2.00	52.00	2.00
	R + L	40.00	58.00	1.00	59.00	1.00
IV	R	77.07	26.53	–	26.53	–
	L	74.00	26.00	–	26.00	–
	R + L	75.53	26.26	–	26.26	–
V	R	34.00	61.00	2.00	63.00	2.00
	L	26.52	71.42	2.04	73.46	2.04
	R + L	30.26	66.21	2.02	68.23	2.02
All digits	R + L	50.54	47.12	1.99	49.11	1.00

From the above table it is clear that finger prints show unlike frequencies on the different digits when combined on both the hands. On digits I, II whorls are frequent and on digit IV whorls appear abundantly. The frequency ranges from 77% in digit IV to 56% in digit I and 54% in digit II. The frequency of the ulnar loops is greater in digit III and V ranging from 66% to 71% respectively, while on digits I, II and IV they are found in 48%, 41% and 26% respectively. The radial loops show the greatest frequency on digit II (8%) and show a sharp reduction on digits I, III and V. The arches are found in the frequency of 2% on digits I, II, III and V. The whorls are seen more on the right hand than on left, while ulnar loops are more on digits III and V and are common on both the hands. Finally arches are very few on both the hands.

Sarkar (1954) proposed that an approximate whorl-loop ratio of 60:40 is probably a characteristic of the Veddids or Australoids. This is confirmed by the finger data of the Australian aborigines (Cummins and Setzler 1951), where whorls occur in 75.5% and lopps in 21.1%. The Juangs show the Munda ratio and it is, as seen from the present study, approximately 50.54%: 49.11%.

The following table shows the pattern intensity index (Cummins and Steggeda 1935), arch-whorl index of Dankmeijer (1938) and the whorl-loop index of Furuhata (1927).

Table 10

Frequencies of Pattern Types in %

Whorl	U.L	R.L	Arch.	P.I	D.I	F.I
50.54	47.12	1.99	1.00	15.02	2.01	105.93

The Dankmeijer index is too low due to the lesser number of arches and the great abundance of whorls and the Furuhata index is great because of the nearly equal number of whorls and loops. The pattern intensity index is 15.02 which bears resemblance to Sabara (14.07) and Juang (14.06) as seen from the following table which is quoted from Sarkar (1957) for comparison.

Table 11

Finger Prints of Orissan Aborigines (all fingers combined)

Tribe	Whorls	Loops	Arches	*Indices* P.I	D.I	F.I
Juangs (♂) — Sarkar	42.00%	56.64%	1.36%	14.06	3.25	74.15
Juangs (♀) — Sarkar	38.82%	57.65%	3.53%	13.53	9.09	67.34
Sabara (♂) — Sarkar	42.43%	55.89%	1.68%	14.07	3.96	99.12
Sabara (♀) — Sarkar	24.72%	67.42%	7.86%	11.68	31.82	36.67
Khond (♂) — Sarkar	41.07%	52.89%	5.14%	13.68	12.12	79.52
Khond (♂) — Rao	29.08%	65.26%	5.63%	12.95	14.24	62.37
Juangs (♂) — present study	50.54%	48.11%	1.00%	15.02	2.01	105.93

Thus from the table it is seen that the Juangs resemble the other Munda tribes of Orissa. Rife (1954) has shown ethnic variations in the pattern intensity indices and they are given below for some of the tribes known.

Table 12

Tribe	P.I	Tribe	P.I
Pahira (♂)	15.23	Pahira (♀)	14.18
Munda (♂)	14.78	Munda (♀)	13.44
Oraon (♂) — W. Bengal	15.39	Oraon (♀) — W. Bengal	15.25
Oraon (♂) — Ranchi	15.67	Oraon (♀) — Ranchi	15.00
Kurmi Mahato (Male)	14.38	Adiyan	14.72
Vettukurma	12.59	Paniyan	15.67
Maale	12.31	Panoo (♂)	12.55
Juangs (♂)	14.06	Juangs (♀)	13.53
Sabara (♂)	14.07	Sabara (♀)	11.68
Khonds (♂)	13.69	Khonds (♂)	12.95
Andamanese (♂, ♀)	12.26	Juangs (♂) — present study	15.02

The pattern intensity index will be high if there is a high frequency of whorls as is true in the case of the Australian aborigines who have 75% whorls and their pattern intensity index is 17.73.

Palmar prints:

Main line formula — It has been shown by many observers that the frequency of the typical main line formulae 11.9.7.-, 9.7.5.-, and 7.5.5.- varies in different races (Wilder 1904). The following table shows the frequency of the three main line formulae as in the right and left hand of the Juangs.

Table 13

Frequency of the Three Typical Formulae in %

Formula	Right	Left	Mean
11.9.7.—	24.00%	6.00%	15.00%
9.7.5.—	34.00%	60.00%	47.00%
7.5.5.—	40.00%	30.00%	35.00%

From the above table it is clear that the main line formula 9.7.5.- is more common, occurring in 47.00%, in the left hand, than in the right hand. The formula 7.5.5.- occurs nearly in equal proportions whereas 11.9.7.- is not so common and it occurs only in 24.00% on the right hands.

Patterns on the configurational areas of the palms — The following table shows the frequencies of the true patterns in the configurational areas of the palms both right and left.

Table 14

Frequencies of the Types of Palmar Configurations

Configurational Area	*Frequencies of the Patterns in %* Right	Left	Mean
Hypothenar	24.00%	30.00%	27.00%
Thenar/Interdigital I	2.00%	4.00%	3.00%
Interdigital II	8.00%	6.00%	7.00%
Interdigital III	54.00%	54.00%	54.00%
Interdigital IV	68.00%	70.00%	69.00%

The frequency of the pattern in the hypothenar area is 27.00% among these people as seen from the above table. It is 32.07% among the Indians (Biswas 1936) and 41.07% among the Euro-Americans (Cummins 1943). The frequency of the patterns in the Thenar/Interdigital I area is 3.00% and that of the Interdigital II is 7.00% among these people. The Juangs show a large percentage of patterns in the Interdigital III and IV areas, 54.00% and 69.00% respectively. This high frequency of patterns is due to the occurrence of the main line formulae 9.7.5.- and 7.5.5.- in many of the cases.

The following table shows the frequencies of the patterns of formulae O.O.L., O.L.O. and O.O.O. of the combination of the three Interdigitals II, III and IV.

Table 15

Formula	*Frequency of the pattern in %* Right	Left	Mean
O.O.L	34.00%	26.00%	30.00%
O.L.O	25.00%	20.00%	22.50%
O.O.O.	—	4.00%	2.00%

From the above table it is clear that the combination formula O.O.L. occurs in many cases (30.00%), more in the right hand and the combination formula O.L.O. is almost equal in both the hands. It is interesting to note that the combination formula O.O.O. is absent in the right hand and is quite insignificant on the left hand occuring in 4.00%.

Axial triradius — The following table shows the position of the axial triradius as observed in the Juangs.

Table 16

Position of the Axial Triradius

Axial Triradius	Right	Left	Total
t	45	45	90
t′	4	1	5
t″	–	–	–
tt″	1	4	5

Among the Juangs the axial triradius is occurring in equal proportions on both right and left hands in the position t (carpal axial triradius). It occurs in 4 cases on the left hand in position tt″ (carpal triradius with central triradius).

SUMMARY AND CONCLUSION

Anthropometric data of 60 adults Juangs of male sex only from the village Sansailo of the Dhenkanal district in Orissa, India, was collected and analysed.

The study of the finger and palmar dermatoglyphics was done on the 500 configurations of fingers and 100 palmar prints of 50 Juang adults of male sex from the same village.

From the analysis of the data on Anthropometry, the Juangs are characterized as short statured people (66.66%) — very few below medium — to medium, having head length 18.5 ± .20 cms. and head breadth 14.1 ± .30 cms. Most of the Juangs have dolicocephalic (45.00%) to mesocephalic (40.00%) heads. Brachycephalic heads are very few (5.00%). The head proportions are characterized by hypsicephaly (86.66%) and acrocephaly (61.66%). In facial proportions they are hyperleptoprosopic (41.66%), leptene (33.33%), to mesene (38.33%). Most of the Juangs have platyrrhine (70.00%) type of nose with a sporadic occurrence of hyperplatyrrhine type of nose (8.33%). Mesorrhine type of nose is also found (20.00%) among these people.

The skin colour of these people varies from dark brown to brown; the hair is low wavy. Epicanthic fold of the eye is not to be seen in this group. Facial prognathism is to be found in some of the persons.

From the study of the finger and palmar dermatoglyphics the Juang appear to conform to the Mundari type of the Orissa such as Sabara, Munda, and others, who are of the progressive proto-australoid ethnic stock.

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