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POLYMORPHISM: WITH REFERENCE TO SIMIAN CREASE AMONGST TWO HIMALAYAN ENDOGENOUS GROUPS

ABSTRACT. — *The association of simian crease is well established with Mongolism and chromosomal aberrations. Also variation in its incidence has been recorded in different populations. The present paper is basically aimed to report the incidence of simian crease in two endogamous groups namely Rajputs and Harijans from Rampur Bushahr, Himachal Pradesh (INDIA). The total data of 188 individuals was categorised as per Bhanu's (1973) classification. Only characters like bimanual symmetry, sexual dimorphism and bilateral variation have been accounted for. The results have also been compared with some other Mongoloid populations.*

KEY WORDS: *Simian crease — Rajputs — Harijans — Himachal Pradesh — Polymorphism — Endogamous groups.*

There are three principal creases which traverse the human palm. Two of these originate from radial and ulnar margins of the palm and are known as proximal transverse crease and distal transverse crease and proceed across the palm in downward and upward directions, respectively. Sometimes these two creases join to form a single transverse crease which is commonly known as "Transverse" or "Simian" crease.

The genetics and incidence of transverse or simian crease find their mention in anthropological literature quite often. Though basically a character of non-human primates, it frequently occurs on the human palms also. The chance association of the trait with diseased conditions, Mongolism, mental defects and chromosomal aberrations aroused the curiosity of many geneticists like Rashad et al. 1964, Lestrangle, 1966, Beckman et al. 1967, Plato, 1970 etc. In the Indian context, there is a number of studies available by Buchi, 1954, Chatterjee & Bose, 1964, Ghatage, 1974, Ahmadi et al., 1975, Mal-

hotra, 1978 etc. But most of these studies vary due to different methods of classification adopted. Bhanu (1973) provides a comprehensive classification for standardisation, which suggests 13 types of patterns.

The present paper envisages to report the incidence of simian crease polymorphism in two endogamous groups, of Rampur Bushahr tehsil of dist. Simla of Himachal Pradesh, namely Rajputs and Harijans. The Rajputs comprise a major chunk of the population. An attempt has been made to study the bimanual symmetry, sexual dimorphism and bilateral variation. The results have also been compared with some other Mongoloid populations.

MATERIAL AND METHODS

All 188 Bushahris were studied to record the variation in the trait. Of these 124 were Rajputs and 64 Harijans. The Rajputs come under scheduled tribes and Harijans under scheduled cas-

tes. Rampur Bushahr tehsil is located in a mountainous tract, surrounded by high hills and banked around Sutluj river. The average height of the area is 3,000 feet above sea level. The identification of various types of simian creases was done according to Bhanu (1973). The 13 types suggested by him have been grouped into 3 categories, namely transitional transverse crease (TT-type. 1), other simian crease (OSC-types 2 to 9) and typical simian creases (TSC-Types 10–13). The individuals with simian crease at least on one hand were treated as positive cases. Further the data are arranged group-wise and sex-wise to have clear cut picture of the incidence of this trait, in the two groups and both sexes.

OBSERVATIONS

Simian crease of various types was observed in the population with changing degree of incidence. The incidence of the simian crease in the present population is fairly high in males (Table 1). The Harijan males, in particular, show much higher frequency of this trait. They show as much as five per cent of individuals having typical simian crease on their hands against three per cent in their counterparts. For OSC Rajput females dominate over males as far as right hand is concerned but the trend is just reversed for left hand. However, Harijan males show the highest frequency for both

TABLE 1. *Bilateral variation in simian crease types*

Group/ Sex	N	TSC				OSC				TT			
		Right	Left	Both Hands	Total	Right	Left	Both Hands	Total	Right	Left	Both Hands	Total
Rajputs													
M	100	3 (3.0)	1 (1.0)	2 (2.0)	3 (3.0)	12 (12.0)	7 (7.0)	5 (5.0)	15 (15.0)	10 (10.0)	6 (6.0)	14 (14.0)	22 (22.0)
F	24	—	—	—	—	1 (4.2)	4 (16.7)	3 (12.5)	8 (33.3)	2 (8.33)	1 (4.2)	—	2 (8.3)
M + F	124	3 (2.4)	1 (0.8)	2 (1.6)	3 (2.4)	13 (10.5)	11 (8.9)	8 (6.5)	23 (18.5)	12 (9.7)	7 (5.6)	14 (11.2)	24 (19.4)
Harijans													
M	40	3 (7.5)	2 (5.0)	1 (2.5)	2 (5.0)	10 (25.0)	6 (15.0)	4 (10.0)	14 (35.0)	5 (12.0)	5 (12.5)	8 (20.0)	12 (30.0)
F	24	—	—	—	—	4 (16.7)	1 (4.2)	6 (25.0)	10 (41.6)	—	3 (12.5)	2 (8.3)	2 (8.3)
M + F	64	3 (4.7)	2 (3.1)	1 (1.6)	2 (3.1)	14 (21.9)	7 (10.9)	10 (15.6)	24 (37.5)	5 (7.8)	8 (12.5)	10 (15.6)	14 (21.9)
Combined sample													
M	140	6 (4.3)	3 (2.1)	3 (2.1)	5 (3.6)	22 (15.7)	13 (9.3)	9 (6.4)	29 (20.7)	15 (10.7)	11 (7.9)	22 (15.7)	34 (24.3)
F	48	—	—	—	—	5 (10.4)	5 (10.4)	9 (18.8)	18 (37.5)	2 (4.2)	4 (8.3)	2 (4.2)	4 (8.3)
M + F	188	6 (3.2)	3 (1.6)	3 (1.6)	5 (2.7)	27 (14.4)	18 (9.6)	18 (9.6)	47 (25.0)	17 (9.0)	15 (8.0)	24 (12.8)	3 (20.2)

TABLE 2. *Bilateral Symmetry in Crease Types.*

Group/ Sex	N	Symmetry					Asymmetry
		TSC	OSC	TT	Normal	Total	
Rajputs							
M	100	2 (2.0)	5 (5.0)	14 (14.0)	55 (55.0)	76 (76.0)	24 (24.0)
F	24	—	3 (12.5)	—	19 (79.2)	22 (91.7)	2 (8.3)
Total	124	2 (1.6)	8 (6.5)	14 (11.2)	74 (59.7)	98 (79.0)	26 (21.0)
Harijans							
M	40	1 (2.5)	4 (10.0)	8 (20.0)	16 (40.0)	29 (72.5)	11 (27.5)
F	24	—	6 (25.0)	2 (8.3)	12 (50.0)	20 (83.3)	4 (16.7)
Total	64	4 (1.6)	10 (15.6)	10 (15.6)	28 (43.8)	49 (76.6)	15 (23.4)
Combined sample							
M	140	3 (2.14)	9 (6.4)	22 (15.7)	71 (50.7)	105 (75.0)	35 (25.0)
F	48	—	9 (18.8)	2 (4.2)	31 (64.6)	42 (87.5)	6 (12.5)
Total	188	3 (1.6)	18 (9.6)	24 (12.8)	102 (54.3)	147 (78.2)	41 (21.8)

hands when compared with Harijan females and Rajput males and females. The sexual variation, which has been found in other studies is very well confirmed in the present study also. The sexual dimorphism seems to be well marked when we find that the females of both groups are absolutely devoid of TSC in comparison to males who are having 3 to 5 per cent individuals with the crease. Again for OSC, the Rajput females have 16.7 per cent for left hand against 7 per cent males for the same hand. On the contrary, Harijan males have much higher frequency in both hands when viewed in relation to their female counterparts. The dominant style for OSC of Harijan males was followed by Rajput males also, but with lesser degree for TT-crease. This trait is totally absent in the right hand of Harijan females, where as much as 12.5 per cent

TABLE 3. *Percentile incidence of simian crease in some (Mongoloid) populations.*

Population	Sex	N	TSC	TT	Source
Tibetans Galong Abor	M	181	3.87	26.52	Buchi, 1954
	M	160	3.13	27.50	
	F	148	—	25.00	Buchi, 1954
	Total	308	1.57	26.25	
Minyong Abor	M	52	3.85	25.00	Buchi, 1954
	F	61	—	19.68	
	Total	113	1.93	22.34	
Riang	M	44	4.54	12.50	Chakra- vartii & Basu, 1960
	F	17	2.94	5.88	
	Total	61	3.74	9.19	
Tippera	M	126	0.79	25.40	Gupta, 1966
	F	18	—	5.56	
	Total	144	0.63	22.90	
Tibetans	M	111	4.50	16.22	Bhalla & Bhatia, 1977
	F	30	—	—	
	Total	141	3.54	12.76	
Kinnaura Rajputs	M	304	2.96	17.43	Malhotra, 1978
Bilaspur Kanets	M	—	5.11	Not Obs.	Bala, 1971
Bushahri Rajputs	M	100	3.0	22.0	Present study
	F	24	—	8.3	
	Total	124	2.4	19.4	
Bushahri Harijans	M	40	5.0	30.0	Present study
	F	24	—	8.3	
	Total	64	3.1	21.9	
Bushahri (Combined)	M	140	3.57	24.3	Present study
	F	48	—	8.3	
	Total	188	2.66	20.2	

males show it, and for the left hand the frequencies are the same for both sexes. In the combined data, we find that the differences between two sexes are mellowed down. This can be seen for OSC and TT in the right hands only, besides the total absence of TSC in females, which is a common feature of both groups.

A good amount of bilateral variation is seen in the appearance of simian crease in two hands. By and large, the unilateral presence of TSC, OSC and TT is higher in the right hand than in the left hand. The inter-group differences seem to be quite marked for OSC, where Harijan males also show higher frequency for both hands. In the females of both groups, the incidence is inter-changed for right and left hands. The Harijans show higher incidence of TT for both hands. In both populations, the unilateral appearance of TSC and OSC is double than the bilateral appearance and for the TT-crease the incidence is almost the same. The Harijans (M+F) show almost double i.e. 15.6 per cent incidence of bilateral appearance of OSC as compared to just 6.5 per cent among the Rajputs (M+F). The trend is the same even for TT, but the differences are much less.

Females of both groups demonstrate higher incidence of symmetrical palms. Similarly, the Rajputs show higher incidence of symmetry (M+F) than Harijans. Though the former show an overall higher symmetry, the latter group show considerably higher symmetry for OSC and TT. This inter-change is due to higher frequency of normal symmetrical Rajput (M+F) hands. The Harijan females have 16.7 per cent of asymmetrical palms as compared to 8.3 per cent of Rajput females. The sexual dimorphism is well marked for Rajputs where the males have incidence of asymmetry three times higher than females, whereas in the Harijans the incidence is just one and a half times higher. In the total sample also, the asymmetrical appearance of this crease is twice more frequent in the males than in females. Similarly, the incidence of normals (symmetrical) is twice higher than the incidence (TSC, OSC and TT) in the total sample (Table 2).

DISCUSSION

The two groups included in the present study are strictly endogamous. The inter-population variation of simian crease is confirmed by the study.

A comparative account of the incidence of typical simian crease (TSC) and transitional type crease in the present groups show considerable variation when compared with other Mongoloid populations (Table 3). It varies from 0.79 per cent in Tippera males to 5.00 per cent in the Harijan Bushahris. The Harijans show perhaps one of the highest incidence of TSC, the other being Kanets of Bilaspur showing 5.11 per cent (Bala, 1971), followed by Riangs i.e. 4.54 per cent (Chakravarti and Basu, 1960), and Tibetans i.e. 4.50 per cent (Bhalla

and Bhatia, 1977). From table 3 a common feature for all the females of various groups emerges (barring a lonely case of unilateral TSC among Rianga females), i.e. the typical simian crease TSC is universally absent in them.

The bisexual variation for TT is well marked in both populations under study. A similar trend is also noticed among the Rianga Tipperas and Tibetans. In fact among Tibetans (Bhalla and Bhatia, 1977) TT is completely absent. Another very conspicuous feature of table 3 is the highest frequency of TSC i.e. 5.00 per cent and of TT i.e. 30.00 per cent among the Harijan males from Rampur Bushahr. Kinnaura male Rajputs, being neighbouring population, show closeness to Bushahri male Rajputs in terms of incidence of TSC and TT. The incidence of TT is not much different in the total sample of both groups (Rajputs and Harijans), showing thereby complementation despite of individual differences and sexual dimorphism.

The results of the present study are well comparable with the reports available on other Mongoloid populations. The results also show that inter-group differences are rather more marked than those between the neighbouring populations of the same racial stock. The simian crease polymorphism among the two groups can be summed up like this:

a) Rajputs are characterised by the average incidence of TSC and TT recorded for Mongoloid populations and

b) Harijans are identified by high incidence of TSC and TT.

REFERENCES

- AHMADI K., KAZI R. B., MALHOTRA K. C. and BHO-SALE N., 1975: Morphogenetic studies among the muslim females of Maharashtra. III Simian Crease Polymorphism. *Proc. Ind. Ann. Conf. Ind. Soc. Hum. Genet.* at Calcutta.
- BALA S., 1971: M. Sc. Dissertation Punjab University, Chandigarh. Unpublished.
- BECKMAN L., GUSTAVSON K. H. and NORRIN A., 1962: Finger and Palm dermal ridge patterns in normal mongoloid individuals (the Down's Syndrome). *Acta Genet.* 12: 20-27.
- BHALLA V., BHATIA K., 1977: Simian crease polymorphism in Tibetans. *J. Phy. Anth. & H. Gen.*, Vol. 3 (I), pp 45-50.
- BHANU B. V., 1973: Simian crease in Man: Some methodological considerations. *J. Hum. Evol.*, 2: 153-160.
- BUCHI E. C., 1954: Simian crease in India. *Surv. Bull. Dept. Anthropol.*, 3: 39-49.
- CHAKRAVARTI M. R., BASU S. K., 1960: A note on the Simian crease of Rianga of Tripura. *Sci. Cult.* 26-41.
- CHATTERJEE B. K., BOSE H. K., 1965: On Simian crease of Onges of Andaman. *Proc. Sci. Congr.* (Abstract) 3: 187.
- GHATAGE V., 1974: Palmar dermatoglyphics among the Paris (Unpubl. M. Sc. dissertation, Poona Univ.).
- GUPTA S. P., 1966: Palmar dermatoglyphics of Rianga and Tipperas in Tripura State — *Proc. Int. Symp. Derm.*, Delhi: 271-278.
- LESTRANGE M. Th. De, 1966: Etude des plis de flexion de la main: Le pli transverse chez les habitants de Plozévet (Finistère sud., France). *Bull. et Mem. Soc. Anthropol.* (Paris), 10: 103-118.
- MALHOTRA R., 1978: Simian crease polymorphism in Kinnaura male Rajputs. *Bull. Ind. Derm. Asso.*, Vol. VII (I): pp. 11-15.
- PLATO C. C., 1970: Dermatoglyphics and flexion crease of Cypriots. *Amer. J. Phy. Anthropol.*, 33: 421-428.
- RASHAD M. N., MORTON W. R. M., SCALLY, B. G., 1964: The Simian crease. *The Lancet*, 3: 10.

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