

A Study of Palmar Dermatoglyphics Among Sugalis, a Tribal Population of Andhra Pradesh

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ABSTRACT Bilateral palm prints of 75 males and 75 females of Sugali, a tribal population of Andhra Pradesh were analysed for principal main line formulae, C- line polymorphism, main line index, a-b ridge count and 'atd' angle. Main line formulae occur in the order of 11-9-7 > 9-7-5 > 7-5-5 among males and 9-7-5 > 11-9-7 > 7-5-5 among females and shows significant bilateral and bisexual variation. C- line terminations show preponderance of ulnar endings in both males (37.33%) and females (40.67%) with significant bilateral difference only among males. Main line index value is found to be more among males (8.33 ± 0.31) than that of females (7.30 ± 0.24) the bisexual variation is statistically significant. a-b ridge counts are found to be higher on left palms than the right ones and both the sexes show significant bilateral difference. Similar trend was observed for 'atd' angle but the differences fall short of significance.

INTRODUCTION

Dermatoglyphics, the study of dermal ridges on finger balls, palms and soles, with its qualitative and quantitative traits which are not adaptive and free from paratypic influences, provide a pertinent area of research to human population, geneticists interested in studying variation within and between populations. Number of caste and tribal populations from different parts of India have been studied for understanding the ethnic and population differentiation of dermatoglyphic traits. A critical review of such works by Singh and Bhasin (1980), Bhasin et al. (1994) and Bhasin and Walter (2001) have shown regional, linguistic and population level variations in the distribution of dermatoglyphic traits. It is also evident that information on some tribal populations particularly from southern India is lacking. Hence, in the present study it is attempted to investigate the distribution of some palmar dermatoglyphic traits among Sugalis of Kadapa district, Southern Andhra Pradesh and to discuss them in the light of works available on tribal populations of the region.

THE PEOPLE

Indian population is divided into different castes, tribes and religious groups. Some of these tribal groups have their own language and dialect. Such is the case of the Sugalis a tribal population of our study whose language do not have script.

The 'Sugali' dialect spoken by Sugalis have some affinity with the 'Marwari' of Rajasthan. Probably these Sugalis migrated to Andhra Pradesh due to cultural contacts in the past. Hence they became bilingual, though basically illiterates. Racially the Sugalis are Aryan (Caucasoid) in origin (Lakshmi and Veeraj, 2000). Sugalis are also called Lambadi, Brinjari or Banjari, Biopari, Lambani and Sukali in different regions. They rarely mix with other tribes. They were once nomadic, now they are settled and practicing business and pastrolism as traditional occupation. Their main business products were salt, fire wood and other forest produce.

Sugalis prefer nuclear families. Monogamy is common. Cross-cousin marriages are preferred. They give preference to the maternal cross-cousin marriage. Widow marriages are accepted. Marriage by elopement is also approved. Sugalis prefer early marriages. Sugali villages are called 'Thandas'. Each thanda has a headman called 'Nayak'; whose word is law and his office is hereditary in nature. The dress and ornaments of Sugali women are of great significance. Married women wear the horn bangles. The number of horn bangles tells about their social status. They wear necklace made up of coins of currency and bead pieces. The way of life of Sugalis differs with that of other people in all aspects.

MATERIAL AND METHODS

The data for the present study comprises

bilateral inked palmar prints of 75 males and 75 females of Sugali tribe inhabiting four villages of Jammalumadugu taluk of Kadapa district of, Southern Andhra Pradesh. The subjects were selected randomly avoiding close relatives. The age of the individuals ranges from 15 to 55 years. The data has been analyzed as per the methods suggested by Cummins and Midlo (1961).

RESULTS AND DISCUSSION

For the present study palmar qualitative characters such as principle mainline formulae, C-Line polymorphism and quantitative characters such as main line index, a-b ridge count and maximal 'atd' angle have been studied.

i. Principle Main Line Formulae: In the present series of Sugalis though many different main line formulae are observed, for the present purpose the most frequently occurring principal main line formulae 11-9-7-, 9-7-5- and 7-5-5- are considered and all the other types are categorized under 'rest', category as given in table 1.

of Southern India 11-9-7- model type occurs predominantly. The right palm of males shows higher frequency of model type 11-9-7-(40.00%) followed by 9-7-5-(9.33%) and 7-5-5-(5.33%), whereas, in left palms model type 9-7-5-(22.66%) shows higher percentage followed by 7-5-5-(13.33%) and 11-9-7- (5.33%). In females, the right hand shows the model type 9-7-5- (20.00%) with high frequency followed by 11- 9-7-(17.33%) and 7-5-5- (8.00%). In contrary left hands show predominance of model type 7-5-5-(18.66%) followed by 9-7-5- (9.33%) and 11-9-7-(6.66%). In both males and females the most predominant model type, 11-9-7- occurs more frequently on right palms, whereas the model type 7-5-5- occurs on left hands. However, the model type 9-7-5- shows higher frequency on left hands of males and right hands of females. Bilateral differences are found to be highly significant in males (27.88) and females (11.04) as shown by the chi-square values revealing the heterogeneous nature of the principal main line formula on right and left palms in both males and females

Table 1: Frequency distribution of principal main line formulae

Principal main line formulae	Males			Females			χ^2 value Bisexual (D.F.=3)
	R	L	R+L	R	L	R+L	
11-9-7-	40.00	5.33	22.66	17.33	6.66	12.00	13.116***
9-7-5-	9.33	22.66	16.00	20.00	9.33	14.66	
7-5-5-	5.33	13.33	9.33	8.00	18.66	13.33	
Rest	45.33	58.66	52.00	54.66	65.66	60.00	
χ^2 value Bilateral d.f.=2	27.88**			11.04*			

* P>0.001 ** P>0.05 *** P>0.01

In general the model type 11-9-7- (17.33%) predominated followed by 9-7-5-(16.00%) and 7-5-5-(9.33%) in Sugali males, whereas, in females the model type 9-7-5-(14.66%) predominated followed by 7-5-5-(13.33%) and 11-9-7- (12.00%) in both hands (R+L) are combined. The frequency of 'rest' shows a higher range of variation in both males (52.00%) and females (60.00%) due to the inclusion of a number of infrequent model types. The order of preponderance observed for the main line formulae among tribes of South India is 11-9-7- is high followed by 7-5-5- and 9-7-5-; and among caste groups the order of preponderance is 11-9-7- > 9-7-5- > 7-5-5- in general (Bhasin et al., 1994).

Present study Sugali males like in many tribes

of Sugali. Significant sex difference (13.1158) also was observed when both hands (R+L) are combined.

ii. C-Line Polymorphism: Plato's (1970) four model types of C-line polymorphism in Sugalis are given in table 2. The most predominant type found in males is ulnar (37.33%), followed by radial (20.67%) and proximal (21.33%). But in females, ulnar type (40.67%) is followed proximal (28.67%) and radial (18.00%) types. In males the higher frequency of ulnar (49.33%) and proximal (24.00%) types on left palms and radial (48.00%) on right palms are observed. Whereas in females higher frequency of ulnar (44.00%) and radial (21.33%) on right palms and proximal (38.67%) on left palms are observed. Absent type

Table 2: Frequency distribution of C- line polymorphism

C- line	Males			Females			χ^2 value Bisexual (D.F.=3)
	R	L	R+L	R	L	R+L	
Ulnar (U)	25.33	49.33	37.33	44.00	37.33	40.67	7.221
Radial (R)	48.00	13.33	30.67	21.33	14.67	18.00	
Proximal (Px)	18.66	24.00	21.33	18.67	38.67	28.67	
Absent (0)	8.00	13.33	10.66	16.00	9.33	12.66	
χ^2 value							
Bilateral d.f.=2		21.96**			7.90		

** P> 0.001

is more in left palms (13.33%) of males and right palms (16.00) of females. The general trend for the C-line model types among males is U>R>P>O, a trend similar to that observed in other tribal populations Manne Dora, and Kotia (Kumar et al,1994) and Savara and Konda Dora (Rao and Babu,1991) of Andhra Pradesh and for females is U>P>R>O.

The bilateral difference among males is found to be highly significant indicating the heterogeneous nature of polymorphic C- line model types on left and right palms. However, the bilateral differences among females and bisexual difference for the combined (R+L) values are found to be insignificant.

iii. Main Line Index: Table 3 shows the mean values along with other statistical derivatives of main line index for each hand and sex of the Sugalis. The combined (R+L) mean value, is found to be relatively higher in males (8.33 ± 31) than in females (7.30 ± 0.24). However, on both the sexes higher mean values are observed on right hand (M: .89 ± 0.25; F: 7.60 ± 0.22) then on left hand (M: 7.77 ± 0.38; F: 7.00 ± 0.26). Thus the transversality as measured by this index is more pronounced on the right palm then the left palm. The bilateral differences for main line index are found to be statistically significant in males (2.73) and insignificant in females (1.76) as revealed by

‘t’ values. However, the bisexual difference is statistically significant.

iv. a-b Ridge Count: The mean value of palmar a-b ridge count among Sugalis is shown in table 3. In both males and females left hand (M=32.55±0.61; F=32.49±0.53) shows relatively higher value then the right hand (M=29.51±0.67; F=29.56±0.61). The bilateral differences for a-b ridge count are significant in males and females of Sugalis as shown by the ‘t’ value.

v. ‘atd’ Angle: The mean values of ‘atd’ angle along with the statistical derivatives among the Sugalis are given in table 3. The mean values are higher in male series (R=46.79±1.16; L=49.17±1.00) then in female series (R=44.57± 1.37; L=46.26± 0.99) and on left then on the right hand in both sexes of the Sugalis, bilateral and bisexual differences are not found to be significant as evidenced by ‘t’ test.

The studies available on palmar dermatoglyphics among the tribal populations of Andhra Pradesh are scanty. Most of the works on palm prints are on the mainline formulae. The frequency of 11-9-7- is high among South Indian populations (Bhasin and Walter, 2001) and similar pattern is observed in Sugali males of present study. On the other, parameters in the present study, the published data on tribal populations is inadequate for drawing meaningful conclusions.

Table 3: Mean values of Main line index, a-b ridge count and atd angle

Sex	Side	Main Line Index	t-value	a-b Ridge Count	t-value	‘atd’ Angle	t-value
		Mean ± S.E.		Mean ± S.E.		Mean ± S.E.	
Male	R	8.89 ± 0.25	2.73*	29.51 ± 0.67	3.84**	46.79 ± 79	1.55
	L	7.77 ± 0.33		32.55 ± 0.61		49.17 ± 1.00	
	R+L	8.33 ± 0.31		31.03 ± 0.63		47.98 ± 1.05	
Female	R	7.60 ± 0.22	1.76	29.56 ± 0.61	3.66**	44.57 ± 1.37	1.00
	L	7.00 ± 0.26		32.49 ± 0.53		46.26 ± 0.99	
	R+L	7.30 ± 0.24		31.03 ± 0.58		45.41 ± 0.98	

* P> 0.05

** P> 0.001

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