

C-Line Polymorphism and Its Association with Some Dermatoglyphic Traits

Y.S. Kusuma, B.V. Babu and J.M. Naidu¹

Department of Anthropology, Andhra University, Visakhapatnam 530 003, Andhra Pradesh, India

KEY WORDS C-Line. Dermatoglyphic Traits. Andhra Tribes.

ABSTRACT The present paper describes the distribution of C-line polymorphism among two endogamous tribal populations namely, Kotia and Manne Dora of Andhra Pradesh. Further, a possible association of absence of C-triradius with consistently lower frequency of true patterns in III and IV interdigital areas is reported. Ulnar type of C-lines are frequently observed among both the populations followed by radial type of C-line. Proximal type of C-line records the lowest incidence. Bisexual and inter population variation is not significant although a clear bimodal difference is recorded. An attempt to test the hypothesis that absence of C-triradius will result in lower incidence of true patterns in hypothenar and IV finger ball area did not show clear and consistent picture. The expected positive association of absence of C-triradius with more distally located axial triradii and higher arch angle lack consistency.

INTRODUCTION

Palmar C-line polymorphism is one of the best dermatoglyphic markers as it demonstrates both qualitative and quantitative variation in population studies in terms of pattern formation in third and fourth interdigital areas, as well as overall measure of ridge transversality (Rife, 1968). Four types of C-line terminations based on the direction of their path were classified by Plato (1970) as ulnar, radial, proximal and absent. Since then, several reports appeared on C-line polymorphism. Investigation of probable association of C-line polymorphs with other dermatoglyphic traits is important for typological and genetical reasons. Among modal C-lines, absent type may be due to non-genesis or scarce development of the corresponding embryonic pad. Certain dermatoglyphic variables of this region appear to correlate with C-line polymorphs. Only a few works appeared in this direction (Ghatge et al., 1978; Sharma, 1980; Fortich Baca, 1982, 1990). The present study is an attempt to examine the

hypothesis whether there is any association of presence or absence of C-line with other dermatoglyphic traits which can be influenced by the absence of C - triradius, such as hypothenar patterns, patterns on III and IV interdigital areas, patterns on IV finger ball and position of axial triradius. The occurrence of true patterns viz., loops and whorls in hypothenar area could be evaluated keeping in view that the genesis of arches does not involve any previous embryonic pad. As per hypothesis a lower occurrence of true patterns in the hypothenar area could be expected if absence of C-triradius is assumed to be less evolved. Accordingly, in the interdigital areas too, a lower frequency of true patterns would be expected with absence of C-line, owing to the reason that the formation of these patterns rely either upon the adjacent distal triradii or on the prevailing accessory triradii. Further, distally positioned axial triradii would be expected frequently among C - absent individuals with a supposition that there could be a greater correlation, if both these characters were assumed to be abnormal. The IV finger ball of C-absent cases would bear frequent arches whose origin

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were a result of low or medium embryonic pad. It is examined in the present study whether the scarce development of embryonic pad at the base of IV finger influences the type of finger ball pattern.

MATERIAL AND METHODS

Inked bilateral palmar and finger impressions of 441 individuals belonging to 235 Kotia and 206 Manne Dora from Paderu agency in Visakhapatnam district, Andhra Pradesh were obtained. The prints were analyzed for modal C-lines after Plato (1970). Following Cummins and Midlo (1961) and Schaumann and Alter (1976), the patterns on hypothenar, interdigital and finger ball areas, position of axial triradii and atd angle were analysed. The palms with absence of C-triradius were considered as test sample while those with C were treated as control group to find any association with other dermatoglyphic traits. The chi-square and t-tests were employed to find out whether the absence of C-line has any significant association with patterns on hypothenar, III and IV interdigital areas, IV finger, position of axial triradius and atd angle.

RESULTS AND DISCUSSION

The distribution of types of modal C-lines among Kotia and Manne Dora tribes is presented in table 1. Ulnar type of C-lines are

more frequent followed by radial type in both the tribes. However, radial type of C-lines are found more frequently on right hands while ulnar type are frequent in left palms. Compared to proximal type of C-line, absence of C-triradius records higher incidence. Clear bimanual differences are noticed due to the absence of C-triradius on left palms more frequently (8.94%) than right palms (4.26%) in Kotia and Manne Dora (14.08% against 3.88%). Chi-square tests reflect significant bimanual differences among both the tribes, but neither of the tribes exhibit significant bisexual difference. Chi-square value ($3.5447=p>0.05$) for inter population difference indicates that Kotia and Manne Dora do not differ significantly from each other in their C-line polymorphism. These results fall well in the range of other tribal populations of this region reported earlier (Babu and Naidu, 1992).

The association between absence of C-line and some of the dermatoglyphic characters is probed by analysing the distribution of true patterns in different areas and position of axial triradius in the test sample where C-triradius is absent, and control sample where C is present. The results are presented in table 2. The incidence of true patterns in hypothenar area is more frequent in C-absent sample among Kotia which is contrary to the present hypothesis. Manne Dora exhibits approximately similar incidences of true patterns in both the samples. Although chi-square test reveals significant

Table 1: Distribution of modal types of C-line among Kotia and Manne Dora tribes

Modal C-line	Kotia				Manne Dora			
	Male (n=110)		Female (n=125)		Male (n=97)		Female (n=109)	
	R	L	R	L	R	L	R	L
C-Ulnar	54 (49.09)	71 (64.55)	62 (49.60)	75 (60.00)	40 (41.24)	50 (51.55)	62 (56.88)	59 (54.13)
C-Radial	45 (40.91)	27 (24.55)	53 (42.40)	28 (22.40)	50 (51.55)	26 (26.80)	41 (37.61)	30 (27.52)
C-Proximal	5 (4.55)	2 (1.82)	6 (4.80)	11 (8.80)	4 (4.12)	7 (7.22)	1 (0.92)	5 (4.59)
C-Absent	6 (5.45)	10 (9.09)	4 (3.20)	11 (8.80)	3 (3.09)	14 (14.43)	5 (4.59)	15 (13.76)
χ^2 (3) value for Bimanual difference,	9.0977= $p<0.05$		13.6869 = $p<0.001$		16.6259 = $p<0.001$		9.4453 = $p<0.05$	

Figures in parentheses indicate percentages

hypothenar patterns, position of axial triradius and atd angle, it may be opined that the absence of C-triradius is an important characteristic feature than other modal types of C-line. The clear association of absence of C-line with lower frequency of true patterns in III and IV interdigital areas observed in the present study is encouraging and requires future investigations in this direction for further confirmation. Even though clear association is not observed between absence of C-triradius and some dermatoglyphic traits in these two population due to lack of consistency, further extensive studies on other populations are worth attempting either for rejection or confirmation of the possible association.

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