

## Palmar Ridge Count in Mentally Retarded Children

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**ABSTRACT** Around 316 palmprints were collected and analysed for palmar patterns. The association for palmar ridge count was examined between mentally retarded children and control in the present paper. Among the three interdigital areas (*a-b*, *b-c* and *c-d*) *a-b* showed the highest ridge count both in patients and in controls. These three types of ridge counts were higher in patients than in controls. *a-b* and *c-d* counts were higher in males than in females. Significant differences were found between patients and controls in all the three types of ridge counts.

### INTRODUCTION

This is the number of ridges which intersect our touch straight lines drawn to join the distal palmar triradii *a*, *b*, *c* and *d* subtending digits 2, 3, 4 and 5, respectively; *a* to *b*, *b* to *c* and *c* to *d* ridge counts with the frequent application of modern statistical methods in dermatoglyphic research, quantifiable characters such as ridge counts of interdigital areas are becoming increasingly important.

### MATERIAL AND METHODS

Around 316 mentally retarded children of both sexes aged below 15 years were drawn from schools and special institutions from different areas of Vizianagaram, Visakhapatnam, East Godavari, Krishna and Guntur districts of coastal Andhra Pradesh, South India. To serve as controls around 315, age and sex matched healthy children drawn from same geographical areas were chosen for the present study. The identification of mentally retarded children was mainly based on IQ tests developed by American Association on Mental Deficiency (Ingalls,

1978). Here the sampling formed the ideopathic type, where the etiology is not known and known syndromes were excluded. Bilateral inked impressions were collected and palm prints were analysed using the methods described by Cummins and Midlo (1961).

### RESULTS AND DISCUSSION

The means, standard errors of the ridge counts of interdigital areas *viz.*, *a-b*, *b-c* and *c-d* are indicated in table 1.

Among the three interdigital areas ridge counts (*a-b*, *b-c* and *c-d*) the highest ridge count is found in the interdigital area (*a-b*) and the lowest in the III interdigital area (*b-c*) in both sexes among patients and controls. The patients (62.48; 42.20; 57.75) show higher values than control (56.94; 37.43; 53.25) for all the three ridge counts, *viz.*, *a-b*, *b-c* and *c-d*, respectively. Among males, in all the three areas the patient groups show higher values than controls, whereas in female patients and controls exhibit almost similar values of mean ridge counts. Further, it is observed among patients that males show higher values than females for *a-b* and *c-d* ridge counts only, whereas among the controls females exhibit higher values than males in all the three areas.

Intergroup differences for the *a-b* ridge count in mentally retarded children and controls indicate statistical significance between male patients and male controls for their left ( $t = 7.8285$ ;  $p < 0.001$ ) and right hands ( $t = 5.2854$ ;  $p < 0.0001$ ) considered separately as well as for left and right hands combined together ( $t = 9.1906$ ;  $p < 0.001$ ) and also between total patients (m+f) for their left ( $t = 7.3979$ ;  $p < 0.001$ ) and right hands ( $t = 4.3330$ ;  $p < 0.001$ ) considered separately also for left and right hands

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Table 1: Distribution of means and standard errors of palmar ridge counts in mentally retarded children and controls

Side	Group	No. tested		a-b		No. tested		b-c		No. tested		c-d	
		M	F	Mean	S.E.	M	F	Mean	S.E.	M	F	Mean	S.E.
Left	Mild	68	39	31.90±0.66	30.79±0.88	63	37	19.76±0.66	19.95±1.17	63	37	28.46±0.93	26.30±1.31
	Moderate	86	40	33.01±0.61	32.77±1.02	81	37	21.04±0.58	22.11±0.98	81	37	30.14±0.82	29.30±1.10
	Severe	59	23	30.68±0.82	31.13±1.32	56	22	21.36±0.78	21.95±1.19	55	22	27.69±0.76	28.05±1.70
	Controls	213	103	27.82±0.35	29.79±0.64	196	92	18.19±0.37	20.87±0.53	196	92	5.98±0.43	6.52±0.68
Right	Mild	68	39	30.91±0.80	28.69±0.89	66	38	20.65±0.63	19.66±0.94	66	38	28.44±0.82	28.11±1.10
	Moderate	85	41	31.80±0.82	29.88±0.89	77	38	22.19±0.68	22.95±0.82	78	38	31.65±0.84	30.79±1.13
	Severe	58	23	30.72±0.85	29.22±1.11	58	23	20.81±0.67	21.43±0.88	57	23	26.89±0.82	27.52±1.34
	Controls	212	103	28.04±0.36	29.41±0.55	200	95	17.44±0.35	20.38±0.53	200	95	5.26±0.37	6.75±0.69
L+R	Mild	136	78	62.82±1.03	59.49±1.25	129	75	40.41±0.92	39.60±1.50	129	75	56.90±1.24	54.40±1.70
	Moderate	171	81	64.81±1.01	62.65±1.35	158	75	43.23±0.89	45.06±1.27	159	75	61.79±1.17	60.09±1.57
	Severe	117	46	61.40±1.18	60.35±1.72	114	45	42.17±1.03	43.39±1.46	112	45	54.59±1.12	55.57±2.15
Controls	425	206	55.85±0.51	59.19±0.84	396	187	35.62±0.51	41.25±0.75	396	187	1.24±0.56	13.28±0.97	

combined together ( $t = 8.2834$ ;  $p < 0.001$ ). It is interesting to note that statistical tests leads to similar conclusions in both *b-c* and *c-d* ridge counts during the present study.

Intergroup differences for the *b-c* and *c-d* ridge counts in mentally retarded children and controls reveal statistically significant only between male patients and male controls (*b-c*,  $t = 8.5218$ ;  $p < 0.001$ ) (*c-d*,  $t = 7.3216$ ;  $p < 0.001$ ) between patients and controls for their left (*b-c*,  $t = 7.097$ ;  $p < 0.001$ ) (*c-d*,  $t = 4.6029$ ;  $p < 0.001$ ) and right hands (*b-c*,  $t = 7.3654$ ;  $p < 0.001$ ) (*c-d*,  $t = 5.7581$ ;  $p < 0.001$ ) treated separately and also for total patients (m+f) and controls left (*b-c*,  $t = 3.9753$ ;  $p < 0.001$ ) (*c-d*,  $t = 3.2514$ ;  $0.001 > p > 0.001$ ) and right hands (*b-c*,  $t = 6.6780$ ;  $p < 0.001$ ) (*c-d*,  $t = 4.9964$ ;  $p < 0.001$ ) and between patients (m+f) and controls (*b-c*,  $t = 7.5021$ ;  $p < 0.001$ ) (*c-d*,  $t = 5.7978$ ;  $p < 0.001$ ).

Intergroup differences are however, not significant between female patients and controls in any of their hands for *b-c* and *c-d* ridge counts.

The palmar ridge counts noted in the present study when compared with those reported by Swarna et al. (1987), it is apparent, that the mean *a-b* and *b-c* ridge counts are almost identical in the present study as well as that reported by Swarna et al. (1987), while the mean *c-d* ridge count in both sexes is higher in the present series of cases than in cases examined by Swar-

na et al. (1987).

When all means were combined for left and right hands together (L+R) patient groups are showing higher values than the controls for *a-b* ridge count in both sexes and also in their left and right hands separately. Males show higher values than females except in severe group in their left hands for *a-b* ridge count.

The reverse trend has been observed in *b-c* ridge count, females exhibit higher values than males except in right hands and both hands together in mild group.

For *c-d* ridge count males show higher values than females except in severe patients in their both right and left hands. Where as in controls females have higher values than males in all instances.

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#### REFERENCES

- Cummins, H. and Midlo C. : *Finger Prints, Palms and Soles*. Dover Publications, New York (1961).
- Ingalls, R.P. : *Mental Retardation - The Changing Outlook*. John Wiley & Sons, New York (1978).
- Swarna, M., Uma, S.T., Issac, G.S. and Reddy, P.P. : Evaluation of dermal patterns in mentally retarded children. p. 73-77. In : *Biology in Mental Retardation* H.S. Goswami, and B.S.S.R. Rao, (Eds.). (1987).