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Growth and Maturity Gradients in the Head and Face Dimensions Among Yadava Girls of North Coastal Andhra Pradesh, India

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ABSTRACT The cross-sectional study was undertaken in rural schools situated in the Bheemunipatnam and Anandapuram Mandals of Visakhapatnam District of North Coastal Andhra Pradesh during January, 1986 to June, 1987. The sample consisted of 632 healthy Yadava girls aged 1 to 20 years. The analysis of the data reveal that all head and face measurements attain adolescent growth spurt between 11 to 14 years. The maturation of these physical traits showed both cephalo-caudal as well as caudo-cephalic direction.

The present study deals with six head and face anthropometric measurements which are studied to show the effect of age from 1 through 20 years on the growth patterns and also to study the developmental-cum-maturational direction of rural and agricultural Yadava girls to study age changes.

MATERIAL AND METHODS

The Yadava (Golla) of North Coastal Andhra region is traditionally a pastoral community occasionally engaged in farming. Data were collected, cross-sectionally, on 632 Yadava girls aged 1 to 20 years, from 12 villages of Bheemunipatnam and Anandapuram Mandals of Visakhapatnam District of Andhra Pradesh during January, 1986 to June, 1987. The age of each individual was calculated to three decimal places after Tanner et al. (1966). The measurements head length, head breadth, morphological facial height, bizygomatic diameter, nasal height and nasal breadth were taken after Weiner and Lourie (1969).

RESULTS AND DISCUSSION

Mean, standard deviation of six head and face anthropometric measurements and maturity gradients of Yadava girls have been depicted in table 1. It can be concluded from the table that the age wise mean values of all physical traits increase with age. The mean head length at 1 year is about 14 cm, it increases by 4 cm from 1 to 20 years. The mean head breadth at 1 year is 10 cm, it increases by 3 cm from 1 to 20 years. The mean morphological facial height at 1 year is 5 cm, it increases by 5 cm between 1 through 20 years. The mean bizygomatic diameter at 1 year is 8 cm, it increases by 3 cm at the end of 20 years. The mean nasal height and nasal breadth at 1 year is 2 cm, it increases by 2 cm and 1 cm, respectively at the end of 20 years. The maximum growth rate is observed between 1 and 2 years and from 3 years the rate of growth declines. The adolescent growth spurt of head length, head breadth, morphological facial height and bizygomatic diameter are observed between 13 and 14 years, which is delayed by two years when compared to nasal height and nasal breadth (11 and 12 years).

It can be concluded that the maturity gradients of all measurements increased with increase in age. The morphological facial height, nasal height and nasal breadth (100.00%) matured earlier when compared to bizygomatic diameter, head length and head breadth suggestive of caudo-cephalic gradient of growth.

Table 1: Mean, standard deviation of six head and face anthropometric variables and maturity gradients among Yadava girls of Visakhapatnam

Age Groups in years		Head length			Head breadh			Morphological facial height			Bizygomatic diameter			Nasal height			Nasal breadth		
	N	$\bar{X}$	SD	Gra-dient	$\bar{X}$	SD	Gra-dient	$\bar{X}$	SD	Gra-dient	$\bar{X}$	SD	Gra-dient	$\bar{X}$	SD	Gra-dient	$\bar{X}$	SD	Gra-dient
1	50	13.84	1.02	76.97	10.50	0.89	77.78	5.70	0.57	56.21	8.10	0.81	68.35	2.30	0.27	52.75	2.07	0.28	62.72
2	40	15.32	0.51	85.20	11.47	0.32	84.96	6.32	0.51	62.33	8.77	0.60	74.00	2.58	0.23	59.17	2.37	0.14	71.81
3	36	15.73	0.49	87.49	11.67	0.36	86.44	6.89	0.58	67.95	9.02	0.41	76.11	2.93	0.25	67.20	2.47	0.14	74.85
4	40	16.09	0.51	89.49	12.14	0.51	89.93	7.36	0.53	72.58	9.67	0.67	81.60	3.13	0.30	71.79	2.51	0.13	76.06
5	60	16.40	0.35	91.21	12.23	0.39	90.59	7.88	0.42	77.71	9.90	0.43	83.54	3.32	0.28	76.15	2.56	0.14	77.57
6	47	16.68	0.54	92.77	12.32	0.39	91.26	8.26	0.45	81.46	10.05	0.44	84.81	3.49	0.27	80.04	2.72	0.16	82.42
7	47	16.78	0.56	93.32	12.38	0.40	91.70	8.38	0.42	82.64	10.19	0.54	85.99	3.58	0.26	82.11	2.77	0.16	83.94
8	44	16.87	0.52	93,83	12.56	0.42	93.04	8.70	0.48	85.80	10.51	0.68	88.69	3.81	0.26	87.38	2.85	0.26	86.36
9	34	16.99	0.49	94.49	12.69	0.49	94.00	8.85	0.47	87.28	10.62	0.45	89.62	3.85	0.24	88.30	2.89	0.12	87.57
10	27	17.11	0.58	95.16	12.78	0.48	94.67	9.00	0.63	88.76	10.77	0.47	90.89	3.90	0.26	89.45	2.92	0.18	88.48
11	27	17.20	0.47	95.66	12.88	0.41	95.40	9.16	0.37	90.34	10.82	0.49	91.30	3.96	0.19	90.82	2.97	0.17	90.00
12	21	17.30	0.56	96.21	13.01	0.60	96.37	9.33	0.40	92.01	10.90	0.48	91.98	4.14	0.22	94.95	3.12	0.31	94.54
13	35	17.45	0.66	97.05	13.14	0.51	97.33	9.50	0.54	93.69	11.02	0.46	92.99	4.20	0.21	96.33	3.15	0.21	95.45
14	18	17.65	0.65	98.16	13.29	0.45	98.44	9.75	0.40	96.15	11.34	0.40	95.70	4.26	0.23	97.70	3.20	0.18	96.97
15	28	17.74	0.65	98.67	13.35	0.42	98.89	9.87	0.44	97.34	11.49	0.56	96.96	4.30	0.24	98.62	3.24	0.16	98.18
16	20	17.81	0.69	99.05	13.41	0.30	99.33	9.97	0.51	98.32	11.59	0.65	97.80	4.33	0.25	99.31	3.26	0.21	98.79
17	21	17.86	0.54	99.33	13.45	0.47	99.63	10.05	0.65	99.11	11.69	0.33	98.65	4.35	0.21	99.77	3.28	0.22	99.39
18	11	17.90	0.58	99.56	13.47	0.22	99.78	10.10	0.41	99.60	11.81	0.60	99.66	4.36	0.42	100.00	3.29	0.31	99.70
19	13	17.94	0.44	99.78	13.49	0.42	99.93	10.14	0.28	100.00	11.83	0.30	99.83	4.36	0.20	100.00	3.30	0.24	100.00
20	13	17.98	0.52	—	13.50	0.32	—	10.14	0.58	—	11.85	0.46	—	4.36	0.19	—	3.30	0.23	—

Yet to achieve is not observed for morphological facial height, nasal height and nasal breadth; and yet to achieve is observed for head length (0.22%), head breadth (0.07%) and bizygomatic diameter (0.17%). On the other hand the head breadth (99.93%) is maturing earlier than bizygomatic diameter (99.83%) suggestive of cephalo-caudal gradients of growth are clearly visible. Perhaps this is the reason why Tanner (1964) speaks of the 'smaller area complicated' is now to be viewed in the sense of caudo-cephalic gradients' instead of 'cephalo-caudal gradients'. This may, for the sake of brevity, be called 'reversal phenomenon'. In the present study as mentioned above the constituent segments of cephalo-facial parts of the head and face segments clearly speak in favour of the 'reversal phenomenon' (*i.e.*, the caudo-cephalic gradient of growth). The present study is in agreement with the works of Sidhu (1969) and Nath (1972) in terms of growth gradients (Table 1).

It will be apparent from the foregoing results that the findings among Yadava girls were almost similar to the findings of Tanner (1962), Goldstein (1939), Shuttleworth (1939) and Singhrol and Mitra (1985).

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