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GROWTH TREND IN EXTERNAL EAR: SOME PRELIMINARY OBSERVATIONS

ABSTRACT: — *The study reports growth pattern of external ear of the Bengali boys and girls aged between newborn and 5 years living in and around Calcutta. Boys show a larger dimension than girls in all the age groups. The rates of increment and velocity are not similar for both the sex. More data are needed to understand the mechanisms and the trend of growth pattern of external ear.*

KEY WORDS: *External ear — Growth pattern — Bengali — Calcutta.*

INTRODUCTION

Studies on child growth and development have always attracted the attention of the researchers in anthropology and medical sciences as well. Many surveys have already been carried out to study the various aspects of growth of children in the Indian sub-continent, but no attempt has so far been made to study the growth pattern of external ear. Thus the purpose of this communication is to present the growth trends in ear length and ear breadth of newborns and children (up to 5 years of age) living in and around Calcutta.

MATERIAL AND METHOD

A total sample of 874 (boys — 436 and girls — 438) consisting of 403 newborns and 471 children between 1 and 5 years of age was drawn from a few maternity homes and educational institutions of Calcutta during 1968–1969. Data were collected from three caste groups of the Bengali population living in and around Calcutta. The three caste groups are the Brahman, Kayastha and Vaidya. Data on these three caste groups have been pooled together since they are

not heterogenous in these metrical characters (Ghosh, 1974). This is supported by the t-test of significance (Values of t for: Kayastha x Brahman = 0.191; Kayastha x Vaidya = 0.218 and Brahman x Vaidya = 0.233), in respect of ear length of newborn males only. The same trend has also been observed in the case of ear length and breadth of all the age groups, and it further holds good for either sex. Hence, all these data were pooled together with a view to identifying the growth pattern of external ear through age groups. Measurements of ear length and ear breadth were taken following the methods of Mollison (1938), and these were recorded in millimetres. The newborns were measured on the second day after birth. The age was expressed in the analyses as of the last completed month of age.

RESULTS AND DISCUSSION

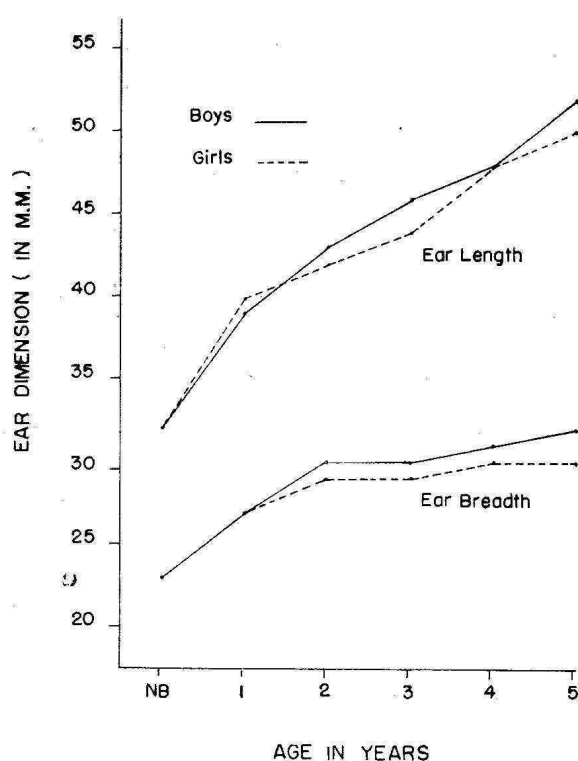
The statistical constants for ear length, ear breadth and the length-breadth index of newborns and children for both the sex are given in Table 1. It is evident that there is a uniform trend of increase in length in both the sex. Further analysis reveals that boys show greater ear length than girls in all age

TABLE 1. *Statistical constants of ear Length, Breadth and Index*

Age Group	No. of ears	Ear Length (mm)			Ear Breadth (mm)			Ear Index		
		Range	Mean	S. D.	Range	Mean	S. D.	Range	Mean	S. D.
Boys:										
New-borns	400	23—39	32.23	3.90	17—28	22.86	2.32	55—93	71.48	6.90
1	72	29—46	39.03	3.03	20—30	27.00	2.87	54—80	68.17	6.14
2	100	36—50	43.46	3.67	24—34	29.50	2.19	50—95	68.36	7.32
3	100	40—52	45.86	3.28	25—35	30.20	2.25	53—83	66.26	5.61
4	100	40—56	47.74	3.99	26—35	30.92	2.03	53—86	65.24	3.84
5	100	44—59	52.12	3.53	27—36	31.68	1.91	45—74	61.20	5.28
Girls:										
New-borns	406	23—39	32.04	3.78	17—28	22.79	2.08	50—94	71.76	6.80
1	80	35—47	39.57	2.86	20—31	26.60	2.84	46—78	67.76	8.46
2	90	38—56	42.31	3.43	23—36	28.93	2.43	48—86	68.74	7.04
3	100	35—52	44.32	3.52	24—34	29.14	2.44	48—86	66.04	7.66
4	100	40—56	47.50	3.61	25—34	29.68	1.91	46—78	62.88	5.76
5	100	40—58	49.98	3.05	26—35	30.30	1.79	50—86	60.88	6.28

groups, except the one year age group. It also shows that the difference between the two sex is less in earlier age groups, but it keeps on increasing with the increase of age. The ear length increases as much as 7 mm during the first year of age, but in the next year it increases up to 4 mm. However, the rate of growth in case of ear length is not identical for each age group.

Table 1 also shows that the growth pattern in case of ear breadth is of the same magnitude in both the sex. The boys show higher values than the girls in all age groups. It increases as much as 4 to 5 mm in the 1st year of child growth. But such a high rate of increase slows down in the succeeding age groups.

FIGURE 1. *Growth trend in external ear.*

From Fig. 1 it is clearly seen the actual growth trend of the external ear for both the sex.

The variability in ear index, calculated on the basis of ear length and breadth (Table 1), is higher in girls than in boys. It is interesting to note that the value of the index decreases with the increase of age, irrespective of sex, excepting the 2 year age group, while a slight increase of value is noticed in the case of boys. But in both the sex the value of this index increases in the last age group, i.e., 5 years age—the percentage of increase is more in boys than in girls. However, such a decrease in the index value is not as clear in girls as in boys. This apparent disconformity may be attributable to the cross-sectional nature of the present data. However, it may be noted that the difference in index values between two successive age groups is not statistically significant. On the basis of the present findings, it may be observed that the index decreases with the increase of age up to 4 years. The decrease of index values suggests that the increase is greater in ear length than in ear breadth.

The rate of increment per year and the rate of velocity have been calculated for both ear length and ear breadth. The results are given in Table 2. It is seen that the increment in case of ear length is highest in the one year age group of both the sex. The rate of increment keeps on decreasing up to 4 year age group in boys and 3 year age group in girls. In case of boys, the rate of increment drops down to the lowest value in 4 year age group, but it abruptly rises in the last age group, i.e. 5 year age group. In case of girls, the rate of increment is appreciably higher in the 4 year age group but suddenly it drops again in the 5 year age group. So it can be inferred that there is no clear set pattern of increment in ear length, though it generally keeps on increasing with the increase of age. This trend is clearly reflected in the velocity values.

The analyses of the rate of increment and velocity in case of ear breadth among the newborns and children indicate that the rate of increment is highest in the one year age group in both the sex. Thereafter

TABLE 2. *Increment per year and rate of growth of ear Length and Breadth*

Age Group	Boys				Girls			
	Ear Length		Ear Breadth		Ear Length		Ear Breadth	
	Increment	Velocity	Increment	Velocity	Increment	Velocity	Increment	Velocity
Newborns								
1	6.80	21.0	4.14	18.1	7.53	23.5	3.81	16.7
2	4.43	11.0	2.50	9.3	2.74	6.9	2.33	8.8
3	2.40	6.0	0.70	2.4	2.01	4.8	0.21	0.7
4	1.88	4.0	0.72	2.4	3.18	7.2	0.54	1.9
5	4.38	9.0	0.76	2.5	2.48	5.2	0.62	2.1

the rate of increment decreases up to the 3 year age group, and then it shows again an upward trend.

From the present observation it may be said that there is a possible set pattern of increment in ear breadth, though, as in case of ear length, it decreases through the increasing age. It holds good for both boys and girls. The velocity is highest in the one year age group and the lowest in the 3 year age group.

TABLE 3. *Coefficient of Correlation (r) Between ear Length and Breadth*

Age Group	Boys	Girls
Newborns	+ 0.008	—0.721
1	—0.272	—0.080
2	+ 0.919	+ 0.727
3	+ 0.382	+ 0.960
4	—0.044	+ 0.393
5	—0.006	—0.388

The product-moment correlation coefficients (r) for ear length and ear breadth have been calculated for each age group and also for boys and girls separately. Table 3 sets out the results. The r-values vary considerably in different age groups. Out of six age groups the values of 'r' in three age groups, of both the sex, are positively correlated with varied magnitudes. The highest positive correlation occurs in the

2 year age group (+ 0.919) in case of boys and in the 3 year age group (+ 0.960) in case of girls. However, from the 'r' values, no definite pattern really emerges.

In short, it may be suggested that both ear length and ear breadth keep on increasing with differential rates of increment and velocity from birth to 5 years of age and possibly even for a longer period (Ghosh 1974). It is also found that the rate of increment of ear length does not necessarily depend upon the rate of increment of ear breadth or vice versa. However, it will not be possible to understand the mechanism and trend of growth pattern of this tiny organ, unless further investigation on longitudinal data is undertaken.

ACKNOWLEDGEMENT

I am thankful to the Director of the Anthropological Survey of India for providing me with necessary facilities; to Dr. P. C. Dutta and Dr. A. K. Ghosh, Anthropological Survey of India, for helpful suggestions and comments and to Shri Nilmani Das for secretarial assistance.

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