

Values for Mouth and Ear Measurements in Newborns

M.L. Kulkarni
N.K. Rajendran

Syndrome identification forms an important field in medicine and helps in proper genetic counselling. Diagnosis of many syndromes depends on clinical observation of abnormal body parts, proportions and unusual features. Abnormalities of mouth width (inter commissural distance) and Philtrum form "Good handles" in the identification of many syndromes(1). Similarly, the diagnostic importance of small and large ears in identifying various syndromes in the neonatal period is well known(1,2). There is only one good study giving standards for mouth and ear measurements for Western newborns of different gestational ages(2). However, there is no similar study reported in the Indian literature. In the present study we report the standards, for two important mouth measurements (mouth width and philtrum length) and ear measurements (length and breadth) in newborns from 26 to 42 weeks of gestation.

These values may help in early detection of many syndromes characterized by abnormalities of mouth width and philtrum

length, large ears (Macrotia) and small ears (Microtia).

Material and Methods

To define standards for various mouth and ear measurements, in the newborn, 817 consecutive live born term and pre-terms ranging in gestational age from 26 to 42 weeks were subjected for measurements defined by Feingold and Bossert(3). Babies with malformations were excluded from the study. Gestational age was calculated from the first day of the last menstrual period and confirmed by clinical assessment by the Dubowitz scoring system(4). All measurements were made between 36 to 48 hours by one of the authors.

Inter commissural distance is the distance from the chelion to chelion and was measured with vernier caliper. The Philtrum length was measured with a sliding caliper and it is the distance from the base of the columella to the midline depression on the vermillion border. The contraction of muscles around the mouth may significantly affect these measurements; therefore care was taken to see that these measurements were done when the muscles around mouth were relaxed. The total length of the ear was measured by measuring the distance between the most inferior and superior portion of the ear using a vernier caliper. To measure the breadth, the tips of the calipers were kept in such a way that one was on the outermost limit of the tragus and the other on the posterior most point of the helix. All ear measurements were done on right side as there was no statistical difference between the values of right and left ears. As no statistical difference was found between boys and girls for mouth and ear measurements, the combined mean ± 2 SD were used for different gestational age period.

*From the J.J.M. Medical College, Davangere
577 004, Karnataka.*

*Reprint requests: Prof. M.L. Kulkarni, 2373,
M.C.C. 'A' Block, Davangere 577 004.*

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Results

The values for mean and ± 2 SD at different gestational period for inter commissural distance (width of mouth) and philtrum length are depicted in *Table I*. The mean ± 2 SD values for ear measurements (length and width) are shown in *Table II*.

Discussion

The mean values for mouth width at 28 and 41 weeks of gestation were 2.1 and 2.6 cm, respectively in our study. The corresponding values in a study by Merlob *et al.*(2) for Israeli newborns were 2.0 and 2.7 cm, respectively indicating that there was not much difference.

In contrast to mouth width value, there was some difference in the philtrum length in our babies and those from Israel(2). The mean values for philtrum length at 28 and 41 weeks of gestation were 0.57 and 0.76

cm, respectively in our study. The corresponding values in Israeli newborns were 0.67 and 1.07 cm(2). This difference may indicate ethnic difference in facial configuration.

Intercommissural distance (width of mouth) and philtrum length help in identifying many syndromes in which abnormalities of these measurements form "good handles" in syndrome delineation.

Though few monograms have listed exhaustively various causes of wide or large mouth (macrostomia), small mouth (microstomic), long philtrum and short philtrum(1,2,5) we think that a small list of these abnormalities will serve as a ready reference.

Large mouth or macrostomia is seen in Goldenhar syndrome, Hemifacial microsomia, Treacher Collin's syndrome, Facial cleft, 18p- syndrome, 18q- syndrome Beckwith Wiedemann syndrome, Morquio's

TABLE I—Mouth Width and Philtrum Length at Different Gestational Periods

Gestation (wk)	No.	Mouth width*			Philtrum length		
		Mean (mm)	SD (mm)	Normal range (mm)	Mean (mm)	SD (mm)	Normal range (mm)
26	5	17.8	0.8	16.2 -19.4	6.4	2.0	2.5 -10.3
28	14	21.5	3.3	14.8 -28.1	5.7	1.4	2.8 - 8.6
30	8	20.7	1.8	17.0 -24.3	5.7	0.9	3.8 - 7.6
31	5	21.3	3.1	15.2 -37.5	6.8	0.8	4.5 - 7.7
32	12	23.3	3.5	16.2 -30.4	6.0	1.4	3.2 - 8.7
33	7	20.9	8.4	14.0 -27.7	5.6	1.6	2.3 - 8.9
34	12	21.7	4.4	12.8 -30.6	6.5	1.1	4.4 - 8.7
35	14	23.7	2.8	18.1 -29.2	6.2	1.0	4.2 - 8.2
36	30	24.7	3.5	17.7 -31.8	6.8	1.3	4.2 - 9.4
37	36	26.1	3.8	18.5 -33.6	6.7	1.2	4.4 - 9.0
38	83	25.8	3.6	18.6 -33.0	7.1	2.2	2.8 -11.4
39	162	25.3	3.3	18.7 -31.9	7.3	1.4	4.5 -10.1
40	311	26.3	3.6	19.1 -33.5	7.5	1.6	4.1 -10.7
41	99	26.6	3.5	19.6 -33.5	7.6	1.3	5.0 -10.2
42	19	27.0	4.0	19.1 -35.0	7.1	1.5	4.1 -10.0

TABLE II—Ear Length and Breadth at Various Gestational Ages

Gestation (wk)	No.	Ear length			Ear breadth		
		Mean (mm)	SD (mm)	Normal range (mm)	Mean (mm)	SD (mm)	Normal range (mm)
26	5	23.4	1.5	20.4 -26.3	14.3	2.1	10.0 -18.6
28	14	24.4	3.1	18.1 -30.7	16.9	2.9	11.1 -22.7
30	8	26.5	4.6	17.3 -35.6	17.4	3.3	10.7 -24.0
31	5	25.1	3.5	18.1 -32.1	16.7	1.9	12.8 -20.5
32	12	27.5	4.4	18.8 -36.2	17.7	3.0	11.6 -23.7
33	7	24.9	2.5	19.8 -29.9	16.9	2.8	11.2 -22.6
34	12	28.7	4.2	20.2 -37.1	19.0	2.4	14.2 -23.8
35	14	29.8	1.8	26.1 -33.5	19.8	2.9	14.0 -25.7
36	30	30.8	2.3	26.2 -35.5	20.0	3.0	14.0 -25.9
37	36	31.6	3.2	25.3 -38.0	19.5	2.8	13.9 -25.2
38	83	31.8	4.3	23.1 -40.5	20.2	2.4	13.3 -27.1
39	162	33.6	2.7	28.2 -39.0	21.3	2.5	16.4 -26.2
40	311	33.6	2.8	28.0 -39.3	22.0	2.7	14.5 -29.5
41	99	34.2	3.0	28.2 -40.1	22.2	2.3	17.5 -26.8
42	19	34.9	2.5	30.0 -39.9	23.0	4.2	14.5 -32.5

syndrome, Scheie syndrome, Kniest dysplasia, Robinow syndrome, William's syndrome, C-syndrome, Opitz-Kaveggia FG syndrome and Coffin-Lowry syndrome.

Small mouth or microstomia is seen in Trisomy 18 syndrome, Treacher Collin's syndrome, Bixler syndrome, Hallermann-Streiff syndrome, Oto-Palato-digital syndrome, Freeman-Sheldon syndrome, Hypoglossia hypodactylia syndrome and Marden Walker syndrome.

Long philtrum is seen in 4p+, 9p-, 10q+, 12p+, 22q- chromosomal syndromes, Femoral hypoplasia unusual facies syndrome, Freeman-Sheldon syndrome, Trichorhinopharyngeal syndrome (Type I and II), Blepharo-naso-facial syndrome, acrodysostosis, Tel Hashomer camptodactyly syndrome, Robinow syndrome, de Lange syndrome, Williams syndromes, generalized gangliosidosis, C-syndrome

and Marden Walker syndrome.

Short Philtrum is seen in 4p-, 5p-, 9p+ chromosomal syndromes, oro-flacio-digital syndromes type I, cleft palate lateral synechia syndrome, DiGeorge sequence and Cohen syndrome.

There is only one earlier study by Sivan *et al.*(6) giving values for ear measurements at different gestational ages. The mean values for ear length at 28 and 41 weeks of gestation in our study were 2.4 and 3.4 cm, respectively. The corresponding values in the study by Sivan *et al.* in Israeli newborns were 2.6 and 3.9 cm, respectively indicating that our values are slightly less than those reported in Israeli infants. This may indicate some ethnic differences in ear measurements. However, there are no comparative values available in the literature for ear breadth in newborns.

Small ears, long ears and large ears form important features of many syndromes(1,2). A few conditions are mentioned here for ready reference.

Small ears are seen in syndromes like Crouzon, Apert, Cranio-oculo-dental, Treacher Collin's, Bixler, Goldenhar, hemifacial microsomia, Klippel-Feil, Cleidocranial dysplasia, Fanconi, Trisomy 21 and 13 and Rubella.

Small ears have been found to be the most consistent clinical characteristic apart from hypotonia in making the diagnosis of Downs syndrome(7) and are the most clinically apparent malformation in mandibulofacial dysostosis and hemifacial microsomia.

Long ears are important features in chromosomal anomalies like XXY, monosomy G, Trisomy 18 and Trisomy 13.

Large area (macrotia) are seen in Trisomy 8⁺ syndrome, Langer-Giedion syndrome, Cerebro-oculo-facio-skeletal syndrome, Leprechaunism and Marfan syndrome.

The data presented in this communication, may serve as reference standards for Indian newborn babies of different gestational ages.

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Pyocolpos

M.H. Mehta
R.V. Patel

A case of hydrocolpos which got converted into pyocolpos following fulminant infection of the branding marks is being reported.

Case Report

A one-month-old female baby had gradually increasing lump in lower abdomen since birth. She underwent branding marks ritual at her village in order to get

From the K.T. Children Government Hospital, Rajkot 360 001, Gujarat.

Reprint requests: Dr. (Miss) Manorama H. Mehta, Medical Superintendent, K.T. Children Government Hospital, Rajkot 360 001, Gujarat.

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