

Determination Of Foetal Age: Bizygomatic Width And Nasion To Prosthion Distance

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Citation

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Abstract

Determination of foetal age is of significant not only in obstetrics management but also in medicolegal cases. Many a medicolegal questions especially related to fetal age are to answered by a forensic pathologist after examining a dead foetus. A study was conducted on 103 fetuses of Haryana population ranging between 8 weeks to 30 weeks in the Department of Forensic Medicine, Pt. B.D. Sharma PGIMS, Rohtak (Haryana). Facial dimensions viz. bizygomatic width and nasion to prosthion distance were measured by vernier caliper (having resolution 0.02, instrument private Ltd. New Delhi.). Both the dimensions correlated well with foetal age with correlation coefficient (6) of 0.83 to 0.85 respectively. The equations of regression curves were calculated for two dimensions which can be used as method for age determination of unknown foetus North India population.

INTRODUCTION

The age determination of foetus is important as there will be enhanced punishment, in case, a criminal abortion has been performed after 28 weeks of pregnancy¹. The age of foetus may be determined from its length, weight, condition and growth of eyes, eyelashes and eye brows, growth of finger nails, location of testis, appearance of ossification centers². Some workers like Cussenot O et al³, Guihard Costa AM⁴, Maydon KL et al⁵ and Tuli et al⁶ etc. studies craniofacial dimensions for age determination of foetus at different places. The present study has been taken up to establish suitable regression equations for age determination from Bizygomatic width and nasion to prosthion distance of foetus of Haryana.

MATERIALS AND METHODS

Hundred and three fresh dead foetus of Haryana subjects of different gestational age ranging from 8 weeks were collected from the department of forensic medicine, Pt. B.D. Sharma PGIMS (Rohtak). Foetuses with gross anatomical abnormalities were excluded.

The fetuses were presented in formalin solution and soft tissues were dissected and removed from the skull. Then with the help of Martin's spreading calipers the following measurements were recorded for each cases using standard landmarks :-

BIZYGOMATIC WIDTH

Distance between nasion to prosthion then the data were statistical analysis (SPSS software).

OBSERVATIONS AND RESULTS

Number of cases studied, mean values of nasion to prosthion bizygomatic width as different age groups are shown in table-I.

Figure 1

Table 1: Age Groups, Number Of Cases Studied And Mean Values Of The Measurements

Age group (in weeks)	No. of cases studied	Mean Value in mm	
		Distance between nasion to prosthion	Bizygomatic width
8-11	10	0.85±1.2	24.9±2.7
11-14	14	08.9±0.2	25.1±3.2
14-17	17	11.7±2.5	37.1±2.4
21-24	17	14.7±2.7	37.1±1.5
24-27	11	18.5±2.0	45.5±3.7
27-30	12	21.9±3.9	52.2±3.2

The nasion to prosthion and bizygomatic width increases as the age increased and the correlation coefficient were 0.83 and 0.85 respectively and 't' value are 2.907 and 3.109 respectively i.e. significant at 5% level of significance. Two regression equations for the determination of age of foetus

from (1) nasion to prosthion width been established and standard errors of estimate calculated as in table-II.

Figure 2

Table 2: Regression Equation And Their Standard Errors

Parameter	Regression	Standard Error
Bizygomatic width	$A = 3.95 + 0.3B$	$\pm 3.9 \text{ weeks}$
Nasion to Prosthion Distance	$A = 5.32 + 4.1B$	$\pm 4.3 \text{ weeks}$

A = Gestational age in weeks
B = Measurement in mm

DISCUSSION

Tuli A et al (1995) studied the correlation between craniofacial dimensions and foetal age on the fetuses of North Indian Population and deduced that the correlation coefficient of superior facial height and bizygomatic width with foetal age as 0.99 and 0.95 respectively₆. In present series it was 0.83 and 0.85 respectively at 5% level of significance but in Rajlakshmi et al studied that the correlation coefficient superior facial height and bizygomatic width with foetal age as 0.85 and 0.87 respectively₁.

Gushard Casta AM (1988) traced the craniofacial growth curves from known foetal skulls. He opined that foetal skull may provide foetal age by means of regression curves₄.

Cussenot et al (1990) established that superior facial height can be used as a predictor of foetal ages. They found a good correlation between superior facial height and foetal age ($r=0.96$) and observed that the mean growth rate was 1.3mm 1 per week upto 34 week after which it decreased to 0.5mm per week₃.

With substantially improved ultrasound imaging it is now possible to identify previously inaccessible structures, such as fetal face. The standard measurements for dating pregnancies, the biparietal diameter is virtually impossible to detain when the foetal head in facing straight up or down₁.

the facial region, however, can identified and measured in an occiput posterior position and it is possible, therefore, that orbital diameters, superior facial height and bizygomatic width could be used to date pregnancies, in lieu of BDD (Mayden K L et al 1982)₅. From the present study regression equation are derived which can be used for estimation of age of the foetus from its superior facial height and also from bizygomatic width.

CONCLUSION

The present study shows statistically significant correlation between the two parameter i.e., nasion to prosthion distance, bizygomatic width and fetal age. The regression equation calculated for both the parameters can be used for estimating the foetal age of unknown gestation period. This study will not only help obstetricians in determining gestational age but also to medicolegal experts and thus will help in administration of justice.

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References

1. Rajlakshmi CH, Bidhumukhi CH. Foetal age from superior facial height and bizygomatic width : Journal of Forensic Medicine and toxicology 2001; 18 (1) : 28-30.
2. Mukherjee JB. Forensic medicine and toxicology, Arnold Associates, second edition Vol 1 1994. p. 100.
3. Cussenot O, Zeyaoui A, Hidden G. Growth of facial bones of foetus reports of the societe Anatomique de paris Surg Radiol Ant 1990; 12 : 230-231.
4. Guihard Cost AM. Estimation of foetal age from Craniofacial dimension. Bull Assoc. Anat (Nancy) 72 : 15-19.
5. Mayden KL, Tortora M, Berkowitz RL, Bracken M, Hobbines JC (1982) : Orbital diameters : A new parameter for prenatal diagnosis and dating : Am J Obstet. Gynaecol 144(93) 289-297.
6. Tuli A, Choudhary R, Agarwal S, Anand S, Garh K. Correlation between craniofacial dimensions and foetal age, journal of anatomical society of India 1995; 44(1) : 1-12.

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