

## Assessment of Age From Early Mandibular Growth – Case Reports

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### ABSTRACT

*Age assessment is an important part of medico legal practice. Changes are seen in both hard and soft tissues. Among the hard tissue, bones are important as they undergo a series of changes from prenatal to postnatal life. Mandible is an interesting bone as it depicts morphological changes in relation to age. During development of mandible, it ossifies with different centres of ossification to form hemi mandible. Mandible fuses in adults as a single bone of lower jaw. There was a slight asymmetry in the growth rate comparing the left with the right halves of mandible of the decomposed bodies ranging between 30-31 weeks, 31 – 40 weeks of gestation and 12-24 months of age. This study may be useful in the estimation of age in unidentified individuals and to monitor prenatal growth of the mandible.*

**Keywords:** *After growth, Mandible, age, assessment, decomposed.*

### INTRODUCTION

Identity means the determination of the individuality or recognition of a person or dead body. The identification of a dead body is required in cases of unclaimed & decomposed bodies and in persons dying of fires, explosions, accidents etc. Identification of a person is done by using various parameters in which age is one of the important parameters (Gupta et al.2007). Methods to estimate death age are important for the study of skeletal remains,

whether the context is bioarchaeological/Paleontological or forensic in nature. Age is determined by studying bones, teeth and general physical features of development (Stout et al.1994).

Determination of age of foetus is of significant medico legal importance to ascertain the age of viability and subsequently to decide about the relevant section of IPC for registering the case of foeticide. Determining the foetus age in case of decomposed or mutilated is even more challenging. Under these circumstances, opinion regarding the age of foetus is framed on the basis of available bones and for that we have to depend on the appearance of different centres of ossification (Mittal et al.2013).

### **Case History**

The foetus bodies were handed over to the department of Anatomy for medical education and research by the police officers after post-mortem examination, being conducted by board of doctors at Civil Hospital Bathinda. On arrival at Anatomy department foetal bodies were in advanced stage of putrefaction. Already the age of foetus had been determined during autopsy by studying ossification centres at lower end of femur, talus, calcaneum and sternum. Here in this study in addition mandible was studied for age estimation. (Figure-1).

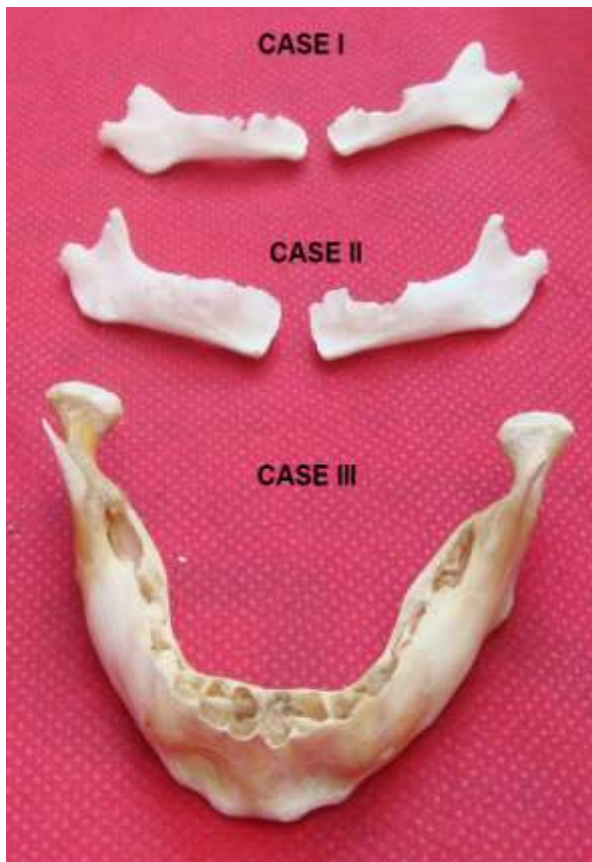


Figure 1

## MATERIAL AND METHODS

After cleaning and washing of the bodies with water and hard brush, soft tissues including periosteum were completely removed for better visualisation of the anatomical landmarks. Various measurements of Mandibles (as mentioned below) were taken with the help of vernier calliper. The extent of the mandibular angle was measured with the aid of goniometer. Following measurements of Mandible were taken (Rafael et al.2010; Hutchinson et al.2012), also depicted in figure-2.

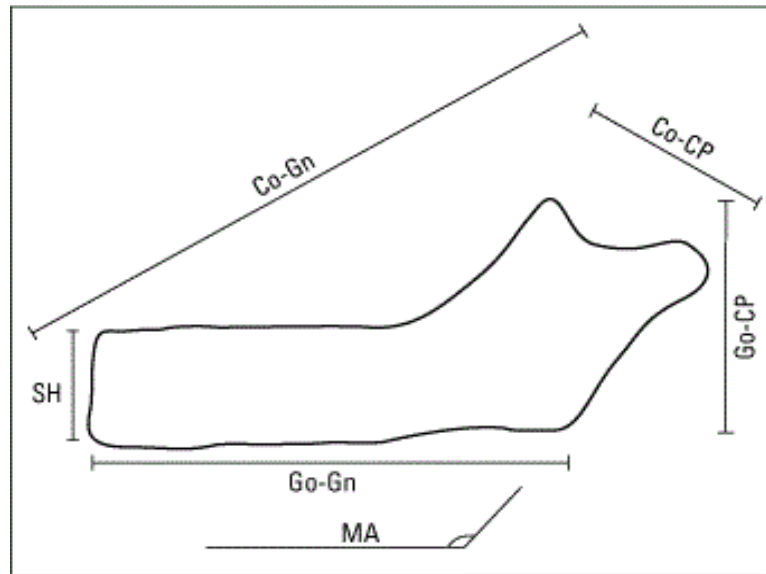


FIGURE 2. Measurements performed in the hemimandible.

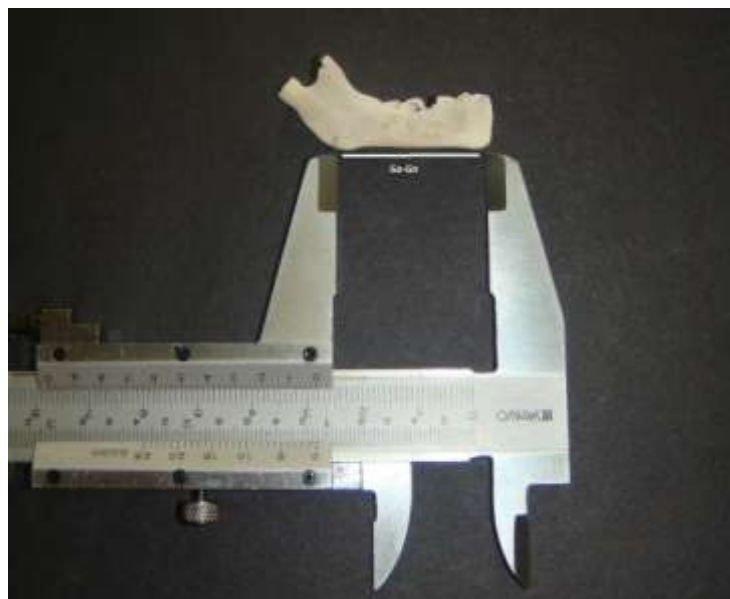


Figure 3- Length from Gonion to Gnathion

1. Condyle-Coronoid Process (Co-CP): Distance between the posterior-most point on the condylar process and the anterior-most point on the coronoid process.
2. Gonion-Coronoid Process (Go-CP): Distance between the gonion and the upper-most point on the coronoid process.
3. Gonion-Gnathion (Go-Gn): Length from Gonion to Gnathion (Figure 3).
4. Condyle-Gnathion (Co-Gn): Distance between the posterior-most point on the condylar process and the Gnathion.
5. Symphyseal height (SH): Measured on the median area to be occupied by the future central incisors, corresponding to the vertical distance between the upper-most and lower-most portions of the mandibular symphysis.
6. Mandibular Angle (MA): Measured between the posterior margin of the mandibular ramus and the lower margin of the mandibular body.
7. Width of mandibular notch (MNW): Measurements taken from the inner surface of mandibular condyle to coronoid process.

**RESULTS:**

**CASE I**

MEASUREMENTS	RIGHT (in millimetres)	LEFT(in millimetres)
Co-CP	12	13
Go-CP	17	16
Go-Gn	31	31
Co-Gn	40	40
SH	08	08
MNW	06	07
MA	144 <sup>0</sup>	144 <sup>0</sup>

**CASE II**

MEASUREMENTS	RIGHT(in millimetres)	LEFT(in millimetres)
Co-CP	15	15
Go-CP	16	16
Go-Gn	32	33
Co-Gn	45	44
SH	10	10
MNW	09	08
MA	140 <sup>0</sup>	138 <sup>0</sup>

**CASE III**

MEASUREMENTS	RIGHT(in millimetres)	LEFT(in millimetres)
Co-CP	24	22
Go-CP	25	25
Go-Gn	47	50
Co-Gn	68	66
SH	14	14
MNW	13	12
MA	140 <sup>0</sup>	139 <sup>0</sup>

There was a slight asymmetry in the growth pattern in the left and right halves of mandible of the decomposed bodies.

**DISCUSSION:**

Growth of the human beings can be studied as a group of changes taking place from the beginning of prenatal life to senility. Hard tissues (bones and teeth) undergo changes with growth, which can be a change in shape on fusion of ossification centres. After death, these changes remain stable and facilitate ease in estimation of age from hard tissue samples (Bhalaji 2006; Ready 2006; Singh 2005).

The study of foetal skeletal development has been of interest for centuries. Charles R. Noback recorded seven ossification centres in the sternum and two in the mandible (Noback 1944).

In the Forensic medicine cases of estimation of foetal age are frequently seen. In cases of infanticide, the age of the foetus is integral to the prosecution (in India) as case is registered under section 302 IPC only if the foetus has crossed the period of viability.

The mandible is amongst the first bones in the body to start ossifying and has both the patterns of ossification (endochondral and intramembranous). The body of mandible is ossified intramembranously whereas the ossification of the coronoid and condyloid processes is endochondral (Mohite 2011).

Mandibular growth, as mentioned earlier, follows a general pattern similar to that of general body growth (Bayley, Tanner). Tanner found that an individual's mandibular growth tend to channelize on a stature distance curve prior to adolescence i.e. Children tend to remain in approximately the same percentile with respect to population standards (Bayley

1956; Tanner 1964). Hunter (1966) studied the correlation of facial growth with body height and found that among all the dimensions studied, mandibular length exhibited the most consistent relationship with growth in height.

**Case I-** Although there is slight asymmetry between right & left halves of mandible, all the parameters except MNW were coinciding with the reading of Mota RS showing the fetal age approximate b/w 30-31 weeks. According to Hutchison EF MNW right is 7.52mm & left is 6.61mm as compared to 6mm & 7mm in present study respectively.

**Case II** The mandibular dimensions are corresponding with the Hutchison study showing age ranging between 31-40 weeks.

**Case III:-** Shows the fusion b/w the right & left hemimandibles, as the fusion of symphysis menti occurs at 12 months of age. So it is above 12 months, even the parameters are coinciding with the Hutchinsons study showing the age b/w 12-24 months.

**Conclusion:** There was a slight asymmetry in the growth rate comparing the left with the right halves of mandible of the decomposed bodies ranging between 30-31 weeks, 31 –40 weeks of gestation and 12-24 months of age. This study may be useful in the estimation of age in unidentified individuals and to monitor prenatal growth of the mandible.

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