



REVIEW ARTICLE

WISDOM FROM WISDOM TOOTH: RADIOGRAPHIC ASSESSMENT OF AGE USING  
THIRD MOLAR – A RETROSPECTIVE REVIEW

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ABSTRACT

**Background:** Establishing age is a major concern in forensic applications. Legal action can be executed appropriately only if the individual is known to be an adolescent or adult. Assessment of age is helpful in anthropological studies. Determining age using third molars is of greater importance from the radiographic images. It can be used as assessment markers in mid teens and adulthood, to establish age. Combination of third molar development with skeletal analysis is more valid in estimating age.

**Material and Method:** A Google literature search was done on various studies done using third molar for estimation of age. Based on the available data, the details were analyzed and reviewed.

**Results and Conclusion:** To conclude third molar plays as a valuable source in estimation of age when no other valid document is available. Assessment of age obtained from the images of radiograph of the developing dentition is more reliable and helpful since it is least affected by the difference in nutrition and other systemic illness.

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INTRODUCTION

Increase in crime in recent times is a major concern for medico legal officers. Identification is essential in criminal cases such as rape, criminal abortion, infanticide, murder and juvenile offenders. Estimation of age plays a pivotal role in schedule of award of sentences in all these instances. Establishment of age is not only required in living individuals but also in dead due to unnatural death such as aero plane crashes, bomb blasts, earthquakes, floods, fire disasters, ship wrecks and railway disasters. It would be helpful in other legal issues like Marriage, management of property, voting right, competency of witness, insurance claims, passport, visa etc. To determine age numerous factors are beneficial which includes ossification of bones, secondary sex characters, general development of body and teeth (Jashwant, 2011).

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From 10 weeks of intrauterine life to old age, the dentition aides in assessment of age by providing the physiological history of a person (Wilson, 1993 and Narnbiar, 1995). Skeletal development in leg bones, joints and cranial sutures takes places at specific ages. These developmental changes however may be affected by general health of the person, environmental factors and genetics (Wilson, 1993). Teeth is considered to be an essential tool in medico legal cases in determining individual identity (Wilson, 1993 and Narnbiar, 1995). Establishing age using teeth is consistent since they can be naturally preserved for long time than other tissues in the body. Similar to bone, teeth can be analyzed in the living as well as in dead persons (Jashwant, 2011; Narnbiar, 1995; Stavrianos, 2008; Bhat, 2007 and Kvaal, 1995) and teeth remain unaltered to fire, heat, 'Wisdom from Wisdom tooth' cold and chemical application (Acharya, 2010). In mid teens and early 20's small number of methods are available to estimate age. Around 14 years of age development of all permanent teeth is completed, except for third molar which could act as a source for estimation of age (Jashwant, 2011; Acharya, 2010; Demisch,

1956 and Ergstrom, 1983). The distinctiveness of third molar is that its development continues for a longer period (Christer Engstrom, 1983). However development of third molars remain the same for both males and females (Acharya, 2010 and Demisch, 1956) but all other permanent teeth develops and erupts early in females (Acharya, 2010). Third molars are not associated with sexual maturation and somatic growth (Acharya, 2010 and Demisch, 1956).

### Age assessment using Third Molars

One of the simple and reliable methods to assess age using third molars is Radiographic method. Radiographs play a vital role in determination of age. Stages of mineralization of third molar may be interpreted and compared with that of standard stage of mineralization by utilization of images obtained from radiograph. Various radiographs may be used such as orthopantomogram lateral oblique radiographs, panoramic radiographs, cephalometric radiographs, advanced imaging and digital imaging techniques. Evaluation of radiographic images for stages of calcification is more reliable for many years (Ciapparelli, 1992 and Panchbhai, 2012). Although disparity occurs in development, contour, position, size and eruption pattern of third molars, it is preferred by medico legal experts as it aides to determine whether the person is adolescent or adult (Panchbhai, 2012). To know whether the individual is 18 or older than 18, stages of calcification can be analyzed from images of radiographs (Acharya, 2010; Monica Tuteja, 2012; Olze, 2008). Various methods are used for analysis of images of radiographs. Some studies have used Demirian stage 'H' to suggest whether the individual is above 18 years of age and found to be valid method (Lewis, 2010; Arany, 2004; AS Panchbhai, 2011). Whereas few studies have used Olze A method of analysis to estimate the minimum or approximate age of the person by analysing the stages of stages of calcification obtained from images of orthopantomogram (Olze, 2008 and Muhammed Ajmal, 2012).

### Conclusion

In considering the legal status establishing age is a major concern in forensic applications. Assessment of age is also helpful in anthropological studies. Legal action can be executed appropriately only if the individual is known to be an adolescent or adult (Narnbiar, 1995 and Bhat, 2007). In this aspect determining age using third molars is of greater importance from the radiographic images. However third molar is a much variable tooth than any other teeth and not an ultimate development indicator, but in lack of other assessment markers in mid teens and adulthood, it can be utilized to establish age (Acharya, 2010). Combination of third molar development with skeletal analysis is more valid in estimating age (Ergstrom, 1983).

### Key Messages

- Third molar plays as a valuable source in estimation of age when no other valid document is available (Narnbiar, 1995).
- Assessment of age obtained from the images of radiograph of the developing dentition is more reliable and helpful since it is least affected by the difference in nutrition and other systemic illness (Eid, 2002).

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