



AGE ESTIMATION FROM THIRD MOLARS BY MODIFIED GLEISER AND HUNT METHOD: A RETROSPECTIVE STUDY

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Abstract:

Introduction: Human third molar improvement is extensively used to expect chronological age of sub person people with unknown or doubted age. Age associated overall performance of degrees and measurements had been as compared to evaluate if measurements introduced statistics to age predictions from third molar root formation stage

Aim: The aim of the study is to determine the age estimation from third molar by the gleiser and hunt method

Material and Method: The study sample consists of 100 OPG's (50 male and 50 female) of age from 15 to 19 years with known date of birth. The data was collected from the department of forensic odontology, Saveetha dental college.

Results: In the study it was observed that there is a difference between male and female roots . The standard deviation of for male in tooth 38 is ± 2.65 whereas in the female it is ± 3.44 . While comparing male and female, female is more accurate compared to male in tooth 38.

Conclusion: It is concluded that the female has more root maturation compared to the male and also it is concluded that age can be estimated from the third molar by modified Gleiser and hunt method.

Keywords: Age estimation, third molar, root maturation, gleiser and hunt method

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1. Introduction

Age estimation is frequently used to estimate the chronological age of children whose birth documents are unknown, and it is also useful for identifying unidentified people at crime and accident scenes.¹ Different physiologic systems, Like the skeletal system and dentition, go through a series of changes during the complicated and dynamic process of growth, Eventually maturing. The teeth provide evidence of these modifications². Human dentition is thought to be a hard tissue equivalent of fingerprints, Making each person unique. In forensic medicine and odontology, age assessment is crucial for identifying deceased victims as well as for crimes and accidents. Due to the minimal variability of dental indications, dental maturity has been a key factor in determining an individual's chronological age. The age of young people has been estimated using a variety of techniques that have been developed and evaluated. Anthropometric measures, Skeletal maturation, and dental age estimation are a few of them³.

According to forensics, The third molars are the only teeth whose developmental stages are not finished in adults, and the essential age that creates legal accountability and rights is above 15 years.⁴ The third molar development of these individuals can be used to determine their age range because the developmental process typically lasts until the age of 22⁵. Because several teeth are developing and mineralizing simultaneously, it is possible to more accurately determine dental age in early children⁶. The only teeth that are still developing are the second and third molars, which are crucial for determining dental age between the ages of 10 and 16 and 17 and 19.9 respectively⁷. Age estimation approaches based on third molar growth are modeled using a radiologically measured degree of third molar development and data logged. The mineralization of a cusp tip signals the start of the third molar growth cycle, while the closure of the apices signals the conclusion of root growth^{8,9,10}. Our team has extensive knowledge and research experience that has translate into high quality publications¹¹⁻²⁰.

Age estimation approaches based on third molar growth are modeled using a radiologically measured degree of third molar development and data logged. The mineralization of a cusp tip signals the start of the third molar growth cycle, while the closure of the apices signals the conclusion of root growth²¹. The Modified Gleiser and Hunt method is the most popular technique for age estimation. The third molar is used in this procedure to estimate age. Nine stages made up the

development of the third molar²². Using this age, the phases were estimated, and each stage was transformed into a developmental score. Even while the growth of teeth is a useful indicator for determining a child's age, accuracy falls off in teens and adults whose dental development is almost complete^{23,24,25}

2. Materials and methods

The present study was conducted in the department of Forensic Odontology. Samples were collected from the department of oral medicine and radiology, Saveetha dental college and hospital. Total number of samples is (50 male and 50 female) of age group from 15 to 17.9 and the data was transferred to SPSS software for further results.

Assessment of dental age using Gleiser and hunt method:

By deducting the date of birth from the day the person's radiographs were exposed, the chronological age (actual age) of the person was determined. On the basis of the calcification of permanent teeth (left side mandibular arch) on digital panoramic radiographs, or "OPGs," of all subjects, the maturation state was evaluated in Third molar Tooth (38). For ease of identification, staging was updated and presented in accordance with the Gleiser and Hunt method of 17 staging system, which changed the labeling terminology from Roman (stages I to xv) to Numericals (Stages 1 to 17) (28).

STATISTICAL ANALYSIS:

The data collected in excel sheet was exported to spss software version 23. Descriptive statistics was done using frequency and percentage. Means and standard deviations were used to convey continuous variables.

3. Results

The results showed (table -1) the standard deviation of male in tooth 38 is ± 2.65 whereas in the female it is ± 3.44 . In the paired sample statistics standard deviation for the male is ± 3.75 whereas in the female it is ± 4.87 (table -2). In the one sample T test the 95% confidence Interval of the difference for male upper is 15.0740 and lower is 13.5660 whereas in the female upper is 14.0592 and lower is 12.1008 (table -3). From the (graph 1) it is seen that comparing male and female, female is more accurate compared to male in tooth 38. It was observed that there is a difference between male and female roots.

Table 1: Descriptive statistics:

	N	Minimum	Maximum	Mean	Std. Deviation
Male	50	8.00	17.00	14.3200	2.65299
Female	50	7.00	17.00	13.0800	3.44543
Valid N (listwise)	50				

From table 1, The standard deviation of male in tooth 38 is ± 2.65 whereas in the female it is ± 3.44 .

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Male	14.3200	50	2.65299	.37519
Female	13.0800	50	3.44543	.48726

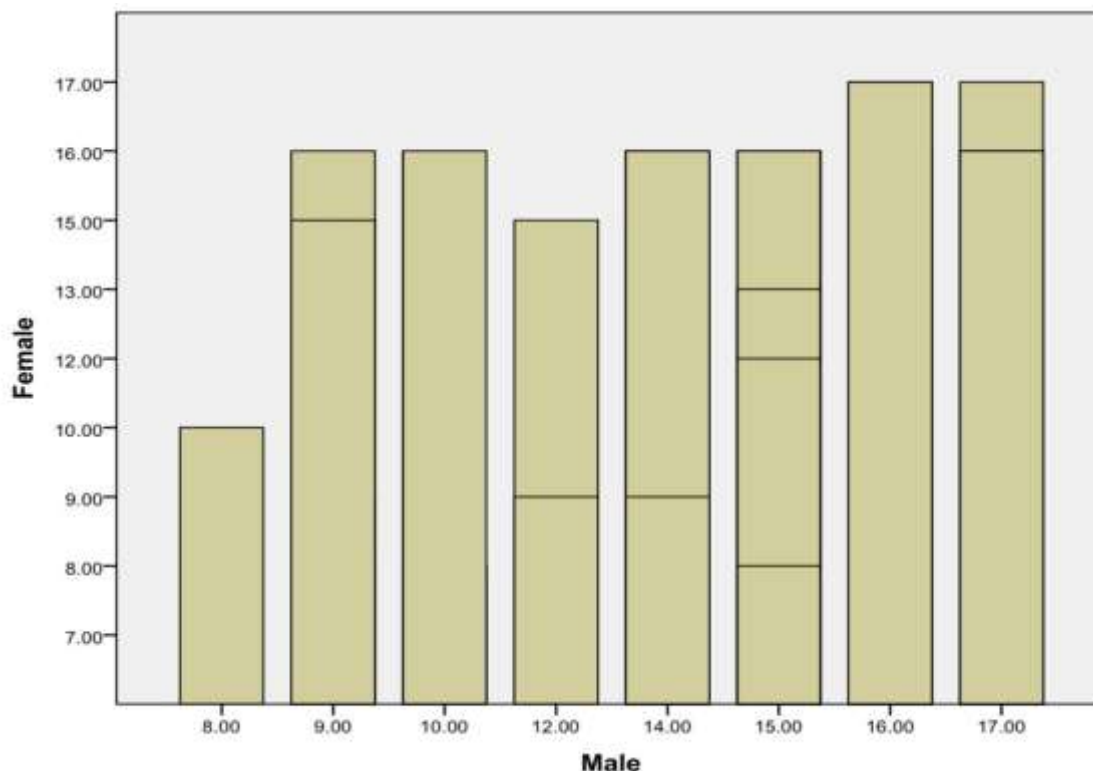
Table 2: Paired sample statistics: T Test

From table 2, In the paired sample statistics standard deviation for the male is ± 3.75 whereas in the female it is ± 4.87 .

From table 3, In the one sample T test the 95% confidence Interval of the difference for male upper is 15.0740 and lower is 13.5660 whereas in the female upper is 14.0592 and lower is 12.1008.

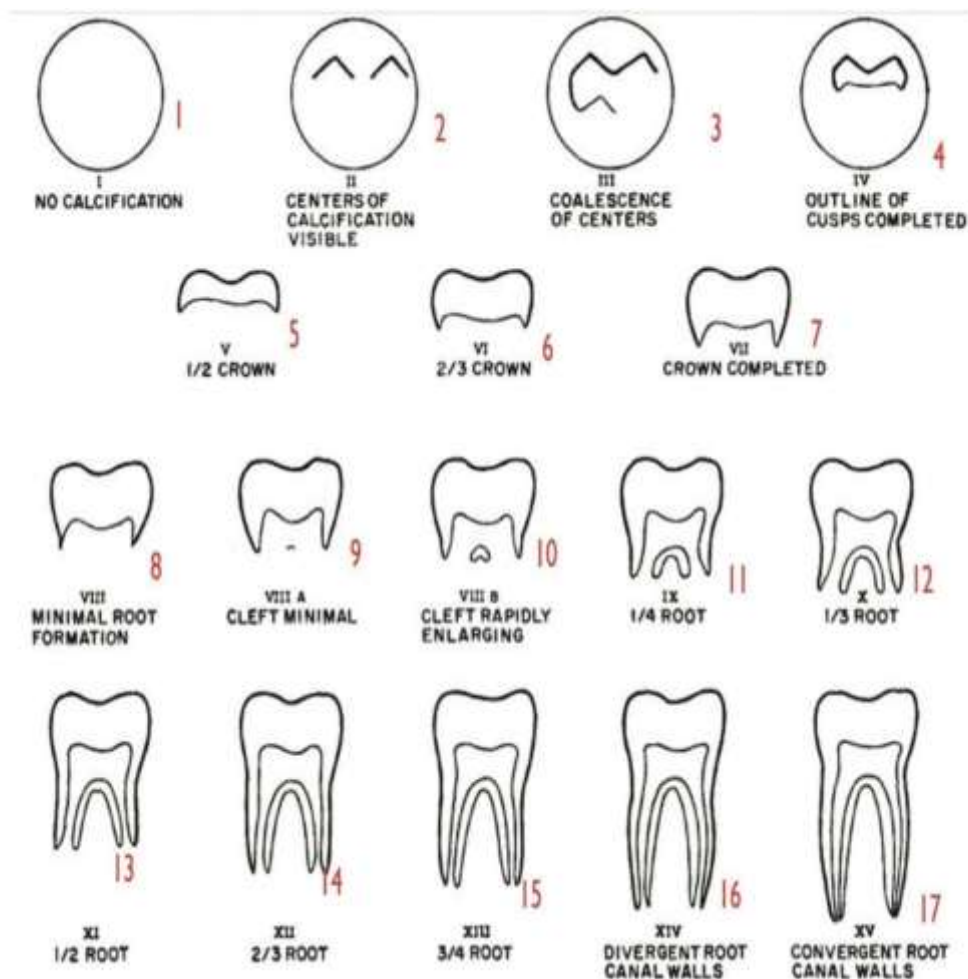
Table 3: One sample test - T Test

Graph 1: Graph develops from root development between male and female.



From the graph 1 it is seen that comparing male and female, female is more accurate compared to male in tooth 38. It was observed that there is a difference between male and female roots.

Figure 1: Figure represents the stages of gleiser and hunt method



4. Discussion:

In the present study it is explained that there was a difference between Male and the female root formation in the third molar 38. The female shows the most root maturation compared to the males. In forensic science, age estimation is crucial for biological identification. It aids in focusing the search for unidentified living or deceased people for legal purposes²⁶. The hard and soft tissues in the oral cavity guard teeth, which are the strongest organs in the human body. The dental structures are therefore quite resistant to outside influences^{27,28}. Age can be divided into three categories. Age in terms of physiology, age in terms of disease, and age in terms of time. The development of the root, apical closure, and comparison to tables are the factors that determine physiological age. Attrition of teeth, root dentin transparency, and arthritic changes in the temporomandibular joint are factors in determining pathological age^{29,30}.

A staging technique suggested by Gleiser & Hunt [10] was refined in 1994 by Kohler et al.. The modified technique (GHK) predicted the development of third molars in terms of stages of crown, root, and apex formation, including initial crown formation (stage 4), 14 root formation (stage 5), 12 root formation (stage 6), 34 root formation (stage 7), complete root formation (stage 8), and 12 apex formation (stage 9) and complete apex formation (stage 10)³¹. In the present study the standard deviation for male 38 staging is ± 2.65 and female is 3.44. By analysing dental radiographs, it is simple and non-invasive to stage the mineralization of the crown and roots of third molars. The dental maturation process has been staged using a number of different staging schemes³². A research evaluating the reliability of five popular classification systems—Gleiser and Hunt (1955); Demirjian et al.[5] (1973); Gustafson and Koch (1974); Harris and Nortje (1984); and Kullman et al.—was published in 2004 by Olze et

al (1992). Demirjian et al., according to Olze et al.^{33,34,35}.

While comparing to both Male and Female tooth number staging females are showing more accuracy than males in root maturation. In particular, it is believed that the third molar development model is more accurate at determining dental ages across ethnic groups³⁶. On the other hand, it has been asserted that the eruption or emergence of the third molar is particularly susceptible to local conditions, including insufficient spacing in the retro-molar region, between the distal of the second molar and the anterior boundary of the ascending ramus of the mandible³⁷. The third molar serves as a legal foundation for establishing a person's chronological age based on the dental developmental age boundary because the age of criminal liability is generally 18 years old^{38,39}. Future research in the area should enhance the sample distribution to enable comparisons between estimated and chronological ages within age intervals of a year.

5. Conclusion

The assessment of dental age is essential in the practice of forensic dentistry. Using a modified Gleiser and Hunt approach, a high association between chronological age and tooth staging was found in our study. It is concluded that the third molar can be used to estimate age using a modified Gleiser and Hunt approach, and that the female has greater root maturation than the male. By using the radiological approach of the permanent mandibular third molar, Gleiser and Hunt discovered a more accurate way to gauge a young person's dental development and chronological age in the range of 10 to 20 years (left side).

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Statement of conflict of interest:

The authors reported no conflict of interest while performing this study.

Authors contribution:

Asmidha - Study designing, data collection, analysis interpretation and manuscript preparation.

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