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ORIGINAL ARTICLE

AGE ESTIMATION BY USING ERUPTION OF PERMANENT TEETH: A COMPARATIVE STUDY IN LOCAL POPULATION TO PROVE/DISPROVE AGES OF ERUPTION USED IN ROUTINE PRACTICE

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ABSTRACT: Estimation of age is one of the important medico legal works where medical knowledge is applied in rendering Justice to the public and to the state. Assessment of age is often required in civil and criminal litigations. Assessment of age of an individual by examination of teeth is one of the universally accepted methods of age estimation. In a developing country like India, a large number of people are illiterate and have no knowledge or records of their date of birth which is required by law enforcing agencies in matters like, criminal responsibilities, identification, judicial punishment, consent, rape, criminal abortion, employment, attainment of majority, kidnapping and prostitution (Pathak et al, 1999). Age estimation is also required for admission purposes at the time of schooling, joining services and during retirement. Estimation of age is also required for giving old age benefits. Hence, scientific determination of age is very important.
Key words; Eruption of permanent teeth, Judicial punishment, Legal sections, Estimation of age in both sexes.
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INTRODUCTION: Teeth are known to aid in personal identification and age estimation as they are highly durable and resist putrefaction, fire, chemicals etc. The permanent teeth will help in age determination from six years to twenty – five years.[1] Some temporary and permanent tooth do co-exist up to twelve years of age. Eruption of teeth is known to be affected by dietary, climatic, racial and geographical variations.[2]

Forensic Odontology is a branch of Forensic Medicine which deals with the examination of teeth in all aspects. Although, Forensic Odontology is a relatively small specialty, it has been utilized for many years especially in establishing identity.[3] Age can be determined from a variety of factors like the appearance of ossification centers and their fusions during skeletal development, from height and weight which is applicable in early periods of life, dental development and changes occurring at puberty like appearance of hair and their growth and colour changes, development of breast in females, starting of menarche and from menopause.[4] From teeth age can be estimated from eruption of teeth when the crowns have been just projecting out from the gums, from microscopic examination of a section of central part of teeth by counting the cross striations which appear daily as devised by Boyde.[5] Gustafson had also estimated the age of an individual above twenty-five years by six stages of attrition, periodontitis, secondary dentine formation, root resorption, root transparency and cementum apposition. The eruption of temporary teeth may be delayed for a considerable time due to rickets and other nutritional deficiencies.[6]

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Dental age assessment can be done clinically or radiologically. By radiographic method, it is possible to follow the formation of crowns and roots of teeth and their calcification.[7] The clinical method to assess dental age is based on emergence of teeth in the mouth. However, it should be used along with other parameters such as physical development, changes occurring at puberty and old age, appearance and fusion of ossification centers. Hence, while giving the estimation of age sum total of all these factors should be taken into consideration.[8]

There are charts and tables for the assessment of age during development period, which shows the formation, eruption, and calcification of teeth.[9] For this purpose table of Krenfild and Logan further modified by Kronfild and Schour (1939) is commonly used which has been accepted standard for many years. These are carefully reviewed by Lund and Law and established earlier ages than the previously accepted value for initial calcification.

Most of the tables and figures presented pertain to children from Europe and America. There is no reference of the difference between these countries and warmer parts of the world. Thus there can be variations to diversity in climate, region, geographical distribution, race, nutritional status, economic status and urbanization.[10]

AIMS & OBJECTIVES: To prove/disprove ages of eruption of permanent teeth used in routine practice in correlation with local population.

Justification for Study: At present we are using same ages of eruption of permanent teeth for all medico-legal works in many parts of India, but eruption of teeth based upon various parameters like genetic makeup, diet, environmental factors etc. Many present works are to find out whether there is any change in ages of eruption in local population and routine practice by doing field work.

METHODOLOGY: Assess ages of eruption of permanent teeth between 6yrs to 25yrs in 1000 members by doing dental examination of school and college students at Thanjavur of Tamulnadu State.

Statistical Analysis:

- The study subjects were analyzed and described according to their status of eruption of permanent teeth by percentage distribution.
- The comparison of complete eruption between jaws and between sides were analyzed and interpreted by 'Z' test of properties.
- The age of the subjects according to the complete eruption of the teeth at particular jaw was analyzed and estimated at 95% of confidence interval by explore method.
- The male and female samples were analyzed teeth wise and interpreted by 'student's independent "t" test.
- The above statistical procedures were performed by the statistical percentage namely PASW (Predictive and Analysis Software) statistics – 18 (The so called SP 18). The P value <0.05 was considered as significant under two tailed conditions.

DISCUSSION:

- The complete eruption of teeth between the right and left side with in upper and lower jaws were no different in terms of percentage except Pre Molar -1 The Pre Molar-1 right side lower

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jaw complete eruption (90.9%) was significantly differed with the left side lower jaw complete eruption (96.8%).

- In respect of right upper and lower jaws, the complete eruption of teeth such as Molar – 1 Central incisor, Pre Molar – 2, Molar – 2 & Molar -3 were not statistically significant (P> 0.05) The other teeth Lateral incisor, Pre Molar – 1 Canine complete eruption of left upper and lower teeth such as Molar -1, Central incisor, lateral incisor & Molar – 3 were not statistically significantly differed. The complete eruption of other teeth left sides were significantly differed (P < 0.05).
- The ages of complete eruption of teeth of Molar – 1, Central incisor, Pre Molar – 1, Pre Molar -2, Canine, Molar - 2 & Molar – 3 were estimated in respect of their right upper, left upper, right lower and left lower and tabulated in table s4 – 11.
- The Mean ages of Male and Females of respective teeth and the results revealed that the difference between Male and Female eruption ages of Molar – 1, Central incisor, Lateral incisor, Pre Molar – 1, Pre Molar – 2, and Canine were not statistically significant (P> 0.05) The Mean age of Male Molar -2 teeth was 185.1 ± 19.1months and the same of the females was 169.1 ± 20.9 months. The difference of months was statistically significant (P< 0.001) (e.g.).[11] The Females teeth were statistically significantly & erupted earlier them Males. Similarly the Molar – 3 also erupted earliest among the females them the male (Table – 12).
- Polson described the 1st permanent molar erupts in boys at the age of 73 to 74 months where in girls erupts 70 to 72 months. The central incisor erupts 72 to 84 months in boys and 69 to 79 months in girls. In our study molar erupt 75.9 to 77.7 months which is similar to Polson study.
- In our study pre molar 1 was earlier erupted in lower jaw (mandible) than upper jaw (maxilla) where it consistent with kuldeep Singh study there is no significant in other teeth.
- In our study the molar 2 where erupted 187.2 to 193.6 months which was later erupted about 25 to 43 months to compare to others. Whereas 12 -14 yrs.[12]
- Correlation eruption of permanent teeth with the sex was variable. Central incisor, Lateral incisor, Pre molar1, pre molar2, Premolar 2 and Molar1 erupted earlier in males compared to females although difference was not significant.[13]
- In our study Molar 2, Molar 3, were erupted in earlier in female than male which is significant. Which is consistent with finding of Sharma and Mittal (2001).

CONCLUSION:

- First permanent teeth to erupt were 1st molar at age between 75.9 to 77.9months in both gender and both halves of both jaws.
- Permanent central incisor erupted at age between 80.8 to 84.0 months in both gender and both halves of both jaw.
- Permanent lateral incisor erupted at age between 105.2 to 107.4 months in both gender and both halves of both jaw.
- Permanent Pre molar 1 erupted at age between109.5 to 112.6 months in both gender and both halves of both jaw.
- Permanent Pre molar 2 erupted at age between 131.0to 133.8 months in both gender and both halves of both jaw.

- Permanent Canine erupted at age between 142.6 to 144.8 months in both gender and both halves of both jaw.
- Permanent Molar 2 erupted at age between 187.2 to 193.6 months in both gender and both halves of both jaw.
- Permanent Molar 3 erupted at age between 302.3 to 306.7 months in both gender and both halves of both jaw.
- Interest of conflict: nil.

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