Comparison Of Dental Age Of Hubli Dharwad Children By Moore's Method With The Skeletal Age And Chronological Age

B Gupta, R Anegundi, P Sudha

Citation

Abstract
The developmental status of a child is usually assessed in relation to physical events that take place during the progress of growth. Although growth events occur in reasonably constant sequences, the ages at which they are reached vary considerably among children. The various biological ages commonly used are dental age, chronological age, skeletal age, secondary sexual characteristics and morphological age but one expression cannot denote the complexity of growth and development. This study is an attempt to compare the dental age with the chronological age and the skeletal age.

INTRODUCTION
The growth of children has long fascinated poets, parents and pediatricians but the diversity in the expressions has left us unsatisfied.

The developmental status of a child is usually assessed in relation to physical events that take place during the progress of growth. Although growth events occur in reasonably constant sequences, the ages at which they are reached vary considerably among children.

Age determination plays an important role in pediatric medicine, endocrinology, pediatric dentistry and orthodontics

REVIEW OF LITERATURE
Pryor (1907) conducted studies on the skeletal development of the hand and wrist by means of X-rays and was the first one to suggest the skeletal precocity of the females as compared to males.

Todd (1937) suggested a method of determining the skeletal age based on the appearance of the joint surfaces, the size relationships, and the shape of the bones in the metaphyseal-epiphyseal regions and other centers of ossification in the hand and wrist radiograph

Nolla (1960) suggested a method for assessment of the age of immature dentitions from radiographs based on a serial study of fifty children. Points were awarded to each tooth on a scale ranging from one point when only the crypt is seen and the calcification has not commenced to ten points when the apex is just completed. The sum of the points of the whole dentition gave the age assessment.

Moorees, Fanning and Hunt (1963) published charts based on a radiographic survey which gives details of the development of both the deciduous and the permanent dentition. The Moorees, Fanning and Hunt charts provide more information on the individual stages of development for each tooth and have the advantage of providing separate charts for each sex.

Ranta N.M. (1988) aimed to check if the dental maturity charts made in southern Finland can be used without modifications in other parts of the country. Demirijians method was used to estimate dental maturity. They suggested differences in dental maturity within a fairly homogeneous population, which should be considered when national charts are used.

Marks (1992) assessed and quantified the differences in two regionally distinct orthodontic series with regard to average tooth mineralization and tooth eruption ages. The scoring was done according to the stages defined by Moorees, Fanning and Hunt. The hand wrist films were scored according to the 11 grade system of Fishman. Statistical comparisons suggested difference in the average tempos of development between midsouth (Tennessee) and Midwest (Ohio) samples of adolescent white orthodontic
patients, the midsouth series being comparatively delayed in all formative and eruptive phases tested.

Prabhakar A.R., Panda A.K., Raju O.S. (2002) studied the maturity scores of the 78 males and 73 females and were converted to obtain dental age using the Demirjian's conversion chart. The chronologic age, skeletal age and the obtained dental age were compared using the student's test. The obtained dental age was found to be overestimated in children of Davangere. An overestimation of 120±1.02 years and 0.90±0.87 years was found in males and females respectively, indicating that Demirjian's method did not give accurate age assessment in the children of Davanagere.

Though various studies have been conducted in Western population to assess the various biological ages individually, very few studies have compared and correlated the different ages. Moreover similar studies are also lacking in Indian population therefore an attempt has been made for Hubli-Dharwad School going children.

AIMS AND OBJECTIVES

1) To determine the dental developmental stages in Hubli-Dharwad children.

2) To determine the skeletal developmental stages in Hubli-Dharwad children.

3) To test the applicability of the Mooree's criteria for maturity score in dental age assessment in Hubli-Dharwad children.

4) To compare and correlate the obtained dental age with the respective skeletal ages.

SAMPLE SELECTION

50 children visiting the clinic randomly picked up from the age group 9-15 years.

25 girls and 25 boys were selected on the basis of absence of any growth disorder and with the presence of all the permanent teeth. (Either erupted or still erupting except the 3rd molar). The chronological age was recorded as per told by the parents.

THE MATERIALS USED WERE

- Orthopantogram machine
- Mouth mirror
- Straight probe

THE METHODS USED WERE

FISHMANS METHOD 8

The radiographic evaluation of skeletal maturation was done by Fishman's Method based on four stages of bone maturation; all found at six anatomical sites located in the thumb, third finger, fifth finger and radius.

MOOREES METHOD 4

Provides norms of the formation of ten permanent teeth, namely, the maxillary incisors and all eight mandibular teeth on the basis of fourteen arbitrarily selected stages of tooth development

Stages in a single rooted tooth
Comparison Of Dental Age Of Hubli Dharwad Children By Moore’s Method With The Skeletal Age And Chronological Age

Figure 2

Stages in multirooted Tooth

Figure 3

TOOTH FORMATION STAGES AND THEIR CODED SYMBOLS

Figure 4

The tooth stages are plotted on the interpolation graph and the mean alveolar emergence or dental age can be calculated using Mooree’s Interpolation chart for females.
Moore's Interpolation chart for males

Orthopantogram

Both the Orthopantograms and Hand wrist radiograph was given the same code for one child. Four orthopantograms were assessed daily to minimize the intraexaminer and interexaminer fatigue and variability to measure the teeth matching the scores.

The data was subjected to Statistical analysis and the following values were drawn.

RESULTS AND DISCUSSION

I. COMPARISON OF DIFFERENT TYPES OF AGE OF FEMALES

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III. COMPARISON OF DIFFERENT TYPES OF AGE OF TOTAL (MALES + FEMALE)

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Comparison Of Dental Age Of Hubli Dharwad Children By Moore’s Method With The Skeletal Age And Chronological Age

Figure 9

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DISCUSSION

Determination of a child’s growth and development are of great value for planning the treatment in orthodontics, Pedodontics, pediatric endocrinopathis and forensic medicine. Though various methods are present yet a single entity cannot express the ever-changing nature of growth and development.

Panoramic radiographs have been used because they are easier to make than the intra oral radiographs in the young children and also give less amount of radiation when compared to full mouth radiography (Mc Donald’s 1969). The picture of the mandibular region they produce is little distorted though there is 3 to 10% enlargement on the left side of the mandible (Sapoka and Demirjian 1971). This is not a serious drawback, because the rating system is based on shape criteria and relative values rather than on absolute lengths. Initially all fourteen lower mandibular teeth in the scoring system were used. Further investigation suggested that a seven tooth system using one side only would give almost the same estimate as one, using all fourteen teeth. For further simplicity each tooth was given equal weight.

In the Mooree’s method, the maxillary central incisors and the mandibular teeth have been considered to prevent any bias due to the shadow of maxillary sinus in the maxillary posterior region. Though Moorees method appears to be cumbersome but has intricated a more detailed chart of tooth development with 14 stages.

The Hand and Wrist radiograph have been used to assess the skeletal age by Fishman’s method due to the presence of all the skeletal maturity stages and thus the reliability can be ensured. The method for evaluation of skeletal maturity is dependent on the appearance, size and differentiation of various ossification centers and the degrees of fusion between the epiphysis and shafts of the bones of hand and wrist. Fishman’s method has been used to as it is simple and well established, it can be utilized without the presence of any atlas and thus can be easily used in clinics.

The dental age obtained by Moorees method, underestimated the age of Hubli-Dharwad children. This is in accordance to that reported by Marks (1992) in the mid south and midwest (Ohio) samples showing racial and ethnic differences. Moorees in 1963 suggested that short time intervals between the different dental development stages may adversely affect the possibility of identifying the relationship between tooth development and maturation.

The difference of the mean of the skeletal ages of the girls was statistically significant. The Skeletal Age is more correlated to the chronological age than the dental age in Hubli-Dharwad children. The mean of the chronological age and the skeletal age showed less significant difference when compared to the dental age in the male children.

A high correlation between dental and skeletal ages has also been observed in Gulati et al (r=0.98 in boys) and r=0.93 in girls), Lamons and Gray (r=0.93 in boys and r=0.88 in girls) and Sierra (r=0.82) Prabhakar (r=0.89). Similarly Tanner et al (1975) has suggested that bone age contributes little to the prediction of adult stature in younger children although it is helpful within a few years of the pubertal growth spurt.

SUMMARY AND CONCLUSIONS DRAWN FROM THE FOLLOWING STUDY WERE

1) The Dental Age of Hubli-Dharwad children were under estimated by Mooree's Method.

2) An under estimation of the Dental age of Females was more than males by Mooree's Method

3) The Skeletal Age is more correlated to the chronological age than the dental age in Hubli-Dharwad children.

4) The mean of the chronological age and the skeletal age showed less significant difference when compared to the dental age in the male children.

Although various methods of age assessment have been used, the applicability can vary due to the wide ethnic
differences between the populations. It is therefore mandatory that maturity standards should be based on the same population for which they are going to be used.

Ethnic differences and racial variations suggest that new criteria's and new grading scores should be formulated and published exclusively for that particular population.

References
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