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Case Report

AGE ESTIMATION - DENTAL AND SKELETAL - A CASE REPORT

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ABSTRACT

The estimation of age is an important activity and is commonly carried in medico legal area. Assessment of age is often required while administering justice to an individual. The times of eruption of temporary and permanent teeth are fairly constant and assessment of age of an individual by examination of teeth is an accepted method of age determination. The assessment of dental age is useful in the planning of orthodontic treatment, in paediatric dentistry, paediatric endocrinology and forensic medicine. It also adds important knowledge of growth and development to human biology. Various methods are used in orthodontics to evaluate the age of a patient. Chronological age is defined by birth date and skeletal age can be assessed, for example, by hand wrist ossification.

Keywords: Age estimation, Dental age, Skeletal age, Panoramic radiograph, Hand wrist radiograph.

INTRODUCTION

The norms of the Rights of the Child suggest that the legal age of maturity is 18 years of age. This is commonly supported by the modern legal framework of most countries. If an individual claims to be younger than 18 years of age, then there is a statutory obligation that the nation is supposed to support that minor until he is an adult. Therefore, the demarcation between 17 and 18 years is a milestone with regards to both legal and social responsibility¹.

Teeth are the only hard tissue structures of the human body that are visible to the naked eye. Hence, from the early times, the study of tooth development was linked to the chronological age of the individual. (Scheuer and Black 2000)¹.

Forensic age estimation in living individuals is based on the three major components of the process:

1. Assessment of dental development,
2. Evaluation of skeletal maturation and
3. Expression of secondary sexual characteristics^{1,2}.

Age can be determined from a variety of factors like the appearance of ossification centres 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, development changes of breast in females, starting of menarche and from menopause³.

CASE REPORT

A male patient was referred from a Tea Company for age estimation. He had been working in the tea company since the last one and a half years. Now they had sent him to inquire about his age, to check if he was 18 years old and was eligible for working. He was a resident of Swai Madhopur and none of his family members were educated. He didn't have a Birth Certificate or School Transfer Certificate.

No relevant Medical or Dental history was revealed.

Patient gave the personal history of supari chewing 1 packet in 2-3 days since last 5 years.

General examination revealed no clinically significant findings.

Hard tissue examination: all permanent teeth had been erupted except 3rd molars.

Decayed : 37,47.

Stains and calculus were present.

On the basis of clinical findings, the probable age of the patient was 16-17 years.

Investigations advised:

Panoramic radiograph

Panoramic report showed tooth buds of 18,28,38,48 with follicular space. No root formation started. According to Radiology his age appears to be above 16 years.

Consultation with the departments of Forensic Medicine and Radio-Diagnosis and Imaging was being taken.

Investigations advised:

Left hand wrist and left elbow radiographs.

Report showed all carpal bones had been appeared.

External and internal epicondyles had appeared and not fused.

Head of radius appeared but not fused.

Distal end of radius and ulna had appeared but not fused.

Bone age was above 12 yrs. and below 16 yrs.

DISCUSSION

The use of teeth for determining someone's age has its origin 170 years ago when tooth eruption was first used for dental age estimation in connection with child labour (Saunders 1837) Dental age estimation in the living is mostly based upon non-invasive methods, which evaluate the timing and sequence of defined growth stages of the developing dentition. The sequence of traits in the mature dentition and the surrounding tissues are also evaluated. Therefore, the recommendations for the age estimation of living persons include a dental status and a panoramic radiograph, a general physical examination, and the X-ray examination of the hand (Schmeling et al. 2004).

Dental Age Determination: In our case, dental age determination is based on the radiography of the mandible. This is called a Panoramic radiograph. All the teeth are clearly demonstrated on the view obtained. The age determination is based on the presence of the teeth (child and adult teeth) and their maturation, crown and roots. It can be used from the first years of life to 21 years⁴. During adolescence, the shape of the roots of the second and of the third molars have to be analysed. Clinically, the development of permanent dentition completes with the eruption of the third molar at the age of 17–21 years⁵ after which the radiographic age estimation becomes difficult^{4,5}.

Skeletal age determination: Parallel to the establishment of methods for dental age estimation, methods for the evaluation of skeletal maturation were developed. In this context, thanks to the discovery of X-rays, methods that had originally been developed using dry skeletal material could now be applied to living individuals as well.

These *correlations between dental, skeletal and chronological age* could be relevant for general dentists and orthodontists and pediatricians as well^{6,7}.

Bone age estimation through carpal X ray is often used to evaluate growth disorders in pediatric patients, showing how much they have developed in relation to their bone maturity⁴.

The study of the morphological parameters of teeth and hand / wrist X-rays of children is more reliable than most other methods for age estimation and is most commonly used to determine age in living humans (Cameriere and Ferrante, 2008)^{8,9}.

In order to establish the chronological age of an individual from their skeletal development, at least one of the three phases of osseous development must be assessed:

The age of appearance (i.e. ossification) of the different parts of the bone.

The morphological appearance and/or size of the bone and its constituent parts.

The timing of fusion of different parts of a bone.

A big discrepancy between the calendar age and the bone age can indicate an atypical skeletal development. In many cases the decision whether to treat a child with growth hormones depends on the outcome of bone age estimation.

CONCLUSION

There is a good correlation between dental age and chronological age in general, except in some situations where two entities are evaluated independently. Among all the growth indicators, dental age has the weakest correlation with general somatic development. Physical growth often changes with the chronological age, but correlates well with skeletal age that represents relative stage of bone maturation¹⁰.

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Figure 1: Extra-oral View



Figure 5: Intra-oral (Maxillary) View



Figure 2: Extra-oral Right Lateral



Figure 6: Panoramic Radiograph



Figure 3: Extra-oral Left Lateral View



Figure 7: Hand Wrist (Left) Radiograph



Figure 4: Intra-oral (Mandibular) View



Figure 8: Elbow (Left) Radiograph

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