ORIGINAL ARTICLE

ASSESSMENT OF AGE OF PATIENTS USING DENTAL RADIOGRAPHS: A FORENSIC STUDY

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ABSTRACT:
Background: Age estimation utilizing the dentition orders a critical stride in human recognizable proof. Teeth have a special property of permanency making them impervious to natural abuse and after death decay and consequently can be held without contortion. Hence; we planned the present study to estimate age with the orthopantomographs (OPGs). Materials & methods: The present study included retrospective assessment of OPGs of 100 subjects of known age. These OPGs were assessed by two autonomous dental practitioners in the meantime interim. The age estimation for each case was finished by decade. At that point the estimation results were contrasted with the ordered period of people by third autonomous dental specialist. Criteria described previously in the literature were used for the evaluation of the OPGs. All the results were analysed by SPSS software. Results: True- false prediction among the age groups of 1- 11 years, 12 to 24 years and 25 to 36 years was observed in 6, 10 and 23 % of subjects respectively. Among subjects of age group of 37 to 49 years and subjects of age group of 50 to 60 years, true false prediction was observed in 22 and 24 % of the subjects respectively. Conclusion: Significant forecasts can be made by assessing age from OPGs.
Key words: Age, Estimation, Orthopantomographs

INTRODUCTION

Age estimation utilizing the dentition orders a critical stride in human recognizable proof. Appropriate distinguishing proof in measurable odontology is required for moral, compassionate and official records, specifically, the legitimate and criminal examinations. It empowers us to build a mortality profile of the perished.¹, ² A few focuses that are generally noted with the end goal of recognizable proof incorporate age, sex, race and stature. In situations where the human remains are obvious, the family and companions of the expired can authenticate their character, while in cryptic circumstances, for example, mass catastrophes and deteriorated after death remains, where survey is unrealistic, different methods for recognizable proof are required to be utilized.³, ⁴ In such conditions, the dental hard tissues pick up significance in distinguishing proof attributable to the way that the two hard structures of teeth, veneer and dentin give the properties of hardness and strength respectively. Because both these tissues are mineralized, they give teeth a special property of permanency making them impervious to natural abuse and after death decay and consequently can be held without contortion.⁵, ⁶ Along these lines, human dentition gives a critical piece of information in following the obscure and certify in the distinguishing proof of people in measurable odontology.⁷, ⁸ Hence; we planned the present study to estimate age with the orthopantomographs (OPGs).

MATERIALS & METHODS
The present study included retrospective assessment of OPGs of 100 subjects of known age. All those patients were included which reported to the clinic with the purpose of orthodontic treatment for which OPGs were taken. These OPGs were assessed by two autonomous dental practitioners in the meantime interim. The age estimation for each case was finished by decade. At that point the estimation results were contrasted with the ordered period of people by third autonomous dental specialist. Two right estimations were recorded as "genuine," false estimations recorded as "false,false," and one right and one false outcome were recorded as "right false. Patients were divided into various age groups depending upon the age. Criteria described previously in the literature were used for the evaluation of the OPGs.⁹ All the results were analysed by SPSS software. Chi- square test and student t test were used for the assessment of level of significance. P-value of less than 0.05 was taken as significant.

RESULTS
Table 1 and Graph 1 show the prediction of the dentist in relation to age estimation. True- false prediction among the age groups of 1- 11 years, 12 to 24 years and 25 to 36 years was observed in 6, 10 and 23 % of subjects respectively. Among subjects of age group of 37 to 49 years and subjects of age group of 50 to 60 years, true false prediction was observed in 22 and 24 % of the subjects respectively.
Table 1: Dentist’s prediction for age estimation

<table>
<thead>
<tr>
<th>Age groups</th>
<th>True – true (%)</th>
<th>False- false (%)</th>
<th>True- false (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-11 years</td>
<td>88</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>12-24 years</td>
<td>74</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>25-36 years</td>
<td>54</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>37-49 years</td>
<td>57</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>50-60 years</td>
<td>61</td>
<td>15</td>
<td>24</td>
</tr>
</tbody>
</table>

Graph 1: Dentist’s prediction for age estimation

DISCUSSION

Age estimation assumes an essential part in criminological pharmaceutical, clinical dentistry, pediatric endocrinology, and archaeology. Age estimation is of more extensive significance in measurable medication, not just with the end goal of distinguishing perished casualties additionally regarding wrongdoings and mishaps. What's more, sequential age is critical in many social orders for school participation, business, social advantages, and marriage. In adulthood, teeth experience time-related changes speaking to natural maturing, and many reviews have demonstrated that few elements of maturing can be utilized for age assurance. Hence; we planned the present study to estimate age with the orthopantomographs (OPGs).

In the present study, we observed that in the first decade, most accurate age estimation through OPGs occurred. Chopra V et al used a digital method to measure dentinal translucency on sectioned teeth and compared digital measurements to conventionally obtained translucency measurements. A total of 200 extracted permanent teeth were collected and were sectioned to a thickness of 250 μm. Translucency measurements were obtained using the digital method and compared with those obtained using a caliper. Correlation coefficients of translucency measurements to age were statistically significant for both methods (P < 0.001) and marginally higher for the digital approach (r = 0.4671). Application of derived linear regression equations on an independent sample (n = 10) revealed a similar ability of both the methods to assess age to within ±5 years of the actual age. The translucency measurements obtained by the two methods were very similar, with no clear superiority of one method over the other.

Singh S et al used a simple digital method to measure dentinal translucency on sectioned teeth and to compare digital measurements to conventionally obtained translucency measurements. Fifty extracted permanent teeth were collected and were sectioned to 250 μm. Translucency measurements were obtained using the digital method and compared with those obtained using a caliper. Correlation coefficients of translucency measurements to age were statistically significant for both methods (P < 0.001), and marginally higher for the conventional approach (r = 0.4671). Application of derived linear regression equations on a sample (n = 10) revealed a similar ability of both the methods to assess age to within ±5 years of the actual age. The translucency measurements obtained by the two methods were very similar, with no clear superiority of one method over the other. Hence, further studies on a large scale are warranted to determine which method is more reliable to estimate the age.

Acharya AB et al obtained translucency measurements on 81 tooth sections using the digital method and compared with those obtained using a caliper. Correlation coefficients of translucency measurements to age were statistically significant for both methods (P < 0.001), and marginally higher for the digital approach (r = 0.49). Application of
linear regression equations derived from both methods on an independent sample (n = 15) revealed better ability of the digital method to assess age-60% of age estimates were within +/-5 years of the actual age as against 40% for caliper-based method. The superior results using the digital method are attributed to refined measurements obtained under magnification and the "touch-free" approach of measuring translucency on digital images of thin tooth sections. Moreover, the computer hardware and software used in the present study are ubiquitous and easy to use. Considering these advantages, the report recommends the use of the digital method to assess translucency for age estimation.15

CONCLUSION
In the field of forensic dentistry, significant forecasts can be made by assessing age from OPGs. However, future studies are recommended.

REFERENCES