Estimation of pubertal growth by using Hand-Wrist radiographs and Orthopantomographs (prospective study)

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By:
Hala Adnan Al-Juboori
B.D.S

Supervised by:
Assist. Prof. Dr. Hayder Fadhil Saloom
B.D.S.,M.Sc.

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ABSTRACT

Assessing maturational status, whether the pubertal growth spurt of the patient has been reached or completed can have a considerable influence on orthodontic diagnosis and treatment plan especially when the orthodontist intend to utilize the growth potential of the individual for forecasting treatment outcome, taking advantages of growth where necessary and trying to minimize growth where undesirable.

This study aimed to verify the possibility of clinical employment of the dental maturation in pubertal growth estimation. The reliability of this measurement has been investigated in relation to a standard method of skeletal maturation assessment, based on the radiographic evaluation of the hand wrist bones maturational stages, also this study aimed to investigate the relationship between chronological age and skeletal age evaluated by hand wrist radiograph, to determine the suitable timing for orthopedic treatment, to gain maximum benefit from growth effect.

The sample of this study consisted of 90 Iraqi adolescent patients (45 females and 45 males) aged 10-16 years; digital panoramic and hand wrist radiographs had been taken for every patient at the same day.

The results showed strong correlations among the skeletal maturation stage, dental maturation stage, skeletal and chronological ages in growing individuals. The males and females were similar in the biological stages, but the males attained them at a later chronological age. The chronological age matched the skeletal age at age 12 year for females and 14 year for males with statistically no significant mean difference ($p>0.05$) at these ages ,then after that there is a tendency towards advanced maturation with mean of the skeletal age being greater than the mean chronological age with statistically significant mean difference ($p<0.05$) at the

maturity stages followed the pubertal growth spurt so the orthopedic treatment preferred to be started before age 12 year for females and 14 year for males.

Moreover, It has been concluded that the maturation stages of the mandibular canine and second molar were found to be reliable indicators for the pubertal growth phase estimation using the panoramic radiograph . Furthermore, it has been found that the dental maturation stage of mandibular 2^{nd} molar was highly correlated with skeletal maturation stage of hand and wrist bones with correlation coefficient ($r = 0.9$) and so, it is possible to estimate the pubertal growth phase by using intra oral peri-apical radiograph for this tooth ,with low radiation dose and low cost.