

Assessment of skeletal age in children and adolescents using radius sonography in comparison to standardised radiography

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Purpose

Determination of skeletal development in children is important. The most used evaluation method is to study left hand X-ray based on the standards depicted by Greulich & Pyle (G&P). The aim of our study was to compare the accuracy of a new sonographically based method with the standard method.

Materials and Methods

160 consecutively evaluated children and adolescents (77m, 83f) who received a X-ray of the left hand were evaluated. Ultrasound examination of the same hand was performed on the same day using the BonAge™ system (Sunlight Medical Ltd., Israel). This system evaluates the relationship between the velocity of the wave and growth using gender and ethnicity based algorithms. Three investigators (U1-U3) analysed the X-ray and assigned bone age based on the G&P atlas.

Results

In 152 patients BonAge™ measurement was successfully. The correlation between the three investigators using the G&P method was between 0.977 and 0.980; correlation between BonAge™ and the investigators (U1-3) was 0.902 and 0.920. The paired t-test showed no significant differences between BonAge™ and the investigators and also for the comparison between U1 and U2. There were significant differences between U1 vs. U3 and U2 vs. U3 ($p < 0.05$).

Conclusion

The BonAge™ device demonstrates the ability to produce a sufficient assessment of bone age using an ultrasound method. Advantages of the ultrasound device are objectivity, lack of ionizing radiation, and easy accessibility. In the case of first investigations, X-ray is necessary to look for dissociated skeletal age, dysplasia, and mineralisation.

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