



### **F29 Dental Assessment of Alterations in Osseous Development and Its Impact on Post-Natal Age Estimation in Populations With Primary IGF-1 Deficiency**

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After attending this presentation, attendees will be aware that considerations of growth deficiencies should be made when doing age estimation.

This presentation will impact the forensic science community by promoting the realization that there could be an error in age estimation if consideration is not made in regard to growth disturbances.

It has been observed among prepubertal children that were deficient in stature that a deficiency in Insulin-Like Growth Factor-1 (IGF-1D) is often a contributing etiology. Insulin-like Growth Factor (IGF) is synthesized in the liver and peripheral structures and circulates in a bound form to a number of proteins like IGF-binding protein-3 (binds 90% of IGF1 which circulates) for instance.<sup>1,2</sup> The levels of IGF-1 fluctuate throughout life, peaking at the onset of puberty and decreasing in early adult life, and declining with the advancement of age, much like the levels of growth hormone do. In the pediatric population, the primary clinical display of this deficiency is short stature (subnormal linear growth), sub-growth velocity, or delayed onset of puberty which is associated with retardation of growth, when compared with age-similar population. Patients may be screened for developmental anomalies during their prepubescent years by assessing dental development both radiographically and clinically. It is conceivable that there is an underdiagnosed population of IGF-1D patients that has a clinical display of delayed growth and development yet no diagnosis from an endocrinology standpoint. Of this group of patients that are diagnosed, there is a subset of patients that has had treatment to correct the IGF-1D condition which may also skew the dental vs. chronological age comparison and age estimation depending on when the diagnosis was made, when therapy was initiated and the duration of therapy. The other subset of patients are those that have received no therapy for the IGF-1D condition or have not been diagnosed at all. An accurate assessment with consideration made to delayed bone development when attempting to determine chronological age can be made with dental age determinants. Demirjian's method of age estimation for this population may not be the most reliable method of age estimation; however, other tools such as evaluating the cementum incremental lines, if possible, may be a more favorable approach.<sup>3,4</sup> There are cultural and social economic considerations where diagnosis of this condition is not made because of the lack of diagnostic facility or a patient's non-access to care. From a forensic odontology standpoint, the examiner should take into consideration the display of un-erupted developed teeth, the presence of any non-exfoliated deciduous teeth and skeletal development and symmetry.

#### **References:**

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#### **IGF1-D, Age Estimation, Pediatric Growth Delay**