



### F21 Dental Age Determination – A New Software Tool

*Kenneth W. Aschheim, DDS\*, 44 East 67th Street, New York, NY 10065*

After attending this presentation, attendees will become familiar with a flexible new software tool that automates the process of determining dental age from birth through the completion of third molar eruption.

This presentation will impact the forensic science community by exploring the next generation of dental forensic software for prototype programs that are being developed for proof of concept testing. One area of interest is the ability to automate the dental aging process. The goal of this presentation is to present a proposed dental age determination software prototype system for possible inclusion in a future version of morgue management software that is being developed.

The use of dental radiographs for age determination has been well documented. Tables, by Moorrees, Fanning and Hunt (1963) and Demirjian, Goldstein and Tanner (1973), have been a common references for the forensic odontologist in determining dental age. However, they are not routinely used in daily morgue operations because a simple software package to aid in visualizing tooth bud development does not exist, and the mathematical calculations are often tedious. Previous software for age determination analysis based on third molar development is available; however, it does not do calculations based on succedaneous teeth in individuals with either a deciduous or mixed dentition.

The need for a software tool that was designed to automate the dental age determination process, as well as accommodate a greater range of ages, has led to the development of the Dental Age Determination (DAD) prototype software. Designed as a proof of concept project, it is hoped that it will ultimately be incorporated into currently available full forensic management software packages.

The software is divided into four sections: the demographic information section, the image manipulation section, the current dental assessment section, and the dental age calculation section. In addition, the software allows for user supplied “age-tables” based on ethnicity, sex, or any other custom metric.

The demographic information section utilizes standard fields for specimen familial data. It currently supports the Familial Data Set of ANSI/ ADA Specification No. 1058, the Forensic Dental Data Set. By allowing a one-to-one relationship with recognized data fields, future data transfer to other software products will be supported.

The image manipulation section allows for importation of multiple radiographic images and contains standardized tools to allow for magnification as well as scrolling for better visualization of the tooth bud stage determination. Importation of multiple images of standardized image formats (jpg, bmp, etc.) is currently supported. Future DICOM importation support is anticipated.

The key section for age determination is the algorithmic or current dental assessment section. Because recent studies have questioned the accuracy of the standard dental age estimation charts for children of different ethnic groups, DAD allows for the importation of user supplied multiple data sets which may be more accurate. The current prototype also displays both line drawings and radiographic samples of individual tooth bud development stages to assist in dental stage determination. This allows for the visual comparison of tooth bud stages to known standards.

The dental age calculation section is the final section of the software. This section performs an average dental age determination based on the forensic odontologist’s assessment of tooth bud development. In addition, it calculates simple statistical analysis of the data based on individual tooth bud development stage estimates. A final output screen displays the final calculation.

At the time of submission, the current version of DAD only contains a rudimentary reporting output, although a more robust system is anticipated as prototype development continues.

**Dental Age Determination, Computer Software, Dental Informatics**