



## Odontology Section – 2008

### F20 On the Uniqueness of Human Dentition

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After attending this presentation, attendees will understand some of the problems and principles of investigation into the uniqueness of the human dentition, the essential assumption of forensic dental identification and of bite mark analysis. A method is presented for measuring the location of anterior teeth that may be used to establish a database for determining how often a particular arrangement of the anterior teeth appears in a population.

This presentation will impact the forensic odontology community by demonstrating a simple, robust method of measuring the location of individual teeth in the dental arch that can be easily applied to create an individual's "dental profile." This method also allows for capturing some three-dimensional information about the location of the incisal edges of the teeth relative to the occlusal plane.

The critical assumption of both dental identification and bite mark analysis is that every individual's teeth are unique. A further assumption in bite mark analysis is that this uniqueness can be adequately transferred to materials such as human skin (this second assumption is not addressed in this presentation.).

In this pilot study, the population of pre-treatment orthodontic patients was examined (both sexes, many races, ages from adolescent to adult) from his practice to establish background information about the amount of variation in this population. This group was arbitrarily chosen on the assumption that there would be a wide variation in location of each individual's teeth. In the next phase, sets of twins were then studied and compared to the baseline population to determine if the method presented was able to discriminate between both monozygotic and dizygotic individuals who have, presumably, less variation between their dental arches.

The method presented here for measuring location of the anterior teeth depends only on locating the cusp tips of the canines. All other measurements derive from the midpoint of the cusp-tip-to-cusp-tip line. It is believed that this makes for a simple and robust system which relies on as few anatomical landmarks as possible and does not require specialized computer image analysis software. The method is easy to implement and does not involve calculating orthodontic curves for each individual arch. Neither does this method depend on arbitrarily tracing the incisal edges of the anterior teeth. Further, this technique allows for reporting some 3-dimensional information about the distance of the incisal edges from the occlusal plane. It is believed this method might eventually be extended to describe bite marks, as well, and might allow for a numerical comparison of each dental arch to a corresponding portion of a putative bite mark. This procedure could be relatively quickly applied to a large number of dental casts in order to begin building a database that could help to determine whether a particular arrangement of the anterior teeth appears only once, or conversely, more than once in a particular population.

**Odontology, Uniqueness, Dentition**