F7 The Uniqueness of the Human Dentition: Fact or Fiction?

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After attending this presentation, attendees will be aware of both the difficulty in attempting to prove the proposition that the spatial arrangement of the human dentition is unique as it applies to bitemark analysis as well as the ultimate irrelevance of such a proposition to both forensic scientists and the law.

This presentation will impact the forensic science community by presenting attendees with examples from not only the forensic field, but general mathematical and philosophical principles that support the concept that uniqueness is an unattainable, irrelevant, and unproveable concept in bitemark analysis and other forensic areas. This will serve to highlight the fact that there is no need to resort to uniqueness principles in order to bolster claims of identification in courts of law or elsewhere. Such claims do not strengthen the position of odontologists as expert witnesses and do nothing to increase the reliability of the discipline as required under current evidence law mandates.

Fingerprint and handwriting analysts, firearms and tool mark examiners, and forensic odontologists often rely on the uniqueness proposition in order to support their theory of identification. In forensic odontology, several articles are commonly cited as providing evidence for the geometric uniqueness of the anterior dentition. These articles were reviewed in order to assess this claim, and benchmarked against more than thirty articles claiming to prove the uniqueness of other forensic traits. The literature providing support for uniqueness in forensic odontology is comparatively weak and archaic in its methodology; however, articles in all forensic disciplines suffer flaws that negate the conclusion that any forensic feature is unique. The sources cited as contributing towards the evidence for uniqueness include the anecdotal and experiential, biological, and mathematical, yet all of these approaches suffer disadvantages that result in little faith being able to be afforded to their conclusions. These included the employment of unrealistic assumptions, erroneous mathematics, and the drawing of illogical conclusions from experimental data. The finding of uniqueness in any study appears to be an overstatement of the significance of the results, and in several instances, this claim is made despite contrary data being presented. Recently, studies have been published regarding the uniqueness of the dentition, and these have definitively falsified the notion that the spatial arrangement of the dentition is quantifiably unique.

Both the mathematical and philosophical viewpoint regarding uniqueness is that obtaining definitive proof of uniqueness is considered impossible by modern scientific methods. More importantly, there appears to be no logical reason to pursue such research, as commentators have convincingly established that uniqueness is not a necessary requirement for individualization or identification by the forensic expert. In fact, such questions broach the scope of the expert witness, and should properly be left to the trier of fact. The courts have accepted this in several recent cases in the United States, and have dismissed the concept of uniqueness as irrelevant to more fundamental questions asked of forensic expert witnesses. Current concepts in evidence law mandate that the expert witness's testimony must be found to be relevant and reliable, and neither of these concepts are supported by statements of uniqueness. Odontologists would be better to focus their efforts in both research and the courtroom elsewhere in order to truly improve the reliability of the discipline.

Odontology, Uniqueness, Forensic Science

