Strategies for Addressing a Daubert Challenge in Forensic Odontology

Alex Forrest

Abstract

While some authorities believe that the chances of a Daubert-type challenge to forensic evidence in Australia are slim, it remains a fact that the bar has been raised in all jurisdictions for standards that we must meet. By addressing the challenge posed by Daubert, we ensure that our evidence will withstand rigorous examination by the courts. Strategies are presented to ensure that routine identifications by forensic odontology can meet these standards internationally.

Introduction

The "Frye Test" for expert evidence originated in an American legal case in 1923. It stated that expert testimony was admissible if it was "derived from a well-recognized scientific principle or doctrine". The test has since been amended in the United States to the "Daubert Test", which requires that expert testimony be based on scientific principles and methods that are "generally accepted" within the relevant scientific community.

Seventy years later, a second important American case, which has become known as the Daubert Case, set a higher standard for admissibility of expert evidence in the United States. According to Samuels, the "Daubert Case and the associated group of "impressionistic" and "scientific" experts represent the point at which the court was forced to make the Daubert-type challenge to the evidence of Forensic Odontology.

Error Rates and Identification in Forensic Odontology

Forensic odontology usually asks the question "who is this person?". It is mainly concerned with individual identification of unknown persons. In this context, the question is answered by examining dental records from a known missing person and comparing them with the dental features of the unknown deceased to determine if they originate from the same person. The significant question in this context is, can we assign a probability to this chance of being wrong?

As it stands at the present, the short answer is "no". This is because each case will offer a different variety of features for comparison, and the elements will vary unpredictably.

If only written dental records are available for the known missing person, then records of missing teeth may be put together with professional judgement that roughly depicts the tooth surfaces involved in various restorations. The materials from which the restorations are fabricated are commonly identified, often including specific brands and colours. These may have a role relating to features of high individual value such as cast dental treatments, crowns, bridges, implants and the like. However, in written records alone, specific recognition of the human dentition is difficult to achieve. A trained clinician with detailed knowledge of the extent of treatment and a professional judgement can provide an indication of the remains on this basis remains problematic. This is a situation in which a probabilistic outcome requires interpretation by the expert, and a professional judgement must be made.

Attempts have been made to compile a database of the probability of finding a given restoration in a given surface of a given tooth, such that a statistical experiment can be done to provide evidence for a specific socioeconomic level within that population (patients receiving free dental treatment from public clinics in Australia will rarely be offered bridges and implants on the public purse, for instance). They will also be dependent on the age of the patient – few young adults now have amalgam restorations, but many older adults have this material extensively in their mouths. Given that a restoration is a unique human tooth, how would we know which particular database of probabilities to apply? And if our identification is faulty, then the figures will be meaningless since the correct database will remain unknown. Further, such databases need to be continually updated to keep track of changing demographics and new treatment techniques and trends. The cost of such surveys might well exceed the usefulness of the information.

If images are used for comparison, then what test do we apply to determine the degree of similarity in ante-mortem and post-mortem images? Slightly different angularities of the image capture device are difficult to account for and different contrast ratios and dynamic ranges present significant challenges for image comparison software. We don’t have an easy way of expressing similarity in an objective, automated way at present, however visual comparison is usually intuitive and is available to the non-expert.

A Possible Solution

A possible solution is to look at the success rate of the techniques themselves, rather than attempting to apply individual statistics to each case of each test. Thus, for instance, is a sense of 2000 routine individual identity identifications using X-rays of teeth, there is the likelihood that any error in identifying an incorrect identification was the correct individual, therefore the probabilistic value of each technique on the total database would be made. This approach could be taken for other techniques, such as image superposition or bite mark comparison.

The problem, begins the question: how do we measure the success or failure of each individual case?

One approach might be rigorous independent peer review. In the event that independent teams of Forensic Odontologists agreed on the outcome in all respects, this would mean that the case had passed independent peer review, and therefore could be added to the database. The same approach could be taken with Disaster Identification. The same approach could be taken with Disaster Identification. Further, such databases would be useful in the event of peer review, and the processes would be generalised to a database of evidence in an international forum.

Potential benefits might arise from the cross-fertilisation that might occur between reviewing teams, and uniform standards across jurisdictions, particularly if the peer review occurred on an international basis. Further, it could potentially lead to a climate of openness in which new approaches would be rapidly accepted.

Conclusions

A possible solution is presented to address potential Daubert-type challenges to the evidence of Forensic Odontologists in respect of identification by odontological techniques.

Even though the evidence might be driven initially by recognition of the implications of the Daubert Case for evidence in Forensic Odontology, it should not be pursued in isolation on the main aim as a test for demonstrating the real basis for the claims we make in respect of identification by the dentition.

Independent peer review is the mechanism suggested, and this would mandate significant organisation to enable consistent national and international peer review of de-identified cases with an acceptably rapid turnaround time.

Possible benefits include the development of a measure of the reliability of each technique used, potential standardisation of approaches to applying identification techniques and standards, and improved communications and cooperation within the Profession.

References:

1. Frye v United States 293 F 1013 (1923).