Forensic Odontology - Part I

Course Author(s): Franklin D. Wright, DMD, D-ABFO
CE Credits: 1 hour
Intended Audience: Dentists, Dental Hygienists, Office Managers, Dental Students, Dental Hygiene Students
Date Course Online: 09/01/2017  Last Revision Date: N/A  Course Expiration Date: 08/31/2020
Cost: Free  Method: Self-instructional  AGD Subject Code(s): 145
Online Course: www.dentalcare.com/en-us/professional-education/ce-courses/ce503

Disclaimer: Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

Warning: This course contains content that some may find disturbing.

Introduction
This course will discuss dental identification, disaster victim dental identification and the dental-legal issues associated with personal injury cases and standard of care cases, sometimes referred to as dental malpractice, including the importance of the dental record. Course participants can expect to learn the basic concepts of the overall practice of forensic odontology.

Please note this is Part I of a two-part series. Forensic Odontology - Part II will discuss bitemark evidence, human abuse issues seen in the dental environment and dental age assessment and will be published soon. Each of the two courses can be taken independently and in any order.

ADA CERP
The Procter & Gamble Company is an ADA CERP Recognized Provider.

ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry.

Concerns or complaints about a CE provider may be directed to the provider or to ADA CERP at: http://www.ada.org/cerp

Approved PACE Program Provider
The Procter & Gamble Company is designated as an Approved PACE Program Provider by the Academy of General Dentistry. The formal continuing education programs of this program provider are accepted by AGD for Fellowship, Mastership, and Membership Maintenance Credit. Approval does not imply acceptance by a state or provincial board of dentistry or AGD endorsement. The current term of approval extends from 8/1/2013 to 7/31/2021. Provider ID# 211886
Conflict of Interest Disclosure Statement
• The author reports no conflicts of interest associated with this course.

Course Contents
• Overview
• Learning Objectives
• Introduction
• Forensic Odontology Professional Organizations
• Dental Identification
• Types of Dental Identifications
• Methodology of Dental Identification
  • Dental Identification - Case 1
  • Dental Identification - Case 2
• Disaster Victim Identification
• Dental Legal Issues in Personal Injury and Substandard Dental Care Cases
• Conclusion
• Course Test
• References
• About the Author

Overview
Each of these two separate courses will consist of three sections of forensic odontology. Part I will discuss dental identification, disaster victim identification and the dental-legal issues associated with personal injury cases and standard of care cases, sometimes referred to as dental malpractice, including the role of the dental record. Forensic Odontology - Part II will discuss bitemark evidence, human abuse issues seen in the dental environment and dental age assessment.

Learning Objectives
Upon completion of this course, the dental professional should be able to:
• List the six main sections of forensic dentistry.
• Understand the concepts and methodology involved in the identification of human remains.
• Understand the concepts, methodologies and complexities associated with managing victim identification in mass disasters.
• Create systematic dental record documentation in patient care as a legal document as well as a chronological historical rendering of patient-dental practice interaction.
• Understand the dental “standard of care” in patient care scenarios and its importance.
• Understand personal injury cases involving dental and oro-facial injuries.

Introduction
Forensic odontology, or forensic dentistry as it is also known, encompasses a sub-specialty of dentistry that deals specifically with the relationship between dentistry and the law. This dynamic field of dentistry is one of the most interesting yet poorly understood of all the areas of the profession of dentistry. This series, divided into two separate independent courses, will provide an introduction to forensic odontology. Course content will be supplemented with actual forensic cases, where appropriate, to help participants understand the complexities and techniques utilized in its practice.

Forensic odontology is divided into six sections:
• Dental identification of unknown human remains
• Disaster Victim Identification of human remains (also known as mass disaster identification or mass fatality incidents)
• Dental legal issues in the practice of dentistry, including both personal injury matters involving dentistry as well as standard of care (dental malpractice) issues
• Bitemark evidence in violent crime
• Human abuse issues seen the dental practice environment
• Dental age assessment

Each of these sections will be presented with the general practice guidelines employed in their use. It is not the intention of these two courses to bring course participants into the realm of forensic dental expertise. These courses serve only as an introduction to forensic dentistry.

There are other outstanding post-graduate courses on forensic odontology that are presented regionally throughout the United States each calendar year providing ample additional learning opportunities. Most of these courses are either one or two-day courses, or in some instances, week-long courses. Online searches on forensic odontology will provide the dates and locations of these courses.
Additionally, there are a number of outstanding textbooks available on forensic odontology. Simple internet searches will provide the most recent publications including textbooks on specific forensic odontology subject matters such as bitemark evidence.

**Forensic Odontology Professional Organizations**

Within the United States, there are three main professional organizations involving forensic odontology. All three organizations meet annually in February as part of a week-long meeting.

The first of these organizations is the American Society of Forensic Odontology (ASFO). This is the introductory organization that can be joined by signing up on the website and paying nominal annual dues. Membership in the ASFO is open to anyone with an interest in forensic odontology. The ASFO publishes a newsletter several times a year on their website which provides information on a wide spectrum of forensic odontology-related topics. The ASFO is a great way to get involved in forensic odontology and network with both novices and experts in the field. No experience or credentials in forensic odontology are required for membership.

The second organization is the Odontology Section of the American Academy of Forensic Sciences (AAFS). The AAFS is comprised of eleven separate sections of forensic science. The Odontology Section is comprised of forensic odontologists exclusively. The AAFS is a credentialing organization, therefore membership requires satisfying a list of educational, practice and experience levels in order to join. The website details those requirements.

The final organization is the American Board of Forensic Odontology (ABFO). Membership in the ABFO requires candidates for exam eligibility to have significant experience in forensic odontology as well as successfully passing the certification examination. Information about the list of requirements necessary to become exam-eligible can be found on their website.

**Dental Identification**

The best known and most commonly practiced section of forensic odontology is dental identification of unknown human remains. Dental identification typically involves comparing post-mortem (PM) radiographs of unknown human remains to ante-mortem (AM) dental x-rays of the presumed decedent. The identification process can include dental records, dental casts, photographs, and other AM records which may prove to be useful for comparison to the unknown person(s).

The identification of unknown human remains can be accomplished by way of several additional methods. A common but unreliable means is by visual identification of the remains. This is often done by a surviving spouse, family member or friend of the decedent. While this is perhaps the most common method of identification, it is unfortunately a non-scientific method that is fraught with errors. Grieving survivors may often be overwhelmed by the circumstances involving the death and their emotions may cloud the objectivity necessary to confirm the identity. Therefore, the authorities will also attempt to confirm the identity by using more reliable scientific methods.

Scientific methods include the use of DNA, fingerprint comparison and dental, anthropological or medical records to positively identify the unknown remains. Each of these scientific comparisons employ established methodologies that will support (or refute) the identification. In some instances the authorities will use several of these reliable methods in
Dental identification is the most expeditious and least expensive scientific means of identification. Research has proven teeth to be the hardest substance in the human body. Teeth are also protected by the soft tissue of the cheeks, hard jaw bones and are insulated by the tongue. Additionally, it is legally and scientifically accepted that the teeth and their surrounding structures are unique to each individual. Therefore, the ability of the forensic odontologist to identify and compare the unique features of the oral and peri-oral structures of the unknown to the AM dental record provides a reliable and scientific means of identification (Figures 2a and 2b). This is especially true when non-viewable human remains are recovered. This does not imply other scientific methods are not also valuable, but they often take far more time and can involve significant costs.

Types of Dental Identifications

In most instances, dental identification is initiated when the remains have been significantly altered from the living person or are not viewable. These cases include burned or charred, decomposed, skeletonized and/or traumatized remains (Figures 3-12). In many of these instances, the recovered remains can present combinations of any or all of the above.
Figure 2a. Ante-mortem radiograph used in positive dental identification.

Figure 2b. Post-mortem radiograph used in positive dental identification.

Figure 3. Viewable Decedents.
Note: The male on the lower right image remains unidentified today.
Figure 4.
Burn victim from automobile accident.
Note how well the teeth are protected even with extensive burn damage. Because of good ante-mortem records, this was a simple identification even though the victim was not viewable.

Figure 5.

Figure 6.
Skeletonized remains. Note how well the teeth are preserved.

Figure 7.
Figure 8. Decomposed remains from a drowning victim with no effect on the teeth.

Figure 9. Co-mingled remains from midair plane crash – three victims, all of whom were positively identified by their dentition.

Figure 10. Combination of burn and trauma – both are victims from the same fire and were simple dental identifications.
Methodology of Dental Identification
Dental identification of unknown human remains will often become part of a legal proceeding and therefore must be handled in such a way that the identification can be proven and historically preserved. This is done using methodology that will protect the identification by following what is called the legal chain of custody. It is not uncommon for the legal proceeding associated with the identification to occur long after the actual identification, many times several years or more. Therefore, accurate and well-preserved records are required.

The identification process is divided into three processes which include the production of the AM and PM dental records, followed by a report of the results of the comparison of these records. Each part of the entire process is created independently of the others and should follow a standard protocol so that each and every case is done the same way.

The first part of the protocol is to create the PM dental record. The PM record will include photographs and PM radiographs of the dental remains. This will often necessitate gaining access to the oral cavity so that the dental structures can be cleaned, examined, viewed, imaged and finally charted. A complete and accurate PM dental record will include notations of all of the dental evidence recovered. Occasionally it may be necessary to take intraoral impressions in order to capture palatal rugae or unusual dental anomalies that may become helpful in the identification. Once all of the PM data has been collected, it is transferred to a PM dental chart (Figure 13b).

The second part of the process involves the creation of the AM dental record. Law enforcement or representatives of the medical examiner’s or coroner’s office will work to obtain the AM dental record, if one exists! This is usually done by following leads on persons reported to be missing or associated with the scene where the death occurred (i.e., a fiery automobile accident with human remains inside the car). Once the AM dental record has been secured the task of deciphering the information contained in the record begins. 

This process can be especially difficult if the dental record is in a foreign language, or a handwritten record versus a digital dental record. A log of the contents of the AM record is created and attached to the final report in order to document all information used in the creation of the AM record (Figure 13a).

The entire dental record is reviewed in chronological order to understand its complete content and to guide the creation of the AM dental chart. It is important to note changes in teeth that may not correspond with the chart’s radiographs. An example of an “explainable discrepancy” would be a bitewing radiograph showing a virgin tooth on the date of the radiograph followed by a chart entry on a later date, indicating that a restoration had been placed in the tooth. If the AM dental record contains film-based dental radiographs, their proper locations and orientation must be known before using the films to chart that portion of the AM dental record.

Once the AM and PM dental charts have been created, they are placed side-by-side for comparison. Most forensic dental identification AM and PM dental charting systems are designed to be mirror images of each other. This facilitates laying them side-by-side for comparison (Figures 13a and 13b). The comparison is completed primarily by identifying restorations charted as completed in teeth and fabrication of prosthetic appliances (Figures 14 and 15). Similarly, the AM radiographs (if any exist) and the PM radiographs are also compared side-by-side for similarities in nasal sinus outline, radicular bone patterns, pulp stones, dilacerated root anatomy, dental implants, etc. (Figures 2a and 2b). All concordant matches are charted on the comparison form and an opinion is formed regarding the identification.

Using the terminology of the American Board of Forensic Odontology, the four conclusions of the comparison are:

• positive dental identification
• possible identification
• insufficient evidence
• exclusion

1 The process can be especially difficult if the dental record is in a foreign language, or a handwritten record versus a digital dental record. A log of the contents of the AM record is created and attached to the final report in order to document all information used in the creation of the AM record (Figure 13a).
Figure 13a. Ante-mortem Dental Chart.
Figure 13b. Post-mortem Dental Chart.

One format of ante-mortem (A) and post-mortem (B) charts, side-by-side for comparison.

Figure 14. Actual case comparison of ante-mortem chart (left) and post-mortem chart (right).
The conclusion “possible identification” is typically used in a situation wherein no AM radiographs are immediately available, or their retrieval is delayed. In such instances, reviewing the procedural chart entries produces no unexplainable discrepancies and several concordant points of treatment to PM features, but nothing unique enough to positively make the identification (Figures 16a and 16b).

Any unexplainable discrepancy between the AM dental record and PM remains precludes a positive identification. Explainable discrepancies have been discussed. However, an unexplainable discrepancy such as an antemortem tooth with a restoration and the same postmortem tooth without a restoration is impossible. Like it or not, the technology to remove a filling in a living person and subsequently have re-growth of dentin and enamel in adult erupted teeth has yet to be discovered.

Once all of the AM and PM records have been charted, compared and the opinion established, a final report is prepared. The report can be as simple as including copies of the AM, PM and comparison charts, or an extensive report that details the entire case, containing dental records, radiographs and photographic images and explanations of the entire comparison process. The type of report and extent of details can be directed by the agency needing the report. Copies of all the collected dental evidence (exclusive of the human remains!) should be retained so that they are available if subpoenaed in a future legal proceeding that requires proof of the identification.

**Dental Identification - Case 1**

**History:** Skeletonized remains were discovered in a public park. The initial cause of death was listed as homicide due to a bullet shot through the skull. Examination of the dentition showed an unusual pattern of extremely heavy lingual and incisal wear on the upper incisors. Anatomically, the rest of the upper and lower dentitions were unremarkable. In an effort to assist investigators with their search of missing persons, possible explanations for the anterior...
Figure 16b. Possible identification (A) then changed to positive identification (B) with discovery of AM bitewings.
wear included anorexia/bulimia, pipe smoking, a wind instrument musician, i.e., clarinet and others (Case ID 1a).

However, when the mandible was articulated with the skull, an interesting finding appeared. The victim had an open bite occlusion with no incisor contact (Case ID 1b).

A subsequent search of the crime scene recovered a small caliber handgun. The handgun was registered out of state to a reported missing person. A suicide note was found in the missing's residence that stated the intention to commit suicide in a place where the remains could never be found or identified.

Law enforcement was able to obtain AM records from the missing person's dentist. These were used to easily make the positive dental identification. Additional information revealed the decedent had a history of mental illness, including a habit of rubbing the thumbnails against the lingual surfaces of the upper incisors, thereby accounting for the abnormal wear patterns that were observed.

**Dental Identification - Case 2**

**History:** Skeletonized remains were found scattered throughout a creek bed, covering a considerable area. Upon further investigation,
it was determined that the remains had been soaked in bleach to de-flesh the skeleton before being relocated to the creek bed. After the remains had been collected, a dentist was asked to examine the skull and mandible. The victim was edentulous, so the dentist stated that there wasn't much that could be done by way of dental comparison.

The skull was then sent to this author for a complete forensic examination. Radiographs were taken, revealing an impacted maxillary third molar (Case ID 2a).

The PM examination of the skull showed an interesting pattern associated with some of the alveolar sockets in the maxilla. Color and ultraviolet photographs were taken of the victim's alveolar sockets which revealed the outline of the tool used to remove those teeth: a needle-nosed plier.

The impacted wisdom tooth was removed and used for a DNA source. A DNA match successfully confirmed the identity of the decedent. The victim's dentist was contacted and AM dental records were obtained for

![Case ID 2a. Post-mortem radiograph showing impacted upper third molar.](image)

![Case ID 2b. Color photograph of the skull showing the alveolar sockets after post-mortem extraction.](image)
additional confirmation. Comparing the outline of the root areas in the maxilla PM to the AM panorex image provided an additional confirmation of the identity. The defendant in the case was charged with homicide and mutilation of a corpse (PM extraction of the victim's dentition).

**Disaster Victim Identification**

Recent world events have shown that there is an increasing frequency of deadly incidents wherein multiple victims have needed dental identification. Tragic incidents can include car bombings involving a few victims, airplane crashes where hundreds die, and the World Trade Center disaster in 2001 where thousands of people perished (Figures 17-20). Similarly, natural disasters can lead to a massive loss of life, such as occurred during Hurricane Katrina in 2005 (Figures 21-25). Thus, the need for a structured system designed to manage multiple victim identification becomes readily apparent.

Disaster victim identification (DVI), also known as mass disaster victim identification and multiple fatality incidents (MFI), involves the identification of multiple victims usually from a single incident. Many of these types of incidents involve violent death. The victims' remains can be fragmented and intermingled, adding a significant layer of complexity to the identification process. The method of identification is similar to the routine dental identification process describe previously, with one significant difference. Each and every fragmented PM remains that is recovered becomes a separate case for identification purposes. Therefore, it is entirely possible to have a single AM dental chart used to identify a number of PM dental remains. This complication requires a significantly more complex system for managing the identifications. Typically, disasters of fifty or fewer victims are managed using the AM and PM paper dental charts and radiographs, as is done with the routine single dental identification. However, with more than 50 victims, past history has shown that DVI management is better suited to computer assisted programs such as WinID. A discussion of this management program follows.

The open source dental program WinID, was created for multiple fatality incidents and was...
Figure 17.  
Source: American Red Cross

Figure 18.  
Aftermath of the collapse of World Trade Center Twin Towers where thousands of innocent people lost their lives. 
Source: American Red Cross

Figure 19.  
Source: American Red Cross

Figure 20.  
Source: American Red Cross

Figure 21.  
Failure of the levee in the Lower 9th Ward, New Orleans from Hurricane Katrina August 2005. 
Photo courtesy of: Dr. David Senn

Figure 22.  
...and the subsequent flooding. 
Photo courtesy of: Dr. David Senn
Figure 23. Flooding in New Orleans from Hurricane Katrina.
Photo courtesy of: Dr. David Senn

Figure 24. Temporary Morgue and Victim Identification Center from Hurricane Katrina disaster.
Photo courtesy of: Dr. David Senn
The methodology used in disaster victim identifications involves working in teams of two in order to facilitate the collection of AM and PM data and creation of the associated charts. By working in teams of two as a source of dual confirmation to do the chartings, the risk for creating errors is significantly diminished as each team of two is providing a redundant layer of review to make sure there are no charting errors. This protocol applies to the AM dental team, which is responsible for the collection of the AM dental record, deciphering the records, cataloging the radiographs for uploading to WinID, and assembling the computer database of the victims. It is important to emphasize that a computer program like WinID is used for managing data for both AM and PM dental records only. The program contains a search algorithm where possible matches are shown. A dental identification team member will then obtain the actual records and radiographs, and then proceed with the comparison (Figures 26-28). WinID points to possible matches; it does not do comparisons. Only qualified experts do that. The WinID software is free to the public domain and can be downloaded from the website. Once installed on a Windows or Macintosh platform, its contents include pages for AM, and PM data entry, printable comparison forms, and portals to import digital dental radiographs and photos. Included in the software is a pre-loaded “practice disaster,” a useful training exercise.

Once a disaster has occurred and site security has been achieved, response teams begin their assigned tasks. The initial response team activity focuses on search, recovery and providing emergency medical treatment for the injured. At the same time, the recovery teams and morgue facility will begin preparations to receive deceased victims as they are recovered and transported. The dental team is just one of several teams that work together within the Disaster Command Structure (Figure 29a). The Dental ID Team contains its own structure of command as seen in Figure 29b.
DVI Management

• Less than 50 victims, generally can be done without computer

• More than 50 victims, Win ID 3

Figure 26.

Figure 27. WinID search for best match - one possible comparison algorithm.
Figure 28. After a search identified a possible match, the ante-mortem and post-mortem records are opened for comparison. If there are no unexplainable discrepancies, the actual records and radiographs are compared by the Dental ID team.

Figure 29a. Disaster Incident Command Structure.
AM dental chart that will be used for the comparisons.

Simultaneously there will usually be two separate PM dental teams deployed. One will be working at the central disaster location (usually a temporary morgue), to take x-rays of and record all PM dental data within the recovered remains. A separate PM dental team will go to the disaster site to work with the other recovery teams in locating and collecting PM dental remains.

As the process of adding AM and PM dental records continues, a separate comparison team will begin the identification of the victims. In a smaller disaster (less than fifty victims) this process will involve spreading out all AM dental charts on large tables to which any unidentified victim’s PM records are compared. If a presumptive identification is found, the AM and PM radiographs will then be compared. Should the results of these comparisons support the identification, the presumptive identification is then reviewed and confirmed by the comparison team and the dental commander. If the dental identification is confirmed, a definitive identification will be recorded and the coroner, medical examiner or incident commander notified. The dual identification process again provides an additional redundant layer of oversight; thus minimizing errors and misidentifications.

Once a victim’s remains have been positively identified, surviving loved ones are notified by either a public relations officer or the incident commander. Thereafter the remains will be transported to a designated mortuary of the surviving family’s choice. The dental team has no direct contact with anyone outside the disaster incident command structure, especially media personnel. As more of the victims are identified and case load decreases, the number of dental team responders decreases as well until the identification process concludes.

Dental Legal Issues in Personal Injury and Substandard Dental Care Cases

Dental legal issues that require an investigation by an odontologist fall into two broad categories: (1) personal injury to the dental-facial complex and (2) delivery of dental treatment with regard to an accepted standard of care. Personal injury cases can involve standard of care issues in some instances as well. Both of these categories involve legal implications that necessitate an independent expert opinion from a forensic odontologist.
In the most general terms, personal injury cases may involve injuries to the face, teeth and jaws. These may be sustained accidentally or intentionally. Injuries to the teeth and/or jaws can be complex, requiring extended periods of time to resolve. In such cases, there will be concerns about the future costs associated with maintaining and replacing dental prostheses over the lifetime of the injured individual. When combined, all of these issues may require an expert dental opinion to define those injuries that are directly associated with the incident. Long-term treatment estimates include the treatment modalities utilized to restore the individual to their optimum health and the expected future care and costs for maintenance. All of this information must be documented and presented to the legal representatives for determination of any settlement for immediate and long-term care.

Standard of Care cases: Dental malpractice cases may involve questions about phases of the entire dental treatment process. These phases include:
• Examination of the patient's oral health status
• Review of the health history
• Collection of clinical information including radiographs
• Diagnosis of oral and peri-oral disease
• Treatment options
• Development of the definitive treatment plan
• Informed consent
• Providing the treatment to the most current professional standards
• Post-treatment care

When viewed from this approach, the standard of care is best defined as a process and not a single event. It is important to note that the dental standard of care is a dynamic process with changes that evolve as practices, techniques, technology and dental materials improve. The clinician must be responsible for keeping up with the most current evidence-based professional standards.

During the entire timeline from meeting the patient to completing treatment and all post-operative care, any deviation from the accepted dental standard of care may offer the patient an opportunity to pursue litigation (Figure 30). To do so, the following four criteria must be met:
• that a duty of care was owed by the dentist to the patient;

Figure 30. This patient had a palatally impacted permanent canine orthodontically moved into proper arch alignment in four weeks. The tooth was moved so quickly that it lost its bony support and had to be replaced with a dental implant. The patient initiated a malpractice suit which lead to an agreed settlement.
• that the dentist violated the applicable standard of care;
• that the plaintiff suffered a compensable injury;
• that such injury was caused in fact and proximately caused by the substandard conduct.²

The best protection for the provider in cases that question the standard of care provided with any given patient is the dental record. It must be complete, written legibly (if not using electronic dental records) and contain the entire patient-doctor interaction from every appointment and other contact the patient had with the provider. It should contain all treatment notes, comments from the patient, instructions given to the patient and any other information that would need to be discussed and documented. Once entered into a patient record, no part of that original record should be altered in any way. Additional notations can be added to explain why a change in the content of the note is necessary, however, altering or destroying a patient record is illegal and will usually create huge problems when defending the treatment provided. Simply stated, the dental record is the sole historical recording of every patient contact as well as being a permanent legal document.

While the dental record is technically owned by the patient, the doctor is the legal custodian. As a result, the doctor is charged with keeping the record and protecting its confidential content. The American Dental Association Code of Ethics states that patients who request in writing a copy of his/her record should be provided with copies. The record may be provided at a nominal cost for duplication or at no cost (Figure 31).³ When properly maintained, a good patient record will accurately and completely reflect the entire history of the patient in that practice.

It is extremely important to differentiate substandard care from untoward results of appropriate treatment. For example, a dry socket following the removal of a wisdom tooth is not necessarily substandard care, assuming the patient was seen and treated for the post-extraction complication. Similarly, a periapical lesion that doesn't heal after root canal therapy that may require further treatment, including the necessity of apicoectomy, re-treating the root canal, or extraction is not necessarily substandard care. In the end, most legal conflicts can be avoided by keeping the lines of communication open between the provider and the patient. Good communication and making sure the patient understands the diagnosis, the purposed treatment, the associated risks, benefits, prognoses and costs is critical to successful provider-patient relationships.

Conclusion

Forensic odontology is a dynamic and evolving sub-specialty in the profession of dentistry. It is a common bridge between dentistry and the law. Dental identification and disaster victim identification are the best known and most commonly practiced areas of the discipline. A basic understanding of the methodology utilized in dental identification and disaster victim identification can be a valuable resource for anyone who desires to help with the identification of unknown human remains.

Dental-legal issues are another area where forensic odontology is important. Incidents that
involve personal injuries of the oral and peri-oral anatomy often require a forensic dental expert opinion. These opinions can range from confirming the injuries as a result of the incident to detailing the short- and long-term treatment and associated costs.

In addition to personal injuries, issues often arise regarding the application of the dental standard of care in relation to dental treatment provided to patients. As these issues are litigated, a forensic dental expert opinion is often required.

One area these combined sections of forensic dentistry have in common is the reliance on patient dental records. The importance of the dental record, its content, organization, accuracy, legibility and detail are critical to the outcome of an individual injury or malpractice case, victim identification or legal proceeding upon which it will be based.
Course Test Preview
To receive Continuing Education credit for this course, you must complete the online test. Please go to: www.dentalcare.com/en-us/professional-education/ce-courses/ce503/start-test

1. The sub-specialty of forensic odontology includes the following EXCEPT:
   a. Dental identification.
   c. Oral diagnosis.
   d. Issues associated with dental malpractice.

2. Disaster victim identification involves ____________.
   a. an ante-mortem team charged with deciphering the ante-mortem dental record
   b. dual confirmation of all positive dental identifications
   c. post-mortem dental teams at the scene of the incident and in the temporary morgue
   d. the creation of an ante-mortem and post-mortem dental chart
   e. All of the above.

3. The dental chart ____________.
   a. can be updated by changing an errant entry
   b. altered to remove unfavorable comments about a patient
   c. belongs to the patient and the dental practice is the custodian
   d. cannot be used in a court of law in a dental personal injury case

4. The most commonly practiced section of forensic odontology is ____________.
   a. dental age assessment
   b. disaster victim dental identification
   c. identification of human dental remains
   d. expert opinions in dental personal injury cases

5. The dental standard of care includes the following EXCEPT:
   a. Review of the medical history of the patient.
   b. Treatment planning complex care when basic restorative treatment can be used.
   c. Informed consent by the patient to pursue treatment.
   d. Appropriate post-treatment care.

6. Positive scientific identification of human remains can be made by ____________.
   a. clothing color
   b. jewelry
   c. wallet found with remains
   d. fingerprints

7. Which of the following precludes a positive dental identification?
   a. Unexplainable discrepancy in the ante-mortem dental record when compared with the remains.
   b. Presence of pulp stones in ante-mortem and post-mortem radiographs of the same tooth.
   c. Dental caries in the mandibular left second premolar in the ante-mortem chart and a restoration in the mandibular left second premolar in the post-mortem radiograph.
   d. Ante-mortem dental chart indicates lower second premolars extracted for orthodontic treatment and post-mortem dental charting shows lower first premolars missing.
8. Culturally, the single most important reason for the identification of human remains is ___________.
   a. execution of wills
   b. collection on life insurance policies
   c. closure for the loved ones of the decedent
   d. criminal prosecution for non-accidental death

9. Which of the following is the best way to minimize a potential dental malpractice case?
   a. Change the dental chart in a way that creates deniability for the treatment in question.
   b. Good patient communication throughout treatment.
   c. Not charge the patient for the treatment in question.
   d. Tell the patient what treatment is going to be done without their participation in the treatment planning.

10. In mass disaster incidents, a computer program _____________.
    a. can identify victim remains by matching an ante-mortem and post-mortem dental record
    b. is routinely used in disasters with less than 30 victims
    c. is an asset in managing large databases of ante-mortem and post-mortem records
    d. must be able to import dental radiographs
References

About the Author

Franklin D. Wright, DMD, D-ABFO

Dr. Wright has been practicing forensic odontology since 1985. He is a diplomate and past president of the American Board of Forensic Odontology (ABFO), one of only 167 board-certified diplomates since its inception in 1976. He is a Fellow in the Odontology Section of the American Academy of Forensic Science and a Member of the American Society of Forensic Odontology. He has served on the Disaster Committee at the Cincinnati-Northern Kentucky International Airport since 1985 and responded two different times to help identify the victims of the World Trade Center disaster. He has lectured throughout the United States as well as Europe, Central and South America on forensic odontology and has been published in numerous textbooks and journals. He maintains a full-time general dental practice in Cincinnati, Ohio.

Email: frankwright@msn.com