

Safety in the Dental Office

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Introduction

When patients attend an appointment in their dentist's office, they assume that care will be performed in a safe and effective manner. This article will consider matters related to safety in dentistry, including how safe is the dental office, what are some of the causes of adverse events, and what can be done to allow limit the incidence and impact of adverse events in the dental office?

Background

Attention began to focus on the issue of safety in healthcare in 1999 when the Institute of Medicine reported that between 44,000 to 98,000 deaths per year were due to "adverse events."¹ Despite efforts to identify ways to improve on this record, medical errors continue to be described as a leading cause of death in the U. S., emphasizing the serious nature and complexity of the problem.

Most experts now recognize that adverse events and bad outcomes are generally not just the result of personal errors or "bad apples." Rather, it seems that in many—if not most—cases, factors conspire in a manner that makes errors more likely to occur. This can be appreciated graphically by the "swiss cheese" model proposed by psychologist James Reason. Professor Reason also pointed out,

"Almost every day we choose whether or not to cut corners in order to meet operational demands. For the most part, such shortcomings bring no bad effects and so become a habitual part of routine work practices. It's easy to forget to fear things that rarely happen. Unfortunately, this gradual reduction in systems safety margins exposes it to increasingly vulnerable accident-causing factors."²

This statement emphasizes the need for constant vigilance on the part of all healthcare providers including the dental team.

How Safe is the Delivery of Care in the Dental Office?

The incidence of adverse events in the dental office is difficult to estimate, in large part because they generally have a limited impact on outcomes. Examples of common adverse events include operating on the wrong tooth; prescribing the wrong dose of a medication; or an inadvertent laceration of the tongue, lip, or buccal mucosa during an operative procedure. Studies attempting to quantify such adverse events differ in the method used for counting and often rely on self-reporting. Further complicating this matter is that there are no uniform requirements for reporting adverse events to state or other agencies, and that most events were managed without noticeable injury to the patient. For our purposes, it is safe to say that the incidence of adverse events in the dental office is not zero.

The area in which the most serious adverse events occur in dentistry is in the administration of anesthesia beyond that of local anesthesia. The California and Texas Dental Boards conducted five-year retrospective reviews of deaths or permanent injuries associated with the administration of in the care of dental patients. The California Board's review considered pediatric (21 years & under) anesthesia related deaths from 1/1/2010 – 12/31/2015. It could not identify a reliable estimate of the number of patients treated (n) during this time interval. They were able to identify nine documented deaths. Of the nine cases, one occurred in an oral surgery office, and the rest in the offices of general dentists, pediatric dentists and itinerant dentist anesthesiologists. Three occurred in a hospital or surgical center and three were associated with local anesthesia overdose.

The Texas panel reviewed “major adverse events” (mortality or permanent morbidity) and “mishaps” (no permanent morbidity) investigated by the state dental board between 2011-16. Six cases were identified including five deaths and one brain injury. Two patients were adults, both of whom were medically compromised, and four were children, of which three were healthy and one had pre-existing cardiac disease. Four of the six cases involved secondary anesthesia providers including physician anesthesiologists and dentist anesthesiologists.

These two studies and others attempting to quantify serious events likely capture a fraction of the overall morbidity and mortality related to dental anesthesia, and suffer from the absence of a database that could provide a better estimate of incidence and prevalence.

Better data comes from the specialty of oral and maxillofacial surgery. For example, at the American Association of Oral and Maxillofacial Surgeons (AAOMS) Clinical Science Innovations in Oral and Maxillofacial Surgery meeting in April 2017,³ Thomas B. Dodson reviewed relevant outcomes studies in an effort to arrive at estimated death and adverse outcome rates. Together these studies suggest an estimated death rate of 1.5 per 1,000,000 anesthetics for the office-based team model in oral and maxillofacial surgery, although this seems unrealistically optimistic because of the method of collecting data in some of the surveys utilized.

What are the Sources of Errors?

There are many potential sources of errors in the dental office. One way to consider sources of error in general comes from the work of Drs. Gorovitz and MacIntyre, who explored the nature of fallibility and proposed three major factors that play a role in leading to errors:⁴

- 1) **Ignorance.** Despite ongoing efforts, science affords a limited understanding of how complex things behave, making it difficult to predict when something adverse may happen.
- 2) **Ineptitude.** Even when knowledge / understanding is available, individuals / teams may fail to apply what they know or understand correctly.
- 3) **Necessary Fallibility.** Some things in the world of science and technology will never be fully understood, which they categorized as the problem of omniscience.

The first and second proposed reasons seem to be surmountable, and it is there that we must focus our attention as that is where we have some degree of control.

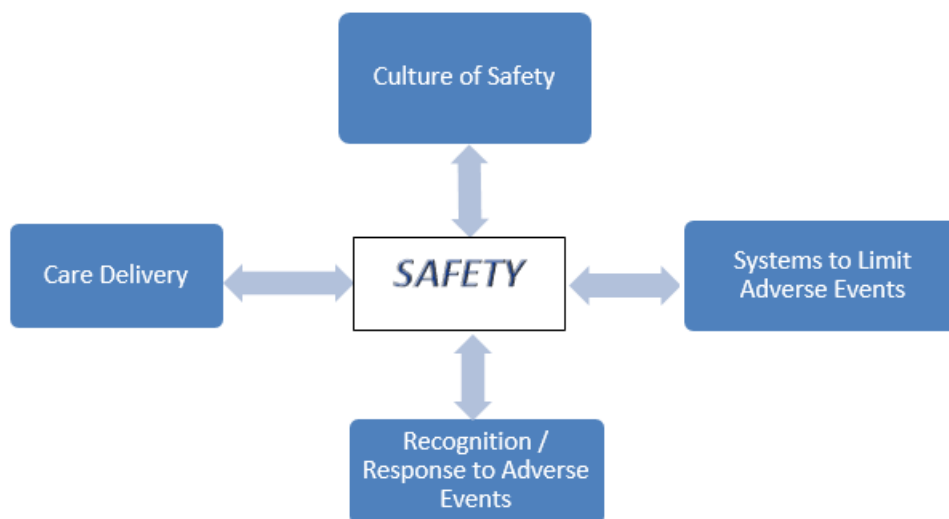
Elements That Prevent or Minimize Adverse Events

Since prevention of adverse events is critical, it is worth considering the value of four elements that have been demonstrated to limit the incidence and severity of adverse events in healthcare.

These elements are:

- 1) A “culture of safety”,
- 2) Systems / routines that encourage safety,
- 3) The knowledge, skills and equipment necessary to provide safe care, and
- 4) Team preparation to effectively recognize and respond in the event of an adverse event (figure 1).

Figure 1. Four Elements that Limit Adverse Events in Health Care



Culture of Safety

It is fundamental to support an environment that values and emphasizes the importance of working together as a team in the effort to ensure safety of patients and fellow team members. The words of W. Timothy Gallwey reflect the importance of embracing a mindset that prioritizes matters like safety when adopting an office identity:

“Take a moment to reflect on what you pursue in the name of ‘success.’ Clarity about your purpose informs all the other decisions in your life. Without clarity, nothing keeps you from pursuing ends not aligned with your core desire and lose yourself in the process.”⁵

Systems to Limit Adverse Events

Every office should have systems or routines in place that make it hard to do the wrong thing and easy to do the right thing. One such routine to identify potential risks is the time-honored “time out,” intended to be performed before beginning any procedure to confirm core elements such as

the patient’s name, the planned procedure, the site of the procedure, changes in medical history, etc.⁶ While some adverse events are associated with performance of a procedure, such as aspiration of an instrument or crown, attention should also be paid to identifying in advance potential medical and physical constraints that may impact the safe delivery of care. Doing so might indicate the need for consultation with other experts. It is also important to recognize the limits of the office venue and equipment as well as the capabilities of the dental team before engaging in patient care.

Delivery of Care

The ability for any team to deliver care depends on having knowledgeable and well-trained individuals who function as team. Ongoing education should be a priority and targeted to grow and reinforce the knowledge and skills necessary to deliver safe and effective care. These educational activities should lead to the development of good clinical judgment. There are diverse forms of continuing education available, ranging from webinars and other forms of distance learning, to in-person lectures and workshops, to experiential offerings that encourage feedback and give and take with participants. The same level of priority should also apply to having the necessary instruments, equipment, and protocols in place to support care delivery. The team must function in a manner that supports one another, recognizing the value of each person in the quest for the whole to be greater than the sum of its parts. Training must include all members of the clinical and clerical staff.

Preparation: Recognition and Response to Adverse Events

The dental team should be on the alert for the possibility of an adverse event occurring and all members empowered to speak up when then identify such. Because adverse events cannot be completely eliminated, the team must be trained and current in recognition and management of crisis events. In that effort, regular and realistic mock drills should be conducted, targeted to address a wide variety of potential adverse events.

The Role of Knowledge and Performance

It is important to recognize that both knowledge and skills decline over time. For example, in Resuscitation (2008), Smith, Gilcrest and Pierce reported that Advanced Cardiac Life Support (ACLS) skills degrade faster than Basic Life Support (BLS) skills.⁷ They considered 133 subjects trained in ACLS and BLS and found that only a percentage could pass the course three or twelve months later (table 1).

Table 1. Skill Declination

Passed BLS Skills Training		Passed ACLS Skills Training	
3 Months	12 Months	3 Months	12 Months
63%	58%	30%	14%

While there are numerous courses, books, and other resources available to help in the effort to obtain and update this base of knowledge, another excellent reference to grow knowledge are guidelines issued by related organizations in an effort to improve and standardize patient care. An example is the *AAOMS Parameters of Care, Clinical Practice Guidelines for Oral and Maxillofacial Surgery*.⁸ After obtaining the necessary knowledge base, teams should establish a

written plan (protocol) that concisely summarize keys to the recognize and manage adverse events.

The ability to deliver care in a safe manner requires not only knowing what to do (knowledge), but also the ability to put acquired knowledge and skills to work (performance).

Making decisions and performing under pressure is never a simple undertaking, particularly given the emotions and complexity inherent in crisis situations. Pressure occurs when a person is attempting to do something they are not sure they are capable of. The further they are from the familiar, the further away they are from being comfortable and confident. This applies to everything we do in life. A multi-year study of the top 10% of 12,000 athletes and business leaders using 360-degree multiple rater assessments revealed that:

- 1) Pressure adversely impacts cognitive success,
- 2) Pressure downgrades behavioral skills,
- 3) Pressure makes people perform below their capacity, and
- 4) Pressure is often camouflaged.⁹

Given the above, it is important that the team adopt a productive mindset. Such a mindset is often referred to as being in the zone. One way to encourage entering the zone of performance is to use tools commonly employed by sports psychologists (mental skills) to enhance performance. An example of mental skill training is to use imagery, a form of rehearsing in advance in a manner that encourages people to visualize / live through a potential adverse event in advance. Mock drills are a form such practice / rehearsal.

Mock Drills

Once an adverse incident is triggered, the best chance of a successful outcome occurs when there are well-trained people and systems in place to recognize and respond effectively. While simulators provide the best method for conducting mock crisis experiences, they are not yet readily available and/or affordable for most. The next best approach is mock drills.

Properly conducted, mock drills allow team to practice in advance of the real thing, so that if and when a crisis occurs, members of the team are more capable in their role in the response process. The familiarity and confidence that can result from having practiced for such events equips them to embrace the challenge when it presents itself, rather than allowing the challenge to control the moment.

Mock drills should be realistic, immersive learning experiences that support:

1. Identification of shortcomings
 - Were communications clear?
 - Were roles and responsibilities understood?
 - Were the appropriate resources available?
 - What errors were made?
 - What went well?
2. Implementation of strategies to solve them.

- Use the “1-2-3 approach”: 1) Tell, 2) Show, and 3) Do.
3. Revision of protocols to improve team performance.

Tips for Effective Crisis Management

Important strategies to practice during mock drills and to employ during an adverse event include:

- 1) Call for help early,
- 2) Mobilize resources,
- 3) Allocate attention wisely,
- 4) Use all available information,
- 5) Communicate effectively, and
- 6) Act as a team.

Failure to speak up because of fear of being wrong or intimidated, failure to confirm communication (not closing the loop), and neglecting to include key facts are common errors in communication. Clear, unambiguous language is preferable during all adverse events, avoiding implied or and inferred communication.

Another approach to consider in the management of adverse events is to follow the acronym “**STOPAR:**”

- S** - Stop (control anxiety and fear),
- T** - Think (get organized),
- O** - Observe (identify key factors / avoid denial),
- P** – Plan,
- A** - Act (deliberate and decisive actions), and
- R** - Revise / Reassess

Conclusions

Perhaps the most important single thing to limit adverse events and enhance safety in the dental office is to foster a culture of safety. In addition, every office should employ an ongoing process to monitor and evaluate clinical performance, patient outcomes, and adverse events in the effort to support continuous performance improvement and ensure the best opportunity for favorable outcomes. Further, having productive systems/routines in place give the dental team the best chance to do the right thing and avoid doing the wrong thing. Finally, given that unanticipated adverse events do occur, the team should be properly prepared to recognize and respond in a timely and effective manner. This is best accomplished by conducting regular, realistic mock drills that can help to identify areas needing improvement as well as equip the team to respond in an effective manner should such an event take place.

One final note: going forward, it will be important for the dental community to make a concerted effort to improve their safety data base and work to standardize reporting requirements of adverse or “near miss” events.

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