

Eleven Basic Procedures/Practices for Dental Patient Safety

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Objectives: This study aimed to help alleviate the shortage of reliable information on clinical care issues; the Spanish Observatory of Dental Patient Safety (OESPO) has resorted to the study of legal claims by patients and searched those which produced clinical problems.

Methods: Based on OESPO data, this article proposes 11 basic procedures/practices for dental patient safety to help mitigate most preventable adverse events.

Results: The sample of the OESPO is large (415 adverse events studied), but it has the bias of a judicial source. However, the results provide an interesting approach to clinical safety in dentistry. When studying in detail the causes that led to preventable adverse events, it can be seen that most of these (and most severe) events have been caused by a small number of erroneous behaviors.

Conclusions: Most preventable adverse events during the dental health care are produced by a relatively small number of causes. Therefore, a few basic safety procedures can reduce significantly these preventable adverse events.

Key Words: patient safety, dentistry, adverse event, OESPO, basic procedures, basic practices

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Patient safety strategies aim at preventing unintended damage to patients as a result of health care. Patient safety efforts help also to detect early and limit nonpreventable harm. Given the complexity of health care systems, it is impossible to completely prevent the occurrence of errors, accidents, or complications during the provision of medical or surgical treatment. It is evident, however, that dentists, the same as other health care professionals, have an ethical and legal obligation to protect our patients from harm in as much as reasonably possible.¹

Since early in the history of medicine, patient safety has been an intrinsic concern for health care providers (just remember the Hippocratic principle of “primum non nocere”). Nevertheless, the birth of patient safety as a scientific field is relatively recent. Patient safety became a scientific discipline only when we began to record and measure damage unnecessarily experienced by patients and to assess also the results of preventive interventions.

Two milestones set at the end of the 20th century are the work of Leape and Brennan at Harvard Medical School and the publication of *To Err Is Human* by the US Institute of Medicine.² The latter study estimated between 44,000 and 98,000 the annual number of deaths caused by errors in health care in

the United States. Although its methodology has been discussed, the numbers revealed to society, health managers, and political powers the social and economic importance of preventing health care errors.³ More recent studies estimate the incidence of death to be much higher.⁴

Since the publication of *To Err Is Human*, all health agencies began to consider patient safety as a basic area of activity. Multiple initiatives have been launched in individual countries or internationally as the World Alliance for Patient Safety launched by the World Health Organization in 2004.⁵

On patient safety, dentistry has been lagging behind medicine. The main causes of this delay are usually the perception of relatively minor damage to dental patients (compared with those who receive medical treatment, especially in hospital) and the geographical dispersion of dental clinics where care is usually provided with little communication between them.

The first problem that arises when we talk about patient safety in dentistry is the lack of data on adverse events actually occurring in the practice of dentistry. In a centralized environment such as a hospital, it is easier to detect, record, and analyze adverse events in medical care. In contrast, most of the clinical problems that arise in ambulatory settings as dispersed as dental care remain within the involved dental clinic's environment and are never known to the rest of the profession. In this regard, we must remember that reporting adverse events is one of the best services we can provide to our profession. Anonymous reporting is a highly ethical behavior that allows our colleagues to learn from clinical or surgical mistakes.

In recent years, dental organizations have implemented diverse initiatives to increase the safety of the patients attending dental clinics. Leading these efforts are the World Dental Federation,^{6,7} the Council of European Dentists,⁸ or the Annapolis-based Organization for Safety, Asepsis and Prevention,⁹ among others. In Spain, the General Board of Dentistry and Stomatology created the Spanish Observatory for Dental Patient Safety (OESPO) and adopted a nationwide Clinical Risk Prevention Plan in Dental Care.¹⁰

There are 2 published international studies that reflect extrapolated results on adverse events in dentistry.^{11,12}

METHODS

To help alleviate the shortage of reliable information on clinical care issues, the OESPO has resorted to the study of legal claims by patients and searched those that produced clinical problems. The sample is large (415 adverse events studied), but it has the bias of a judicial source because the adverse events detected from court cases are often the most serious. Minor adverse events usually do not lead to legal claims. However, the results provide an interesting approach to clinical safety in dentistry.¹³

The OESPO study classified adverse events (understood as damage to patients as a result of dental assistance and independent of disease process) in 3 categories with the following results: errors (40%), complications (40%), and accidents (20%). The distinction between error and accident is based on behavioral intentions (no damage).

- Errors are incorrect behaviors (acts or omissions) but made consciously, usually caused by lack of knowledge or skills.

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TABLE 1. Causes of Death in the OESPO Series (n = 11)

Cause of Death	n	%
Infectious processes after the dental treatment	5	1.2
Adverse reactions to drugs	2	0.5
Anaphylactic reaction to latex	1	0.2
Subarachnoid hemorrhage that occurred during anesthetic injection	1	0.2
Acute respiratory insufficiency in a patient with significant previous restriction	1	0.2
Major liver failure caused by acute hepatitis B (acquired at the dental office)	1	0.2

Modified from Perea-Pérez et al.¹³ Adaptations are themselves works protected by copyright. So in order to publish this adaptation, authorization must be obtained both from the owner of the copyright in the original work and from the owner of copyright in the translation or adaptation.

- Accidents are random, unforeseen, and unexpected events that cause harm to the patient or any other type of harm (material damage, harm to health care personnel, etc).

However, it is true that the borders between both concepts are often not clear. Treatment by a dentist without the necessary clinical skills can promote the emergence of an accident. Although this unexpected event is not intended, the treatment that caused it was intended. In any case, the distinction between both concepts has a high subjective component.

The classification of adverse events regarding the type of dental maneuver that produced the adverse event indicates that implant dentistry is the area of unnecessary harm to patients, followed by endodontics, oral surgery, prosthodontics, and orthodontics. When referring to the type of harm suffered by the patient, as expected, unnecessary tooth loss is the most common injury, but there are also many cases of alveolar bone loss, permanent damage to the inferior alveolar nerve, and chronic sinus damage. Interestingly, this series has detected 11 patient deaths related to dental treatment received (Table 1).

When studying in detail the causes that led to preventable adverse events, it can be seen that most of these (and most severe) events have been caused by a small number of erroneous behaviors. Overconfidence is responsible for most of incorrect or careless behaviors. The most common incorrect behaviors in our series were as follows:

- Not spending enough time to perform clinical quality records or not adequately consulting patients before making a treatment.
- Absence of regular monitoring of procedures for cleaning, disinfection, and sterilization of clinical instruments.
- Making incomplete and/or illegible drug prescriptions.
- Systematic realization of complete radiologic tests administered to all patients, regardless of their specific situation.
- Reusing of products or devices designed for single use.
- Failure to protect patients against the possibility of eye damage or ingestion or inhalation of materials or instruments.

Based on OESPO data, this paper aims to propose basic and easily implemented measures to help mitigate most preventable adverse events.

RESULTS AND DISCUSSION

Recommended Activities/Procedures

Basic procedures for patient safety in the dental clinic (Table 2) include the following.

1. Develop a culture of safety and a health care system focused on prioritizing patient safety.

It is the starting point of any process aimed at improving the safety of patients in the dental clinic. Each member in a dental team must¹:

- Be involved in transmitting basic knowledge on patient safety.
- Integrate the basic steps of “patient safety” in all health care activities.
- Encourage reporting of errors or conflictive situations.
- Participate in the discussion of these at staff consultations.
- Encourage the dental team to embrace patient safety.

2. Look after the quality of clinical records.

In the OESPO series, there are 3 fatal cases (and a large number of serious adverse reactions) caused by allergies (latex and β-lactam antibiotics), endocarditis caused by the lack of antibiotic prophylaxis, major bleeding in anticoagulated patients, undetected severe (some fatal) infections in immunocompromised patients, and so on.

- Clinical records (especially those related to previous pathologies, allergies, and regular medication) must be properly completed and must be periodically updated.¹⁴
- In case of any potentially dangerous circumstance, this should stand out in a clearly visible way (without breaching the confidentiality of our records).
- Under no circumstances should you treat a patient (or prescribe a medication) without having reviewed his or her medical history.

3. Check the procedures for cleaning, disinfection, sterilization, and preservation of clinical instruments.

In the OESPO series there are 2 cases of transmission of viral diseases during dental care (hepatitis B and C): a patient died of acute hepatitis, and the other experienced chronic liver damage.

TABLE 2. The 11 Basic Procedures/Practices for Dental Patient Safety

Number	Procedure/Practice
1	Develop a culture of safety and a health care system focused on prioritizing patient safety.
2	Look after the quality of clinical records.
3	Check the procedures for cleaning, disinfection, sterilization, and preservation of clinical instruments.
4	Exercise extreme caution when prescribing medications.
5	Limit the exposure of patients to ionizing radiation only to what is strictly necessary.
6	Never reuse packaging materials or substances intended for one clinical use only.
7	Protect the patient's eyes during dental procedures.
8	Establish barriers to prevent ingestion or inhalation of materials or small instruments.
9	Use a checklist in all oral surgical procedures.
10	Monitor the onset and progression of infection in the oral cavity.
11	Have an action protocol for life-threatening emergencies in the dental clinic.

- Establish clear protocols and have them available in writing.
- Inform and train the personnel in charge of cleaning, disinfection, sterilization, and preservation, ensuring their proficiency and awareness of the importance of these tasks.
- Make the necessary periodic checks (chemical and bacteriological) to ensure efficacy of sterilization cycles.
- Periodically monitor procedures to ensure that these operations are performed according to established protocols.
- Personally train all new staff in cleaning, disinfection, and sterilization procedures. In this way, we prevent transmission to the new members of possible misconceptions the staff may have.^{9,15}

4. Exercise extreme caution when prescribing medications.

In the OESPO series, there are 7 adverse events related to prescription drugs, 2 of them fatal due to severe allergic reactions.

Errors in prescribing and dispensing medication are very common in hospital care.^{16,17} In dental care, prescribing errors are not infrequent and may cause serious even fatal adverse events as described in the second point. To mitigate as much as possible the occurrence and consequences of these adverse events, the dental team must adhere to these safe practices:

- Do not prescribe any medication without performing a “dual control,” reviewing the patient's clinical record and by asking the patient directly about known allergies.
- Inform the patient adequately about treatment: goals, duration, number and characteristics of injections, and the importance of full compliance.
- Make sure that the prescription is legible and is consistent with the patient's medical history.¹⁴
- In patients with polypharmacy (a large percentage of older patients), make sure to document all the drugs the patient takes and their possible interactions with the medication you prescribe.
- Make sure that the doses used are correct, particularly for children and patients with compromised metabolism or drug elimination (renal and/or hepatic failure).¹⁸
- Always ask women of childbearing age about the possibility of pregnancy.
- After completion of drug treatment, ask patients about their physical and mental performance and record the appearance of clinical problems during the course of their medication.

5. Limit the exposure of patients to ionizing radiation only to what is strictly necessary.

Although no adverse event is collected in the OESPO series related to dental radiological exams, recent studies show possible health problems arising from the unwarranted use of such tests.^{19,20} To reduce patient exposure to radiation the following may be done:

- Restrict patient exposure to ionizing radiation only to what is strictly necessary. Avoid the systematic use of radiographs without clinical suspicion of pathology. These restrictions should be tighter in the case of children.
- Protect from ionizing radiation anatomic areas that are not under study, using barriers. This is especially recommended in the cervical area.
- Always be aware of a possible pregnancy among patients or staff potentially exposed to ionizing radiation.
- Prevent accidental exposure of patients or caregivers to ionizing radiation. Use visual alerts such as posters or lights that indicate the performance of radiographic tests, and so on.

- Choose diagnostic systems that emit a minimal amount of ionizing radiation.

6. Never reuse packaging materials or substances intended for one clinical use only.

In the OESPO series, there are 3 cases of injection of sodium hypochlorite by an improper reuse of local anaesthesia cartridges.

- Containers intended for clinical use only contain less preservatives and prevent bacterial growth; therefore, if used repeatedly, they could lead to infection of the area in which the substance is placed.
- Furthermore, the reuse of disposable clinical materials poses a risk of contamination with blood, which may transmit viral infections to other patients (as has happened several times in hospitals).
- Reuse of containers to package materials other than the original products can also lead to dangerous confusion.^{21,22}

7. Protect the patient's eyes during dental procedures.

The OESPO series collected 5 cases of significant eye damage (one with complete loss of the eyeball) caused by instruments fallen from the work tray or accidental scalpel cuts during surgery.²³

- Patient's ocular protection with goggles, similar to those we use, is one of the easiest and most effective patient safety measures.
- Every dentist has seen different substances or fragments of a material jump to the patient's eyes. Usually, these incidents cause only temporary discomfort.
- 8. Establish barriers to prevent ingestion or inhalation of materials or small instruments.

In the OESPO series, there are 12 cases of accidental ingestion and 4 cases of accidental inhalation of materials and instruments, but 2 cases were especially severe. The first involved an implant screwdriver that caused intestinal perforation and a fatal peritonitis. In the second case, a patient inhaled an endodontic file, which became lodged in the secondary bronchi (causing an infectious focus); because it was impossible to extract this instrument bronchoscopically, the patient underwent removal of the affected lung lobe.

- Ingestion or inhalation of materials or small dental instruments is a “classic” accident during dental care performed without the use of appropriate barriers, rubber dams, or “threads,” ensuring that small tools (such as implant screwdrivers) are not ingested or inhaled.²⁴
- The vast majority of ingestion or inhalation accidents usually have no clinical effect, but swallowed sharp instruments may need to be removed by gastroscopy.
- The vast majority of inhalation cases may require performing a bronchoscopy.

9. Use a checklist in all oral surgical procedures.

In the OESPO series, there are 23 cases of dental treatment in the wrong area. On the other hand, surgical procedures in the oral cavity (including placing implants) represent by far the largest source of adverse events in our series.

- Although surgical procedures in dentistry are limited in terms of importance, it is clear that they pose risk exacerbation usually present in dental treatments.
- As currently done in surgical procedures at a hospital, the use of a checklist is a valuable tool to avoid most adverse events

during oral surgery. A checklist helps prevent an erroneous intervention or an intervention being performed in the wrong area, among other risks.²⁵⁻²⁷

10. Monitor the onset and progression of infection in the oral cavity.

In the OESPO series, a significant percentage of hospital admissions were caused by the development of infections, most of which healed without sequelae. However, 5 cases of fatal infection were recorded.

- Although most infectious diseases in the oral cavity are usually self-limiting, in exceptional cases (and especially in medically compromised patients), they may endanger the patient's life.²⁸

11. Have an action protocol for life-threatening emergencies in the dental clinic.

Vital emergency situations in the dental office are fortunately rare. The tasks and maneuvers to be performed must be protocolized for the dental team to perform properly and not chaotically. This protocol should include the specific tasks of each team member (stay with the patient, bring and operate emergency instruments or equipment, call for external help, etc).

- A person must be designated to keep medication and emergency equipment updated and ready; keep in mind that some drugs have a short shelf-life.
- The direct care of the patient experiencing a medical urgency is a key aspect in which errors are detected frequently.
- It is essential that the dentist stays with the patient until the emergency is solved or until the patient is taken to the hospital by external emergency responders (paramedics).
- If evacuation to an external health center is performed by the dental team, the dentist must necessarily accompany the patient.
- In any case, although apparently the patient recovers completely, it is advisable to accompany the patient to his or her home.

CONCLUSIONS

Most preventable adverse events during the dental health care are produced by a relatively small number of causes. Therefore, a few basic safety procedures can reduce significantly these preventable adverse events. Set in place protocols to ensure the quality of clinical records and verify procedures for cleaning and sterilization; exercise extreme care when prescribing drugs or performing radiographic exams; ban reusing of disposable instruments, containers, or materials intended for a single clinical use; provide ocular protection to all patients, and always use protective barriers to avoid ingestion or inhalation of small instruments; use a surgical checklist; closely monitor the evolution of infectious processes; and always be prepared for possible life-threatening emergency situations in the dental office.

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