PROPERTY

COMMENTARY PAPER

Recovering from dental practice losses without pain reliever

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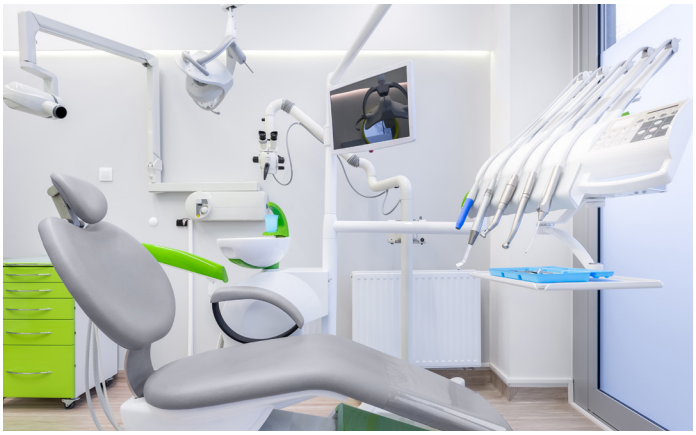
The healthcare sector is evolving at an astonishing rate. Consider for example that it took biotechnology company Moderna just one hour in January 2020 to formulate an effective SARS-CoV-2 vaccine, based on their messenger ribonucleic acid (mRNA) technology. Advancements in technology are changing the dental field, too, but like other healthcare facilities, dental practices are not immune to property losses. In this commentary, we explore typical equipment found in a dental office, common perils, post-loss recovery options and how collaborating with manufacturers helps instill certainty.

Dental equipment

Digital X-rays

Digital X-rays, or intraoral radiographs, are a common imaging modality that exists in most modern practices. It's usually a wall-mounted unit that is connected to an extended arm. While traditional X-rays use film to capture images, digital X-rays use a sensor connected to a computer.



Patient chairs and delivery stations

The dental patient chair is the centerpiece of the operatory – allowing the hygienist or dentist to recline patients to the desired treatment position. The delivery station is a console or hub for air and electrically powered instruments.

Intraoral cameras

The intraoral camera is roughly the size of a pen and has a small lens fitted on its tip. The camera is connected to a computer and when it is moved around inside the mouth, it captures images that are logged by the computer.

Hard and soft tissue lasers

Lasers are used to remove decay within a tooth, reshape gums, address bacteria during root canals, a biopsy or lesion removal, and whiten teeth. A clear difference between the lasers is the type of tissue they were designed to address. Hard tissue lasers are used on teeth, tooth roots and jawbones while soft tissue lasers are designed for gums.

Panoramic X-rays

A panoramic X-ray is a machine that rotates around the patient's head and captures the entire mouth in a single image. It is a two-dimensional (2D) X-ray that projects a beam through the patient, and onto film or a detector rotating opposite the X-ray tube. Most X-ray images are now stored digitally.

Cone beam 3D X-rays

Cone beam 3D X-rays, which look similar to panoramic X-ray units, use a scanning technology that enables the dentist to see teeth, soft tissues and even nerve pathways. Images are created using computed tomography (CT) technology. The X-ray machine emits a cone-shaped beam that allows it to capture multiple images of the mouth. Those images are combined to create 3D images.

Compressors and vacuum pumps

Compressors are used to create high-quality, high-pressure air, which is then delivered through specialized lines to dental operatories. The high-pressure air runs the handpieces that a dentist or hygienist use to clean and treat patients. Vacuum pumps are used for suction.

Property damage

Natural disasters, equipment failure, accidents and malicious mischief put dental practices at risk of property losses. The following examples are from recent claims:

- South Portland, ME – A light fixture fault in the dentists' office started a fire. The fire reached an oxygen tank – causing an explosion – which turned a small fire into a serious blaze.
- Thomaston, ME – A vacuum system motor malfunctioned. The breaker panel in the basement was de-energized, which prevented localized overheating of combustible materials from igniting. While no flames were witnessed, a couple of pieces of wood near the motor exhibited charring.
- Ospitaletto, Italy – During an operation, a Bunsen burner used to heat the dentists' tools exploded.
- Portland, OR – After an electrical short in an X-ray machine, the staff quickly unplugged the device which prevented a fire.
- Bethesda, MD – A fire started as a result of a malfunction in a sterilizer.
- Huntsville, TX – A water pipe break caused six to eight inches of water throughout the practice.

Post-loss recovery

There tends to be a great deal of confusion among dentists and their suppliers regarding the proper way to recover following a loss event.

The dentist and supplier perspective

While healthcare facilities are generally owned by corporations, a large number of dental practices are owned by the dentist. This aspect adds to the gravity of a loss, simply because it is far more personal for the dentist as a small business owner. The dentist likely makes two immediate calls following a disaster: one to their agent and the second to their trusted equipment supplier.

Dental equipment suppliers offer two solutions: repair or replacement. Given that these suppliers are not set up to address equipment that's been affected by smoke, tornado/hurricane debris or water exposure, they recommend replacement as their solution to an unfamiliar situation. The dentist, who may still be making payments on equipment and needs it to last for many years, agrees with the supplier, simply because no other recovery options are presented. Additionally, both the dentist and their supplier are cognizant that an insurance claim will be filed. As such, the dentist will not be responsible for the cost of the new equipment, excluding their deductible. This makes the decision to replace even easier to agree with.

Equipment recovery experts

Post-loss equipment recovery experts recognize the need to thoroughly assess the equipment and quantify foreign debris empirically. Assessment helps determine the extent of exposure. Experts note cosmetic staining, odor, potential for mechanical binding, obscuration, likelihood of increased contact resistance, visible damage from short circuiting, potential thermal dissipation problems, as well as corrosion and rust.

Combustion byproduct tape lifts and analytical samples help ascertain the type of contamination present. Sampling also reveals how corrosive contaminants are and potential for short circuits if the quantified particulates are conductive.

If equipment does not exhibit deterioration past the point of economic recovery, professional decontamination should be considered. Post-loss professional decontamination has been successfully employed for over 40 years, even though many original equipment manufacturers (OEMs) advise that they never heard of the service. While there are several companies that offer professional decontamination, the approach to a loss event is not uniform. Below are some key differences:

- Utilization of ultrasonic cleaning baths for assemblies containing electronic circuitries – Assemblies and/or components can sustain damage in a high frequency/vibration environment. Post-loss ultrasonic cleaning is only recommended for rigid metal tools, parts and other items that do not incorporate sensitive electronic components.

- Utilization of the deionized water wash process – While this process will certainly clean circuitries properly, the process may be more than the assemblies require. Cleaning processes should depend on the extent of exposure. If dry decontamination will suffice, there is no need to wash the assembly, saving time and cost.
- Some companies elect to clean everything in the facility, simply because they do not have expertise to empirically quantify which areas were truly impacted. This is a waste of indemnity dollars.

Professional equipment decontamination is followed by testing, repair and recalibration. The goal is to ensure that equipment warranties and service contracts remain intact. For this reason – and to restore confidence in the equipment – OEMs and service providers are encouraged to be an integral part of the whole recovery.

Collaboration with manufacturers

Collaborating with manufacturers and suppliers is key even if service contracts and equipment warranties do not exist. These entities serve as the trusted advisors to the dentist. By helping these entities understand recovery options, they can support the expert's recommendations and instill the level of confidence the dentist deserves.

Getting OEMs onboard requires that both parties speak the same language. As an example, manufacturers stand behind their published equipment specifications. Such specifications detail transportation or storage environmental conditions, installed equipment conditions between operations (ambient temperature and relative humidity), operational environmental conditions (atmospheric pressure, ambient temperature and relative humidity), exposure to vibration or shock, direct sunlight, dust and salts among others.

While medical equipment circuit board cleanliness is not cited among these specifications, the OEMs are cognizant of the standards their equipment meet. Stringent standards ensure that the equipment is safe for patient use, and that the manufacturers exposure to warranty claims – resulting from poor manufacturing practices – is minimized.

Tempo Automation, a manufacturer of printed circuit board assemblies (PCBA), advises the following, *"medical device electronics are unique in that many are designed and developed to not only analyze the human body but directly interact or connect with it while doing so. Although swabs, tongue suppressors, and other basically harmless devices do interact with the body, they are categorized as class 1 medical devices due to the low risk of patient injury. Electronic medical devices are more likely to fall under class 2 or class 3 as the risks to patients are significantly higher.*

Regardless of classification, all medical device development must adhere to quality control standards as stipulated in ISO 13485. This standard broadly covers all aspects of designing, manufacturing, testing, and monitoring medical devices. This includes specific steps and actions to ensure reliable operation, which depends to a great extent on cleanliness. Another standard, ISO 14971, delves into particular stages and the steps that may pose risks to the medical device development process.

The PCB standard that directly addresses cleanliness for board fabrication is IPC-5704, Cleanliness Requirements for Unpopulated Printed Boards, which covers prevention or removal of ionic contamination and other types of unwanted debris. IPC-6012D, which extends to include PCBAs, covers cleanliness as well as all aspects of circuit board manufacturing. For most PCBA applications, the rules and guidelines of these standards are sufficient. However, the requirements for medical device electronics boards are much higher. In fact, for these boards, a cleanliness regimen is crucial and should include validation that sufficient levels of contaminants are removed during the process."

It is noted above that combustion byproduct tape lifts and analytical samples help ascertain the type of contamination present. While combustion byproduct sampling is not necessary once a piece of equipment is decontaminated, ionic sampling will help ensure that the rigid cleanliness standards for medical devices were met. This type of empirical data speaks to manufacturers; it is data that is not based on perceived bias. The manufacturers themselves can sample the equipment and obtain the same results.

Once the equipment is decontaminated such that it meets the manufacturers specified cleanliness requirements, the OEMs can safely test, perform repairs as needed, and recalibrate the equipment. The manufacturers will then be able to advise their client, the dentist, that they are going to stand behind the equipment and support it for years to come.

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