What To Do
When Your Sensors
Go Down

By Apteryx Imaging

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DDS

Contents

Introduction

Innovative digital technologies are constantly evolving. Digital X-ray sensors and practice management software products have changed dental medicine. Today, patients experience better patient care and greater satisfaction. At the same time, dentists benefit from more efficient treatment tools and streamlined medical records storage, transfer, and retrieval. Patient data is securely backed up, and records are protected from theft, cyberattacks, fires, floods, or other natural disasters.

While the benefits of these technologies in a dental practice are evident, product decisions are complex. Investments in digital radiographic equipment can be substantial. Often they are the most significant financial commitment a practice makes when they start up and as they grow.

Consider this. A general dentistry practice with two full-time hygienists would need at least one panoramic sensor, plus two sets of three different-sized sensors to take full-mouth series. Without multiple sensors, it is futile to invest in digital imaging because the staff (and patients) will have to wait while sharing sensors. If your dental sensor costs $5,000 each and the panoramic sensor is $20,000, the equipment alone has become a considerable expenditure.

Expense is one only factor. Meanwhile, dental practices also dedicate time and resources to training and implementing new sensors, software, or programs. Practice owners must weigh these costs against the benefits. What's more, they must consider long-term returns on their investments.

The American Dental Association recognizes the benefits of using digital imaging for digital X-rays. Digital X-rays offer several benefits over film radiography. For instance, digital X-rays are immediately available, easy to share and store, and offer the ability to enhance the image. Today's digital X-rays can be quickly enlarged or annotated for patients' records. In today's dental practice, digital sensors and other digital radiographic equipment are critical to patient care and successful operations.

Yet many dental practices and organizations still find choosing the right digital technology intimidating. Dentists want cutting-edge tools, but may not know where to start in choosing the right equipment or software program. The price tags can add to the challenge.

Dentists, dental professionals, and IT managers need direction to help them make choices about their digital tools. And once new equipment is installed, there will be a day when a device fails. When a sensor goes down, what do you do? We want to offer you some helpful solutions.

This eBook will cover:

1 What to consider when your sensor goes down?

Are you aware of all the options you have? Understanding key components involved in dealing with a broken or malfunctioning sensor in your office will help you and your team alleviate challenges.

2 How can you navigate the options and make the right decision for your practice?

When you are aware of your choices, you need help to lead you to the best solutions. Should you consider a software upgrade? How will that affect your current software and hardware? Providers must understand the true cost vs. benefits to get this decision right.

3 Ultimately, how can you maintain the highest quality of patient care through the process?

We have some practical tips to continue operations without compromising care quality.

Let's examine these important questions to help you run your practice better.

Digital Technologies in Dental Medicine

Over the years, dentistry has evolved.

Although X-rays have been instrumental in diagnosis and treatment, today's digital imaging has come a long way. With intraoral sensors, panoramic X-rays, and dental cone beam computed tomography (CBCT), today's dentists can serve patients better.

Today's Digital Intraoral Sensors

Today's dental sensors work with intraoral cameras to provide X-ray images for dentists and other dental professionals that aid in diagnosis of oral complications. These digital sensors offer many advantages for a busy dental practice.

PATIENT EXPERIENCE

Today's sensors are more comfortable for the patient. Plus, digital imaging is fast. One study suggested that the increase in overall speed of service, from the request for an examination to reporting, could justify the high cost of going digital. Waiting time and treatment time are decreased. Patients are in and out of the chair faster. And with instant digital scans, dentists can quickly and efficiently show areas of concern to patients, and offer tailored treatment plans. The total patient experience is better with digital imaging.

SAFETY

Today's sensors are safer. Digital radiography has the potential to achieve better quality images with lower radiation exposure. It uses higher sensitivity plates for better resolution and sharper images. Patients and staff benefit from less exposure.

Another advantage of digital X-rays is environmental safety. Digital sensors are more eco-friendly. Their use eliminates chemical processing and disposal, thereby protecting our environment.

STORAGE

Digital imaging allows insurance companies to store scans on small drives that save space. Micro-storage technology can easily be scaled, and digital image storage makes it easy to access stored data. Moreover, use of easy-access digital images helps both patients and dentists have a smoother billing experience with fewer headaches.

INTEROPERABILITY

The use of digital tools offers another advantage—interoperability. Interoperability is the ability of computer systems or software to exchange and use information. For example, using the latest dental technologies, dentists can send patient records and images to consulting providers or payers instantly through secured email.

EFFECTIVE TREATMENT

Enhanced digital images can help catch small areas of hidden decay, tooth infections and abscesses, even cysts and tumors that are undetectable with a visual examination.

IMAGE QUALITY

Today, newer technologies offer features to enhance detail and contrast to improve image quality. Sensor softwares allow providers to color, flip, sharpen, and zoom into images, which helps dentists with early detection, interpretation, diagnosis, and treatment. Dental providers can point to specific areas or digitally annotate problems when they share images. Plus the quality and integrity of digital images remain intact, no matter how far they travel.

When Today's Digital Intraoral Sensors Fail

Despite all the advantages, sometimes sensors fail. Patients may bite the sensor too hard or in the wrong way. Sensors are accidentally dropped on the floor. Over time, internal processing chips can fail.

Dental sensors are subject to wear and tear from frequent use, which can cause them to malfunction. Cleaning and infection control practices require staff to be properly trained and use only approved solutions. In order to maintain the integrity of a dental sensor, office staff must use, store, and clean each piece according to the manufacturer's instructions.

Today, the average lifespan of a digital oral sensor is around five years.

When Sensors Go Down or Break

Patient care is disrupted when your sensor goes down. So what should you do when this happens?

Troubleshooting

Initially, you'll need to determine if your sensor is malfunctioning or broken. Knowing the parts of the sensor can give you clues about the problem and how to proceed.

Sensor Anatomy

Popular CCD and CMOS digital intraoral sensors are made up of three main parts:

1 The **outer casing** is what we see and generally call the sensor.

2 Inside, the sensor houses sheets of computer processing chips, layered together to form the **sensor module**.

3 A **cable or wire** runs from the module to transfer power and data to and away from the sensor. Usually this is a USB cord. However, some newer sensor models are wireless.

It's easy to assume that if a part of the internal hardware breaks, it can simply be repaired or replaced. Unfortunately, that is not the case. The internal sensor module cannot be disassembled without damaging the entire unit.

SENSOR FAILURE

When an internal processing chip dies, the sensor fails. It is irreparable and has reached the end of its lifespan. In this situation, the dental practice must replace the sensor.

HARDWARE DAMAGE

How do you know if internal sensor hardware is damaged? Here are a few examples.

Sensor signals to the computer that it is "ready to expose" but does not capture an image.

This error message may occur in Gendex, Dexis, or other USB sensors. Often this issue is related to sensor damage from dropping or compressing the sensor which damages internal processing chips.

Exposed images show dark shadow lines or marks.

A sign of hardware damage that creates shadows on the images is called delamination. Delamination happens from excessive force to the sensor module. This type of internal damage causes shadows on your images. It is usually caused by dropping or crushing the sensor. This problem is not fixable, because it indicates damage to the internal hardware.

Digital scans have irregular white marks or light patches.

Light marks or white patches show that light filters within the sensor hardware are broken.

In these situations, it is best to replace the broken sensor.

SENSOR NOT WORKING

If the sensor fails to connect to your computer system, there is a 50% chance that it can be repaired.

In the best-case scenario, the problem is a simple connection failure in the wires that connect the sensor to the control box. In most cases, the manufacturer or a third-party dealer can repair these connections. Sensor cords, depending on the brand, have between four and sixteen wires bound together inside the cable. These wires of varying thickness can become disconnected or even break over time as cords are bent or stretched. A typical sensor cable in your dentist's office may be jostled around, bent, or coiled 30 times a day. That's 150 times per week or 7,800 times per year! Over time, cables wear out. Eventually, wires will split.

If your vendor or manufacturer is unable to replace or repair the cord, the sensor must be replaced.

When a sensor goes down, contact your manufacturer or vendor for warranty or support assistance. Practice managers should understand the coverage and costs of equipment maintenance.

You should consider the warranty and support that come with a sensor before it malfunctions. When shopping for practice equipment, think about warranties and support that come with your purchase, as well as incidental costs such as repair, replacement, and technical support fees.

Today, many vendors offer monthly maintenance plans as well as warranty subscriptions. If one of your sensors goes down and you want to replace it, you might have to

pay a deductible for a replacement. If you use an authorized third party for service and repairs on the equipment, some or all of that might be covered through your plan. But if you try to repair the sensor yourself without any support from the vendor, you could void equipment warranties. It is best to call the vendor or manufacturer first when your device fails.

If your manufacturer or vendor confirms that your sensor is dead, it may be time to explore replacement options.

So you need a new sensor: How to navigate options and find the best option for your practice?

Considerations When Your Sensor Goes Down

When a patient comes to you for help, what is one of the first things you do to help them?

Likely, you start with a systematic collection and analysis of their oral health needs. In other words, you assess the situation. In the same way, when your staff comes to you for help with a broken dental sensor, it's time for a complete assessment.

Questions to Ask

To navigate the many digital X-ray sensor options, you have to ask the right questions. By now, you've talked to your vendor. They've answered your questions about your device and warranty.

Next, ask these questions to your staff and the dentists in your practice.

- What sensor(s) and how many do you have? How many do you need?
- What kind of budget do you have for replacing a sensor? What about recurring costs?
- What problems do you want to solve?

It's important to review your previous experience using the sensor and identify any problems you encountered. Were there any capture, software, or hardware compatibility problems with your last sensor? This will give you the opportunity to learn from your past experience with this particular sensor and enable you to make an informed decision about whether or not it's the best choice for your practice.

Options to Consider

There are many different options for purchase, rent, repair, or leasing an X-ray sensor. Consider these factors to find out which might be the best option for your practice.

BUY THE SAME SENSOR AGAIN

A simple solution is to buy the same device again. If your staff is already comfortable with a particular model, sticking with that product will save time and resources you would otherwise spend on training and implementation.

Furthermore, some imaging software programs restrict offices from using other sensors. In other words, you would have to buy new software for a new sensor. This is a factor worth considering.

A cost-effective alternative is to switch to a cloud-based imaging software, like Apteryx Imaging, that lets users use different sensor models within one software program. To see how it would work in your office, talk to an expert to learn more about Apteryx cloud-based imaging software.

RENT OR LEASE A REPLACEMENT

Another newer solution in the industry is equipment rental. You could lease a replacement. Typically, this type of solution would cost around $2000 upfront, followed by a monthly subscription of $150 per sensor. For some, the lower initial cost of this option is an attractive feature, but over time this alternative is more expensive. However, practices that want to test a particular device could consider renting it before they buy it.

Buy a New Sensor

Maybe it's time for an upgrade. This might be the case if you've had your sensor for more than four years. You could be missing out on newer features. Sensors today offer greater dependability, patient comfort, hardware/software compatibility, and affordable pricing.

Switching to a new system or sensor could be the right solution for your organization or practice. Yet admittedly, this is the more intimidating option. Investing in a new sensor has implications for your Practice Management (PM) system and imaging software.

Let's break down the types of sensor technologies available and what your practice should look for in selecting the right device.

Types of Sensor Technology

There are many digital sensors on the market. Each has its own attributes, but only a thorough assessment of your practice needs will help you determine which is best for you. Dentists today have three main options for digital imaging.

1 CHARGED COUPLED DEVICE (CCD)

CCD sensors are solid-state sensors many providers are familiar with. A scintillation layer inside the sensor converts energy from X-ray photons into light photons. Then the electronic CCD chip absorbs the light and converts it to an electronic signal sent out through the cable wire. The performance of the CCD is predictable and fast.

2 COMPLEMENTARY METAL OXIDE SILICON (CMOS)

CMOS sensors are similar to the CCD technology, but differ in structure. The CMOS chip features more components to convert photon energy into electronic signals. This design simplifies manufacturing and decreases cost.

Studies have shown CCD and CMOS technologies to be virtually indistinguishable.

3 PHOSPHOR PLATE SYSTEMS

Systems using photo-stimulable phospho (PSP), also known as a "storage phosphor plate" system, uses a plate covered with phosphor crystals. The phosphor layer stores X-ray photons, while a scanner reads the plate and produces a digital image. Because you must scan the plates, image capture is not instantaneous. After the plates are scanned, they must be exposed to bright

light to erase the plate for reuse. Since the sensors are light-sensitive, they must be protected from exposure.

This technology is different from the CCD or CMOS sensor and preferred by some dentists. Phosphor-plate scanning systems provide a more reliable and consistent image-capture than CCD or CMOS. Additionally, the flexible phosphor plates are more comfortable for patients than more rigid intraoral CCD or CMOS sensors. Over the past several years, phosphor plate sensors have nearly replaced the previously dominant CMOS sensors in numerous European and Asian countries.

On the other hand, phosphor plates bend which can distort images. For treatments requiring precise measurements, such as endodontics, dentists prefer CCD or CMOS sensor images.

Using both CMOS sensors and phosphor plates is a logical concept.

Some dentists use phosphor plates for routine screenings, initial exams, and dental hygiene appointments. Then they utilize CMOS sensors for complicated procedures such as endodontics, impactions, and implants. The same dental X-ray unit can be used for both sensors.

FEATURE	CCD	CMOS	PHOSPHOR PLATE
Processing Time	Instant	Instant	In minutes
Cost	**$3-10k** per sensor	**$3-10k** per sensor	**$20k** for scanner and multiple plates and sizes
Lifespan	Approx 5 years	Approx 5 years	500-750 uses per plate
Care	Must protect from dropping sensor, bending cables	Must protect from dropping sensor, bending cables	Must protect from light exposure

What To Look For in a Sensor

When shopping for a dental sensor, here are the key features you want to examine.

HIGH-QUALITY IMAGES

The image quality of various sensors is relatively standard. What varies, however, are the digital enhancement capabilities of different software products. Make sure your sensor software features lets you easily see and work with images for efficient and accurate diagnosis and treatment decisions.

COMFORT

Because CMOS sensors and CCD sensors are inflexible, they can be difficult to adjust to if they do not accommodate a patient's unique oral anatomy. You should invest in sensor sizes that will be comfortable to the patient.

Sensors come in four sizes:

1. **Size 0** is a pediatric sensor for children age eight or below

2. **Size 1** is a pediatric sensor for children age eight or above

3. **Size 1.5** is a small adult or intermediate sensor available in some models

4. **Size 2** is a universal adult sensor

Your practice also needs the right sensor holders or placement devices to ensure proper placement and protect your sensors. Universal holders, such as the XCP-DS-FIT fit any sensor.

AFFORDABILITY

Most CCD and CMOS dental sensors are priced in the $3-10k range for a single sensor, basic positioning accessories, and an initial warranty.

Here are some general numbers to give you an idea of the investment for today's sensors.

For a general dentistry practice with two patient care stations, excluding the cost of computer hardware, you will need:

- **Two CCD or CMOS oral sensors** – average around $10,000 (2 x $5,000)
- **Imaging software** – varies, purchased separately from the sensor or subscription-based

Recurring Costs:

- **Technical Support** – No Charge up to $800 per year per sensor
- **Initial warranty** – 1 to 5 Years with purchase
- **Extended warranty** – up to $2,000 annually per sensor

WARRANTY

Manufacturers typically offer a 1-5 year manufacturer's warranty, which may include coverage for parts and labor. Extended warranties can cost up to $2,000 per year per sensor.

In order to determine the value of an extended warranty on a specific model, consider the following factors:

- the cost of a replacement
- the cost of repair
- how likely it is that the sensor will fail over time

For example, an expensive device would likely be worth insuring with an extended warranty; a lower-end model might not be worth the expense.

Plans rarely cover accidental damage, like dropping a sensor. You may want to consider additional coverage for accidental damage.

ACCIDENTAL DAMAGE

Some sensor manufacturers offer accident coverage for accidental damage, but the scope of the protection varies considerably. For example, one vendor might sell plans for $1,500-2,000 per year; other vendors sell limited protection plans covering five years for approximately $500-700. When a sensor breaks, buyers receive a discounted replacement.

TECHNICAL SUPPORT

Dentists and dental service organizations need great technical support. When purchasing sensors, consider whether there are additional fees for technical support for your sensor when things aren't working. Support is generally included for the first year. However, manufacturers tack on additional fees for any technical assistance after the initial warranty.

HARDWARE/SOFTWARE COMPATIBILITY

Perhaps the most important consideration when replacing a sensor or acquiring a new one is hardware/software compatibility. Will your new sensor integrate with your computer system?

When shopping for your next dental sensor, the imaging software compatibility is of utmost importance. Does your sensor work with other equipment and systems in your office? When considering a particular sensor model, try a demo to make sure it will work. The ideal would be a "plug and play" system, with no extra clicks. Some vendors deliver their products without hardware setup and installation.

If your practice is already using digital imaging software and you need to add another sensor or replace a broken one, you might have to buy additional software. In this case, make sure that your existing software integrates with the new sensor you are considering. Compatibility issues are common.

Alternatively, you might consider a cloud-based imaging software that works with any sensor—possibly the best option.

Consider Cloud Imaging Software

The most convenient solution for digital imaging is cloud-based imaging software. Apteryx is a highly-rated cloud-based imaging software that works with most dental sensors. It is a scalable solution for any size practice or growing DSO. Apteryx offers the ability to use different sensors within one system. Dental providers have the freedom to use any device they already have in the practice and add any sensor that would otherwise be restricted with current software.

One benefit of a cloud-based program is the **ability to securely access and share patient images and medical records from outside of the office**. Using a web-enabled tablet or smartphone, a dentist can view scans when they are out of the office and after-hours.

Other advantages of using a cloud-based sensor software include:

- ✓ **Reduced requirements to run**
- ✓ **Offsite data storage**
- ✓ **Lower IT costs**
- ✓ **Continuous technical support**

Apteryx supports most intra- and extraoral cameras, including digital X-ray sensors, panoramics, and CBCT technologies on the market. You get the ability to integrate with multiple devices easily. Better yet, Apteryx bridges with most Practice Management (PM) software. Additionally, several PMS tools offer a two-way integration with Apteryx that allows users to see images inside the patient record.

Get a Demo

It is important to test-drive several digital radiography systems before making a decision. You will want to find a system with the right sensor and software that fulfills your practice's needs and style. A good place to compare systems is in your office where you can look at actual patient X-rays. Check out the features of each sensor and software to fully understand what they do and how they can benefit your practice.

Most vendors offer live demonstrations with a representative on-site. Use them as a resource. After all, they are experts on their products. Ask questions and learn about new features and capabilities. If you'd like to see how you can used different sensors together in one imaging suite, contact Apteryx for a demo. They can assess your needs and make recommendations to meet your needs.

SCHEDULE A DEMO

How to Provide the Best Patient Care During the Process

When a sensor goes down, you can't let it affect your patients. Here are practical tips for maintaining optimal patient care during challenging times.

Be Aware of the Patient Experience. It Drives Future Success.

The patient experience is part of patient care. How a patient perceives your competence is important. When things go wrong, you should try to minimize any inconvenience to the patient. Let them know that you're having "technical difficulties," but you're working to resolve the issue. Apologize for any delay in treatment. Be considerate of their time.

Train your team to be aware of the patient's experience too. If everyone treats your patient like a VIP, you will exceed their expectations. Positive patient experiences will drive your practice's future success!

Maintain a Smiling Attitude

Masks have been a standard for patient care for some time. Recently, however, the COVID-19 era has extended facial coverings beyond traditional treatment protocols. Now more than ever, healthcare providers must rely on their "smiling attitude" to put patients at ease.

"Smile" through problems that come up during treatment. Stay cool under pressure, and your patients will likely follow your example. Maintaining a smiling attitude will elevate your patient experience every time.

Communicate, Communicate, Communicate

When a sensor goes down and your streamlined operations are compromised, the number one thing to remember is to communicate, communicate, communicate.

1 **Communicate with your patient.** If a patient's appointment requires a diagnostic X-ray, let them know if you cannot complete their examination because of a failed sensor. Explain what you are doing to resolve the problem (waiting for a different camera in the office? or postponing imaging next time?). Patients understand problems with technology. We've all experienced them. On the other hand, they may not be as understanding of staff that fumble around with confused looks and avoid eye contact without explanation.

2 **Communicate with your staff.** When someone notices a problem with the sensor, you have to address it immediately. Your staff should alert you when there are issues. Likewise, you should keep your staff updated when considering new equipment, replacing faulty pieces, or repairing devices. Good communication keeps everyone happy.

3 **Communicate with your manufacturer or vendor.** If a sensor is failing, report your issues to the experts early to get the help you need.

With open communication, the right attitude, and focus on the patient experience, you can navigate through the challenge of a broken or faulty sensor. Remember these tips and share them with your team to provide excellent care under difficult circumstances.

Summary

Dental imaging is essential for oral diagnostic and treatment procedures. When sensors go down, it's essential to understand how to minimize patient care disruptions and replace the sensor quickly.

Dental providers can use a sensor failure as an opportunity to improve or even upgrade their technology.

Apteryx Cloud-based Imaging Software

With Apteryx, dental providers get the freedom to use devices they already own and add newer devices without worrying about compatibility or integration. Apteryx software supports most intraoral and extraoral sensors, panoramics, and cone-beam technologies in today's market. If you want to consider a flexible software solution with free client support, go online to book a demo today.
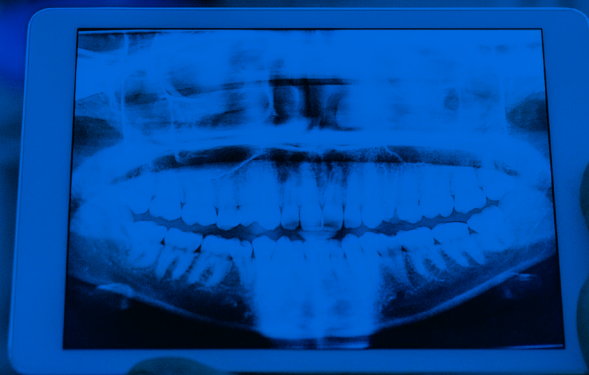
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