The best X-ray device for dental practice

As handheld dental X-ray units are becoming more widely used in dental practices, many dentists have begun asking important questions about their safety and effectiveness. Midmark Corporation, a leading dental solutions provider focused on the design of the clinical environment for improving delivery of care, recently released a white paper entitled "Handheld versus Conventional Dental X-Ray Units in Clinical Dental Practice—a Cautionary Discussion," examining the differences in operation, clinical workflow and safety of handheld dental X-ray units compared to conventional counterparts. "When something this vital to a dental office can also pose a significant safety hazard, it's important for dentists to look at the available research and make an informed decision about what type of X-ray device is best for their practice," says Mark Greenwood, vice president of imaging product development for Midmark.

Since it was founded in 1915, Midmark has developed into the leading solutions provider of medical, dental and veterinary care environments. Today, Midmark is the only clinical environmental design company that enables a better care experience for the medical, dental and animal health markets. With more than 2,200 teammates worldwide, Midmark focuses on harmonizing space, technology and workflows, creating a better experience for caregivers and patients at the point of care. Headquartered in the greater Dayton, Ohio area, Midmark maintains production facilities, administrative offices, and the Midmark Experience and Technology Centers in Versailles, Ohio, with nine additional locations in the United States as well as subsidiaries in India and Italy. Midmark's imaging products are designed and manufactured in its Buffalo Grove, Illinois facility.

Midmark helps dental professionals deliver exceptional care by harmonizing design, technology and workflows. Midmark is a single-source leader for planning, equipping and developing better utilization of operatory, imaging, digital impressions, instrument processing, dental cabinetry and mechanical room solutions.

Handheld dental X-ray units were originally developed for situations where

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fixed units could not be used, like in field hospitals and emergency triage facilities. With handheld dental X-ray units becoming more widely used in dental practices, dentists are faced with a question. Are these units a better choice than conventional X-ray units? While the appeal of handheld units is strong, many dentists have discovered the reality of using them in daily practice is full of challenges.

Mark Greenwood has twenty plus years of experience in medical and dental imaging across a broad spectrum of responsibilities in engineering, operations, finance, and executive management. He explains: "Health and safety for both patients and dental office staff is a strong trend in the market today. Midmark is meeting that need by helping to reduce X-ray exposure where possible in our X-ray units."

He adds that Midmark's recently released white paper was written in recognition of the need to help dental practitioners make an informed decision about the safety risks of handheld X-rays when used in everyday routine dental practice. "Midmark designs its products with dentists, their staff and their patients in mind. This starts with safety, which is at the heart of everything a dental practice does to help ensure the best patient care."

When using a wall-mounted X-ray unit, the operator leaves the room, eliminating the potential for exposure to both leakage and scatter radiation. Exposure to radiation is a significant safety concern for the operator of any handheld device. Since the operator is holding the X-ray source assembly, the principle of "distance" as a safety factor against leakage radiation cannot be applied.

Very specific operating procedures must be followed to minimize scatter radiation exposure as well. These procedures include keeping the backscatter shield perpendicular to the operator's body, moving the patient's head to position for the exposure and keeping the shield all the way at the end of the cone. Handheld units have been tested to be safe if used properly, but operators must precisely follow manufacturer's instructions which are often difficult to do and accomplish all X-ray examinations. Operators must meet these safety instructions without alerts to indicate when the X-ray unit is not in proper alignment.

The patient's radiation dose also increases as the battery charge decreases. This increase in dose happens because kilo-voltage can drop to as low as 54 kVp when the battery loses charge, which means the exposure time must increase to compensate. It can be more difficult to take consistently good X-rays with a handheld unit. While the first image taken on a fully charged handheld unit may perform at a fixed 60 kVp, subsequent images will be taken with diminished radiation (10% less or down to 54 kVp) as the battery discharges.

While it may seem staying in the room between exposures would improve workflow, it often does not. Placing a receptor in the patient's mouth is a two-handed operation and if both hands are being used, the handheld generator would end up cradled in the operator's arm or placed on a work surface. This placement makes them highly susceptible to being dropped and damaged. It also causes arm and hand fatigue for the operator who has to hold the heavy device, which can weigh as much as 5-8 pounds, in awkward positions for longer exposures to get the best image.

Not all handheld intraoral dental X-ray units available in the US are FDA-

approved, and not all FDA-approved machines have been approved for use by every state. In the US, there are no standard federal regulations regarding the use of handheld X-ray units. Therefore, individual states vary in their approval and requirements for handheld X-ray units, which can include device secure storage to reduce risk of theft, use of protective apron, and radiation monitoring. Some states provide cart blanche approval for the use of handheld units, while others give approval on a case-by-case basis, usually by an exemption.

Not only does one handheld unit cost almost the same as two wall-mounted units, the general life expectancy of a wall-mounted unit is 10 years with little to no maintenance. Because they are permanently fixed to the wall, there is no risk of dropping the unit. If handheld units are dropped, many operating instructions dictate they must be sent to the manufacturer for evaluation before being used again. If the office has only one handheld unit, they would have no X-ray device until that unit is returned. The batteries, chargers and damage waiver warranties also add to the cost. In fact, the estimated 5-year cost for a popular handheld X-ray unit is over $5,700 more than its wall-mounted counterpart, the Midmark Preva.

Midmark concludes that handheld dental X-ray units are still best suited for use in situations where a wall-mount is not readily accessible. Because a handheld unit is only as stable as the operator can hold it and exposure times are long, motion artifacts and retakes are far too common. They also pose an increased radiation risk, which requires the adoption of several added protection protocols while still offering no operational safety features to warn of potential radiation exposure. Wall-mounted units deliver more consistent quality X-rays with less radiation exposure risk. Units such as the Midmark Preva Intraoral X-Ray offer features like an exterior cone for proper positioning, drift-free arm and braking systems to keep the device perfectly stable during exposure, secure placement on a wall, cabinet, pass-through or mobile cart to prevent dropping or theft, and the ability to be programmed with the technique factors for optimal image quality. For most dental practices, conventional dental X-ray units are still the safest, best option for routine daily use.

Mark ends: “Midmark wants to continue to grow in the dental market not just in X-ray but in the entire broad range of solutions that Midmark provides in the dental market (operatory, instrument processing, cabinetry and more). We continually look at ways to take advantage of the possible synergies between our products and solutions.”

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