

Microbiologic Contamination of a Phosphor Plate System (10/10)

Kalathingal S, Youngpeter A, Minton J, Shroul M, Dickinson D, Plummer K, Looney S. An evaluation of microbiologic contamination on a phosphor plate system: is weekly gas sterilization enough? *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2010;109:457–462.

This study was performed to determine the rate and source of microbiologic contamination of the Optime photostimulable phosphor plates (PSP) (Sordex/Orion Corp) in a predoctoral clinic and whether a combination of weekly gas sterilization and barrier protocols can prevent contamination of the PSP plates. The authors examined 50 plates in clinical use and 25 gas-sterilized control plates. The PSP plates were pressed onto blood agar medium and incubated at 37°C. The number, size, distribution, and variety of resulting colonies were noted. To test whether these bacteria could have come from oral sources, 17 colonies were selected for additional culturing and Gram staining. Twenty-eight test plates (56%) exhibited growth of bacterial colonies on blood agar. Seventeen of those bacterial colonies were selected for additional culturing and 13 (76.47%) showed growth, 69% of them gram positive.

The results indicate the need to reinforce standard precautions of infection control for intraoral radiography, and that gas sterilization of plates after each day's clinical use is a potential solution.



DECS Comment: Digital radiography presents infection-control challenges, primarily because the image receptor (i.e., sensor, plate) is reused multiple times compared to a one time use with a film-based system. Intraoral digital sensors/plates come into contact with mucous membranes and ideally, therefore, should be cleaned and heat sterilized or high-level disinfected between patients. Currently, sensors/plates cannot withstand heat sterilization or complete immersion in a high-level disinfectant. Until technology allows this, the Centers for Disease Control and Prevention (CDC) recommends at a minimum, using barrier protection to reduce gross contamination during use and because using a barrier does not always protect from contamination, after removing the barrier, the device should be cleaned and disinfected with an EPA-registered intermediate-level disinfectant after each patient.

Other studies have shown cross contamination occurs when using digital sensors/plates. The current study was conducted in a dental school setting where the plates were handled by multiple individuals (e.g., dispensary staff, students, instrument processing technicians) which may account for some of the contamination. In the author's previous study with the OpTime plates, they found most of the contamination was along the edges of the plates. The location of the contamination suggested that it would be beneficial to pay extra attention to these areas during cleaning and disinfection and based on their results they decided to gas sterilize (i.e., ethylene oxide [EtO]) their plates weekly at the dental school.

In the present study a substantial proportion (35.5%) of colonies isolated had growth characteristics consistent with identification as oral streptococci. Moderate contamination was noted on the first day of clinical use after sterilization. The present study showed the possibility that the barrier bag with a folded seal on one end may not be sufficient for all patients. The question as to how well differences in private practice protocols can prevent the barrier failure observed in a school setting remains unresolved. Another limitation of the present study is that only OpTime plates were evaluated; results may vary with other brands of plates.

While the authors suggested using ethylene oxide (EtO) to sterilize the OpTime plates periodically in a dental school setting, EtO is not available in USAF treatment facilities or the majority of private practice dental settings. This reinforces the need for using other measures to prevent cross contamination. Currently, the primary digital radiography systems in use in USAF dental treatment facilities use sensors and the phosphor plate systems are considered secondary or back-ups. However, infection-control procedures apply to both systems. Additionally, because the sensors/plates vary by manufacturer and are expensive, manufacturers should be consulted regarding specific disinfection products and procedures.

USAF Guidelines for Infection Control in Dentistry

The following apply for digital radiography sensors/plates:

- a. Use FDA-cleared barriers.
- b. To minimize the potential for device-associated infections, after removing the barrier, clean and disinfect using an EPA-registered hospital disinfectant with an intermediate-level activity after each patient.



Selected References

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