G4 Technology in Cleaning and Sterilization Equipment: An Added Step Toward Quality Assurance

Interview with Philip Dattisman

Marie T. Fluent, DDS

The Centers for Disease Control and Prevention (CDC) published the *Guidelines for Infection Control In Dental Health Care Settings* in 2003. In 2016, utilizing the Guidelines as a foundation, the CDC provided several additional recommendations within the *Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care.* The Guidelines remain the gold standard for dental infection control principles, policies, and protocols, as these have changed little since 2003. However, one aspect of infection control equipment has improved dramatically—technological advances in wireless communication. Just as G4 (fourth generation) cell phones now offer communications 10 times faster than G3 networks, this new technology has the capacity to significantly improve the efficiency, reliability and effectiveness of YOUR instrument washers and autoclaves!

This article explores how G4 Technology can profoundly impact infection control policies, procedures, AND quality assurance. We will learn about this through a fascinating conversation with longstanding, mission-critical, "behind-the-scene" SciCan employee, Philip Dattisman. Phil is responsible for monitoring SciCan G4 equipment throughout the US. For examples of relevant cleaning and sterilization equipment, we will utilize STAT*IM*, HYDR*IM*, and StatClave (SciCan/Coltene).

Marie: Please tell us a little about your background and how you became involved with cleaning and sterilization equipment.

Phil: My career began in the US Navy in the 1960's where I received training in electronics. After military service, I began to work on televisions and then transferred dental equipment. I loved being a service tech because I knew that the dental team was always happy to see me. I joined SciCan in 1991, set up the repair facility in '92, and I've been there ever since!

A quick thought from Marie: It is not difficult to notice how much pride Phil takes in the quality of his work and how he goes about it. He communicates with dental personnel quite literally day and night via email and phone calls and helps troubleshoot potential malfunctions, because he "knows people need help—and that is just what I do"! I also learned that Phil is the longest standing employee of SciCan in the US.

Marie: So Phil, would you tell us about G4 equipment?

Phil: G4 Technology was integrated into dental equipment in 2012. G4 equipment is connected via the internet to our home office in Pittsburgh. I look at monitors and review all emails regarding potential cycle-faults. I decide whether the error was operator-related, or if repairs are needed, and whether to repair equipment in the field, or have it sent in to our facility. Currently, the STAT*IM*, Hydrim and StatClave have G4 Technology. Note that our classic Statim and the Bravo autoclave do not have G4 Technology. And, the StatClave is so new that very few of these are connected yet.

Marie: For our readers, this seems like an opportune time for a quick review of CDC Guidelines regarding mechanical monitoring: "Mechanical techniques for monitoring sterilization include assessing cycle time, temperature, and pressure by observing the gauges or displays on the sterilizer and noting these parameters for each load. Correct readings do not ensure sterilization, but incorrect readings can be the first indication of a problem with the sterilization cycle."

With this in mind Phil, how does G4 Technology aid in mechanical monitoring of autoclaves?

Phil: Well, these new machines have a USB port. A flash drive will record every cycle number, each day, month, and year. G4 equipment will connect the dental facility's network and provide the same records. In addition to the dental staff looking at these gauges, we monitor the parameters as well. I often notice a cycle-fault before the dental team notices. So, G4 Technology adds a layer of assurance that your machine is indeed working!

> *"In this scenario, the dentist and staff are happy because the problem is immediately corrected, and money is saved as they do not have to call in a technician."*

Marie: Interesting,. Let's discuss the STAT*IM*. Tell us about how many cycles you monitor, and what may be a common cycle error?

Phil: Yesterday I noted on the monitors that 8081 G4-STAT*IM* cycles were run in the US. 101 of these had messages that showed a cycle-fault, and I estimate approximately 90% of these were operator-related. The most common user error is due to something hanging over the edge of the cassette—like a piece of wrapping or an edge of a pouch. In these instances, the cassette cannot properly seal, the machine leaks steam, and an error code is shown. I will often see the code before the dental team notices, and I will notify the office. I'll tell them to check the packaging materials and the cassette to ensure the seal is tight, and this typically takes care of the problem. In this scenario, the dentist and staff are happy because the problem is immediately corrected, and money is saved as they do not have to call in a technician.

Marie: Are there any potential cycle-faults with a STAT*IM* that are NOT due to operator errors?

Phil: Yes, a typical example of this is a clogged water pump in the STAT*IM*. If this happens, the cover needs to come off and a technician will do this—NOT dental staff. If you are ever unsure whether a dental team member or service technician should perform a certain repair, call us. This is what we are here for!

Marie: Let's move on to the HYDR*IM*. What kind of cycle-faults may occur?

Phil: I would estimate that 75% of HYDR*IM* cycle-faults are due to the operator and fall in three categories. First, are water-related, and typically occur first thing in the morning or in the evening cycles because the dental facility's master water switch is typically turned off during evening hours. In these cases, I will email the office and tell them to check the water input—and this generally solves the problem. The second involve not following regular maintenance. Remember, the machine must be kept clean! A cleaning cycle should be run periodically with white vinegar, and the arms should be checked to ensure they are free from debris and working properly. The third common error is due to items in the Hydrim that don't belong. Burs and small bits of orthodontic wires may enter the interworking of the machine and prevent the machine from pressurizing. I am not sure why, but I have also seen cotton rolls, gauze, and other disposable items within the Hydrim. I would like to stress that routine maintenance is provided in the owner's manual and reviewed at the time of purchase, and staff should have been trained how to use this equipment.

Marie: Are there any errors that are NOT operator-related?

Phil: Yep. These are much less common but they can occur. Kinks in the exhaust hose or water inlet tubing may occur when a machine is moved or during installation. Incorrect wiring (115V instead of 220V) will allow the machine to turn on—but not operate. And finally, a clogged filter or closed valve will provide a cycle error code.

Marie: Let's talk more about "operator error." Since most cycle-faults are errors by those who reprocess instruments, it seems that education and training of dental personnel is paramount. Do you perceive any gaps in the education and training of dental staff?

Phil: Yes! First, staff changeover presents a challenge. Training may occur with the original dental team, however new employees may miss important information. Second, owner's manuals are often stuffed in a drawer or thrown away. Thus, staff may not know how to use the machine nor follow maintenance schedules. Third, staff are often "too quick to push a button." Thus, when an error codes is displayed, staff may not remember or record it. In addition, the dental staff needs to remember that the service technician is part of the team—they are there to help you!

Marie: For our readers—first, thanks so much to Phil for sharing his hard-earned insights and pearls of wisdom. Our discussion covered a number of key learning points that will help us better utilize and maintain G4-related equipment and ALL dental equipment. I'd like to summarize in a chart to help staff members who reprocess instruments.

> *"G4 equipment will connect to the dental facility's wifi network and provide the same records…"*

DO'S and DON'TS for maintaining G4-related Instrument Washers and Autoclaves (and ALL other dental equipment)

DO:	DON'T:
DO keep owner's manuals of infection prevention equipment (and ALL other dental equipment) in a designated location known by all dental personnel.	**DON'T** place owner's manuals in a random drawer with other supplies and materials. This information may become lost, or may not be readily available when needed.
DO have manufacturer instructions for reprocessing reusable dental instruments and equipment readily available, ideally in or near the reprocessing area. *Note: this is a CDC recommendation.*	**DON'T** rely exclusively on the VERBAL transmission of operating instructions from one team member to another. Important information will most likely be missed! *Note: WRITTEN instructions reduce miscommunication among dental team members; and help achieve efficiency, quality, consistency, and longevity of equipment.*
DO assign responsibilities for reprocessing of dental equipment to personnel with appropriate training. *Note: this is a CDC recommendation.*	**DON'T** assume that newly hired personnel know how to use equipment in your facility. *Note: Per CDC Guidelines, "education and training must be job- or task-specific and must occur during orientation and at regular intervals. In addition, training records must be maintained according to state and federal requirements".*
DO follow routine maintenance for all equipment. **DO** keep a maintenance file for all dental equipment *Note: Per CDC Guidelines, "ensure routine maintenance for sterilization equipment is performed according to manufacturer instructions and maintenance records are available".*	**DON'T** attempt repairs that should be performed by trained service technicians. This may lead to damaged equipment, unnecessary cost and frustration, and may void your warranty. **DON'T** discard maintenance records (or owner's manuals).
DO provide as much detail as possible (including error code) when communicating with service technicians. **DO** everything you can to help your technician to help you.	**DON'T** call service technician and merely state "machine is not working" without providing any details.
DO rely on the expertise of manufacturer's representative (or sales representative) of dental equipment. They may: • Help troubleshoot potential errors when experiencing technical difficulties. • Determine whether or not equipment requires repair. • Facilitate loaned equipment during repair times. • Facilitate training of dental personnel on proper use and maintenance of equipment.	

Marie: On a final note, the monitoring and recording of time, temperature and pressure for each load is an important step to indicate any problem with the sterilization cycle. While correct readings do not guarantee sterilization, incorrect readings can be the first indication of a problem with the sterilization cycle. Interestingly, Phil mentions that he has "never seen a biological indicator failure unless mechanical indicators noted that the cycle failed"! There are many fail-safes within the reprocessing system and G4 Technology adds yet another element of consistency, efficiency, and quality assurance to your sterilization program.

> *"Our discussion covered a number of key learning points that will help us better utilize and maintain G4-related equipment and ALL dental equipment."*

References:

Guidelines for Infection Control in Dental Health-Care Settings—2003
https://www.cdc.gov/mmwr/pdf/rr/rr5217.pdf

Summary of Infection Prevention Practices in Dental Settings (2016)
https://www.cdc.gov/oralhealth/infectioncontrol/pdf/safe-care2.pdf

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Dr. Fluent is a graduate of the University of Michigan School of Dentistry. Her dental career spans 35 years and includes roles as dentist, both as an associate and practice owner, infection control coordinator, office manager and dental assistant. Additionally, she has extensive experience and expertise as a dental inflection control clinical instructor, educator, speaker, author, and consultant. Dr. Fluent is passionate and deeply committed to improving dental infection control and patient safety. Through her writing, webinars, and invited lectures, she has educated thousands of dental professionals and students nationally and internationally. Dr. Fluent has written numerous peer reviewed articles on infection control in the dental setting, OSHA compliance and responsible antibiotic prescribing. She serves as Education Consultant for the Organization for Safety, Asepsis, and Prevention (OSAP).