



Infection Control

Monitoring gauges

By Noel Kelsch, RDHAP

I had to drive my child's car today. Mind you, I don't really care about cars. As long as they start, the brakes work, and there is no duct tape holding it together, I am fine. My son's "project car," a VW Van, is a testament to the miracles that a mechanic can perform. I turned the ignition, and the engine purred. The gear shift which had to be welded into place last month worked smoothly. The brakes that Brice put in the day before gently brought me to a stop, preventing my demise. I drove down the freeway with the air gently sweeping my hair back (the sunroof is wide open and will not close).

As I started up a hill, the engine surged and then sputtered. The van slowly came to a stop. I looked at the gauges — the gas was full, and the oil was full — and the gauges told me that this machine should be working fine. I called my son and asked him to come and get me.

He said, "Mom, did you put gas in it?"

I replied, "No, it says the tank is full."

Brice laughed and said, "All the gauges are disconnected. The sticky note on the visor tells you at which mile you have to add gas."

Understanding the system for monitoring a machine is very important. Not only will it prevent you from having to walk up a hill in your high heels, but it will aid you in monitoring your sterilizer. Sterilizers are a vital tool in infection control. Monitoring them correctly will assure that they are working effectively and that instruments are properly sterilized. The Centers for Disease Control, American Dental Association, and the Organization for Safety and Asepsis Procedures provide dental professionals guidelines for three basic ways to monitor your sterilizer.

- **Mechanical techniques** — This includes monitoring the gauges, dials, and if present, the printout of your sterilizer. It reviews the time, pressure, and temperature. Observe the gauges and displays during the process. If available, monitor the computer printout. On most units

with a timer and temperature and pressure gauge, the timer should not start until the proper temperature and pressure has been reached. This technique detects gross equipment malfunction, but does not indicate sterility. If the gauges are not functioning, take the unit out of service. This test should be done with every load.

- **Chemical indicators** — This indicator comes in many forms, including color-changing ink and heat sensitive chemicals. It shows that one or more of the conditions necessary for sterilization were met (temperature, penetration of sterilant, etc.). It can be built into the pouch or tubing, and it is available in tape or stripes. It should be used with every package, ideally placed both inside and outside.

The external indicator on the outside of the package gives you a clear view that the package has been processed. The internal indicator placed inside the package or cassette verifies that the sterilizing agent has penetrated the packaging materials and reached the instruments. It cannot be used to show that the conditions necessary for sterilization were met. Its

Sterilizer	Temperature	Pressure	Time
Steam autoclave	121 C (250 F)	15psi	15 minutes
Unwrapped items	132 C (270 F)	30psi	3 minutes
Lightly wrapped items	132 C (270 F)	30psi	8 minutes
Heavily wrapped items	132 C (270 F)	30psi	10 minutes
Dry heat	170 C (340 F)		60 minutes
	160 C (340 F)		120 minutes
	150 C (300 F)		150 minutes
	140 C (285 F)		180 minutes
Dry heat (rapid flow) unwrapped items	121 C (250 F)		12 hours
	190 C (375 F)		6 minutes
Dry heat (rapid flow) packaged items	190 C (375 F)		12 minutes
Chemical vapor	132 C (270 F)	20-40 psi	20 minutes
Ethylene oxide	Ambient		8-10 hours

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use is to identify packets that have been processed through the heating cycle and identify gross sterilizer malfunction. This test should be performed with every load.

• **Biological indicators** — Biological spore testing is a method of verifying sterilizer performance through the use of a filter paper strip saturated with resistant spores with a matching control. The spore strip is placed in the center of a sterilization cycle. The control strip is not processed. This will evaluate the effectiveness of the cycle, killing *Bacillus stearothermophilus* or, more recently, *Geobacillus stearothermophilus* in autoclaves and chemical vapor sterilizers. In dry heat systems, it tests with *Bacillus subtilis* and more recently, *Bacillus atrophaeus*. It can be done in office or sent out for processing to the company that produces the product. It is important to use the kit that matches your system.

A positive result indicates conditions are inadequate to achieve sterilization through actual organism kill. It directly measures the sterilization process and its effectiveness.¹ This is the ultimate assurance that all microbial life has been destroyed.

If the test is positive, the machine should be removed from service and a retest of the machine performed. All instruments that were sterilized since the last test must be pulled from service and re-sterilized in a sterilizer that has tested negative.

Many times, these failures are operator errors, such as overload-

Six tips for monitoring

- 1. Read the directions and refer to them frequently. Many sterilization failures are the direct result of operator errors. Follow all the directions for maintenance and cleaning. Set up a calendar for service and maintenance.²**
- 2. All results of mechanical, chemical, biological monitoring and repair for the sterilizer must be recorded in a notebook. Place the date, test, load type, sterilizer serial number and results, as well as repairs and maintenance.**
- 3. Date all packages before sterilizing. Do not use any items from a failed test. Pull all items that were processed during the time period following the last test that did not fail and reprocess them. This is why it is vital to date the packages.**
- 4. All implantable items must go through a biological indicator process and the results seen before they are placed in a patient mouth. Offices should take this into consideration when planning patient appointments, giving time for the results to be returned or read before placement.³**
- 5. The single most common error in sterilization is overloading. Refer to the unit directions for instructions on loading. Make sure you are not overloading and are leaving enough space between instruments to allow penetration of the sterilant.²**
- 6. It is important to know who is doing your biological spore testing if you have it done by a third party. Make sure you use a reputable company that has the background and understanding of the process. Find out what their turnaround time is (some take up to two weeks). Ask if they charge for retesting. There are many simple in-office systems that take as little as 24 hours to deliver results.**

ing the sterilizer beyond capacity, which inhibits the exposure to the sterilant, worn out door seals, and inadequate water level or chemical level. Follow your manufacturer directions closely and many times the test will come out negative when the issues are addressed and the next load is run properly. If the next test is positive, have the machine serviced and retest. This test should be done weekly or with every load that has an implantable item present.³

I will not drive my son's VW again any time soon. There is no guarantee that it will get me where I need to go without intervention that I am not able to deliver. I will stick to monitoring the things I understand. Sterilizers are so important in infection control. Monitoring them in three methods will assure that they are working properly and that we are keeping patients safe. ●●●

About the Author

Noel Brandon Kelsch, RDH, is a freelance cartoonist, writer, and speaker. Noel's cartoons can be seen in RDH magazine and her articles have been published in both dental and nursing trade magazines, as well as books. She has received many national awards including Colgate Bright Smiles Bright Futures, RDH/Sunstar Butler Award of Distinction, USA magazine Make a Difference Day award, President's Service award, Foster Parent of the Year, and is a five-time winner of the Castroville (Calif.) Artichoke cook-off! Her family lives in Moorpark, Calif. She can be contacted at n.kelsch@sbcglobal.net.

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