



# Study: Custom Trays Can Prevent Costly Damage to Delicate Eye Instruments

BY RICK WELLS, CCSVP, PRESIDENT, SOLUTIONWELLS LLC

**D**uring a study performed by SolutionWells LLC at Altru Hospital in North Dakota that examined how the use of custom trays would lower costs, more questions surrounding the process emerged from data collection. This detail merited a closer look. This article is the beginning of addressing some of those questions (including ways to improve how one evaluates repair data, and how one approaches resolution). This article is by no means the beginning and the end of this challenge, but serves to open the conversation within the healthcare industry.

## Abstract

The Altru study showed a 34% reduction in repair expenses when comparing the hospital's old cataract trays versus repair expenses using custom trays. Historical data from 2014-2016 was compared to data gathered during the study in 2017. Four hundred and ninety-nine cataract surgeries took place at Altru hospital's four Operating Rooms (ORs) at its off-site surgery center in Grand Forks, N.D. Even though the results showed significant savings in 2017, the data highlighted one particular instrument, which accounted for 60% of the repair expense. This article looks at ways to approach a problem such as this; if we can identify and correct the root cause

behind this one instrument failure, it can significantly impact the bottom line of repair expense budgets.

## Question

If time is invested trying to solve the problem of needless repair expenses, will the time invested be worthwhile?

## Methods

Before the study began, three years of repair history for the cataract instruments were mined and compiled. Spreadsheets were created to capture real-time data and compare it to historical data.

The cycle of use for the previous tray and cataract instruments were followed over the course of four surgery days of cataract surgery (for the first four days of the study, SolutionWells physically followed the cataract instruments through the entire cycle of use with the previous trays). The cycle of use is defined as every time someone handles a particular instrument; this begins when the sterile instruments are transported from the Central Service/Sterile Processing (CS/SP) department to the OR; from the sterile wrap or container into the sterile field; use in the sterile field; moving from the sterile field to the dirty transportation table; transportation to decontamination; time of arrival in decontamination until cleaning; hand

washing; ultrasonic cleaning; automatic washing; inspection; putting the instruments back in the tray; wrapping or containerizing the tray; sterilization; and storage.

Prior to the study, SolutionWells met with the washer and sterilizer manufacturers to understand and implement consistent settings and chemicals aligned with the instrument and tray instructions for use (IFU). The water was tested twice to determine the pH level of the water being used in the washers and in the ultrasonic washer.

During the 12-month study, data was collected and analyzed by SolutionWells. After compiling data weekly for six months, a pattern began to emerge and the same instrument seemed to be breaking more than the rest of the instruments in the trays.

## Study Data & Results

When SolutionWells looked closely at 2017 damage, \$2,900 of the \$4,834 dollars spent was to replace the same instrument used exclusively by the same surgeon. Upon seeing the data results, it may seem easy to blame the surgeon for the damage and move on; however, needless repair costs often hide behind blame and inaccurate assumptions.

Figure 1 shows the dispersion of repairs on all the cataract instruments damaged for 2017. Prior to 2016, Altru

had nine trays of cataract instruments, which made it difficult for them to manage a busy day of cataract surgeries. They added nine more trays and instruments to help manage the bottleneck in CS/SP. When they have a busy day now, there are enough trays to get them through their day without turning over trays. Still, even with these additional trays and instruments, notable damage resulted. The instrument was not breaking on a regular basis prior to 2017, so we needed to explore the situation more deeply and ask some new questions.

**Discussion**

When looking at the data from this study, there are several explanations and solutions for damage during the cycle of use. The IFU for each instrument specify chemical and enzyme use, time and temperature settings for ultrasonic cleaners, automatic washers, and sterilizers. When following the cycle of use, it becomes clear that many opportunities exist for potential damage. Let's look at eight areas of question that are not impacted using custom trays:

**Cycle of Use Questions**

1. Is this instrument more delicate than others?

2. Does it break more often than others like it? Why or why not?
3. What does the data suggest?
4. Are our chemicals aligned with the IFU?
5. How are the instruments organized and protected after surgery?
6. How long do the trays sit before being cleaned, and why?
7. Are trays being stacked on top of exposed instruments?
8. Is this a personnel issue?

**Possible Solutions**

1. This instrument is delicate, but there is another one just like it that hasn't seen the same damage, so we need to keep digging.
2. The instrument has been damaged more in 2016 than in previous years, but the rest of the instruments saw dramatic decreases in damage.
3. The data suggests that something in the cycle of use has changed, thereby, exposing this instrument to greater damage and risk of failure.
4. pH-neutral enzymes are not being used after surgery, even though the IFU recommend them. This could be part of the problem. Some people believe that enzyme use can cause a condition known as toxin anterior segment syndrome (TASS), and this

- may be why pH-neutral enzymes are not being used. TASS is a sterile, non-infectious, acute postoperative anterior segment inflammation. It is caused by a noninfectious substance that enters the anterior segment, resulting in toxic damage to intraocular tissues.
5. Used instruments are arranged on a blue cloth in the upside-down lid of the custom tray and placed on top of the base of the tray.
  6. The instruments are stacked in the decontamination area on a back table and wait for hours to be cleaned, rather than being cleaned immediately.
  7. On occasion, trays are stacked more than two high in the decontamination area, waiting to be cleaned.
  8. Nothing odd or abnormal was noted during observation, although wire brushes were used at times to remove difficult debris, which is contraindicated in the IFU.

**Findings**

Other instruments in the cataract tray are as delicate as the one instrument that accounted for the high repair expenses and all the instruments were subjected to the same process. The data suggests that something in the process changed and created a weakness for this particular instrument. The surgery

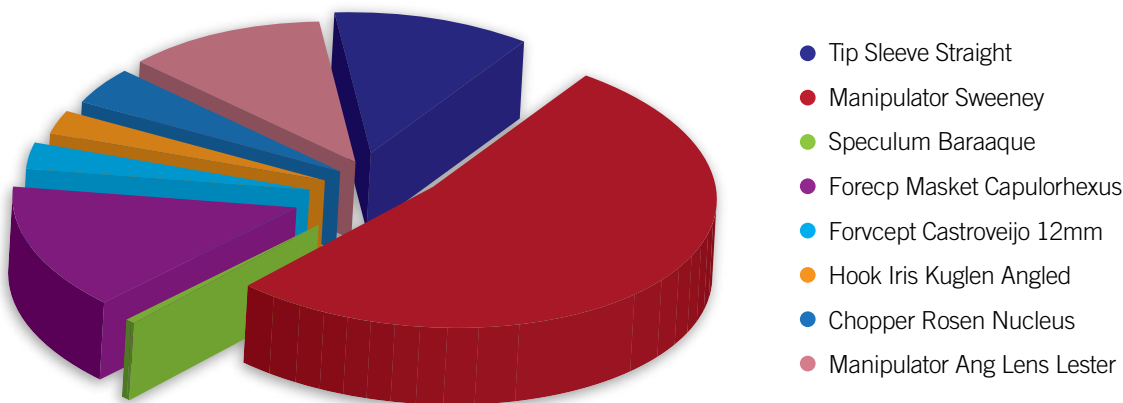


Figure 1



center is not a dedicated eye center and it handles many orthopedic cases on Tuesdays and Wednesdays (that remains constant). At times, the workload for the decontamination staff creates a bottleneck and the eye trays wait to be processed during busy orthopedic days. In 2016, the cataract instrument fleet was doubled to allow for less reprocessing time on busy days. The additional instrument trays solved the bottleneck issue for staff, although it may be creating an opportunity for increased damage to delicate instruments. Allowing eye tissue time to dry creates a challenge for staff to completely remove debris. Stacking of the trays might also be a contributor of damage; however, it would be expected to see damage across the fleet rather than with just one instrument.

### Solutions

More observation is needed in post-operative care to determine the most likely cause of this damage. Three possible solutions stand out for the damage to this instrument. The first is that this particular instrument may not be able to handle the current reprocessing regimen. Eye tissue is difficult to remove, even when processed immediately, and it becomes exponentially more difficult to remove after it has been sitting for hours. The reprocessing technicians must work harder to remove any tissue stuck on this instrument, and when rigor is used, the instrument becomes bent while cleaning, which can shorten the lifespan of the instrument. The surgeon and hospital may need to look at acquiring a sturdier instrument if the bottleneck between orthopedic cases and cataract cases is not resolved.

The second solution might be a thorough, evidence-based exploration of TASS to determine whether pH-neutral enzymes can be safely used for cataract

instrument trays. If pH-neutral enzymes can be used, they will help remove the debris at the point of use and while the instruments wait to be decontaminated. If they cannot be used, the instrument trays will need to be cleaned immediately following surgery.

The third solution may already be underway as the new eye center is being built. The new facility may enable immediate cleaning of the instruments, which should produce immediate savings on repair expenses and improve the cycle of use for all the instruments.

### Conclusion

The cataract study at Altru Hospital confirms that investing time exploring the cycle of use can help identify problems contributing to damage. One thing we do know is that using custom trays will significantly reduce repair expenses. More time is needed to definitively conclude whether the resolution for this problem can be financially sound.

The study results showed a 35% reduction in repair expenses and the data analysis showed that one instrument contributed to more than 60% of damage for 2017. This detail suggests that with some investigative work, we can find and correct a care and handling issue, which may further increase savings. Observing the cycle of use and how the IFU are reflected in instrument care and handling can lead to additional savings. Identifying the problem by asking questions and designing and executing a corrective action plan for tracking results will help reduce expenses. Those facilities that do not have the time or staff to handle this process should consider seeking professional help because it will pay dividends.

### Acknowledgements

SolutionWells is seeking teaching institutions as a study partner to expand research into custom trays and damage reduction. If interested in participating, please contact Rick Wells, President of SolutionWells, at [rick@solutionwells.net](mailto:rick@solutionwells.net). 