

Innovation in Sterilization – The Multiple Tray Sterilization System

Cory Nestman, BS, MS, ACE, CRCST, CHL, FCS

AVP Central Sterile Processing & DME Support Services, Hospital for Special Surgery
Poster presented at OR Manager Conference 2016



Introduction

At HSS, we are always on the lookout for innovative technology that may improve an already efficient instrument process loop. The new MTS300 Multiple Tray Sterilization System (a.k.a. "The Cube") has proven to be an enormous success. Not only have we been able to increase efficiencies within CSP and the OR while reducing our incidents of IUSS, but the Cube provides unexpected benefits in ergonomics, waste reduction and staff satisfaction as well.



Most U.S. hospital OR and CSP departments are experiencing quality defects within the instrument tray process loop which result in case delay, customer and staff dissatisfaction, and the undesirable use of IUSS. CSP and OR team members are challenged to maintain sterility throughout the entire process loop while simultaneously meeting the best practice standards for aseptic technique when setting up the back table. The MTS300 technology provides an effective solution to:

- ✓ *Eliminate contaminated trays due to holes in wrappers or undetected moisture wicking*
- ✓ *Eliminate back and shoulder injuries caused by repetitive lifting and holding of heavy trays*
- ✓ *Eliminate potential for wet instrument trays*
- ✓ *Reduce OR turnover time due to rapid Cube unloading process (no wrap or individual container filter inspection)*
- ✓ *Reduce time spent looking for trays*
- ✓ *Reduce CSP process time by eliminating packaging and reducing sterilization dry times*
- ✓ *Reduce steps for handling of sterile trays in storage and case cart assembly process*
- ✓ *Reduce or eliminate IUSS*
- ✓ *Reduce pre-surgical waste to enhance green initiatives*

Over the past several months at HSS we documented the improved efficiencies resulting from the Cube usage. We are pleased to present our internally validated Time and Motion Studies. We captured time savings and waste reduction experienced in the OR as well as steps eliminated in the instrument processing workflow.

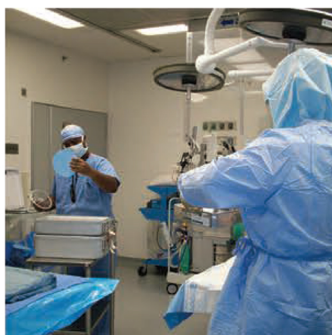
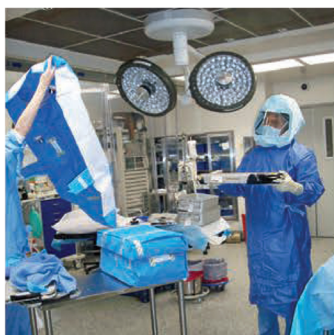
The Product

The Cube is best described as a "giant rigid container" or a "sterilizable case cart." The FDA has cleared the Cube to hold up to 300 pounds of any manufacturer's instrument trays. There is room for three (3) trays on each of the four (4) adjustable shelves, making it ideal to use for joint replacements, spine and trauma cases. The cabinet holds all the instrument trays for a single procedure. The transfer cart acts as the sterilization load cart to safely deploy the cabinet into the steam sterilizer chamber. It is also used to transport those trays from CSP to the OR. The Cube fits into most medium to large chambered steam sterilizers.

The Process

The instrument trays are put through the usual decontamination, washing and assembly processes, then loaded into the Cube with no lids or packaging. The Cube is then processed in accordance with the instrument manufacturer's IFU, typically a 4 minute sterilization cycle followed by a 30 minute dry time. At HSS we found there was no need to preheat the autoclave chamber, extend the dry time, or allow the trays to remain in the autoclave after the cycle for additional drying. When using the Cube to process our orthopedic trays, we are able to reduce our current cycle time by an average of 40 to 50 minutes. By eliminating the packaging process we saved on both materials and staff labor. Perhaps most important and valuable to our facility is the time saved in the OR when unloading the trays. Routinely it takes an average of 10 to 15 minutes for the nurse and scrub to unload the case cart, unopen and inspect the packaging materials and then place the trays onto the back table for our joint procedures. More complex spine cases take even longer. It took our staff an average of 3 minutes and 5 seconds to unload all the trays for a total joint onto the back table. We found our spine cases, with several more trays on average, saved even more time. Per published data, the average cost of OR time ranges from \$100 to \$120 per minute. Saving just a few minutes here or there may add up to enough time to perform additional procedures or at the very least reduce overtime expenses. Time saved absolutely gives the nurses more time for patient focused tasks.

Non-Cube vs. Cube



*Above Photos: Unwrapping in the OR... The conventional way...
A bag of trash before case starts...*



Photo: Unloading the Cube in the OR.

Discussion

Benefits

- ✓ Decreased OR Turnover Time
- ✓ Decreased Surgery Delays
- ✓ Decreased IUSS/Flashing
- ✓ Decreased Surgical Waste
- ✓ Decreased Labor Expense
- ✓ Decreased Case Cart Pilfering
- ✓ Decreased Tray Handling
- ✓ Decreased Misplaced Trays
- ✓ Decreased Potential for Injury
- ✓ Decreased Case Cart Pick Time
- ✓ Decreased Wet Trays
- ✓ Increased Staff Satisfaction
- ✓ Increased CSP Throughput
- ✓ Increased Tray Accountability
- ✓ Increased Confidence in Sterility
- ✓ Increased Efficiency in CSP Tray Turnover



Photo: Loading the Cube into a sterilizer (not HSS)

In this evaluation, we have discovered the Cube to be one of the most innovative devices that impacts efficiency in the CSP and OR instrument processing loop. It increases the collaboration between CSP and OR pertaining to the delivery of sterile trays for orthopedic procedures. It is such an intuitive idea that many people take one look at it and say "I thought of that a long time ago." Of course, none of us took the extra steps necessary to file patents, build prototypes, undergo years of independent testing, receive FDA clearance, and finally bring the product to market. Fortunately someone did.

Results

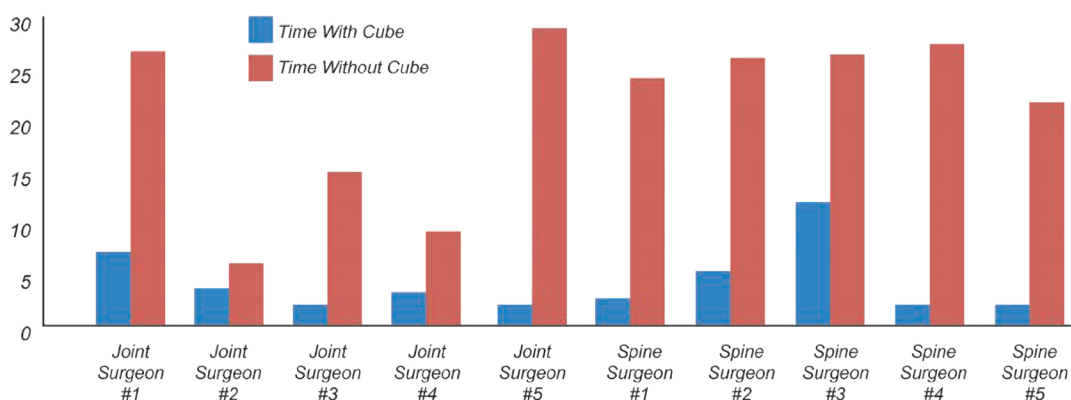
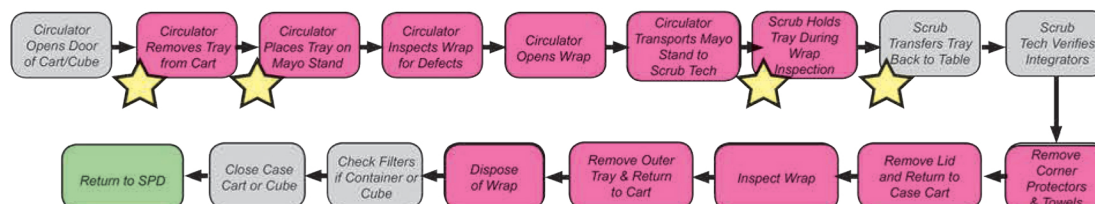


Chart 1. Time Savings in the OR

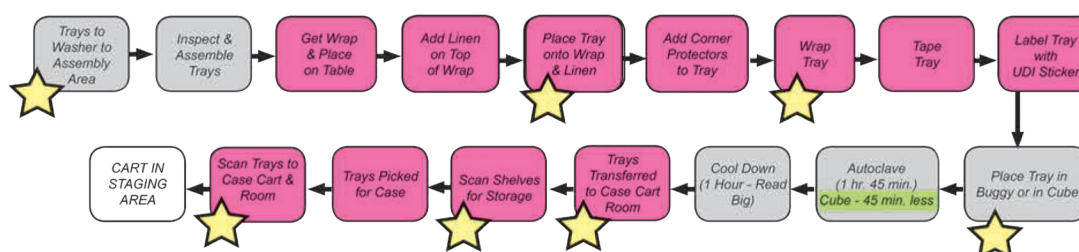
The chart above shows the average time saved by physician. The more instrument trays used in the procedure, the more time was saved during the unwrapping process. In addition, there were no defects that compromised sterility or caused delays in procedures.

Workflow Analysis

OR Workflow



SPD Workflow



- ELIMINATED PROCESS STEP WITH CUBE
- PRE AND POST CUBE PROCESS STEP
- CUBE ONLY STEP
- ELIMINATED LIFT WITH CUBE

Conclusions

After evaluating the product at HSS, we have determined that the Cube consistently saves approximately one minute per tray of OR room opening time. In addition, there was a significant reduction in packaging materials and CSP staff preparation time. At HSS, our #1 priority is patient safety and quality followed closely by patient and staff satisfaction. The Cube affords us both.

The Cube's unique design makes it nearly impossible for sterility to be compromised therefore Infection Control strongly supports this technology. During use in the OR, the Cube allows the circulating nurse to focus more time on patient related tasks. The Cube promotes employee safety and assists with green initiatives. Using the Cube gave us the opportunity to identify waste that exists in our current instrument reprocessing workflow. We also used the evaluation period to identify opportunities for improvement in our preference cards.

In addition to the benefits listed above, the predicted savings generated by the use of this technology could be well over \$7,000,000.00 annually for hospitals with high volumes of orthopedic procedures. The elements in calculating savings included costs of packaging materials, staff labor, overhead and waste.