



Five common mistakes

when optimising washer disinfectant cycles



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Introduction

Optimisation of washer-disinfector cycles not only increases the efficacy of the cleaning and disinfection processes but can also make them more energy efficient and reduce water consumption.

The benefits are undeniable but the task requires great knowledge of decontamination processes and experience to be executed properly.

I prepared a list of five most common mistakes people make while attempting it. I believe that solutions to these mistakes will help to speed up the process, make it more

comprehensive and most importantly avoid false assurance.

As Mark Twain said, *"what gets us into trouble is not what we don't know. It's what we know for sure that just ain't so."*

Having a validated cycle that fails to properly clean instruments is just that.



1. Focusing on process, not the result

Why is this a mistake?

In order to truly explore the issue we have got to first answer the question what should be the result of a well-designed cycle. In my opinion what comes first, is the improved process efficacy. This is then followed by the shorter cycle time and fits in the overarching decontamination process. The third outcome is the reduced cost that is directly related to

chemicals used, as well as power and water consumption. That is the ideal world. In reality the primary objective of improved process efficacy very often collides with the other two points. On top of that standards and guidelines define the framework for the cycle quite strictly so there it may seem there is not much space to manoeuvre.

How to solve this issue? Follow the three step process that is going to turn the focus towards the result.

1. Define your load, define the challenge

When you approach cycle optimisation from the perspective of instruments you will notice how big of a challenge you really have. It is a common misconception that one cycle cleans them all. Washer disinfectors are just tools that help efficiently decontaminate surgical instruments and it is the instruments that should drive processes - not other way around.

Knowledge of what is actually reprocessed is the first step to a well optimised cycle. In general, the more complex the instrument the tougher the challenge. The objective is not to simply pass the validation test but to ensure worst case scenario is covered - Instruments that are hardest to clean get cleaned, every time. Such result becomes a benchmark.

2. Measure performance and eliminate inefficiencies

There is no point in changing any parameters if performance is not measured and compared against a benchmark. Once benchmark is established inefficiencies can be tackled. The choice of chemicals will have a direct impact on the shape of the cycle. Manufacturers clearly specify the range of temperatures they are most effective at – using them outside this range is going to result in a waste.

Additionally some chemicals require longer exposure times to become effective – make sure your cycle accommodates for it. Optimising cycle structure may be difficult as it directly depends on the machine design and process intentions.

A cycle that includes disinfection may have an entirely different prewash, main wash and rinse temperatures in comparison to one that does not include it for the same type of instruments. At this point the energy efficiency of the process is usually improved together with the cycle time.

3. Monitor and improve

Monitoring is essential and sterile services cannot just rely on one annual validation as the ultimate test. Over the course of one year new instruments are introduced and new members of staff get engaged in decontamination processes. On top of that washer disinfectors may malfunction and loose performance. All these factors may result in loss of overall performance and for this reason monitoring system is in place to flag problems as soon as they appear. What is more, periodic tests when recorded allow for trend tracking and implementation of continuous improvement process.

In such ecosystem processes facilitate the end goal – safe instruments for staff and patients.

2. Using inappropriate test load

Why is this a mistake?

Instruments are the key element of an effective cycle optimisation. Washer disinfectors processes do not exist for their own sake but to target contamination residing on instrument surfaces. Having the variety of instruments available on the market in mind it is not possible to effectively improve performance taking those differences out of the equation.

First problem is that in many cases validation of washer disinfectors is done on a standard set of instruments that does not correspond with the actual load being used in particular sterile services department.

In such situation validation gives false assurance and is a source of confusion and poor performance. In extreme cases manufacturing or design faults of washer disinfectors are blamed while the source of the problem is far more trivial.

In general, the greater the variety of instruments the stronger the need for tailored cycles. Optimisation should aim at the primary result of improved process efficacy and this cannot be achieved by widening its scope. For example heavy orthopaedic sets will require different cleaning conditions when compared to complex, fine, laparoscopic ones.

Second problem is the inappropriate use of the test load. Many instruments require specific orientation in the chamber that prevents contamination to sediment inside hollow parts, crevices and mechanisms. The simple example refers to the box joint instruments that should be always reprocessed open.

Optimising processes based on instruments not loaded in line with manufacturer's recommendation may lead to highly inefficient cycles. What is worse, there is a risk that this practice, once approved, is transferred to every-day practise.

How to address the issue?

The best practice would be to select most commonly used instruments that are also challenging from the reprocessing point of view.

The more realistic the load the more efficient optimisation can be achieved.

Where a large variety of instruments is reprocessed it is a good idea to group them around similar levels of complexity and design processes tailored to them.

Simple instruments in such case can always be used as the filler to the load. Such differentiation requires qualified staff as well as monitoring systems in place that will flag the use of inappropriate cycle with particular load.

Gladly some modern washer disinfectors are equipped with systems that automatically recognise the load and apply optimised cycle parameters.

Correct loading is down to the staff training and understanding of decontamination procedures – in this case washer disinfectors' principles of operation.

Bespoke organisers, instrument holders optimised for washer disinfectors are of a great help. They not only speed up loading and unloading time but significantly reduce the risk of reprocessing instruments inadequately.



3. Not looking beside washer disinfector process

Why is this a mistake?

Washing and disinfection are a part of a much broader decontamination process that takes place every time a reusable surgical instrument is used. Optimisation of cycles should take into consideration what happens before instruments are loaded into the chamber and what happens after they are unloaded.

On upstream side it is important to analyse the state the instruments come in. Is the contamination fresh and still wet or is it well dried and stuck hard to the surfaces. The latter case is a much tougher challenge for a washer disinfector.

Additionally basic washer disinfectors may not be able to sufficiently clean complex instruments and for some instruments additional manual cleanings steps may be necessary.

In case of hollow instruments ultrasonication is often used before instruments are reprocessed in a Washer Disinfector. If the entire process is not well examined there is a potential for contamination being reintroduced to the surfaces cleaned in previous operations. On the downstream it is important to analyse the case from the perspective of the flow of instruments through the department and think of most efficient use of time.

In many cases instruments are introduced to the clean area at temperatures that do not allow staff to handle them without thermal protection – this is particularly problematic with heavy, large orthopaedic instruments.

This situation comes as a result of marketing war for short cycle times that has no reflection in everyday use of equipment.



How can this problem be solved?

Problem of dry instruments on the upstream side could be solved by reorganising the logistics of surgical instruments so they get reprocessed immediately after use. If that is not feasible it is worth examining different methods of keeping instruments moist and apply the most suitable one to particular setting.

Moist instruments reduce the need for energy inefficient cycles and make instruments easier to clean what was proven by scientific research (Nayuni 2014).

Whatever preceding stages are used before the washer disinfectant cycle should be well thought through. Different stages of the decontamination cycle should not counteract each other.

It happens for example when a lumen instrument goes through a full washing cycle in ultrasonic washer with irrigation and is then followed by a full WD cycle without irrigation.

The inside of the instrument will get re-contaminated during prewash. When cycle times are considered it is in some cases worth to look at what time is available overall and then work backwards from there.

There are cases where cycle time is critical but it should not be achieved at the cost of efficacy and operators safety. Washer disinfectant takes a part in a much wider process and cannot be considered in isolation.

Understanding of the flow of instruments through the department allows to optimise processes taking its input and output.

4. Not mapping the cleaning performance

Why is this a mistake?

Washer disinfectors use load carriers of various shapes and sizes to accommodate for different types of instrument and medical equipment as well as make the best use of chamber volume. When you imagine rotating spray arms on each level of the basket they directly cover only an area in the shape of a circle.

Spray arms should be designed in such a way that not only the entire load is efficiently clean but the internal walls of the chamber itself as well. Most chambers are of square or rectangular horizontal cross section what means that there are areas that fall outside the direct coverage. It simply means that performance will not be uniform in every position within a single level in the chamber. That is not the end of the story unfortunately.

So far we have looked at a single level. This exercise should be repeated for every level of the carrier as there may be differences between efficacy on different levels. Mapping is a performance test that allows to compare cleaning efficacy in different positions and identify areas where performance is worst.

If this exercise is not done prior to optimisation the results may be inconclusive. In the worst case when load is always randomly placed during the test runs it can lead to worsening the overall performance while resulting in false assurance.

How to solve the problem?

As it is a comparative test it is essential to use exactly the same test method for every position in the chamber. It is important to test every level in the machine during the same cycle to have comparable results.

It is worth remembering that when spray arms are centrally positioned we may need to map only a quarter of every level.

In some cases there is a difference between adjacent quarters due to construction of spray arms but these are usually insignificant – in some cases a full map is therefore advisable especially in older machines. Simple flat indicators are more than sufficient for this initial test.

Corners as well as areas directly underneath the centres of spray arms are the natural weak spots and care should be taken to identify how much of an issue are they.

Once weak spots are identified they should be used to challenge the worst case scenario of the process and optimisation should focus on them.

Depending on the design and chemistry used in the process the lowest level of the carrier may experience extensive foaming that impedes cleaning performance.

It should be picked up during initial mapping but should not be confused with poor mechanical cleaning performance on this particular level.

4. Not talking to staff

Why is this a mistake?

Sterile services staff deals with surgical instruments and decontamination equipment every day. They see the instruments on both side of the process and are the first ones to spot problems as well as process inefficiencies. Staff knows the routines and will be able to provide information about the flow of instruments through the department as well as identify areas for improvement. Knowledge of routines can also help identifying whether there are problems with dried contamination on the surfaces of the instruments after weekend break or in the morning where instruments were left to dry overnight.

Verification of process efficacy is best done on the instruments most commonly reprocessed which are challenging for decontamination

equipment. Sterile services staff is able to provide information on these instruments and will be able to select those, they know or suspect cause issues. Most departments do visual inspections prior to packaging and sterilisation and feedback from these checks should be readily available. Additionally feedback will be provided on the condition of instruments after the cycle and its impact on following decontamination procedures.

Not involving staff does not allow for spotting problems with use of machines, loading and instrument handling that may be a primary reason for poor performance of washer disinfectors but not directly connected to the processes themselves.

How to solve this issue?

Involve sterile services staff in troubleshooting and capture their feedback.

Do not rely purely on information from sterile services manager as in case of larger departments they may not have the hands on experience with all types of instruments.

Feedback should focus on operation of washer disinfectors but at the same time it should provide information about the entire environment. Loading procedures, need for additional equipment or accessories to further aid these processes can be identified and rectified.

At this stage feedback may also highlight problems with comprehension of decontamination procedures and issues with training. Daily monitoring is a source of invaluable feedback especially when it comes to non-standard surgical instruments who may require closer attention and perhaps additional cleaning instructions or accessories.

Additionally monitoring staff will help to have an eye on problems indirectly connected with performance of the washer like new members of staff, particular types of instruments or medical procedures, logistics and transportation of equipment.

In cases where staff is instructed to record and report issues it is possible to track and trace problems and performance of processes. This in the long term will help to eliminate even the less likely causes of performance drops like detergent ageing or differences in water quality between seasons.

Taking into consideration the value of the feedback sterile services staff can provide it is definitely beneficial to engage with them in the optimisation of cleaning and disinfecting cycles.

A close-up photograph of surgical instruments, including a pair of forceps and a scalpel, arranged in a circular pattern within a washer disinfector. The instruments are metallic and show signs of use. The background is slightly blurred, focusing attention on the instruments.

Summary

Optimisation of washer disinfector processes is a complex and laborious task that requires great experience.

There are many factors and variables that influence washer disinfector performance from the choice of instruments and their location in the chamber through choice of testing methods to the knowledge of supporting processes. Holistic approach is essential as washer disinfectors fit in much wider context.

I strongly believe in the worst case scenario approach. It should not be a surprise that as a result it will be discovered that some instruments will not get cleaned properly in a particular washer disinfector no matter what cycle profile and chemistry are used (within reasonable boundaries). Identification of such instruments is a major important outcome of the optimisation process as in these cases additional decontamination steps will need to be designed prior to the washer disinfector cycle. In turn it may prove beneficial for the overall performance of the processes.

I also believe that optimisation is a gradual process and needs to be linked directly with periodic performance monitoring. On top of that proactive staff involvement is another essential element as this way the entire team works towards the ultimate goal of having instruments and equipment that is safe to use.



About the author

Pawel de Sternberg Stojalowski MBA, MSc, BSc is a research and development consultant specialising in solutions for decontamination of complex surgical instruments. He's been involved in the decontamination sciences since 2007, designing equipment and processes for cleaning, disinfection and sterilisation of surgical instruments. He created Aseptium to innovate decontamination sciences and develop solutions that will become the answer to the growing complexity of surgical instruments. If you are interested in exploring the subject further visit www.aseptium.com



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