BencoDental
Driving Dentistry Forward, Together

THE OFFICE NUCLEUS™:

Centralized Sterilization & Supply for a More Efficient, Productive Practice

BENCO DENTAL | WHITE PAPER


SciCan

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Abstract

During the COVID-19 pandemic, Benco Dental's *Future of Dentistry Task Force* sat down with a clean sheet of paper and a question:

How could dental practices improve efficiency and productivity as the pandemic recedes?

The answer soon became clear: the sterilization and resupply area of dental offices, still reliant on 1980s-era design for processing dirty equipment and managing inventory, is ripe for redesign.

By most measures, the sterilization and resupply area is the beating heart of a practice, touching every patient and procedure. Supplies and sterilized instruments go together like a restaurant's cooking and dishwashing: if either slows, the entire operation backs up. Centralizing and optimizing them only makes sense.

After more than a year of detailed research, scientific testing, and creative simulations, Benco's most experienced thought leaders across multiple disciplines came up with the solution: **THE OFFICE NUCLEUS.**

Derived from the lean manufacturing method popularized by Toyota, it is a redesign and efficiency-booster that centralizes and reimagines the sterilization/resupply area for the age of automation. Developed exclusively as part of Benco's ongoing practice ergonomic and efficiency studies, the Office Nucleus repositions sterilization and resupply

next to each other, keeping the treatment process moving with everything close at hand. It incorporates automation in the form of cassettes and thermal disinfectors, utilizing a highly efficient unit that studies show saves time and requires little training.

Less staff time and better inventory management mean reduced operating costs and significantly higher ROI over the life of a practice: even conservative estimates place the Office Nucleus's annual savings at about $64,000, compared to a manual sterilization setup and ordinary supply closet.

Abstract

This white paper details the many benefits to:

efficiency, productivity, and patient care

– all realized by the Office Nucleus.

The concept is intuitive, orderly, and organized, creating a smooth internal design that can be implemented in offices large and small. The Office Nucleus stands as the first ground-up rethinking of the dental sterilization/ resupply area since COVID changed dentistry, a workflow breakthrough that makes practices faster, safer, and more efficient. At a critical time when efficiency Is more important than ever—amid rising salary costs, difficulties in hiring and retention, busier patient schedules, and stubborn inflation–any solution that enables dentists to do more with less deserves serious consideration.

Less Automation
& Sub-optimal Organization

means → **More Wasted Time & Mundane Effort**

(Source: Hu-Friedy market survey results)

TIME SAVED
by implementing cassette sterilization (vs. manual scrub, rinse, sort, etc.):

5-10 Minutes
per procedure

(Source: SciCan)

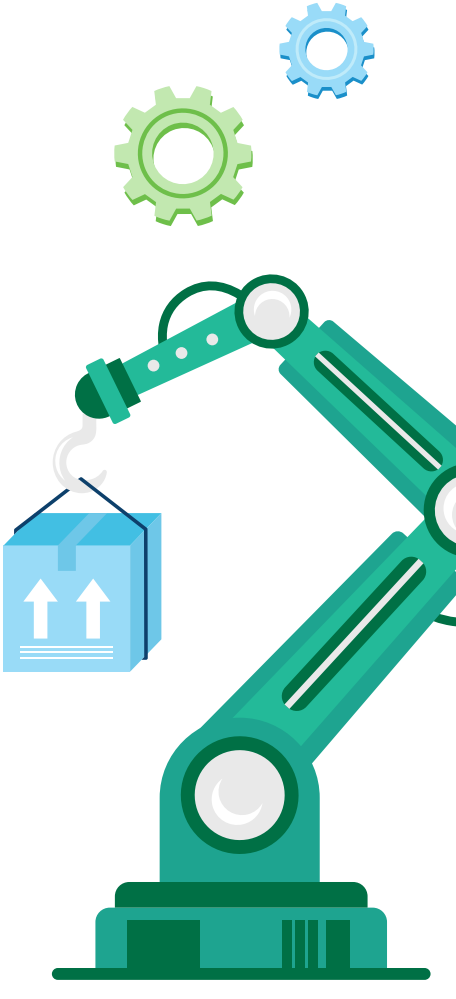
TIME SAVED
by implementing automated instrument washing (vs. manual cleaning):

60 Minutes
per nine procedural setups

The Office Nucleus's Organizing Principle: **Lean Manufacturing**

It all comes down to ***jidoka***. That's a Japanese term meaning "automation with a human touch," or "intelligent automation."

Jidoka is a key concept behind Toyota Motor Corporation's Toyota Production System (TPS), often referred to as the original "lean manufacturing system."[1] Developed by Kiichiro Toyoda, the company's founder and second president, lean manufacturing focuses on eliminating all waste in pursuit of the most efficient production methods, with waste defined as excessive inventory, extraneous processing steps, or defective products.



Although the system was developed for automobiles, it has been studied and adapted worldwide by manufacturers and other businesses seeking to improve performance. Just last year, the Harvard Business Review published an analysis[2] determining that Toyota, "the originator of lean concepts," fared better than most competitors in withstanding pandemic-related supply chain disruptions. The author attributed this relative success to the automaker's lean thinking approach. "The biggest thing most people overlook about TPS is that it is a system designed for learning," the review stated. "This focus on learning and continuous improvement occurs at multiple levels," ranging from the shop floor to the executive suite.

PROJECT TIP:

UNDERSTANDING THE LEAN APPROACH TO PROCESS IMPROVEMENT

Lean thinking means employing methodology for eliminating waste to continually improve a process, with the goals of saving time, improving quality, and reducing costs. This thinking was applied to the development of the Office Nucleus to reduce factors like unnecessary motion or transportation, and waiting (in the form of idle people or slow/idle equipment).

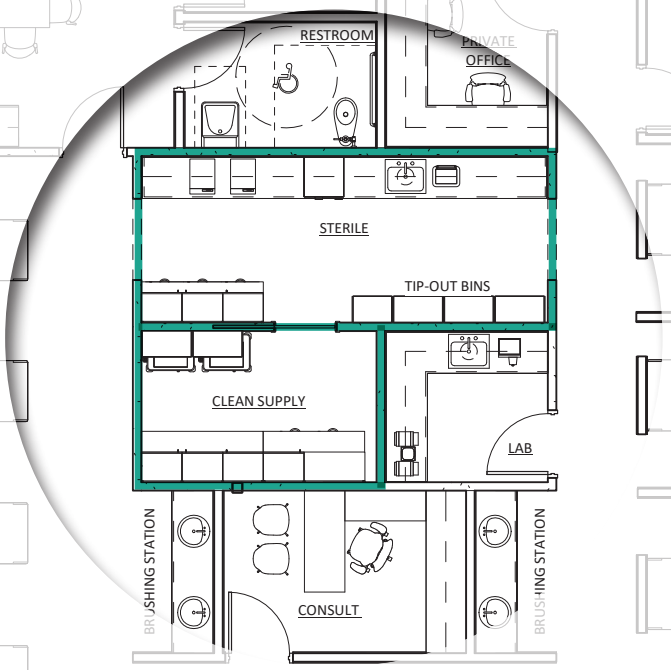
Lean Thinking in Dental Offices

Cars are not teeth, but the conceptual bases of lean manufacturing bear much in common with dentists and their practices. Like the practitioners of Toyota's lean manufacturing system, dentists are focused on scientific learning and continuously finding ways to improve patient care - and the bottom line.

> **A 2018 study published by the National Institutes of Health's National Library of Medicine found that two-thirds of dentists surveyed attended continuing education activities, for career development and "to fulfill their personal learning needs."**[3]

The quest for learning applies directly to dental offices, which are similar to manufacturing operations. Like factories, practices have input (the patient who comes through the door); a manufacturing-related process (treating that patient); and output (the patient leaving post-treatment). Lean thinking simplifies and reduces those steps, ensuring that practices perform more of the functions that add value for the customer–in this case, the patient–and less of those that don't.

A lean approach uses a methodology for eliminating waste to continually improve a process, saving time, improving quality, and reducing costs. In the dental office, that means reducing inefficiencies such as unnecessary motion and waiting, in the form of idle people or slow/idle equipment. As we will examine further, that's exactly what the Office Nucleus does.



PROJECT TIP:

PAIR THE "JUST RIGHT" OPERATORY WITH THE "OFFICE NUCLEUS" FOR DENTISTRY'S MOST EFFICIENT OFFICE

Benco Dental's detailed ergonomic studies have proven that right-sized operatories not only reduce the costs of cabinetry and construction, they also put everything within easier reach, with less stretching and wasted motion. The "Just Right" operatory design is about 18% smaller than traditional rooms, meaning that six ops can be built in the space of five. Combine the two for dentistry's most efficient facility.

The Problem: Productivity

Thinking lean is especially needed during this time of significant challenges to the practice of dentistry. Research shows that the dental sector "is facing a serious workforce shortage"[4] – due to factors such as COVID and declining enrollment in dental assisting and hygiene programs–that is unlikely to end soon. Those who are hired earn higher salaries, propelled by the staffing squeeze and persistent inflation.[5]

The swirl of obstacles makes forward-thinking efficiency—resulting in greater productivity—vitally important. Maximizing productivity brings long-term benefits such as higher profitability, additional value to patient experiences, and enhanced personal well-being of dental team members. In today's digital world, productivity is driven by automation,[6] and research shows that automation specifically in dental sterilization centers saves money and makes staff more productive.[7]

Yet efficiency is not just about speed—it's about smarts.

Simply working faster is never the answer for streamlining the flow of patients, team members and supplies. This approach tends to lead to frustration, fatigue, and burnout. What, then, is the single best way to heighten productivity? Industry professionals have yet to reach a consensus. Some experts single out front desk operations and scheduling as most crucial, and they certainly have a point.

PROJECT TIP:

OVERCOMING FEAR OF AUTOMATION

In many ways, employers and employees are very much aligned in their views about automation: automating more mundane and repetitious tasks in a practice is a good thing for both team and business health.

The Problem: Productivity

Others say *patient flow* is the real key to dental office efficiency—also a reasonable argument.

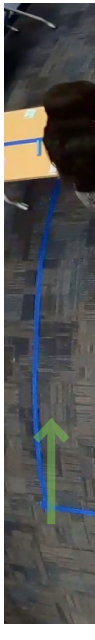
Certainly, we've heard from practical-minded people arguing that *mechanical rooms* are the most important part of every practice, because without them, no work can get done. Fair enough.

All those answers are at least partially true, within their obvious limits. In the broadest sense, it seems clear that practitioners who successfully employ proven, methodical approaches will save money and time, effectively offsetting rising wage costs and persistent problems like shrinking reimbursements.

Yet the question still lingers:

How can practice owners logically approach the goal of measurably improving productivity at a time when it's most needed?

Perhaps more importantly, how should doctors best focus their investments in productivity to deliver measurable ROI?



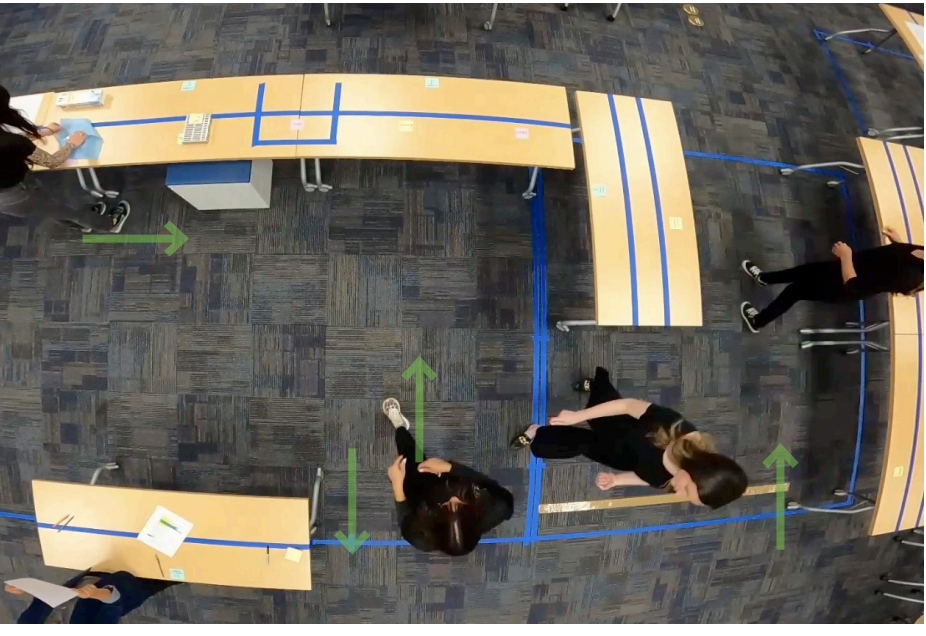
AUTOMATION INDEX

BY THE NUMBERS

(Source: International Federation of Robotics)

70% *of workers* believe automation will bring opportunities to qualify for more highly skilled work.

This screenshot from a Benco Dental time lapse video shows one example of a simulation performed to test new ideas ***for adding productivity to sterilization and resupply.***



(Source: Wills Tower Watson)

57% *of employers* want to use automation to improve human performance and productivity.

(Source: McKinsey & Company)

33% *of US jobs* are created for occupations that didn't exist 25 years ago.

Our Methodology

Benco's **Future of Dentistry Task Force** vowed to find out. Assembled during the pandemic, the cross-country team—whose members boast more than a half-century of in-house design experience and knowledge—realized that dentistry won't be returning to "normal." COVID had changed the conditions of operating a dental practice or clinic too much. Given that reality, team members applied innovative thinking to the issue of how to get on the other side of COVID—and the best way to make practices more productive for the long term.

The team quickly focused on the sterilization and resupply area. On one hand, a poorly organized sterilization process could put patients and team members in danger, and, at a minimum, slows down the practice. On the other hand, when organized and managed correctly, all instruments are cleaned, safe, and waiting for the next procedure.

In short, sterilization and resupply touch everything. Centralizing and automating them yields improved efficiency and sterility, resulting in vital time and cost savings.

The sterilization and resupply area is especially ready for a refresh because dental facilities have relied for decades on 1980s-era design.

Until now, resupply and sterilization office layouts have been dictated largely by personal preferences and assumptions, without hard science to back them up.

FOOD FOR THOUGHT:

Consider a typical restaurant. While every part is important, the 'back of the house'—containing the kitchen and dishwashing areas—is most critical. A lot can go wrong when seating diners or filling water glasses, and a restaurant will still function acceptably well. But if food production and/or the supply of clean dishware, cutlery and cooking utensils backs up, the entire restaurant falls apart. More than that, food quality and even safety can suffer. It's easy to see how dental practices face similar, but far more serious, challenges.

Our Methodology

Once our task force members focused on applying lean thinking to the sterilization/resupply area. They invested more than a year performing simulations, tests, drills, and exercises aimed at (a) assessing prevailing current procedures, (b) testing proposed improvements and recording the results for digital analysis via time lapse video, and (c) applying those results to formulate best design practices, using building information modeling software.

LABOR COSTS

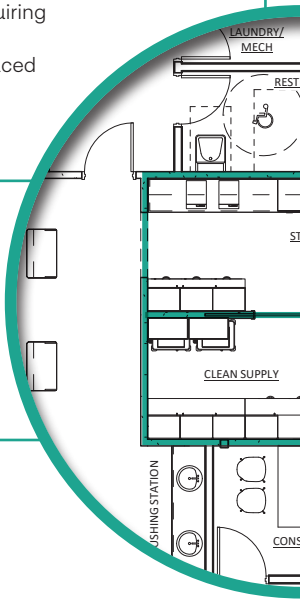
Healthcare inflation rises hand in hand with labor costs, requiring providers to strike a balance between skyrocketing wages, patient care, and profitability. What systems can be introduced to help offset high wages with greater efficiency?

SUPPLY

How can supplies (processed instruments and consumables) be inventoried and made easily accessible via innovative storage, ergonomics, electronic management, and artificial intelligence (AI)? How can dentists reduce waste to ensure that all necessary items are available on demand?

HUMAN RESOURCES

Top notch employees don't just cost more–they're harder to find. How can dental offices make the most of their human capital? In what ways can work be automated to simplify training and everyday tasks—and make workers want to stay?

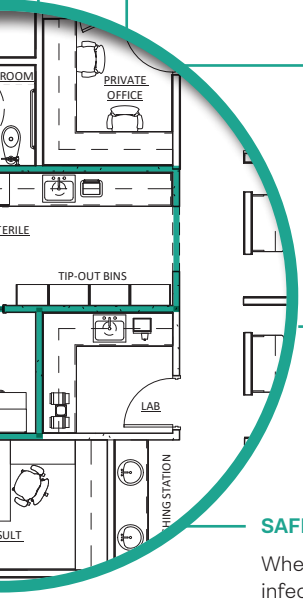


SCALABILITY

On a good day, healthcare is messy and chaotic. How can processes be implemented and machines be added to accommodate unpredictable patient levels, without burdening team members?

SETUPS

How can innovative cabinetry, bins, and carts create a storage system that puts everything necessary for each operatory within easy reach, and in the same place every time, so setups come together effortlessly?



TECHNOLOGY

Where can automation really make a difference? How can instrument washers, cassettes, and cabinetry—plus space planning via advanced information modeling software—combine to make the sterilization and resupply area more than the sum of its parts?

STERLIZATION

Can sterilization be systemized and automated to reduce wasted motion and create reproducible, scalable, easily teachable machine-led processes that add efficiency and safety?

SAFETY

Where can human error be reduced to improve general infection control as well as the safety of patients and team members? How can practices ensure that dirty and clean items never mix?

Our Solution: The Office Nucleus™

The clear solution:
The Office Nucleus.
This white paper proposes that the sterilization/resupply area of dental offices be centralized into a single unit, redesigned, and automated to boost productivity, reduce costs, and potentially create opportunities for seeing more patients. A set of carefully developed best practices applicable to virtually any office by designers specifically trained in its execution, the Office Nucleus is a crucial yet practical and cost-effective element of practice design. It harmonizes the elements of the sterilization/resupply chain, putting instruments and supplies within easier and more intuitive reach. With its automated instrument washers and cassettes, this innovative approach also increases safety, standardizes procedures, and cuts down on mundane tasks for team members.

In today's marketplace, more advanced automation products are available than ever for dental offices. They are proven to process instruments faster (stericenters, cassette systems), store and supply them better (pass-through cabinets), and more effectively manage consumables (using electronic inventory tools and AI).

Yet these efficiencies have not been fully integrated by office design firms and product manufacturers, nor given sufficient attention by practice owners.

It's time for that to change.
Automation and technological modernization are essential for dental practices, as is finding synergy between equipment, cabinetry, and space planning. Too often, these items are arranged and located according

OFFICE NUCLEUS ADVANTAGES:

REIMAGINES the central organism of every practice (supply and sterilization) for a new, post-COVID environment.

SEPARATES 'clean' and 'dirty' into two individual rooms with a pass-through connection. Bonus: it also improves air quality.

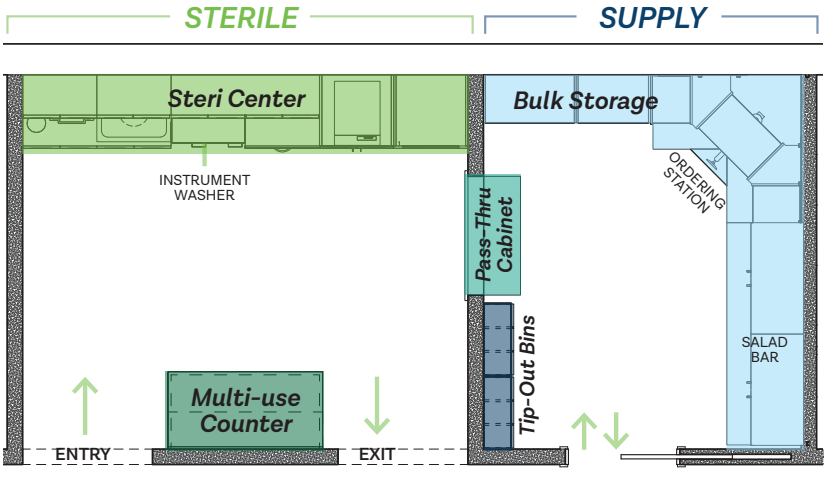
AUTOMATES instrument processing to reduce team member intervention and boring, repetitive tasks.

DELIVERS a faster, safer, and more efficient system for processing instruments and managing inventory.

PROVIDES a predictable workflow that makes team members happier and more efficient at a time when employee hiring and retention are a bigger challenge than ever.

REDUCES bottlenecks and enables the dental team to deliver better patient care.

The Ideal Scenario



to personal preferences, with space plans based on assumptions about how people think things may work best together. That's like tossing darts at a dartboard and hoping they hit the center.

The Office Nucleus removes guesswork from the equation by offering specific, research-based improvements for achieving the best interactions between people and things. It places sterilization and resupply next to each other, repositioning these two key areas to keep equipment and instruments closer to treatment rooms. The better ergonomic design is matched by the right equipment.

The Sterilization Center in the Office Nucleus uses an instrument washer with a cycle time as fast as 44 minutes. Because the process is automated and processes more instruments than a traditional ultrasonic cleaner, instrument throughput is faster, without the danger of cross-contamination or system breakdown. Plus, any team member can operate the system with minimal training.

The Office Nucleus also reimagines the resupply function. Consumable supplies are stored in a Clean Storage Room—within proximity and in sync with sterilization so supplies flow out to treatment rooms effortlessly, along with clean instruments. This dual-room design imposes order on managing instrument processing–one of the messiest and most chaotic parts of a practice–optimizing the flow of people and supplies, limiting the risk of cross-contamination and infection.

The result: a flexible system with faster and more efficient sterilization; fewer wasted steps; reduced manual labor; increased flexibility for patient volume—and heightened efficiency. When practitioners get chairside, everything they need for a procedure will be right there and ready to go. The Office Nucleus enables the team to organize everything, keeping people and processes moving smoothly.

In essence, it is lean thinking for a dental practice.

The Office Nucleus™ Implementation

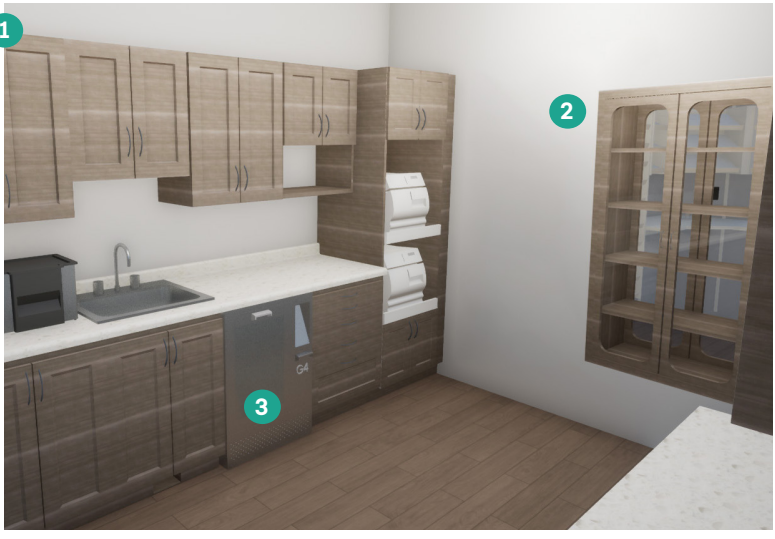
How does a dental office implement the Office Nucleus?

The new structure requires a modest investment in interior design, space planning, cabinetry, and equipment, but that investment will be offset by greater efficiency and organization for years to come.

The four essentials of every Office Nucleus:

1. SEPARATE ROOMS for sterilization and clean supply.

2. PASS-THROUGH CABINET between sterilization and clean supply for instruments.



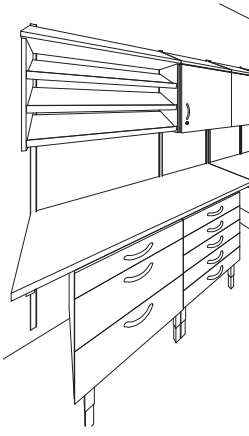
3. AUTOMATED INSTRUMENT PROCESSING
in the sterilization room (incorporated into stericenter) and water purification to prevent water quality-related malfunctions or clogs.

4. CONSUMABLES STORAGE
in the clean supply room using procedure and supply carts.

Implementation Process

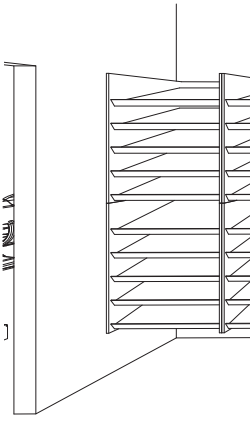
STEP 1: Design

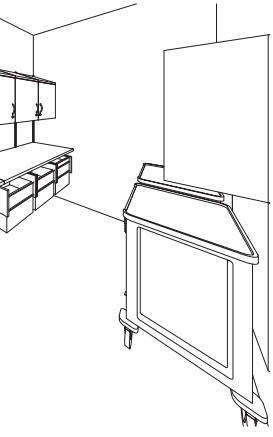
Adding an Office Nucleus to a practice's space plan must be done by trained designers—ideally as part of a complete build-out or renovation, but an experienced designer can adapt the Office Nucleus into an existing office. The design process is at once simple and complex: from the practice owner's standpoint, it means relying on trained designers to apply complex best practices proven to increase throughput and efficiency.

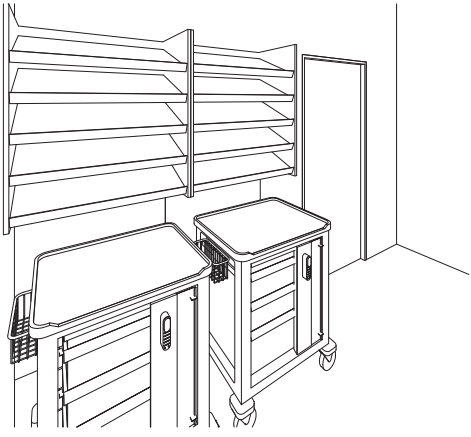


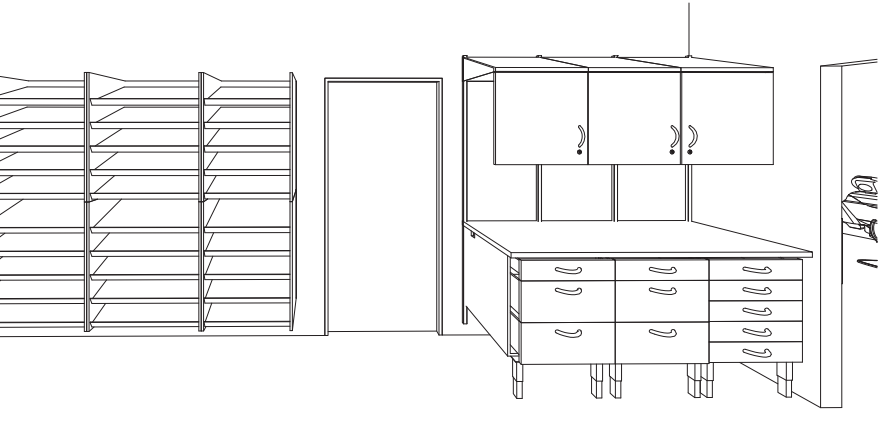
STEP 2: Choosing equipment, stericenter, and storage.

Office Nucleus best practices for design allow plenty of room for choosing different brands of equipment. Automated instrument washing is key to adding speed and reducing staff oversight, and these devices are available from multiple manufacturers. However, the Office Nucleus was designed around Herman Miller Co/Struc modular and movable storage for supply and consumable storage because of its immediate practicality, flexibility, expandability, and affordability.









Implementation Process

STEP 3: Automating consumable supply management.

A system for electronic ordering and inventorying must be included as part of the implementation process, including a station (computer or tablet) at clean storage for reordering within easy reach of inventory.

STEP 4: Retraining.

The system is intuitive, but some training is still required. Current team members will instantly appreciate the simplicity compared to current procedures. Training new team members is also easier because there is less manual labor and fewer steps—meaning fewer opportunities for error.

OPTIMIZED EQUIPMENT SUGGESTIONS

4 OR LESS OPERATORIES

10' STERILIZATION CABINETS

- 1 Instrument Washer
- 2 Full Size Autoclaves
- 1 Small Tabletop Ultrasonic
- 1 Water Filtration System

5 - 7 OPERATORIES

12' STERILIZATION CABINETS

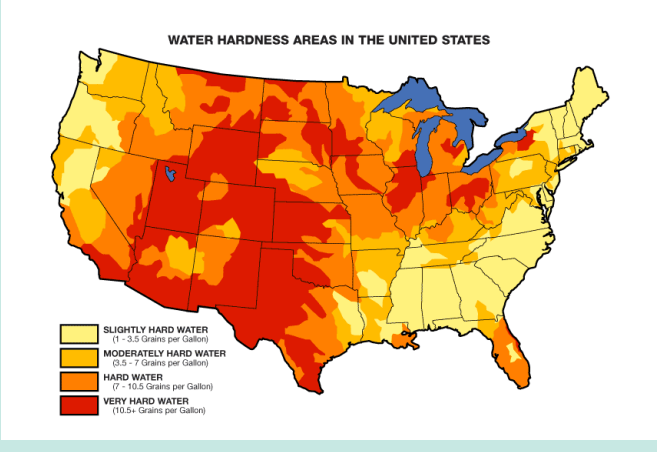
- 1 Instrument Washer
- 2 Full Size Autoclaves
- 1 Small Tabletop Ultrasonic
- 1 Water Filtration System

7 OR MORE OPERATORIES

14' STERILIZATION CABINETS

- 1 Instrument Washer
- 2 Full Size Autoclaves
- 1 Speedclave
- 1 Small Tabletop Ultrasonic
- 1 Water Filtration System

MANAGING WATER QUALITY

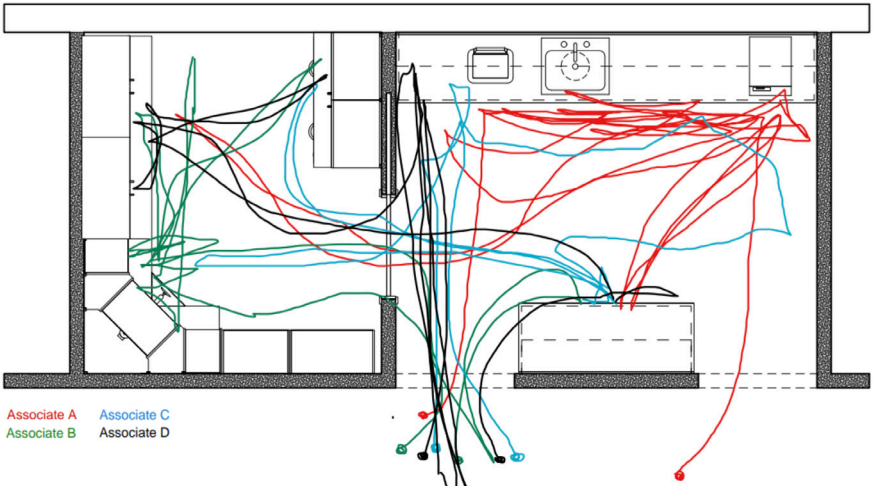


Hard water can cause various sterilization equipment to malfunction—but hard water can be fixed in almost every dental practice with an integrated filter/softener system.

Testing can determine whether mitigation is required. If needed, bottled water is one solution. A system like VistaPure that supplies water at the proper pH level for autoclaves, bottles, ultrasonic cleaners, and instrument washers, is better, easier, and less expensive over the life

By The Numbers

BEFORE

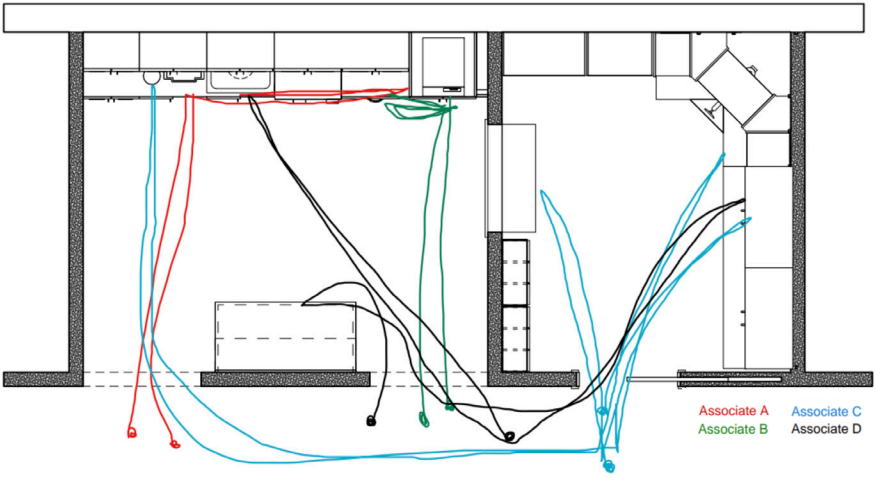


Once a practice has the Office Nucleus in place, owners will naturally expect a substantial return on investment. They will not be disappointed. While calculating ROI as a prerequisite for prioritizing productivity can be tricky, research from team members who currently or formerly worked in dental practices shows that an Office Nucleus setup will yield significant savings in time, cost, and training.

Conservative estimates put the annual cost savings at approximately $64,000.

It's partly a matter of ergonomics. As this white paper has demonstrated, the Office Nucleus increases efficiency in

AFTER



practices by placing supplies and instruments closer together and nearer treatment rooms, reducing the number of steps staff members need to take every day. Less time moving between rooms means faster room turnover, and significant savings.

Beyond basic efficiency, experts say increasing productivity in the crucial areas of sterilization and resupply–the Office Nucleus's focus–will save substantial time and money.

A Dental Products Report ROI guide,[8] for example, found that using new technology in sterilization, especially instrument washers and cassettes, will "save a significant amount of time each month."

By The Numbers

“An instrument washer dramatically reduces the amount of counter space required in sterilization and it really drives down labor costs,”
said one doctor quoted in Dental Products Report ROI guide.

HuFriedyGroup, a dental instrument manufacturer, also found that an efficient sterilization area can be a significant source of savings. “There are three ways to increase profitability in an office: increase revenues, reduce expenses and raise productivity,” the company wrote in a selling guide.[9] “All three goals can be addressed by creating an efficient sterilization environment. A well-designed instrument management system and sterilization area can create an environment that is systematic and efficient.”

There is also evidence that the Miele Instrument Washer specifically, which the Office Nucleus can utilize, yields higher productivity. Miele reported[10] that using the washer saves 1.5 hours per day, or $9,642.85 per year, in part because it does not require pre-soaking. The company described the estimate as conservative. The Office Nucleus’s use of cassettes for storing instruments in the sterilization center will also likely result in additional savings. The HuFriedyGroup document reported that 98 percent of offices surveyed “are satisfied with their investment in cassettes.”

THE BOTTOM LINE:

The Office Nucleus is lean manufacturing applied to a dental office. It will improve productivity, lower stress, and increase team member retention. In an environment where staff members are difficult to retain, costs are increasing, and practice profitability is under pressure, the innovative Office Nucleus will position dental practices to grow and succeed in a post-pandemic world.

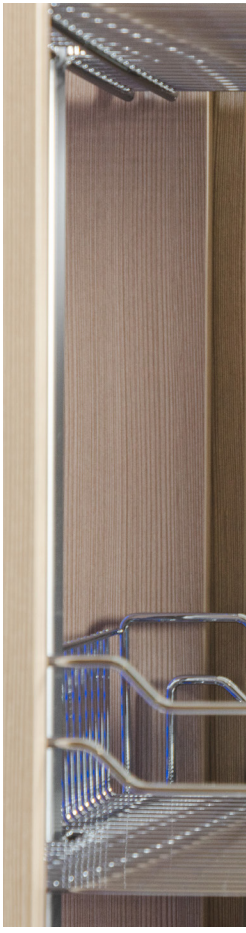
Practice Size	Time Savings/ Year (hours)	Cost Savings/ Year
2 Doctors 3 Hygienists	2,560	$64,000
4 Doctors 6 Hygienists	5,120	$128,000
12 Doctors 18 Hygienists	15,360	$384,000

Example based Office Nucleus time savings including the use of automated instrument processing and cassette system vs. ordinary processing and supply closet. Examples assume 12 minutes total time savings per patient turnover at 27 treatment patients per day (two doctors) and 37 hygiene patients per day (three hygienists) with average labor costs of $25 per hour.

Conclusion

Benco Dental's Office Nucleus concept is a major step forward in improving productivity, efficiency, and safety in dental offices. By centralizing the all-important sterilization and resupply area, it upends traditional workflows, optimizing the movement of people and supplies, and mitigating the risk of cross-contamination and infection. Adapting widely admired lean manufacturing techniques to the dental profession, the Office Nucleus creates an efficient space at the heart of every practice with a single entry and egress, eliminating cross traffic and wasted motion.

Best of all, this exclusive and technologically advanced design concept will result in lower costs, improved productivity, and measurable time savings for practices that adopt it. At a time of great challenge, nothing could be more important.



Endnotes

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This white paper is one in a series of information on best practices.

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