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The Economic Case for Implementing Automated Tissue Removal and Bone Milling Systems IN ORTHOPEDIC SPINE PROCEDURES

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GRAPHIC DESIGN AND PRODUCTION

Cheryl Patrick **EDITOR** Jodi Licalzi

tions@ast.org.

CONTENT EDITOR Kevin Frey, cst, ма, fast

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The Economic Case for Implementing Automated Tissue Removal and Bone Milling Systems in Orthopedic Spine Procedures

LISA O'SULLIVAN, PhD, ANGELA ENOCHSON AND CARLYNE CAINS

Automated tissue removal and bone milling systems represent significant advancements in orthopedic spine procedures that involve preparing autologous bone grafts, considered the gold standard for bone repair because of their biocompatibility and regenerative properties. Automating autologous bone preparation presents a compelling opportunity to streamline the surgical technologist's (STs) workflow while maintaining consistency in the size and cleanliness of bone samples.

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Celebrating and Honoring Surgical Technology Volunteers

LISA DAY, CST, CSFA, FAST, MA, AST DIRECTOR

BOARD MESSAGE

pril marks National Volunteer Month, a time to honor those who selflessly give their time and expertise to support their communities and professions. In surgical technology, this month holds special significance as we recognize the Certified Surgical Technologists (CSTs) and Certified Surgical First Assistants (CSFAs) who are dedicated to advancing the profession and ensuring the highest standards of patient care.

The Priceless Gift of Time and Expertise

Volunteering is always a generous act, but for CSTs and CSFAs, it carries even greater significance. The operating room demands technical skills, endurance, and advanced critical thinking, requiring long hours and unwavering focus. Yet, despite these challenges, many surgical professionals go beyond their clinical responsibilities to give back to their profession through advocacy, education, mentorship, and leadership.

The dedication to professional organizations, educational institutions, and legislative advocacy reflects a deep passion for both the field and the patients they serve. Time is one of the most valuable gifts a person can offer, and our volunteers continuously find ways to contribute – whether advocating for stronger certification standards, assisting with exam development, or leading hands-on training workshops. Their commitment ensures that surgical technology continues to grow, evolve, and maintain the highest standards of excellence.

How to Get Involved

For CSTs and CSFAs looking to make an impact through volunteerism, there are many ways to contribute. These efforts not only strengthen the profession but also provide personal and professional fulfillment. Some examples:

• Embrace your role as a preceptor, whether it be with new hires, students or new graduates. Be a guiding light to those that are new to the profession or learning a new specialty. You can make all the difference in someone's career.

- Advocate for stronger legislation to enhance patient safety and professional standards. Even if you are in a state with established laws or want to fight for legislation, be a big voice locally for stronger hiring practices and elevated standards of education and credentials.
- Volunteer for medical mission work, assisting in lifechanging surgeries worldwide. AST and other nonprofit organizations seek volunteers for many specialties and locations across the world.
- Serve on your state or national committees or boards to help shape the future of the profession. Not ready to take the plunge to run for a position or office? Ask your leadership team if they need an extra hand. There are many ways to contribute your ideas, knowledge and strengths as a practitioner. Volunteer to speak at a workshop or submit your Consent to Serve for a committee that interests you!

A Heartfelt Thank You

The Association of Surgical Technologists (AST) proudly recognizes and deeply appreciates the unwavering dedication of those who volunteer their time to advocacy, education, mentorship, and community service. These contributions are instrumental in advancing surgical technology as a respected and impactful profession, ensuring continued growth and excellence in patient care.

Whether supporting local initiatives or participating in global outreach, surgical technology volunteers make a lasting difference – not only in the lives of patients but also in shaping the future of the profession.

On behalf of the AST Board and staff, we extend our heartfelt gratitude to all surgical technology professionals who selflessly give their time, skills, and expertise to elevate the field. Your work and dedication ensure that patients receive the highest standard of surgical care – both in your communities and across the globe.

Your service is truly invaluable, and we proudly celebrate your contributions. Thank you for all that you do!

Associations are built by volunteers.

With more than 500 volunteers elevating our mission for the highest standards in surgical patient safety,

AST says THANK YOU

to all of you who have committed your time, energy and leadership to push our mission forward.



Happy National Volunteer Month



AST News

AT A GLANCE

10134

AST'S SURGICAL TECHNOLOGY CONFERENCE Register Now!

(95th percentile)



Orlando – June 5-7, 2025, with hands-on workshops June 4

Hilton Orlando Buena Vista Palace – across from Disney Springs

Registration is open for AST's national event where we bring together surgical technologists from around the country, as well as industry experts, supportive organizations and others to enhance the profession and celebrate the role.

AST is thrilled to partner with Intuitive and provide multiple opportunities to learn about the da Vinci robotic system and get up close to see how to navigate the robot and troubleshoot the system.

Ready for the next step in your career? Don't miss the 3-hour Beyond the Mayo: Career Development workshop where you will be guided on how to fine tune supportive career documents and pathways for career advancement so you can be confident about your next move.

Start planning for the biggest celebration of the year during AST's opening night party Thursday evening from 7-9:30. Theme: Miami Vice.

Don't miss your chance to connect with vendors supporting the profession and learn about the latest techniques, equipment or career opportunities when you visit all the vendors during the Exhibit Hall on Thursday and Friday.

Plus, earn 16 CE credits, with the opportunity to learn additional credits with hands-on workshops. This and more when we convene in June. We can't wait to see you in Orlando!

Find more details the link to register or book your room at www.ast.org

APPLY FOR FAST Deadline is Coming Up - April 15

Interested in being considered for the highest honor of the profession? This prestigious honor began in 2006 as an opportunity



to recognize those individuals who have upheld the highest professional, ethical and moral standards and traditions of the surgical technology profession, and whose professional activity has been devoted to the advancement of the profession toward improving the quality of surgical patient care.

Applications are available online and due by April 15.

Selection Criteria: To see if you meet the criteria to apply to become a FAST, visit www.ast.org – Members – Fellows of FAST – and click on the link selection criteria.

To apply for FAST, visit www.ast.org – Members – Fellows of FAST. Use your login information to sign into your AST account, and look for the FAST application.

BEST PRACTICES AST Guidelines for Best Practices

Did you know that AST has developed a a library of guidelines for best practices? From surgical technologist responsibilities to counts and positioning, to aseptic techniques, disinfection and sterilization and surgical attire, AST provides these resources so you can remain at the top of your game. After careful research and development, the AST Board of Directors have approved a multitude of best practices developed by the AST Education and Professional Standards Committee.

Check them all out online at www.ast.org.

WRITE FOR US Calling All Writers!

We are always looking for new CE authors and surgical procedures that detail the latest advancements in the surgical arena. We'll also help you every

step of the way, AND you'll earn CE credits by writing a CE article that gets published! Here are some guidelines to kick start your way on becoming an author:

- An article submitted for CE must have a unique thesis or angle and be relevant to the surgical technology profession.
- The article must have a clear message and be accurate, thorough, and concise.
- It must be in a format that maintains the Journal's integrity of style.
- It must be an original topic (one that hasn't been published in the Journal recently).
 - Ready to get started? Email us at communications@ast.org.

MILESTONES Happy Anniversary!

Congratulations to the following state assemblies as they celebrate anniversaries this month! AST appreciates your hard work, dedication and all your years of service for making our state assemblies the backbone of this organization.

- Alaska 10 years
- Arizona 21 years
- Idaho 23 years
- Illinois 24 years
- Iowa 21 years
- Kansas 21 years
- Maine 19 years
- Michigan 25 years
- Missouri 25 years
- New Hampshire/Vermont 18 years
- New York 25 years
- Pennsylvania 23 years
- Wisconsin 25 years





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FREE CEs FOR 2025.

Check out the new free CEs for 2025 - an exclusive AST member benefit. Each year, members receive 3 CEs just for being a member. To view this year's free CE, log into your member account on the AST website at www.ast.org. Whenever. Wherever. AST is making continuing education more accessible—more convenient—**and even FREE**. Now you can look, listen and learn from our quality education presentations that have been archived from national conferences and advanced specialty forums. Specialty topics range from orthopedics, OB/GYN, general and neurosurgery. You will actually see the medical professionals and slides as they were presenting their

Topics include Intrauterine Repair for Spina Bifi da, Pelvic and Acetabular Surgery, Infertility, Drug Abuse During Pregnancy, ACL Surgery, Issues in Patient Care, Advances in Spine Surgery, Epithelial Ovarian Cancer, and Preventing Preterm Delivery. Any or all are free to watch and study.

Whenever you're ready, take the examination—there is absolutely no charge. If you pass, you will be offered the opportunity to purchase the accompanying CE credit and register it with AST at a very affordable price.

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FAST

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FAST applications due April 15. www.ast.org – Members – Fellows of AST



Your State Assembly and You

Olalekan Olakanmi, CST, FAST State Assembly Leadership Committee

STATE ASSEMBLY

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There is a common belief that a born leader naturally excels in leadership roles. Some argue that if one is not inherently a leader, there is no point in pursuing leadership positions. Perhaps this is why Dwight D. Eisenhower defined leadership as "the art of getting

someone else to do something you want done because he wants to do it.³¹ True leadership is about cultivating a spirit of service, following the guidance of mentors, and inspiring others to act.

As a surgical technology student at Kingsborough Community College in New York, I developed a deep passion for the profession, particularly in learning about surgical instruments and procedures. This passion motivated me to explore ways to promote the field and unite fellow surgical technologists across different schools and states. With the mentorship of my program director and clinical coordinator, I honed my leadership skills. I had the opportunity to represent my department at a meetand-greet event as the association's president. During this event, I educated the audience about surgical technology, and many were amazed to learn about the program – some even enrolled and have since become my professional colleagues.

Many individuals hesitate to pursue leadership roles, assuming they require specialized skills or may find them too challenging. However, within the Association of Surgical Technologists (AST), leadership is driven by dedication to the profession and the support of peers. Prior experience is not a prerequisite – anyone with a commitment to growth and service can step into a leadership role.

As the saying goes, "Yes, you can do it," I once encour-

aged a colleague in the same way, and today, he serves as a board member in his state. AST leadership opportunities are both accessible and rewarding, especially when guided by experienced mentors. Success comes from a willingness to learn, grow, and contribute to the profession.

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You may have asked yourself: What leadership positions are available in my state? What are the requirements to serve? Will it interfere with my work? How can I get involved if I only know my colleagues at work?

Each state assembly is supported by dedicated volunteers who organize workshops and facilitate continuing education (CE) opportunities. Many state assemblies hold two or more workshops each year based on their specific needs. These events rely on volunteers to contribute ideas, identify relevant topics, and assist with planning. Responsibilities include recruiting speakers and managing logistics, making volunteer participation essential to their success. Your insights and engagement play a crucial role in shaping these educational opportunities and enhancing the professional development of surgical technologists.

The state assembly board consists of officers, including the president, vice president, secretary, treasurer, and five directors. Many of us began our leadership journeys as directors. Serving in this role prepares you for future leadership positions and provides opportunities to collaborate with various committees and professionals while engaging in areas that align with your interests and career goals. To be eligible, you must be an active AST member of your state assembly for at least one year.

Moreover, serving as a board member does not interfere with your work schedule. Meetings are thoughtfully planned, and as a member, you will have a role in determining the day and time that best accommodates everyone's availability.

Did you know that you can make a meaningful impact

even now as a surgical technologist? There are numerous ways to advocate for this profession. Attend your state's next workshop and engage with board members. Ask questions, get involved, and take the first step toward leadership. Your contribution matters, and your voice can help shape the future of surgical technology.

1. Eisenhower, Dwight D. Leadership and Strategy. XYZ Publishing, 1955.

AST is currently seeking speakers for our clinical webinar series, AST Educators Event and our national conferences. Have a good topic you'd like to see presented or know of a peer or surgeon who would make a good presenter?

Complete our speaker application and help us provide relevant and timely information to surg techs around the nation!

Visit ast.org - Educators - Events to get started.

What is the Role of the Bylaws Committee?

Tracy Jackson, CST, FAST Bylaws, Resolutions and Parliamentary Procedures Committee Chair





As a surgical technologist, you're already part of a community that thrives on precision, collaboration, and improvement. But what if you could take those same qualities and apply them to shaping the future of our profession? The Bylaws, Resolutions

and Parliamentary Committee of the Association of Surgical Technologists (AST) offers you the opportunity to do just that.

This committee is vital for ensuring that the rules, policies, and practices that guide our profession are up to date, relevant, and reflective of the needs of our members. By getting involved, you can help ensure that the framework which governs our field is efficient and effective.

What is the Bylaws Committee?

The Bylaws, Resolutions and Parliamentary Procedures Committee (often referred to as the Bylaws Committee) is a standing committee within AST. This committee plays an essential role in the development and maintenance of the governing documents that affect surgical technologists at both the national and state levels.

In other words, the Bylaws Committee is responsible for overseeing the Bylaws that guide how AST operates, as well as ensuring that the policies and procedures that govern the field of surgical technology are current and effective. It's a critical committee that helps make sure our profession stays dynamic and well-regulated.

What Do We Do?

The Bylaws Committee isn't just about reviewing documents – it's about contributing to maintenance and growth within the profession. Here's how we serve the members and state assemblies:

- Bylaw Amendments: The committee prepares, reviews, and recommends amendments to the bylaws. This includes amendments proposed by AST members, ensuring that the bylaws reflect the evolving needs of the profession.
- 2. State Assembly Support: We play a critical role in reviewing and advising on the bylaws of state assemblies. By providing recommendations to align state bylaws with national guidelines, we help maintain consistency across the profession. As well, assist state assembly Board of Directors with their state's assembly policies, elections, and annual business meeting procedures.
- 3. Model Bylaws for State Assemblies: We also prepare model bylaws that state assemblies can use as templates, helping them establish their own rules and governance structures through their state assembly policy and procedure manuals. As well as host frequent webinars with the assistance of AST State Assembly staff and the State Assembly Leadership Committee to provide clarification and resources.
- 4. Reporting & Communication: The chair of the Bylaws Committee serves on the Policy and Procedure Committee, where the broader policies that govern AST are discussed. We ensure that members have access to proposed bylaw revisions and provide a detailed rationale behind these changes.
- 5. Supporting the House of Delegates: We assist the House of Delegates in writing motions and serve as

tellers during the business sessions, helping keep the processes transparent and orderly.

6. Emergency Revisions: If necessary, the committee can declare an emergency or extraordinary need for bylaw amendments, ensuring that the association can adapt quickly in critical situations.

Who Are We?

The Bylaws Committee is made up of nine Certified Surgical Technologists (CSTs) from across the country, representing five different states. This diversity ensures that we have a wide range of perspectives and experiences to draw from when making decisions. The committee members are appointed by the AST President with approval from the Board of Directors, and they serve a term of two years with the possibility of serving up to three terms.

Why is This Committee Vital?

The Bylaws Committee is vital because we are the stewards of the professional integrity and structure of the surgical technology association. Our work ensures that the organization is not only governed fairly but also remains adaptable to changing needs. Whether it's advocating for updated needs or requirements, clarifying professional standards, or ensuring policy alignment, the committee serves as a backbone to the evolving landscape of surgical technology association.

What Are We Working Toward?

As we look to the future, the committee will continue to review and revise policies as needed to keep the profession on a forward trajectory.

Some of our ongoing and future goals include:

- Ensuring inclusivity and accessibility within the Bylaws and policies.
- Advocating for the most current standards.
- Streamlining the process for members to receive, review, and vote for proposed amendments or bylaw changes as needed.

How to Apply?

If you're passionate about the profession and want to have a direct role in its governance, applying for a position on the Bylaws Committee is your opportunity to make a real difference. The term commitment is two years, and members can serve up to three terms as vacancies occur. The application process is straightforward – check out the AST website for details on how to apply.

In Summary: Why Get Involved?

By joining the Bylaws Committee, you're stepping into a position where your contributions can shape the future of surgical technology. Whether it's ensuring that the national standards reflect the needs of our members, helping state assemblies align with national policies, or assisting in the crafting of policies that affect every surgical technologist, your impact will be a unique chance to give back to the profession.

For more information on how to apply or to learn more about the role, visit:



SCAN CODE

Learn more about the AST Bylaws, Resolutions and Parliamentary Procedures Committee, visit:



SCAN CODE



The Economic Case for Implementing Automated Tissue Removal and Bone Milling Systems in Orthopedic Spine Procedures

LISA O'SULLIVAN, PhD, ANGELA ENOCHSON AND CARLYNE CAINS

As healthcare facilities face increasing pressure to improve efficiency and patient outcomes while managing costs, it is essential to consider the economic implications of adopting advanced technologies. In the operating room, automation can streamline procedures, enhance precision, address workforce shortages, improve surgical outcomes, and reduce healthcare expenditures.¹ However, the short- and long-term clinical and economic benefits should be weighed against the initial investment and any ongoing maintenance costs.

BACKGROUND

utomated tissue removal and bone milling systems represent significant advancements in orthopedic spine procedures that involve preparing autologous bone grafts, considered the gold standard for bone repair because of their biocompatibility and regenerative properties.² Traditional methods for processing autologous bone involve manually removing soft tissue and milling the bone into usable particles – tasks that are labor-intensive, time-consuming, and prone to variability based on individual skill. These manual processes also pose safety risks, such as sharps injuries and hand fatigue. Automating autologous bone preparation presents a compelling opportunity to streamline

LEARNING OBJECTIVES

- Understand why it is important to consider the economic implications of adopting automated technologies in the operating room.
- Recognize the factors that impact the decision to invest in an automated tissue removal and bone milling system in orthopedic spine procedures.
- ▲ Compare the bone yield and quality outcomes between manual and automated bone processing methods and understand how these differences can impact surgical procedures and patient outcomes.
- Learn the potential impact of automated bone processing systems on reducing workplace injuries among surgical technologists.
- Discuss the role of automation in promoting standardization in the operating room and its effects on workflow efficiency, consistency of results, and overall surgical outcomes.
- Identify practical strategies for surgical technologists to advocate for automated equipment in their healthcare facilities.

the surgical technologist's (STs) workflow while maintaining consistency in the size and cleanliness of bone samples. It can also offer enhanced workplace safety by reducing sharps exposure and physical strain on surgical staff.

The use of a reusable power base (Bone Mill+) that drives automated tissue removal (Prep+ disposable cartridge) and automated milling (Bone Mill+ fine, medium, or large disposable blade cartridge) can transform these manual tasks into automated ones from start to finish. Prep+ mechanically removes soft tissue from extracted bone within a closed, see-through cartridge on a 10-minute run cycle. Cleaned bone is placed directly into Bone Mill+, which mills bone in an 8.4-second single pass into the surgeon's specified particulate size.³

With staffing shortages and surgical demands on the rise,⁴ automated bone processing may offer a cost-effective solution to optimize efficiency, improve outcomes, and support the operating room (OR) team during orthopedic procedures. Understanding the economic factors involved in implementing such a system can contribute to informed decision-making that balances clinical excellence with fiscal responsibility, ultimately promoting more efficient and patient-centered orthopedic care.

- **Faster bone milling:** The automated system milled bone in just 8.4 seconds, more than 99.9x faster than manual milling, which took an average of 14 (±9) minutes.
- Decreased total bone processing time: Total bone processing time (cleaning and milling combined) was reduced from an average of 41 (±23) minutes for manual processing to 10.14 (±0.06) minutes for automated processing. This 75% reduction in total processing time can significantly impact overall procedure duration.

This study showed that with automation, surgeons could rely on a consistent time of 10 minutes to fully process up to 25 g of autologous bone while planning surgery and recoup up to 30 minutes per level of harvested bone preparation. This time savings can result in freeing valuable minutes per procedure to dedicate more time to instrument preparation, assisting the surgeon, or managing other aspects of patient care. Depending on the ST's manual processing speed, this can potentially free up 40 valuable minutes per procedure. Notably, half of the STs underestimated their manual bone processing time by approximately 14 minutes.

TABLE 1: MANUAL VERSUS AUTOMATED BONE PROCESSING TIME ³			
Method	Avg time (mins) plus standard deviation (mins)	Total processing time (time to readiness)	
Manual bone cleaning	27 <u>+</u> 14	<i>(</i> 1 , 22,	
Manual bone milling	14 <u>+</u> 9	41 <u>+</u> 23	
Prep+ bone cleaning	10 <u>+</u> 0	10.14 <u>+</u> 0.06 p<0.0001	

SAVING TIME AND IMPROVING EFFICIENCY

Implementing automation in the OR can lead to more predictable case duration predictions and better OR time utilization, ultimately resulting in cost savings, improved surgical

outcomes, and increased operational efficiency.⁵

Automated tissue removal and bone milling have been shown to significantly reduce manual processing time and improve overall efficiency in autologous bone graft procedures. In a study comparing automated bone stripping and milling to manual bone processing,³ (Table 1) 16 experienced STs demonstrated a faster time to readiness resulting from the following:

• Faster bone processing: Automated bone cleaning consistently took 10 minutes, more than 2.5x faster than manual tissue removal, which required an average of 27 (±14) minutes.

INCREASING BONE YIELD AND QUALITY

The quality and yield of autologous bone graft material can impact OR costs and surgical outcomes in orthopedic spine procedures. Efficient harvesting and processing of autologous bone not only affects procedure duration but also influences the need for supplementary bone graft materials and the development of potential complications.^{7,8}

An automated tissue removal and bone milling system may offer significant advantages in bone yield and quality of cleaning compared to manual methods. The study of experienced STs demonstrated that automated processing resulted in 64% greater bone yield than manual processing within a

TABLE 2: MANUAL VERSUS AUTOMATED BONE YIELD DURING TISSUE REMOVAL/BONE CLEANING ³		
	Manual cleaning	Automated cleaning
Bone yield measured after 10 minutes (the time of Prep+ run cycle)	Average 4 g of bone (68% of scrub techs cleaned 32% of the total 25 g)	25 g of bone <i>(for all samples)</i> Avg 64% more bone yield than manual cleaning p<0.0001
Additional manual tissue removal time needed to finish cleaning 25 g of porcine bone	50% of participants required 20 minutes more	0 mins

10-minute period.³ While automated cleaning consistently recovered the entire 25 g bone sample, manual cleaning yielded only 4 g on average in 10 minutes. Furthermore, half of the STs required an additional 20 minutes of manual cleaning to recover the full 25 g sample (Table 2).

The quality of cleaning of the processed bone also improved with automation. Independent STs, who were blinded to whether the sample had undergone manual or automated bone cleaning, rated the cleanliness of automated samples 15% higher than manually processed bone on a 10-point scale. Notably, 33% of manually cleaned samples scored below 4.8, indicating inconsistent quality (Figure 1).



Figure 1.³ (A) Randomly selected automated sample (B) Randomly selected manual sample

REDUCING LABOR COSTS

Automation can potentially reduce staffing requirements, minimize agency costs, and decrease costs associated with high turnover rates. Of the average cost-perminute OR time, a significant portion – \$13 to \$14 – is attributed to wages and benefits.⁶ With staffing shortages a top concern for American College of Healthcare Executives (ACHE) 2023 survey respondents9 and 51% and 56% of OR managers reporting rising turnover rates among STs and OR nurses, respectively, the challenging labor situation has led to increased reliance on agency and travel staff.⁴

High fatigue and burnout rates among healthcare workers impact productivity, job satisfaction, and turnover. One study reported that 65.6% of STs experience medium to high levels of work-related emotional exhaustion.¹⁰ The physical demands of tasks such as manual bone processing may contribute to staff fatigue and potential burnout. In the aforementioned study comparing manual and automated bone processing, 100% of participants experienced hand fatigue during manual bone cleaning, and 75% reported fatigue during manual bone grinding³ (Table 3). By reducing these physical strains through automation, healthcare facilities may see improvements in staff productivity and job satisfaction, decreasing turnover rates and associated costs.

With less time and resources spent on manual processes, staff can be reallocated to other critical tasks such as enhanced patient monitoring, improved team communication, and preparation for subsequent cases. In addition to improving efficiency, this reallocation may allow skilled OR staff to maintain better focus during critical phases of procedures and contribute to improved surgical outcomes.

MITIGATING THE RISK OF STAFF INJURIES

Workplace injuries are costly, both in terms of workers' compensation and lost productivity. By automating physical tasks that involve injury risks, healthcare organizations can potentially realize significant cost savings.¹¹ In the OR, implementing automated bone cleaning and milling could be considered a preventive measure to help mitigate costs related to sharps injuries and carpal tunnel syndrome.

Sharps Injuries

The Centers for Disease Control and Prevention reports an estimated 385,000 sharps-related injuries annually among hospital-based healthcare personnel. However, at least half of these injuries go unreported. These injuries carry a high risk of exposure and transmission of blood-borne pathogens, including hepatitis B, hepatitis C, human immunode-ficiency virus, and at least 20 other pathogens that can cause serious illness.¹² The direct and indirect costs borne by a healthcare facility may include the following:¹³

- Initial and follow-up laboratory testing and treatment
- Post-exposure prophylaxis or vaccine
- Workers' compensation and rehabilitation
- Time spent reporting the injury
- Time and wages diverted to receiving and providing exposure-related care
- Lost productivity

OR environments account for 42.8% of all sharps injuries, making it the highest-risk area in a hospital.¹⁴ STs are at particular risk for percutaneous injury because they routinely handle sharp instruments, devices, and bone. One example is manually cleaning bone for autologous bone grafts. In the aforementioned study comparing traditional manual processing to an automated method during these procedures, half of the participants were observed to experience one or more glove punctures during manual bone cleaning versus no participants using the automated system. Notably, one-third of the study participants reported a previous sharps injury while manually cleaning or grinding bone³ (Table 3).

Carpal Tunnel Syndrome

Because of the nature of their work, STs may also be at risk for developing carpal tunnel syndrome. Repetitive hand and wrist movements and forceful exertion in manual tasks are risk factors for this condition.¹⁵ Manual bone processing is an arduous task involving multiple sharp tools and physically repetitive motions, which can cause hand fatigue and injury. In a survey of STs, 100% and 75% reported that they had experienced hand fatigue during manual bone cleaning and manual bone grinding, respectively (Table 3).

STs rely heavily on fine motor skills and manual dexterity to handle surgical instruments and supplies. Common carpal tunnel syndromes symptoms such as numbness, tingling, and weakness in the hands and fingers can affect their overall ability to perform their duties, resulting in time away from work and costs related to workers' compensation.

TABLE 3: PERSONAL SAFETY ASSESSMENT³

Past experiences with manual bone processing during self-reported survey $^{\rm 8}$

HAND FATIGUE

Ever experienced hand fatigue while manual bone cleaning	100%		
Ever experienced hand fatigue while manual bone grinding	75%		
GLOVE PUNCTURE			
Ever experienced holes in gloves while manually cleaning bone	31%		
Ever experienced holes in gloves while manually grinding bone	13%		
INJURY			
Ever experienced injury while manual bone cleaning	31%		
Ever experienced injury while manual bone grinding	19%		

PROMOTING STANDARDIZATION

Standardization through automation may benefit ORs economically by addressing unnecessary clinical variation, which is a major driver of increased costs, such as extended OR time, in surgical procedures.¹⁶

Automated systems may provide more consistent

results across procedures, potentially leading to more predictable procedure times and improved resource allocation. Studies have shown that implementing standardized processes and digital support systems can reduce OR time by 6%-22% per case.¹⁷ Additionally, automated workflow systems have demonstrated improvements in compliance rates, first-case on-time starts, and overall OR efficiency.⁵

A prime example of automation-led standardization in orthopedic spine procedures is automated tissue removal and bone milling, which has shown more consistent bone yields for grafting and significantly less variability in time to readiness (Tables 1 and 2). When asked to rate processed bone samples for cleanliness (free of excess soft tissue) on a scale of 1 to 10 (1 = very poor, 10 = excellent), STs blinded to the bone processing method (automated or manual) gave the automated samples a 15% higher quality cleanliness rating on average.³

More consistent results can help mitigate variations in individual ST skill and efficiency. Standardizing the bone graft preparation process with an automated system also helps streamline workflows and reduce the physical strain on surgical staff. This approach is particularly valuable when integrating new or rotating staff members because it minimizes the learning curve and potential for human error in a critical step of autologous bone graft procedures.

ADVOCATING FOR AUTOMATED EQUIPMENT

STs can effectively advocate for automated equipment purchases by leveraging their hands-on experience to provide valuable insights on the potential workflow improvements, efficiency gains, and safety enhancements that new technologies could offer. An online survey of STs conducted by Styker to determine what methods have proven successful in giving STs a voice in the decision- and purchase-making process revealed the following:¹⁸

- 73% brought convincing data or marketing materials to their OR managers
- 73% reported using interpersonal dynamics, friendship, and trust to influence equipment purchases
- 55% presented convincing data or peer-reviewed articles to surgeons
- 27% of STs participated on hospital value analysis committees

A combination of approaches, including collaborating with procurement teams and presenting convincing data or marketing materials to their OR managers, can empower STs to promote more efficient and patient-centered orthopedic care.

KEY TAKEWAYS

Evaluating the costs and benefits of automation

The up-front cost of implementing an automated tissue removal and bone milling system should be weighed against the potential long-term savings in terms of the following:

Efficiency and cost reduction

 Time and labor optimization: Automated systems can significantly reduce the time required for bone preparation, potentially allowing for more procedures to be performed and improving overall OR efficiency. This may also enable hospitals to optimize staffing levels or reallocate skilled personnel to other critical areas.

Ongoing operational considerations

• Total cost of ownership: Beyond the initial purchase, factors such as training requirements, maintenance costs, and operational expenses (including disposables, energy consumption, and specialized materials) contribute to the long-term financial impact.

Workflow integration and process optimization

 Adaptation and standardization: Successful implementation may require adjustments to current processes, which can initially impact efficiency but may lead to overall improvements in the long term. Automation can help standardize procedures across different surgeons and facilities, potentially leading to more consistent outcomes and quality control.

Labor and staff injury costs

 Mitigation of staffing shortages and injury risk: Automating labor-intensive tasks may help healthcare facilities address costs related to skilled labor shortages, expensive agency staff, and staff turnover. Automating tissue removal and bone milling may also help mitigate costs stemming from sharps injuries and carpal tunnel syndrome caused by manual/traditional bone milling.

As healthcare facilities strive for both clinical excellence and cost-effectiveness, the adoption of an automated tissue removal and bone milling system in the OR may represent a strategic investment that aligns with these dual objectives.

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The Economic Case for Implementing Automated Tissue Removal and Bone Milling Systems in Orthopedic Spine Procedures

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- 1. Why is understanding the economic factors of implementing automated systems in the OR critical for healthcare facilities?
- To ensure clinical excellence through improved surgical outcomes and enhanced patient care
- To maintain fiscal responsibility by evaluating short and long-term financial impacts
- c. To reduce equipment maintenance costs and staff training time
- d. Both a and b
- 2. Which of the following factors is NOT mentioned as impacting the decision to invest in automated systems for orthopedic spine procedures?
- a. Initial investment costs
- **b.** Long-term maintenance costs
- c. Surgeon preference for manual methods
- d. Clinical outcomes improvement
- Manual processes in the operating room promote standardization and help reduce variability in outcomes across different surgical technologists.
- **a.** True
- **b.** False

- 4. In the study comparing manual and automated bone processing, how much faster was the automated system in total bone processing time?
- a. 2 times faster
- **b.** >2.5 times faster
- c. 5 times faster
- **d.** None of the above
- 5. What capacity of autologous bone can be processed in 10 minutes with automation?
- **a.** 60cc **c.** 120cc
- **b.** 90cc **d.** 150cc
- 6. How much greater was the bone yield with automated processing compared to manual processing within a 10-minute period?
- a. 32% greater
 b. 48% greater
 c. 64% greater
 d. 80% greater
- 7. In a blinded evaluation of bone cleaning methods, what key finding emerged regarding automated processing?
- a. The samples were processed more quickly but were of similar quality
- **b.** The automated samples showed consistently higher cleanliness ratings
- c. Manual processing provided more reliable cleaning results
- **d.** There was no significant difference in cleanliness between methods

- 8. Which of the following workplace injuries may be reduced through the implementation of automated bone processing systems?
- **a.** Sharps injuries
- **b.** Injuries resulting from repetitive strain
- c. Both a and b
- d. None of the above
- 9. Which of the following is NOT listed as an economic benefit of automated bone processing?
- a. Reduced need for surgical instruments
- b. Reduced processing time
- c. Enhanced workplace safety
- d. Improved bone yield
- 10. Which combination of approaches were proven most successful for surgical technologists in influencing equipment purchase decisions?
- Providing clinical data and participating in value analysis committees
- Presenting peer-reviewed articles and organizing staff petitions
- Bringing convincing data to OR managers and leveraging interpersonal relationships
- d. Submitting formal proposals and conducting cost analyses

THE ECONOMIC CASE FOR IMPLEMENTING AUTOMATED TISSUE REMOVAL AND BONE MILLING SYSTEMS IN ORTHOPEDIC SPINE PROCEDURES # 499 APRIL 2025 1 CE CREDIT \$6

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Summary of the WHO 2024 Report on Infection Prevention and Control

AST STAFF

E very day, health care professionals are exposed to and affected by healthcare associated infections (HAI) that include those caused by antimicrobial resistant (AMR) microbes. This has brought forth an acute awareness, particularly considering the COVID-19 pandemic and the more recent monkeypox virus, how quickly pathogenic microbes can spread throughout the world placing a strain on healthcare systems and providers. It highlights the role of not only Infection and Prevention Control (IPC) Officers, but the role all health care professionals perform in preventing life-threatening HAIs.

The World Health Organization's (WHO) latest report, *Global report on infection prevention and control 2024*, is the result of a multidisciplinary endeavor that involved WHO staff at their headquarters and worldwide regional locations. It provides information and data gathered from multiple sources such as WHO global databases, survey results, and publications, as well as from scientific reports published by other organizations. The report is a mix of encouraging news but identifies priorities that countries must urgently focus upon based on gaps in IPC implementation. The following is a summary of the key elements of the report. To read the full report go to file:///C:/ Users/kfrey/Downloads/9789240103986-eng%20(4).pdf.

On a global scale, the impact of AMR and HAIs is still critical, causing prolonged stays in the hospital to longterm complications and deaths, including the economic and psychological effects placed on the family and communities. On average, seven out of every 100 patients hospitalized in a high-income country (HIC) acute-care facility and 15 patients in low- and middle-income countries will acquire at least one HAI during their stay. According to the Organization for Economic Co-operation and Development (OECD) and WHO, approximately 3.5 million people will die annually because of HAIs up to the year 2050. The mortality rate in patients infected with an AMR is two to three times higher as compared to patients infected with a sensitive microbe (microbes that are inhibited by a drug at the normal dosage). However, global estimates by the OECD and WHO indicate that IPC programs implemented by healthcare facilities using multimodal improvement strategies (MMIS – see Appendix A) that is nationally coordinated could possibly prevent 821,000 deaths per year through 2050.

The system used to monitor a country's progress towards implementation of the AMR global action plan (see Appendix B) is called the Tracking AMR Country Self-assessment Survey (TrACSS). In 2023-2024, on a global level, 9% of the 194 countries that are a member of WHO did not have an IPC program or plan and only 39% of countries had a national IPC program fully implemented.

The WHO identified four gaps needing improvement when it comes to global IPC.

- Budget allocation: Only 44% of the countries have a dedicated IPC budget.
- Training and education: Only 38% of countries have a national IPC curriculum, indicating a need for broader training programs.
- HAI surveillance: 53.3% of countries have a multidisciplinary technical group for HAI surveillance, but lower income countries (LIC) are the farthest behind with only 25% having an established HAI technical group.
- Monitoring and evaluation: 51.3% of countries have a strategic plan and system in place for IPC monitoring with HICs leading at 58.3% and LICs at 45.8%.
- At the regional level, the 2023-2024 WHO global survey on IPC minimum requirements showed differences in the implementation of the IPC core components.
- Improvements were reported by countries in the following areas – having an appointed IPC-trained national

focal point, updating and developing evidence-based, national IPC guidelines, adapting guidelines and implementing through standard operating procedures, and establishing hand hygiene compliance as a key national indicator.

• The same global gaps were identified at the regional level to include evaluation of the training and education effectiveness and using the results for targeted improvements in IPC.

The WHO Region of Americas that includes the United States, the report indicates remarkable improvements in several of the core components as compared to the data collected in 2021-2022, but a severe lack of the availability of a curriculum for IPC in-service training.¹ The European region also showed significant improvements, but gaps still exist including the lack of active national IPC programs with a dedicated budget and national guidelines.²

At the healthcare facility level, the differences in implementation of IPC are strikingly evident according to the country's income level. In LICs, only 35.7% of facilities met at least 50% of IPC requirements and only 0.6% met all of them. In contrast, facilities in HICs had a much higher percentage, with 98.8% meeting at least 50% of requirements and 27.9% fulfilling all the requirements. HICs therefore, are more advanced in the implementation of all IPC core components, while LICs are limited when it comes to implementing IPC guidelines, training and education, monitoring, auditing, feedback, and HAI surveillance.

In 2019, it was reported that IPC programs existed in almost all secondary and tertiary healthcare facilities. However, particularly in lower middle income countries (LMIC), the facilities lacked full-time IPC professionals, a dedicated IPC budget, routine microbiological laboratory support, and appropriate staffing and bed occupancy. This is still the situation in 2023-2024, highlighting the ongoing inequality in IPC program effectiveness and resource availability between the LIC, LMIC, and HIC countries.

The report also provides an update regarding global hand hygiene programs based on information from multiple published and unpublished sources – WHO *Hand hygiene self-assessment framework 2019*, WHO and United Nations Children's Fund (UNICEF) Joint Monitoring Program (JMP) for Water, Sanitation, and Hygiene's WASH in Health Care Facilities 2023 Data, and WHO unpublished data. The 2019 report surveyed 3,206 healthcare facilities in 90 countries. Region of Americas countries: Antigua and Barbuda, Bahamas, Barbados, Belize, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haita, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, United States, Uruguay, Venezuela

European Region countries: Albania, Andorra, Armenia, Austria, Azerbaigan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Modova, Monaco, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania Russia, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Turkmenistan, Ukraine, United Kingdon, Uzebekistan

The results showed a significant gap in hand hygiene practice between LIC, LMIC, and HIC countries. This translated to 3.4 billion people using healthcare facilities that lacked hand hygiene facilities at the point of care and bathrooms.

In 2023, 742 million people or 9% of the global population had no water service at their healthcare facility, meaning no proper water source, the water was from an unimproved water source such as a well, or water had to be collected from an improved source more than 500 meters away.

The WHO report provides an analysis of the global status of IPC programs with highlights regarding the progress that has been made but pointing out that several gaps still exist. However, the gaps are significantly different according to the income level of countries, with LICs and LMICs experiencing the most challenges in implementing functional IPC programs.

The 2022 IPC report made the call for action that listed the priorities and directions. This continued with a 2022 resolution adopted at the 75th World Health Assembly requesting the development of a global strategy, action plan, and monitoring framework (MF). In 2023, the first WHO global strategy was approved and served to guide the development of the global action plan and MF that was adopted by all WHO member countries at the 77th World Health Assembly in May 2024.

Eight strategic directions are listed in the WHO global

strategy as being critical in achieving improvement in IPC (Table 1). Next, eight targets that are prioritized for achievement at the global level and four at the facility level (Tables 2 and 3).

Table 1: Eight Strategic Directions

Overall guiding framework of the WHO global strategy and action plan on IPC
1. Political commitment and policies.
2. Active IPC programs.
3. IPC integration and coordination.
4. IPC knowledge of health and care workers and career pathways for IPC professionals.
5. Data for action.
6. Advocacy and communications.
7. Research and development.
8. Collaboration and stakeholder's support.

Table 2: Core targets of the IPC MF at the at the global level

Eight core targets
1. Increase the proportion of countries with a financial plan and approved national action plan and MF on IPC.
2. Increase of the proportion of countries with legislation and regulations to address IPC.
3. Increase of the proportion of countries having an identified protected and dedicated budget allocation to the national IPC program and action plan.
4. Increase of the proportion of countries meeting all WHO IPC minimum requirements for IPC programs at national level through WHO IPC portal.
5. Increase the proportion of countries with national IPC programs.
6. Increase of the proportion of countries with (1) basic water, (2) sanitation, (3) hygiene, and (4) waste services in all healthcare facilities.
7. Increase of the proportion of countries that have achieved their national targets on reducing HAIs.
8. Increase of the proportion of countries with a national HAI surveillance system.

Table 3: Core targets of the IPC MF at the at the facility level

Four core targets
1. Increase the proportion of facilities meeting all WHO minimum requirements for IPC programs.
 Increase in the proportion of facilities with a dedicated and sufficient funding for water, sanitation, and hygiene services and activi- ties.
3. Increase of the proportion of facilities providing training to all frontline clinical and cleaning staff upon employment and annually and to managers upon employment.
4. Increase of the proportion of tertiary and secondary healthcare facilities having an HAI and related AMR surveillance system.

As stated in the report, the achievement of the WHO IPC minimum requirements should be an urgent priority for all countries and healthcare facilities to provide minimum protection and safety to patients, health care workers, as well as families and other visitors to facilities, to achieve targets for AMR reduction. Significant investments are required by all countries to achieve the core targets and resource mobilization is also needed for stakeholders supporting them. However, compelling data demonstrate that a high return can be derived from investment in IPC, both in terms of lives saved and economic gains.

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World Health Organization (eds.). Global report on infection prevention and control 2024. *WHO*, November 2024. <u>file:///C:/Users/kfrey/Downloads/9789240103986-eng%20</u> (<u>4</u>).pdf.

Appendix A: Additional Information on Multimodal Improvement Strategies

In practice, it is the use of multiple approaches that in combination will contribute to influencing the behavior of health care professionals toward the necessary improvements that will impact patient outcomes and contribute to a cultural change within an organization. In June 2009, the WHO introduced five multimodal strategies. This is the link to the WHO chart: <u>https://cdn.who.int/media/docs/default-source/integrated-health-services-(ihs)/infection-prevention-and-control/core-components/ipc-cc-mis.pdf?</u>

- 1. Build it (system change).
- 2. Teach it (training and education).
- 3. Check it (monitoring and feedback).
- 4. Sell it (reminders and communication).
- 5. Live it (culture change).

Appendix B: Global Action Plan on AMR and TrACSS

The Global Action Plan on Antimicrobial Resistance (AMR) was adopted in 2015 by all countries through decisions in the World Health Assembly, the Food and Agriculture Organization of the United Nations (FAO) Governing Conference and the World Assembly of World Organisation for Animal Health (WOAH, founded as OIE) Delegates. Countries agreed to have a national action plan on AMR that is consistent with the Global Action Plan, and to implement relevant policies and plans to prevent, control and monitor AMR. According to the World Health Organization

(WHO), all countries adopted the Global Action Plan on Antimicrobial Resistance (GAP-AMR), which was endorsed by the World Health Assembly in 2015, meaning every member state of the WHO has committed to implementing the plan to combat antimicrobial resistance (AMR). The WHO has 194 member countries

To monitor the country's progress in the implementation of the national actions plans, an annual AMR country selfassessment survey (TrACSS) is jointly administered by FAO, WOAH, WHO and UNEP. (TrACSS – Tracking AMR Country Self-assessment Survey). Link to additional information: <u>https://www.who.int/publications/m/item/tracking-amrcountry-self-assessment-survey-tracss-(7.0)-2023</u>

ON A MISSION



AST-sponsored Medical Mission Team Serves the Community and Builds Camaraderie

ENT Surgical Mission Trip to La Romana Dominican Republic 2024



CHRISTINE ALEXANDER, CST, CSFA

y mission trip with HTCNJ in La Romana, Dominican Republic was incredible. Our trip included a group of 22 medical professionals. I have never met any of them before, but I can honestly tell you that this team had such a comradery amongst us. It was amazing.

The first day of actual cases, we had a little paperwork hiccup, but it was all resolved by midday. We were all super pumped/excited to get back to the OR to help our patients. On our return to the hospital, we were greeted by loud applauding from the parents of our patients. We worked our butts off every day but it was all worth it in the end. I think I made lifelong friends on this trip.



Our group did Pediatric ENT cases, which included BMT's, dnoidnectomies, Cerumen Impaction Removal and Coblation of Inferior Turbinates just to name a few. On Day One, when we were screening the patients and getting the OR ready, it was out of this world. I think the doctors saw something like 300 kids that day. All in all, I think we ended up doing something like 87 cases, and a hundred plus procedures. I believe that going on a mission trip is a lot of hard work, but at the same time, very rewarding. I have been blessed with these particular skills, among other things, so giving back, it's like I've found my calling in life. Once given the opportunity to serve with AST or any other mission again, I would do it within a heartbeat.



SARA JIPSON, CST, CSFA

As I pack for a pediatric ENT surgical medical mission to the Dominican Republic, I cannot help but feel anxious about getting there and helping the children who live there. This is my fifth surgical medical mission and my second to the Dominican Republic. My first mission was in 2017, sponsored by AST, and we did general and pediatrics in Kenya, Africa. Before I even got home, I knew this was something that I was passionate about and that I would continue to go on as many missions as often as possible!

My flight to the Dominican was very early. I had a 5 am flight and would be traveling most of the day. I arrived in the Dominican Republic late afternoon and met with a couple of ladies who also arrived earlier than the rest of our group. When the rest of the team arrived, we packed up our bags onto the bus and began our an hour and a half hour ride to where we were staying. We checked in, had a nice dinner, and went to bed. In the morning, we had breakfast and loaded into the bus to take us to the hospital to triage all the patients that were waiting to be seen. We saw over 300 patients and scheduled 85 procedures for the four days of surgery.

Monday morning, we had breakfast and all of us were prepared to work hard on the first surgical day, but we were told after breakfast that our approval to perform surgery in their country was not approved yet. The document that needed to be signed was not able to be completed until the afternoon. We all waited anxiously for the call to meet in the lobby to head to the hospital. It seemed like forever, but when we finally received the call, we all cheered and ran to the bus to get to



the hospital as quickly as possible. When we arrived at the hospital, the families cheered with excitement because we were finally approved and able to help their families!

Over the next few days, we worked from sunup to sundown and completed the 85 procedures! As a team we all worked together to complete a common goal to help I have had this kind of opportunity on, not only my career bucket list but on my life bucket list as well. It's been on those lists for over 16 years. As I said it was beyond amazing! One of the main surprises was how well everyone on the team worked together to make every day happen and run so well. I was in the same room with the same sur-



The families were all very thankful and many times throughout the week greeted us with cheers, tears and gratitude. *– Sherridan Poffenroth*

change the lives of the children and families all over the world! We made some great memories and some amazing friendships! I cannot wait for my next mission, and I hope to see you there!

DENA SPRINGER, CST

First and foremost, thank you to the AST so much for presenting the opportunity to apply for a surgical mission trip and then choosing my application! I feel so honored that I was chosen! And second, thank you so much to Healing the Children NJ for partnering with the AST and making this trip possible! I can't even convey how amazing this surgical mission trip was for me! geon, nurses and anesthesia all week and if you were to peek into our room during our cases you would have thought we all worked together for years and years!

This was my very first mission trip ever, so I had never met anyone from our 22-person team until the day we all met at the airport to leave. We seemed to all start bonding instantly! We had to set up our sterile processing and supply storage workspaces and it was fantastic how that all came together and flowed so nicely with the minimal area that we had! I also rotated into the sterile processing area on occasion and again we got a flow down quite quickly and made it work rather well cleaning and turning over our own instruments and supplies! It was amazing to see it all come together Sunday into Monday and then just proceed each day as if we had all been doing this together here forever! Even outside of the hospital and workdays we had all our meals together and just genuinely enjoyed each other's company.

There was no doubt that we helped a great number of children, and the patients and families were beyond grateful! On

our first day of surgeries (Monday) we came up out of the stairwell to the floor we were working on to an uproar of applause and cheers from that day's patients and their families! That was an amazing moment. The opportunities I got to interact with the patients and families were fantastic and always filled with heartfelt thank you, appreciation and the warmth of smiles and hugs!

It was sad how unbelievably fast the week went! I feel like this far into this career lots of us scrub techs are looking for a new and instrumental way to utilize the skills and knowledge that we've garnered over the years and a surgical mission trip absolutely fulfilled that desire and that yearn-



ing for something more! It has certainly given me a new itch to scratch, and I look forward to volunteering for more trips in the future!

SHERRIDAN POFFENROTH, CST, CRCST, FAST

I did not go on this trip for me, or for the opportunity to work with friends, or the chance to visit a foreign country. I was not planning to do another trip so soon, as I served on a trip in October of 2023. But the experience of sharing my skills and abilities with the children of La Romana, Dominican Republic, was once again a blessing. I would do it again and again.

Our team was a dynamic group of professionals that came together quickly and efficiently for a week's worth of work. The surgeons, nurses, pediatrician, and anesthesiologists saw about 230 children in a 12-hour clinic. There, they identified 85 cases with over 100 procedures to prepare for in the following days. On that same day, the CRNAs, the circulating nurses, and the certified surgical technologists worked together to unpack 22 suitcases of supplies, set up two operating rooms, a small core of supplies, and the sterile processing room. Thanks so much to the staff at Centro Medico Hospital for the help in finding and providing any missing items that we may have needed.

The following three and half days, we cranked out case after case providing the children with much needed ENT procedures. And we did a little bit of everything. It was awe-



some to see the staff rapidly create a process through pre-op, the OR, PACU and sterile processing to successfully serve. The families were all very thankful and many times throughout the week greeted us with cheers, tears and gratitude.

Thank you to The Association of Surgical Technologists and Healing the Children New Jersey for making this trip possible. This relationship goes back many years, and I have no doubt that it will continue to flourish with many trips in the future.

I believe that going on a mission trip is a lot of hard work, but at the same time, very rewarding. I have been blessed with these particular skills, among other things, so giving back, it's like I've found my calling in life. - Christine Alexander





ALISON WILSON, CST, FAST

What an amazing experience in La Romana, Dominican Republic. This is my first-ever experience with a mission trip, and I knew that it would be a lot of work and very rewarding. However, I really did not know the extent of how rewarding this trip would be for me personally over the course of five days, we were able to see close to 300 patients and perform surgeries on 85 individuals. On Day One of the clinic seeing all the parents and their children come to the hospital to receive care was overwhelming in a good way. Once we set up the operating rooms, we were able to go down into the clinic and see how many people had turned out to receive care from us over the next week. All the families were so excited to see us. There was a lot of laughing and joy and a lot of singing.

On Day One of surgery, we had a bit of a setback with some paperwork and so we were not able to start surgeries until later in the day, although it made for a very long day. Surgeries did not start until about 1:30 in the afternoon and finished about 9:30 in the evening. We were able to get the ball rolling taking care of all the kids who were to receive surgeries from us over the week. Although some of the kids would not be able to receive the type of care we were able to give – they were all so thankful and so happy to be there. The pre-op area was full of music, laughter, pictures, and all kinds of fun adventures. As the days went on and with every child we saw, my eyes were opened to how much we were helping the community. Some of the kids really touched our hearts more than I thought and I will remember them fondly.

Our team was amazing. We all worked so well together for the common goal of providing the medical care to the community. Everyone really pitched in and made every child feel special and loved even if it was a brief time. Also, making lifelong friends in the process is wonderful.

I am looking forward to going on another mission trip in the future and continuing to give back to those less fortunate than us. Thank you to AST for sponsoring this trip and to Healing the Children of New Jersey for everything. This was by far one of the best experiences I have ever had and memories that will last with me forever!



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Arthur David Steffee, Jr., MD: Father of Modern Spine Surgery

AST Staff

MEDICAL MARVELS

or many years, one person was one of the best known surgeons and inventors in spinal surgery and that was Arthur David Steffee, Jr., MD (August 16, 1934 – August 16, 2024). He was known as a compassionate surgeon always searching for new surgical methods while persevering through legal difficulties with an eye on keeping the patient first.

He was born in Oil City, Pennsylvania when the town was at the height of its population of 22,000 plus residents. He graduated from the local high school in 1952 and attended Allegheny College in 1956.1 His parents could not afford to send him to medical school, but due to the generosity of an Oil City dentist who paid for Dr. Steffee's medical school, the medical community was ensured of gaining a physician who was destined to make significant contributions.² He received his medical degree from McGill University, Montreal, Quebec in 1960.1 He was a resident at the Cleveland Clinic Foundation and St. Vincent Charity Hospital (2010 renamed St. Vincent Charity Medical Center) in Cleveland, Ohio. He served as a captain in the U.S. Army Orthopedic Service at Ft. Belvoir located in the County of Fairfax, Virginia from 1962 - 1964 and then returned to the Cleveland Clinic Foundation to complete orthopedic residency.¹

Early in his practice he had already begun to work on solutions to challenging orthopedic pathologies such as lumbar deformities and rheumatoid arthritis, thus becoming a pioneer in creating implants for the hand and spine. However, he eventually became solely focused on the challenges presented by spinal surgical procedures. During this time, he was the Director of Orthopedic Services at Lutheran Medical Center's Spine and Arthritis Center and Chair of Orthopedic Surgery at Charity Hospital and in 1982 he revolutionized spine surgery by inventing the pedicle screw system.³

Dr. Steffee said the invention rose from a challenge during a procedure in 1982.³ At the time the primary system used in spinal surgery was Luque in which a wire was passed posterior to the laminae and round a rod to stabilize the specific vertebra, but it could not be firmly attached to the spine. However, in this patient, the laminae had been excised. He improvised by using a bone screw that was placed down the pedicle with a washer and wired to the spine.³ Dr. Steffee continued to modify the procedure with the assistance of Louis Keppler, MD, who was the Chief Resident at Charity Hospital. At that time, bone-fracture plates with holes were not compatible with spinal anatomy. Dr. Steffee changed the holes to slots and cut off the heads of the regular bone screws.² He would place the screws in the pedicle bone, position the bone plate with slots over the screws, and fix them in place with hexagonal nuts.² He named the technique the "variable screw placement".² It cut patient's hospital stay by 50% to 11 days.

In 1982, he applied to the U.S. Food and Drug Administration (FDA) for approval of the variable screw placement technique, but the application was denied. He founded the AcroMed company in 1983 to produce artificial vertebrae, spinal implants, and total lumbar artificial discs that he invented and patented.^{1,3} This lead to the creation of the Isola Implant System used for correcting complex spinal deformities. In 1984, the FDA allowed AcroMed to market their product as bone plates and bone screws, but did not approve their use in the spine; that approval would not come for another 12 challenging years.² Unfortunately, legal battles occurred regarding the pedicle screw that affected Dr. Steffee, other spine surgeons, medical societies, and implant companies. Eventually, the scientific research won out with the ability to prove the efficacy and safety of the pedicle screw and its contribution to bettering the treatment of patients. But the legal challenges took their toll and

Dr. Steffee sold AcroMed to Depuy to resolve the issues.¹

But more importantly, Dr. Steffee will always be remembered for his contributions to spinal surgery in advocating for improving the techniques of posterior interbody fusion, spinal osteotomy, and vertebral body replacement. He traveled extensively throughout the world teaching courses and allowing surgeons to observe his procedures. According to the National Library of Medicine PubMed, he published 27 studies on the surgical management of adult spinal abnormalities. In 2019, approximately 6,000 surgeons performed 700,000 spinal surgeries in the United States in which they used innovations that were established by Dr. Steffee.²

In 2010, the Scoliosis Research Society Board of Directors honored Dr. Steffee with an Honorary Membership.¹ In 2023, he was the recipient of the Cleveland

Clinic Alumni Association's Distinguished Alumnus Award for recognition of exceptional, enduring achievements, and leadership that brought pride and recognition to the Cleveland Clinic community.¹ Dr. Steffee will always be remembered for teaching health care providers to continue to research solutions to challenging problems that better the lives of spinal surgical patients.

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 </u>



Study Shows Intraoperative Nerve Monitoring Contributes to Decreasing Nerve Injury During Thyroidectomy

OF INTEREST IN THE MEDICAL ARENA

atients who must undergo thyroidectomy and have large a lesion, have a drain inserted, or experience postoperative hypocalcemia are at a higher risk to experience recurrent laryngeal nerve (RLN) injury as opposed to those who do have these risk factors.

The results of the study were presented at the American Academy of Otolaryngology – Head and Neck Surgery 2024 Annual Meeting that also indicated that intraoperative RLN monitoring decreased the risk for nerve injury for all thyroidectomy patients. The findings imply that RLN monitoring should be considered for all thyroidectomy procedures, particularly patients who have a large, complex lesion, Ryland Spence, a medical student at Brown University, Providence, Rhode Island, and fellow researchers indicated in their abstract.

The research team studied data from the National Surgical Quality Improvement Program database from 2017 – 2021 that included 31,605 adult patients. They reported that the preoperative factors of biopsy result, multifocality, neoplasm type, nodal status, M stage of cancer (refers to metastasis in the TNM staging system for tumors), surgical indication, and T stage (size of the primary tumor) are all indicators for an increased risk of RLN injury. The highest on the list of factors were neoplasm type and M stage. The highest intraoperative indicator for injury was neck dissection. The postoperative risk factors of drain use, hypocalcemia, and neck hematoma were significantly linked to RLN injury.

The use of a database study prevents arriving at conclusions of causality, thus calling for additional research to target why certain factors contribute to RLN injury.

Reference

Conference News, AAO - HNS 2024. Association of Surgical Technologists.

The Future of Ophthalmology Surgery

Ophthalmology surgery has had a reputation for trailing other surgical specialties when it comes to implementing automated technology in the operating room. However, a team of researchers at the University of California – Los Angeles (UCLA) is changing that based on successful results with a new robotic platform that can perform cataract and vitreoretinal (VR) surgery.

Aya Barzelay-Wollman, MD, PhD, co-director of the Advanced Robotic Microsurgery (ARMS) Laboratory at UCLA, presented the technology at the European Society of Retina Specialists (EURETINA) 2024 conference held in September 2024 in Barcelona, Spain. Dr. Barzelay-Wollman reported that the microsurgical robot that is powered by artificial intelligence and an advanced image-guidance system has shown a high degree of precision during preclinical testing.

"The robot has a 1-micron increment of resolution, meaning I could command the robot to move at 1-micron increments. The platform boasts an impressive 10-micron precision, 40-micron accuracy, and less than 20-micron targeting accuracy, with a mere 0.15-micron orientation error. So, it is highly precise," Dr. Barzelay-Wollman said during her presentation. She noted that typical hand tremors range from 30 – 50 microns. However, the robotic arm, developed by Tsu-Chin Tsao, PhD, co-director of the ARMS Laboratory, eliminates the tremors thus providing the surgeon with unprecedented resolution at the micron level.

The UCLA team experienced visualizing the retinal pathology during vitreoretinal procedures. Commercial surgical microscopes use a top-down imaging that provides a limited view of the anatomical structures of the eye. To solve the problem the UCLA researchers developed intraocular imaging probes that are mounted on the vitrector to provide a detailed view of the anatomy.

Combined with intraoperative optical coherence

tomography that displays images of the retinal layers, data is input into the system to control the robot's trajectory and provide the ability to perform a fully automated vitrectomy.

The platform works in two modes – a fully automated mode in which the robotic arm performs the procedure while the surgeon is seated at the console to monitor the surgical procedure and a teleoperation mode where the surgeon uses a joystick to operate the robotic arm.

The research is in the preclinical phase. Dr. Barzelay-Wollman said in vivo studies need to be competed on live animals and then work upon getting U.S. Food and Drug Administration clearance for a clinical before the next step of using on humans.

Reference

Barzelay-Wollman A. Presentation – European Society of Retina Specialists (EURET-INA) 2024. https://euretina.org/barcelona-2024/programme-overview/.

Surgeons Perform the World's First Fully Robotic Heart Transplant

Surgeons at King Faisal Specialist Hospital and Research Center (KFSHRC) successfully performed the world's first fully robotic heart transplant on a 16-year-old patient suffering from end-stage heart failure in September 2024. The reason for the selected patient is that he requested the surgical team to not perform open heart surgery.

The surgery took two and a half hours, performed by a team led by Saudi Arabian cardiac surgeon Feras Khaliel, MD, Head of Cardiac Surgery and Director of the Robotics and Minimally Invasive Surgery Program.

After receiving approval from the hospital's medical committee and the patient's family, Dr. Khaliel assembled the surgical team. To ensure precision and minimize the potential risks, the preparation began with detailed theoretical planning that progressed to the team devising a surgical approach to access the heart and perform the transplant without having to open the chest cavity. The team practiced the procedure virtually seven times over three days prior to performing it on the patient.

Majid Al Fayyad, MD, CEO of KFSHRC commented this paves "the way for a transformative leap in healthcare services unlocking new possibilities to elevate the quality of life for patients both locally and globally."

It has been reported that the patient has not experienced significant postoperative complications.

Reference

Large Brain Tumors Removed Through Eyebrow Incision

In what is considered the first in the world, an innovative surgical procedure has been successfully performed in Scotland to remove large brain tumors, some the size of large apples, through an eyebrow incision, leaving patients with a much smaller scar as compared to traditional craniotomies and a temporary black eye.

Anastasios Glamouriadis, MD, a neurosurgeon who works for National Health Service (NHS) Grampian (one of 14 regional health boards in Scotland) in Aberdeen, has adapted an already existing surgical eyebrow technique that allows him to remove larger tumors. As a result, the patient experiences fewer postoperative complications, and shorter operating and recovery times with less scarring.

Known as the Modified Eyebrow Keyhole Supraorbital Approach for Brain Tumors, the procedure can be completed within three hours. Normally patients can go home within 24 - 48 hours after the procedure and return to work in days. The new procedure has been performed on 48 patients so far.

Dr. Glamouriadis said, "I didn't invent this type of surgery, but I have modified it to give me more space, through the eyebrows, and it is allowing me to remove very big tumors. The technique is a game-changer and much less invasive. Traditionally people would be left with scars across their full forehead, we avoid that with this method. We're not aware of anywhere else in the world that has managed to remove tumors as large as we have." Dr. Giamouriadis is optimistic that he can eventually use virtual reality to teach the procedure to other neurosurgeons.

Reference

Hosie L. A brain tumour the size of a tennis ball came out of my eyebrow. *BBC*, 24 Oct. 2024. https://www.bbc.com/news/articles/czj7ynj2mjwo.

KFSHRC performs the world's first fully robotic heart transplant. *KFSHRC*, 12 Sept. 2024. https://www.kfshrc.edu.sa/en/news/2024/09/kfshrc-performs-the-worlds-first-fully-robotic-heart-transplant

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UPCOMING PROGRAMS

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ALASKA STATE ASSEMBLY

Program Type: Annual Meeting/Elections Date: April 19, 2025 Title: Alaska AST Spring Conference Location: Alaska Regional Hospital, 2801 DeBarr Road, Anchorage, AK 99508 Contact: Sarina Hauser, 423-213-3212, whitaless@yahoo.com CE Credits: 6

COLORADO/WYOMING STATE ASSEMBLY

Program Type: Webinar (approved only Colorado/Wyoming State Assembly members) Date: April 26, 2025 Title: April Showers Contact: Julie Beard, 720-256-5863, information@coloradoast.com CE Credits: 3

Program Type: Webinar (approved only Colorado/Wyoming State Assembly members) Date: July 30, 2025 Title: Working Wednesday Contact: Julie Beard, 720-256-5863, information@coloradoast.com CE Credits: 2

Program Type: Annual Meeting/Elections

Date: September 27, 2025 Title: 2025 Business Meeting Location: Denver Health, 777 Bannock St, Denver, CO 80204 Contact: Julie Beard, 720-256-5863, information@coloradoast.com CE Credits: 5

FLORIDA STATE ASSEMBLY

Program Type: Annual Meeting/Elections Date: April 5, 2025 Title: Spring into 2025! Location: St. Joseph's Hospital, MAB Conference Rooms, 3001 West Doctor Martin Luther King Junior Blvd, Tampa, FL 33607 Contact: Stephanie Hurst, flsastateassembly@gmail.com CE Credits: 5.5 Live

GEORGIA STATE ASSEMBLY

Program Type: Workshop Date: September 13, 2025 Title: September in the South Registration at: ast-gasa.com/fall-2025-meeting Location: Southern Regional Technical College, 52 Tech Dr, Tifton, GA 31794 Contact: Susan Feltmann, PO Box 109, Auburn, GA 30011, 678-226-6676, gasawebmaster@gmail.com CE Credits: 8

IDAHO STATE ASSEMBLY

Program Type: Workshop & Webinar (webinar approved only Idaho State Assembly members) Date: April 5, 2025 Title: Morning Munch & Meet Location: St. Luke's Central Plaza Auditorium, 720 Park Blvd, Boise, ID 83712 Contact: Dani Hammer, 208-283-3693, daniroesler5@gmail.com CE Credits: 4

IOWA STATE ASSEMBLY

Program Type: Workshop Date: April 5, 2025 Title: IASA Spring 2025 Workshop Online Registration: ia.ast.org Location: Western Iowa Tech Community College, 4647 Stone Ave, Sioux City, IA 51106 Contact: Tim Danico, 319-540-6008, ttimathy depice Quiewe edu

mothy-danico@uiowa.edu **CE Credits:** 8

MAINE STATE ASSEMBLY

Program Type: Workshop Date: May 10, 2025 Title: MESA Spring Conference Location: MaineHealth Maine Medical Center Portland - Dana Center, 22 Bramhall St, Portland, ME 04102 Contact: Brittany Babb, 910-477-1559, brittany.babb@mainehealth.org CE Credits: 6

MASSACHUSETTS STATE ASSEMBLY

Program Type: Annual Meeting/Elections Date: April 5, 2025 Title: Spring Mix 2025 Location: St. John of Damascus Church, 300 West St, Dedham, MA 02026 Contact: Kristen Urbanek, 617-257-5384, mastateassembly@gmail.com CE Credits: 4 Live

MICHIGAN STATE ASSEMBLY

Program Type: Webinar (approved only Michigan State Assembly members) Date: April 12, 2025 Title: MSA Spring Conference 2025: Explore, Engage, Elevate Online Registration: msaast.weebly. com/conference-registration.html Contact: Renona Gauthier, 248-891-3989, michiganassemblyofast@gmail. com CE Credits: 3

NEW HAMPSHIRE/VERMONT STATE ASSEMBLY

Program Type: Workshop Date: April 5, 2025 Title: Spring Conference Location: Elliot Hospital, 1 Elliot Way, Manchester, NH 03103 Contact: Lynn Jones, 603-370-1489, Imwhitney76@gmail.com CE Credits: 6

NEW JERSEY STATE ASSEMBLY

Program Type: Workshop Date: April 5, 2025 Title: NJAST Spring Workshop Location: Passaic County Community College, Paterson Room, 1 College Blvd, Paterson, NJ 07505 Contact: Amanda Carrasco, PO Box 218, Ridgefield Park, NJ 07660, 973-459-1043, njast3@icloud.com CE Credits: 6

Program Type: Annual Meeting/Elections

Date: September 20, 2025

Title: 2025 Fall Workshop & Business Meeting

Location: Morristown Memorial Hospital, 100 Madison Ave, Morristown, NJ 07960

Contact: Janee Flynn, PO Box 218, Ridgefield Park, NJ 07660, 201-658-9922, njast3@icloud.com CE Credits: 6

OHIO STATE ASSEMBLY

Program Type: Annual Meeting/Elections Date: April 11-13, 2025 Title: Best in the Midwest Location: Renaissance Columbus Westerville-Polaris Hotel, 409 Altair Parkway, Westerville, OH 43082 Contact: Michael Pickering, 614-439-3428, ohioast@gmail.com CE Credits: 15

OKLAHOMA STATE ASSEMBLY

Program Type: Annual Meeting/Elections Date: April 5, 2025

Title: Spring Conference and Elections **Location:** Canadian Valley Technology Center, 1701 S Czech Hall Road, Yukon, OK 73099

Contact: Miguel Agosto, 580-301-1648, miguelagosto100@gmail.com **CE Credits:** 6

SOUTH DAKOTA STATE ASSEMBLY

Program Type: Workshop

Date: April 25-26, 2025 Title: SDSA Spring 2025 Conference Location: Sanford USD Medical Center - Schroder Auditorium, 1305 W 18th St, Sioux Falls, SD 57105 Contact: Justice Brandt, 605-328-0858, justice.brandt@sanfordhealth.org CE Credits: 9

WASHINGTON STATE ASSEMBLY

Program Type: Workshop Date: April 26, 2025 Title: WSA Spring Workshop and Student Scrub Bowl Location: Clover Park Technical College, 4500 Steilacoom Blvd SW, Lakewood, WA 98499 Contact: Eugene LeRoy, PO Box 55153, Seattle, WA 98155, 903-453-4738, gene. leroy.wsa@lebbrin.com CE Credits: 7

WISCONSIN STATE ASSEMBLY

Program Type: Workshop Date: April 5, 2025 Title: Head to Toe: Elevating Skills in Surgical Technology Location: Northcentral Technical College, 1000 W Campus Dr, Wausau, WI 54401 Contact: Nicole Van Vonderen, 715-350-1088, nvanvonderen12@hotmail.com

CE Credits: 6

STATE ASSEMBLY ANNUAL BUSINESS MEETINGS

Members interested in the election of officers & the business issues of their state assembly should ensure their attendance at the following meetings.

ALABAMA

BALASKA Anchorage April 19, 2025 Annual Meeting 2025 BOD Elections & 2025 Delegate Elections

COLORADO/WYOMING

Denver September 27, 2025 Annual Meeting 2025 BOD Elections & 2026 Delegate Elections

FLORIDA

Tampa April 5, 2025 Annual Meeting 2025 BOD Elections & 2025 Delegate Elections

MASSACHUSETTS

Dedham April 5, 2025 Annual Meeting 2025 BOD Elections & 2025 Delegate Elections

NEW JERSEY

Morristown September 20, 2025 Annual Meeting 2025 BOD Elections & 2026 Delegate Elections

OHIO

Westerville April 11-13, 2025 Annual Meeting 2025 BOD Elections & 2025 Delegate Elections

OKLAHOMA

Yukon April 5, 2025 Annual Meeting 2025 BOD Elections & 2025 Delegate Elections

Program Approvals: Submit the State Assembly Program Date Request Form A1 no less than 120 days prior to the date(s) of the program for AST approval. The form must be received prior to first (1st) of the current month for program publication in the next month of the AST monthly journal The Surgical Technologist. The Application for State Assembly CE Program Approval A2 must be received at least thirty (30) days prior to the date(s) of the program for continuing education credit approval. An application submitted post-program will not be accepted; no program is granted approval retroactively.

Contact stateassembly@ast.org or 800.637.7433, ext. 2547.

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