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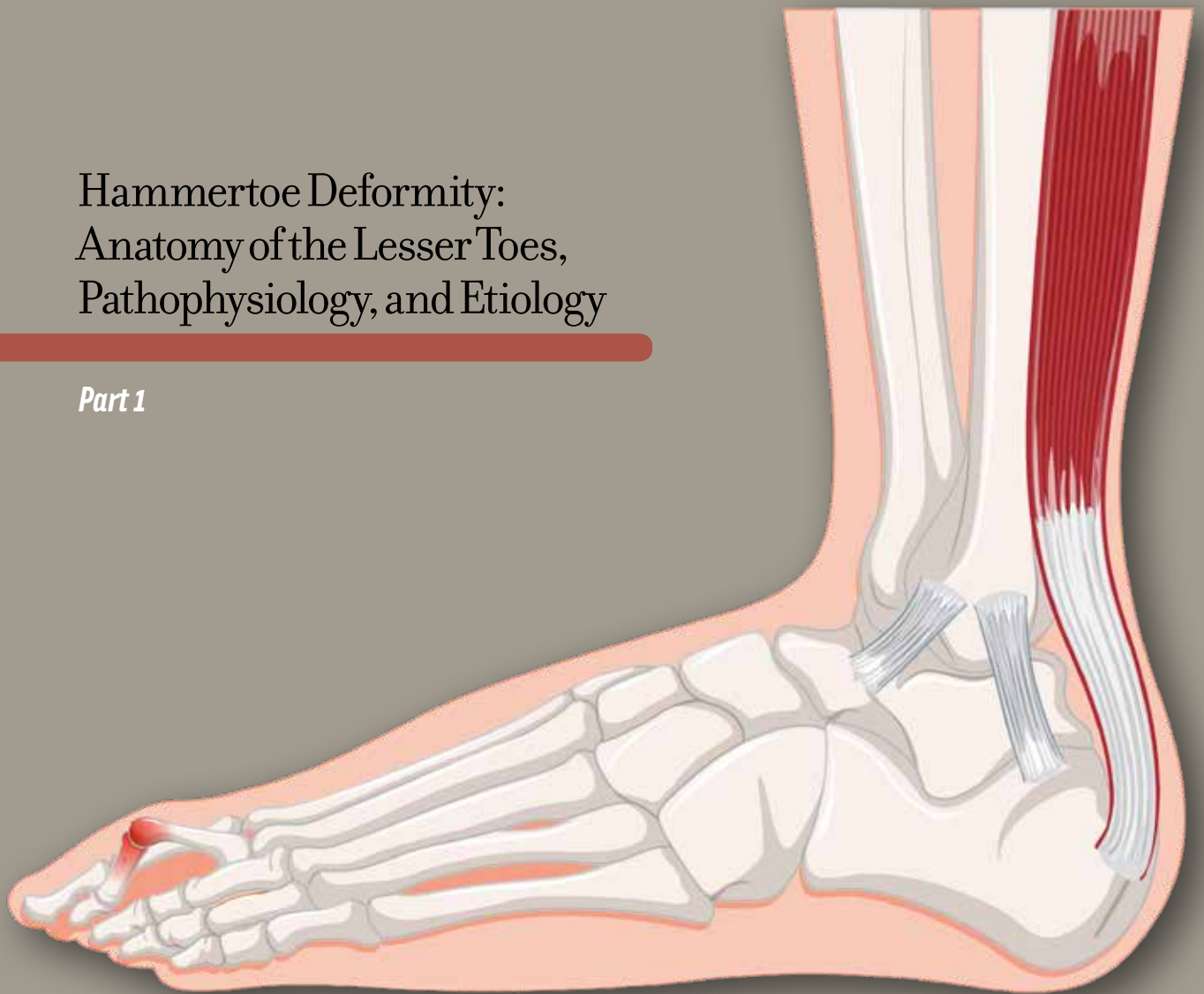
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SURGICAL TECHNOLOGIST

OFFICIAL JOURNAL OF THE ASSOCIATION OF SURGICAL TECHNOLOGISTS, INC.

Hammertoe Deformity: Anatomy of the Lesser Toes, Pathophysiology, and Etiology

Part 1



SAVE THE DATE — 2027 AST SURGICAL TECHNOLOGY CONFERENCE

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where the lake meets momentum

JUNE 3-5, 2027

Join us in Milwaukee, Wisconsin, for the 2027 AST Surgical Technology Conference—a premier opportunity to come together as a profession, learn from industry experts, collaborate with colleagues from across the country, and strengthen the future of surgical technology. Set along the beautiful shores of Lake Michigan, Milwaukee offers a unique blend of rich history, vibrant culture, renowned festivals, and exceptional dining. Whether you're attending educational sessions, networking with peers, or exploring a dynamic new city, the 2027 AST conference promises an engaging and memorable experience both inside and outside the convention center.

STATEMENT OF EDITORIAL PURPOSE The purpose of the *Journal* is to advance the quality of surgical patient care by providing a forum for the exchange of knowledge in surgical technology and by promoting a high standard of surgical technology performance.

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Hammertoe Deformity: Anatomy of the Lesser Toes, Pathophysiology, and Etiology, Part 1

KEVIN B. FREY, CST

Part 1 of the hammertoe deformity series includes discussions on the anatomy of the lesser toes that can be affected by hammertoe deformity, the pathophysiology, the etiology, and the nonoperative management.

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Precision, Purpose, and Pride: Celebrating the Profession of Surgical Technology

BROOKE OLIVER, MED, CST, FAST, AST DIRECTOR

BOARD MESSAGE



Every September, National Surgical Technologists Week gives us an opportunity to celebrate something we often don't take time to acknowledge, each other.

As surgical technologists, we are accustomed to focusing our attention on our patients, our surgeons, our sterile fields, and the countless details that demand our vigilance every day. We arrive early, prepare meticulously, anticipate constantly, and stay focused until the final dressing is applied. We do our jobs because we understand the responsibility that comes with standing at the surgical field.

Yet during National Surgical Technologists Week, the spotlight belongs on the profession itself and the experts behind the Mayo stand.

This week is about recognizing the expertise, dedication, and professionalism that surgical technologists bring to every procedure, every patient, and every operating room. It is a celebration of a profession that has earned its place as an indispensable part of modern surgical care.

The Experts Behind the Sterile Field

Every surgical technologist understands that success in the operating room is built on preparation. Before a surgeon ever enters the room, we have already begun laying the groundwork for a safe and efficient procedure.

We know the instruments. We know the equipment. We know the procedure. We know what comes next.

Our expertise is often measured not by what we say but by what we anticipate. The ability to stay several steps ahead of a procedure is a skill developed through education, training, experience, and an ongoing commitment to professional excellence.

Every specialty presents unique challenges. Whether scrubbing cardiovascular, orthopedic, neurosurgical, robotic, trauma, general surgical cases, or any of the vast specialties, surgical technologists bring expert knowledge and

technical precision to the operating room.

We are problem solvers. We are critical thinkers. We are surgical professionals whose contributions directly influence the success of every surgical procedure.

Guardians of Patient Safety

Patient safety is not just one aspect of our job; it is at the center of everything we do.

Every time we establish a sterile field, inspect and prepare instrumentation, perform counts, anticipate the surgeon's needs, or advocate for corrective action when a break in technique occurs, we are protecting our patients.

The vigilance required to maintain sterility throughout a surgical procedure is a responsibility that belongs to all members of the surgical team, but surgical technologists serve as the first line of defense. We understand that small details matter. We know that a single oversight can have significant consequences.

Because of this, surgical technologists bring a unique perspective to patient advocacy. Even though our patients may never meet us, we become their advocates from the moment they enter the operating room.

We protect them when they are most vulnerable and that responsibility is both an honor and a privilege.

The Value We Bring to Every Case

One of the most remarkable aspects of surgical technology is that our contributions extend far beyond instrumentation.

We contribute to efficiency.

We contribute to organization.

We contribute to clinical expertise.

We contribute to confidence.

Surgeons rely on surgical technologists who understand procedural flow and can anticipate needs before they are verbalized. An experienced surgical technologist helps cre-

ate an environment where the entire surgical team can perform at its highest level.

The best surgical technologists make difficult cases run more smoothly, they help manage unexpected challenges, they remain calm under pressure, and they maintain focus when circumstances become complicated.

These contributions may not always be visible to those outside the operating room, but everyone who has worked beside an exceptional surgical technologist understands the difference.

The value we provide is real, measurable, and essential.

A Profession Worth Recognizing

For many years, surgical technologists have advocated for greater recognition for our profession. While healthcare systems increasingly acknowledge the importance of surgical teams, there is still work to be done in ensuring that the expertise and contributions of surgical technologists are fully understood and valued.

Recognition is not about seeking praise; recognition is about acknowledging professional expertise.

It is about understanding that surgical technologists are educated, highly skilled members of the perioperative team whose knowledge contributes directly to patient safety and surgical outcomes.

It is about supporting accredited education, certification, continuing education, professional development, and opportunities for advancement.

It is about ensuring that future generations of surgical technologists enter a profession that is respected, supported, and recognized for its contributions to healthcare.

Every surgical technologist can play a role in advancing our profession. Whether mentoring students, pursuing continuing education, participating in professional organizations, advocating for legislative initiatives, or simply demonstrating excellence in daily practice, we strengthen the profession every time we demonstrate the value of what we do.

Celebrating Who We Are

National Surgical Technologists Week is more than dates on the calendar. It is a reminder of the impact we make every day.

It is a celebration of the early mornings, the emergency call shifts, the complex cases, the long procedures, and the countless moments when preparation, knowledge, and skill come together in service of a patient.

It is a celebration of the professionals who maintain

Every surgical technologist can play a role in advancing our profession. Whether mentoring students, pursuing continuing education, participating in professional organizations, advocating for legislative initiatives, or simply demonstrating excellence in daily practice, we strengthen the profession every time we demonstrate the value of what we do.

composure under pressure, protect sterile technique without compromise, and approach every procedure with the same commitment to excellence.

Most importantly, it is a celebration of a profession that continues to evolve, grow, and elevate the standards of surgical care.

This week, take pride in what you have accomplished.

Take pride in the knowledge you have gained.

Take pride in the patients you have helped and the lives you have touched.

And take pride in being a surgical technologist.

Because every instrument prepared, every count completed, every sterile field protected, and every procedure supported reflects the skill and professionalism that define our profession.

This National Surgical Technologists Week, we celebrate not only what we do, but who we are.

We are surgical technologists, and our contributions matter.

AST News

AT A GLANCE

GET READY TO CELEBRATE SURG TECHS EVERYWHERE! NATIONAL SURGICAL TECHNOLOGISTS WEEK IS SEPTEMBER 20-26, 2026



National Surgical Technologists Week, September 20–26, 2026, is a time to recognize and celebrate you, the dedicated surgical technologists who play a vital role in ensuring safe, high-quality patient care. Throughout the week, we will honor the skill, professionalism, and commitment you bring to the operating room while recognizing your invaluable contributions to surgical teams and the patients you serve. Join us as we celebrate the profession and thank surgical technologists everywhere for the difference you make!

Not Feeling the Love? Make Your Own Celebration!

No recognition from your OR manager or hospital admin? No problem! Rally your fellow techs and throw your own party!

Ideas to get started:

- Bring in your favorite snacks or plan a potluck lunch
- Happy hour after work? Yes, please!
- Put up banners in the breakroom
- Flip the script: bring snacks for your managers and teammates to show YOUR appreciation

Grab Your FREE Posters!

Download, print, and display them loud and proud—in your hospital, school, or even at home!

- Visit the AST site to download your free NSTW posters! <https://www.ast.org/surgicaltechnologistsareessential/>
Get ready to celebrate!

SAVE THE DATES! UPCOMING EVENTS

**2027 AST Educators
Conference – Austin, TX**
February 19-20, 2027, with preconference February 18



Plan to join us for our next two AST Surgical Technology Conferences. We want to see you there!

**2027 AST Surgical Technology
Conference – Milwaukee**

- June 3-5, 2027

**2028 AST Surgical Technology
Conference – Phoenix**

- June 8-10, 2028



SCHOLARSHIPS EDUCATORS – APPLY NOW FOR A CONSTELLATION AWARD!

The Constellation Awards presented by the Foundation for Surgical Technology recognizes the profession's hard-working surgical technology educators at three different career levels: early, mid-level, and veteran.

Educators nurture our techs-to-be and mentor practitioners. It is a difficult step to move outside the OR and into the classroom. The Foundation hopes that these recognized professionals will share their successes, provide insights on avoiding pitfalls, and offer encouragement to other CSTs who are considering making the leap to academia.

Educators can qualify in three categories. One recipient will be selected at each level.

- **RIISING STARS** - Educators with 1-5 years of teaching experience
- **SHINING STARS** - Educators with 6-14 years of teaching experience
- **GUIDING STARS** - Educators with 15 or more years of teaching experience

Each award, valued at \$1,000, will include a registration for the AST Educators Conference in February and monetary support.

Applications are due December 1.

To view more details and to apply online, visit ffst.org – Constellation Awards.

MEMBERSHIP

WHAT YOUR MEMBERSHIP GETS YOU

There are a multitude of benefits when you're an AST member

Ever wonder what your AST membership gets you? Take a look at the following list. Being a member of AST really does have its benefits!

- Low membership fee. AST has kept the low fee a priority while other associations have raised its membership fees.
- Cost savings when registering for AST events, such as the national conference and Educators Event.
- State-specific legislative efforts driven by AST National to further along the profession.
- Discounted CE opportunities that are offered by AST, including CE Credit Packages.
- Automatic transfer of CE credits to the National Board of Surgical Technology and Surgical Assisting.
- Automatic recording of CE credits earned through AST • online offerings and earned at AST events such as the national conference.
- Submittal of CE credits at any time during your membership so you don't lose those valuable certificates of completion/attendance.
- Maintenance of your CE credit certificates for 5 years.
- Annual CE credit letter; a tally of how many credits you earned throughout the year.
- Having a say when it comes to you state's assembly board. Active members get to vote for their state assembly Board of Directors.
- Communications including *The Surgical Technologist*, monthly e-newsletters, and AST social media sites, including Facebook, Pinterest and videos on Vimeo.
- Leadership opportunities to serve on state assembly and national boards as well as state and national committees.
- Scholarship opportunities for students, educators, and CSTs.
- The AST Career Center, where you can post your resume and obtain information on job openings.
- Legislative updates and support for your state.
- Access to the Map of State Laws.
- An opportunity to be published in *The Surgical Technologist*. If your CE article is published, you earn CE credits.

DISCOUNTS

MEMBER-GET-A-MEMBER

Earn two or more months of FREE membership with the Member-Get-A-Member program. Recruit colleagues and AST will extend your membership by the appropriate number of months. Here's how:

Recruit a valid new member at the one-year membership rate of \$80.

Make sure that each person you recruit provides AST with your name and your AST member number when filling out their application.

After AST receives the recruited member's application, we will extend your membership by two months for each person you recruit.

Recruit two members at the \$80-level, and we'll extend your membership by four months! The more people you recruit, the longer your membership gets extended.

Bonus membership months are not applicable to members who recruit themselves, students, or retired/disabled members. No substitutions will be permitted. Your membership must be current to receive the bonus months. Potential members MUST supply your name and your AST member number in order for you to receive bonus membership months. If a person's membership has lapsed for more than a year, they are considered a new member.

Call our Member Services team at 1-800-637-7433 for more information.

MILESTONES



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.

- Arkansas – 21 years
- California – 25 years
- Maryland/Delaware – 23 years
- Ohio – 25 years
- Rhode Island – 16 years

Innovation at the Mayo Stand: Entrepreneurship for CSTs

Cortney Hartman, MBA, CST, FAST

BEYOND THE MAYO



Every certified surgical technologist (CST®) has had the same thought at some point in the OR: *There has to be a better way to do this!* Maybe it was a new way to organize instruments, a more efficient teaching strategy, or

an idea for a product that could make procedures safer and smoother.

For some CSTs, those sparks of creativity are just passing thoughts. But for others, they become the seeds of entrepreneurship — turning ideas into businesses that make a lasting impact on the profession.

Entrepreneurship may sound like a leap into the unknown, but it's simply another way CSTs can take their skills, insights, and creativity beyond the Mayo stand.

Why Entrepreneurship?

Entrepreneurship gives CSTs freedom to:

- **Create Solutions:** Turn problems you've noticed in the OR into real innovations.
- **Shape Your Career:** Build work that aligns with your strengths and passions.
- **Expand Impact:** Reach far more people than you could in a single OR.
- **Achieve Independence:** Set your own schedule, vision, and goals.

For CSTs with an entrepreneurial spirit, the opportunities are as varied as the procedures we support.

Types of Entrepreneurial Opportunities for CSTs

1. Consulting

- Helping hospitals improve OR processes, onboarding, or specialty services. Example: advising on instrument tracking systems or efficiency improvements.

2. Education & Training

- Creating CE courses, webinars, or hands-on workshops for CSTs.
- Developing exam prep resources or career development coaching.

3. Product Development

- Designing tools, devices, or organizational systems to solve everyday OR challenges.
- Partnering with engineers or vendors to bring ideas to market.

4. Publishing & Media

- Writing books, blogs, or digital resources for surgical technologists.
- Launching podcasts or YouTube channels focused on CST growth and innovation.

5. Entrepreneurial Side Hustles

- Building niche projects while still working in the OR — from content creation to selling digital products online.

The Entrepreneurial Mindset

Entrepreneurship isn't just about starting a business — it's about cultivating a way of thinking:

- **Problem-Solving:** See challenges as opportunities.
- **Resilience:** Learn from failure and try again.
- **Creativity:** Find new approaches to old problems.
- **Initiative:** Act instead of waiting for change to come.

These qualities already exist in CSTs who thrive under pressure in the OR. Entrepreneurship is simply a new outlet for them.

Steps to Start Small

Many CSTs hesitate because starting a business feels overwhelming. The key is to start small and build gradually:

1. **Identify a Problem You Care About.** What frustrates you most in the OR? That may be your opportunity.
2. **Brainstorm Solutions.** Sketch ideas, research competitors, and explore feasibility.

3. **Test on a Small Scale.** Offer a workshop, write an article, or create a prototype.
4. **Seek Feedback.** Share your ideas with colleagues, mentors, or potential customers.
5. **Refine & Repeat.** Improve based on what you learn before scaling up.

Entrepreneurship is less about giant leaps and more about steady, thoughtful steps.

Realistic Challenges

Like any career pathway, entrepreneurship comes with challenges:

- **Uncertainty:** Income may fluctuate, especially at the start.
- **Time Commitment:** Balancing work, family, and a side business can be demanding.
- **Risk:** Not every idea succeeds, and setbacks are part of the process.
- **Learning Curve:** Business requires skills in marketing, finance, and legal matters.

These challenges are also opportunities for growth. Many CST entrepreneurs find the journey as rewarding as the destination.

Building Your Entrepreneurial Toolkit

CSTs stepping into entrepreneurship can strengthen their chances of success by developing:

- **Business Basics:** Budgeting, marketing, contracts, and branding.
- **Networking:** Connecting with mentors, investors, or collaborators.
- **Technology Skills:** Websites, social media, and online learning platforms.
- **Persistence:** The ability to stay committed even when progress feels slow.

Resources like small business development centers, online courses, and mentorship programs can provide support along the way.

Stories of CST Innovation

Across the profession, CSTs have already proven their entrepreneurial potential:

- Some have launched consulting firms to train surgical teams nationwide.
- Others have developed exam prep resources, helping hundreds of students pass their CST or CRCST certification.

- A few have partnered with companies to create educational tools.

Each of these stories reinforces an important truth: entrepreneurship isn't just possible for CSTs — it's already happening.

The Role of Passion

Entrepreneurship is demanding, but passion fuels persistence. The most successful CST entrepreneurs choose ideas that align with what excites them:

- If you love teaching, education-based ventures may be your fit.
- If you constantly redesign your Mayo stand, product innovation might be your path.
- If you thrive on writing or speaking, publishing and media could be your outlet.

Passion not only sustains the hard work but also ensures that your contributions feel authentic and meaningful.

Closing Thoughts

Innovation doesn't always come from the top down. Sometimes, it comes from the people who know the work best — and that's us. As CSTs, we see the challenges, we feel the inefficiencies, and we imagine the solutions.

Entrepreneurship is simply the decision to take those ideas seriously — to step beyond the Mayo stand and into a role where your creativity, problem-solving, and vision can shape the future of surgical technology.

If you've ever thought, "*I can make this better,*" maybe it's time to try. The profession needs your innovation — and so does the next generation of CSTs.

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AST EDUCATORS CONFERENCE

Save The Date!

Austin, TX

February 19-20, 2027

Preconference Event

February 18



Registration opening fall 2026.
Stay tuned for more information!

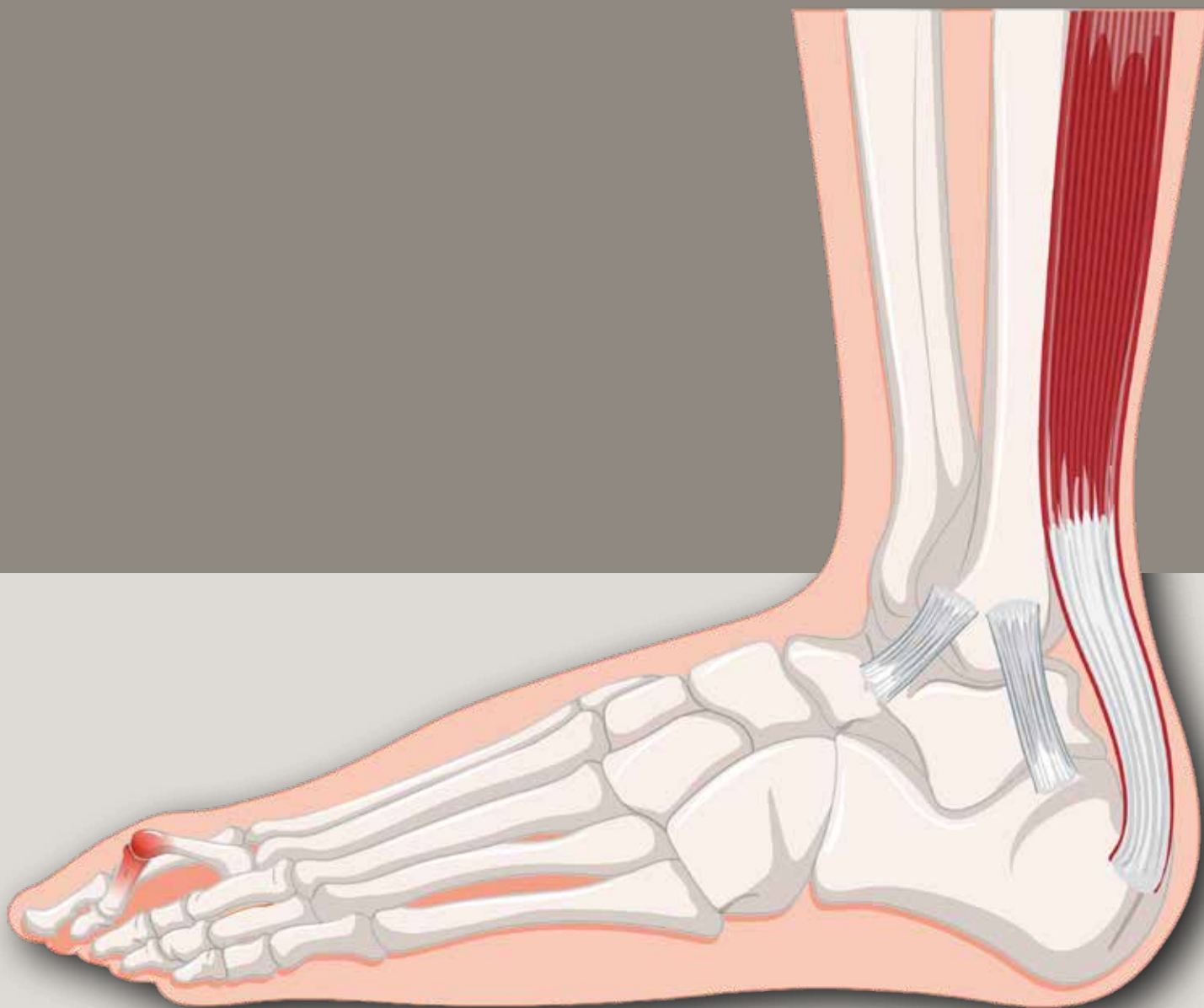
Empower YOURSELF



YOUR VOICE, YOUR POWER

- The Workforce Shortage: A Message from AST
- Turning the Workforce Chute into a Ladder
- CSTs Many Lifesaving Roles
- Education and Certification as an Appropriate Minimum
- Standard for Surgical Technology and Patient Safety
- AST Position Statement on Minimum Education for Surgical Technologists
- AST Position Statement on Accreditation, Certification, Official Title of the Profession, and OJT Training
- ACS Statement Supporting Surgical Technology Accredited Education and the CST
- AORN Job Description Supporting Surgical Technology Accredited Education and the CST
- AST Encourages Healthcare Facility Leaders to Support Local, Accredited Surgical Technology Educational Programs
- AST Recommendations for CSTs, Program Directors, and State Assemblies when Addressing OTH Training with a Healthcare Facility
- Message to Surgical Technology Program Directors Regarding Alternative Certification Credentials from the AST, ARC/STSA, and NBSTSA
- Should Healthcare Facilities Require CST Certification for Surgical Technologists? Yes...Here's Why





Hammertoe Deformity: Anatomy of the Lesser Toes, Pathophysiology, and Etiology

Part 1

KEVIN B. FREY, CST

Hammertoe deformity is a prevalent disorder of the lesser toes, particularly in older adults and populations in which constricting footwear is popular. The PIP joint is the only joint affected by flexible hammertoe deformity causing abnormal flexion of the joint. A rigid hammertoe is distinguished by abnormal flexion of the PIP joint and extension at the MTP joint.¹

Leonardo Da Vinci is credited with one of the first descriptions of the interaction between the intrinsic muscles of the foot with the extrinsic muscles of the lateral aspect of the lower leg.¹ During the winter season from 1510-1511, Leonardo was working at the University of Pavia Medical school located south of Milan, Italy, and had switched his scientific research to focus on the bones and muscles of the human body. This provided the opportunity for the Renaissance physician and anatomist Marcantonio della Torre, who worked at the university as a professor, to meet and collaborate with Leonardo. This gave Leonardo access to corpses to dissect and study; he may have dissected up to 20 bodies during this time. It is thought that Leonardo and della Torre were intending to co-publish a book, but this did not come to fruition with della Torre's unfortunate death due to the plague in 1511. However, it did lead to Leonardo producing 18 sheets of detailed drawings known as the *Anatomical Manuscript A* (Figure 1).



Figure 1 *Bones of the Foot and Shoulder (Drawings by Leonardo Da Vinci)*

LEARNING OBJECTIVES

- ▲ Describe in detail the anatomy of the lesser toes
- ▲ Discuss the role the lesser toes play in the biomechanics of movement
- ▲ Explain how the pathophysiology of the toes is responsible for the hammertoe deformity
- ▲ Discuss the etiological factors of hammertoe deformity

KEYWORDS

distal interphalangeal joint, extensor digitorum longus, flexor digitorum brevis, flexor digitorum longus, hammertoe, metatarsophalangeal joint, plantar plate, proximal interphalangeal joint,

DEFINITIONS

Attenuated: Weakened.

Bipennate muscle: A muscle with fibers that attach obliquely to both sides of a central tendon, resembling a feather. The fibers run at an angle to the tendon, providing strong contractions and force generation but with a smaller range of motion.

Lesser toes: Second through the fifth toes.

Slip: A branch of a larger ligament or tendon.

Subluxate: Incomplete or partial dislocation.

Unipennate muscle: A muscle with fibers that are arranged obliquely only on one side and inserts into a tendon, resembling half of a feather. The muscle is designed for strength and endurance rather than contributing to a wide range of motion.

ABBREVIATIONS

DIP: Distal interphalangeal (DIP) joint

EDB: Extensor digitorum brevis

EDL: Extensor digitorum longus

FDB: Flexor digitorum brevis

FDL: Flexor digitorum longus

MTP: Metatarsophalangeal (MTP) joint

PIP: Proximal interphalangeal (PIP) joint

"The cause of hammertoe deformity is considered to be caused by a weakening of the plantar plate and collateral ligaments that are the stabilizing structures in conjunction with an imbalance between the extrinsic and intrinsic muscles."

In 1863, Guillaume Benjamin Amand Duchenne (Duchenne de Boulogne), famous French neurologist in the early to mid-1800s, is credited with his excellent description of toe deformities, including claw toe and hammertoe as both resulting from a dynamic muscular imbalance.² He determined that the deformity was not due to a localized joint defect, but the result of atrophy or functional failure of the intrinsic foot muscles.

The imbalance leads to continuing deformity and dysfunction of the toe that also can cause the patient chronic pain. Patients with a hammertoe deformity often complain of pain because of the formation of a callus on the dorsal PIP joint, plantar callus on the posterior of the metatarsal heads, or the tip of the toe that is pressing against the front of the footwear.³

LESSER TOE ANATOMY AND KINESIOLOGY OF TOE ALIGNMENT AND FUNCTION

Several anatomical structures of the toes interact to properly distribute the body's weight and sustain correct toe alignment to provide the person with the ability to walk normally. These structures include bones and their joints, extrinsic and intrinsic muscles, tendons, and ligaments (Figure 2).

Beginning with the dorsal side of the toe, situated down the middle of the bone, is the EDL that divides into three slips at the joint of the proximal phalanx. Two slips are positioned dorsolaterally over the middle phalanx and merge together to form a single tendon inserted onto the base of the distal phalanx.¹ The middle slip inserts into the base of the middle phalanx. The entire tendon is held in place by the extensor hood that positions the EDL to the plantar portion of the MTP joint and to the base of the proximal phalanx. The EDB originates at the dorsal surface of the calcaneus and inserts on the dorsal base of the middle phalanx and is also held in place by the extensor hood.⁴ The EDB facilitates toe extension.

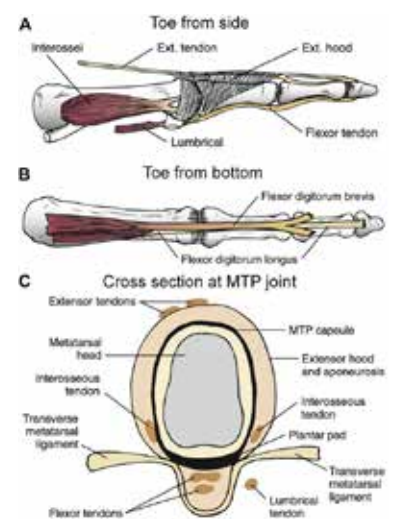


Figure 2 Anatomy of the MTP Joint and Lesser Toe

Positioned on the plantar aspect of the toe are the FDB and FDL. The FDB originates from the plantar surface of the calcaneus and inserts onto the middle phalanx.⁴ The FDB primarily supports flexion of the PIP joint.⁵ The FDL originates from the deep posterior compartment of

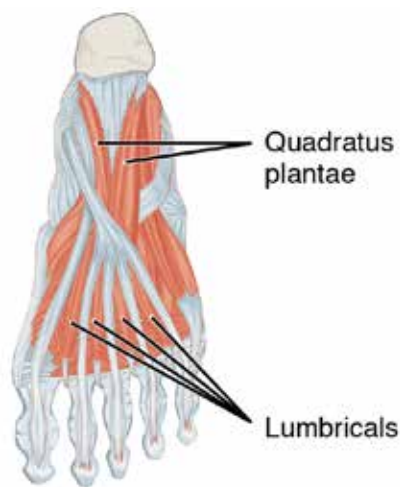


Figure 3 Lumbricals

the leg, crosses the ankle medially, and inserts onto the distal phalanx and flexes all three joints of the toes.⁴ The lumbricals originate from the adjacent FDL tendons, run plantarly to the MTP, and extend dorsally to merge with the lateral bands.⁴ The primary role of the lumbricals are to flex the MTP joint and extend the DIP and PIP joints (Figure 3).

To further understand the anatomy of the MTP joint, the anatomy of the plantar plate needs to be described. The plantar plate is a thick fibrocartilaginous ligament that runs along the ball of the foot and attaches to the joints that also acts as an attachment site for the plantar fascia. It extends from the periosteum of the inferior metatarsal neck to the inferior aspect of the base of the proximal phalanx.⁶ The two primary functions of the plate are to safeguard the metatarsal head from excess pressure and stabilize the MTP joint of the lesser toes.⁶ This is achieved because of the fibrocartilaginous structure of the plate that provides resistance to tension and compression forces at the MTP joints.

The two collateral ligaments of the MTP joint are the phalangeal collateral ligament that attaches to the proximal phalanx base and the accessory collateral ligament that attaches to the plantar plate.⁵ The third ligament, the transverse metatarsal ligament, attaches to the lateral and medial edges of the plantar plate.

The intrinsic muscles are involved in the normal function of the toes as well as the abnormal development of hammertoe deformity. The plantar interossei are a group of three small muscles that, along with the dorsal interossei, form the deepest layer of plantar muscles and have a unipennate shape.

The three muscles originate from the medial metatarsals of toes three to five and attach to the medial sides of the phalanges. The dorsal interossei are four muscles that have a bipennate shape. The muscles originate from the lateral aspect of the metatarsals. The first muscle attaches to the medial side of the proximal phalanx of the second toe. The second to fourth interossei attach to the lateral sides of the proximal phalanges of the second through fourth toes.

The arterial blood supply to the toes are branches from the anterior and posterior tibial arteries consisting of the:

- arcuate artery,
- deep plantar artery,
- plantar arch artery,
- dorsal digital arteries (including the 1st dorsal metatarsal artery)
- plantar metatarsal, and
- plantar digitals.⁵

The interdigital artery is prone to traction injury in the presence of hammertoe deformity.⁴

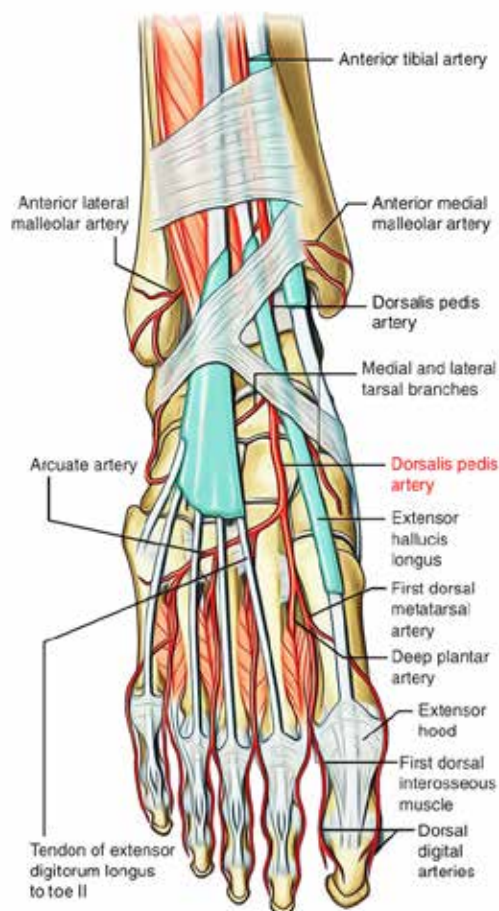


Figure 4 Arterial supply to the foot

The nerve supply is multiple branches of the lateral and medial plantar nerves including laterally the adductor hallucis, all interossei, lateral 3 lumbricals and medially, the medial lumbrical, flexor hallucis brevis, adductor hallucis, and medial plantar nerve.⁵

The lesser toes have an important function towards normal gait and balance. During movement, such as running or walking, the body weight is shifted to the foot and heel. The force of the movement is transferred to the toes by the intrinsic muscles of the foot and the structures of the arch that includes the plantar fascia.¹ The normal toe alignment is maintained by a balance between the extrinsic muscles, the EDL and FDL, with the extrinsic muscles, the interossei, lumbricals, and quadratus plantae. The intrinsic muscles counteract the extrinsic muscles flexion of the MTP joints and extension across the DIP and PIP joints.¹ Dysfunction of the extrinsic or intrinsic muscles contributes to the development of hammertoe deformity.

During normal movement, the MTP joints extend and the DIP and PIP joints flex to facilitate foot contact with the ground. When the toes are moving off the ground, the FDB and FDL muscles push the body forward over the foot. The plantar plate contributes to stabilizing the MTP joint. Through its connections to the intrinsic muscles, the MTP joint prevents excessive dorsiflexion. The next section on pathophysiology provides additional details as to how abnormalities of the joints and ligaments contribute to hammertoe deformity.

The plantar plate's role is to stabilize the MTP joint. The plate provides active and passive resistance to dorsi-

flexion through its connections with the intrinsic muscles of the foot that prevents excessive dorsiflexion.¹ Lastly, the collateral ligaments help maintain the alignment of the toe in both the sagittal and transverse planes.¹

PATHOPHYSIOLOGY

The cause of hammertoe deformity is considered to be caused by a weakening of the plantar plate and collateral ligaments that are the stabilizing structures in conjunction with an imbalance between the extrinsic and intrinsic muscles. This imbalance can be caused by atrophy of the intrinsic muscles, over extension of the extrinsic muscles, and chronic extension of the MTP joint, such as the constant wearing of high heeled shoes.¹ Chronic extension of the MTP joint causes the plantar structures to weaken leading to extension of the proximal phalanx at the MTP joint. Over time, the EDL no longer exerts its extension on the interphalangeal joints that allows the phalanges distal to the PIP joint to move into flexion. Upon dorsiflexion by the MTP joint, the extrinsic muscles undergo tension at rest, thus further contributing to the flexion deformity at the PIP joint. The following provides additional details that contribute to the pathophysiology of hammertoe deformity (Figure 5).

The position of the proximal phalanx and the function of the EDL must be understood in relation to the development of hammertoe deformity. The main function of the EDL is to dorsiflex the toes.¹ Normally, the EDL functions to extend the PIP joint when the proximal phalanx is in a flexed or neutral position at the MTP joint. However, in the presence of hammertoe deformity and the MTP joint is extended, the EDL

cannot extend the PIP joint that causes a flexion contracture at that joint.¹ Additionally, during normal movement, the MTP joint is moved from a neutral position to a dorsiflexion position. When the EDL cannot extend the PIP joint with the MTP joint dorsiflexed, the DIP and PIP joints flex because of unopposed flexion. This extrinsic muscle movement also contributes to hammertoe deformity.

When the plantar plate is improperly functioning, the proximal phalanx subluxates dorsally onto the metatarsal head. This also causes the



Figure 5 Hammertoes

interossei muscles to function as dorsiflexors instead of plantar flexors, further contributing to the severity of the hammertoe deformity. The lumbrical muscle also contributes to hammertoe deformity because of its insertion on the medial side of the MTP joint. It can place an unwanted adduction force vector on the toe (pulling the toe inward toward the other toes).

ETIOLOGY

Hammertoe deformity occurs more often in women than men, with a female-to-male ration of approximately 4:1 and 85% of patients being women.⁷ The incidence of hammertoe deformity increases with age with the highest rate between the ages of 50-70 years of age.⁸ Multiple toes are affected in 70% of cases with the second toe most frequently involved, possibly due to its increased length as compared to the lengths of the other toes.⁷ Additionally, patients with hallux valgus (bunion) or a long second toe (Morton's toe) are susceptible to developing hammertoe deformity because of mechanical overload and the individual compensating when walking (Figure 6).



Figure 6 Morton's toe

A primary contributing factor to the development of a hammertoe deformity is restrictive footwear, including high heels that place an abnormal force upon the structures of the foot. Hammertoe deformity is often a secondary result of a disease or injury including:

- compartment syndrome,
- degenerative disk disease,
- diabetes,
- hallux valgus,
- psoriatic arthritis, and
- rheumatoid arthritis (causes hammertoe deformity by progressive MTP joint destruction that leads to MTP joint subluxation).^{3,4}

Part 2 will discuss the methods used for diagnosing hammertoe deformity and its extent, nonsurgical treatment options, and common surgery procedures.

REFERENCES

1. Jastifer JR, Martin KD. Hammertoes: anatomy, pathophysiology, and comprehensive treatment strategies. *J Am Acad Orthop Surg*. 2025; 33(16): e919-e927. doi: 10.5435/JAAOS-D-25-00025
2. Alvine FG, Garvin KL. Peg and dowel fusion of the proximal interphalangeal joint. *Foot Ankle Int*. 1980; 1(2): 90-94. doi: 10.1177/107110078000100208
3. Goransson M, Dixon M. Hammertoe. [Updated 2026 Feb 15]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559268/>
4. Watson A. Hammertoe deformity. *Medscape*. 2023. Accessed September 24, 2026. <https://emedicine.medscape.com/article/1235341-overview>
5. Agur AMR, Dalley AF. The lower limb. In: Agur AMR, Dalley AF, *Grant's Atlas of Anatomy*. 16th ed. Wolters Kluwer; 2025.
6. Hatch DJ. Anatomy: plantar plate. *Clin Podiatr Med Surg*. 2022; 39(3): 411-419. doi: 10.1016/j.cpm.2022.02.004
7. Coughlin MJ, Dorris J, Polk E. Operative repair of the fixed hammertoe deformity. *Foot Ankle Int*. 2000; 21(2): 94-104. doi: 10.1177/107110070002100202
8. Jastifer JR, Coughlin MJ. Lesser toe deformities. In Haskell A, Coughlin MJ, eds: *Coughlin and Mann's Surgery of the Foot and Ankle*. 10th ed. Elsevier; 2024: 303-399.

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Hammertoe Deformity: Anatomy of the Lesser Toes, Pathophysiology, and Etiology, Part 1

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1. Which of the following refers to muscles that are arranged obliquely on only one side of a toe?
 - a. Ray
 - b. Bipennate
 - c. Slip
 - d. Unipennate
2. What anatomical structure holds the EDB and EDL in position?
 - a. Plantar plate
 - b. Lumbricals
 - c. Extensor hood
 - d. Ligaments
3. Which of the following is a role of the lumbrical muscles?
 - a. Protect the metatarsal head
 - b. Resist tension at the PIP joint
 - c. Flex the DIP joint
 - d. Flex the MTP joint
4. Which anatomical structure is located along the ball of the foot?
 - a. Plantar plate
 - b. Collateral ligaments
 - c. Intrinsic muscles
 - d. Interossei muscles
5. Which of the following anatomical structures forms the deepest layer of plantar muscles?
 - a. Lumbricals
 - b. Plantars
 - c. Interossei
 - d. Extrinsic
6. Which artery is prone to traction injury caused by hammertoe deformity?
 - a. Arcuate
 - b. Interdigital
 - c. Plantar metatarsal
 - d. Dorsal metatarsal
7. Which of the following is a nerve that provides multiple branches that innervate the toes?
 - a. Lateral plantar
 - b. Adductor hallucis
 - c. Medial lumbrical
 - d. Flexor hallucis brevis
8. What causes a flexion contracture of the PIP joint that contributes to the pathology of hammertoe deformity?
 - a. MTP is preventing excessive dorsiflexion
 - b. Intrinsic muscles counteract extrinsic muscles
 - c. FDB muscles are pushing the body over the foot
 - d. EDL cannot extend the PIP joint
9. Which toe is most frequently affected by hammertoe deformity?
 - a. First
 - b. Second
 - c. Third
 - d. Fourth
10. Which of the following is not a secondary cause of hammertoe deformity?
 - a. Diabetes
 - b. Hallux valgus
 - c. Osteosarcoma
 - d. Psoriatic arthritis

HAMMERTOE DEFORMITY: ANATOMY OF THE LESSER TOES, PATHOPHYSIOLOGY, AND ETIOLOGY, PART 1

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Surgical Technologists Week

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2026 Scholarship Recipients

The Foundation for Surgical Technology funds various awards during the year, but it is best known for the academic scholarships that assist students entering the field. This year we awarded \$49,000 in student scholarships. Over the next couple of months, this year's scholars will describe what this award means to them.



KELSY DYSHELL ROGERS, CST
SOUTH COLLEGE, MARYVILLE, TN

\$1,000

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I have always enjoyed working in healthcare. While working as a non-certified medical assistant, I had the opportunity to work alongside a breast oncology surgeon who allowed me to observe several surgical procedures. I found the experience fascinating and spoke with him about my interest in furthering my career in surgery. He suggested that I pursue a career as a surgical technologist, and from that moment I knew it was the path I wanted to take.

My current plans are to begin working as a certified surgical technologist while continuing my education by pursuing a Bachelor of Science in Health Science at South College. I am excited to further develop my skills and knowledge while building a long-term career in the surgical field.

One of my favorite aspects of being a surgical technologist is playing a vital role in the operating room and assisting the surgical team during procedures to help ensure patient safety and positive outcomes. During my clinical experience in labor and delivery, I had the opportunity to scrub on a cesarean section in which twins were delivered. Witnessing one of the babies still enclosed in the amniotic sac was an unforgettable experience and reminded me of how unique and rewarding a career in surgery can be. Moments like that strengthen my passion for the profession and reinforce my desire to continue learning and growing in the operating room.

I look forward to experiencing a wide variety of surgical procedures, learning more about the human body, and continuing to grow both personally and professionally as a surgical technologist. I am honored to receive this scholarship and grateful for the support of the Foundation for Surgical Technology as I begin this exciting chapter in my career.



JASMINE L MCMILLER, CST
SOUTHERN TECHNICAL COLLEGE,
THONOTOSASSA, FL

\$500

*SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY*

Receiving this scholarship is both an honor and a blessing. As a surgical technology student, mother, and future healthcare professional, this award represents far more than financial assistance. It represents recognition of the hard work, perseverance, and dedication that have brought me to this point in my educational journey.

I chose surgical technology because I wanted a career where I could make a meaningful impact on the lives of others while being part of a team dedicated to patient care. The operating room is a unique environment where precision, teamwork, and critical thinking come together to help patients through some of their most vulnerable moments. From the beginning of my program, I was drawn to the important role surgical technologists play in ensuring patient safety and supporting successful surgical outcomes.

Throughout my clinical rotations, I developed a deep love and passion for surgery. Being able to witness procedures

firsthand, learn the intricacies of surgical interventions, and understand the anatomy and physiology of the human body in a real-world setting has been an incredible experience. Seeing everything up close in the operating room allowed me to connect classroom knowledge with patient care in a way that strengthened my understanding and appreciation for the profession. I value every opportunity to ask questions, learn from experienced surgical team members, and contribute by making appropriate observations and suggestions. These experiences have reinforced my desire to continue growing in this field.

The clinical setting has not only expanded my knowledge but has also strengthened my confidence and commitment to becoming an exceptional surgical technologist. As I continue my education and training, I look forward to further developing my technical abilities, expanding my surgical knowledge, and refining the skills necessary to provide the highest level of patient care. Every case, every procedure, and every learning opportunity has fueled my determination to become the best professional I can be.

After graduation, I am excited to become a valuable asset in the operating room and contribute meaningfully to the surgical team as a certified surgical technologist. I look forward to applying the knowledge and skills I have gained throughout my education while continuing to learn, grow, and advance within the profession. My goal is not only to provide exceptional patient care but also to continue expanding my expertise and furthering my career within the surgical field.

I am deeply grateful for this opportunity and for the individuals and organizations that invest in students pursuing careers in healthcare.



SANDY OROZCO, CST

MOUNT ALOYSIUS COLLEGE,
KERSEY, PA

\$2,500

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SURGICAL TECHNOLOGY

Receiving the Foundation for Surgical Technology scholarship is an incredible honor and a milestone that represents years of hard work, sacrifice, and determination. Pursuing a career in healthcare has been both a personal and professional dream. My journey to becoming a certified surgical technologist has required perseverance, resilience, and an unwavering commitment to improving the lives of others through patient care and great attention to detail while also reminding myself where I come from and the honor of having earned a place in this country and field of study.

I chose surgical technology because it combines technical skill, critical thinking, teamwork, and compassion to help improve patient outcomes. From my first day in the operating room, I knew I had found my calling. I was fascinated by the precision of surgery and inspired by the collaborative efforts of the surgical team working together to provide safe and effective care. Being able to contribute to that process and advocate for patients during some of their most vulnerable moments is a responsibility that I deeply value.

Throughout my education at Mount Aloysius College, I had the privilege of completing clinical rotations at Penn Highlands DuBois, where I gained experience in a variety of surgical specialties thanks to wonderful preceptors that gave me valuable insights and helped me prepare for my future. These experiences strengthened my passion for the profession and confirmed my desire to continue growing as a surgical technologist. I particularly enjoy the fast-paced environment of the operating room, the opportunity to anticipate the needs of the surgeon, and knowing that my preparation and attention to detail directly impact patient outcomes.

One of the accomplishments I am most proud of is successfully passing my national certification examination and becoming a certified surgical technologist despite the odds as an immigrant student. This achievement represents not only academic success, but also the countless hours spent studying, practicing skills, and overcoming challenges along the way. I am also grateful to have been recognized through scholarships, dean's list honors, and membership in the National Society of Leadership and Success, all of which encouraged me to continue striving for excellence.

As I begin my professional career, my goal is to continue developing my skills in gynecology, robotics, and general surgery while serving patients with integrity, compassion, and professionalism. I look forward to gaining experience, mentoring future students, and becoming an advocate for the surgical technology profession. I am committed to lifelong learning and to making a positive impact on every patient and every surgical team I have the privilege to serve.

I am sincerely grateful to my family, my daughter Camila Rios, and the Foundation for Surgical Technology for this generous scholarship and for investing in the future of surgical technology professionals. This award not only provides financial support, but also serves as a reminder that dedication, perseverance, and passion for patient care are recognized and valued when you fight hard to achieve your dreams. I am honored to be a recipient and look forward to representing the profession with pride throughout my career.



MCKENNA LYNN MORSE, CST
QUINCY COLLEGE, NORTON, MA

\$2,500

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Before school each morning, my grandfather would send me off with the same advice: “Learn something today.” Those words have guided me throughout my education and ultimately led me to surgical technology.

My interest in surgery began in seventh grade when I researched cardiothoracic surgeons for a STEM project. What started as a simple assignment sparked a fascination with anatomy, medicine, and the operating room that has never left me. As a first-generation college student without healthcare connections, pursuing a career in surgery often felt daunting, but I remained committed to finding a path forward.

That path led me to surgical technology. Through my education and clinical experiences, I have discovered that what I love most about the operating room is the opportunity to learn. Every case, surgeon, and team member offers a new lesson. Whether learning a more efficient setup, understanding the rationale behind a procedure, or even just observing different surgical techniques, I am constantly reminded that growth in this profession never stops.

After graduation, I look forward to beginning my career as a surgical technologist and continuing to develop my skills in the operating room. I am particularly interested in cardiac and thoracic surgery, but I am excited to continue exploring the many specialties within the field. Long-term, I hope to continue my education while remaining connected to the profession that first allowed me to turn my passion for surgery into a reality.

Receiving this scholarship is an incredible honor. I am grateful to the Foundation for Surgical Technology, my instructors, classmates, mentors, and family for supporting me throughout this journey. Most importantly, I am excited for what comes next and for the opportunity to continue learning something new every day.

Scholarships continue on page 411

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GUARDIANS OF THE PATIENT

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HANNAH GRACE KIFFER
CARLOW UNIVERSITY, FREEPORT, PA
\$500
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SURGICAL TECHNOLOGY

I am incredibly honored and grateful to receive the Foundation for Surgical Technology scholarship. Thank you to the Foundation and the committee for investing in students who are passionate about the surgical technology profession.

I chose surgical technology because I knew I wanted to work in the operating room and be part of a team dedicated to helping others. After undergoing two surgeries on my own leg, I gained a firsthand appreciation for the impact that skilled healthcare professionals can have on a patient's life. Those experiences inspired me to pursue a career where I can make a difference for patients during some of their most vulnerable moments.

Currently, my goal is to absorb as much knowledge and experience as possible throughout my clinical rotations. Each day provides an opportunity to learn new skills, strengthen my confidence, and grow as a future surgical technologist. Looking ahead, I am excited to begin my career at Children's Hospital of Pittsburgh, where I will have the privilege of caring for pediatric patients and contributing to a team dedicated to improving and saving young lives.

Throughout my surgical technology training, I have especially enjoyed neuro and thoracic procedures. I find the complexity of these specialties fascinating, and I enjoy the preparation, organization, and teamwork required for each case. Being part of procedures that can significantly improve a patient's quality of life is both rewarding and fulfilling.

After graduation, I look forward to beginning my career at my dream hospital and making a positive impact on children and their families. Receiving this scholarship encourages me to continue working hard toward my goals, and I am truly grateful for this recognition and support.

Thank you again for this generous award and for supporting the future of surgical technology.



CHELSEA PHOEBE CALAHAN
DALTON GAY MEMORIAL SCHOLARSHIP,
REYNOLDS COMMUNITY COLLEGE,
MIDLOTHIAN, VA
\$3,000
SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY

For more than fifteen years, I have worked in emergency medicine, caring for patients during some of the most frightening and uncertain moments of their lives. While I found tremendous purpose in helping stabilize critically ill patients, I often wondered what happened after they left my care. Did they receive the surgery they needed? Did they heal? Did they get their life back?

Over time, I found myself increasingly drawn to the operating room. Emergency medicine allowed me to provide immediate, lifesaving interventions, but surgical technology offered something different—the opportunity to be part of the healing itself. To help move patients from crisis to recovery and from temporary stabilization to long-term hope.

I chose surgical technology because it combines technical skill, teamwork, precision, and patient advocacy into one profession. I truly believe there is no time when a patient is more vulnerable than when they are lying unconscious on an operating room table. In that moment, they place complete trust in a team of strangers to care for them, protect them, and advocate for them.

While patients may never remember the surgical technologist standing beside them, I believe surgical technologists hold one of the most important roles in the operating room. Surgeons and nurses are vital members of the team, but without meticulous attention to sterile technique and patient safety, even the most technically successful procedure can have devastating consequences. That responsibility is one I do not take lightly. I want to be part of the team entrusted with protecting patients during some of the most critical medical moments of their lives.

My passion for healthcare extends beyond my work in emergency medicine. I firmly believe in the power of compassionate, evidence-based care, and the profound impact it can have on individuals, families, and communities. Medicine and travel have always been two of my greatest passions, which is why participating in a medical mission trip to Guatemala became one of the most meaningful experiences of my life. When I initially volunteered, I expected to assist

with triage and clinical assessments. Instead, due to unexpected family emergencies, I was given the opportunity to step into the operating room and scrub cases alongside an incredible surgical team. That experience changed everything and renewed this passion.

I watched families wait days for the chance to receive care. I listened to their stories, shared their hopes, and witnessed relief on their faces when they learned surgery could help them. For the first time, I wasn't only helping stabilize a patient. I was helping provide a solution. I was able to witness not just the problem, but the healing that followed. The experience reaffirmed what I had already begun to feel: the operating room was exactly where I wanted to be.

None of this journey would have been possible without the surgical technologists, educators, and mentors who came before me. Throughout my education, I have been fortunate to learn from individuals who generously shared their knowledge, encouraged my growth, and challenged me to become the best version of myself. I am especially grateful for the guidance and support of Lisa Day. Her passion for surgical technology, commitment to education, and dedication to preparing the next generation of surgical technologists is truly inspiring. She, along with so many remarkable women in this profession, have helped strengthen my passion for this field and reinforced my desire to serve others through surgical care.

When I applied for this scholarship, financial need was not my primary motivation. In fact, I initially felt hesitant to apply because I knew there were others who might need the financial assistance more than I did. Ultimately, I chose to apply because I believed my dedication, academic performance, passion for the profession, and commitment to patient care reflected the values this scholarship represents.

Learning that I had been selected was both an incredible honor and a deeply emotional experience. This scholarship bears the name of someone whose life ended far too soon, yet whose legacy continues to impact students like me. Meeting his mother and witnessing her strength, resilience, and commitment to honoring her son's memory was profoundly moving. Receiving this scholarship is not only a privilege but also a responsibility—one that I carry with gratitude and humility.

I am forever grateful to have found this profession. The support, mentorship, and encouragement I have received throughout this journey has strengthened my commitment to becoming the best surgical technologist I can be. As I continue my education and career, I hope to honor the faith others have placed in me by serving patients with compassion, protecting them with vigilance, and one day helping guide the next generation of surgical technologists, just as so many have guided me.



BRITTANY NICOLE SABLAN, CST
MT. HOOD COMMUNITY COLLEGE,
PORTLAND, OR

\$500

SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY

One of the reasons I chose to become a surgical technologist is because of the incredible people I have had the privilege of working alongside in the operating room. Long before I entered my program, I watched surgical technologist demonstrate exceptional skill, unwavering composure, and a level of teamwork that made a lasting impression on me. Their knowledge, confidence, and dedication to every patient inspired me to strive for more in my own career.

I am grateful to the mentors and peers who generously share their experiences with me. They have answered my questions, challenged me to grow, and believed in my potential even while I was still learning to believe in myself. Watching them anticipate the needs of the surgical team, advocate for patient safety, and remain calm under pressure showed me the kind of professional I want to become.

I would like to sincerely thank the Foundation for Surgical Technology for awarding me this scholarship and investing in my education. I would also like to express my deepest gratitude to two incredible mentors who have supported and encouraged me throughout this journey: Program Director, Amy Aldus, and Clinical Director, Angie Hansen. I hope to honor their investment in me by one day mentoring future students with the same patience, kindness, and encouragement they have shown me.



AMANDA JUNE THOMPSON, CST

SOUTH COLLEGE, KNOXVILLE, TN

\$2,500

*SPONSORED BY FOUNDATION FOR
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I am honored to be recognized as a scholarship recipient and grateful for the opportunity to continue growing within the profession of surgical technology. I am currently a certified surgical technologist working at Knoxville Orthopedic Clinic, where I have the privilege of caring for patients alongside a dedicated surgical team and gaining valuable experience in orthopedic surgery and trauma care through my work with UT Medical Center.

My journey into surgical technology has led me to a profession where skill, compassion, and purpose come together. Working in the operating room has shown me the importance of being fully present, prepared, and committed to every patient who places their trust in the surgical team. Although patients may not always remember the individuals who cared for them while they were under anesthesia, I believe they deserve to know they were surrounded by people who treated their care with the highest level of respect and dedication.

Orthopedic surgery has become a specialty that I am especially passionate about because of the immediate and meaningful impact it has on patients' lives. I find it incredibly rewarding to witness the restoration of function through procedures such as fracture fixation and joint replacement. Seeing a patient's quality of life improve through surgical intervention reminds me every day why I chose this profession.

One of the most important values I carry into the operating room is treating every patient as if they were a member of my own family. Patient advocacy is at the center of what I do, and I take pride in being their voice while they are unable to advocate for themselves. From maintaining a safe sterile environment to anticipating the needs of the surgical team, every responsibility I have is ultimately connected to one goal: providing the safest and best possible care for each patient.

As I continue my career as a certified surgical technologist, I look forward to expanding my knowledge, developing my skills, and remaining committed to lifelong learning. Surgical technology is a constantly evolving field, and I am excited to continue growing alongside the profession while contributing to the future of patient-centered surgical care.

Receiving this scholarship is an incredible honor, and I am grateful for the support and recognition from the surgical technology community. This opportunity encourages me to continue striving for excellence and to represent the profession with dedication, compassion, and pride.

Thank you again.



YASMINE M FIRDIOUS, CST

OWENS COMMUNITY COLLEGE, TOLEDO, OH

\$1,000

*SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY*

My interest in surgical technology began during a medical mission trip to the Philippines with Helping Hands Medical Missions. I initially joined the team as a sterile processing technician, but due to a shortage of surgical technologists, I was asked to step into that role and was given a brief hands-on introduction. During that experience, I saw firsthand the impact surgical care can have on underserved communities and how every member of the surgical team contributes to patient outcomes. That experience inspired me to pursue a career in surgical technology.

After returning home from the Philippines, I knew I wanted to pursue a career in surgical technology. Enrolling in the Surgical Technology program at Owens Community College allowed me to transform that experience into a profession and begin developing the skills needed to care for patients in the operating room.

Balancing work, school, and clinical rotations was overwhelming at times. Reducing my work hours created financial stress, and much of my personal life had to be put on hold to keep up with the demands of the program. There were moments when I felt burnt out and questioned whether I could continue. What kept me moving forward was remembering the

patients I met during my mission trip and the impact I hoped to make in the operating room. Even on the most difficult days, I knew I had a purpose.

As I progressed through the program and my clinical experiences, I gained confidence in my abilities and developed a deeper appreciation for the responsibilities of a surgical technologist. These experiences strengthened my commitment to patient care and reinforced the importance of precision, teamwork, and professionalism in the operating room.

The aspect of surgical technology I find most meaningful is the responsibility of protecting and advocating for patients during surgery. Patients are at their most vulnerable, and I strive to treat every patient as if they were my own loved one. I am especially interested in the role surgical technologists play in maintaining a sterile field and ensuring patient safety throughout every procedure. Knowing that my actions directly contribute to a safe and successful outcome is what draws me most to this profession.

After graduation, I began working as a surgical technologist at the facility where I completed my final clinical rotation, making the transition from student to professional a smooth one. While I do not yet have a favorite specialty, I am eager to learn from every surgical service and gain experience across a variety of specialties. Each area presents unique challenges and opportunities for growth, and I look forward to becoming a versatile and dependable member of the surgical team.

Looking ahead, my goal is to become highly proficient as a surgical technologist while continuing to promote patient safety and quality care. I hope to advance into specialized roles that help meet the growing demands of healthcare and to develop expertise in robotic-assisted surgery. I am committed to lifelong learning and professional growth so that I can continue providing the highest standard of care to my patients.

I am incredibly grateful to receive this scholarship. Completing my education was a major financial challenge, especially when I had to significantly reduce my work hours to balance school and demanding clinical rotations. Although I have now graduated, this award provides immense relief by helping me pay down the financial burdens I accumulated during that time. More importantly, it serves as a reminder that the hard work, sacrifices, and perseverance required to reach this point have been recognized and supported.

Thank you to the Foundation for Surgical Technology for this honor and for investing in the future of surgical technology professionals. I am proud to be part of this profession and excited for the opportunities ahead.



ALLYSON A GUDEN, CST

MID STATE TECHNICAL COLLEGE,
MARSHFIELD, WI

\$1,000

SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY

I chose to pursue a career in surgical technology because of my experience working as a CNA for three and a half years in the pre-operative and post-operative setting. Working in this environment was extremely rewarding and gave me valuable insight into the surgical process. Over time, I became interested in expanding my role and gaining a deeper understanding of the operating room, which led me to pursue surgical technology as the next step in my career.

My experience working as a CNA in the pre-operative and post-operative setting has also given me a strong foundation going into Surgical Technology school, as it allowed me to become familiar with patient flow, perioperative care, and the overall surgical process, which helped make my transition into surgical technology school more seamless and confident.

Currently, I am transitioning from my CNA role into the operating room as a recent graduate of Mid State Technical College's Surgical Technology program. I plan to build on my experience, continue growing in the field of surgery, and expand my knowledge of surgical procedures and surgeon preferences. I am excited to continue learning and further develop my skills in the surgical environment.

One of the most meaningful aspects of working in surgical technology is being part of

the patient's surgical experience. While my new role is not as direct as a CNA, preparing the sterile field and assisting during surgery plays a critical role in patient care. I also value the relationships built with coworkers and surgical team members. Every person in the operating room plays an essential role in patient outcomes, and I am proud to be part of that team.

After recently graduating, I look forward to continuing to expand my knowledge and applying what I have learned throughout my clinical experiences. I am also excited to grow into an independent surgical technologist. Many recognize that surgical technology is a field that requires continuous learning, and I am eager to develop my skills and confidence as I gain more experience in the operating room.



KYLEE SHARON NOLAN
RASMUSSEN UNIVERSITY,
CLEARWATER, FL

\$1,000

*SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY*

I chose a career in surgical technology because of the impact my surgical team had on me during one of the most uncertain experiences of my life.

The characteristics of the team that have resonated with me since that day are calm, collected, and confident. While inpatient, I received care from several departments, but the entire operating team gave me the greatest sense of reassurance. Going through something so personal gave me a profound appreciation for the dedication delivered by healthcare professionals every single day.

It is these experiences that have encouraged me to move forward in the surgical profession and build connections with other professionals in my community. I look forward to helping patients feel more comfortable during what may be one of the emotionally driven moments of their lives.

I discovered the Surgical Technology program at Rasmussen University and felt it was a great fit for me. Balancing full-time work while attending school full-time has not been easy but has strengthened my dedication and perseverance. I am committed to becoming the best certified surgical technologist I can be through engagement and continued education.

With incredible honor, I am grateful to be awarded this scholarship. From the bottom of my heart, thank you for supporting my education and my journey toward serving my community through healthcare.



ALEXA C DAVIS
BOB CARUTHERS SCHOLARSHIP
THE COLLEGE OF HEALTH CARE
PROFESSIONS, HOUSTON, TX

\$1,000

*SPONSORED BY THE TEXAS STATE
ASSEMBLY*

My name is Alexa Davis, and when I am not in the operating room, I am at home with my two toddlers. As a prior military service member, I have always had a passion for helping others, which ultimately led me to pursue a career in surgical technology.

I began the Surgical Technology program in October 2024, and am currently completing my final clinical rotation. Throughout this journey, I have discovered a deep appreciation for the operating room and the important role surgical technologists play in patient care. I enjoy continuously learning about anatomy, surgical techniques, and the many ways a surgical team works together to improve patients' lives.

One of the most rewarding parts of this profession is seeing patients come in hopeful that a procedure will relieve pain or improve their quality of life. Knowing that I can contribute to that process is incredibly meaningful to me.

After graduating in September, I hope to begin my career as a surgical technologist and continue developing my skills. My long-term goal is to attend first assist school and further advance my education. I am grateful for this scholarship and the opportunities it provides as I continue working toward a career dedicated to helping others.





KATHRYN NOELLE DAVIS, CST

PIMA MEDICAL INSTITUTE, TUCSON, AZ

\$2,500

SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY

Hello! My name is Kathryn Davis, and I am a recent certified surgical technologist graduate! Becoming a surgical technologist has been an incredible opportunity to make a meaningful difference in the lives of patients during some of the most vulnerable moments of their lives.

My journey to becoming a surgical technologist has not always been easy. Shortly before beginning my surgical technology program, I lost my father to cancer. Caring for him during his illness taught me the importance of compassion, resilience, and quality healthcare. His passing strengthened my determination to pursue a career where I could contribute to helping patients and their families during difficult times. Throughout my education, I have remained committed to achieving my goals despite personal challenges, and that experience reinforced my dedication to the healthcare field.

One of the aspects I enjoy most about surgical technology is being part of a team that works together to improve patients' lives. Every member of the surgical team plays a critical role, and I find it incredibly rewarding to know that my preparation, attention to detail, and commitment to maintaining a sterile environment directly contribute to patient safety. The best part of working in surgery is witnessing the collaboration, skill, and professionalism required to perform successful procedures while knowing that our efforts can have a lasting impact on a patient's health and well-being.

After graduation, I look forward to beginning my career as a certified surgical technologist and continuing to develop my skills in the operating room. My immediate goal is to gain experience across multiple surgical specialties and become a dependable, knowledgeable member of the surgical team. I am incredibly grateful to those who have supported and encouraged me throughout this process, and look forward to paying it forward by encouraging others to further their education in healthcare.



NATALIE COOPER

CONCORDE CAREER COLLEGE,
ADELANTO, CA

\$2,500

SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY

When I began as a perioperative assistant, I was doing simple tasks like turning over rooms and pulling cases. Starting there helped me understand how every role in the operating room matters and how each step directly connects to patient care. That experience is what led me to choose surgical technology. Being in the operating room showed me that I want to be part of a team where everyone is directly involved in patient care, working together to support safe and efficient surgeries. As a student, I carry that perspective into every clinical experience. I am grateful for where I started because it shaped how I see the operating room and confirmed that surgical technology is the path I am committed to pursuing.



PRESTON DIVALL

SOUTHWEST TECH, MONTFORT, WI

\$500

SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY

Receiving this scholarship from the Foundation for Surgical Technology means so much to me, and I am incredibly grateful to have been selected. As a surgical technology student, this scholarship is not only a financial blessing but also a reminder that the hard work, dedication, and passion I have for this profession are being recognized and supported.

Pursuing a career in surgical technology has been such an important journey for me. I have worked hard throughout my education and clinical experiences to grow my skills, strengthen my knowledge, and prepare myself to provide safe, quality care to patients in the operating room. Being awarded this scholarship encourages me to keep pushing forward and reminds me why I chose this path in the first place.

This scholarship will help relieve some of the financial stress that comes with continuing my education, allowing me to focus more fully on school, clinicals, and becoming the best surgical technologist I can be. It will help support expenses related to my program and make a meaningful difference as I continue working toward my goals.

I am truly thankful to the Foundation for investing in students like me and supporting the future of the surgical technology profession. Your generosity is helping me continue my education with confidence and motivation, and I am honored to be a recipient of this scholarship.



EMILY ALEXIS CUPO

BERGEN COMMUNITY COLLEGE, WOOD-
RIDGE, NJ

\$500

SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY

I am deeply honored to be selected as a scholarship recipient by the Foundation for Surgical Technology. Throughout my Certified Surgical Technologist program, I have discovered a true passion for surgical technology and found a career path that feels both natural and rewarding. The hands-on nature of the profession has allowed me to thrive while continually motivating me to expand my knowledge and skills. As I prepare for my certification exam, I am also looking ahead to my future at Hackensack University Medical Center, where I am eager to apply my training, contribute to patient care, and gain experience across a wide variety of surgical procedures.

Receiving this scholarship is more than just financial support to me; it is a meaningful reminder that others believe in my potential and the future I am working toward. It strengthens my commitment to becoming the best surgical technologist I can be and inspires me to continue learning, growing, and serving patients with compassion and excellence.

I am sincerely grateful to the Foundation of Surgical Technology for investing in my education and career, and I look forward to carrying that support with me as I begin this exciting new chapter in the operating room.



**MADALYN JEAN SCHNETTLER,
CST**

ST. CLOUD TECHNICAL COMMUNITY
COLLEGE, SARTELL, MN

\$1,000

SPONSORED BY FOUNDATION FOR
SURGICAL TECHNOLOGY

I chose surgical technology because I enjoy hands-on work and thrive in environments that require focus, organization, and teamwork. Being able to support surgeons and contribute to positive patient outcomes makes this career both meaningful and fulfilling to me. My plan now is to focus on my career at St. Cloud Hospital while maintaining my certification. In the future, I hope to expand my knowledge, gain experience in a variety of surgical specialties, and become a highly skilled and dependable member of the surgical team.



DAVID DANIEL MUNOZ

DON BRAZIEL SCHOLARSHIP, TEXAS
STATE TECHNICAL COLLEGE, MCALLEN,
TX

\$2,000

SPONSORED BY THE TEXAS STATE
ASSEMBLY



I didn't choose surgical technology because it was easy, I chose it because it challenged me. Over the past few months since beginning the program, I have experienced significant personal and professional growth. I've rebuilt my health, pushed myself through difficult life hurdles, and committed to a career that requires excellence every single day. Through those experiences, I learned that some of the most heartfelt work happens behind the scenes. That's exactly where surgical technologists thrive.

The operating room is a place where preparation, skill, and teamwork directly impact a patient's life. I love the intensity of surgery, the constant learning, and the responsibility that comes with being part of the surgical team. Whether I'm preparing instruments, anticipating the surgeon's next move, or helping maintain a safe and sterile field for the patient, I know that my role matters.

After graduation, I look forward to earning my place as a valued member of the surgical team in a high acuity hospital, where I can apply the knowledge and skills I have gained through both the classroom and clinical experience. More importantly, I am excited to continue proving to myself that hard work, determination, and perseverance truly pay off. This program has challenged me academically, physically, and emotionally, but those challenges have strengthened my confidence, expanded my skill set, and reinforced my passion for surgery. Graduation will represent more than the completion of a program, it will mark the beginning of a career that I am proud to pursue. My goal is to continue developing my abilities in a fast paced surgical environment, particularly in trauma and other complex surgical specialties, while continuing to seek opportunities to learn and grow. Ultimately, I aspire to become a certified surgical first assistant and continue advancing within the profession, making a positive impact on patient care throughout my career.

What excites me most is that surgery is a field where there is always something new to learn. Every procedure, every patient, and every day in the operating room presents an opportunity to improve. That pursuit of growth is what motivates me, and it is why I am proud to pursue a career in surgical technology.

Receiving this scholarship from the Foundation for Surgical Technology is an incredible honor and a milestone that I will forever cherish. I am deeply grateful for this investment in my education and future, as it serves as a reminder that hard work and dedication are recognized and rewarded. This achievement would not have been possible without the support of my family, friends, colleagues, and instructors, who believed in me every step of the way. I share this recognition with each of them, and I am committed to honoring their support by continuing to grow, learn, and provide the highest level of care to every patient I have the privilege to serve.



FOUNDATION *for* SURGICAL TECHNOLOGY

What is The Foundation for Surgical Technology?

The Foundation is a 501c3 organization comprised of representatives from the Association of Surgical Technologists (AST) and the National Board of Surgical Technology and Surgical Assisting (NBSTSA). This type of organization also means any donation you give to the Foundation is tax deductible.

Who does The Foundation support?

The Foundation provides scholarships to the following:

- ✿ Students
- ✿ Educators
- ✿ Military personnel
- ✿ Those who have helped others by serving on medical mission trips

When are the annual deadlines for the scholarships?

- ✿ Students scholarships - March 1
- ✿ Military scholarships - March 1
- ✿ Constellation (Educator) Awards - December 1
- ✿ Medical mission reimbursement - December 31

Learn more at www.ffst.org and give today!

Journal of Society for Cardiovascular Angiography & Interventions

OF INTEREST IN THE MEDICAL ARENA

Note: The following is a summary of key sections of a consensus statement regarding cardiac catheterization. The intent of this article is to provide information that is important for CSTs who work as a cardiac catheter technician who may also have achieved or are working towards earning the registered cardiac invasive specialist (RCIS) credential. CSTs are encouraged to review the consensus statement in its entirety: <https://www.jscai.org/article/S2772-9303%2823%2901183-3/fulltext>

2024 Consensus Statement on Cardiac Catheterization for Adult and Pediatric Patients

In 2024, the “Expert Consensus Statement on Cardiac Catheterization for Pediatric Patients and Adults with Congenital Heart Disease” was published. The consensus statement was published by the Pediatric and Congenital Interventional Cardiovascular Society, the Association for European Pediatric and Congenital Cardiology, the Asia-Pacific Pediatric Cardiac Society, the Cardiac Society of Australia and New Zealand, the Society for Cardiovascular Angiography & Interventions, and the Latin American Society of Interventional Cardiology. Endorsement was given by the American Association of Physicists in Medicine and the Congenital Cardiac Anesthesia Society. The statement provides guidance on best practices for cardiac catheterization and transcatheter management of pediatric and adult patients with congenital heart disease (CHD) with additional recommendations for resource-limited environments.

Policies and Procedures

Health care providers are very familiar with policies and procedures that serve many purposes. They facilitate adherence to recognized professional practices, promote compliance with facility accreditation requirements, regulations, and statutes, standardize practices throughout the facility, and serve as a resource for staff. Policies and procedures are broadly grouped into two categories – those related to providing patient care and those related to providing a safe organization such as administrative and human resource policies. It is important that the manager of the congenital catheter lab ensures the members of the lab team are familiar with the policies and procedures that are relevant to their roles.

The list of policies, procedures, and guidelines that are important to the congenital catheter lab needs to be able to be adapted and adjusted according to the needs of each institution including in consideration of other general institutional requirements.

Examples of documents include:

- acquisition of new technology,
- full-time cover for emergencies,
- handoff of patients to other units,
- emergency chest open in the catheter lab,
- introduction of new devices and interventional procedures,
- checklists for equipment that may be required with urgency,
- emergency institution of ECMO or other circulatory support,
- activation of extra support for emergencies in the catheter lab, and
- transfer of patient to OR for emergency surgery post cardiopulmonary resuscitation (CPR) and stabilization.

Considerations for Adult Congenital Heart Disease Patients

- Nonphysician staff qualifications and training may have additional requirements such as requiring additional certifications and credentials.
- Nonphysician staff should have a thorough knowledge of adult congenital cardiac procedures.

Considerations for Resource-Limited Environments

- When staff do not have the formal training and qualifications, the focus should be on cross-training so staff can assist in any specific role during a procedure.
- Nonphysician staff should be prepared to fill multiple roles within the facility.

Staffing Considerations: Nonphysician Staff

Congenital Catheterization Team Composition

- The specific job titles, qualifications, and training requirements for staff can vary, but what is consistent is that the main roles that need to be covered for a congenital heart

catheterization program are scrub assistant*, circulator, and recorder or monitor.

- Even when a second physician is present during a case, it does not eliminate the need for a scrub assistant who is particularly valuable during emergencies.
- The scrub assistant must understand and maintain sterile technique when setting up the back table, draping a patient, and handling supplies and equipment during procedures.
- Additional functions can include preparing and flushing transducers, sheaths and catheters; housing wires; assisting in maintaining wire position; and preparing balloons and devices under the direction of the physician.

**The consensus statement uses the terminology “scrub assistant.”*

Because this is an international statement in which countries have various titles for the role of what is called the “surgical technologist” in the United States, the broad term of scrub assistant is used within the statement.

Cross-training and Coverage

- Preferably, all personnel should be licensed or certified and should at least have an associate degree.
- A competence-based system for assigning roles is desirable for maximum efficiency of the use of staff. Unless prohibited by regulatory requirements, it is recommended that the nonphysician catheter lab staff be cross-trained to manage a minimum of two roles and preferably all three roles – scrub assistant, circulator, monitor.

Procedural Competency: Nonphysician Staff

- In catheter labs that perform pediatric cardiac catheterization, the minimum number of hours required for nonphysician staff should be a minimum of 75 cases per year with 50 of those as pediatric cases.
- In-service presentations should be a part of the catheter lab education as new procedures, devices, and equipment are introduced.
- Continuing education and annual competencies are important towards building and maintaining the staff’s knowledge base. Continuing education opportunities can include participation in case management conferences, mortality and morbidity conferences, and quality review meetings. Additionally, to increase staff competency, pre-procedural discussions, and time-outs are effective towards patient-specific teaching opportunities.
- Annual competencies should be completed on safety and quality use, including reviews and assessments of complex procedures that are not often performed.
- Mock codes are another opportunity for improving the competencies of the catheter lab team.
- All catheter lab team members should be certified in both adult and pediatric CPR.

Surgical Backup and Circulatory Support

Life-threatening adverse events occur in approximately 2% of cardiac catheterization procedures. Therefore, ensuring the survival of the patient depends on the availability of surgical backup and circulatory support such as extracorporeal membrane oxygenation (ECMO).

Surgical Backup vs ECMO Backup and Recommendations

- Backup with ECMO, without also having cardiac surgical backup availability, is rarely appropriate for any cardiac catheter procedure.
- An ECMO program may allow the cardiac team to be selective in choosing the type of backup in hemodynamic emergencies, it does not eliminate the need for surgical backup.
- The “2012 Expert Consensus Document on Cardiac Catheterization Laboratory Standards” and the Intersocietal Accreditation Commission “Standards and Guidelines for Cardiovascular Catheterization Accreditation” both recommend that cardiovascular catheterization procedures on any age group should only be done in facilities that have an on-site cardiovascular surgical backup.
- An established ECMO program is not a necessary requirement for backup if circulatory support using cardiopulmonary bypass can be provided. The following are the backup categories by urgency.
 - Surgical backup
 - Standby: The surgical team is present within the catheter lab to provide surgical support immediately.
 - Rescue: Surgical backup is available on site and can be provided rapidly with the expectation of time to incision of <15 minutes.
 - Deferred: A surgeon may be off campus or scrubbed in a different procedure but is available so the surgical incision is made within one hour of activation.
 - No backup: Surgical backup is not available.
 - Circulatory support categories
 - Standby: Expectation of establishing circulatory support/ECMO flow in <10 minutes from activation and/or ECMO team on standby in the catheter lab.
 - Rescue: Expectation of establishing circulatory support/ECMO flow on average in <30 minutes and in 1 hour or less from activation.
 - Deferred: Expectation of establishing circulatory support/ECMO flow within 1 to 3 hours from activation.
 - Deferred: Expectation of establishing circulatory support/ECMO flow within 1 to 3 hours from activation.
 - No backup: ECMO backup or circulatory support is not available.

- A variety of patient-related factors should be considered when deciding the availability requirements for circulatory/ECMO support backup, including:
 - age,
 - weight,
 - presence of a shunt,
 - type of intervention,
 - previous cardiac surgery,
 - preprocedural risk scores,
 - hemodynamic vulnerability,
 - associated genetic conditions,
 - most likely expected adverse events, and
 - single ventricle vs 2-ventricle anatomy.
- A variety of factors should be considered when assessing the need for surgical backup.
 - It should be considered how easily and how effectively an injury can be temporarily controlled by interventional methods while waiting for surgical backup.
 - When the ability to control a catheter-related complication is inadequate, the availability of immediate surgical backup is recommended.
 - Preparations should be made in advance with the surgical team to ensure they are available as backup. The surgical team's availability should be confirmed prior to the patient being transported into the catheter lab.
 - Ideally, a catheter lab procedure that has been determined to have a higher preprocedural risk should be scheduled early in the day to guarantee in-house surgical backup is available.
 - However, some cardiac catheterization procedures are performed as a last resort salvage procedure in patients who are not candidates for surgical intervention even if an adverse event occurs.
- A formal protocol should describe how surgical and ECMO backup is activated.
 - The protocol should be confirmed during the time-out or the preprocedural meeting.
 - Given the multiple tasks required in an emergency, the entire activation process should ideally be initiated by a single designated catheter lab team member who can perform the activation in one step.
- When a patient can be sufficiently stabilized, it is preferable to transfer the patient to the specialized cardiothoracic operating room rather than performing a procedure in the catheter lab.
 - There is limited room in most cardiac catheter labs making it difficult to provide ECMO and surgical back up for multiple teams to work.
 - Mock training procedures of the entire process from initiation to completion and transfer of the patient assists in identifying and correcting workflow situations in advance.

Radiation Safety

- Catheterization lab team members are primarily exposed to scattered radiation from the patient and x-ray machine, because the team should not be exposed to the primary x-ray beam.
 - Protective garments include lead aprons and thyroid shields for all staff entering the catheter lab where x-rays systems are being used.
 - For the sterile team, lead glasses are important to wear due to working close to the radiation source.
 - A dedicated space for storing the protective equipment should be established. Protective equipment should be assessed at least every 6 – 12 months for integrity.
 - Using lead glass shields that are mounted on adjustable props reduces the radiation scatter and exposure for staff.
 - Lightweight, reusable or disposable lead-drapes and pads can be positioned on the patient, for example, the patient's thigh, to reduce scattered radiation levels from the patient to the team. However, positioning the drapes within the primary beam must be avoided as this can increase both patient and team exposure.
- A standard lead apron is usually sufficient to protect the embryo and fetus of a pregnant team member.
 - The American College of Radiology recommends a pregnancy test should be performed in patients of menstrual age within 72 hours prior to a fluoroscopic interventional procedure.
 - In the instances a pregnant patient must undergo a cardiac catheterization procedure, the abdominal and groin areas should be shielded to protect the uterus.
 - Regulatory requirements vary by country, but in the United States, disclosing pregnancy is a personal issue that is decided by the staff member.
 - The pregnant staff member should wear an abdominal dosimeter for the monthly dose reports. The reports should be provided to the staff member as soon as possible to allow her to make changes according to the exposure level.
- Exposure to radiation by medical personnel must be monitored.
 - A badge must be worn outside the protective garments at the collar level on the left side.
 - A second badge can be worn under the protective garments at the waist level.
 - The catheter lab manager is responsible for designating a staff member to collect, return, and replace badges on a regular basis.
 - When a staff member works at more than one facility, it is essential for the employers to coordinate summing all the doses acquired at each facility into one dose record.
- Catheterization team members must be knowledgeable of radiation biology and physics, technological developments in x-ray imaging systems, x-ray dose management, radiation

protection, and monitoring methods of patient and personnel exposure.

- A course covering these topics should be an essential part of cardiac catheter lab's personnel training.

Adverse Events

- Full capture of all adverse events regardless of their severity provides the opportunity for a cardiac catheterization program to recognize patterns and identify opportunities for improvement.
- The adverse event report should include a detailed narrative that provides the opportunity for improvement and facilitates discussion by the cardiac catheterization team. The narrative should include the following:
 - When did the event occur?
 - What interventions were necessary?
 - What was the outcome of the event?
 - When and how was the event identified?
 - Was there any permanent patient injury?
 - Did the patient require unexpected or additional care?
 - Were additional diagnostic studies required to assess or monitor the patient?
 - What procedural actions/steps were being done/taken at the time of the event?
 - What was the overall health status of the patient prior to, during, and after the event?
- Key facility meetings, referred to as “key conferences” in the document, in which it should be mandatory for all cardiac catheterization lab team members to attend include morbidity and mortality (M&M) meetings and Serious Safety Event Reviews.
 - The meetings are essential to serving as a method for process improvement via collaboration, feedback, and education.
 - The meetings should be held on a regular basis with M&M meetings occurring at least quarterly.
 - The meetings should be all-inclusive, non-punitive, and focus on practice improvement.
 - The meetings should focus on opportunities for improvement at a systems level, rather than focusing on the individual (punitive), to allow for an open environment that fosters an open review of events to contribute to performance improvement.

Preprocedural Team Huddle

- The team huddle is differentiated from the time-out procedure in that it is completed the day of the case, prior to the patient being transported into the catheter lab.
 - All team members should be present for the team huddle in which all relevant clinical and procedural information is

discussed.

- The team huddle provides the opportunity to discuss potential adverse risks that are specific to each patient to include preparation for adverse events and their mitigation.
- During the team huddle, the assignment of key roles to team members during emergencies and resuscitation should be agreed upon.

Intraprocedural Management

- As with any type of invasive procedure, the catheterization lab team members must complete the “time-out” just prior to the procedure starting as mandated by the World Health Organization.
 - This also gives the physician the opportunity to reiterate any unusual procedural items, confirm specific equipment requirements, and confirm the patient's weight and existing allergies.
- Properly positioning the patient is obviously extremely important to avoid injuries including addressing pressure areas and avoiding hyperextension, particularly at the shoulder joints, establishing the ability to maintain a sterile field, and preserving the patient's body temperature.
 - The supine position with the arms placed above the head is a common position and injury to the brachial plexus must be avoided.
 - The procedure length and the use of general anesthesia are established risk factors for complications related to the patient's position.

Hybrid Procedures

- Hybrid procedures are a combination of surgical and interventional techniques such as intraoperative stent placement and intraoperative placement of transcatheter valves.
 - The team should include all members of the surgical and cardiac catheterization teams who are necessary to perform specific roles.
 - Both teams should complete training to function in different environments and in the use of the variety of the equipment that is required for hybrid procedures.

Reference

Holzer RJ, Bergerson L, Thomson J, et al. PICS/AEPC/APPCS/CSANZ/SCAI/SOLACI : Expert consensus statement on cardiac catheterization for pediatric patients and adults with congenital heart disease. *J Soc Cardiovasc Angiogr Interv.* 2024; 3(1): 101181.

Joseph Colt Bloodgood, MD: Esteemed Cancer Pathologist, Public Health Educator, and Researcher

AST Staff

MEDICAL MARVELS

*"There are two types of research. One seeks for the unknown irrespective of the needs of the people. The other is a research for the practice and pressing needs of the people today."*¹

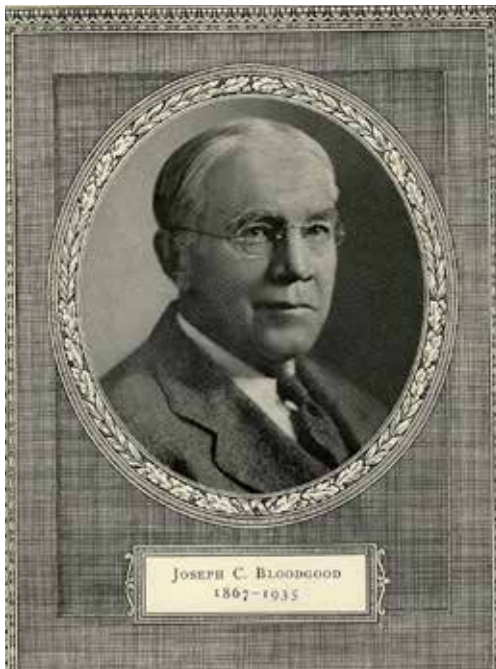


Figure 1 Joseph Colt Bloodgood, MD
(November 1, 1867 – October 22, 1935)

Joseph Bloodgood, MD was a leader in developing the field of surgical pathology through the meticulous collection of patient data and analysis to include the routine use of frozen section to guide the treatment of patients and for collecting patient information, he was a tireless educator introducing innovative methods of teaching medical students, he was a leader in treating breast and bone cancer including becoming

one of the first physicians to become an expert in communicating with the public regarding cancer prevention, and he was a strong advocate of wearing gloves during every surgical procedure. Dr. Bloodgood held the belief that the surgeon's role did not end in the operating room, and surgeons should be educators, contribute to public health, and continuously follow up with patients.

Education and Career

Dr. Bloodgood was one of four children, the son of Francis and Josephine (Colt) Bloodgood, born in Milwaukee, Wisconsin. His father and two uncles on his father's side were well-known lawyers in Wisconsin. He attended the University of Wisconsin, graduating with a Bachelor of Science degree in 1888 with a concentration in embryology and histology. He completed medical school at the University of Pennsylvania, graduating in 1891.²

From 1891 to 1892, he was a resident physician at Children's Hospital in Philadelphia. Soon after the "big four" physicians, William Halsted, Howard Kelly, William Osler, and William Welch, established the medical leadership at the new Johns Hopkins Medical School, Dr. Bloodgood switched his residency to the school.² Dr. Halsted was not originally impressed with Dr. Bloodgood, but Dr. Osler was able to convince him to take on Dr. Bloodgood as his fourth and youngest assistant resident surgeon from June to November 1892.² Dr. Halsted soon laid aside his uncertainties regarding Dr. Bloodgood and sent him on a one year trip to visit major clinics in Europe. During his time, he traveled to Vienna, Austria, to attend the clinic of the eminent abdominal surgeon Dr. Theodore Bilioth, and additionally, visited the clinics of Edoardo Bassini, the Italian surgeon who pioneered the modern surgical approach to treating inguinal herniorrhaphy, Fredrich von Recklinghausen, German physician best known for discovering the genetic disorder neurofibromatosis type 1, and Emil Theodor Kocher, the Swiss surgeon who was the first surgeon in history to receive the Nobel Prize in Medicine.

Dr. Bloodgood returned to Johns Hopkins Hospital in

1893 to be appointed as a resident surgeon and eventually was appointed as chief resident surgeon. His passion for histology and pathology that was initially discovered during his undergraduate studies became a fulltime focus. Dr. Halsted tasked him with establishing the Department of Surgical Pathology at the John Hopkins Hospital.²

In 1897, Harvey Cushing, MD, who would later be known as the “father of modern neurosurgery,” was appointed as chief resident and Dr. Bloodgood was appointed as Dr. Halsted’s primary assistant of which he spent most of his early career while delving into his research and data gathering.³ The famous “All-Star Operation” photograph (<https://collections.library.yale.edu/catalog/15951371>) shows Drs. John Finney (first president of the American College of Surgeons), Harvey Cushing, Hugh Young (famous urologist), and William Halsted with Joseph Bloodgood standing to his right (when viewing the photograph, the surgical team is wearing gloves but not yet wearing masks). Halsted often acknowledged Dr. Bloodgood’s dedication to gathering and organizing patient data and would request his assistance in examining the results of surgical procedures.²

Between his extensive career, Dr. Bloodgood managed to find the time to marry Edith Holt in 1908, who was the daughter of the famous publisher Henry Holt who co-founded Henry Holt and Company in New York in 1866, that is now Holt, Rinehart, and Winston, one of the oldest publishers in the United States. She was a social worker who, with her sister, founded the New York Association for the Blind in 1905 and established several Lighthouses for the Blind around the world. In 1920, Edith received the French Medal of Recognition for her philanthropic relief efforts and volunteer work in Europe.

Dr. Bloodgood held various positions throughout his surgical career including assistant visiting surgeon and adjunct professor at Johns Hopkins Hospital and the university. He served as the chief surgeon at St. Agnes Hospital, now called Ascension St. Agnes, in Baltimore from 1906 to 1935. Under his leadership, St. Agnes Hospital was changed from a facility focused solely on treating psychiatric disorders and substance abuse to a general hospital. In 1906, he also started a surgical residency program at the hospital which is now the second oldest in the United States.²

Wearing Gloves

In 1890, Caroline Halsted (see article in July 2026 edition of *The Surgical Technologist* for details), who was the chief nurse of the operating room at Johns Hopkins Hospital, became the first person to wear gloves in the operating room. Beginning

in 1893, Dr. Bloodgood started wearing gloves and noted a decrease in postoperative infections.⁴ Reflective of Dr. Bloodgood’s focus on gathering detailed information regarding surgical procedures, he showed that in 220 herniorrhaphies performed without gloves, 38 patients, or 17%, developed postoperative infections.⁴ In 226 herniorrhaphies performed with gloves, only 4 patients, or 1.8%, developed a postoperative infection.⁴ Dr. Bloodgood published his research results in 1899 and subsequently became the first surgeon to require all members of the surgical team to wear gloves.

World War I (WWI)

Dr. Bloodgood served as a Major in the Medical Reserve Corps during the war and also served on the medical section of the National Council of Defense as well as a member of the National Medical Commission of the American Red Cross.² In his article, “Primary Treatment of Accidental Wounds,” he reviewed a history of the medical treatment of soldiers to advocate for the optimal methods of treating wounds.⁵ He recognized the challenges associated with preventing infections, particularly in those soldiers involved in trench warfare. He emphasized that treatment entailed covering the wound with sterile gauze and letting the soldier rest during recovery.² He underscored that the application of the sterile dressing was the most important first step in treating a wound. He believed it was important to share this knowledge with the soldiers because invasive treatments could not be performed in the trenches and transporting wounded soldiers to the rear of the front line would often be delayed. As a precursor to his time spent as a public educator, Dr. Bloodgood stressed that these instructions should also be shared with the public, particularly with factory workers, miners, and railroad workers who had limited access to hospitals.² To further his treatment initiatives, Dr. Bloodgood pushed for the publication of a first-aid manual and public education on first aid treatment.

Lastly, during the war, Dr. Bloodgood was of the belief that it was the duty of young physicians to provide medical services by serving in the Medical Reserve Corps.⁶ He stressed the importance of civil and military surgeons sharing information regarding surgical treatments, especially since WW I introduced modern mechanized warfare that contributed to causing a variety of wounds never before seen.

Public Educator

As evidenced by his contributions during WWI, Dr. Bloodgood was dedicated towards public education about dis-

ease, particularly cancer. Most of his articles between 1930 and 1935 were published in non-medical journals and in newspapers. His goals were to provide the public with accurate, factual information about cancer, including available treatments. He had the ability to communicate with the public by avoiding complicated medical language, using terms that were understood. He was the first physician to give Federal government sponsored radio talks on the prevention of cancer and advocating the importance of early diagnosis.² He was a pioneer in establishing routine screenings of precancerous lesions in healthy people including cervical carcinoma, which, at the time, was an innovative concept, but is now an important routine examination for women. However, his views were not readily accepted by the medical community, leading to an effort to remove him from the local medical society.

Diagnostician, Investigator, and Data Collector

"The surgeon should not only be his own diagnostician as well as his own operator, but also his own investigator."⁷ Dr. Bloodgood steadfastly believed that it was the duty of the surgeon to investigate the pathological factors causing the disease or infection and to stop the pathology before automatically assuming surgery was the only solution. He came to this conclusion early in his career after observing that when an infection was present treatment was confined to incision and drainage or amputation. He commented, "To cure an infection by amputation cannot be looked upon as a great triumph..."⁷

Dr. Bloodgood was the first surgeon to consistently rely on frozen sections to guide his intraoperative decisions. When he had finished his studies in 1892 with Dr. Bilroth, he returned home with a frozen section microtome "which allowed us to see the sections more quickly after the operation to satisfy our curiosity."⁸ Dr. Bloodgood as a surgeon could be rapid and was skillful but tended to be slow and methodical because he would take multiple frozen sections. His personal frozen section team would wait for a specimen, and he would often leave the operating room to join them to examine the tissue.

A major contribution by Dr. Bloodgood was incorporating into his practice an effective follow-up system for all his surgical patients beginning in 1890. He used the system to gather information of each of his patients over a long period of time that provided him with the long-term response to surgical treatments.³ His detailed postoperative patient follow-up system provided a great body of

accurate clinical scientific data that contributed to eliminating groups of tumors as being malignant that were originally classified as such by pathologists, thus changing the treatment regimen from one of removing a breast or limb to one of only excising the lesion. By 1923, he had documented 33,000 histories of patients that were filed in the Surgical Pathological Laboratory at Johns Hopkins Hospital.¹

He played a major role in collecting and collating material for Dr. Halsted's studies, who wrote, "it affords me the greatest pleasure to express anew my obligation to Dr. Bloodgood for his efficiency and inexhaustible zeal in collating facts year after year."⁸ His early studies included a review of Halsted's inguinal hernia cases and radical mastectomies. During a difficult surgical procedure in which Dr. Bloodgood was assisting, Dr. Halsted said, "You know Bloodgood, you will never be as good a surgeon as I." Dr. Bloodgood was visibly shaken and after a few moments asked why. "Because, dear sir," replied Dr. Halsted, "you do not have a Bloodgood."⁸

As an investigator (researcher), his primary interest was oncology, focusing on malignant diseases of the bone and breast. He was the first to advance the theory of dysplasia as a precancerous lesion which is now a well-established factor for many types of malignancies. In 1913, he co-founded the American Society for the Control of Cancer (now the American Cancer Society).

One of Dr. Bloodgood's most well-known contributions to breast disease was his description of the blue-domed cyst (see Figure 2).⁹ He proved that the cysts were benign. Up until that point, the assumption of surgeons was that the primary treatment was a mastectomy. As a pioneer in breast-conservation surgery, Dr. Bloodgood continually pursued to establish that only removing benign lesions and not the entire breast was

necessary, thus eliminating the need for disfiguring surgical treatment. Another important finding by Dr. Bloodgood was establishing that giant-



Figure 2 Blue-domed cysts of the breast tissue

cell sarcomas of the bone are tissue reactions to irritants rather than malignant growths and could be surgically cured by curettage rather than amputating the limb.

A pursuit that put him at odds with other physicians, including Dr. Halsted, was the use of irradiation in treating cancer. He showed how x-rays contributed towards diagnosing fractures as well as diagnosing malignant diseases of the bone. He published his findings advocating not only for using radiation for making diagnosis but using it along with radium to treat bone malignancies. Even though he received the Gold Medal of the Radiological Society of North American (RSNA) in 1929, the highest honor of the RSNA, Dr. Bloodgood, along with Dr. Howard Kelly, the first professor of gynecology at Johns Hopkins University who also realized the potential benefits of using irradiation as a cancer treatment, were strongly criticized by physicians at Johns Hopkins Hospital.

The Dedicated University Educator

Dr. Bloodgood's philosophy as an educator was not only to teach students about common pathologies, but that the surgical training program should provide the opportunity to study diseases they may rarely come upon while working in the wards to be able to arrive at the correct clinical diagnosis (see Figure 3). His approach to teaching third-year medical students consisted of two parts, systemic instruction and routine instruction. During systemic instruction students studied museum tissue specimens and pamphlets that provided information regarding frequency of a disease according to a specific body organ and the clinical history and treatment of the disease.² Routine instruction involved studying fresh tissue specimens from procedures to verify the clinical history and diagnosis. Dr. Bloodgood introduced a novel method of teaching during his lectures by using four lantern projectors and four screens to simultaneously display a photo of the patient, the x-rays, the gross specimen, and the photomicrograph.²

His Lasting Impact on Medicine

Dr. Bloodgood was constantly thinking about ways to provide better treatment for patients, better ways to prevent disease, and better ways to educate students and the public. He was so engrossed in thinking about his work it is said he refused to drive because he believed it would distract him from being able to drive safely. Therefore, Edith was one of the first women to earn a driver's license in Baltimore. Another constant companion was his personal secretary, Mr. Shapiro, who accompanied him at home and in the car dictating his correspondence, notes, and articles. Dr. Bloodgood's contributions towards the treatment of cancer, educating the public on the prevention of cancer and the



Figure 3 Dr. Bloodgood during a pathology demonstration with students

importance of diagnosis, and documenting information regarding the treatment of diseases in hundreds of patients provided the medical profession with models to expand upon to continue improving the clinical and surgical treatment of patients.

References

1. Bloodgood JC. The diagnosis of early breast tumors, based on the clinical history and pathology at the exploratory incision. *JAMA*. 1923; 81(11): 875-882. doi: 10.1001/jama.1923.0265011000503
2. Marmon LM, Mandal AK, Hoy GR. The life of Joseph Colt Bloodgood, M.D., public surgeon. *Surg Gynecol Obstet*. 1993; 177(2): 193-200. https://www.researchgate.net/profile/Aloke-Mandal/publication/14857405_The_life_of_Joseph_Colt_Bloodgood_MD_public_surgeon/links/5862c8f108ae6eb871ab1e64/The-life-of-Joseph-Colt-Bloodgood-MD-public-surgeon.pdf
3. Bruguera M. Joseph Colt Bloodgood, Halsted's assistant becomes a great surgeon. *Miquel Bruguera's blog about curiosities from the history of medicine*. October 27, 2021. Accessed June 2, 2026. <https://miquelbruguera.blog/2021/10/27/joseph-colt-bloodgood-adjutant-de-halsted-cirurgia/>
4. Kean S. The nurse who introduced gloves to the operating room. *Distillations Magazine*. May 5, 2020. Accessed April 14, 2026. <https://www.sciencehistory.org/stories/magazine/the-nurse-who-introduced-gloves-to-the-operating-room/>
5. Bloodgood JC. First aid in accidental wounds. *JAMA*. 1916; 66(10): 758-759. doi: 10.1001/jama.1916.02580360060032
6. Bloodgood JC. The army and navy need young physicians. *South Med J*. 1917; 10: 449-450.
7. Bloodgood JC. Gas bacillus infection: surgical bacteriology. *Surg. Gynecol Obstet*. 1916; 23: 182-184.
8. Hughes LE. History of benign breast disease. In: LE Hughes, RE Mansel, Webster DJT, et al, eds. *Benign Disorders & Diseases of the Breast*. 3rd ed. Elsevier Ltd; 2009: 7-24.
9. Bloodgood JC. The pathology of chronic cystic mastitis of the female breast with special consideration of blue domed cysts. *JAMA Surg*. 1921; 3(3): 445-542. doi: 10.1001/arch. Surg.1921.0111009000201

UPCOMING PROGRAMS



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ARIZONA STATE ASSEMBLY

Program Type: Workshop
Date: September 19, 2026
Title: Bring the Heat
Registration: azsaofast.org
Location: HonorHealth NSSC, 2500 W Utopia Road, Phoenix, AZ 85027
Contact: Teresa Sochacki, azsa.assembly@gmail.com
CE Credits: 4 Live approved by AST

ARKANSAS STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 3, 2026
Title: Fall Workshop/Business Meeting
Location: TBA, Fort Smith, AR
Contact: Tamara Morgan, PO Box 10301, Fort Smith, AR 72917, 479-414-6720, ark-stateassembly@gmail.com
CE Credits: 6 Live Planned

CALIFORNIA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 17, 2026
Title: 25 Years of Surgical Technologists of AST
Registration: casaofast.org
Location: Children's Hospital Los Angeles, 4650 Sunset Blvd, Los Angeles, CA 90027

Contact: Sabrina Arreaga, PO Box 616, North Hollywood, CA 91603, 818-288-6917, ca.sastateassembly@gmail.com
CE Credits: 6 Live Planned

COLORADO/WYOMING STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 10, 2026
Title: Annual Business Meeting
Registration: coloradowyomingast.org/events
Location: Concorde Career College, 4300 Kittredge St, Denver, CO 80239
Contact: Lori McGregor, 406-781-3973, gfmtgirl@yahoo.com
CE Credits: 5 Live Planned

FLORIDA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 26, 2026
Title: Florida Surgical Technologists: YOU Matter!
Location: Sheraton Orlando North Hotel, 600 N Lake Destiny Road, Maitland, FL 32751
Contact: Florida State Assembly, flsastateassembly@gmail.com
CE Credits: 6 Live approved by AST

GEORGIA STATE ASSEMBLY

Program Type: Workshop
Date: September 12, 2026
Title: 25th Anniversary Celebration
Registration: ast-gasa.com/fall-2026-meeting
Location: Brenau Downtown Center, 301 Main Street SW, Gainesville, GA 30501
Contact: Erin Baggett, PO Box 109, Auburn, GA 30011, 678-226-6943, gasawebmaster@gmail.com
CE Credits: 7 Live Planned

Program Type: Annual Meeting/Elections
Date: March 13, 2027
Title: Surg Tech Spring Sync
Registration: ast-gasa.com/spring-2027-meeting

Location: Gwinnett Technical College, 5150 Sugarloaf Pkwy, Lawrenceville, GA 30043
Contact: Susan Feltmann, 678-226-6676, gasawebmaster@gmail.com
CE Credits: 7 Live Planned

IDAHO STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 26, 2026
Title: Harvesting Innovation in Neuro Surgery
Location: St. Luke's Plaza, 800 E Park Blvd, Boise, ID 83712
Contact: Keri McKenney, 208-941-2457, IDSAST@gmail.com
CE Credits: 6 Live Planned

INDIANA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 19, 2026
Title: INSA Fall Workshop and Business Meeting 2026
Registration: indianastateassembly.org
Location: Conference Center & Culinary Institute at Ivy Tech College, 2820 North Meridian St, Indianapolis, IN 46208
Contact: Sara Velligan, 219-808-8240, svelligan@hotmail.com
CE Credits: 6 Live Planned

IOWA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 10, 2026
Title: Fall 2026 Workshop and Business Meeting
Registration: ia.ast.org
Location: Mary Greeley Hospital, 1111 Duff Ave, Ames, IA 50010
Contact: Joyce Ortega, 515-954-8332, jaortega@dmacc.edu
CE Credits: 7 Live Planned

Program Type: Workshop
Date: April 10, 2027
Title: IASA Spring 2027 Workshop
Registration: ia.ast.org

Location: University of Iowa Medical Center - North Liberty, 701 W Forevergreen Road, North Liberty, IA 52317
Contact: Tim Danico, 319-540-6008, tdanicocost@gmail.com
CE Credits: 8 Live Planned

KANSAS STATE ASSEMBLY

Program Type: Webinar (approved only for Kansas State Assembly members)
Date: November 7, 2026
Title: KSAST Fall Workshop
Contact: Melanie Meyer, 785-550-4101, melanie.meyer0713@gmail.com
CE Credits: 5 Live Planned

LOUISIANA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 19, 2026
Title: Fall Workshop and Business Meeting
Registration: eventbrite.com/e/1994214025834?aff=oddttdtcreator
Location: Baton Rouge General, 8585 Picardy Ave, Baton Rouge, LA 70809
Contact: Renee Guillory, 337-550-1310, kguillor@lsue.edu
CE Credits: 4 Live Planned

MAINE STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 10, 2026
Title: Fall Workshop and Annual Meeting With Elections
Location: Northern Light Mercy Hospital, 175 Fore River Pkwy, Portland, ME 04102
Contact: Lorraine Swenson, 207-329-8402, lorrainekimball@yahoo.com
CE Credits: 5 Live Planned

MICHIGAN STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 26, 2026
Title: Michigan Becoming One Fall Dual Conference 2026
Registration: msaast.weebly.com/conference-registration.html
Location: Two locations: 1st location Henry Ford Providence Southfield-Fisher Auditorium, 16001 W Nine Mile Road, Southfield, MI 48075; 2nd location Northern Michigan University- Northern Center, 1401 Presque Isle Ave, Marquette, MI 49855
Contact: Renona Gauthier, 248-891-3989, michiganassemblyofast@gmail.com
CE Credits: 5 Live Planned

MINNESOTA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 19, 2026
Title: MNSA Fall 26 Workshop and Business Meeting
Registration: mnast.mn

Location: Anoka Technical College, 1355 West Highway 10, Anoka, MN 55303
Contact: Jolianne Mohler, 763-458-2764, mnast2016@outlook.com
CE Credits: 6 Live Planned

MISSOURI STATE ASSEMBLY

Program Type: Workshop
Date: September 19, 2026
Title: Missouri State Assembly Fall Workshop
Location: State Fair Community College, 1701 N 2nd St, Clinton, MO 64735
Contact: Victoria Thompson, PO Box 1740, Camdenton, MO 65020, 573-836-0637, missouriassemblyast@gmail.com
CE Credits: 8 Live approved by AST

MONTANA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 16-18, 2026
Title: Montana CSTs & CSFAs ROCK!
Registration: mt.ast.org
Location: St. Peter's Health, 2475 E Broadway St, Helena, MT 59601
Contact: Kristen Stone, 406-407-1595, mtast.president@gmail.com
CE Credits: 12 Live Planned

NEVADA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 19, 2026
Title: Nevada State Assembly
Location: St Mary's Hospital, 235 W 6th St, Reno, NV 89503
Contact: Christopher Scott, 404-664-3515, cscott427@yahoo.com
CE Credits: 5 Live Planned

NEW HAMPSHIRE / VERMONT STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 3, 2026
Title: NH/VT Fall Conference
Location: Dartmouth Hitchcock Medical Center, 1 Medical Center Dr, Lebanon, NH 03766
Contact: Jennifer Fleury, 603-817-3039, jenniferfleury08@gmail.com
CE Credits: 6 Live approved by AST

NEW YORK STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 2-4, 2026
Title: NYAST Fall Conference, Business Meeting, and Elections
Location: Renaissance Albany Hotel, 144 State St, Albany, NY 12207
Contact: Alisia Pooley, 315-575-0403, boardnyast@gmail.com
CE Credits: 12 Live Planned

NORTH CAROLINA STATE ASSEMBLY

Program Type: Workshop
Date: October 3, 2026
Title: Precision in Autumn
Registration: nc.ast.org
Location: Forsyth Medical Center, 3333 Silas Creek Pkwy, Winston-Salem, NC 27103
Contact: Brittany Toth, 507-720-1892, ncsaast@gmail.com
CE Credits: 7 Live Planned

NORTH DAKOTA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 12, 2026
Title: 2026 NDSA Workshop & Elections
Location: Boniface Auditorium, 900 E Broadway Ave, Bismarck, ND 58501
Contact: Emily White, 701-202-5779, esmallbeck27@gmail.com
CE Credits: 6 Live Planned

OREGON STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 17, 2026
Title: OAST Fall Business Meeting/Workshop
Registration: or.ast.org
Location: Providence Willamette Falls Community Center, 519 15th St, Oregon City, OR 97045
Contact: Jeffrey Rebo, 406-291-7220, jefreyrebo.oast@gmail.com
CE Credits: 8 Live Planned

PENNSYLVANIA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 19, 2026
Title: Shaping Tomorrow's OR
Location: Central Penn College, 600 Valley Road, Enola, PA 17025
Contact: Chris Kapp, 717-728-2230, christopherkapp@centralpenn.edu
CE Credits: 5 Live approved by AST

RHODE ISLAND STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 24, 2026
Title: Heads or Tails
Location: New England Institute of Technology, 1 New England Tech Blvd, East Greenwich, RI 02818
Contact: Ariel Zorrilla, 401-548-2359, rhodeislandast@gmail.com
CE Credits: 4 Live Planned

SOUTH CAROLINA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 26-27, 2026
Title: SCSA 25th Fall Business Meeting and Workshop

Registration: scaast.org
Location: Southeastern Institute of Manufacturing Technology, 1951 Pisgah Road, Florence, SC 29501
Contact: Katrina Williams, 843-615-7454, katrinawilliams89@yahoo.com
CE Credits: 12 Live Planned

SOUTH DAKOTA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 2-3, 2026
Title: South Dakota State Assembly Fall 2026 Conference and Elections
Location: Lake Area Technical College, 1201 Arrow Ave, Watertown, SD 57201
Contact: Stacey Vande Zande, 605-520-1516, sanortje@yahoo.com
CE Credits: 9 Live Planned

TENNESSEE STATE ASSEMBLY

Program Type: Workshop Cruise
Date: October 2-5, 2026
Title: CE's at SEA
Location: Carnival Glory, 1492 Charles M. Rowland Dr, Cape Canaveral, FL 32920
Contact: Ellen Wood, 865-283-5901, ellenwoodtnast@gmail.com
CE Credits: 6 Live Planned

Program Type: Annual Meeting/Elections
Date: March 6-7, 2027
Title: CE's in the Hub City
Location: Jackson-Madison County Hospital, 620 Skyline Dr, Jackson, TN 38301
Contact: Ellen Wood, 865-283-5901, ellenwoodtnast@gmail.com
CE Credits: 12 Live Planned

TEXAS STATE ASSEMBLY

Program Type: Workshop
Date: September 12, 2026
Title: West TX Workshop
Registration: texasstateassembly.org
Location: Knipling Education and Conference Center, 21st St & Louisville Ave (6th Floor), Lubbock, TX 79410

Contact: Kristie Cole, PO Box 152982, Arlington, TX 76015, 806-787-8298, kcole@southplainscollege.edu
CE Credits: 8 Live Planned

Program Type: Workshop
Date: September 26, 2026
Title: South Texas CE's
Registration: texasstateassembly.org
Location: Texas State Technical College - Cultural Arts Center, 2425 Boxwood St, Harlingen, TX 78550
Contact: Kristie Cole, PO Box 152982, Arlington, TX 76015, 806-787-8298, kcole@southplainscollege.edu
CE Credits: 8 Live Planned

Program Type: Workshop
Date: January 23, 2027
Title: Education By the Sea
Registration: texasstateassembly.org
Location: Lamar State College, 1800 Lake Shore Dr, Port Arthur, TX 77640
Contact: Kristie Cole, PO Box 152982, Arlington, TX 76015, 806-787-8298, TXSAS-tateAssembly@gmail.com
CE Credits: 8 Live Planned

Program Type: Annual Meeting/Elections
Date: February 27-28, 2027
Title: Patty Sooter Best Little Workshop in Texas
Registration: texasstateassembly.org
Location: DoubleTree Hilton Fort Worth South Hotel and Conference Center, 100 Altamesa Blvd East, Fort Worth, TX 76134
Contact: Kristie Cole, PO Box 152982, Arlington, TX 76015, 806-787-8298, TXSAS-tateAssembly@gmail.com
CE Credits: 15 Live Planned

VIRGINIA STATE ASSEMBLY

Program Type: Workshop
Date: September 26, 2026
Title: Central Virginia Surgical Technology Workshop
Registration: vcsaofast.org
Location: Lynchburg General Hospital, 1901 Tate Springs Road, Lynchburg, VA 24501
Contact: Amy Whitacre, 434-945-9125, virginiastateassembly@gmail.com
CE Credits: 4 Live Planned

WASHINGTON STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 10, 2026
Title: WSA Fall Conference and Board of Directors and Delegate Elections
Location: Goldendale Grange Hall, 228 E Darland Dr, Goldendale, WA 98620
Contact: Eugene LeRoy, PO Box 18394, Spokane, WA 99228, 360-292-0770, wa.association.of.ast@gmail.com
CE Credits: 5 Live Planned

WEST VIRGINIA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 24, 2026
Title: WVA Fall Workshop & Business Meeting
Registration: lp.constantcontactpages.com/ev/reg/c477b55
Location: Southern West Virginia Community & Technical College, 100 College Dr, Logan, WV 25601
Contact: Meloney McRoberts, PO Box 708, Chapmanville, WV 25508, 304-784-2772, meloney.mcroberts@southernwv.edu
CE Credits: 6 Live Planned

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- An article submitted for CE must have a unique thesis or angle and be relevant to the surgical technology profession.
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- It must be an original topic (one that hasn't been published in the journal recently).

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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.

ARKANSAS

Fort Smith
October 3, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

CALIFORNIA

Los Angeles
October 17, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

COLORADO / WYOMING

Denver
October 10, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

FLORIDA

Maitland
September 26, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

GEORGIA

Lawrenceville
March 13, 2027
Annual Meeting
2027 BOD Elections
& 2027 Delegate Elections

IDAHO

Boise
September 26, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

INDIANA

Indianapolis
September 19, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

IOWA

Ames
October 10, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

LOUISIANA

Baton Rouge
September 19, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

MAINE

Portland
October 10, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

MICHIGAN

Southfield & Marquette
September 26, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

MINNESOTA

Anoka
September 19, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

MONTANA

Helena
October 16-18, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

NEVADA

Reno
September 19, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

NEW HAMPSHIRE / VERMONT

Lebanon
October 3, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

NEW YORK

Albany
October 2-4, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

NORTH DAKOTA

Bismarck
September 12, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

OREGON

Oregon City
October 17, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

PENNSYLVANIA

Enola
September 19, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

RHODE ISLAND

East Greenwich
October 24, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

SOUTH CAROLINA

Florence
September 26-27, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

SOUTH DAKOTA

Watertown
October 2-3, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

TENNESSEE

Jackson
March 6-7, 2027
Annual Meeting
2027 BOD Elections
& 2027 Delegate Elections

TEXAS

Fort Worth
February 27-28, 2027
Annual Meeting
2027 BOD Elections
& 2027 Delegate Elections

WASHINGTON

Goldendale
October 10, 2026
Annual Meeting
2026 BOD Elections
& 2027 Delegate Elections

WEST VIRGINIA

Logan
October 24, 2026
Annual Meeting
2026 BOD Elections
& 2027 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 the 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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