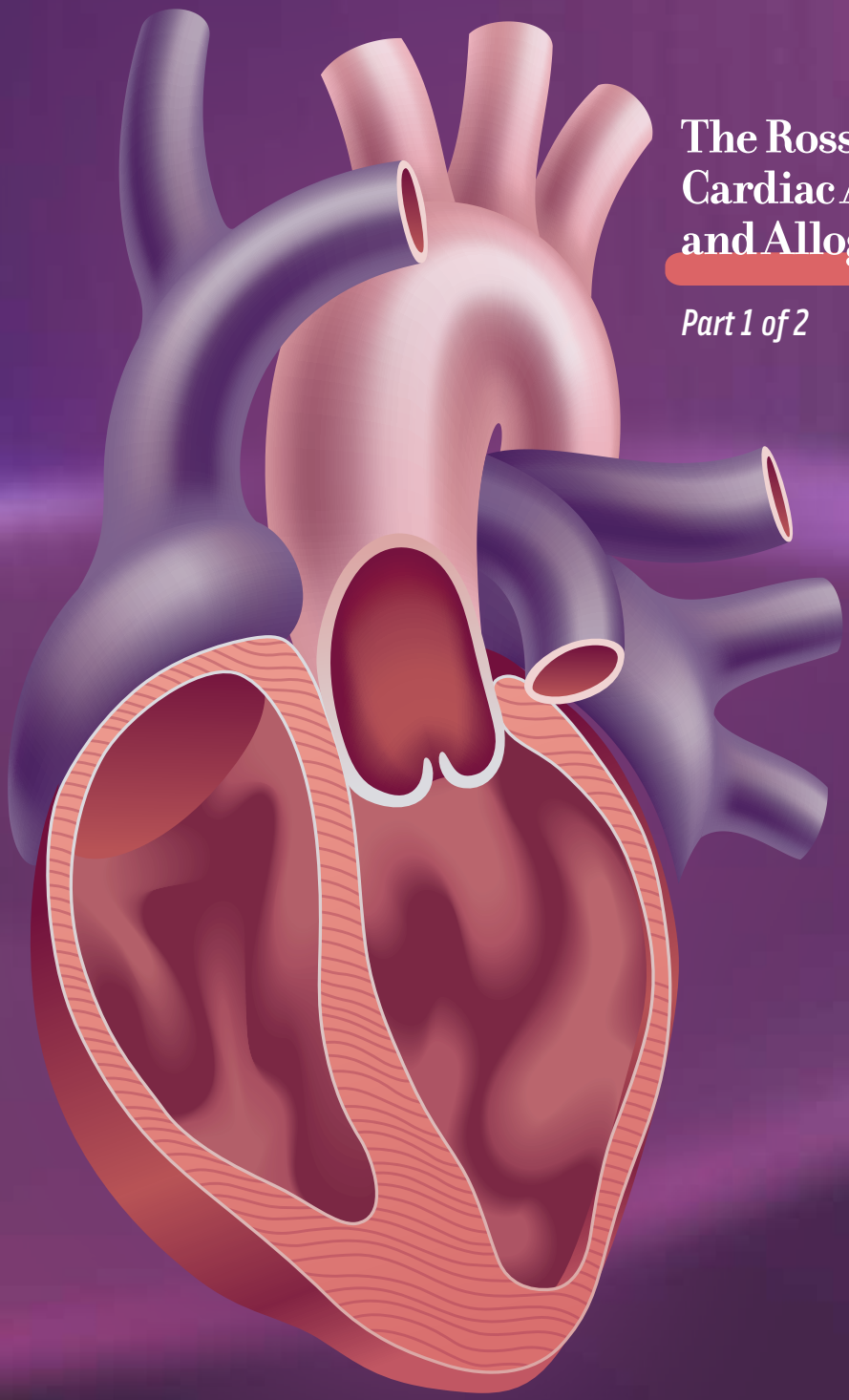
JULY 2025 VOLUME 57 NO 7

THE SURGICAL TECHNOLOGIST

OFFICIAL JOURNAL OF THE ASSOCIATION OF SURGICAL TECHNOLOGISTS, INC.



The Ross Procedure: Cardiac Autograft and Allograft

Part 1 of 2

ADVOCATE FOR YOURSELF.

AST
Association of Surgical Technologists

You advocate for your patients – no question. Now it's time to advocate for the critical role you play as a key member of the surgical team and how important your role is to patient safety.

AST developed a toolkit specifically for surgical technologists to use when you're explaining just how crucial is it that certified surgical technologists earn education from an accredited program thus making them eligible to sit for the national certifying exam and earn the distinguished CST credential. Scan the QR code to access documents, AST position statements and other resources you need to keep advocating for the profession.

AST Position Statement on Accreditation, Certification, Official Title of Profession, and On-the-Job Training

American College of Surgeons Statement on Surgical Technology Training and Certification

Council on Surgical & Perioperative Safety Statement in Support of CST

AST
Association of Surgical Technologists

6 West Dry Creek Circle ▲ Littleton, CO 80120
Tel 303-694-9130
Member Number (toll free 8-4:30 pm MT, Mon-Fri)
800-637-7433 ▲ www.ast.org

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.

THE SURGICAL TECHNOLOGIST (ISSN 0164-4238) is published monthly by the Association of Surgical Technologists, Inc, 6 West Dry Creek Circle, Suite 200, Littleton, CO 80120-8031. Telephone 303-694-9130. Periodical postage is paid at Littleton, Colorado, and additional mailing offices. Correspondence to *The Surgical Technologist* can be sent to communications@ast.org.

ADVERTISING Contact: ***exhibits_advertising@ast.org.*** Acceptance of advertising in *The Surgical Technologist* in no way constitutes an endorsement by the Association of the product, organization, or service advertised. Similarly, mention of a commercial product by trade name, organization, program, or individual and that person's statements in any article does not constitute an endorsement by the Association of the product or sanction of the organization, program, or individual. The Association accepts health-related and recruitment advertising and reserves the right to decline ads at its discretion. While the Association takes every precaution against mistakes, it assumes no responsibility for errors or inaccuracies.

SUBSCRIPTIONS A one-year subscription is $40 for nonmembers and $55 (US funds) for foreign. Back issues are available for $5 each (specify date of issue). Written requests for replacement issues will be honored up to 60 days after date of publication only. Please address all requests to the editor.

JOURNAL DEADLINES The deadline for editorial copy is 8 weeks prior to the cover date (eg, the deadline for the July issue is May 1).

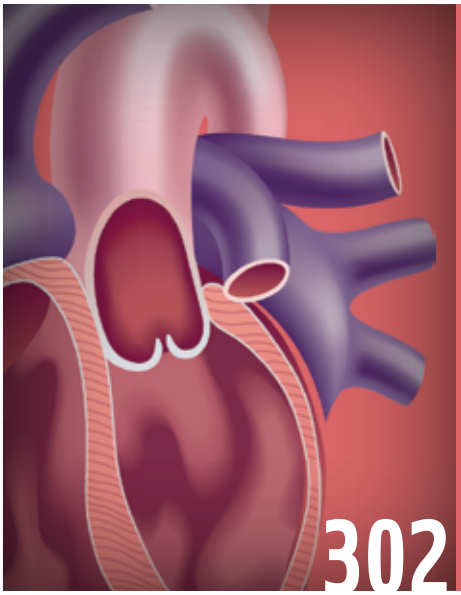
POSTMASTER Send address corrections to The Surgical Technologist, 6 West Dry Creek Circle, Suite 200, Littleton, CO 80120-8031.

Connect with AST on LinkedIn, Facebook, Instagram, and Pinterest to grow your professional network!

JULY 2025 | VOLUME 57 NO 7

THE SURGICAL TECHNOLOGIST

OFFICIAL JOURNAL OF THE ASSOCIATION OF SURGICAL TECHNOLOGISTS, INC.



302

The Ross Procedure: Cardiac Autograft and Allograft

Kevin B. Frey, CST, FAST

The Ross procedure has a history of fluctuating popularity over the years, but due to recent studies providing data on long-term survival rates that attest to the durability of the pulmonary valve (PV), the number of procedures is climbing again. This article provides the details of the procedural steps, a discussion of factors that support a successful procedure, and a review of the recent studies showing that the procedure provides excellent long-term results for the patient.

In This Issue

In Every Issue

AST News

AT A GLANCE

NATIONAL NEWS

Meet AST's 2025-2026 AST Board of Directors

Congratulations to AST's 2025-2026 Board! The AST House of Delegates elected positions of president, vice president, treasurer and three director positions to fill the up-for-election board positions.

Front row: Director Jaime Lopez, Secretary Rob Blackston, President Joe Charleman, Vice President Dustin Cain, Treasurer Rachel Clark, Director Lisa Day
Back row: Director Chris Blevins, Director Brooke Oliver, Director Dave Blevins, Director Monica Thulon, Director Stephanie Austin

Congratulations to This Year's FAST Recipients

AST's highest honor is the Fellow of the Association of Surgical Technologists. This award recognizes those members who have significantly contributed to the surgical technology profession through professional activities that support the AST mission and dedication to the profession.

We congratulate this year's FAST recipients:

- Christine Anderson, CST, FAST
- Christine Gardner, CST, FAST
- Ellen Morrow, CST, FAST
- Ellen Wood, CST, FAST
- Geoffrey McNeave, CST, CSFA, FAST
- Gilda Fontanez, CST, FAST
- Glenda McCloskey, CST, FAST
- Kathy Sandmoen, CST, CSFA, FAST
- Patricia Lincoln, CST, FAST
- Robert Torres, CST, FAST
- Rochelle Lewis, CST, FAST
- Shirley Mahoney, CST, CSFA, FAST
- Tyronne Johnson, CST, FAST

Standing Strong – 17 State Assemblies Celebrate 25 Years

State assemblies serve as foundational backbones to AST's success. It's no easy feat to keep a state assembly running successfully year after year. This year we recognize 16 state assemblies that have been doing that for 25 years: 25 years of meeting planning, 25 years of grassroots advocacy and dedication, 25 years of supporting members in their state.

Congratulations to the following states for 25 years of excellence!

- Connecticut
- Florida
- Indiana
- Michigan
- Minnesota
- Mississippi
- Missouri
- New York
- North Carolina
- Oklahoma
- Oregon
- South Dakota
- Tennessee
- Texas
- Virginia
- Wisconsin

We must also recognize a state that celebrated its 25th anniversary in 2024. Congratulations, Washington!

Watch the August Journal for more highlights from AST's Surgical Technology Conference in Orlando.

SAVE THE DATES!

Upcoming Events

AST EDUCATORS CONFERENCE

2026 AST Educators Conference – Nashville
February 6-7, 2026, with preconference February 5
We are thrilled to announce the next 3 locations for conference! Stay tuned for more detailed information and registration details.

NATIONAL CONFERENCE
2026 AST Surgical Technology Conference – Seattle
May 31-June 2, 2026, with preconference May 30

2027 AST Surgical Technology Conference – Milwaukee
2028 AST Surgical Technology Conference – Phoenix

CONTINUING EDUCATION RESOURCES

Earning CE

Many of the CE credits processed by AST for CSTs for CSFAs are earned through one or more of the ways listed below.

None of these are subject to a processing fee.

- AST Distance CE (journal tests or CE packages)
- Hospital in-services
- Live lectures at AST state assemblies, national conference and others, such as ACS Congress
- College Courses
- Healthcare Manufacturer's Events. AST accepts CE credits that are offered at in-person events that have been planned and are sponsored and advertised by healthcare manufacturers - referred to as commercial interest organizations (CIO). However, in order for the CE credits to be accepted by AST, the in-person program must be approved by AST and the program must be relevant to the practice of surgical technology or surgical first assisting. In-person events are stand-alone events, such as forums or hands-on workshops that are the sole responsibility of the CIO to plan and market as well as offer the CE credits, and are held at the location of the CIO's choice.

CE credit fees

These only apply to a very small percentage of credits earned through commercial providers due to the increased time and resources required to research and assess CE credits earned through those providers, particularly those CE credits offered by commercial businesses that contract with healthcare facilities, and now live events. There are no refunds given for AST online CE tests or CE credit packages.

Members: See above for any additional fee for processing CE credits excluding AST tests. Nonmembers: Nonmembers may be subject to a processing fee at the time of submission.

Money orders, personal checks, institutional checks, Visa, MasterCard and American Express are accepted. Checks payable to AST.

Qualifying CE Credits Checklist

- Are all CE your credits earned while an AST member?
- Are all CE credits earned within your current certification cycle established by the NBSTSA?
- Are all your CE credits relevant to the medical-surgical practice of surgical technology and surgical assisting?
- Have you submitted a CE Reporting Form? CE credits will be returned without a CE Reporting Form.
- Did you list each educational activity on the CE Reporting Form?
- Did you submit proper documentation for each education activity listed on the CE Reporting Form? *Keep originals of documentation and submit copies.*
- Is any applicable fee enclosed?

2 Ways to Submit Your CE Credits

- Mail to: AST, 6 West Dry Creek Circle, Ste 200, Littleton, CO 80120-8031
- Email scanned CE credits in PDF format to AST Member Services. Do not mail credits that were previously emailed.

CALL FOR AUTHORS

Become Published and Earn CE

We are in need of CE articles and authors that detail the latest surgical procedures and surgical advancements.

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

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

Ready to get started? Email us at communications@ast.org.

MILESTONES

Congratulations to the following state assembly as it celebrates its anniversary this month! AST appreciates your

hard work, dedication and all your years of service for making our state assemblies the backbone of this organization.

• Nebraska – 21 years

For Healthcare Facility In-services Use the AST Certification of Attendance

Two of the most fequent questions that AST receives are:

1. "Are live in-services offered by the healthcare facility accepted for CE credits?"
2. "Do the live in-services count towards fulfilling the requirement of four live CE credits for CSTs and eight live CEs for CSFAs?"

The resounding answer for both of these are "Yes."

In-services have been accepted for CE credits for many years as long as the in-service is planned and offered in-house at no cost to the CST and CSFA employees. Additionally, if the healthcare facility invites a healthcare manufacturer representative to provide an in-service such as providing information about a new piece of equipment or instrumentation that the surgery department purchased the CE credits are accepted.

Live in-services will be recorded as such and when logging into the AST website to view your Member Dashboard they will be indicated in the "Live CE" number.

However, there are two primary reasons why there may be a delay in recording the CE credits.

1. The certificate of attendance that is provided by the healthcare facility does not contain the required information including the word "in-service."
2. If a healthcare manufacturer representative provides the certificate that has the name of the manufacturer on the certificate, it is viewed that possibly the manufacturer provided a program that should have been pre-approved by AST.

Both of these issues can be easily solved by using the AST Certificate of Attendance that is available on the AST website – ast.org – Members – HCF Inservice Certificate.

Please encourage your healthcare facility surgery department supervisor or clinical educator to use the certificate. This certificate meets all the requirement and even includes a title at the top that reads "Certificate of Attendance – Healthcare Facility Sponsored Educational In-Service."

By using this certificate, it will streamline the process and gets you closer to renewing your credential. After all, renewing your credential is a 2-Step Process:

- **Step One:** Earn and submit your CE credits to AST. The CST in the two-year certification cycle must earn 30 CE credits of which 4 must be live. The CSFA in the two-year cycle must earn 38 CE credits of which 8 must be live.
- **Step Two:** Submit the NBSTSA CST or CSFA certification renewal application on the NBSTSA website, nbstsa.org.

Bylaws vs. Policies: What Certified Surgical Technologists Need to Know About Governance

Cortney Hartman, CST, FAST, BYLAWS, RESOLUTIONS AND PARLIAMENTARY PROCEDURES COMMITTEE

In the operating room, precision is non-negotiable - and the same principle applies to the way our professional association is governed. For members actively involved in leadership, state assemblies, or committee work within the Association of Surgical Technologists (AST), understanding the difference between **bylaws** and **policies** is essential. These governance tools serve distinct but equally important purposes, and when applied effectively, they ensure consistency, fairness, and professionalism across all levels of our organization.

What are Bylaws?

Bylaws are the foundation of an organization's governance. Think of them as the "constitution" of AST and each of its state assemblies. They define the structure, responsibilities, and procedures that guide how we operate. Bylaws outline the framework for leadership, decision-making, and membership participation. They are designed to ensure clarity and accountability across the board. Bylaws govern high-level elements such as the composition and responsibilities of the board, membership eligibility and classifications, meeting requirements and voting procedures, and procedures for amending the bylaws themselves.

Because of their importance, bylaws require a formal process to change. Amendments at the national level must be approved by the AST House of Delegates, while state assembly bylaws are typically revised during annual business meetings with member input and vote. This ensures the legitimacy and transparency of any changes. For nonprofit organizations like AST, bylaws are often required by law. They serve as a legal record of how the organization is structured and expected to function.

Six national bylaws were recently approved at AST's Surgical Technology Conference in Orlando.

Please see page 298 for the approved bylaws.

What are Policies?

Policies are specific, actionable guidelines developed to manage operations, address emerging issues, and clarify how certain procedures are carried out within the framework set by the bylaws. While bylaws lay the groundwork, policies offer the "how-to" instructions for day-to-day operations. They provide consistency and direction in everything from financial practices to leadership conduct. Policies often address things such as code of conduct for members, procedures for travel reimbursement, and conflict resolution and grievance processes. Unlike bylaws, policies can be updated more easily and frequently. AST's Board or designated committees often approve policy changes as needed, making them more adaptable to current circumstances and member needs.

Bylaws and Policies in Practice

Bylaws and policies don't exist in isolation – they work hand in hand to support the integrity and functionality of our association. For example, the bylaws may require that state assemblies hold an annual business meeting. The accompa-

nying policy, then, would detail how notice is given to members, what constitutes an agenda, and the process for nominating and voting on candidates.

The Bylaws, Resolutions and Parliamentary Procedures Committee collaborates closely with the State Assembly Leadership Committee and AST staff to ensure that both the bylaws and the policies remain clear, current, and consistent. This is vital for maintaining alignment and efficiency across our national and state-level operations.

When and How Each is Applied

Governance Tool	When It's Applied	Who Approves Changes
Bylaws	Structural decisions (eg, elections, quorums, officer duties)	AST House of Delegates or State Assembly members
Policies	Operational issues (eg, travel, conduct, election timelines)	AST Board or relevant committees

Understanding when to refer to bylaws and when to follow policy ensures that processes are carried out correctly and fairly. It also protects members, leadership, and the association from inconsistencies or missteps.

Why it Matters to Surgical Technologists

As a certified surgical technologist, whether you are involved at the grassroots level in your state assembly or serving on a national committee, your familiarity with bylaws and policies empowers you to be an effective contributor. It builds your capacity to participate confidently in business meetings and elections, understand the rationale behind decisions, and uphold the standards and mission of AST. Additionally, having a strong grasp of governance makes it easier to mentor new members, run for leadership positions, or support state assembly operations with clarity and professionalism.

Looking Ahead

AST and its committees are committed to continuous review and improvement of both bylaws and policies to keep pace with the profession's evolving needs. We encourage all certified surgical technologists to engage with the structure of their association – not just through clinical excellence, but through participation in the democratic processes that guide our professional future.

If you are involved – or would like to get involved – with AST or your state assembly, take the time to understand both. These tools don't just shape the organization – they empower you to shape it, too.

2025 Approved AST Bylaws Amendments

The following AST Bylaws Amendments passed the House of Delegates at the 2025 AST Surgical Technology Conference in Orlando June 7, 2025.

Amendment 1 | Article VII, Officer, Section 2, A and C

A. A candidate shall be an active member for three years immediately preceding nomination and, if elected, shall maintain that active status.

C. A member who violated the AST Professional Code of Conduct, as determined by the AST Board, is not eligible to be an officer.

Amendment 2 | Article VII, Officers, Section 3, Add F, Term of Office of Officers

F. An officer who violated the AST's Professional Code of Conduct, as determined by the AST Board, may be removed from office by a two-thirds vote of board members and voting as provided by the parliamentary authority. If the board votes to remove them and they hold the title of FAST, it will be removed and they are not eligible to run for office again. A letter will be held on file with AST.

Amendment 3 | Article IX, Board of Directors, Section 2. B, Eligibility of Directors

B. A candidate for the Board of Directors shall have served at least one complete term on a national committee, whether standing or special (ad hoc), the NBSTSA, the ARC/STSA, or a complete two-year term as an officer in a state assembly within the last 8 years.

Amendment 4 | Article IX, Directors, Section 2, A and C, Eligibility of Directors

A. A candidate for the Board of Directors shall be an active member for three years immediately preceding nomination, and if elected, shall maintain that active status.

C. A Director who violated AST Professional Code of Conduct, as determined by the AST board, may be removed from office by a two-thirds vote of board members voting as provided by the parliamentary authority. If the board votes to remove them and they hold the title of FAST, it will be removed and they are not eligible to run for office again. A letter will be held on file with AST.

Amendment 5 | Article IX, Board of Directors, Section 3, Term of Office of Directors

A. Directors shall serve for a term of two years or until their successors are elected. A Director, who violated AST's Professional Code of Conduct, as determined by the AST Board, may be removed from office by a two-thirds vote of board members and voting as provided by the parliamentary authority. If the board votes to remove them and they hold the title of FAST, it will be removed, and they are not eligible to run for office again. A letter will be held on file with AST.

Amendment 6 | Article X, Committees, Section 4

The president shall be an ex-officio member of all committees except the Credentials Committee and any disciplinary committees.

Please refer to the AST website – www.ast.org - for the full set of AST Bylaws.

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
- CSPS Surgical Team Member Roles - Partner Organizations and Credentials
- 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

AST
Association of Surgical Technologists
Your Voice Is Your Power
ADVOCATING FOR THE PROFESSION

Volunteering Locally as a CST

Allison Lacey, CST, FAST, State Assembly Leadership Committee

STATE ASSEMBLY

How can we each help spread the word about our profession? You can do any of these by yourself, with coworkers, friends, family, or your state assembly members.

Some ideas include:

- Gather donations (items or money) at your state's next conference towards an important cause in your state assembly's name.
- Volunteer at your local healthcare and non-healthcare related events and businesses, for a single day or routinely. If for healthcare, there are places that would love to have surgical technologists sort and put together supplies and instrumentation. Some non-healthcare related events could be community days, walk/run fundraisers, holiday and seasonal events, flower shows, and business grand opening days. These events are always looking for help with organizing and volunteering, even if just for a couple of hours.
- Set up a surgical technologist table display at a school, college, and community career days. AST often has pamphlets and giveaways for these events to hand out. Make your table inviting and interactive with surgical gowns, gloves, and instruments. Some hospitals have career days where we get to share about being a surgical technologist in a classroom setting, or they allow people into the OR (without patients of course!) or mock location to be hands on with gowning, tools, and some learning equipment.

When you volunteer, often your photo will be taken and shared on their social media with a description of who you or your group are. You may be able to take your own photos, too, to share in your state assembly, hospital and local newsletters, magazines, blogs, or newspapers. Bonus: if doing these as a state assembly, media coverage and career days count for points when applying for the state assembly leadership award.

When I have volunteered specifically as a surgical technologist, I've had to explain what my job entails, education required, and what our knowledge is that will help in their event (if necessary for that). The organizer has been so thankful after every volunteer opportunity or donation I've been a part of. It is a gratifying thing to do, no matter the number of hours spent doing it. We all can help do a small part of sharing our profession while helping in the community.

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.

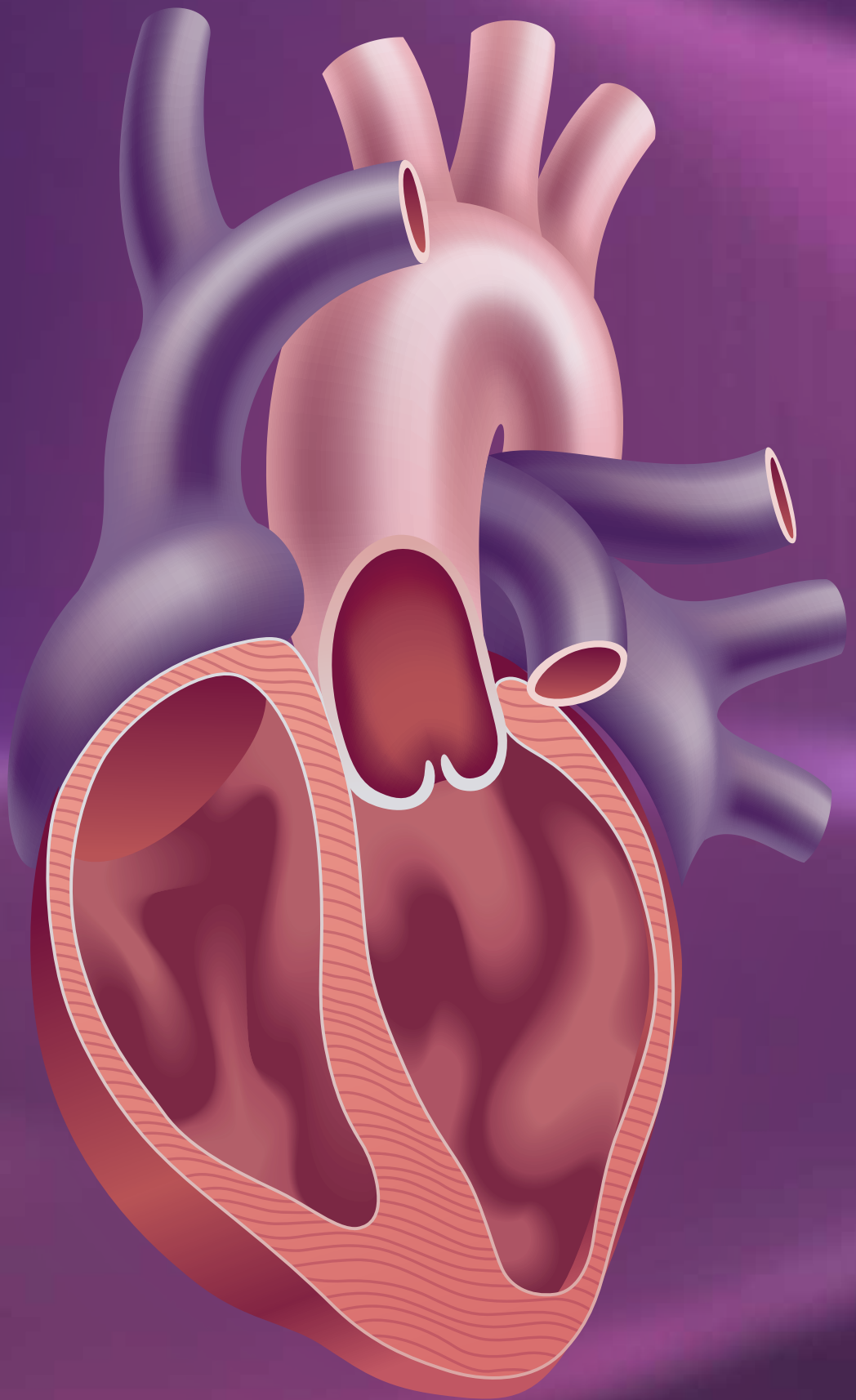
Who does The Foundation support?

- The Foundation provides scholarships to the following:
- Students
- Educators
- Military personnel
- and CSTs 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 (Eduscator) Awards - December 1
- Medical mission reimbursement - December 31

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



The Ross Procedure: Cardiac Autograft and Allograft

Part 1 of 2

Kevin B. Frey, CST, FAST

The Ross procedure has a history of fluctuating popularity over the years, but due to recent studies providing data on long-term survival rates that attest to the durability of the pulmonary valve (PV), the number of procedures is climbing again.[1] The procedure has proven to be free from valve-related complications and restore an excellent quality of life to patients. The procedure has proven to be free from valve-related complications and restore an excellent quality of life to patients.

The increase in performing the procedure is attributed to improving and modifying the surgical techniques in stabilizing the autograft root at the annulus, sinotubular junction, and sinus of Valsalva. This article provides the details of the procedural steps, a discussion of factors that support a successful procedure, and a review of the recent studies showing that the procedure provides excellent long-term results for the patient.

INTRODUCTION

The Ross procedure, also known as the switch procedure, that involves replacing the diseased aortic valve (AV) with the patient's own healthy PV was developed by and first performed by the British surgeon, Dr. Donald Ross, in 1967 (he also led the surgical team at the National Heart Hospital in London in performing the United Kingdom's first

LEARNING OBJECTIVES

- Identify the relevant anatomy.
- Recall the indications and contraindications for the procedure.
- Describe the technical aspects of the procedural steps.
- Evaluate the factors that contribute to good patient outcomes.
- Discuss the results of studies that confirm long-term positive results.

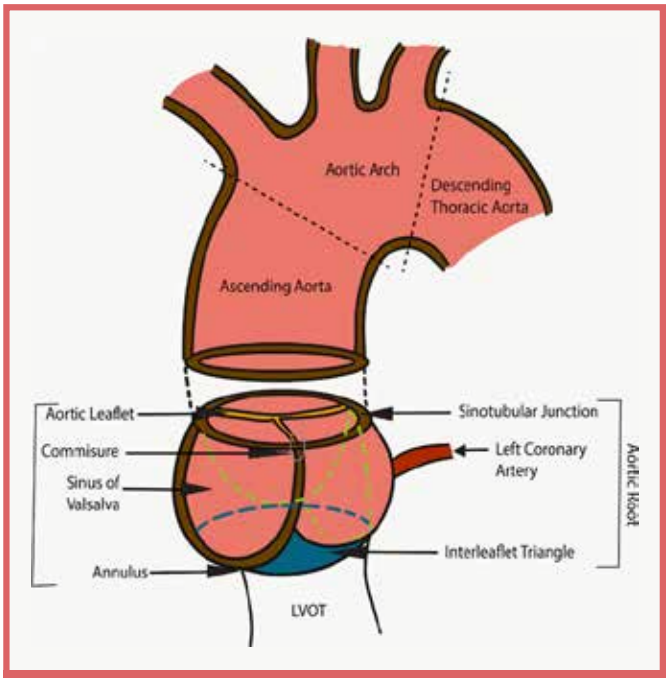


Figure 1: Aortic root anatomy.
(https://insightsimaging.springeropen.com/articles/10.1186/s13244-020-00855-w/figures/2)

heart transplant in 1968).[2,3] An allograft PV is used to replace the patient's native PV. The procedure was initially popular reaching its peak in the 1990s, but was followed by a significant decrease in usage because of its technical complexity, lack of long-term durability, and controversy that it transforms a one-valve procedure into a two-valve procedure.[2,4] While it is a technically demanding procedure that does take longer to perform as compared to a one-valve procedure, in the last decade it has been demonstrated to be the only operation that restores life expectancy similar to that of the general population with excellent quality of life, long-term outcomes, and low rates of valve-related complications.[1,2,4] Other advantages of the procedure include:

- low risk of thromboembolism,[5]
- autograft PV grows as a pediatric patient grows,
- excellent hemodynamic performance at rest and during exercise,[6]
- eliminating the need for lifelong anticoagulation medicine because biological valves are used,[5]
- quality of life is comparable to the population that has not undergone aortic valve replacement (AVR),[5] and
- allograft PV typically lasts 15 – 20 years because of the lower pressures on the right side of the heart that places less stress on the PV.[7]

The goal of the procedure is to implant a PV autograft into the left ventricular outflow tract (native aortic root) that has normal anatomic symmetrical shape and physiologic function with valve cusps and commissures the open and close normally, mimicking a normal aortic valve.

REVIEW OF ANATOMY AS RELATED TO THE ROSS PROCEDURE

The first step in understanding the Ross procedure is knowing the surgical anatomy. It is critical for the CST to understand the surgical anatomy to be able to fully prepare for the procedure including the equipment, instruments, and supplies that will be needed for the procedure as well as being able to anticipate the needs of the surgical team. This contributes to the long-term success of the procedure for the patient.

The anatomical focus of the procedure is on the aortic root. The aortic root is a small section with an average diameter of 3.0 cm that connects the heart to the circulatory system. It consists of the AV leaflets, the leaflet attachments, the sinotubular junction (STJ), the sinuses of Valsalva, the interleaflet triangles (trigones), and the annulus (Figure 1). The AV sustains a good amount of force and pressure as all the oxygenated blood that enters the circulatory system exits the left ventricle passing through the AV into the ascending aorta (Figure 2). Three leaflets, also called semilunar cusps, form the tricuspid AV; anatomically, the valve leaflets are divided into three parts.

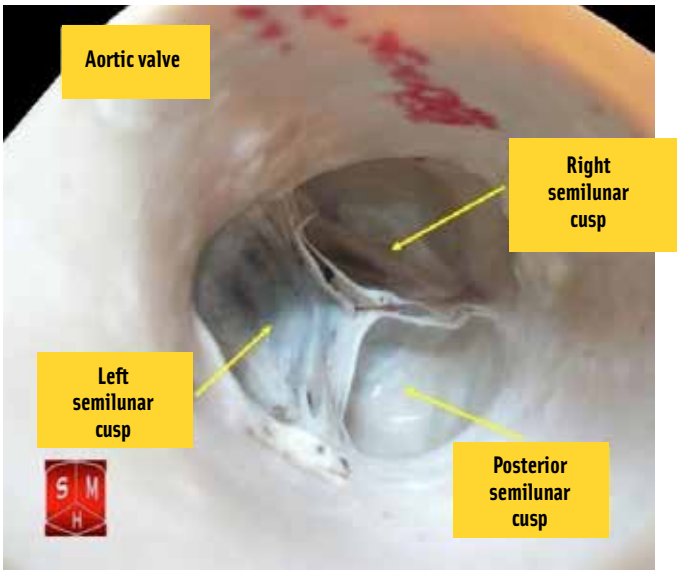


Figure 2: Aortic valve located centrally between the ascending aorta and LVOT.
(Anatomist90, Public Domain, via Wikimedia Commons)
(To view video clip of valve movement, go to https://www.ncbi.nlm.nih.gov/books/NBK558939/figure/article-617.image.f2/)

The anatomical focus of the procedure is on the aortic root. The aortic root is a small section with an average diameter of 3.0 cm that connects the heart to the circulatory system.

- Free margin that provides the coaptation area to ensure proper alignment and function of the leaflet with the other leaflets. The thickened circular node called the nodule of Arantius is in the center of the free margin.[8] It helps to stabilize and guide the closure of the valve to prevent prolapse as well as serves as a point of attachment of the tendinous cords to connect the valve to the papillary muscles of the left ventricle.[8]
- The main portion of the leaflet.
- The leaflet attachments.

Where the leaflet attachments insert in the wall of the aortic root, they form a thick fibrous structure called the annulus. The commissures are the points where the leaflet attachments run parallel towards the ascending aorta.[8]

The three aortic wall prominences are the sinuses of Valsalva, named after the 18th century Italian anatomist Antonio Valsalva. Two of the three sinuses are the origin of the coronary arteries; therefore, the sinuses are named respectively the left, right, and non-coronary sinus.[8] At the bases of sinuses, the ventricular musculature is partially involved. The walls of the sinuses predominantly consist of aortic wall, but the wall is thinner as compared to the aorta itself.

Posterior to each commissure is one of the three interleaflet triangles also called trigones. Histologically, they consist of thin aortic wall, but hemodynamically they are an extension of the left ventricular outflow tract (LVOT) and extend to the level of the STJ in the area of the commissures.[8]

The tubular structure from the distal portion of the sinuses toward the ascending aorta combined with the commissures is the STJ. It separates the aortic root from the ascending aorta. In some patients, dilatation of the STJ is the cause of central aortic insufficiency and replacing the ascending aorta with a short tubular graft restores the valve competence.[8]

KEYWORDS & DEFINITIONS

KEYWORDS:
Allograft (homograft), annulus, aortic regurgitation, aortic root, aortic stenosis, aortic valve replacement, autograft, coaptation, coronary button, decellularized cryopreserved allograft, infundibulum, left coronary artery, left ventricular outflow tract, nadir, native, pulmonary valve, sinotubular junction, sinus of Valsalva.

DEFINITIONS

Adventitial tissues: outer layer of connective tissue that surrounds organs to bind them to surrounding tissues and provide support.

Allograft (homograft): Tissue or organ transplanted from a donor of the same species, but different genetic makeup.

Aortic regurgitation: Disease where the aortic valve improperly closes, allowing blood to flow backwards from the aorta into the left ventricle. Common causes are endocarditis, dissection of the ascending aorta, and Marfan syndrome.

Autograft: Patient's own (autologous) tissue or organ, called that is transplanted from one part of the body to another.

Coaptation: Bringing two anatomical structures or surfaces together to ensure proper alignment and function.

Coronary button: Small-full-thickness section of aorta surrounding the coronary artery ostia (opening). In the Ross procedure, preserved to later reattach to the artery.

Decellularized cryopreserved allograft: Human heart valve treated to remove all donor cells while preserving the valve's structure.

Infundibulum: Funnel-shaped portion of the right ventricle that opens into the pulmonary artery; also called the conus arteriosus.

Nadir: Also called the hinge point, the nadir of a cusp refers to the point where the cusp is attached to the left ventricular outflow tract. The nadirs of the three aortic valve cusps form the annulus.

Native: Tissue or organ that is not prosthetic; body's original tissue.

Septal perforator arteries: Small arteries that branch off the left anterior descending artery and supply blood to the interventricular septum. Injury to the arteries can lead to arrhythmias and ischemia. The anatomy must be understood when performing cardiac procedures such as aortic valve replacement.

Sinotubular junction: Region of the ascending aorta between the aortic sinuses of Valsalva and where the normal tubular structure of the aorta is attained. The superior attachments of the aortic valvular leaflets establish the level of the junction.

Sinuses of Valsalva: Three anatomical outpouchings in the aortic root located between the aortic valve annulus and sinotubular junction. They help to prevent the aortic valve cusps from touching the inner surface of the aorta and obstructing the openings of the coronary arteries during systole.

The definition of annulus is a ring or circular shaped object or structure. However, when applied to the aortic root, the term is inaccurate, because the 'annulus' is more of a crown shape. However the term is used, it is the area of the smallest diameter in the circulatory route between the left ventricle and the aorta.[8] This is also an important anatomical landmark as this is the level measured by echocardiographers called the 'aortic valve annulus' to determine the size of a prosthesis to be implanted during an AVR.

Regarding the Ross procedure, it is important to know the anatomy of the left coronary artery (LCA) to understand its relationship to the aortic root (Figure 3).[7] The LCA originates from the left side of the base of the ascending aorta. Its opening is located on the dilated wall of the ascending aorta, slightly superior to the left semilunar cusp (leaflet) of the AV.[9] It travels in an anterior direction and to the left, passing between the pulmonary trunk and left atrial appendage.[9] It divides into two branches – left anterior descending artery and left circumflex artery. In 15% - 30% of patients there will be a third branch in the middle of the two other branches called the ramus intermedius.[9]

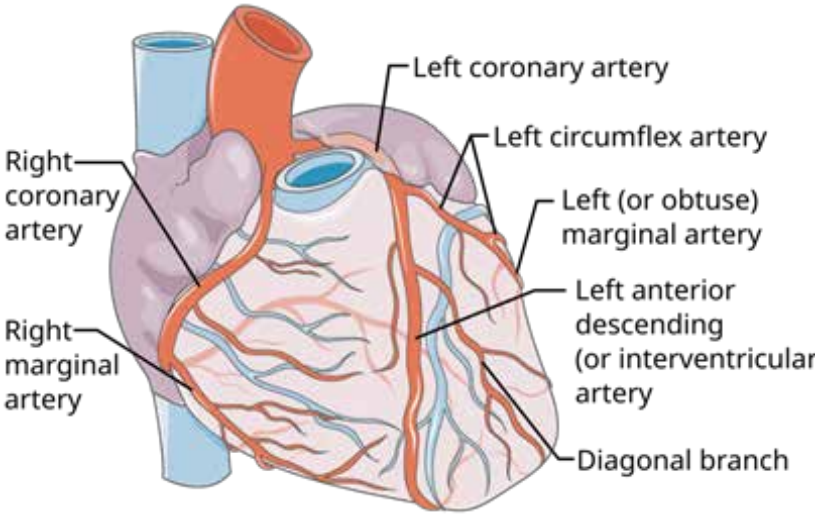


Figure 3: Coronary artery anatomy
(https://commons.wikimedia.org/wiki/File:Coronary_vessels,_with_annotated_arteries.svg)

The PV is the logical valve to use for AVR because it is an anatomical mirror image of the AV (Figure 4).[3] It is comparable in hemodynamics, allowing the patient to maintain a normal quality of life and exercise capacity. Bioprosthetic and mechanical replacement valves, when compared to the Ross procedure, are unable to fully reproduce the heart's natural hemodynamics thus causing more stress on the heart muscle. Additionally, these types of replacement valves have a significantly higher level of risk for blood clot formation and infection as well as shorter life span of functioning.[3]

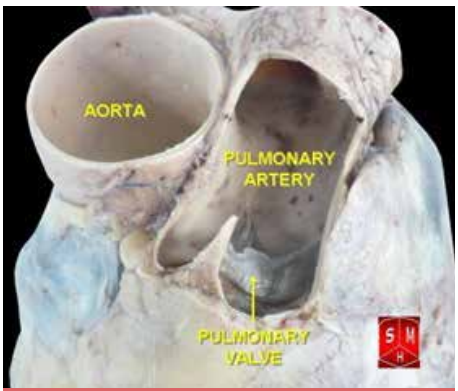


Figure 4: Pulmonary valve
(https://commons.wikimedia.org/wiki/File:Pulmonary_artery.jpg)

PATIENTS WHO ARE IDEAL CANDIDATES FOR THE ROSS PROCEDURE

The ideal patients for the Ross procedure include the following.

Adults with aortic regurgitation with a dilated aorta.

- Patient that has a life expectancy of at least 15 years.[10]
- Patients with left ventricular outflow obstructive disease.
- Severe forms of aortic valve disease that cannot be repaired.
- Pediatric patients with congenital aortic stenosis (most common indication).[7]
- Native or prosthetic valve endocarditis; however, depends on extent of the disease.[7]
- Females wanting to have children diagnosed with bicuspid aortic valve and small aortic annulus.
- Patients that have no chronic condition that may affect long-term survival such as chronic renal disease or coronary artery disease.[2]
- The ideal patient is active, healthy, and 50 years old or younger. However, active patients that are up to 65 years of age can be considered for the procedure.[10]

The reasons for the Ross procedure being ideal for pediatric patients who require an AVR are small-sized AVs are not available on the market and secondly, the prosthetic valve remains the same size as the child grows leading to left ventricular outflow obstruction.[7] In contrast, both the

autograft and allograft PV grow with the child making the Ross procedure an excellent surgical option.

Preoperatively, a transesophageal echocardiography (TEE) is performed to:

- assess the patient's aortic valve and LVOT,[7]
- rule out any other cardiovascular abnormalities, and
- assess the pulmonary valve for regurgitation and stenosis.[7] Mild pulmonary regurgitation is common and does not exclude the patient from undergoing surgery, whereas severe regurgitation will require further assessment.[4]

Additionally, the TEE allows for sizing the aortic and pulmonary annulus, the sinuses of

Valsalva, the STJ, and ascending aorta.[1] If the aortic annulus is 2-3 mm smaller than the pulmonary annulus, the patient will first have to undergo an aortic root enlargement procedure.[7]

CONTRAINDICATIONS FOR THE ROSS PROCEDURE

A patient with any of the following diseases is not eligible for the Ross procedure. These contraindications are reflective of the current American Heart Association and Canadian Cardiovascular Society valvular guidelines.[11,12]

- PV disease.
- Advanced mitral valve disease.[7]
- Radiation-induced heart disease.[10]
- Life expectancy is less than 15 years.[10]
- Advanced three-vessel coronary artery disease.[7]
- Autoimmune disorders such as lupus erythematosus and rheumatoid arthritis.
- Any type of connective tissue disorder including Loeys-Dietz syndrome (genetic tissue disorder characterized by enlarged aorta and other skeletal and craniofacial abnormalities) and Marfan syndrome.[2]

COMING NEXT

Part Two: The Ross Procedure, Part 2 will be published in the August edition of The Surgical Technologist.

REFERENCES

1. Mazine A, Ghoneim A, El-Hamamsy I. The Ross procedure: how I teach it. *Ann Thorac Surg*. 2018; 105(5): 1294-1298. doi: https://doi.org/10.106/j.athoracsur.2018.01.048
2. Cryolife, Inc. The Ross procedure. theRossprocedure.org. 2019. Accessed February 10, 2025. https://therossprocedure.org/the-ross-procedure/
3. Tansey EM, Reynods LA (eds.). Early heart transplant surgery in the UK. Witness Seminar. June 10, 1997. Accessed April 1, 2025. https://core.ac.uk/download/pdf/30696211.pdf
4. Williams EE, El-Hamamsy I. The Ross procedure. *Oper Tech Thorac Cardiovasc Surg*. 2021; 26(2): 189- 209. doi: https://doi.org/10.1053/joptechstcvs.2020.12.004
5. El-Hamamsy I, Eryigit Z, Stevens L, et al. Long-term outcomes after autograft versus homograft aortic root replacement in adults with aortic valve disease: a randomized controlled trial. *The Lancet*. 2010; 376(9740): 524-531.
6. Laforest I, Dumesnil JG, Briand M, et al. Performance at rest and during exercise after aortic valve replacement: comparison of pulmonary autografts versus aortic homografts. *Circulation*. 2002; 106(12 Suppl 1): 157-162.
7. Brown KN, Kanmanthareddy A. Ross procedure for aortic valve replacement. StatPearls. Updated February 13, 2023. Accessed February 10, 2025. https://www.ncbi.nlm.nih.giv/books/NBK537249/
8. Charitos EI, Sievers H. Anatomy of the aortic root: implications for valve-sparing surgery. *Ann Cardiothorac Surg*. 2013; 2(1): 53-56.
9. Knipe H, Feger J, Yap J, et al. Ramus intermedius artery. Radiopaque.org. September 12, 2013. Updated July 29, 2023. Accessed April 2, 2025. https://radiopaedia.org/articles/24782
10. Aboelnazar NS, Losenno K, Guo L, Chu MWA. The 10 commandments for the Ross procedure. *Innovations*. 2024; 19(6): 575-583. doi: https://10.1177/155698452541294051
11. Appoo JJ, Bozinovski J, Chu MWA, et al. Canadian Cardiovascular Society/Canadian Society of Cardia Surgeons/Canadian Society for Vascular Surgery joint position statement on open and endovascular surgery for thoracic aortic disease. *Can J Cardiol*. 2016; 32(6): 703-713. doi: 10.106/j.cjca.2015.12.037
12. Otto CM, Nishimura RA, Bonow RO, et al. 2020 ACC/AHA guidelines for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association joint committee on clinical practice guidelines. *Circulation*. 2020; 143(5): e72-e227. doi: https://doi.org/10.1161.CIR.0000000000000923
13. Stelzer P, Itagaki S, Varghese R, et al. Operative mortality and morbidity of the Ross procedure: a 26-year learning curve. *Heart Valve Dis*. 2013; 22(6): 767-775.
14. Patients who received Ross procedure demonstrate excellent survival rates after 20 years. News Release. The Society of Thoracic Surgeons. January 26, 2025. Accessed February 10, 2025. https://www.sts.org/press-releases/patients-who-received-ross-procedure-demonstrate-excellent-survival-rates-after-20-years#:~:text=At%20follow%2Dup%2C%20Dr.,respectively%2C%E2%80%9D%20the%20researchers%20reported.
15. Bouhout I, Noly P, Ghoneim A, et al. Is the Ross procedure a riskier operation? Perioperative outcome comparison with mechanical aortic valve replacement in a properly-matched cohort. *Interact Cardiovasc Thorac Surg*. 2017; 24(1): 41-47. doi: 10.1093/icvts/ivw325
16. Beckman E, Martens A, Krueger H, et al. Aortic valve-sparing root replacement (David): learning curve and impact on outcome. *Interact Cardiovasc Thorac Surg*. 2020; 30(5): 754-761. doi: 10.1093/icvts/ivz324
17. Chu MWA, Losenno KL, Dubois LA, et al. Early clinical outcomes of hybrid arch frozen elephant trunk repair with the Thoraflex hybrid graft. *Ann Thorac Surg*. 2019; 107(1): 47-53. doi: 10.106/j.athoracsur.2018.07.091
18. Mazine A, El-Hamansy, Outounion M. The Ross procedure in adults: which patients, which disease? *Curr Opin Cardiol*. 2017; 32(6): 663-671. doi: 10.1097/HCO.0000000000000449
19. Bouhout I, Ghoneim A, Poirier N, et al. Impact of the learning curve on early outcomes following the Ross procedure. *Can J Cardiol*. 2017; 33(4): 493-500. doi: 10.1016/j.cjca.2016.11.014

The Ross Procedure: Cardiac Autograft and Allograft, Part 1

#503 JULY 2025 1 CE CREDIT $6

1. What structure do the AV leaflet attachments form in the wall of the aortic root?
A. Sinuses
B. Annulus
C. Nadir
D. Infundibulum

2. What is the cause of central aortic insufficiency that leads to replacing the ascending aorta?
A. STJ dilatation
B. Aortic regurgitation
C. Leaflet calcification
D. Endocarditis

3. Which of the following is a complication associated with the use of bioprosthetic replacement valves?
A. Does not place enough tension on heart
B. Grows to large over time
C. High risk for infection
D. Mimic's heart's hemodynamics

4. Which preoperative diagnostic test is performed to assess the LVOT?
A. TEE
B. Plethysmography
C. Angiography
D. Cardiac MRI

5. What part of the tricuspid AV is the point of attachment of the tendinous cords?
A. Main portion of the leaflet
B. Leaflet attachments
C. Nodule of Arantius
D. Free margin

6. Which of the following serves as the origin of the coronary arteries?
A. Cusps
B. Aortic root
C. Commissures
D. Sinuses of Valsalva

7. In a certain percentage of patients there is a third branch of the LCA called the _____.
A. Left circumflex artery
B. Ramus intermedius
C. Right marginal artery
D. Diagonal branch

8. Which structure separates the aortic root from the ascending aorta?
A. Leaflets
B. Trigones
C. STJ
D. Sinuses of Valsalva

9. What complication occurs with pediatric patients that receive a prosthetic valve?
A. Endocarditis
B. Aortic regurgitation
C. Coronary artery disease
D. Left ventricular outflow obstruction

10. Patients will undergo an aortic root enlargement procedure if the aortic annulus is _____ mm smaller than the pulmonary annulus.
A. 2 - 3
B. 4 - 5
C. 6 - 7
D. 8 – 9

THE ROSS PROCEDURE: CARDIAC AUTOGRAFT AND ALLOGRAFT, PART 1
 # 503 JULY 2025 1 CE CREDIT $6

AST Member No.

☐ My address has changed. The address below is the new address.

Name

Address

City State Zip

Telephone

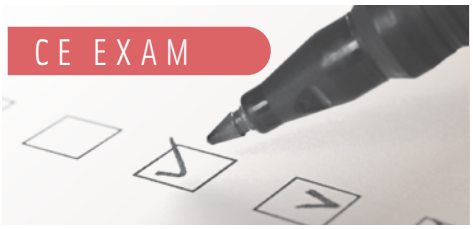
☐ Check enclosed ☐ Check Number

	a	b	c	d
1	☐	☐	☐	☐
2	☐	☐	☐	☐
3	☐	☐	☐	☐
4	☐	☐	☐	☐
5	☐	☐	☐	☐
6	☐	☐	☐	☐
7	☐	☐	☐	☐
8	☐	☐	☐	☐
9	☐	☐	☐	☐
10	☐	☐	☐	☐

Make It Easy - Take CE Exams Online

You must have a credit card to purchase test online. We accept Visa, MasterCard and American Express. Your credit card will only be charged once you pass the test and then your credits will be automatically recorded to your account.

Log on to your account on the AST homepage to take advantage of this benefit.



Earn CE Credits at Home

You will be awarded continuing education (CE) credits toward your recertification after reading the designated article and completing the test with a score of 70% or better. If you do not pass the test, it will be returned along with your payment.

Send the original answer sheet from the journal and make a copy for your records. If possible use a credit card (debit or credit) for payment. It is a faster option for processing of credits and offers more flexibility for correct payment. When submitting multiple tests, you do not need to submit a separate check for each journal test. You may submit multiple journal tests with one check or money order.

Members this test is also available online at ***www.ast.org.*** No stamps or checks and it posts to your record automatically!

Members: $6 per credit
(per credit not per test)

Nonmembers: $10 per credit
(per credit not per test plus the $200 nonmember fee per submission)

After your credits are processed, AST will send you a letter acknowledging the number of credits that were accepted. Members can also check your CE credit status online with your login information at ***www.ast.org.***

2 WAYS TO SUBMIT YOUR CE CREDITS

Mail to: AST, Member Services,
6 West Dry Creek
Circle Ste 200, Littleton, CO 80120-8031

E-mail scanned CE credits in PDF format to:
memserv@ast.org

For questions please contact Member Services - ***memserv@ast.org*** or 800-637-7433, option 3.
Business hours: Mon-Fri, 8 am - 4:30 pm MT

Everything You Need to Know About

EARNING CE CREDITS

The Association of Surgical Technologists (AST) is the national professional organization for surgical technologists. AST's primary purpose is to ensure that surgical technologists have the knowledge and skills to administer patient care of the highest quality by setting standards for education, supporting state and federal legislative efforts, and providing quality continuing education opportunities.

Listed below are all the ways you can earn CE credits to help you maintain your credential and expand your professional exploration.

AST CE ONLINE LIBRARY THREE FREE ONLINE CE CREDITS PER YEAR

Log in to the AST site to complete and earn three free credits per calendar year toward recertification.

AST MEMBER CE PACKAGES

Take advantage of AST's CE packages available on the AST site. The packages are available at a substantial AST member discount.

SUBMITTING ONLINE CE CREDITS

By paying online through your CE shopping cart, the CE credits post to your AST credit history within 24-48 hours after payment.

- You do **NOT** need to submit the certificate of completion or an *AST CE Reporting Form* if you are submitting and paying for online CE credits.
- **No refund** is given for AST online CE tests or packages, and they **cannot** be applied to another certification cycle.
- **Available 24/7 at www.ast.org.**

AST NATIONAL SURGICAL TECHNOLOGY CONFERENCE

Member: CE credits are automatically recorded in your AST CE file. A CE credit conference confirmation letter is mailed four to six weeks post-conference for your personal records.

Nonmember: A CE credit conference confirmation letter is mailed four to six weeks post-conference to maintain in your personal records. Your conference registration fee includes one-year of AST membership.

AST MONTHLY JOURNAL – *The Surgical Technologist*

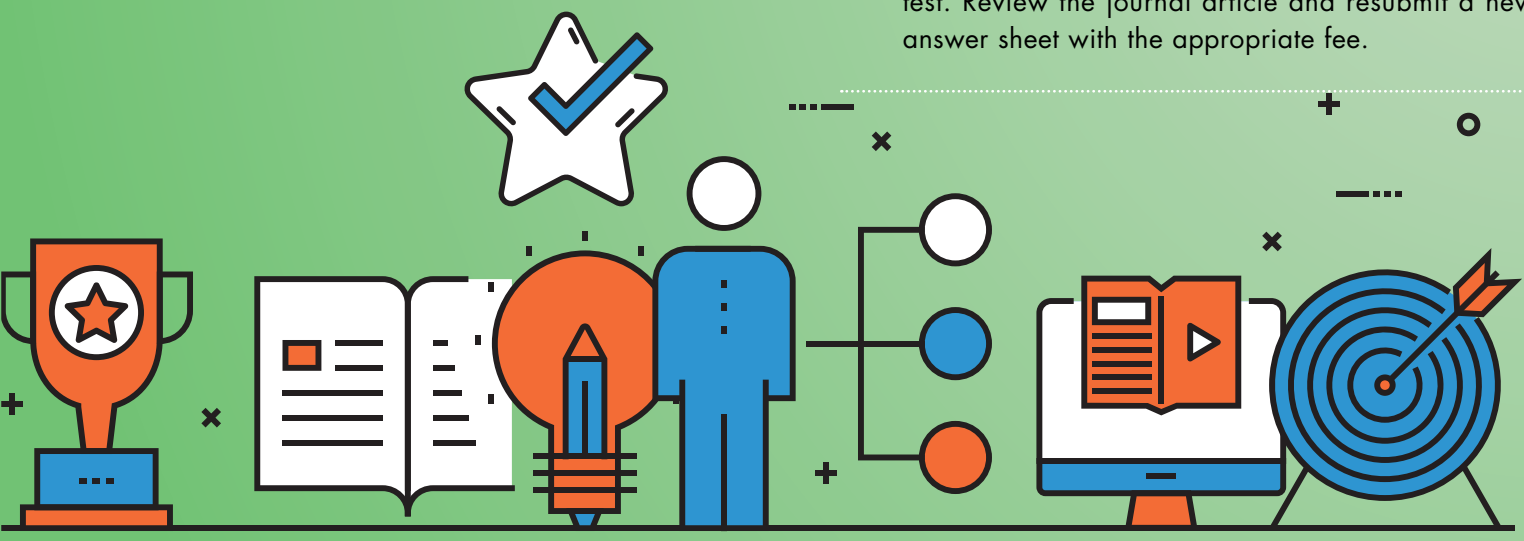
The CE article featured in AST's monthly journal provides up-to-date information concerning a relevant surgical topic, as well as, the ability to earn one or more CE credits. There is no expiration date on the articles and tests may be submitted from any article in AST's CE library.

Submitting Journal CE Credits

- Submit the answer sheets to AST with the appropriate payments. Make a copy of the answer sheets for your records.
  - **Member:** $6 per CE credit, not per test. **NOTE:** If the test is 1.5 CE credits, the fee is $9. If the test is 2 CE credits, the fee is $12. If the test is 3 CE credits, the fee is $18, etc.
  - **Nonmembers:** $10 per CE credit, in addition to the $200 nonmember processing fee.
  - Do **NOT** submit separate checks for each journal test. Multiple journal tests can be submitted and paid with one check or money order.
  - Printed on the journal test answer sheet is the month, year, test number, and number of CE credits the test is worth. For example: 1, 2, or 3 CE credits. If it is an older test that doesn't show the number of CE credits, the test is worth 1 CE credit.
  - You do **NOT** need to submit the *AST CE Reporting Form* with the journal tests.

Reasons Journal Tests are Returned:

- Overpayment
- Payment is not included
- Duplicate: The test(s) were previously submitted and CE credits recorded
- Failed test: A minimum of 70% must be scored on the test. Review the journal article and resubmit a new answer sheet with the appropriate fee.



STATE ASSEMBLY MEETINGS

State assemblies provide CE during meetings, as well as serving as the grassroots organization in regard to state legislative efforts. Announcements of state assembly meetings are published in *The Surgical Technologist,* on the states' websites, and the AST site, www.ast.org, under the State Assembly tab. State assemblies also contact state members of upcoming meetings through email and mailings.

Submitting State Assembly CE Credits

- All state assemblies are required to complete the AST CE program approval prior to the date(s) of the meeting for the CE credits to be approved. The participant should verify that the meeting has been AST approved.
- The state assembly is required to provide a certificate of attendance to the participants even if "auto recorded."
- **Member:** Submit a copy of the certificate to AST for processing. The *AST CE Reporting* Form is not required to be submitted.
- **Nonmember:** Submit a copy of the certificate of attendance with the *AST CE Reporting* Form and $200 nonmember processing fee.

COLLEGE COURSES

College courses that are relevant to the medical-surgical practice of surgical technology or surgical first assisting can be submitted to AST for CE credits.

- College courses **MUST** be completed with a minimum grade of "C."
- The courses **MUST** be completed at an institution that is accredited by an organization recognized by the US Department of Education.
- Surgical first assistant college courses submitted for CE credits **MUST** be completed at a CAAHEP-accredited surgical first assistant program.
- General nursing and physician assistant college courses that are not specifically related to the medical-surgical practice of surgical technology or surgical first assisting **will not be accepted** for CE credits.
- Anatomy & physiology, microbiology, pathophysiology, and pharmacology must be advanced level college courses.

Determining the Number of CE Credits:

- College courses are awarded five CE credits for each semester hour completed. For example, a three-college-credit semester course: 3 x 5 = 15 CE credits.

Submitting College Courses for CE Credits

- **Member and Nonmember:** Submit an unofficial college transcript from the institution where the courses were completed with the *AST CE Reporting Form* – no exceptions.
- **Nonmember:** Include the $200 nonmember processing fee.

Recommendation

- Provide a copy of the course descriptions from the current edition of the college catalog with the *AST CE Reporting Form* and transcript(s).
- The descriptions assist in determining the relevancy of the course(s) to the medical-surgical practice of surgical technology or surgical first assisting.

HEALTHCARE FACILITY SPONSORED IN-SERVICES

Healthcare facility sponsored in-services can be submitted to AST for CE credits as long as they are relevant to the medical-surgical practice of surgical technology or surgical first assisting. Employers are **NOT** required to submit healthcare facility in-services to AST for approval.

- AST accepts annual mandatory CE in-services relevant to the medical-surgical practice of surgical technology or surgical first assisting. For example, fire safety.
- Healthcare facility orientation is **NOT** accepted for CE credits.
- If the employer sponsors or provides funds for an employee(s) to attend a conference, forum, seminar, symposium, or workshop, or complete any other type of CE activity sponsored by an organization other than the healthcare facility, the program **MUST** be AST approved for the CE credits to count toward certification renewal.
- BLS, ACLS, and PALS are accepted for CE credits. Every 50-60 minutes of activity = 1 CE credit.
  - BLS includes CPR and automated external defibrillator (AED) training.
- CE credits are **NOT** awarded for on-the-job training, healthcare facility orientation, or work

experience that the CST and CSFA completed as an employee of the healthcare facility providing the training.

  - Example: A CST is completing on-the-job training in learning the first scrub role to be a member of the healthcare facility's cardiovascular team. This training is distinct from attending healthcare facility sponsored in-services as described above.

SUBMITTING IN-SERVICE CE CREDITS

- A healthcare facility certificate of attendance, official healthcare facility transcript, or sign-in sheet with an authorized signature (for example, a surgery department supervisor, clinical educator, or other individual authorized by the employer).
- The documentation must also include the name of the healthcare facility, indicate it is an in-service, title of in-service, date of in-service, number of CE credits, and signature of the CST or CSFA attendee. The documentation must be submitted with the *AST CE Reporting Form*.

OTHER ENDURING MATERIAL

Enduring material is self-directed learning in which the CST or CSFA independently completes CE activity that is AST approved.

- The enduring material must be AST approved to earn the CE credits. The CST or CSFA is responsible for researching if a CE enduring material offered by a business or organization is AST approved.
- Businesses and organizations that would like to offer CE to the CST and CSFA are required to submit their CE offerings to AST for review and possible approval.
- AST does **NOT** accept enduring material CE offered by healthcare manufacturers.
- Types of enduring materials include CE articles that requires completing the post-article exams that are offered hard-copy or electronically, viewing recorded lectures that includes completing a post-lecture exam that are offered on CD, DVD, online, or other electronic means.

SUBMITTING ENDURING MATERIAL CE CREDITS

Upon completion of an AST approved enduring material offered by another business or organization, the CST and CSFA must submit a copy of the certificate of completion provided by the business or organization with the *AST CE Reporting Form*. The business or organization does **NOT** directly report the CE credits to AST.

For additional information, please see the AST CE Policies for the CST and CSFA at www.ast.org.

PROFESSIONAL ORGANIZATIONS

AST accepts the CE credits offered at live events, (for example: conferences, forums, symposiums, and workshops) that are sponsored by ACCME-accredited organizations and if the event is approved to offer *AMA PRA Category 1 Credit(s)™*, CE credits are accepted if an organization's live event is approved to offer *AMA PRA Category 1 Credit(s)™* by another ACCME accredited organization. Additionally, CE credits are accepted for live events approved by the ADA-CERP and JCAHPO.

Submitting Professional Organization CE Credits

- The professional organization should provide a certificate of attendance that is signed by an individual designated to represent the organization.
- The certificate should include the name of the organization, title of event, date(s) of event, name or signature of the CST or CSFA, and number of CE credits.

Member: Include a copy of the certificate with the *AST CE Reporting Form*.

Nonmember: Include a copy of the certificate with the *AST CE Reporting Form* with the $200 nonmember processing fee.

SURGICAL MISSION

CSTs and CSFAs who perform their job duties as a member of a surgical team that performs surgeries during a surgical mission can earn CE credits.

- One time per certification cycle, the CST or CSFA may submit a surgical mission trip to AST for CE credits.
- **2-year certification cycle:** 10 CE credits awarded, no matter the length of the mission
- The *AST Surgical Mission Verification Form* must be completed by the CST or CSFA, including an authorized signature of mission team leader. Incomplete forms will be returned.

WRITING FOR HEALTH-RELATED PUBLICATIONS

The CST or CSFA, who authors a CE article, may be awarded CE credits due to the research that is necessary to write the article.

- When writing a CE article to be published in a journal or magazine, the article must be a health-related publication.
- The publisher must have a peer-review process in place to determine if the article meets the publishing standards of the journal or magazine.
- CE credits will only be awarded for the initial publication of an article.
- Four CE credits are awarded per 2,000 typewritten words. Partial CE credits are awarded in increments of 500 words: for example, 2,500 words equals 1.25 CE credits. The word count does **NOT** include the title of the article, headings, post-article CE exam, reference page, or bibliography.

SUBMITTING PUBLICATIONS FOR CE CREDITS

- *The Surgical Technologist:* The CE credits will be automatically entered for CSTs and CSFAs that write a CE article for the AST journal.
- Other publications: CST or CSFA must submit an official, published copy of the article that has his/her name printed as the author, name of the journal or magazine, date of publication, and volume number with the *AST CE Reporting Form.*

INSTRUCTION OF HEALTH PROFESSIONALS

- CSTs or CSFAs who provide a CE lecture may be awarded CE credits.
- This applies to providing a CE lecture at an AST-sponsored event, such as the National Surgical Technology Conference or Surgical Technology Educators Conference, healthcare facility in-services, or serving as an instructor at an AST-approved CE program or workshop, such as a state assembly meeting or wound closure workshop.
- CE credits are **not** awarded for providing lectures or lab/clinical demonstrations when it is a part of the CST's or CSFA's job duty: ie, educators, medical sales representatives, and preceptors.
- **Awarding CE Credits**
  - The lecture or workshop **MUST** last a minimum of 30 minutes.
  - CST and CSFA presenters and instructors receive 2 CE credits for the initial preparation of a topic.
  - For example: If a lecture lasts 45 minutes, the CST or CSFA presenter would be awarded 2.75 CE credits.
  - However, if the lecture is repeated at a future program, CE credits are only awarded for the length of the lecture.
- **Submitting CE Credits for Presentation or Instruction**
  - **AST sponsored programs,** such as conferences: The CST or CSFA presenter **MUST** be a member of AST to be eligible to present. The CST or CSFA is **NOT** required to submit documentation as proof of giving a CE lecture or serving as a workshop instructor. AST will automatically enter the CE credits in the individual's CE file.
  - **Other programs:** CSTs and CSFAs that present a CE lecture or serve as an instructor at a non-AST sponsored program, such as a state assembly meeting, must submit a copy of the program agenda with the *AST CE Reporting Form.* The program agenda **MUST** include the name of the presenter, title of the presentation or workshop, and length of activity.

WHY CE CREDITS ARE NOT ACCEPTED

CE credits that are not accepted can present a challenge in recertifying if there is not sufficient time left to earn additional CE credits before the expiration date of the credential. **As previously mentioned, it is encouraged to submit CE credits six months prior to the certification expiration date.** This allows time to earn additional CE credits within the certification cycle if CE credits were not accepted and avoid taking the NBSTSA national certification examination to renew the credential. The following are some of the more common reasons for CE credits not being accepted.

CE Credit Value NOT Met

- If a CST or CSFA attends a lecture or program, or views a recorded CE lecture that is less than 30 minutes. (One CE credit equals 50-60 minutes of activity.)
- Partial CE credits are accepted by AST; however, the CE activity must last a minimum of 30 minutes.
- After 30 minutes, CE credits are accepted in 15-minute increments.

CE Credits NOT Earned During Current Certification Cycle

- CE credits **MUST** be earned during the current certification cycle.
- CE credits are accepted based on the date of completing the CE activity, **NOT** when the CE activity was purchased or date submitted to AST.

CE Activity is NOT Approved by AST

- CE credits were earned by completing a CE activity or attending a CE event that is **NOT** AST approved.

CE Reporting Form NOT Submitted with CE Credits

- CE credits were submitted without a completed *CE Reporting Form.* The form is available on the AST site, www.ast.org.

– Each CE activity, with the exception of AST-sponsored CE, must be listed on the reporting form. Forms that state "see other pages" or "see transcript" will be sent back.

Documentation NOT Included with the *CE Reporting Form*

- Documentation verifying completion of CE listed on the *CE Reporting Form* is NOT included when submitted to AST.
- With the exception of AST sponsored activities and state assembly meetings, copies of verification documentation must be included with the *CE Reporting Form.*
- Accepted documentation includes:
  - certificate of attendance or completion
  - attendance sign-in sheet for healthcare facility in-services (see previous information regarding healthcare facility sponsored in-services for details).

Documentation that is **NOT** accepted includes:

- tests,
- paid receipts,
- announcements of events
- program agenda/brochure

CE Activity is NOT Relevant

- CE credits are returned if it is determined the activity is **NOT** relevant to the medical-surgical practice of surgical technology or surgical first assisting.

Previously Completed CE Submitted Again

- Previously completed CE that was submitted to AST and processed, **CANNOT** be resubmitted for CE credits and will NOT be accepted.
- An exception is made for BLS, ACLS, and PALS. Each time the CST or CSFA renews one of those certifications it can be submitted for CE credits.

Nonmember Fee NOT Included

- The nonmember CE processing fee of $200 is **NOT** included when CE credits are submitted.

World Health Organization Publishes Results of Study to Improve Hand Hygiene in Health Care

AST STAFF

A 105 member-panel reached a consensus for a prioritized research agenda of 178 items categorized into six domains for hand hygiene in health care that was published by the World Health Organization (WHO) on 8 April 2025. The consensus process produced a research agenda that can be used to globally address gaps in hand hygiene improvement.

Hand hygiene is one of the most effective methods to prevent microbial transmissions that can lead to infections in healthcare providers and patients. During the past three decades, achievements include replacing soap and water with alcohol-based solutions for handwashing and implementing the WHO multimodal hand hygiene improvement strategy (MMIS) that has been used to promote behavioral changes in healthcare providers at the point of care. The current study is a continuation of several years of research into infection and prevention control methods. The objective of the study was to develop a 2023 – 2030 research agenda based on global research priorities to improve hand hygiene in healthcare settings to coordinate research, guide funding, promote investment, and inform policy making that improves healthcare quality and patient and healthcare provider safety.[1]

The study involved a 105-member panel of international hand hygiene experts. The panel included the 27 members of the Hand Hygiene in Healthcare Research representing six WHO regions and World Bank economic income levels.[1] The other members were selected through literature searches, and WHO networks and regional offices.

A multiphase, modified Delphi consensus process comprising of two rounds was used to establish the final research priorities for hand hygiene. A meta-review and analysis of research gaps provided the basis for establishing the research priorities categorized into six domains: system change, training and education, evaluation and feedback, reminders and communications, institutional safety climate, and the impact of hand hygiene improvement on antimicrobial resistance and healthcare-associated infections.[1] The first round participants received a survey with a series of research priorities that were rated on a 5-point Likert scale with the objective of achieving a consensus on the research priorities to be included in the final hand hygiene research agenda for each of the six domains.[1] Round two focused on re-evaluating the research priorities in which a consensus had not be reached during round one.[1]

Results

A final list of 178 research priorities were established, with 121 priorities reaching >80% consensus. The results according to the six domains are as follows.

- **System Change:** Forty-five research priority statements reached consensus, with 24 achieving >80% consensus.[1]
- **Training and Education:** Fifteen research priority statements reached consensus, with 13 achieving >80% consensus.[1]
- **Evaluation and Feedback:** Forty-one research priority statements reached consensus, with 25 achieving >80% consensus.[1]
- **Reminders and Communications:** Thirteen research priority statements reached consensus, with 9 achieving a consensus level of >80%.[1]
- **Safety Climate and Culture Change:** Thirty-one research priority statements reached consensus, with 22 achieving a consensus level of >80%.[1]
- **Impact of Hand Hygiene on HAIs and the Transmission of Antimicrobial Resistance:** Thirty-three statements reached consensus, with 30 achieving >80% consensus.[1]

Discussion

The completion of a study and publication of a research agenda of this depth is a significant step forward in addressing the gaps in hand hygiene "providing a roadmap for future research and practice improvement."[1] Further research agen-

das have continued to be published focused on infection prevention and control issues that underscores the increasing emphasis on utilizing a systematic approach to addressing healthcare issues and associated knowledge gaps.

The final published research agenda brought forward two key topics that overlap among the domains. First, the potential role of technology is stressed, using unobtrusive electronic monitoring methods to improve hand-hygiene practices, and developing novel teaching tools for training and education.[1] Artificial intelligence is positioned to be used for education and training that can provide point of performance assessment to the healthcare provider and compliance monitoring. The second topic is the relationship between an institution establishing and supporting a culture of safety and improved hand hygiene practices.[1] Further research is essential, particularly regarding the influence of leadership and organizational culture, towards cultivating an environment where healthcare providers consistently practice good hand hygiene.

The WHO team purposely designed the research agenda to be global and flexible. The agenda is meant to be adaptive, not prescription to meet the specific needs of healthcare institutions in each country. An example provided in the report, "while advanced technological interventions are highlighted, their implementation in low-income countries could focus on low-cost, scalable adaptations."[1] The research team further stated, "Adaptation ensures that the agenda remains relevant and actionable across diverse settings."[1]

Strengths and Limitations of the Study

The research team indicated that the strength of the study was using the Delphi process because it involved many international experts from diverse backgrounds and locations worldwide.[1] It also maintained participant anonymity and their feedback, strengthening the credibility of responses to the surveys.[1] A high response rate was achieved in the surveys, guaranteeing that the final consensus on the research agenda for hand hygiene is accepted by communities worldwide.

The study does has some limitations. Some regions were underrepresented, and most participants in the surveys were from high-income countries. The research team stated this may have introduced bias, as research priorities by participants from high-income countries may not align with the needs of healthcare providers and administrators in low-income countries.[1]

The Delphi process has the inherent risk of overlooking certain research areas because of the subjectivity of the participant's opinions.[1] This can result in important research areas being overlooked or underemphasized.

Another potential limitation is the high level of agreement regarding the research priorities among the participants, which may have challenged the team to rank the research priorities effectively.[1] Lastly, the personal biases of participants may have influenced their choices when completing the surveys.[1]

However, the prioritized research agenda of 178 items for hand hygiene in healthcare is the only existing comprehensive guide that funding bodies, healthcare organizations, healthcare providers, policymakers, and researchers can use to contribute to the overall efforts toward infection prevention and control.

Definitions

Iterative process: Cyclical process of refining a project where steps are repeated as opposed to a linear process where each step happens only once, such as re-evaluating items in a research project in which a consensus had not been reached.[2]

Meta-review: Type of study that analyzes and summarizes the findings of other publications. Used to address research questions where multiple studies have been completed on the same subject. The researcher is searching for common themes, discrepancies, and trends.[3]

Modified Delphi Process: Process designed to assist a group of experts to reach consensus on a particular topic. It is a combination of in-depth discussions and anonymous, iterative surveys determine research priorities.[4]

Multiphase approach: Refers to a strategy that involves multiple stages or steps in a research project. Used for large, intricate projects by dividing them into smaller, more manageable stages, allowing the project to be better organized so each stage can be specifically focused on. It is often used for complex research projects that require the collective intelligence of the group.[5]

References

1. Allegranzi B, Tartari E, Kilpatrick C. WHO global research agenda for hand hygiene improvement in health care: a Delphi consensus study. *Infect Control Hosp Epidemiol*. 2025; 1-16. doi: 10.1017/ice.2025.32
2. What is an iterative process? Definition and stages. Chisel glossary. August 10, 2023. Accessed April 18, 2025. https://chisellabs.com/glossary/what-is-an-iterative-process/#:~:text=Iterative%20Process%20Definition:,improvements%20and%20refinements%20over%20time
3. Mellor L. The difference between a systematic review and a meta-analysis. Covidence. n.d. Accessed April 18, 2025. https://www.covidence.org/blog/the-difference-between-a-systematic-review-and-a-meta-analysis/
4. Nasa P, Jain R, Juneja D. Delphi methodology in healthcare research: how to decide its appropriateness. *World J Methodol*. 2021; 11(4): 116-129. doi: 10.5662/wjm.v11.14.116
5. 4.6 multiphase design. Fiveable. 2025. Accessed April 18, 2025. https://fiveable.me/communication-research-methods/unit-4/multiphase-design/study-guide/xoOerNtK7At72O2M

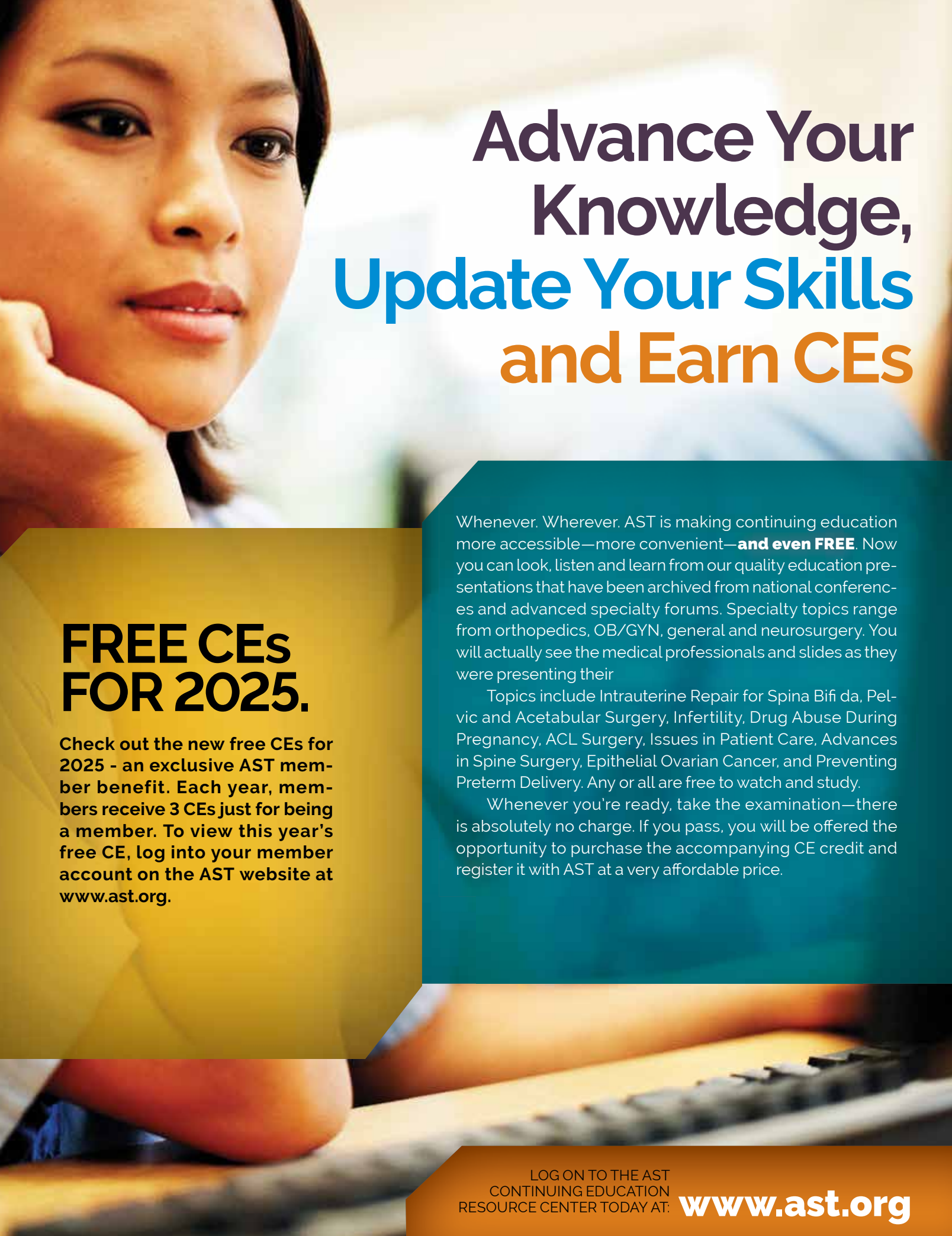
ADVOCATE FOR YOURSELF.

AST
Association of Surgical Technologists

You advocate for your patients – no question. Now it's time to advocate for the critical role you play as a key member of the surgical team and how important your role is to patient safety.

AST developed a toolkit specifically for surgical technologists to use when you're explaining just how crucial is it that certified surgical technologists earn education from an accredited program thus making them eligible to sit for the national certifying exam and earn the distinguished CST credential. Scan the QR code to access documents, AST position statements and other resources you need to keep advocating for the profession.

- **The Workforce Shortage: A Message from AST**
- **CSTs Many Lifesaving Roles**
- **AST Encourages Healthcare Facility Leaders to Support Local, Accredited Surgical Technology Educational Programs**
- **Recommendations for CSTs, Program Directors, and State Assemblies when Addressing On-the-Job Training with a Healthcare Facility**



Advance Your Knowledge, Update Your Skills and Earn CEs

FREE CEs FOR 2025.

Check out the new free CEs for 2025 - an exclusive AST member benefit. Each year, members receive 3 CEs just for being a member. To view this year's free CE, log into your member account on the AST website at www.ast.org.

Whenever. Wherever. AST is making continuing education more accessible—more convenient—**and even FREE**. Now you can look, listen and learn from our quality education presentations that have been archived from national conferences and advanced specialty forums. Specialty topics range from orthopedics, OB/GYN, general and neurosurgery. You will actually see the medical professionals and slides as they were presenting their

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

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

LOG ON TO THE AST CONTINUING EDUCATION RESOURCE CENTER TODAY AT: **www.ast.org**

Thomas E. Starzl, MD: Father of Transplantation

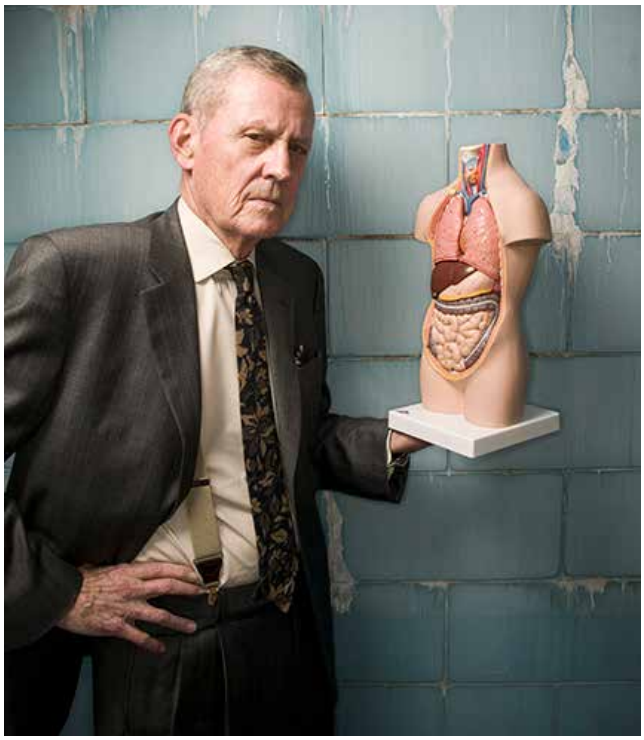
AST Staff

MEDICAL MARVELS

The history of medicine is that what was inconceivable yesterday, and barely achievable today, often becomes routine tomorrow – Dr. Thomas Starzl, 1982.

Dr. Thomas E. Starzl (11 March 1926 – 4 March 2017) is regarded as the "father of transplantation" having successfully performed kidney and liver transplants for over 50 years. Born in LeMars, Iowa, he completed his medical degree and a Ph.D in neurophysiology in 1952 at Northwestern University in Chicago. From 1952 to 1956 he worked as a surgical intern at Johns Hopkins Hospital in Baltimore. In 1956, he left Johns Hopkins Hospital and transferred to the University of Miami, where he began his research on the liver. Two years later, he went back to Chicago to assume a position as associate professor of surgery at Northwestern University, where he continued his liver research funded by a grant by the National Institute of Health and awarded the prestigious Markle Scholarship in 1959.

In 1961, Dr. Starzl moved to the University of Colorado in Denver concurrently serving as Chief of Surgery at the Denver Veterans Administration (VA) Hospital, where he received support to research and make liver transplants a reality. In 1962, prior to his advancements in liver transplantation, Dr. Starlz began a series of kidney transplants resulting in long-term survival because of his pioneering use of the immunosuppressant drug azathioprine and the steroid prednisone that contributed to his future successes in liver transplant surgery. While not the first surgeon to perform a successful kidney transplant, he is credited with the first series of repetitively successful human kidney transplantation.



Dr. Starzl's first liver transplantation took place at the Denver VA Hospital on May 5, 1963. The patient was William G. Grisby, a 48-year old janitor who had cancer affecting approximately a third of his liver, but it had not metastasized. The donor was a 55-year old male who had died of a brain tumor. A week after the procedure, Grisby was able to sit up and feed himself. However, two weeks later, on May 27, he died from pneumonia due to a respiratory infection. But the post-mortem autopsy revealed that the new liver was fully functioning until the end, proving

that a diseased liver could be replaced with a healthy donor liver.

He performed three more liver transplants in 1963, but with the same results where the patients lived up to 23 days eventually dying from postoperative infections. Again, autopsy results confirmed good liver function, but Dr. Starzl was frustrated by the outcomes and placed the liver transplantation program at the Denver VA Hospital on hold for four years. He stated at the time that the primary obstacle was still the lack of effective immunosuppressive therapy. He headed back to the lab to continue his research to work on improving surgical techniques with a focus on refining reconnecting the blood vessels to better perfuse the liver and immunosuppressive drug therapy.

In 1967, anti-lymphocyte globulin was developed that Dr. Starzl added to his immunosuppressive mix of drugs that provided some improvement in patient outcomes. He performed seven successful liver transplants on children in 1967. But he was still frustrated, because the average life span of a liver transplant patient was two and a half years. During the late 1960s and into the 70s, he continued his research into finding more effective methods for treating organ rejection. His answer came when the new drug cyclosporine was developed by Swiss researchers in 1969; the new drug prevented both infection and rejection. He advocated for the use of the drug while at the University of Denver in 1979, but the risk of kidney failure as a side effect of cyclosporine led the university to disallow its use and put a halt to his research trials.

Believing that cyclosporine was a key drug to solving the issues of infection and rejection, Dr. Starzl felt he was at a dead-end with the university. He was recruited by Henry T. Bahson, MD, Chairman of the University of Pittsburgh School of Medicine, to start a new transplantation center and Dr. Starzl transferred to the university in 1981. He continued his trials of cyclosporine eventually establishing its effectiveness in 1982 which led to its commercial use in 1983.

In addition to his contributions to the field of transplant surgery, Dr. Starzl also put in countless hours as an advocate for the surgical specialty. In Washington, D.C., he pushed for drivers to be able to have indicated on their license they are an organ donor and was a consultant to organizing the first national system of organ procurement that led to the United Network for Organ Sharing started in 1987, based on the model at the University of Pittsburgh. Dr. Starzl continued to perform surgery until 1991. It is estimated he was involved in or performed over 10,000 transplant surgeries.

In Washington, D.C.,he pushed for drivers to be able to have indicated on their license they are an organ donor and was a consultant to organizing the first national system of organ procurement that led to the United Network for Organ Sharing started in 1987 ...

Combined with his surgical career and advocacy endeavors, Dr. Starzl was a prolific author, contributing immensely to medical literature. He wrote four books, including his autobiography *The Puzzle People: Memoirs of a Transplant Surgeon*, and over 2,000 medical articles. In 1999, the Institute for Scientific Information indicated him as the most cited scientist in the field of clinical medicine. The book *1,000 Years, 1,000 People: Ranking the Men and Women Who Shaped the Millennium,* ranked him 213th on its list of 1,000 people having the greatest influence on the world in the preceding 1,000 years. Ever the researcher, he continued his research at the University of Pittsburgh after retiring from performing surgery. He promoted the use of FK506, later renamed tacrolimus, that was more effective than cyclosporine. Dr. Starzl had the vision to procure he drug from Japan, pioneered its development, and paved the way for its investigation in multicenter trials that led to its U.S. Food and Drug Administration approval in April 1994.

In 1996, the University of Pittsburgh, of which he had been the Director, was renamed the Thomas E. Starzl Transplantation Institute. He was the recipient of over 200 awards and honors including the American Liver Foundation Distinguished Service Award (1991), Lannelongue International Medal (awarded in 1998 by the French Académie Nationale de Chirurgie (National Academy of Surgery), King Faisal Prize for his contributions to medicine, formerly the King Faisal International Prize (2001), and the National Medal of Science (2004), presented to Dr. Starzl by President George W. Bush at the White House.

References

Nalesnik M, Paris S, Mangan T, et al. The official Dr. Thomas E. Starzl web site. *University Library System, University of Pittsburgh*. 2025. Accessed April 14, 2025. https://www.starzl.pitt.edu/index.html

Feedback by Stakeholders to FDA: Pulse Oximeter Guidance Should Reflect ISO Standard

Stakeholders have communicated to the United States Food and Drug Administration (FDA) they should review and align its draft guidance with the pulse oximeter standard being developed by the International Organization for Standardization (ISO), Geneva, Switzerland, as well as give a rationale for requiring a larger sample size for clinical performance trials.

As previously reported in T*he Surgical Technologist*, June 2025, pulse oximeters have been reported to give inaccurate readings for patients with darker skin tones. The FDA published a draft guidance document on 6 January 2025 that recommends manufacturers provide better data that supports the device's accuracy in measuring oxygen saturation across a range of skin pigmentation, improving labeling requirements, and increasing the number of clinical study participants to a minimum of 150. Several stakeholders have submitted feedback, including the lobby groups Advanced Medical Technology Association (AdvaMed) and Medical Device Manufacturers Association (MDMA), the American Medical Association (AMA), and the healthcare manufacturer Medtronic.

The FDA draft guidance references ISO standards, including ISO 80601-2-61:2017 *Medical electrical equipment – Part 2-61,* 2nd edition, which is currently under revision. However, the stakeholders contend that the FDA's recommendations differ from the referenced ISO standards.

AdvaMed said the FDA should rely on international voluntary standards that allow manufacturers to meet global requirements. "These standards are developed through an open, inclusive process that ensures balanced participation from various stakeholders," said AdvaMed.[1] They continued by adding, "We strongly urge FDA to continue its active participation in the voluntary consensus standardization process for updating ISO 80601-2-61, and to fully adopt the updated version of this standard once it is finalized. Additionally, we urge the FDA to align its recommendations with the upcoming version of the ISO 80601-2-61 (that would replace ISO 80601-2-61:2017) for the premarket performance evaluation of pulse oximeter devices, which was developed with input from international experts, including FDA."[1]

MDMA also has an issue with the FDA guidance not aligning with international standards regarding pulse oximeters. "The draft guidance sets a concerning precedent as both the FDA and the industry have been participating in good faith using data-driven science from a broad stakeholder group to update ISO 80601-2-61 through the international consensus standard process," said MDMA.[2]

MDMA continued by advocating for the FDA to remove the guidance document by saying, "Many of the recommendations provided in the draft guidance are not supported with scientific or statistical rationale. As such we recommend the current guidance be withdrawn so that the FDA can partner with the industry and international stakeholders to standardize new requirements for performance testing of pulse oximeters and fully adopt the text of the future updated version of ISO 80601-2-61."[2]

AdvaMed and MDMA both voiced the concern that the minimum requirement of 150 participants in clinical studies is an arbitrary decision that is not backed by evidence. The ISO standard recommends 24 participants, but the FDA significantly increased its recommendation. AdvaMed and MDMA agree that the "justification for this sample size" in the FDA guidance is lacking.[1,2] Both groups agreed that commercial testing laboratories qualified to conduct clinical testing have indicated they are unable to support large studies for the entire US market that would result in product shortages because of the FDA's recommendations.[1,2] Both commented that this limitation could lead to shortages, particularly affecting vulnerable populations such as neonates.[1,2] AdvaMed added, "We urge FDA

to reconsider its sample size recommendation to ensure regulatory recommendations remain both scientifically and practically feasible."[1]

A major concern of AdvaMed, AMA, and MDMA is the lack of clear labeling recommendations in the FDA guidance document. AdvaMed recommended that the FDA establishes different clinical performance levels for pulse oximeter devices based on how the device will used. They maintain that the guidance has a generic approach to testing requirements for all pulse oximeters, not taking into consideration if the device is used within a health care facility or at home purchased over-the-counter (OTC).[1] MDMA echoed AdvaMed's concerns by saying, "Currently, consumers are at risk as unregulated pulse oximeters available through various online and retail platforms vary widely in quality, accuracy, labeling, and performance."[2] Both groups expressed that labeling ambiguity may lead consumers to use OTC products in non-intended ways or any user, including medical offices, use a pulse oximeter intended for general wellness for a medical purpose. Both groups also recommended the FDA ensure clear labeling on pulse oximeters intended for non-medical purposes, such as those intended for general wellness and aviation.[1,2]

The AMA agreed with the AdvaMed and MDMA statements saying labeling transparency is essential to ensure physicians and patients know the limitations of the pulse oximeter. AMA said, "The AMA recognizes the draft guidance's encouragement of transparency in reporting; however, it does not fully ensure clear disclosure of known performance limitations Patients and providers must be fully informed of potential limitations to ensure accurate interpretation of readings and appropriate clinical decision-making. To ensure full disclosure of device limitations, the FDA should also recommend warning labels on pulse oximeters that have been shown to reproduce bias in results across skin tones, explicitly noting the risk of inaccurate readings."[3]

The AMA asked the FDA to promote awareness and education to ensure health care providers are informed regarding the use of pulse oximeters to avoid making errors in diagnoses and treatment and improve patient outcomes. "Given the FDA's role in advancing medical device safety through *Letters to Health Care Providers*, which communicate essential information about the safe use of medical devices in clinical settings, the AMA encourages the agency to incorporate guidance on pulse oximeter accuracy limitations into these communications," said AMA.[3]

References

1. Advanced Medical Technology Association. Reply: Docket no. FDA-2023-n-4976 for "pulse oximeters for medical purposes – non-clinical and clinical performance testing, labeling and premarket submission recommendations. 2025. https://www.regulations.gov/
2. Medical Device Manufacturers Association. Reply: Docket no. FDA-2023-n-4976 for "pulse oximeters for medical purposes – non-clinical and clinical performance testing, labeling and premarket submission recommendations. 2025. https://www.regulations.gov/
3. Madara JL. Reply: Docket no. FDA-2023-n-4976 for "pulse oximeters for medical purposes – non-clinical and clinical performance testing, labeling and premarket submission recommendations. *American Medical Association*. 2025. https://www.regulations.gov/

AST Medical News > Conference News > ACC 2025

Large Prospective Study Finds Pulse Oximeter Results Continue to be Unreliable

A comparison of pulse oximeter and arterial blood oxygen saturation measurements showed the pulse oximeter measurements varied significantly between patients with darkly pigmented skin compared to light skin pigmentation, according to the EquiOx study presented at the American College of Cardiology Annual Scientific Session (ACC.25), Chicago, IL, March 30, 2025.

Carolyn Hendrickson, MD, Medical Director of the Medical Intensive Care Unit at Zuckerberg San Franciso General Hospital and Associate Professor, University of California, San Francisco, School of Medicine, and colleagues conducted a study to assess the relationship between skin pigmentation and pulse oximeter measurements in critically ill patients through direct measurements. Considered the largest prospective real-world study[a] to investigate pulse oximeter performance, the researchers enrolled 631 patients who received treatment in the intensive care unit at Zuckerberg San Franciso Hospital between 2022 and 2024. Each patient received a minimum of two oxygen saturation readings by both a pulse oximeter and blood gas analysis, both simultaneously. The mean age of patients was 62 years. By demographics, 20% were identified as Hispanic, 20% as Asian, 21% as Black, and 25% as White patients.

Skin pigmentation was measured using both the Monk Skin Tone Scale (see *The Surgical Technologist,* June 2025) and measurements of melanin content with a spectrophotometer. According to the spectrophotometer measurements, 53% of patients were classified as having medium pigment, 33% as having light pigment, and 14% as having dark pigment.

Results showed that pulse oximeter readings underestimated blood oxygen levels. However, the study found that

among the critically ill patients, there were higher rates of overestimated pulse oximeter readings among patients with darker pigmentation. The research team concluded that pulse oximeter performance is inexact.

"Our study shoes that the oximeters have a lot more uncertainty in the critically ill patients than they do in the healthy volunteers wo participate in validation studies," said Dr. Hendrickson who presented the results. "More discussion is needed between manufacturers, regulators, and clinicians to draw attention to times when the oximeter is uncertain," she continued.

Dr. Hendrickson said there is a need for additional large, prospective studies with a larger representation of patients with darker skin pigmentation and an increase in observations in lower oxygen saturation ranges to identify patterns in pulse oximetry bias.

The EquiOx study is funded by the US Food and Drug Administration. The research team acknowledged that the study may have limitations including prospective study design and equipment differences. The team also said future studies would benefit from including patients with stable hypoxemia, pediatric patients, and analyzing patients with even darker skin pigmentation.

[a] *Prospective study is where researchers select a group of participants who meet specific criteria and real-time data is collected over a set period. The study aims to determine the reasons for the outcomes.*

Keeping It Sterile Since 1969

AST
Association of Surgical Technologists

AST
Association of Surgical Technologists

The Association of Surgical Technologists has been fighting for surgical technologists for more than 50 years.

77 Procedures
12 Surgical Specialties

Check out AST's Procedures PowerPoint Surgical Series

Teaching surgical procedures takes time and ingenuity. Images to illustrate the various steps in a procedure are difficult to find but are crucial to students' comprehension and retention. Enter AST's Surgical Procedures PowerPoint Series as it puts teaching procedures at your fingertips!

And in this time of remote learning, AST's Surgical Procedures PowerPoint Series is exactly the tool you need to teach your students. Not only do they present procedural steps, the series includes information such as patient presentation and pathophysiology, case preparation tips, and built-in tools to highlight and engage critical thinking skills.

AST's Procedure PowerPoint Series includes access to **77 procedures spanning 12 surgical specialties** included in the 6th edition of the *Core Curriculum for Surgical Technology.*

Specialties include:

- Cardiothoracic
- General
- Genitourinary
- Gynecological
- Miscellaneous
- Neurosurgery
- Ophthalmological
- Orthopedic
- Otorhinolaryngology
- Peripheral Vascular
- Plastic
- Trauma

The entire AST Procedures PowerPoint Series can be purchased for $1200/year in an annual subscription.

Get started!

Interested in serving on a medical mission?
Check out our Medical Missions page with details and resources, and start planning your pathway to assist those in need.

Visit www.ast.org - About Us - Medical Missions

AST
Association of Surgical Technologists

UPCOMING PROGRAMS

AST MEMBERS: Keep your member profile updated to ensure that you receive the latest news and events from your state. As an AST member you can update your profile by using your login information at ***www.ast.org.*** You may also live chat at ***www.ast.org*** or contact Member Services at ***memserv@ast.org*** or call 1-800-637-7433. AST business hours are Monday-Friday, 8 am - 4:30 pm, MST.

ARKANSAS STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 4, 2025
Title: Harvesting Credits: Reap Knowledge and Refine Skills
Registration: ar.ast.org
Location: Center for Economic Development-University of Arkansas Fort Smith (Bakery District), 70 S 7th St, Suite D, Fort Smith, AR 72901
Contact: Tamara Morgan, 479-414-6720, tamara.morgan@uafs.edu
CE Credits: 6

ALABAMA STATE ASSEMBLY

Program Type: Workshop
Date: September 13, 2025
Title: Sailing into Knowledge
Location: Coastal Community College, 1900 US-31, Bay Minette, AL 36507
Contact: Abigail Jones, 334-389-1250, abigailcarter8614@gmail.com
CE Credits: 6

ARIZONA STATE ASSEMBLY

Program Type: Workshop
Date: September 20, 2025
Title: Advancing Technology in the OR
Registration: azsaofast.org
Location: HonorHealth Network Support Services Center (NSSC), 2500 W Utopia Road, Phoenix, AZ 85027
Contact: Teresa Sochacki, azsa.assembly@gmail.com
CE Credits: 4

Program Type: Workshop
Date: November 15, 2025
Title: Tucson Time!
Registration: azsaofast.org
Location: Pima Medical Institute – Tucson, 2121 N Craycroft Road, Building 1, Tucson, AZ 85712
Contact: Teresa Sochacki, azsa.assembly@gmail.com
CE Credits: 4

CALIFORNIA STATE ASSEMBLY

Program Type: Workshop
Date: July 12, 2025
Title: Northern Exposure III
Registration: ca-saofast.wixsite.com/casa/events/northern-exposure-iii
Location: Stanford Newark Campus, 7600 Gateway Blvd, Newark, CA 94560
Contact: Jessica Ramirez, 650-519-8429, ca.sastateassembly@gmail.com
CE Credits: 6

COLORADO/WYOMING STATE ASSEMBLY

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

Program Type: Annual Meeting/Elections
Date: October 11, 2025
Title: Annual Business Meeting, Elections and Workshop
Location: Intermountain Health Platte Valley Hospital, 1600 Prairie Center Pkwy, Brighton, CO 80601
Contact: Julie Beard, 720-256-5863, jbeard2650@gmail.com
CE Credits: 5

GEORGIA STATE ASSEMBLY

Program Type: Workshop
Date: September 13, 2025
Title: September in the South
Registration: ast-gasa.com/fall-2025-meeting
Location: Southern Regional Technical College, 52 Tech Dr, Tifton, GA 31794
Contact: Susan Feltmann, PO Box 109, Auburn, GA 30011, 678-226-6676, gasawebmaster@gmail.com
CE Credits: 9

Program Type: Annual Meeting/Elections
Date: March 14, 2026
Title: Spring Forward: Advancing Surgical Technology Education
Registration: ast-gasa.com/spring-2026-meeting
Location: Chattahoochee Technical College - North Metro Campus, 5198 Ross Road SE, Acworth, GA 30102
Contact: Erin Baggett, PO Box 109, Auburn, GA 30011, 678-226-6943, gasawebmaster@gmail.com
CE Credits: 7

IDAHO STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 13, 2025
Title: Idaho AST 2025 Annual Business Meeting
Location: St. Luke's Central Plaza, 800 E Park Blvd, Boise, ID 83712
Contact: Dani Hammer, 208-283-3693, daniroesler5@gmail.com
CE Credits: 7

INDIANA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 20, 2025
Title: ISA Fall Conference 2025

Location: Franciscan Education Center, 421 N Emerson Ave, Greenwood, IN, 46143
Contact: Lora Hofmann, PO Box 421673, Indianapolis, IN, 46242, 812-201-9563, lhofmann1@ivytech.edu
CE Credits: 6

IOWA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 18, 2025
Title: IASA Fall Business Meeting and Workshop
Registration: ia.ast.org
Location: Mary Greeley Medical Center, 1111 Duff Ave, Ames, IA 50010
Contact: Tim Danico, 319-540-6008, timothy-danico@uiowa.edu
CE Credits: 7

KANSAS STATE ASSEMBLY

Program Type: Workshop & Webinar (webinar approved only for Kansas State Assembly members)
Date: October 4, 2025
Title: Annual Fall Workshop
Location: WSU Tech, 3821 E Harry St, Wichita, KS 67218
Contact: Melanie Meyer, 785-550-4101, ks.st.assembly@gmail.com
CE Credits: 4

MINNESOTA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 20, 2025
Title: MNSA 2025 Fall Workshop & Annual Business Meeting
Location: LifeSource, 2225 W River Road, Minneapolis, MN 55033
Contact: Lori Molus, PO Box 163, Becker, MN 55308, mnast2016@outlook.com
CE Credits: 6

MISSOURI STATE ASSEMBLY

Program Type: Webinar (approved only for Missouri State Assembly members)
Date: August 2, 2025
Title: Summer School for Surgical Super Stars
Registration: https://buy.stripe.com/8wM03y8G16Nve089AP
Contact: Victoria Thompson, PO Box 214, Ashland, MO 65010, 573-836-0637, missouristateassembly@gmail.com
CE Credits: 3

Program Type: Workshop
Date: September 27, 2025
Title: Fall Workshop - Celebrating National Surgical Technologists Week
Registration: https://subscribepage.io/gaWgUf
Location: Ozarks Healthcare-Willard Hunter Conference Room, 1211 Porter Wagoner Blvd, West Plains, MO 65775
Contact: Victoria Thompson, PO Box 214, Ashland, MO 65010, 573-836-0637, missouristateassembly@gmail.com
CE Credits: 8 Live

MONTANA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 4, 2025
Title: Montana State Assembly of AST Fall Conference and Workshop
Registration: http://mt.ast.org
Location: Intermountain Health St. Vincent Regional Hospital, 1233 N 30th St, Billings, MT 59101
Contact: Megan Ellman, PO Box 1513, Columbia Falls, MT 59912, 406-471-1363, meganrellman@gmail.com
CE Credits: 6

NEW JERSEY STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 20, 2025
Title: 2025 Fall Workshop & Business Meeting
Location: Morristown Memorial Hospital, 100 Madison Ave, Morristown, NJ 07960
Contact: Janee Flynn, PO Box 218, Ridgefield Park, NJ 07660, 201-658-9922, njast3@icloud.com
CE Credits: 6

NEW MEXICO STATE ASSEMBLY

Program Type: Workshop
Date: September 20, 2025
Title: Fall into Surgery Workshop
Registration: nm.ast.org
Location: UNM Domenici Center for Health Sciences Education, MSC09 5100, 1 University of New Mexico, Albuquerque, NM 87131
Contact: Tyler Briggs, PO Box 66496, Albuquerque, NM 87193, 505-366-1847, briggs3.tb@gmail.com
CE Credits: 5

NEW YORK STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 3-5, 2025
Title: 2025 NYAST 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

PENNSYLVANIA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: September 13, 2025
Title: PAAST Fall Conference with Business Meeting and Elections
Location: UPMC West Shore, 1995 Technology Pkwy, Mechanicsburg, PA 17050
Contact: Chris Kapp, 717-856-1278, kappcj@upmc.edu
CE Credits: 5 Live

RHODE ISLAND STATE ASSEMBLY

Program Type: Reformation Meeting/Elections
Date: October 4, 2025
Title: Advancing Technology in Surgery
Location: New England Institute of Technology, 1 New England Tech Blvd, East Greenwich, RI 02818
Contact: Christine Madeira, 401-474-7892, rhodeislandast@gmail.com
CE Credits: 4

SOUTH CAROLINA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: November 1-2, 2025
Title: SCSA Fall Business Meeting and Workshop
Registration: scsaast.org
Location: Southeastern Institute of Manufacturing Technology (SIMT Building), 1951 Pisgah Road, Florence, SC 29501
Contact: Katrina Williams, 843-615-7454, katrinawilliams89@yahoo.com
CE Credits: 12

TENNESSEE STATE ASSEMBLY

Program Type: Workshop
Date: October 4, 2025
Title: Wild Wild West Regional
Location: West Tennessee Healthcare Jackson-Madison, 620 Skyline Dr, Jackson, TN 38301
Contact: Ellen Wood, 1344 Copperstone Lane, Knoxville, TN 37922, 865-283-5901, ellenwoodtnast@gmail.com
CE Credits: 6

Program Type: Workshop Cruise
Date: October 2-5, 2026
Title: CEs at SEA
Location: Carnival Glory, 1492 Charles M. Rowland Dr, Cape Canaveral, FL 32920
Contact: Ellen Wood, 1344 Copperstone Lane, Knoxville, TN 37922, 865-283-5901, ellenwoodtnast@gmail.com
CE Credits: 6

TEXAS STATE ASSEMBLY

Program Type: Workshop
Date: September 27, 2025
Title: Houston Workshop
Location: Memorial Hermann Texas Medical Center, 6411 Fannin St, Houston, TX 77030
Contact: Joy Taylor, 409-882-4761, joyadalee@gmail.com
CE Credits: 8

VIRGINIA STATE ASSEMBLY

Program Type: Workshop
Date: August 9, 2025
Title: VCSA Summer Mini CE Workshop
Location: Winchester Medical Center, 1840 Amherst St, Winchester, VA 22601
Contact: Sarah Mercer, 540-325-9396, virginiastateassemblyofast@gmail.com
CE Credits: 4

Program Type: Workshop
Date: October 25, 2025
Title: VCSA Fall CE Workshop - All About Pediatrics
Location: Children's Hospital of the King Daughters- Children's Pavilion, 401 Gresham Dr, Norfolk, VA 23507
Contact: Rebecca Schultheis, 757-202-9962, virginiastateassemblyofast@gmail.com
CE Credits: 7

WEST VIRGINIA STATE ASSEMBLY

Program Type: Annual Meeting/Elections
Date: October 18, 2025
Title: 2025 West Virginia AST Fall Workshop and Business Meeting
Registration: https://lp.constantcontactpages.com/ev/reg/2fhdkcv
Location: WVU Reynolds Memorial Hospital, 800 Wheeling Ave, Glen Dale, WV 26038
Contact: Erin Carr, 304-214-8930, ecarr@wvncc.edu
CE Credits: 6

STATE ASSEMBLY ANNUAL BUSINESS MEETINGS

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

ARKANSAS
Fort Smith
October 4, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

COLORADO/WYOMING
Brighton
October 11, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

GEORGIA
Acworth
March 14, 2026
Annual Meeting
2026 BOD Elections
& 2026 Delegate
Elections

IDAHO
Boise
September 13, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

INDIANA
Greenwood
September 20, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

IOWA
Ames
October 18, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

MINNESOTA
Minneapolis
September 20, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

MONTANA
Billings
October 4, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

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

NEW YORK
Albany
October 3-5, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

PENNSYLVANIA
Mechanicsburg
September 13, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

RHODE ISLAND
East Greenwich
October 4, 2025
Reformation Meeting
& Elections
2025 BOD Elections
& 2026 Delegate
Elections

SOUTH CAROLINA
Florence
November 1-2, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

WEST VIRGINIA
Glen Dale
October 18, 2025
Annual Meeting
2025 BOD Elections
& 2026 Delegate
Elections

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

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

JOIN AST

Now it pays even more to be a member of AST—especially for students.

Students - Your savings begin right away when you apply for the special student membership rate, $45 (a $35 savings). **Save** with the member discounted price of the examination study guide.

Enjoy the benefits of membership in the premier national professional organization for surgical technologists. Join online at *www.ast.org;* by phone at 800-637-7433; or by mail

Benefits include:

- ✔ scholarship opportunities
- ✔ access to the most up-to-date information about the profession
- ✔ insurance discounts
- ✔ education and employment opportunities
- ✔ access to resources that connects you to nearly 60,000 other surgical technology professionals
- ✔ student rate discounts

Apply

Become a member in minutes by completing the Join Form online at www.ast.org

CONTINUING EDUCATION

Choose any nine articles and we will be happy to send them out free of charge. Return the answer sheets provided with the appropriate processing fee—only $6 per credit (not per test) for members, $10 per credit (not per test) for nonmembers. AST automatically records the returned CE credits for AST members.

Parotidectomy with Facial Nerve Dissection 1 CE

Radiostereometric Analysis in Orthopaedic Surgery 1 CE

The Modern-Day Caesarean Section 1.5 CEs

The Economic Argument for Using Safety Scalpels 2 CEs

Emergency Department Visits and the Public Health 2 CEs

Staged Rapid Source Control Laparotomy in Emergency General Surgery 1 CE

Functional Endoscopic Sinus Surgery with Image-Guided Navigation 1 CE

PJACT: Treating Articular Cartilage Defects 1 CE

AST has even more continuing education opportunities available in print and online. We will be adding more continuing education credits on a continual basis, and the lists that are published in the Journal will be rotating on a quarterly basis so that we can provide more CE credits in a range of specialties.

Other articles, as well as archived conference and forum presentations, are easily accessible on the AST Web site, http://ceonline.ast.org. And there are three free CE opportunities for AST members to earn continuing education credits online—be sure to check them out.

To order please visit: **http://ceonline.ast.org/articles/index.htm**
or contact Member Services at **memserv@ast.org**
or call Member Services at 800-637-7433.

Returned CE tests cost:
Members $6 per CE
Nonmembers $10 per CE, plus $200 Nonmember Fee

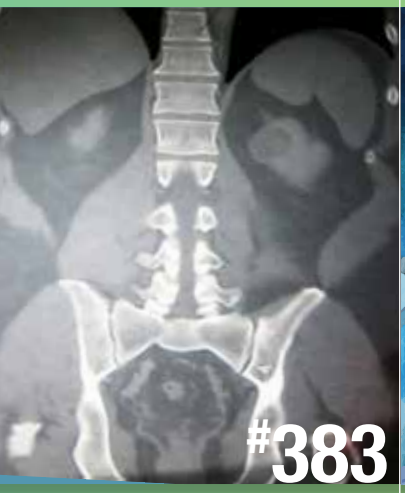
OPPORTUNITIES

Surgical Rib Fixation 1 CE

Butterfly Graft in Functional Rhinoplasty 1 CE

Micromotion at the Tibial Plateau in Total Knee Arthroplasty 1.5 CEs

Disc Battery Ingestion in Pediatric Patients



Partial Nephrectomy 2 CEs

Emotional Intelligence and the Surgical Technologist 2.5 CEs

Cervical Arthroplasty 1.5 CE

Treating Glioblastoma Multiforme 1 CE

ORDER FORM

❑ Member ❑ Nonmember

Membership No. _____

Name _____

Address _____

City _____ State _____ ZIP _____

Telephone _____

Test No.	Title (please print)	Test No.	Title (please print)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____		

SAVE THE DATE

May 31 - June 2, 2026

AST Surgical Technology Conference

BIG IDEAS, FLYING FISH, AND SKY-HIGH CONNECTIONS IN SEATTLE!

Event details and more information coming soon. We can't wait for you to join us in 2026!

AST
Association of Surgical Technologists