Contents

Interview with Dr. Geoffrey Krampitz 04

Primum Non Nocere: Surgeons and the Politics of Firearm Trauma 08

General Surgery 101: Nissen Fundoplication 10

Interview with Dr. Dawn Salvatore 14

The Utility of Surgical Simulation in Student Education 16

Bedside to Bench: Basic Science Research During General Surgery Residency 18

Longevity in Surgery: A Conversation with Two Temple Surgeons About How They Continually Find Joy in Their Careers 20

Surgery Myths and Facts 22

Gibbon Surgical Society 24

John H. Gibbon Jr., MD 25

Editorial Board and Contributors 26

Also in this issue...

Resources for Succeeding in Surgery
Podcasts, apps, and twitter handles to help you stay up to date, learn new techniques, and gain insight into the world of surgery.

Keeping up with the literature
Insight into picking the best journals to read and setting up weekly updates to make staying on top of new advancements easier.
Clockwise from top left: Gibbon Surgical Society (GSS) members attend the 14th annual Pancreatic Cancer and Related Diseases Symposium on November 16, 2019; The surgery interest table at the 2019 specialties fair at SKMC; Dr. Benjamin Philips speaks to a group of first year students about being a surgeon; GSS members participate in the annual PanCAN PurpleStride on November 2, 2019; The 2019-2020 GSS executive board; Dr. Vakhtang Tchantchaleishvili speaks to a group of students about cardiac surgery.
What made you interested in pursuing surgery?
My interest in medicine and surgery, in particular, started when I was very young. I am originally from Costa Rica. I actually lived on a coffee plantation in Guanacaste, Costa Rica, where I had a picturesque life living in the jungles and rainforest. My dad was an American who moved to Costa Rica, and he was interested in oil exploration and mineral exploration. He had businesses all throughout South America, Latin America, and the world. He had gold mines around the world, and one of them was in Costa Rica. He had sold [this] gold mine to another person, who was also an explant to Costa Rica, and that person defaulted on the payments. My dad was in the process of reclaiming the gold mine equipment, and part of that involved an inspection. My mom went [to the mine] as did my dad, and when they arrived, they were confronted by the person [he sold it to] and his girlfriend, who then murdered my mother and father. Their death provided a huge impetus for me to evaluate medicine, surgery, and, initially, trauma surgery, as a calling of mine.

In many ways I wanted to prevent others from enduring the same loss and hardships that resulted from [my] loss. I initially wanted to do trauma surgery because it had that direct connection to what had happened to me, my siblings, and my family. Also, growing up I didn’t have family members in medicine or in surgery, so the closest contact I had through college and then as a pre-medical student applying to medical school were the shadowing opportunities that I had in the emergency room, which led to shadowing opportunities in the operating room with the trauma surgeons. So, to me it felt very natural, not only from an inspirational perspective, but also from an accessibility perspective, too.

During medical school at Stanford you founded the Medical Mentorship Program and worked with the Latino Medical Students Association. Could you speak more on those experiences?
I mentioned earlier that I didn’t have any direct family ties to medicine. Coming initially from a very disadvantaged background, I think mentorship was hugely important. At Johns Hopkins, making it into and throughout graduate school, and getting into medical school and during medical school, mentors played a huge role [for me]. At every point along the way, I think mentorship has been the foundation of my success. So, I certainly recognize that, and realize that there are a lot of really disadvantaged folks going through similar struggles to those that I went through. I just wanted to help in some way to alleviate that. At least, provide a path. I think when you’re climbing up the ladder you really want to be able to reach down and help the next person up the rung. So, that’s what I wanted to do, and that was the inspiration for founding [the Medical Mentorship Program].

When I got to Stanford, there were a lot of individual mentoring programs, but nothing really cohesive with a unifying message. What I did was try and organize some
of those already existing programs and also expand that to help a lot of people, [which] was certainly a huge team effort. [The program] was able to reach a lot of the community colleges and other colleges in the Bay Area to provide one-on-one mentorship with Stanford medical students, develop workshops for improving applications, facilitate bridging that gap, and try to get more disadvantaged students to apply to and get into medical school.

Are you still connected with the Medical Mentorship Program? Have you been able to find ways to incorporate advocacy as you’ve progressed through your medical career?

Yeah! I still have ties to that program, which is still going on at Stanford. It’s essentially part of a larger organization within Stanford. I think one of the things that I wanted to do was not build something that was a one-off that was going to die as soon as I left. Part of what I wanted to do was to build a lasting legacy, so to speak, where that could continue on. I still go back; a couple of years ago I went back and gave a talk to the new crop of mentees, and I think that certainly recharged my batteries, so to speak, [getting] to reconnect with the real people that I wanted to help along the way.

You worked in Silicon Valley before starting medical school. What did you do there, and what did you learn there that informs your medical practice today?

I went to Johns Hopkins for college, and I majored in biomedical engineering, so I had a lot of computational background. When I finished college, I wanted to take a year off between college and medical school. At this point, it was the late nineties, and it was the height of the dot-com boom, and I really wanted to go out to San Francisco and see what the excitement was about. I moved out there and initially worked for a consulting company. Then, as a result of that opportunity, I got involved in a couple of internet startup companies in Silicon Valley. What was intended to be a one-year break while I applied to medical school turned into a six-year hiatus where I became immersed in startup culture and what it takes to build a startup company and wearing many hats. You train as an engineer, but you’re also in many ways a businessperson as well, and you learn a lot of those skills. While working with clients - you’re representing the company. You’re not only doing the technical aspects, but also a lot of the other soft skills that come with building a start-up company. Those were extremely helpful skills to have regardless of what you go into.

After working in Silicon Valley, you pursued a MSE in biomedical science focusing on stem cell research. How did you decide to pursue that degree, and how did it influence your decision to go into cancer research?

At the end of six years, the companies were doing very well, and they were sold to larger entities. At the end of that, I decided that six years was long enough to put my real calling on hold. So, I went back and worked in a lab at UCSF, where I did my Master’s thesis, and really got back into the research world, specifically in stem cells. That’s really what started my interest in stem cells - working in Dr. Susan Fischer’s stem cell lab at UCSF. After that point, I went to medical school at Stanford and continued my real love for research while I was there. I did a Howard Hughes fellowship year during medical school there and worked on VEGF signaling in heart valve development, and that led to looking at VEGF signaling in adventitial stem cells. [I looked at] tissue-specific stem cells in the vasculature and how they respond to vessel injury and contribute to neo-intimal hyperplasia - which is a big problem with cardiac stents and vascular stents in general - and tried to figure out ways to mitigate that. That led to a couple of other research fellowships and foundational fellowships that really helped propel my research work.

What made you interested specifically in surgical oncology and hepatopancreaticobiliary cancer?

When I was in medical school, I developed another mentor-mentee relationship with a surgical oncologist, Dr. Jeff Norton, who is a legend in his own right. He has one of those larger-than-life personalities, and it’s very difficult not to become engrossed by his personality and his energy, drive, and commitment to patients. So, while I was rotating on his service, I really started to evaluate what I wanted to do and what aligned with my own research interests that I had developed over time, and I felt that surgical oncology really fit the bill. It aligned my interests in stem cells, cancer stem cells, and immunotherapies with my love for doing complex operations and helping people. Additionally, being inspired by someone of that caliber drove me to do surgical oncology, and in particular, pancreas and pancreaticobiliary surgery.

Your current research interest is in programmed cell removal and immune-mediated signaling. What got you interested in this specific area of oncology?

I stayed on at Stanford for my residency, and during residency I worked with Dr. Jeff Norton and Dr. Irv Weissman. I took some time off during my research years in residency to get a PhD in stem cell biology and regenerative medicine in Dr. Weissman’s lab. One of the projects I did was looking at cancer stem cells...
within pancreatic neuroendocrine tumors, which hadn’t been discovered yet. Part of that was driven by my own interests in pancreatic neuroendocrine tumors and Dr. Norton’s expertise in that area as well, but we also had a very prominent member of the community that was afflicted by a pancreatic neuroendocrine tumor, and that was Steve Jobs. He was one of the big reasons why I took on that project as well, trying to figure out not only what these tumorigenic cells were and how they behaved, but also how we could target them and potentially find additional therapeutic avenues for this type of tumor.

That was one of my main objectives during my PhD and it all tied into this molecule that Irv Weisman discovered to be a “don’t-eat-me” signal. His lab identified CD47 as a cell surface molecule that was initially looked at as a cancer stem cell marker. What he quickly found was that it was expressed not just in cancers with a stem cell component but also in all the other cancer cells that we tested. CD47 acts as the “don’t-eat-me” signal, so it interacts with SIRP receptors on macrophages and basically inactivates macrophages from performing phagocytosis. This is one of the ways cancer cells are able to evade immune surveillance, and by blocking CD47 signaling, we were able to essentially re-awaken the immune system, uncloak the cancers, and allow for immune destruction of cancer cells. We demonstrated this in vitro and in vivo with animal models and across many different cancer types. This combined work by many talented people in Dr. Weisman’s lab demonstrated the preclinical evidence for the efficacy of CD47 therapies, which lead to the creation of Irv’s company Forty Seven, Inc. [The company] is now carrying out the clinical trials with animal models and across these new discoveries - taking a discovery from inception fully recognize that developing these drugs and making them available to patients will take time. How do you see cancer treatments and surgical oncology changing in the coming decades?

I’ve always seen surgical intervention as being the cornerstone for cancer treatment. I think there’s always going to be a time where surgical intervention is warranted. The indications may become more specific, but I think taking out the primary tumor is always going to be important. I think that a lot of targeted therapies that are being discovered and, in particular, the immunotherapies and checkpoint inhibitors, of which CD47 is one, are going to play a larger and larger role. Especially as we figure out how cancers protect themselves from such powerful therapies, we’ll be able to do combination therapies that really allow us to push the envelope and - hopefully, at one point - make each individual cancer a more manageable disease. My focus is on pancreatic cancer, which is one of the most challenging cancers. I’d like to be part of what I think is going to be a real revolution in the next decade or two in how we treat pancreas cancer.

How do you see cancer treatments and surgical oncology changing in the coming decades?

I’ve always seen surgical intervention as being the cornerstone for cancer treatment. I think there’s always going to be a time where surgical intervention is warranted. The indications may become more specific, but I think taking out the primary tumor is always going to be important. I think that a lot of targeted therapies that are being discovered and, in particular, the immunotherapies and checkpoint inhibitors, of which CD47 is one, are going to play a larger and larger role. Especially as we figure out how cancers protect themselves from such powerful therapies, we’ll be able to do combination therapies that really allow us to push the envelope and - hopefully, at one point - make each individual cancer a more manageable disease. My focus is on pancreatic cancer, which is one of the most challenging cancers. I’d like to be part of what I think is going to be a real revolution in the next decade or two in how we treat pancreas cancer.

What are some barriers that you see to people accessing these advancements in cancer treatment? What are your thoughts on how to help overcome these barriers?

I think a lot of that really comes down to health policy. I fully recognize that developing these drugs and making these new discoveries - taking a discovery from inception
to putting it in the human - takes an enormous amount of effort and an enormous investment. So, I fully understand the more practical aspect of drug development and discovery and the need for investment in research and development. But then, you make a point about this being accessible to people, which I think is multifaceted and very complicated. Otherwise it would already be solved.

I think it goes hand-in-hand with industry, which has recognized that in a lot of ways. A lot of pharmaceutical companies have outreach measures to make their drugs more available to a broader portion of the population, especially the uninsured or underinsured. There’s also a policy component, whether we talk about how we restructure our healthcare system or our insurance system in such a way that more people have access to coverage. So, I think it will require cooperation from the pharmaceutical industry, the insurance industry, healthcare providers, and government. There’s the corporate level on the drug development and pharmaceutical side, the insurance industry and making sure that reforms are made there - [so] more people have more access and better quality health insurance - and then the governmental side, essentially facilitating. I think the government works best as a facilitator of these different processes.

Now that you're a practicing surgeon and a researcher, could you discuss work-life balance and how it's changed throughout your career? What advice do you have for medical students interested in surgery?

Yeah! I think that’s an interesting topic. I kind of view it as a triangle. You have your clinical aspects - taking care of patients and operating - and that’s certainly paramount because it’s how you affect your patients individually and their families. You have this tremendous impact on those people every day, and it’s extremely rewarding. That’s one of the things that fuels surgeons: to be able to make that difference for that particular person and [give them] the chance to heal. Everything that we’ve all essentially aspired to be as doctors - that’s what that opportunity allows. Another apex of that triangle is the research component, and that’s how we touch the lives of the broader population. The discoveries you make in that area are potentially the ones that are going to impact the most people. So, that has obvious importance to it. And the other side of that triangle is family. I think those are the triumvirate of success or happiness, and I think that you have to figure out a way to nurture all of those areas, and it’s not easy. At times, one will suffer at the expense of the others, but you have to figure out a way to make that one area not be neglected for too long. That is where the balance comes in.

I’m not really sure “work-life balance” is the right term. I think you’re always in a state of imbalance, and you just have to find a way where that imbalance is somewhat shared. I think at times family life is going to suffer a little bit, but you have to figure out a way to recharge those batteries, to replenish that, and to re-water that tree. And, similarly, I think there will be times where you’ll cut back on some of the patient work that you’ll do - or, sometimes, the research aspects - to make room for the other of the three pieces. I think the idea that you can have all things at all times is probably a disservice to people that are hearing that advice and going into medical school thinking that’s possible.

I don’t mean to suggest that it’s not a worthwhile endeavor. I think that it’s one that you have to go into with eyes wide open. It all becomes about time management. I think the more that you do, the more focused you become on the things that you want to focus on, and the things that you previously engaged in but weren’t really at the core of who you are or what you really enjoy go by the wayside. And I think that’s good in a lot of ways, because it really allows you to focus on the things that are important to you.

What do you like to do outside of work?

I used to be a competitive weight-lifter, and I even won a national championship in powerlifting. I still enjoy lifting from time to time, but I no longer compete. Now the bulk of my time is spent with patients, in the lab, or with my family. I have a daughter and a baby boy, and they keep me and my wife pretty busy at home.
In April 2015, the American Academy of Family Physicians (AAFP), American Academy of Pediatrics (AAP), American College of Emergency Physicians (ACEP), American Congress of Obstetricians and Gynecologists (ACOG), American College of Physicians (ACP), American College of Surgeons (ACS), American Psychiatric Association (APA), the American Public Health Association (APHA), and the American Bar Association (ABA) published a joint statement advocating a public health approach to curbing the epidemic of firearm violence. According to a study conducted by the American Public Health Association, there have been 1,678 reported mass shootings since 2015, resulting in 1,921 deaths and 7,169 injuries. This is an alarming statistic, as firearm violence is responsible for approximately 1% of firearm deaths in the United States. Studies have shown that Americans are significantly more likely to die from firearm violence, both through homicide and suicide, than people in other industrialized nations. A World Health Organization (WHO) study compared the United States to 22 other nations and found that Americans are ten times more likely to die from a firearm, eight times more likely to commit suicide by firearm, and 25 times more likely to be murdered by a firearm. Each day, approximately 100,000 Americans are shot, with 34% of those deaths occurring during a mass shooting. For those keeping score, the second highest annual firearm homicide rate is in Switzerland, at 7.7 per one million. As if this were not troubling enough, the victims of firearm violence are predominantly young Americans. The national emergency department presentation rate for gunshot wounds (GSWs) is as high as 20.16 per 100,000 for children under 19 years old, and 90% of children under 14 years old killed by firearms each year are American.

These horrifying statistics are largely a result of skyrocketing levels of firearm ownership and loose laws. Current estimates suggest there are approximately 120.5 firearms per 100 residents, dwarfing the next highest nation of Yemen, which registers 52.8 per 100. In 2017, the United States contributed to 4% of the world’s population and 46% of the world’s firearm ownership. Exacerbating the issue is the current state of firearm regulations. Currently, all 50 states and the District of Columbia (D.C.) permit concealed carry and only 35 states require a permit to do so. Moreover, only 21 states and D.C. require a criminal background check from unlicensed dealers. 17 states and D.C. require records of all sales, 15 states and D.C. require background checks for the sale of all firearms, and only 9 states and D.C. require a waiting period to purchase a firearm.

Together, this data paints the picture of a firearm-friendly, people-unfriendly state. Until recently, the debate surrounding common sense gun reform was limited mainly to the media. However, to chain this debate to the modern media – both news and social – is to banish an issue of great importance to the realm of sophists. Common sense gun reform requires a debate based in evidence and data, not the disheartening sinusoid of attention and neglect that occurs in the news media each time there is another mass shooting. This need for an informed debate had been greatly hindered by the Dickey Amendment, effectively prohibiting government funded research into gun violence. The 2018 Omnibus package slightly lessened the burden of the Dickey Amendment, affording the Centers for Disease Control and Prevention (CDC) the right to conduct research on gun violence, just not specifically to advocate for reform. Small as this change may be, it does open the door for more research and data collection on the true impact of firearms.

While the CDC is shackled in its capacity to push for common sense gun reform, it falls on the rest of the healthcare field to pick up the slack. Physicians and surgeons are increasingly doing just that. This was perfectly demonstrated in November 2018 when the ACP published a policy paper addressing the public health crisis created by firearm violence, prompting a tweet from the National Rifle Association (NRA) telling doctors to “stay in their lane.” The backlash from medical professionals was immediate and overwhelming, with
doctors flooding social media with heart-wrenching stories and harrowing photos of blood-soaked scrubs that clearly demonstrated, as Dr. Judy Melinek phrased it, “This [firearm violence] isn’t just my lane. It’s my [expletive] highway.”\(^\text{10}\) While individual physicians take to social media, medical professional organizations have been publishing more policy statements and position papers in the past few years. Statements from the ACS, ACEP, and American Association for the Surgery of Trauma (AAST) have all argued that it is incumbent upon those in medicine to advocate for common sense gun reform because good, patient-centered healthcare is as much about injury prevention as it is about injury care.\(^\text{11-13}\)

These statements are supported by research articles from various medical organizations that have demonstrated lower rates of firearm violence and associated deaths in states with stronger firearm laws.\(^\text{3,4,14}\) Data consistently shows that the best outcomes for victims of firearm violence are achieved by preventing the violence in the first place.

What does all of this mean for us as medical students? It means that as the next generation of healthcare providers, we owe it to our patients to do more than just suture an unending series of GSWs. The crisis of firearm violence in America continues to worsen and the call to action cannot be ignored. If we are to make a real impact, we must be just as skilled policy makers as proceduralists. We must wield the pen as well as we wield the scalpel. All the clinical knowledge and surgical skills in the world will make no difference if we do not reduce the number of firearm injuries. The skillset we need is policy analysis and lobbying, which can only be developed through political activism and engagement, not more practice questions and Online MedEd.

As Dr. Martin Croce said in his 2018 AAST Presidential Address, our “primary goal is to reduce the number of bullet holes in people.” Until we do that, we may win some battles, but we will lose the war on firearm violence.

References


**Liked this article? More like this in “Evanescent”**

Evanescent is a literary journal published by the Jefferson Center for Injury Research & Prevention and is dedicated to stories of injury and all its victims. Evanescent seeks submissions of high-quality writing on themes related to injury, including short nonfiction, fiction, and poetry. Submissions are welcomed from all members of the Jefferson community. Please send your submissions to Evanescent@jefferson.edu. All submissions will be reviewed by an editorial committee of Jefferson faculty members and students.
SYNOPSIS

The Nissen fundoplication, routinely performed laparoscopically, is a procedure indicated to treat gastroesophageal reflux disease (GERD) and hiatal hernias. In short, the surgeon intends to buttress the lower esophageal sphincter (LES) in order to stop gastric reflux into the esophagus. This will decrease the “heartburn” symptoms that the patient feels and lower the chance of developing dysplasia of the esophageal mucosa. In order to tighten the LES, the gastric fundus is wrapped around the base of the esophagus and sutured in place. The extra tissue that this maneuver adds to the lower esophagus also prevents the stomach from sliding upward through the diaphragm hiatus.

INDICATIONS

In patients with type I-IV paraesophageal hiatal hernias, Nissen fundoplication is the first line procedure. In patients with refractory GERD, it is usually done after medical treatment has failed. Symptoms of refractory GERD can include frequent heartburn, severe esophagitis, esophageal ulceration, recurrent strictures, and esophageal dysplasia (Barrett’s esophagus). To qualify for this surgery, patients must have at least some preserved motility and a normal length esophagus. If motility is very diminished, partial fundoplication should be considered.

MECHANISM OF RELIEF

Fundus reinforcement of the lower esophageal sphincter has two effects. Stomach wall contraction helps close the sphincter to reduce acid reflux. The additional mass of the gastric wrap reduces the risk of recurrent hiatal hernia by producing a plug less prone to slipping through the opening of the diaphragm.

DIAGNOSTIC STUDIES

Esophagogastroduodenoscopy (EGD) is mandatory. Other studies include esophageal manometry, barium swallow, and pH monitoring.

In a barium swallow (pictured), the patient is asked to swallow a radio-opaque dye. At the time the patient is swallowing, an x-ray is taken, so the inside of the esophagus can be visualized. This is useful for diagnosing many esophageal pathologies. In the case of a sliding hiatal hernia, the gastroesophageal junction (GEJ) can be visualized above the diaphragmatic constriction. In a patient without a sliding hiatal hernia, the GEJ and diaphragmatic constriction would be in the same location.
THE OPERATION

1. PORT PLACEMENT

The patient is induced under general anesthesia and secured to the table. The patient then is placed in reverse Trendelenburg position with the hips flexed. The surgeon uses an insufflator to inflate the abdomen with carbon dioxide, which helps to visualize the surgical field. A periumbilical incision is then made to establish the camera port. The other 4 ports are then placed to face toward the GEJ. Depending on the level of expertise of the medical student, the student may “drive” (hold and position) the camera during the case.

2. MOBILIZING THE FUNDUS

First, the surgeon must free the fundus of the stomach in order to provide the tissue that will ultimately be wrapped around the esophagus. In order to do this the surgeon must divide the gastroplenic ligament, which contains the short gastric arteries. In order to visualize the anterior stomach, a liver retractor is used to retract the left lobe of the liver. The gastroplenic ligament is identified. Using a grasper to hold the fundus of the stomach, and another grasper to provide counter-tension, the ligament is divided using a cautery device. The division of the gastroplenic ligament and any other lateral attachments mobilizes the fundus for easy handling.

3. DISSECTING THE HIATUS

Dissecting the hiatus allows the surgeon to assess any potential hernia and expose the GEJ. At the left crus, the left gastrophrenic ligament is opened to expose where the left crus meets the right crus. After retracting the stomach laterally, the lesser sac is split to reveal the right crus.

Care is taken to avoid injuring the left gastric artery, a possible replaced hepatic artery, and the anteroposterior branches of the vagus nerve.
4. MOBILIZING THE FAT PAD AND ASSESSING ESOPHAGEAL LENGTH

After dissecting the hiatus, the surgeon will be able to identify a fat pad on the anterior esophagus. The fat pad reliably demarcates the GEJ. Using a grasper, the surgeon can confirm the location of the GEJ by identifying an oblique border where the longitudinal esophageal muscle meets gastric sling muscle (they run perpendicular to each other). Mobilizing the fat pad is a highly important step; failure to accurately isolate the GEJ often results in a mis-estimation of the GEJ location and a consequently weaker fundoplication.

Gastric wrapping around a short esophagus may place extra tension on the hiatus and can reopen the hernia. Furthermore, leaving extra tension on the esophagus can be a cause for a “slipped Nissen” where the fundus is wrapped around the cardia of the stomach, rather than around the esophagus. If the patient has a short esophagus (incidence 10%), the surgeon can perform a Collis gastroplasty to lengthen it.

5. HIATAL CLOSURE

The right and left crura are reapproximated with 3-5 sutures, with the last suture placed but not yet knotted. The surgeon introduces a bougie, a thin cylindrical tool used to explore and widen tubular organs, roughly 10 cm below the GEJ to gauge the tightness of the hiatal closure. After ensuring a snug, non-constricted fit, the surgeon retracts the bougie, then adjusts and ties the last suture.

6. FASHIONING AND SECURING THE WRAP

One grasper grips the most apical region of the greater curvature, pulling it underneath the esophagus and medially toward the right side. Another grasper grips the lateral stomach for stability and in preparation for the wrap. The bougie is reintroduced and the fundus is “shoeshined” around the esophagus to confirm the right tension and alignment of the wrap.

7. SECURING THE FUNDOPLICATION AND CLOSING

The first two stitches to secure the fundus travel through all three tissues of stomach-esophagus-stomach. The last stitch at the base secures stomach-stomach tissue. When stitching, care is taken to penetrate the serosa and muscularis while avoiding the mucosa, since mucosal perforation can cause leakage and ensuing necrosis if knotted too tightly. The fascia and skin are then closed. The student will likely help close the port sites.
**Dysphagia**

**Causes**
- Overtightened hiatal closure
- Long fundoplication wrap
- Slipped wrap

**Prevention**
- Calibrate with a bougie
- Measure the wrap
- Preoperative manometry

---

**Perforation**

**Types**
- Esophageal perforation
- Gastric perforation

**Prevention**
- Carefully identify and avoid esophagus
- Avoid aggressive traction and assess stomach before closure

---

**Splenectomy**

**Cause**
- Iatrogenic trauma

**Prevention**
- Remove the splenic attachments to the stomach early
- Use gentle traction when taking the short gastric

---

**POTENTIAL SURGICAL COMPLICATIONS**

**Transoral incisionless fundoplication (TIF):** the endoscopic procedure allows the operator to staple the stomach to the esophagus through the mouth rather than through abdominal incisions.

**LINX magnetic sphincter device:** introduced in 2013, the LINX consists of a ring of magnets that encircle the outer wall of the lower esophageal sphincter and reinforce the GEJ. A food bolus can separate the components of the magnetic ring, and the reattraction of the ring components after a meal prevents acid reflux.

---

**REFERENCES AND FIGURE SOURCES**


February 2020 I 13
A medical student’s path to surgery is notoriously long and arduous. Traditionally, students who are interested in the field begin to prepare their qualifications from day one, especially given the competitive nature of acceptance into surgical programs. For students who develop an interest in surgery during their later years of medical school, it can be a daunting task to pursue a track in which they already feel behind. Often times, these students are discouraged from applying to surgical residencies, worrying that their non-traditional path may hinder their success. However, Dr. Dawn Salvatore can reassure students that a non-traditional path to surgery can be fruitful, rewarding, and most importantly, feasible. Dr. Salvatore is a vascular and endovascular surgeon who has been practicing medicine for 30 years, the last nearly 20 years as a surgeon. After graduating from Georgetown University School of Medicine in 1989, she completed a competitive combined Internal Medicine and Pediatrics residency at The Cleveland Clinic Foundation in Cleveland, OH, practiced for two years, and then began her surgery training. I sat down with Dr. Salvatore to gain more insight into her experiences.

What drew you to the field of medicine?
When I was 12 years old I had to do a book report, and I chose the biography of Elizabeth Blackwell, who was the first female physician in the United States. I thought it was amazing that this woman went into a field where she could help people and use unique skills which I felt I possessed as well. She thrived in a time when women weren’t really accepted in medicine, and she overcame so much to do what she really loved. Her story spoke to me. I am one of six children, and though neither of my parents have a college education, they encouraged all of us to work hard. Throughout my life, from middle school to college, I was interested in medicine, not knowing if it would come to fruition. I was drawn to the idea of helping people, I loved science, and I appreciated how this career is one in which you learn for life.

What factors attracted you to surgery? What factors deterred you from initially seeking a surgical residency?
By my second year of medical school, I knew I wanted to do surgery. Throughout my life, I was attracted to challenge, which is what brought me to medical school in the first place. So naturally, I was drawn to surgery for its challenging nature. Unfortunately, I was discouraged by the people to whom I turned for guidance. Given the lack of female representation in the surgical department at my institution, I did not have the confidence, nor did I have any role models who could help me build that confidence. Even though I reluctantly stepped away from pursuing surgery at first, I was still determined to challenge myself, so I completed a combined four-year Med-Peds residency at The Cleveland Clinic Foundation.

What inspired you to pursue surgery after completing your Med-Peds residency? Did you have any reservations about this decision, and if so, how did you resolve them?
During my training at Cleveland Clinic, I came across more female surgeons than I had seen in my past experiences. This was a reassuring sight for me, since it was so different from my past line of exposure in the field. With that new lens, I knew I wanted to give surgery a second chance. So I completed my Med-Peds training, became board certified in both specialties, and worked for a couple years to manage my financial debt. I didn’t have any reservations about my decision, but I did have to acknowledge some trade-offs. For example, given my extensive years of training, my husband and I do not have any children. Fortunately, I started my surgery training at Ohio State University in 1995 and never looked back.

What do you enjoy about vascular surgery?
Vascular disease is systemic, so when it comes to vascular surgery, you operate from the angle of the mandible all the way down to the foot – how interesting and diverse! It also requires very fine technical skill, and there is a beautiful artistry involved in reconstruction. Everyday it’s something new and unique. Additionally, vascular surgery is one of the few surgical specialties where you can follow your patients for life. I monitor the interventions I’ve performed and address any changes that may have occurred naturally over time. For example,
if a patient’s previous graft starts stenosing after a few years, my team goes back in to maintain the patency of the graft. Most of our patients are very loyal, and I enjoy that aspect.

**Can you describe your typical week in the hospital?**
Every day is different. I typically have office hours on Monday mornings, all day on Tuesdays, and Thursday afternoons. Some visits are quick, where I only have to take out staples or check a surgical wound, while others are longer such as if I am explaining a complicated issue or intervention. Wednesdays and certain Fridays and Thursdays are surgery days. I arrive at 6:30am and operate all day, round on inpatients and field phone calls/deal with emergencies, and typically do not leave the hospital before 8pm or so. Most of our surgeries are scheduled electively, but when we do have emergencies, they tend to be either life or limb threatening. Interspersed throughout the rest of the week are meetings, conferences, administrative tasks, or lower intensity office-based procedures. Some afternoons I meet in small group sessions with medical students. I also mentor college and medical students as well as residents.

**Are there unique aspects of your internal medicine and pediatrics training that you have found to be assets in your work as a vascular surgeon?**
I certainly believe my past training helps me every day to become a better physician. I have a deeper understanding of disease processes, and even though this isn’t something I primarily manage as a surgeon, it does help me in the way I approach my patients. This helps my residents, fellows, and students see a different kind of surgeon. It has also helped me become very detail oriented, which is crucial for a surgeon. I believe the devil is in the details, and if we stay on top of these details, we can avert negative outcomes for our patients.

**Did you have any mentors who positively impacted the course of your career? How valuable is mentorship to someone who is just starting their medical education?**
Mentorship is tremendously important. Unfortunately, I did not have that type of relationship with anyone when I was a medical student, which is what discouraged me from pursuing surgery in the first place. Luckily I found a way to reach my goal, but it would have been very valuable if I had a role model to provide insight into nuances that only come with experience. I try to share this insight with my students.

**How has the field of vascular surgery evolved in your experience, specifically from your time in medical school to now? What changes do you foresee occurring in the next 20 years?**
I primarily trained in open surgery, but the majority of our procedures have now transitioned to a minimally invasive, endovascular approach. I didn’t have to think about the technology too much when I was a resident, but nowadays, I see new residents interested in this field specifically for its technological emphasis. For example, there was once a time where we could only treat an infrarenal aortic aneurysm with major open surgery, but now such procedures are mostly performed endovascularly (minimally invasive). We can even treat complex paravisceral aneurysms with endografts and stents placed into the visceral branches. In the coming years, I predict that there will be more creativity in the stents and endografts, such that we can customize them specifically for the patient. Some institutions already modify standard stents or design their own based on an individual’s imaging, but I predict it will be a more widespread and efficient process in the future.

**How do you enjoy spending your time outside of the hospital?**
I love reading, watching old movies from the Golden Age of Hollywood, and sewing. In fact, I’ve sewn my entire life, so surgery was a natural fit for me. I have two sisters and three brothers, so between all of them, I do a lot of alterations and hemming for my family. One unique project I did was create a mini doll replica of both of my sisters’ wedding dresses, complete with a veil and bouquet, which I gifted them.

**What advice do you have for students who are unsure of which specialty to pursue? What would you like to tell students who decide on surgery “too late” into medical school?**
For students who are undecided, shadowing various physicians is a very valuable experience. Reach out to physicians you admire and respect. If you don’t have a role model or mentor, seek one out. I would have benefited greatly from an expert’s guidance. For students who worry they are “too late” in deciding on surgery, I would say it’s never too late or too hard. If you have a passion for something, don’t let anything deter you from pursuing it. Surgery is indeed getting more competitive, and every year I see applicants who are increasingly qualified. Even then, it’s not too late. It’s also very common for students to take a year or two to do research and gain experience before applying to residency. If I was board certified in two specialties and practiced for two years before starting surgical residency, anything is possible.
The Utility of Surgical Simulation in Student Education

Jared Raikin, Class of 2022

The use of simulation in the field of surgery has become a heavily researched topic over the last few decades, but it is by no means a new concept. The first recorded use of surgical simulation dates back 2,500 years with evidence of nasal models for flap reconstruction made of leaf and clay. But simulation as we know it today did not take shape until the 1980s with the invention of the Comprehensive Anesthesia Simulation Environment (CASE) mannequins. The use of nonorganic simulation tools revolutionized the field and continues to play a large role in medical education. These modalities have become particularly helpful in the field of surgery because they allow for repeated practice of skills without sacrificing patient safety. Current surgical simulation has many forms that include, but are not limited to, live animal surgery, cadavers, benchtop simulators, virtual reality (VR) simulators, and robot assisted surgery (RAS) simulators. Each of these simulation techniques offer unique opportunities to learn, practice, and improve surgical technique in a high fidelity, minimal stress environment.

Speaking from personal experience, surgical simulation has provided me opportunities to learn and practice surgical techniques that would otherwise be inaccessible as a medical student. Through SCALPELS, a longitudinal clinical skills-based surgical curriculum at Jefferson, students have the opportunity to be involved with many of the different modalities of simulation. This program was started by a group of senior medical students and a Jefferson faculty member, Dr. Gerald A. Isenberg, with the hope of increasing students’ exposure to the field of surgery in their preclinical years. This curriculum represents a new trend in medical education and is founded on the 2008 AAMC recommendations for clinical skills in medical education. The ability to practice these skills in a simulation setting has been invaluable and has given me the confidence to use the skills learned to assist in a clinical setting.

While anecdotal experiences highlight the impact that simulation can provide for medical students, it is important to examine its broader effects from an objective perspective. One of the most important questions to ask is, “are the skills attained from simulation translating into patient-based scenarios?” A review article by Dawe, et al. found that students who became proficient in simulation-based training performed better in patient-based training than their counterparts without simulation training. The same study found that for procedures including colonoscopy, laparoscopic camera navigation, and endoscopic sinus surgery, simulation-based training was equally as effective as clinical-based training when tested in a clinical setting. These findings are encouraging and suggest that simulation-based training can be a reasonable supplement or even alternative to traditional early patient-based training.

There are many advantages to integrating surgical simulation-based training into medical student education, but limitations do exist. While the isolated use of simulation has been shown to be advantageous, many argue that solely providing sophisticated simulation equipment without integrating it into an educational curriculum will not lead to improved patient outcomes. Current research has found that while multiple simulation-based curricula have been created, there is a significant lag in their implementation due to inadequate human resources, difficulty determining how simulation integrates with existing educational strategies, and logistic barriers. A potential cause is the high cost that is associated with simulation technology and how cost can act as a barrier to its integration into mainstream curriculum. For simulation-based education to reach its full potential, more studies need to be performed to create and optimize complementary curricula to support the new simulation technology available.

These findings expose the reality of the challenges in implementing research findings into practice. The practical integration of new curricula to support simulation technology has been struggling due to unforeseen organization and administrative logistical challenges. This highlights an exciting goal for the field of surgical simulation, which is to explore ways to optimize and logistically implement the new technology and proposed curricula available. Surgical simulation education is a field worth investing in because it has the potential to teach skills in a unique way that...
We use our phones all day to communicate, check social media, and search the internet, but what if our phones could help us be better surgeons? Read on for some ways to turn your phone into an educational tool.

Podcasts to listen to...
- Behind the Knife: a weekly series that includes interviews with prominent surgeons, education material for passing the boards, and behind the scenes looks into surgery
- Surgery 101: a series of 10-20 minute episodes out of the University of Alberta in Canada that serve as brief introductions to surgical topics for medical students
- Legends of Surgery: Stories about the people and events that make up the history of modern surgery

Apps to download...
- Touch surgery: a free surgical simulator that walks the user through procedures and offers quizzes to test your mastery
- Human Anatomy Atlas: a virtual cadaver for reviewing anatomy
- Medscape: a resource of drugs, procedures, medical conditions, and the latest guidelines
- MedCalc: a great tool for calculating risk scores, lab value corrections, and more

Twitter handles to follow...
- @JEFFsurgery: Jefferson Department of Surgery
- @AmCollSurgeons: The American College of Surgeons
- @WomenSurgeons: The Association of Women Surgeons
- @john_SKMC: Gibbon Surgical Society

How technology can make you a better surgical student

can ultimately lead to improved patient outcomes. I look forward to continuing my involvement in the exciting field of surgical simulation and taking advantage of the opportunities it provides me to improve my own clinical abilities.

REFERENCES:

The LapSim® essence by Surgical Science (left) is the laparoscopic simulator used at Sidney Kimmel Medical College for the SCALPELS program. Screen captures of LapSim® essence modules are shown on the right.
Clinical, basic science, and quality improvement research is becoming increasingly integrated into general surgery residency programs, providing aspiring surgeons with an avenue to engage with academia and improve patient care early on in their careers. For example, as an essential part of their training, general surgery residents at Thomas Jefferson University Hospital (TJUH) complete one to two years of research, usually between their PGY3 and PGY4 years. The goal of this protected research time is for residents to gain hands-on surgical research skills and work on translational research projects that correlate with clinical cases, while also becoming more competitive for fellowship program applications. During their research years, residents attend bi-weekly seminars that feature research-in-progress presentations by their peers, as well as lectures on refining study design, statistical analysis, or grant-writing skills. To establish their academic careers, residents are encouraged to submit conference abstracts, publications, and grant applications, and to collaborate with other researchers at TJUH or at outside institutions. Every spring, the Division of Surgical Research, led by Dr. Jonathan Brody, hosts a Resident Research Day where residents present the culmination of their scholarly activity prior to returning to the hospital as fourth years. The research year at TJUH allows residents to use their clinical knowledge and experiences to further the greater medical community’s understanding of surgical procedures and stimulate innovation in the field.

TJUH offers a plethora of clinical and basic science research opportunities to general surgery residents, many of which correlate with surgical subspecialties. Previous projects have focused on the effectiveness of multimodal treatments for pancreatic cancer, patient outcomes following gastric bypass surgery, the pathobiology of vascular disease, and the prevention of post-operative complications such as deep vein thrombosis and septic shock, to name a few. Within the current general surgery research year cohort, two residents, Alicja Zalewski, MD and Peter Altshuler, MD, chose to pursue translational basic science research. Dr. Zalewski is working in the Scott Waldman lab at Thomas Jefferson University, where she has been learning how to isolate colorectal cancer stem cells from patient tumors. Her next experiments will include growing the stem cells in culture and in mice, treating them with immunotherapy, and evaluating tumor growth.

Dr. Altshuler is studying mechanisms to downregulate ischemia/reperfusion injury during revascularization post-myocardial infarction with Dr. Pavan Atluri at the University of Pennsylvania. In particular, he is interested in quantifying the degree of injury caused by an initial ischemic event compared to the additional insult that results from reperfusion.

Both residents worked in basic science labs prior to starting residency and consider these experiences formative in their decision to conduct bench work, rather than clinical research. During her combined seven-year BA/MD program at The College of New Jersey and Rutgers New Jersey Medical School at Newark, Dr. Zalewski worked in a chemistry lab for two years. While
this was a valuable introduction to the scientific method, she was eager to seek out additional opportunities to work on translational projects that could potentially inform clinical practice guidelines. As an undergraduate and Master’s student at the University of Michigan, Dr. Altshuler worked with Dr. Bishr Omary researching cytoskeletal rearrangement during liver injury; there, he built a foundation in basic science that made it easier to step into the research year of surgical residency. Both residents expressed that the integrated research year and the availability of research projects drew them to TJUH as it signaled an emphasis on training well-rounded surgeons who are given an opportunity to explore their individual interests in the field.

Both residents have experienced challenges during the research year: picking up new unfamiliar jargon, learning to patiently await the results of a days-long experiment, and persisting when data collection doesn’t go as planned. After three years of clinical residency training, Dr. Zalewski felt confident in the operating room and outpatient clinic, communicating with her surgical team and running consults. Being in the lab every day was a welcome change of pace, however she noticed that she was “like an intern again, learning everything from the ground up.” Despite the steep learning curve, Dr. Zalewski considers her research year to be an important contribution to her training and her appreciation of evidence-based medicine. Over the past few months, she has learned the minutiae of new biomolecular techniques and how to design experiments with appropriate controls. Furthermore, she is able to approach scientific literature papers and data critically, while practicing her own writing and presentation skills. Similarly, Dr. Altshuler feels that, as a surgeon, he has been trained to think pragmatically; generating scientific hypotheses in the lab has allowed him to practice his theoretical and creative problem-solving, competencies he considers integral to addressing gaps in patient care. Dr. Zalewski and Dr. Altshuler agree that, compared to clinical research, basic science research requires more dedicated time and has a lower guarantee of success, especially given the relatively short timeframe of the research year. However, the prospect of publishing high quality data that significantly contributes to their respective fields and promotes further translational research is extremely rewarding. Working in the lab has also involved a shift in work-life balance as compared to the clinical years. The ability to dictate one’s own hours has allowed both residents to reconnect with family and friends, and to commit more time to their personal lives. Dr. Zalewski has especially enjoyed getting to further know other residents in the program at their monthly ‘family dinners’.

It is unclear what role basic science research will play in Dr. Zalewski’s and Dr. Altshuler’s careers post-residency. While neither resident currently foresees starting their own wet labs, they expect to use the knowledge and technical proficiency gained this year during their fellowship training and beyond. As an attending, Dr. Zalewski hopes to teach her residents to value data-driven clinical practice and to be analytical of accepted protocols and guidelines. Ultimately, she feels that translational research should be bedside to bench, driven by improving patient outcomes and quality of life. Dr. Altshuler agrees that clinician-scientists are uniquely positioned to generate high-yield scientific questions that bridge the gap between the patient experience and the basic science research lab. In terms of which students would be best suited to pursue basic science research during or before residency training, both residents offered similar advice: while all students would benefit from learning how to ask clinically relevant and innovative clinical or basic science research questions and learning a different way of thinking, Dr. Altshuler notes that “just as students have the choice to pursue the specialty that excites them most, they should also pursue research in the same fashion,” guided by genuine interest and excitement for their project.
Longevity in Surgery
A Conversation with Two Temple Surgeons About How They Continually Find Joy in Their Careers

Kelsey Muir, Lewis Katz School of Medicine, Class of 2022

For over 25 years, the poem, “For Women and Men Such as These” (right) has remained a stalwart fixture in Dr. John Daly’s office. The poem was written and gifted to him by Rudy, a part-time minister being treated by Dr. Daly for cholangiocarcinoma, an invasive cancer of the bile ducts. His tumor was successfully removed by Dr. Daly and he lived “without knowledge of any recurring cancer for five years” until the cancer returned. Unfortunately, despite aggressive treatments, Rudy lost his battle with cancer. To Dr. Daly, Rudy and his poem embody the “highs and lows” that cancer patients experience. As a physician and with each subsequent patient he treated, Dr. Daly has learned to “accept the highs and deal with the lows”.

Dr. Daly is the current interim dean at Lewis Katz School of Medicine at Temple University and has been a surgical oncologist for over 25 years. He is a clean-cut man with winter white hair, a soft, friendly smile, and a voice that captures your attention. While describing his decision to pursue a career in oncology, he reflects that “if I didn’t have this, I’m not sure what I would do”. Oncology has allowed him to develop long-term commitments to his patients, where he becomes like a family doctor to both the patient and their family. With that connection comes tremendous emotional investment. Dr. Daly celebrates and rejoices “the highs” with them, but also “comes outside of himself during the tremendous lows” to comfort them in times of need. He has treated thousands of patients over his career, and each one has left their own unique mark, making him more humble and grateful for their connection.

“I never have to wake up and wonder if I’m doing something that matters”, Dr. Michel Pontari starts. As he sits across from me in his white coat with a calm and inviting demeanor, he pulls out lollipops that he keeps in a bowl in his office and offers me one. An antidote to a long day. Self-described as an “out of work guitar player”, he has spent his entire career as an academic surgeon at Temple University Hospital. When he describes his experiences at Temple, his back straightens slightly. He expresses his deep pride and gratitude for the urology department that he helped build and for the patients that he has the privilege of treating every day.

Both Dr. Daly and Dr. Pontari describe the stress and pressure that comes with a long career in patient care, however intertwined with the stress is their overwhelming gratitude and joy for surgery. Maintaining that perspective for medicine and patient care has required two things: community and an outlet. Dr. Daly and Dr. Pontari expressed the need to be able to share their anxieties and struggles with someone to process the stress, the difficulties, and the demands of a surgical career.

For Dr. Daly, opening up to his family helps him decompress and unpack the emotions that are tucked away during a busy day in the operating room. “It would be a detriment to keep all of that inside and that will...
hurt you in the long run.” Having a community with which to share the emotional burden allows him to maintain perspective of his career and patient care. Dr. Daly’s wife was his rock, his confidant, and his best friend. For 13 years of Dr. Daly’s career, his wife was sick with stage 4 appendiceal cancer. He describes caring for her “rather aggressively” during her sickness. Recalling the numerous times he delivered test results to his wife, “the highs and lows” became immensely personal. He felt that his two worlds had collided. He had to learn to balance his roles as both a healer and a husband to care for his wife. When his wife passed, he experienced a time of “tremendous emotions” that confirmed his need for a support system. “You have to be able to talk about it with others”, Dr. Daly states. “You surround yourself with people, share your stories and emotions, and let that community support you.”

Conversely, for Dr. Pontari, it is imperative to “not bring the job home.” There is a distinct separation, both physically and mentally, of the hospital and home. The people that he believes understand the demands of the job the most are colleagues. “It is very difficult to describe to someone who is not in surgery the pit in your stomach when something goes wrong.” Having strong connections with his colleagues provides the space for him to share his concerns and allows for deep reflection in order to process and prepare oneself for the next patient.

Family and colleagues allow both Dr. Pontari and Dr. Daly to consistently reflect and express their feelings, however both described the necessity to clear their minds and escape the pressures each day can bring. As a guitar player turned surgeon, music has remained an outlet that has allowed Dr. Pontari to unwind and take his mind off his worries from the OR. Having this musical outlet that brings him such happiness allows him to “maintain positivity and bring that attitude to work each day.” With a big smile, he pulls out a picture of the guitar near his bed. “I keep my guitars near my bed and in the living room to ensure that I play frequently. I’ll get home from work and sit with my wife and play before bed.” His guitars give him something to look forward to at the end of the day. His music grounds him to life outside of the hospital, especially after a long day of work.

A commonality between the two surgeons was their need to work out the stresses of the job with physical activity. As Dr. Daly describes, “It is hard to think of much when you are short of breath on a treadmill.” After his wife passed, he used exercise as an important tool to calm his mind and distract from the overwhelming amount of emotions he felt. “I use exercise often to clear my head”, Dr. Pontari says. “Yesterday was a long day, so I went to the gym at 8pm to get the endorphins flowing.” For both, exercise is key for decompression and destress.

“My favorite word is equanimity”, Dr. Pontari states. “If I had a yacht, I’d name it that.” No yacht yet, but it is clear these two surgeons have found their way to equanimity in their careers. Through deep connections and enjoyable hobbies, they describe being able to feel steady in the face of ever-changing medicine and patient situations. Reflecting on their careers, both speak of the importance in understanding there is little control in the situations that you face. To gain that perspective, you need people to share with and you need to be able to clear your thoughts.
Throughout social media, television shows, movies, and “public perception”, surgical residents and attendings are often stereotyped into a personality that is most often incorrect. Unless you are a surgeon, it is often hard to understand what exactly the life entails. Add in some Hollywood drama and social media, and what you get is a wildly disproportionate picture of what surgeons’ personalities are like. As a medical student, it is often difficult to separate fact from fiction, so here are some of the most common myths debunked:

**Myth:** Surgeons are meatheads who only like to cut people.

**Fact:** You’d be surprised to know that there is a lot of general medicine involved in surgery. Surgeons really need to be well equipped to treat the whole patient, before and after surgery. This includes being able to manage all of their chronic and acute conditions in the pre- and post-operative period, and in intensive care units. It involves working with a lot of doctors in other specialties such as internal medicine, family medicine, acute critical care, cardiology, nephrology... you get the idea. There is a significant amount of non-OR work that goes into surgery, which is often not shown in TV shows because it seems “boring” for the fake hospital plotlines, but is absolutely essential for the real patients in hospitals.

The only part of the above myth that is true is that surgeons like to cut. Being a surgeon involves a certain dexterity of the hands as well as a genuine love for the intricate anatomy of the human body. In other words, of course surgeons love to cut, and they do it very well, but that surely does not mean that surgeons are meatheads.

**Myth:** Surgeons are cold-hearted.

**Fact:** With the exception of trauma and surgery, there is no other occasion when someone’s inner organs are exposed to anyone. The operating room is a delicate place where the inside of a human is carefully opened and exposed to the world. It is nothing but a privilege to be in that position and requires the warmest of hands and hearts to do this. The idea that surgeons are cold-hearted is merely a perception.

When a surgeon is trying to take care of a whole ward of patients in the ICU, he/she has to do some triaging. There are some patients that are more urgent and higher priority while others are in a less critical position. Residents have often said that this is where patients frequently mistaken them for being cold hearted, when in reality, they simply have to make sure that each patient gets the level of care that is necessary for them to recover.

The degree to which the media portrays surgeons as cold-hearted is definitely not accurate since most surgeons truly empathize with their patients and feel all of the emotions involved in their care, from the happiness of success to denial after a death to the anxiety in awaiting new results. It is this connection with their patients that allows them to be great doctors. However, surgeons need to be able to have careful control of their emotions for success inside and outside the operating room. Inside the operating room, you need to be a little detached otherwise there is no way you can saw through a little girl’s sternum to fix her heart defect.

There needs to be a balance of emotions to be able to connect with your patient while also being able to operate successfully. Detachment is necessary to make sure that you are not bringing every patient home with you and excessively attaching yourself to others’ sorrows to the point that it interferes with your personal mental health and performance as a doctor. But this detachment should not be mistaken for cold-heartedness.

**Myth:** Surgeons have a so-called “God complex”.

**Fact:** Television dramas love to have complex characters, and the surgeon with an ego problem is their classic favorite. They love to have a pretentious, charmingly good-looking, overconfident doctor who thinks of himself as nothing short of God. It’s no doubt that people strongly associate surgeons with an undeflatable ego. However, this is not entirely the case. Having your hands inside a human body is one of the most intimate and delicate places to be, and can be a humbling experience. In addition, it takes countless years of grueling hard work and training to get to the point of being a surgeon. So along with the pressure of a human life in their hands, there is a lot of personal pressure to succeed. With all of this in mind, yes, some surgeons have a larger ego than
other doctors. But it is definitely not a requirement to be a good surgeon. In fact, some of the greatest surgeons are extremely humble and honored to be in the position they are in. They take it as a privilege to treat their patients and teach their students the same. Hopefully one day, our media might realize that humility is more powerful of a character trait than ego and we’ll start seeing more humble, caring surgeons on TV. Until then, just take our word for it when we say that not all surgeons have a God complex and it absolutely is not a requirement to become a good surgeon.

**Myth:** There is no life outside of the OR.

**Fact:** This is perhaps one of the most controversial of all the points. It is definitely true that surgeons spend a lot of time operating, seeing patients in clinic, doing charting, research, and then going home to study because of the ever-changing nature of their work. Surgical residency is one of the most intense endeavors to go through, and residents often describe themselves as “living at the hospital”. It takes true dedication and unrelenting hard work to get to be a surgeon, and then to keep continuing to practice as well. However, being a surgery resident does not preclude you from having a family or outside interests. At Jefferson, residents have gotten married, had kids, and even competed in Ironman triathlons without disrupting their training. Furthermore, residency training is not representative of life as a practicing attending surgeon. The opportunities to do things outside of the hospital increase with every year after becoming an attending, and while being a surgeon is not a 9-to-5 job, most attending surgeons have families, hobbies, and full lives beyond the hospital.

It is also important to keep in mind that residency has long hours regardless of the specialty; ask any internal medicine intern, and they will tell you that life gets put on hold for 16-hour days and weekend calls. But there are improvements being made with regards to work hours for residents of all specialties. In the near past, medical training was all about constantly working and spending the maximum number of hours in the hospital. However, we are now starting to realize that this is doing much more harm than good, especially in terms of teaching. After a certain amount of learning, the brain needs time to properly process and encode all of the information. A lot of the encoding process happens during deep sleep, and learning is a very energy-consuming process that also requires a well-nourished bodily state. This makes our model of overworked residents eating M&Ms for dinner sound absolutely absurd and counterintuitive. If we want surgeons to be the best trained professionals, they need to be taught properly - and this includes getting good sleep and nutrition daily. Previously, these things were considered to be “distractions” to learning in residency, but we are now starting to realize how essential they are for successful training. Slowly but surely, more and more changes will be underway at our country’s programs to allow for better surgical training.

---

**Keeping up with the literature**

As a student, resident, and attending, it is important to keep up to date with the newest research, technology, and techniques, but doing so can be time-consuming and it’s often difficult to know where to start. After all, there are hundreds of journals out there, so how do you know which are best? The short answer is that there isn’t any one “best” journal out there, and many surgery studies are published in non-surgical journals. So how exactly do you go about finding high-impact studies without extensive searches? To start, try using a service such as PubMed or download the app Read by QxMD, which send you newly published articles every week based on keywords that you provide. Keep in mind that this method may still require you to do some weeding out if your only keyword is “surgery”, but if you’re working on a specific project (and certainly once you’re a resident or attending with a certain focus), these services are a great option. For those of you who are just beginning to explore the field of surgery, some good journals to check out are Annals of Surgery, JAMA Surgery, and the Journal of the American College of Surgeons (JACS). Also check out research published in non-surgical journals; just try to find journals with high impact factors, as these will be the most selective journals and the studies are more likely to be worth your time. The most important thing to remember is that you can’t read everything, so don’t try to! Any reading that you do will improve your skills as a writer, critical thinker, and evaluator of scholarly work. If it helps you get a pimp question right, that’s just a bonus!
The John H. Gibbon, Jr. Surgical Society (GSS) at Sidney Kimmel Medical College (SKMC) at Thomas Jefferson University is a unique student interest group that has been working hard to increase interest in the field of surgery among medical students for the last 37 years. The society has over 400 total active members on a year to year basis, spread across the four-year curriculum. The GSS increases exposure and interest to the surgical field through a unique blend of episodic and longitudinal programming that helps bring together students, residents, and faculty in an educational setting.

The crux of the GSS approach to bolstering medical student interest is early exposure. Over the years, the GSS has run many programs specifically targeted at students in the pre-clinical curriculum to increase surgical exposure. Potentially the most influential program is Surgery at Night, which provides an opportunity for students to spend an overnight shift with a surgical resident and intern early in their medical school career; there are typically over 200 such overnight stays by students in an academic year. Students frequently have the opportunity to scrub in on emergent cases and are often instructed in suturing small incisions at the end of cases. Another excellent opportunity for students is the Organ Procurement Program, in which all students who receive the necessary training are signed up for a lottery that allows them to travel and scrub in with the organ procurement team. The most innovative program that has been started by the GSS is the SCALPELS program, in which faculty members and upperclassmen plan a longitudinal surgical curriculum that runs concurrently with the pre-clinical curriculum, and offers surgery-specific lecture topics and skill sessions relevant to the underclassmen's studies.

There are also events that are available to all students. The GSS runs a quarterly journal club, which is led by a surgeon at Jefferson in the field that is currently being studied by the second-year medical students. Many surgeons take this time to not only educate the students in critical review of the findings of papers, but also the underlying statistics that were used. The Philadelphia Surgical Symposium is the GSS's signature event each year. Students from all medical schools in the Philadelphia region are invited, and it is intended to be an informative opportunity for medical students interested in surgery. There is an associated regional medical student research poster session and competition during the event, complemented by presentations from a faculty member from each school, ranging in topics from clinical experiences, to advocating for a particular field of surgery, to hot topics in research.

The GSS was presented at the AAMC’s Learn, Serve, Lead 2017 conference as a model for an effective medical student interest group. This journal, the GSR, is written, compiled, and curated by SKMC students through the invaluable help and planning of the GSS members, and stands not only as a testament to the involvement and hard work of the GSS, but also of the student body as a whole.
Dr. John Heysham Gibbon, Jr. graduated from Jefferson Medical College in 1927, and in a brief series of events, he was named Fellow at Massachusetts General Hospital. In 1930, he found himself assisting Dr. Edward Churchill in an emergency pulmonary embolectomy. At that time the procedure was one of desperation, as no patient in the U.S. had survived the removal of blood clots in open-heart surgery. As Dr. Gibbon recorded the patient’s waning vital signs prior to the procedure he thought, “If only we could remove the blood from her body by bypassing her lungs, and oxygenate it, then return it to her heart, we could almost certainly save her life.” Despite a successful removal of large clots from the patient’s pulmonary artery, she never regained consciousness. This “critical event” initiated Dr. Gibbon’s determination to produce a heart-lung machine.

Dr. Gibbon was Chief of Surgical Services at the 364th Station Hospital in the Pacific Theater. After the war, upon returning to Philadelphia, his alma mater offered him the position of Professor of Surgery and Director of Surgical Research, which he accepted. Through Jefferson Medical College’s connections, IBM and its premier engineering department entered the picture and worked with Dr. Gibbon and his oxygenator to develop a larger device known as IBM “Model I.” His wife, Maly Gibbon, and the Jefferson Medical College surgical residents were also deeply involved in the evolution of this huge apparatus (too heavy for the building’s elevators), which proved repeatedly successful in experiments on dogs. But limitations on the machine for human patients existed and the decision was made to cannibalize parts of Model I for Model II, which was ready for its first test in February 1952. Although the heart-lung device was fully functional, the first patient, a 15-month old baby, died during the operation. A post-mortem revealed a much larger defect than was suspected.

On May 6, 1953 at Jefferson Medical College Hospital, Dr. Gibbon and his staff, with the help of his latest-designed heart-lung machine, “Model II,” closed a very serious atrial septal defect between the upper chambers of the heart of eighteen-year-old Cecelia Bavolek. This was the first successful intracardiac surgery of its kind performed on a human patient. “Jack” Gibbon did not follow this epoch-making event by holding an international press conference or by swiftly publishing his achievements in a major medical journal. According to a recent biographical review by C. Rollins Hanlon, “Therein lies a hint of the complex, unassuming personality behind the magnificent technical and surgical achievement of this patrician Philadelphia surgeon.” After the triumphant Bavolek case in May of 1953, Dr. Gibbon employed the Model II on two more patients in July 1953. Both children subsequently died, prompting Gibbon to declare a year’s moratorium regarding use of the heart-lung machine, pending investigations into solving clotting problems and blood loss.

During the years leading up to his successful surgery, Dr. Gibbon had been sharing his blueprints and experiences with Dr. John Kirklin at The Mayo Clinic. Eventually, the Mayo Clinic built the “Model III” based on the proposed changes from Dr. Gibbon’s lab, which led to several successful operations there. While Dr. Gibbon turned to his non-cardiac interests, others continued to perfect cardiac surgery. It is clear that Dr. Gibbon’s contributions to the field of cardiac surgery were necessary in order for the field to develop, which is why he is often referred to as the “father of cardiac surgery”.
EDITORIAL BOARD

Samantha Savitch
Editor-in-chief

Tyler Bauer
Senior Editor

Christina Stuart
Senior Editor

Emily Sagalow
Junior Editor

Michele Fiorella
Junior Editor

Vishal Swaminathan
Junior Editor

FACULTY ADVISORS
Renee Tholey, MD, FACS
Charles Yeo, MD, FACS

GUEST WRITERS
Signe Caksa
Kaushal Desai
Kelsey Muir
Heli Patel
Preeyal Patel
Jared Raikin
Colin Yost
Kelley Yuan

REVIEWERS
Peter Altshuler, MD
Karen Chojnacki, MD, FACS
Gerald Isenberg, MD, FACS
Geoffrey Krampitz, MD, PhD
Stanton Miller, MD, MPH
Dawn Salvatore, MD, FACS
Alicja Zalewski, MD
Sherry Weitz
Want to write for the GSR? We would like to recruit writers from all schools that attend the Philadelphia Surgical Symposium. If interested, please contact the editor at gibbonsurgicalreview@gmail.com

The Gibbon Surgical Review and the Philadelphia Surgery Symposium are sponsored in part by the Philadelphia Academy of Surgery and the Metropolitan Philadelphia Chapter of the American College of Surgery.