# Surgical Savvy

# WINTER 2014, ISSUE



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# MEET OUR PRESIDENT - NANCE MORAN



# Q: How did you get involved with the Academy?

I got involved in the ASR back around 2002, when my new boss, a Veterinarian who was also a member, pointed me in the right direction due to my interest in learning orthopedic surgical procedures for our research efforts. It was several years later I was formally asked to join and then eventually lead the Communications Committee where we put out the first Surgical Savvy issue and continued doing so for several years. I learned a lot about myself in those years doing things I had not done before and harnessing creativity and problem solving skills to get the job done well. Q: Can you describe a memorable experience from your time as a member of the Academy?

A memorable experience, there are so many to choose from. I have made so many good friends and new colleagues from being a part of the ASR. Each year my list of friends and contacts expands. A most memorable moment was winning the Michael Di Leo award several years ago, and meeting and exchanging research experiences with

#### **INSIDE THIS ISSUE**

<u>What the Academy of Surgical Research (ASR) Means to me – A Member's Perspective</u> Jenifer Sheehan, BS, SRS, LATg

Surgical instrument review - what's in a name?

Test Tips - Tips to help you with you certification exams

Ergonomics for the Microsurgeon Devra J. Olson, BA, SRS, LATg

#### SURGICAL SAVVY – WINTER 2014, ISSUE 1

Dr. Wayne McIlraith, our keynote and Markowitz award recipient. When I was nominated for President I was greatly honored and humbled. I also really enjoyed Clearwater where we were able to contribute to the aid of Winter the dolphin. When I have traveled for other seminars I have been able to catch up with ASR friends and enjoy their friendship. In the end it really comes down to many moments, moments of laughter, and shared experiences in defeat and wins in our efforts, and most of all sharing embarrassing moments with my ASR family. I find that sharing these experiences makes you more approachable once you have shared that you have had your bad moments with another friend. Those of you that know me, know I enjoy making others laugh most.

### Q: As President of the Academy, what is the main goal you hope to achieve this year?

It is difficult to say one goal is the main goal as there are many and they are all important. One particular goal of mine is to get more members volunteering and create a natural flow in passing on the torch of our committee and board leaders. This year, I appointed Vice Chairs to each of the Committees and asked each to reach out to those that wished to volunteer. This will contribute to longevity in completing and relaying ongoing goals and efforts when chairs retire and perhaps move on to other positions. What I am now experiencing with our team is that they are empowered, excited, energetic, and responsible. They are embracing the goals of each of their committees and thinking critically and creatively to support our not for profit efforts. These volunteers should be thanked for their time and efforts, I commend them and am very proud to be a part of the team.

#### Q: What do you do in your free time?

I love to spend time with my husband and furry kids, "Baxter" the boxer, and "Sampson" a.k.a. "Sammis", the kitty. We enjoy camping, many will say not the real kind, you see we have all the amenities of home in our travel trailer. We have made so many friends that we consider our camping family over the last eight years in New Hampshire. We also get to take Baxter with us to camp so he gets weekend vacations too and plenty of walks and fresh air! I have taken an extensive interest and courses in positive reinforcement dog training, instructor training, and behavioral modification. I enjoy working with my dog Baxter and other dogs. I say working "with" because clicker training is a team effort, where the dog is a "thinking dog". The dog learns to think and offer behaviors that can be shaped. Shaping is similar to creating a flip picture book, with small changes occurring on each page of the book. When you flip the pages you see the whole action or behavior you want to see. You mark and reward progressive increments of the behavior until you have the full behavior you are seeking. This is the same approach used in training dolphins. I also enjoy baking for family and friends and for all dogs as I make all natural dog treats for many occasions for friends and for my own.





#### Mayo scissors

Mayo scissors were developed by the Mayo brothers of the Mayo Clinic fame, in the 1800's. This scissor resembles the Metzenbaum scissor, but is a heavier, bulkier scissor. It is used for dissection, cutting thick tissue such as muscle/fascia, and also for cutting sutures.



#### The Metzenbaum scissor

Developed by oral/facial surgeon Dr. Myron Firth Metzenbaum, these scissors are more delicate than the Mayo and come in curved and straight blades. Popular in many areas of surgery, they are used for dissection and cutting of delicate soft tissue.



#### Allis Forceps

This forcep was created by Dr. Oscar Huntington Allis (1826-1921) to grip the ends of intestinal tissue during anastomoses. Today they are also used to grasp fascia and tendons.





Photo courtesy of David Castillo Dominici at FreeDigitalPhotos.net

### What the Academy of Surgical Research (ASR) Means to me – A Member's Perspective

#### Jennifer Sheehan, BS, SRS, LATg

I attended my first ASR meeting in 2001. As a young and relatively inexperienced surgical technician, I was completely overwhelmed by what I experienced. The various and complex surgical projects that were being presented seemed totally out of the realm of possibility for me, and I was in awe of the level of expertise represented. In my short professional career as a surgical technician, I had only been exposed to basic surgical procedures for the implantation of infusion catheters and telemetry devices. It never occurred to me that I would someday be leading a global surgical team, developing and implementing new surgical techniques and refining surgical procedures. It also never occurred to me that I would have the ASR to thank for its role in

my career path.

Although I felt a bit out of place at first, my passion for learning and developing my expertise in the field of surgical research kept me coming back. I have attended just about every annual meeting since then, with the exception of the years in which my children were born. The first few years of my involvement were spent familiarizing myself with the Academy and what it had to offer, which is how I learned about the Surgical Research Specialist (SRS) certification. I realized that obtaining this certification was a way to further my career, especially since no one else in my organization had yet obtained it. So I began keeping my logs, writing my surgical narratives, and studying the seemingly endless amount of

recommended reading materials. Finally, it all paid off when I passed my SRS certification exam in 2004.

It was a lot of work and a difficult exam, but I am fortunate to work for a company that recognized the effort and was willing to move me into a position where I could focus on the development and expansion of our Surgical Services Division. I also received a nice monetary bonus for passing the exam, which was an additional benefit!

This was when things really began to change. I now had the ability (and confidence) to drive changes, improvements and refinements. It started with vendors. Not the annoying, salesy-type vendors, but vendors that work in the same field as you, listen to your ideas and work with you to develop custom-designed products to suit your needs. I met most of the vendors by attending the ASR meetings and still value and maintain those relationships today. It helps when you get to talk directly to the people who are responsible for designing and manufacturing your equipment, as well as hear end-users talk about different types of catheters, ports, anesthesia machines, etc. that they have developed or tried for different applications.

My team and I started working with the vendors to design or assist in the development of custom catheters, ports and other materials that have been requested in response to a customer need. This included a rat catheter design that decreased the incidence and severity of background histopathological findings in infusion studies and a vascular access port that could retain a needle during ambulatory infusion intervals.

There were also model refinements. One most notable example of a refinement I gained from attending the ASR meetings was a change in the placement of our telemetry devices. At the time, we were placing our telemetry devices in dogs and nonhuman primates in the intraperitoneal cavity or in a subcutaneous pocket. Both locations had complications associated with the long term success of the model and our drop-out rate was high. I attended a presentation on the inter-muscular placement of the telemetry devices, talked with the presenter (Matt Flegal), and had trialed this procedure within a month of the meeting. Since then, we have completely eliminated transmitter related drop-out in dogs and nonhuman primates and still use this procedure today.

This had a huge impact on animal welfare and introduced a major surgical refinement — all as a result of attending a half-hour presentation at the ASR.

Then there is the quality of presentations. Many other conferences I have attended are loaded with presentations from perfect people who somehow achieve perfect results the first time, every time. We all know that surgical research is not that perfect; many models require careful development, and often times some refinement, before arriving at the optimal surgical model. Most ASR presenters are comfortable and confident enough to present those challenges and the story of how they were overcome. This is extremely valuable information for all of us, whether an experienced surgeon or a technician just starting out in the field.

Speaking of levels of experience, there is something for everyone. The ASR makes a real effort to ensure that there is adequate content for all, from basic surgical skills courses, certification exam prep and suturing labs to more complex microsurgery wetlabs, surgical writing workshops and everything in-between. As I learned early on, there is no need to feel overwhelmed in this environment because there is something to be gained for everyone, regardless of level of experience.

Last but not least, there are the people - the heart and soul of the Academy who have made it so successful. I don't know how else to describe it other than a family of sorts. Over the years I have met so many amazing people who have inspired me, assisted me, and become my friends. We support each other, share our successes and failures, and learn from each other. It is a truly remarkable community in that we all share a passion for surgery and want to help

#### each other in the advancement of science, regardless of what company we work for and whether it is a CRO, Pharma, Academia, or Biotech. You can't find that type of community in the non-intimate setting of the large industry conferences. Oh, and I nearly forgot to mention – these people know how to have fun!

So flash forward to today, almost 14 years after attending my first ASR meeting. I lead a global surgical group across 2 continents. I have no doubt that the Academy played an important role in achieving my goal, and has provided a reliable support network that could not be replaced by other means. At HLS we have 4 certified surgeons (3 SRS and 1 SRA), and the Academy is regarded as an essential source for the surgical team's continued education and professional development.

If you are a new member or someone considering joining, please do — you will not be disappointed. Additionally, if you want to be more involved in the organization, you can do so on a number of levels with committees, board positions and sponsorships. If you are a long-time member then the above was more than likely common knowledge for you, but thank you for being part of our professional organization!!

### TEST TIPS

- 1. NSAIDs provide analgesia by:
  - (A) Blocking the  $\mu$  receptors of the CNS
  - (B) Blocking neurotransmitters at all synapses
  - (C) Stimulating prostaglandin production
  - (D) Inhibiting prostaglandin production
- 2. What is an incision in the urinary bladder called?
  - (A) Cystotomy
  - (B) Cystectomy
  - (C) Cystocentesis
  - (D) Cystostomy

- 3. Which of the following would be the most appropriate for abdominal retraction?
  - (A) a Gelpi retractor
  - (B) a Weitlaner retractor
  - (C) a Balfour retractor
  - (D) a Senn retractor

Answers on the last page!!

Devra J. Olson, BA, SRS, LATg

Ergonomics has been studied extensively for years as a reactionary tactic to minimize workplace accidents and injuries, providing a safer work environment and improving productivity. In the early 20<sup>th</sup> century, booming industry and production was fundamentally dependent on human-machine interaction, which drove further focus on ergonomics and mechanical design. Currently, there is a vast emphasis on general safety and ergonomic design in order to protect both employee and employer. Information regarding activities such as how to safely lift objects and how to properly sit at a computer is widely available and is typically integrated into Occupational Health and Safety training programs.

It is exceedingly difficult to find information about ergonomics relating to workplace conditions and health hazards for the research microsurgeon. The most complete commentary on ergonomics as it pertains to surgery dates back to the 1960's, when an Australian general surgeon's life-long interest in applying ergonomics to surgery became a mainstream topic. Dr. Michael Patkin's concern for the surgeon's safety, efficiency of movement and instrument design was compiled in a clear and comprehensive way. His work included several publications, essays, and presentations on how to apply ergonomics to using the surgical microscope. I plan to share a focused explanation of Dr. Patkin's ergonomic principles integrated with my own opinions and experiences with respect to the discipline of microsurgery. I have performed rodent procedures using a microscope in the research setting for over 10 years. Much of what I have learned over the years has been through trial, error, and injury, not necessarily through formal training. The majority of publications and training materials focus on the "microsurgical triad"; the importance of magnification, illumination and instrumentation (and let's go ahead and add surgical technique to this list). In addition to precise surgical technique and how to efficiently operate a microscope, ergonomics is an often neglected element of this training.



*Figure 1: Ergonomics: the science of designing the user interaction with equipment and workplaces to fit the user.* 

This places the responsibility solely on the technician to learn and develop the skills necessary to mitigate issues as they arise. My goal is to provide a sufficient mixture of objective and subjective analyses of Dr. Patkin's ergonomic recommendations in order to inform and guide novice and experienced microsurgeons alike.

Not unlike Figure 1, body positioning and posture at a microscope (Figure 2) is comparable to that of a computer or office-setting. It is very common to become careless about your posture and position after hours of working on the microscope. Consistent self-reminders to adhere to the rules in Figure 2 will help avoid pain and injury from repetitive motion as well as inactivity. Proper equipment, such as microscopes, tables and chairs (with lumbar support) need height adjustment capabilities because no two surgeons are the same size or proportion. An often overlooked necessity is foot support in order to create 90-degree angles in your hips and knees. Maintaining a comfortable, correct leg position can improve lower extremity circulation and delay the feeling of fatigue. Neutral position of the head and shoulders can also be difficult to maintain after a period of time, especially during technically difficult procedures. Anxiety and fatigue, which will be discussed later, can cause the shoulders to unknowingly rise and the head to lean forward, causing undue stress on the neck and upper back. Pain and tightness in these areas is a common complaint from technicians working on a microscope for several hours. This

checklist should be integrated into a daily routine until it becomes second nature. Hanging a sign (Figure 2) on the wall in front of your microscope or developing a mantra recited every time you sit down at your station are some suggestions that may help develop healthy habits while performing microsurgery.



*Figure 2: Image from Michael Patkin's PowerPoint presentation, Introduction to Ergonomics, in 2009.* 

#### Mitigating Fatigue:

Microsurgery appears to be a sedentary activity, but only those who work on the microscope for hours at a time over several consecutive days can appreciate the difficulty of the task. Have you ever broken a sweat while not moving an inch? Fatigue while working on the microscope can be minimized by taking micro-breaks as frequently as the procedure allows. If your surgical procedure takes 45 minutes per patient, then utilize the time between to stand up, walk around, and stretch key areas. If possible, get a quick snack or a drink of water – this will force you to walk to another location and change your visual and mental focus. Briefly looking away from the microscope binoculars in order to let your eyes relax and return to normal focus can reduce eye strain, which can also contribute to an overall feeling of drowsiness.

#### Visual Perception Issues

Visual health is of the utmost importance while performing tasks using the microscope. Visit your optometrist on your prescribed schedule or more often if you are noticing any changes in your visual acuity. I noticed my vision changing during a lengthy study so I scheduled a visit with my optometrist. After a new prescription and glasses, I felt a renewed energy and clarity – quite literally! Improper focus is a common cause of eye strain, and therefore fatigue. Obtain training from your microscope manufacturer next time your scope is serviced. It is possible to focus the eye pieces to your glasses prescription; however, this may not be practical because you will be unable to focus your eyes when you look away from the microscope.

Glare from the intense microscope light can also cause eye strain and eventual damage. It can be difficult to avoid glare from moist or shiny tissues, as allowing the tissue to dry causes desiccation. Surgical instruments are another cause of glare since they are commonly manufactured with surgical-grade stainless steel, which is inherently shiny. A smooth finish is easier to clean, but different finishes are becoming increasingly popular to avoid instrument glare under the bright lights of a surgery suite or microscope. Matte, satinized, black chrome and blue anodized finishes are just some of the options that microsurgeons have to maintain eye health.

Magnification can both help and hinder a surgical procedure. Increasing magnification to your microscope's maximum capabilities will allow a visual advantage, but may cause the microsurgeon to quickly lose spatial awareness, depth perception and the overall picture. Hyper-focusing on the surgery site can also come at the expense of the whole animal - especially animals under anesthesia, where respiration, skin and mucous membrane color and temperature must be closely monitored. It is beneficial to adjust the magnification as needed throughout procedure. Maintaining a acute perception and spatial awareness as the magnification is changed comes with training and practice.

Adding light during microsurgical procedures can be a challenge since your field of view is small and the microscope lamp will only produce so much light. Adding directional lighting can reduce shadows as well as glare. Regular service, cleaning your microscope and using new bulbs can help keep your lights bright! If that isn't enough, adding a LED headlamp or an accessory lighting system (Figure 3) can help illuminate the work field. Intense light can wash out color and affect contrast. Using dyed sutures, colored tubing and plastic strips during procedures can help mitigate this issue. Placing a colored strip behind a vessel during anastomosis will highlight the often undyed, smallgauge sutures used for these procedures.



Figure 3: Dual Goose LED Accessory Light from Ningbo Hinotek Technology Co.

#### Controlling Tremors and Anxiety

All human beings are plagued with tremors – even the best surgeons with the steadiest hands. Tremors of 0.5-3mm and 7-30 vibrations per second are considered normal. Long-term factors such as age, general health and constitution can affect a person's baseline tremor. Dr. Patkin deems products like nicotine, alcohol, and caffeine as "social poisons," which along with lack of training, confidence, and elevated anxiety are intermediate factors that could negatively impact tremor. Below is a list of additional, short-term factors that can exacerbate this issue the day-of surgery and actions the microsurgeon can take to dampen tremors.

Issue	Desolution
15500	Resolution
Tremor (point-of-limb support)	More distal support = less tremor
Fatigue	Make sure you are fully rested the evening prior to surgery
Muscle Strain	No heavy lifting prior to surgery
Muscle-loading	<pre>&gt;50g of pinch pressure increases tremor (can be easily tested using a scale)</pre>
Stress/distraction	Leave all drama at the surgery suite door!
Injury (pain or weakness)	If an injury affects your work, you may need time to heal
Excessive Heat/Cold	Check the room temperature, adjust accordingly
Digestion (hunger or feeling full)	Eat a healthy breakfast the morning of surgery and schedule water and snack breaks throughout your day
Direction of movement/rotation	Strive for natural movements and rotation while holding instruments and performing tasks
Range of motion	Strive for natural range of motion while holding instruments and performing tasks, work within your limits if you have restricted range of motion

Point-of-limb support is probably the simplest solution that many microsurgeons overlook. When you write on a white board, do you rest the heel of your hand on the surface as your write? Imagine how your penmanship would change if you stood arms-length from a white board to write your name. This same concept is used when performing microsurgery - the more distal the support, the more control. As a golfer would choke down on his putter for precise control on the green, the microsurgeon must adjust his or her grip on the instrument to increase control and reduce tremor during precision microsurgery.

#### Instrumentation and Hand GripsImages from Dr. Patkin's presentation, 'Introduction to Ergonomics'

Gripping and supporting your instruments correctly is as important as the instrumentation you choose for your procedure. Below is a summary of Dr. Patkin's descriptions of common hand grips and their applications during surgery.

The Power Grip - gripping a baseball bat, club, tennis racket or large retractor. This grip limits your mobility to the wrist and proximal joints. It is a static grip and has no functional use in microsurgery.



<u>The Pinch Grip</u> – best for picking up small objects, not for fine movements. Again, mobility is mostly limited to the wrist.



External Precision Grip – the "pencil grip". Movements are controlled by the wrist, thumb and fingers. A pencil-shaped instrument is ideal for this grip to facilitate tactile communication between the fingers. There is increased support by the apex between the thumb and forefinger, which can provide additional feedback. The ulnar edge (or heel) of the hand is generally rested on the surface for additional support and to reduce tremor.



Internal Precision Grip – used when length, shape and thickness of the instrument is appropriate. This grip is suitable for instruments used parallel to the surface rather than at an angle (eg. scalpel, needleholders, hemostat, Senn retractor, etc.). The heel of the hand is also in contact with the

Cylindrical

an additional control.

instrument



of



Microsurgical Grip – modified external precision grip. The lateral edge of the arm, hand, and fingers are fully supported on the surface. The middle finger may be

used close to the instrument tip to increase control. The instrument handle lies on the index finger rather than the apex of the thumb – this creates a steeper angle and yields more distal and therefore more precise control with less tremor.

<u>Simultaneous/Ulnar Storage Grips</u> – useful when working without an assistant. These grips allow the microsurgeon to perform multiple tasks simultaneously. Rarely does a microsurgical field allow enough space for additional hands, which makes multitasking and assisting oneself a necessary skill.



The above hand grips should be appropriately integrated into a surgical procedure according to the instrumentation used, the procedure being performed and the individual's own ability. The microsurgical and simultaneous grips have the most relevance and application when working under a surgical scope. Understanding the numerous ways we can use our hands will broaden our capability, creativity and speed!

#### "Give me but a fulcrum close enough to the work, and sufficient visual acuity,

#### and I will move a single atom.<sup>39</sup>- M. Patkin, cf. Archimedes, 200 B.C.

#### In Closing

Be mindful of posture and positioning, mitigating fatigue, visual perception issues, understanding tremor, controlling anxiety, and learning the appropriate grips specific to the instruments being used. By addressing these specific ergonomic variables, we reduce our own limiting factors and can realize our true ability. New technologies such as robot-assisted surgery or anti-vibration surgical tools tout fewer complications; however there is no substitute for human intervention when performing microsurgery. The recurring theme in Dr. Patkin's message explores a systems approach to performing surgery. Understanding each element involved and the interface between them embodies Dr. Patkin's philosophy. Below is a model of a surgeon at work. You see three elements and two interfaces. The Operator-Instrument Interface is Ergonomics, and the Instrument-Tissue Interface is Bio-engineering. Microsurgery is a precise and delicate activity and requires precise and delicate understanding of the unique interface between surgeon and patient. One must appreciate the intermediate factors such as

microscopes, lighting, instrumentation, and the human element. Ι am passionate about understanding. sharing, and applying these principles in my own day-to-day activities. I strongly believe that ergonomics should be formally integrated into the microsurgeon's foundational knowledge.





Reference: http://www.mpatkin.org/index.htm

Thank you Dr. Patkin!

Your passion for ergonomics changed the way I do microsurgery!

# **SAVE THE DATE:**

# 2015 ASR 31st Annual Meeting

"Everyday Heroes: Surgical Models Saving Lives" October 8-10, 2015 Winston-Salem, NC

**\*\*Currently accepting abstracts\*\*** 

Visit <u>www.surgicalresearch.org</u>

# WHAT DO YOU WANT TO TALK ABOUT??

Send us a tech tip or article to share your knowledge with other members! CEU's are awarded!

Submission deadlines: May 1<sub>st</sub> and November 1<sub>st</sub>. Please send in Times New Roman font, and attach any pictures as a ".jpg" file format.

SUBMIT ELECTRONICALLY TO: JENNIFER SHEEHAN

SHEEHANJ@PRINCETON.HUNTINGDON.COM

**Test Tips Answers:** 1 D 2 A 3 C

# INTERESTED IN REPRESENTING THE ASR AT YOUR LOCAL AALAS MEETING?

Contact one of the Communication Committee members if you would be interested in representing the ASR at your

local AALAS meeting.

#### Academy of Surgical Research: Advancing Medicine Through Information Exchange

Founded in 1982, the Academy of Surgical Research promotes the advancement of professional and academic standards, education and research in the arts and sciences of experimental surgery.

The Academy interfaces with medical and scientific organizations, and governmental agencies in establishing and reviewing ethics, theories, practices and research pertaining to surgery and promotion of the results for clinical application.

#### If you would like to be involved:

Website: www.surgicalresearch.org

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