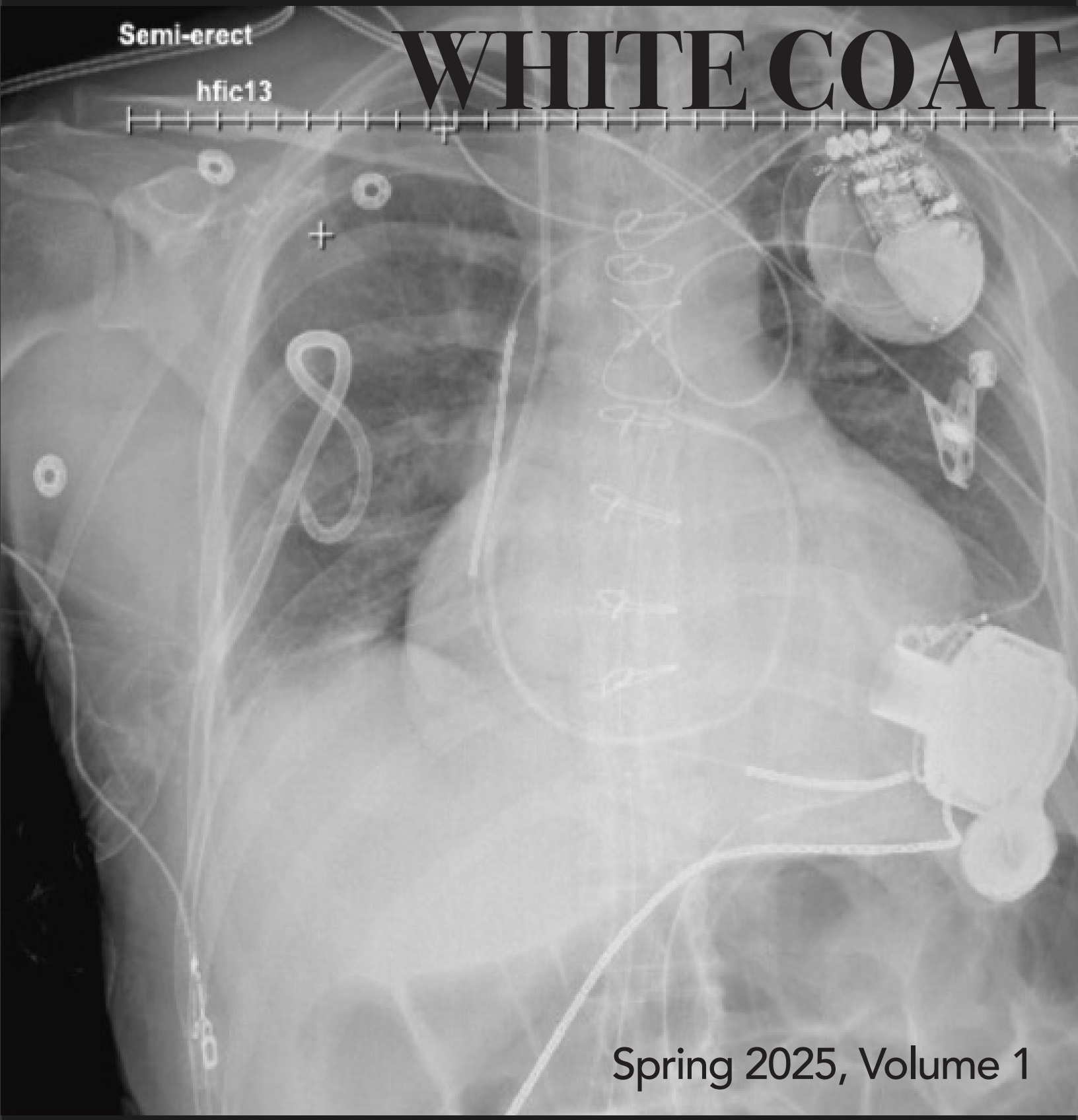
BEYOND THE WHITE COAT



Spring 2025, Volume 1

Tom and Julie Wood College of Osteopathic Medicine

Student Led Medical Journal - Marian University

Cover image. Mangal et al. pages 52–54. Chest X-ray of patient on POD0 show a right-sided small pneumothorax. Mild basilar opacities may represent aspiration or atelectasis. No definite right pleural effusion. Trace left pleural effusion.

Beyond the White Coat (ISSN print: 3067-7440, ISSN online: 3067-7432) is an annual publication produced by the Faculty and Student Research Committees of the Wood College of Osteopathic Medicine, Marian University.

Contact: Editorial Office, 3200 Cold Spring Road, Evans Center 309K, Indianapolis, Indiana 46222.

Dear Colleagues, Students, and Members of the Medical Community,

Welcome to the inaugural edition of our new medical journal at MU-WCOM, Beyond the White Coat. This milestone publication marks the culmination of a vision that was initiated by OMS-III student Jillian Nicely, who recognized the need for our school to have a medical journal dedicated to student scholarship and creative contributions.

Beyond the White Coat is a student-led, faculty-supported annual medical journal that showcases the varied scholarly work and perspectives of our medical students. This journal highlights original research, reflective narratives, creative works, and service experiences that capture the educational journey that occurs within our osteopathic medical education program and MU-WCOM.

The creation of this journal addresses a critical need in the field of medical education. While scholarly publishing remains an essential component of medical education, medical students often face significant barriers to publication, including cost constraints, time limitations, and limited access to appropriate peer-reviewed platforms.

As we launch this inaugural edition, I am excited for the future of this journal and its potential to grow as an essential contribution to research and scholarly activity for the students at MU-WCOM. This publication represents more than just a collection of student work. It reflects their commitment to the mission of MU-WCOM.

We want to thank Dean Amanda Wright, DO, who believed in this initiative from the very beginning. Her unwavering support gave us the foundation we needed to move forward, and when she suggested the name Beyond the White Coat, she captured exactly what we hoped this journal would become, a space where our students can express the full breadth of their experiences in medicine, not just what happens in the clinic or classroom.

Sincerely,

Robyn Fuchs, PhD
Faculty Advisor, Beyond the White Coat
Professor of Physiology, MU-WCOM

Dear Readers,

It is with great pride to introduce the inaugural issue of Beyond The White Coat, Marian University Wood College of Osteopathic Medicine's student run medical journal.

This journal was created with the intent of providing an accessible platform for student authors, promoting scientific achievement and highlighting the boundless creativity within our student body. More than just a publication, Beyond The White Coat provides students with invaluable professional experience through the editorial process.

Within the pages of this journal, you will find not only scientific research but a broad array of artistic expressions, testimonials, spotlights and other pieces that capture the multifaceted experiences of medical students at MU-WCOM.

We would like to thank Dr. Robyn Fuchs, our dedicated faculty mentor, whose unwavering support was instrumental in bringing this journal to life. We also extend our gratitude to the authors whose passion and commitment are illustrated by their contributions.

We invite you to explore this collection and be inspired by the ingenuity of our student body.

Sincerely,

The Student Editorial Board

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Spotlights

Faculty Spotlight:
David Strom, PhD

"I first met Dr. Strom as a first-year student looking for research opportunities, and I never could have imagined the impact he would have on my life. From keeping track of our experiment mistakes in the lab to traveling to Honduras and feeding his chickens, he has been an incredibly meaningful mentor. Dr. Strom genuinely cares about each student's success and has been a dedicated part of MU-COM since its inception, always going out of his way to help. I'll miss our monthly chats, and while the Evans Center won't be the same without him, I wish him all the best in his retirement**."**

- Alexis Klink, OMS-III

"I first met Dr. Strom while preparing for our mission trip to Honduras, where we spent an afternoon packing medical supplies and hearing stories about his and his wife Sylvia's decade-long commitment to this trip. In Honduras, I saw him thrive in his element, running a busy pharmacy and living in the mountains while helping people in need, and I spent much of my time assisting him. Through long, busy days, I discovered the real Dr. Strom—a tough, sarcastic man with an enormous heart and a great sense of humor. When I heard of his retirement, I felt both sadness and excitement for his new adventures, but I'll always treasure our time in Honduras and the lasting impact he made on me and others."

- Alexa Neff, OMS-II

Faculty Spotlight:
John Lucich, MD

"If you asked my friends and classmates they'd tell you that Dr. Lucich and I are pretty close, best friends I'd say, but if you ask Lucich, well, he'd make a sly smile and say something along the lines of, "sure if you say so." I always looked forward to my ICM sections first year because it was one of the only times I felt like a student doctor. However, it was also a great relief to be around Dr. Lucich and receive his humorous but open insights on physical exams, working through possible differential diagnoses for cases, etc. Dr. Lucich has always been someone I have been able to vent to, joke with, and seek advice from. He is a man of many talents, such as wonderful mnemonics, woodwork, and tinkering about his home, but I'd say being an educator is one of his best. He's taught me so much both in and out of the classroom. I'm forever thankful to have had the pleasure of learning from him."

- Chynna Walker, OMS-III

"I appreciated you teaching ICM and your review sessions. Your witty remarks always made my day."

- Daniel Jung, OMS-III

"Thank you for being such an incredible teacher! It has truly been a privilege to be your student this year. Your exceptional organization, unwavering kindness, and tireless efforts to bring laughter into our classroom have made a profound impact on all of us. I genuinely appreciate everything you do; your efforts did not go unnoticed. As you embark on this exciting new chapter of your life, I hope you embrace retirement wholeheartedly. May it be filled with joy as you spend time doing the things you love most and with the people who mean the most to you."

- Roukaya Najdi, OMS-III

Getting to Know **Dr. Dazé:** A Clinical Partner Spotlight

Jillian Niceley, OMS-III and Gabriella Battiston, OMS-III

Robert Dazé, DO '18, Marian University Wood College of Osteopathic Medicine alumnus and dermatologist at Forefront Dermatology, serves as a preceptor and mentor for MU-WCOM students. His well-developed pedagogy and devotion to medical education has made a significant impact on students. Dr. Dazé introduces foundational dermatology concepts to OMS-2, students as a guest lecturer in the DiSkO (Dermatology, Immunology, Skeletal, Orthopaedics) course. As a preceptor, Dr. Dazé has found novel ways to teach OMS-3, and OMS-4 students. For instance, he allows students to practice performing punch and shave biopsies on limes before carrying out biopsies on patients in the clinic.

He also organizes and instructs at the annual suture clinic where OMS-1 &2 students advance their suturing skills using pigs' feet. Despite his demanding profession and busy schedule, Dr. Dazé still makes time to be a mentor in the meaningful mentor program at Marian. He provides his mentees with invaluable guidance as they explore their professional interests either in dermatology or other fields of medicine. As a mentor, Dr. Dazé actively provides students with opportunities for shadowing and encourages student involvement in research. As a recent alumnus who has already enriched the education of MU-WCOM students in so many ways, we asked Dr. Dazé to share his personal journey in medicine and experience as an educator and dermatologist.

What inspired you to pursue a career in dermatology?

Prior to medical school I worked as a makeup artist for Nordstrom for seven years. It was during this time I solidified my passion for aesthetics, but ultimately, I felt limited in my role as I could only "cover up" certain conditions whether it was

acne or eczema and never fully it treat it given the products I was asked to sell. This inspired me to go back to school and complete a post-baccalaureate as I was a dance major back in college and did not have any pre-medical science classes. After being accepted into medical school, I kept Dermatology in the back of my mind as I wanted to be open to any specialty that may inspire me. After my Dermatology rotation in my 3rd year of Marian I knew I was meant to be a Dermatologist. I loved the field and could not see myself in any other specialty. The breadth of knowledge required to treat multiple skin conditions, prevent skin cancer, perform surgery, and see patients of all ages and skin tones is ultimately why I chose Dermatology.

Can you share your educational journey and any specialties within dermatology you focus on?

I completed my undergraduate degree at Santa Clara University in Theater Arts with an emphasis in Dance. From there I finished a 2-year post-baccalaureate certificate program at California State University Fullerton. After graduating from MU-COM in 2018, I completed my internship and Dermatology residency at Largo Medical Center in Largo, FL. I did not decide to pursue a fellowship in Dermatology (i.e. Mohs, Pediatric Dermatology, Dermatopathology, Cosmetics) as I loved the breadth of Dermatology and what it had to offer. I did not want to feel limited in my role and just perform skin cancer excisions, just treat children, or look at slides behind a microscope. I wanted to do everything my specialty had to offer which is why I decided to practice as a general Dermatologist.

What inspired you to serve as a preceptor and mentor students at MU-WCOM?

Ultimately, I wanted to give back to Marian who gifted me with my education. I look back on my journey and I would not be where I am today without the instrumental mentorship of all my clinical preceptors. Regardless of their specialty, each physician taught me invaluable life lessons as well as clinical pearls I still rely on today in my practice. It is because of their selfless dedication to education and mentorship that I too wish to pay it forward.

"Find a mentor who can provide you with invaluable advice and constructive feedback to guide you along your journey."

What is the most rewarding aspect of serving as an educator for medical students?

The most rewarding aspect of serving as an educator is to see the growth, progress, and academic development of every student I have come to mentor. Even with students who may not choose Dermatology as their specialty, I am still blessed to see how far they come in their individual journey - whether it's expanding their medical knowledge of different disease states, mastering basic suture skills, or participating in clinical research. I am humbled to know the time they spent with me will ultimately shape who they will become as an Osteopathic physician.

Is there anything up and coming in dermatologic care that excites you?

I think the most exciting component of dermatologic care is the field of biologics. We have been able to change so many lives with this class of medication and steer patients away from antiquated immunosuppressive agents. We have made immense progress in the treatment of psoriasis, eczema, hidradenitis suppurativa, vitiligo, and alopecia with these mediations. They have changed the face of Dermatology but more importantly they have improved so many lives. Even in my short time as a practicing Dermatologist so many new biologics have hit the market, and each medication seems to surpass the previous ones in terms of clinical efficacy and side effect profile. We are able to give patients a quality of life they previously may have never been able to attain.

What advice would you give to students considering a career in dermatology?

My one piece of advice would be to never give up. I know it may be cliché, but in my experience, this could not be any truer. Dermatology is an exceptionally difficult specialty to match into and even more so for Osteopathic medical students. It requires unwavering perseverance as the journey can be long and difficult. Some students may not match on the first go around and it may require a research/gap year to increase one's competitiveness. If you want Dermatology be prepared to face competitive hardship, but do not give up. Find a mentor who can provide you with invaluable advice and constructive feedback to guide you along your journey. Finally, make yourself the most competitive candidate on paper and in person – excel in all your medical school classes, seek out volunteer opportunities, join Dermatology societies, participate in research, but never give up!

"Continuous UV radiation exposure without proper sun protection will increase one's risk of actinic damage and skin cancer. Wear sunscreen."

What are some misconceptions people have about skincare and skin conditions?

This is a loaded question, and I could probably write a novel about the myriad of misconceptions people have about skincare and skin diseases. In the age of TikTok, Instagram, and "Dr. Google" I have found a good majority of my job debunking these misconceptions and providing patients with data-driven science and research to rectify these misnomers. I would say for skincare there is no single cream or treatment to stop aging. Unfortunately, with the beauty industry and all the viral "skinfluencers" there are too many products to choose from. Patients can be overwhelmed by the sheer number of cleansers, serums, lotions, and moisturizers, to make a practical decision about their skincare routine. I will often recommend a very simple yet effective skincare routine to optimize their patient's preferences. Focus on what is proven to work, not on the fluff of marketing or advertising. Regarding skin conditions and general Dermatology, there is NO such thing as a "base tan" to prevent burns or skin cancer. This is not based in science and is just not true. Continuous UV radiation exposure without proper sun protection will increase one's risk of actinic damage and skin cancer. Wear sunscreen – end of rant.

STUDENT AWARD WINNER PROFILES

Global Scholar of the Year: Kamryn Benscoter, OMS-3

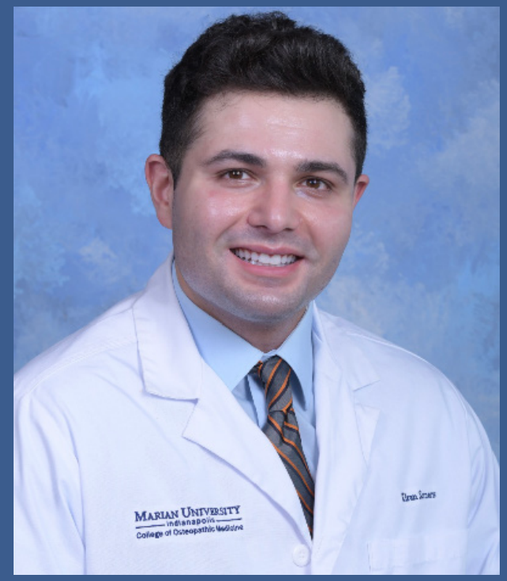
"It is an honor to be selected as MU-WCOM's 2025 Global Scholar of the Year! My passion for global health began during my first international mission trip to Nassau, Bahamas, while I was still in high school. Since that experience, I have aspired to bridge my interests in global mission work with my goal of becoming a physician through medical brigade opportunities. Traveling to San Pedro Sula, Honduras, in May 2023 with Humanity and Hope United and Ascension St. Vincent was an incredible experience that profoundly reshaped my vision for providing medical care in the future. I am also grateful for the chance to share my experience from my time in Honduras at the 2023 Osteopathic Medical Education Conference in Orlando, Florida. I am committed to actively participating in medical brigades and global health initiatives throughout my future career as an osteopathic physician."

Student Doctor of the Year: Kasey Kruse, OMS-IV

"My name is Kasey, I am a current 4th year student at Marian. I am from a small town in Northwest Ohio, studied biology at the Ohio State University for undergrad, and completed my master's with the BMS program at Marian. My journey to medicine was not the typical path, no one in my family is in medicine and I am a first-generation college student, so I was not always aware of the opportunities available to me. I have always had a passion for helping others and learning, especially science/math, and growing up I believed I wanted to be a veterinarian. In college I discovered that animal science was not the path for me, and I began shadowing different roles in medicine, eventually discovering that I wanted to be a physician. I took time off after undergrad and worked as a nurse aide, this is where my true understanding of medicine, especially family/osteopathic medicine, began and I am so grateful that it led me to Marian.

Throughout my time at Marian, I have been involved in multiple leadership positions and roles with the NWFC, SAAO, OMA, Healthcare Camp, and GHHS; research with Dr. Hum and the Bone and Mineral Research Group; and volunteering through multiple capacities as a member of the interview committee, medical student mentor, and healthcare pathways ambassador. Some of my noteworthy achievements include being nominated into the Gold Humanism Honor Society, receiving 2nd place nationally for an oral research presentation at the 2021 OMED conference, and being chosen as the 2024 Student Doctor of the Year for my class. very honored to receive this award and grateful for the faculty, staff, and students of Marian who have supported me on my journey to becoming a physician."

Student Researcher of the Year: Kiran Somers, OMS-IV



Kiran's research journey began in Rochester, MN when his high school offered the opportunity to spend weekends and summers as a Research Intern at the Mayo Clinic. He jumped at the chance, and was assigned to work with a cardiac electrophysiologist on exploring the risk for cardiac arrhythmias in patients with chronic obstructive pulmonary disease. This experience sparked an increasing hunger to better understand and answer questions with a direct bearing on improving patient care. As an undergraduate at the University of California, he continued to work with his mentor, presenting his studies at the National Meeting of Chest Physicians, and publications in the American Journal of Cardiology and Heart Rhythm.

Kiran's commitment to research was reinforced and cemented by his years volunteering at the Ronald McDonald House at Mayo Clinic. Here he met patients and families who traveled great distances at enormous sacrifice to get to Mayo,

because their disease had failed standard therapies, and at Mayo they would have the chance to take part in research trials of experimental treatments. This gave him a new perspective on the immediacy of how research could impact patient care.

While at USC, he was awarded an American Physiology Society STRIDE Fellowship, enabling him to work summers in a basic biology bench lab. Here he studied the biology of human visceral and subcutaneous adipocytes. He would go to the surgical suites and collect fat tissue harvested from patients' intra-abdominal and subcutaneous fat depots, bring them to the lab, and prepare and preserve the samples. He explored the role of the renin-angiotensin system in visceral versus subcutaneous fat, resulting in a presentation at the American Physiology Society and a publication in Frontiers in Physiology.

Kiran also developed some ideas and questions based on his undergraduate experiences at USC, noting how widespread the use of energy drinks and Adderall was in the student population and how little was known of how these stimulants affected blood pressure and heart rate. He approached a mentor and they were able to get funding for these studies, with results presented at several American Heart Association meetings, a paper in Journal of the American Medical Association, and another paper currently in preparation, which he hopes to submit for publication in the next month or so.

Kiran is looking forward to residency and the opportunity to integrate research into his training, with the long term goal of developing into a physician-investigator.

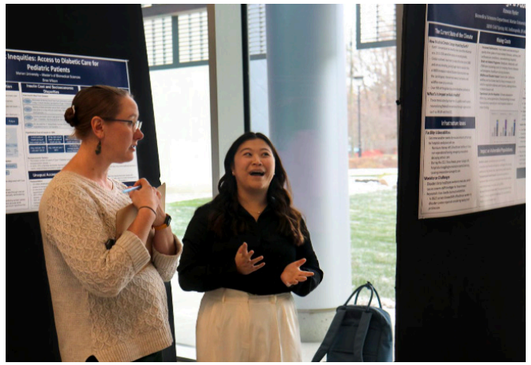
At a personal level, Kiran enjoys weight training, mixed martial arts, anime and spending quality time with Tessa and Petey, his dearly beloved golden retrievers.

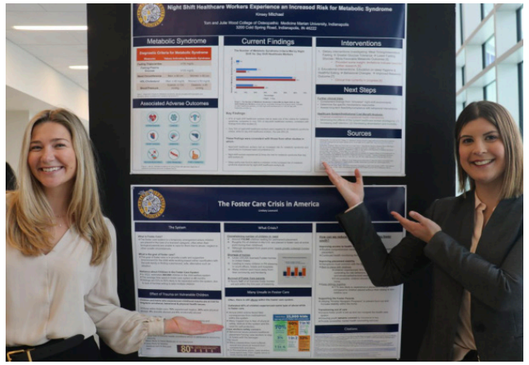
Research Day

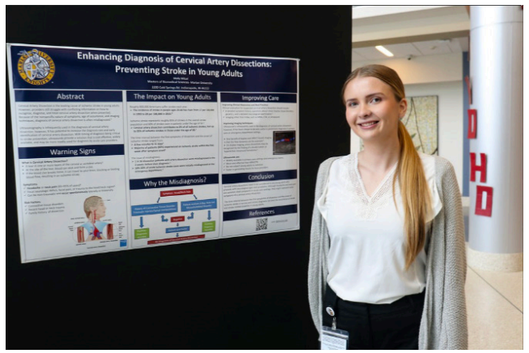
Research day provides students with a platform to highlight their unique interests and expertise across a wide array of topics

The MU-WCOM Research Day, held on November 15, 2024, showcased 31 poster presentations and four oral presentations highlighting the scholarly work of our students and faculty. Three awards were presented: Best Oral Pesenation (1st place) and Best Poster Presentation (1st and 2nd place).

Best oral presentation went to Risha Mehta, OMS-2 (Dr. Catherine E. Steding lab) for "Exploration of Vaccine Hesitancy in Medical Student Population." First place for best poster presentation was awarded to Iliana C. Cordova Mendez, OMS-2, (Dr. Wilbert A Derbigny lab) for "Examining the impact of the Chlamydia muridarum-induced synthesis of IFN-β during genital tract infection." Lastly, second place for best poster presentation went to Mitchell Keeling, OMS-2, (Dr. Elizabeth Delery lab) for "SIV Infection Decreases α-Klotho in Choroid Plexus of Rhesus Macaques."







The Biomedical Sciences Master's (BMS) Research Day took place on December 3, 2024, featuring presentations from 63 students who showcased posters on a diverse range of topics as part of their degree requirements.

From Bench to Bedside: Advances in Genital Tract Infection and Immunity

Robyn Fuchs, PhD

Meet Dr. Wilbert A. Derbigny Jr., a passionate researcher at Marian University College of Osteopathic Medicine, who is tackling big questions about how our bodies fight microbial infections. As a Professor of Microbiology and Immunology, he's particularly interested in the immune responses to genital tract *Chlamydia* infections, and their unexpected role in contributing to the pathology of the genital tract in women infected with *Chlamydia*.

With over $2.3 million in research funding from NIH and other sources since 2007, Dr. Derbigny's laboratory investigates the complex interplay between intracellular bacterial pathogens and the host immune system. Dr. Derbigny's investigations center on Toll-like receptor 3 (TLR3) signaling pathways and the novel discovery that TLR3 has a significant role in the immune response to *Chlamydia* infections. His laboratory has made several significant discoveries regarding how TLR3 contributes to the protective immune response against *Chlamydia* and its potential influence on disease progression.

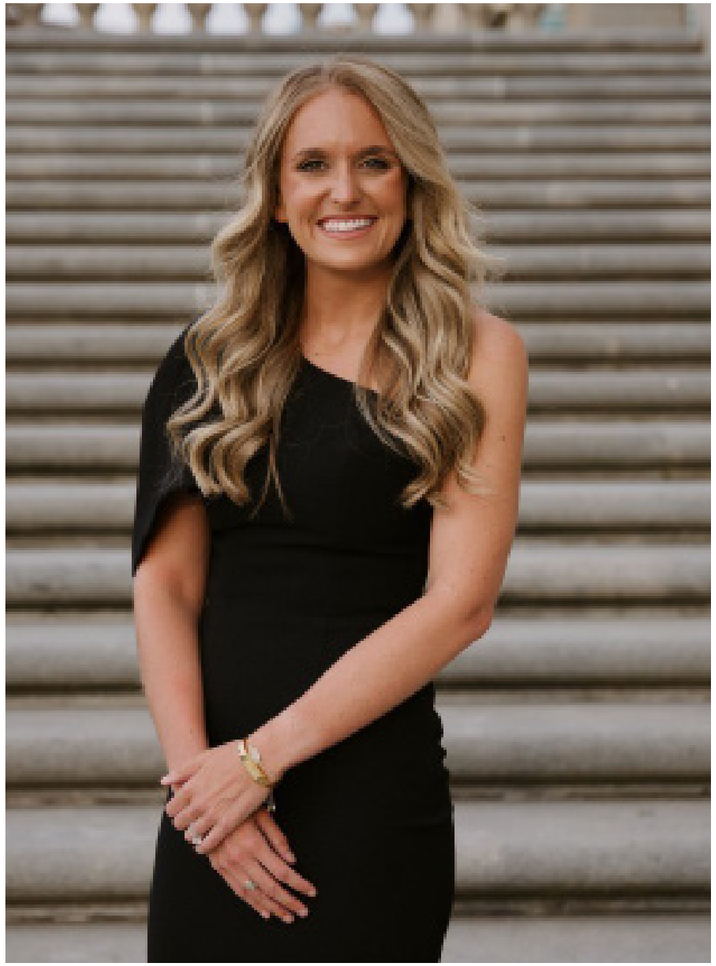
His groundbreaking work revealed that TLR3 promotes the resolution of *Chlamydia muridarum* genital tract infection in mice, attenuates the bacterial replication in the genital tracts of mice, and that TLR3 deficiency can exacerbate the loss of epithelial barrier function during infection. These findings have significant implications for understanding how *Chlamydia* infections lead to severe clinical complications such as pelvic inflammatory disease (PID), ectopic pregnancy, and infertility.

Dr. Derbigny has expanded the scope of his ongoing research to explore other critical questions that are at the intersection of immunology and infectious disease. Currently, he is working on multiple NIH-funded projects, including a study investigating whether immune responses to *Chlamydia trachomatis* can increase HPV infectivity in women. In this study, he is investigating whether inflammatory immune responses induced during *Chlamydia* infection can enhance HPV infectivity, and thereby potentially elevate cervical cancer risk in women co-infected with both STIs. Another current project, which is on the verge of NIH funding, examines the specific impact of IFNα on the pathogenesis of genital tract Chlamydia infection.

Beyond his research accomplishments, Dr. Derbigny is dedicated to training the next generation of scientists and physicians. He has mentored numerous undergraduates, graduate students, medical students, and postdoctoral researchers, many of whom are from underrepresented groups in science. His collaborative approach extends to partnerships with researchers across multiple institutions, creating a rich environment for scientific discovery.

Alumni Spotlight: Ashley Orr, DO

Alexa Neff, MS, OMS-II



Ashley Orr, DO, is a 2024 graduate of MU-WCOM and has served as a mentor to me during my time in both the Biomedical Science (BMS) and DO programs. We quickly bonded over our shared paths to medical school and a mutual passion for pediatrics. Ashley graduated with a degree in Health and Human Sciences, with a minor in Biology from Purdue University in 2017. She completed her thesis in the MU-COM Biomedical Science Master's program in 2019, and is now in her first year of pediatric residency at Riley Hospital for Children in Indianapolis, IN.

Ashley and I were introduced by Dr. Julia Hum, Associate Professor and Director of the BMS program, who has served as a mentor to both of us. Given her deep understanding of our experiences, I knew Dr. Hum would be the perfect person to conduct this interview with Ashley.

Can you briefly describe your journey entering into your time at Marian, even going back to where you grew up and went to undergrad?

I am originally from Martinsville, Indiana. I grew up on a small farm about half an hour from town and I went to undergrad at Purdue University. I absolutely loved my time here, but because it's a large institution, I never really planted roots or got involved with research or different programs that are really important when seeking out a career in health care, so upon graduation, I was really unsure what to do. I always thought that medical school was the end goal, but there were some avenues or things that I hadn't tried yet that I wanted to before reaching the final destination.

Marian's BMS program was a great bridge into that next step and when I found out that there was an option to get a full master's degree with a full year dedicated solely to research, that was really appealing because it really played into the long game of wanting a varied background and wanting to enter medical school with no stone left unturned.

I loved my time there. It allowed me to experience research in a way that I hadn't before. It also allowed me to get to know faculty members and mentors which I really missed out on where I was at a larger institution because Marian's student to faculty ratio is a lot kinder. I felt like people were really investing in me and my goals and dreams. This program allowed me to be admitted to medical school, which was incredible. When I went looking where to apply, I knew that Marian was really it for me, I didn't look elsewhere because I knew that I had a home here and it aligned with my values.

How did your master's degree complement your medical education?

I think the master's program allowed me to customize my education in a big way. I was able to choose the courses that I found interesting and aligned with my longterm goals, which was really helpful. As I said, I did the two-year program which had a year of dedicated research and minimal course work, which was helpful because I hadn't experienced research in such a deliberate and intentional way. Marian really fosters opportunities and the collaboration with other laboratories, specifically where I did mine at Indiana University (IU) was really helpful because I never felt hindered by the fact that I was a Marian BMS student. I was welcomed at IU and that collaboration between schools fosters creativity and education while pushing the boundaries of science at the time. I felt really supported in opportunities to explore, publishing articles or attending conferences and doing things that are really difficult to do in the normal medical school timeline.

"Marian has a lot of ways to get involved that are meaningful and actually change the community we live in."

I think this just really shapes how I think now that I am at an academic institution for residency. We talk about research all the time and I am not intimidated by it because it's been a part of every step of my journey on both the BMS side and the DO side and even now as a resident. It doesn't always have to look like Petri dishes in a hood where you're wondering what this means and how it can impact patients one day.

Reflecting on your time at our medical school, how did your education here shape your approach to patient care?

Marian is largely a group of doers. It's not people who just talk about things; it's people that get things done. People aren't afraid to complete difficult tasks, they're not afraid to be the ones to show up early or work late if it means giving the best care possible. Especially now, I have the opportunity to work with medical students from other institutions and it's really clear that work ethic is something intrinsic to students that go to Marian. I can't pinpoint what makes it special, be the recruiting or the faculty that just engrained that in you from the start, but it really stands out.

One thing that really stands out to me is the opportunities and experiences that we had early on to have patient care at the center of our education. At the time, the OSCEs that we do seem cumbersome, frustrating and stressful because you're still trying to study for exams at the same time. But I really do think that they helped because we never went several months between taking a history and physical or seeing a standardized patient.

I think Marian has a lot of ways to get involved that are meaningful and actually change the community we live in, not just something to put on a CV. I felt that way with the Near West Free Clinic. Our deans and faculty like Dr. Jones would show up and be a provider in the clinic as well as clinical partners like Dr. Pike, who founded the clinic. It really shows that the people leading the school and involved in our curriculum have a patient care and community focus at the top of their mind and want to give back.

What are you up to now and what does a day in your life look like?

After leaving MU-WCOM, I started at Riley Children's Hospital in their pediatrics program. The start to residency has been quite busy because every four weeks or so we change services. Right now, I'm on the Hematology-Oncology service, so I am in the hospital every day from 6am until 5pm caring for patients who are admitted for a variety of reasons. In addition to patient care, we also do daily didactics. We have different meetings and opportunities to get involved, so every day is a little different from the next.

How do you see your research experience helping you now as a resident physician?

When I'm on a service, every attending I work with is working on something. They all have different passions; I've seen the whole gamut of those that focus on clinical trial data versus those that do more case-based reviews or op-ed pieces. But people are really excited to talk about the work that they're doing because they're proud of it, and they're invested in it. I think it's really important because I can think of a patient that we had recently in the PICU that had a particular syndrome and was having a really difficult course in their hospital stay. My attending physician told me that five years ago, he wrote a publication about this presentation because it was super rare and super interesting and that is actually what I was referencing as I presented this patient. Now, on the oncology side of things, we implement different protocols every day that these attending physicians are a part of and we're real time doing things and collecting data points that will shape how children with cancer are treated in years to come.

Are there any lessons or insights from your educational journey that you carry with you now as a resident physician?

I feel like there are many, but one in particular that I think of comes from Dr. Nelligan. He always said to not undervalue the importance of relationships and connections, whether that be with patients, with mentors, with co-residents because those are relationships you will never regret.

I think the role that we get to have as physicians is really special because we get to see the curtains pulled back and partner with people and see really vulnerable moments. Being with them and taking the time to listen and more importantly not listening just for your turn to speak but really listening to understand.

Can you discuss any faculty members or members of our medical school community who significantly impacted your professional development?

Oh my gosh, Dr. Julia Hum is going to have the biggest blush ever. I can remember before BMS even started, I sent an email to Dr. Hum, who by the way, I was very intimidating to email, and asked if we could meet to see what the BMS program is really about and how to get ahead and have a good game plan at the start of the program. We met in the student center, before Chick Fil A was even there, so a long time ago. But she talked about the long game, which at the time included the idea of doing a two-year program, spending an entire year doing research, and receiving a full master's degree rather than just a certificate.

That meeting was really important to me because I had never had an advisor or mentor who invested in me and talked to me in a way more than just shutting down my dreams, instead uplifting them and saying "this is possible, and these are the ways we can make it happen." I think that constant hope and encouragement has brought me to where I am today. Up until then, I didn't have anyone who supported my dream but rather was a barrier to those. As someone who came from a family where I was the first to have a college education, having someone, particularly that is a female with a doctoral degree, look at me and say that I could do this, was so powerful.

Julia – Do you know the reason that we met over there? It's because I didn't even have an office yet, so let's just look how far we've both come, my friend.

What advice would you give to a current BMS student about your path to both medical school and residency?

I think that if I was to talk to someone going through this now, I would say don't undervalue the present when looking towards the future because during my time in the BMS program, if I had only been focused on where I would be seven years down the road and trying to get there as fast as I could, it would not have been the same experience.

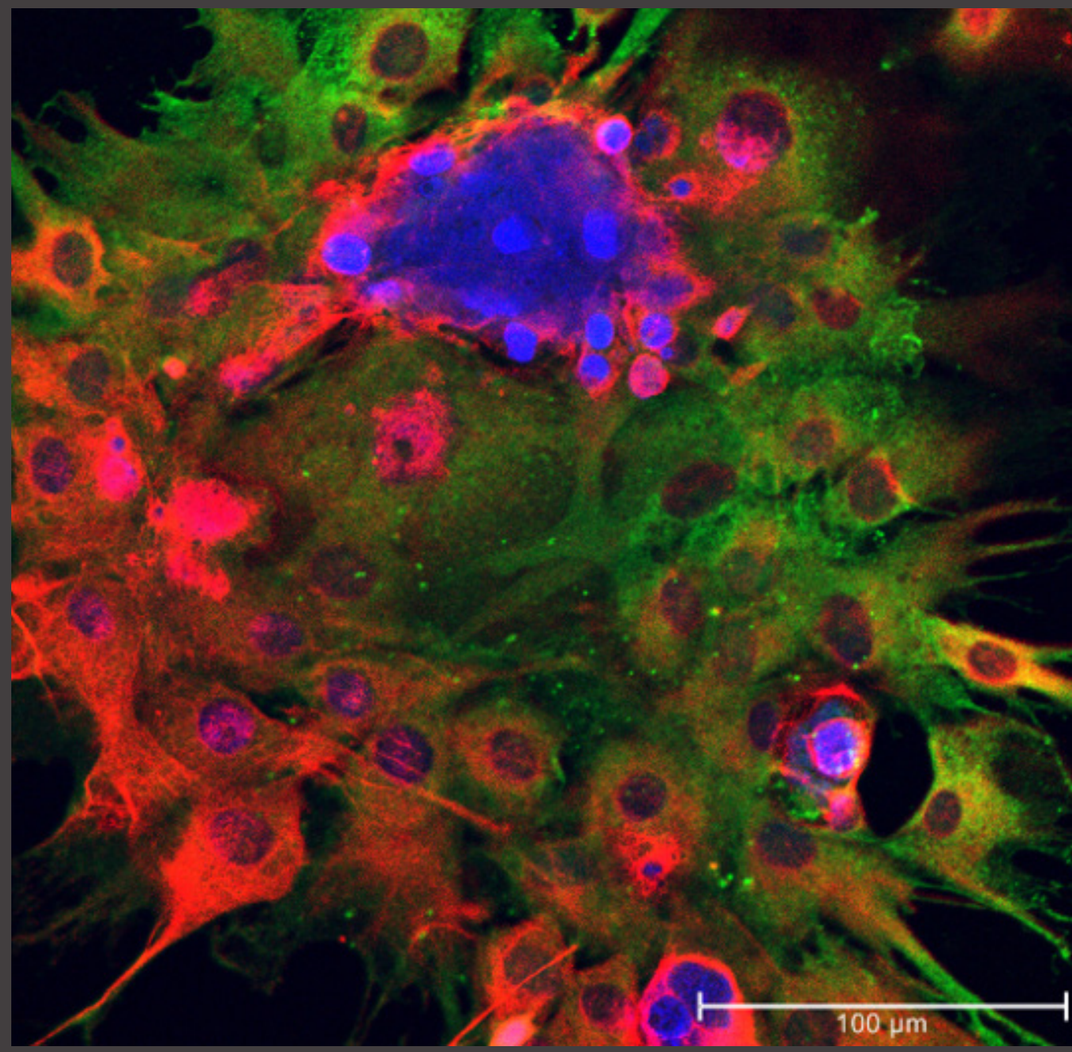
While some looked at the BMS program as a pivot or a roadblock or speed bump to get where they're going, I would encourage them to look at it more as a bridge to the next step. Each part of the journey is important, and they should try not to be so focused on where you're going to be ten years from now. I would also tell them to celebrate the current because the goal posts always keep moving. For me, medical school was always going to be there, so no matter what roadblocks I needed to go through first, I was going to end up where I needed to be anyway.

Speaking of the present, but also looking towards the future, tell us what your next career goals are? Post-residency, what does that look like for you?

Long-term, I will likely go into neonatology, so I'll work in the NICU hopefully. Next step is going to be to find a great research project to do while in residency and then hopefully match into fellowship in just two and a half years, time flies. Also, as a resident, I joined the advocacy committee, so hopefully while I'm a resident I'll be able to do things that impact the community in a positive way because I know the children of Indiana specifically need us, and they need our voices to be their voices.

I am deeply grateful to both Ashley and Dr. Hum for their ongoing support, guidance, and willingness to help me whenever I reach out. Their generosity and mentorship have made a significant impact on my journey. I hope you enjoyed reading more about Ashley's story and how MU-WCOM has impacted her future.
- Alexa Neff, M.S., OMS-II

A BEAUTIFUL ACCIDENT



Elizabeth Delery, PhD

40X confocal microscopy of an overconfluent cluster of primary Rhesus macaque choroid plexus epithelial cells, grown ex-vivo. Fluorescent Stain: Transthyretin (green), Vimentin (red), Phalloidin (far red), DAPI (blue).

Testimonials

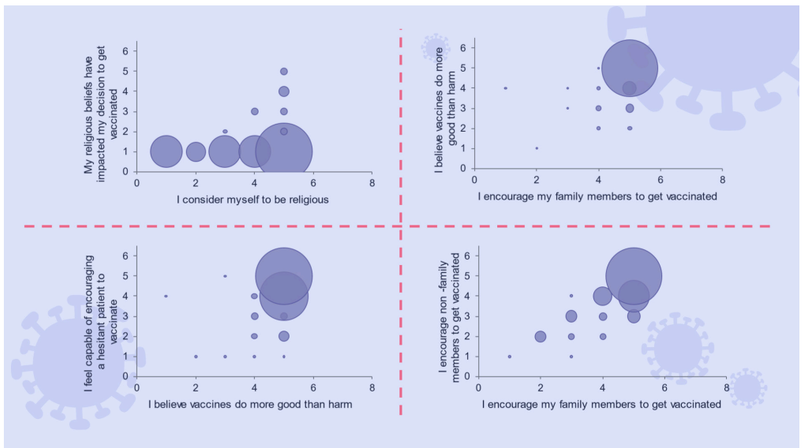
MU-WCOM Summer Research Fellowship

Risha Mehta, OMS-II

Many students enter medical school with the goal of gaining valuable research experience to help them specialize in a particular field and explore its clinical applications. However, research opportunities can often be hard to navigate, and many are unpaid, which can discourage students from pursuing them. To address this, the MU-WCOM Summer Research Fellowship was designed to offer incoming OMS-II students a stipend to conduct research over the course of eight weeks under the mentorship of a Marian University faculty member. This financial incentive provides students with the opportunity to engage in meaningful research during the summer, making it more accessible and appealing. In turn, it has helped the institution place a stronger emphasis on research, giving students a platform to explore their interests in this area.

I had the privilege of being selected for the fellowship this past summer, working closely with Dr. Steding on my research project. I designed and developed a survey on Qualtrics to examine the "Impacts of Vaccine Hesitancy on a Medical Student Population," which I distributed to all four classes of medical students at MU-WCOM. The survey garnered a response rate of over 20%, and the data allowed me to draw important insights into this critical issue. I presented my findings at the 10th annual MU-WCOM Research Day, where I was thrilled to receive a 1st place award for my work. Currently, I am working on publishing my research and collaborating with other medical schools to expand the study and explore the broader implications of vaccine hesitancy.

Receiving this fellowship not only allowed me to pursue my own research interests but also facilitated meaningful connections with faculty members. I highly encourage any student interested in research to apply for this fellowship. Research is all around us, and it is up to the students to seek out and seize these opportunities to expand their knowledge. MU-WCOM offers a wealth of resources for students to engage in research, and this fellowship is just the beginning of what students can achieve.



Density scatter plot. Based solely on the individuals who answered the related survey questions, religiosity does not impact decisions surrounding vaccinations. Additionally, comfort level with advocacy for vaccinations declined as the separation in a relationship increased.

MEDICINE OVERSEAS: INSIGHTS FROM A VASCULAR SURGERY ROTATION IN GERMANY

Sujana Vemuru, OMS-II and Chandana Kodumuri, OMS-II

During our vascular surgery internship in Germany, we found ourselves immersed in an extraordinary learning environment from the outset. This enhanced our comprehension of significant diseases and healthcare trends within vascular surgery, while offering significant insights into surgical techniques, multidisciplinary teamwork, and patient care. We aim to apply our newfound knowledge to improve our ability to work on a healthcare team and improve the care we provide to patients in the future.

Immediately granted the privilege to scrub into major surgeries ranging from intricate amputations to delicate varicose vein removals and complex endovascular aneurysm repairs, we were captivated by the precision and teamwork involved. The hands-on experience extended beyond observation; we practiced suturing under guidance, gaining invaluable skills on real patients. Witnessing the workday of a surgeon firsthand was also eye-opening, resolving our initial concerns about patient interaction. Through structured rotations, we worked closely with patients every Wednesday, followed their progress in ICU post-surgery, and attended outpatient clinics weekly. This continuity allowed us to witness the profound impact of our interventions on patients' lives. Moreover, we gained a deep appreciation for the multidisciplinary collaboration within the surgical team, interacting closely with scrub nurses, other healthcare professionals, and the anesthesia team, all of whom played pivotal roles in our daily operations.

When we were not by the operation table, we were able to gain key insights into the life circumstances of vascular surgery patients. Firstly, we noticed that patients had different stays within the hospital based on their health insurance. Although there were different types of insurance, every patient did receive the same medical attention and care. Patients who qualified for private insurance; had a more refined experience with private rooms, newer facilities, and more personalized care. In contrast, patients with public health insurance were cared for in group rooms within the older sections of the hospital. Compared to American healthcare, however, there are far less out-of-pocket expenses that patients need to cover, and most treatments are covered by the public health insurance.

Within the vascular surgery unit, we learned quickly that many of the patients were lifelong smokers. Unfortunately, doctor-recommended smoking cessation was not usually successful. This was evident from witnessing the same patients smoking outside the hospital as we were leaving work. Nevertheless, an inevitable aspect of vascular surgery was seeing patients with peripheral artery disease (PAD), which is most common among smokers. These patients have an increased risk of forming calcifications within their arteries, resulting in stenosis and loss of circulation to the distal regions of the artery. Unfortunately, some of the patients did not seek medical treatment early enough and would be seen in vascular surgery when the extremity tissue had already undergone necrosis, resulting in toe, foot, or calf amputations. Most commonly, once a patient was diagnosed with PAD it was very likely that the calcifications would form again and worsen, resulting in additional amputations. However, we were also able to see these operations performed on younger patients who could continue to live a prosperous life as a result of the vascular surgeon's intervention.

Postoperatively, some patie ts had nowhere to go because, for many years, Germany has faced a shortage of space in nursing homes for new residents. Consequently, many patients extended their hospital stays, often passing away there. These prolonged stays also increased the risk of infections among patients, which we were able to see firsthand. For example, we closely followed a patient who was operated on three times due to recurring infections during the internship. Although it was fascinating to see the graft interventions used to correct the infection in each operation, it was devastating to see the patient's health decline as each operation took a toll on their body.

In just three weeks, we were able to grow immensely as medical students. We not only observed what it took to correct vascular insufficiencies physically, but we were also able to learn about the underlying topics of smoking culture, health insurance, and extended hospital stays – that surround these surgeries. This experience was irreplaceable in honing our surgical skills while also deepening our passion for both vascular surgery and patient care.

A Summer Mission in Honduras

Zoe Bowen, OMS-II and
Sophie Brown, OMS-II

I wholeheartedly believe every future and current physician should experience a medical mission trip during their education or career. I say with certainty medical mission trips will change one's outlook on this profession. The gratitude with which the Honduran communities had for our services, of even the simple act of providing NSAIDs, was both heartbreaking and heartwarming at the same time. Little children showed up to the clinic in their best outfits, suits and poofy dresses, as this was very likely one of the only times a year they had the opportunity to receive medical attention. Up in the mountains of Honduras the closest hospital or clinic is at least a 3 hour drive away, requiring patients to pile into the back of a pickup truck like sardines making the journey less than comfortable. To even reach our clinic in the mountains, many families had to trek many miles by foot. Even with these obstacles, every patient was more than grateful for our time and attention to their medical needs. It makes you realize how many lives you can make a difference in with the knowledge we are learning during medical school, putting into perspective the hours of studying versus what we can accomplish with our career one day both in local communities and those abroad.

As a medical student this was an amazing opportunity to obtain hands-on experience. One of my favorite stations to work at was triage, where we took patients' vitals. I am personally interested in pediatrics; helping comfort crying babies by giving them a princess temporary tattoo or a toy car before taking their temperature is something they can't teach you in a lecture hall. We also had the opportunity to work closely with "petitos": Honduran high school students interested in pursuing a career in medicine. They assisted as our translators when creating treatment plans for the concerns and problems each patient presented with. I became very close with a petito named Scarleth over the course of the week. Even though we live hundreds of miles away from each other, it was striking our similarities in personalities and interests. Scarleth hopes to complete her undergraduate education in the United States and I am happy to be someone she comes to for advice as she closes out her high school career. One of the most heartwarming moments was receiving a message from Scarleth once I had returned home letting me know she was grateful to have had the chance to practice her English on me. I will most definitely take advantage of future opportunities to utilize my education to serve more communities across the globe." **- Zoe Bowen, OMS-II**

In late May of 2024, myself and multiple other students, doctors, and volunteers packed up our things and headed on a 3-hour journey up the mountains of Honduras. We were covered in dust, packed tight in the back of a pickup truck, and sweating in the 90 degree weather, unsure of what the week would bring. I can confidently say that during that time, I had no idea of the impact that this week with the people of Honduras would have on me and my path to become a physician.

The week began with loads of preparation. The volunteers spent hours packing our things for the clinic, pharmacy was busy counting and sorting medications, and students were finetuning their osteopathic techniques before our first day. I will never forget approaching our first location for the clinic. Hundreds of people were lining the streets by 5:30 AM, awaiting our arrival, in hopes of receiving the care and the answers they were searching for. Many of them walked miles, drove far distances, and were prepared to wait all day to be seen.

One of the most impactful aspects of this entire experience was the gratitude that was expressed from every last patient. No matter how long the patients waited, they would thank us, continually expressing how important this experience was for them. For many of the patients we were seeing, this was one of the only opportunities they had to receive medical care for the whole year, as the closest hospital was in the city which is almost a 3 hour ride down the mountain.

We were able to see a breadth of different cases from general primary care concerns to more chronic clinical conditions. This was an amazing way to put into practice some of the physical exams and clinical knowledge that we had learned during our first year of medical school. We were also able to discuss differential diagnoses and come up with the best possible care plan for every patient that we saw. There were tough cases and many challenging days, but seeing the impact we got to bring to these communities in a short week there was nothing short of incredible.

Over the course of the 4 days, we saw over 1250 patients. Each patient was able to get a full check-up, receive any OMT they needed, and talk to the pharmacy to get vitamins/medications. I am incredibly grateful for MU-WCOM for providing this opportunity for students, as it opened my eyes to the needs of the world and only furthered my love for primary care. I hope that we are able to provide this care and more to the people of Honduras for years to come." **- Sophie Brown, OMS-II**

Marian University Healthcare Camp: A Week of Exploring Medicine

Irish Starkey, M.S., OMS-I, Caitlyn Phillips, OMS-II, Nikki Ayala, Lauryn Felder, OMS-II, Essa Siddiqui, OMS-II, Stephany Gutierrez

The Annual Marian University Healthcare Camp is a week-long event hosted for high school students. These students learn about the varied careers in healthcare and medicine through interactive activities and lectures throughout the camp. This year, 100 high school students were selected to participate. Each day was a coordinated theme that ranged from patient diagnosis, treatment, therapy, and follow-up. The event was a Marian University collaboration consisting of students, faculty, and staff from different academic areas of study. There were also guests from the United States Army, Pfizer, and Indiana Donor Network, who contributed to fulfilling the campers' experience by expanding the education of healthcare in armed forces, pharmaceuticals, and organ transplant respectively. Campers were able to perform science experiments, participate in emergency and nursing simulations, practice patient encounters, learn about patient centered medicine, present research posters, and practice osteopathic manipulative medicine.

The preparation of the event was extensive and began around January. Our program director, Mrs. Elena Bolin, worked with the Marian University Tom and Julie Wood College of Osteopathic Medicine faculty and employed Camp Interns, Camp Mentors, and Activity Station Coordinators. As lead mentors, we were responsible for assisting the program director with the day-to-day operations during camp. Not only did we help in coordinating and scheduling, but we also assisted in training and providing mentorship to the campers, Camp Mentors, and Activity Station Coordinators. The IT intern was tasked with duties that focused on managing Qualtrics application for the specific roles, working with the program director and the Interns in creating online presentations, daily events, maintaining communication, and updating camp logistics.

The communication and scheduling intern's roles included conducting the student hiring process for Camp Mentors and Activity Station Coordinators, connecting students with the faculty they would work with, working to integrate the schedule into Outlook calendars, distributing and planning for supply lists, and problem solving with cancellations. The digital media intern was responsible for designing the digital program, planning the daily camp activities, serving as contact for questions, creating camp counselor training and information packets, and managing the social media Healthcare Camp and ordering and distributing apparel for campers, counselors, staff, and faculty.

The Community Engagement Lead Intern's role centered on advancing the mission of the Camp by creating an environment where campers and staff felt welcomed and supported. Many students have limited access to opportunities and resources for early exposure to medicine. This role aimed to work closely with mentors and camp staff to address those challenges and provide meaningful opportunities for all campers to learn, engage, and grow in their interest in healthcare careers. The responsibility of the Research Intern involves guiding and assisting group facilitators in their project and ensuring the mentored literature review goes smoothly. In addition to being a source of help and guidance, the research intern is responsible for creating and organizing the groups for meetings on Microsoft Teams. The projects would be done over the course of 4-5 weeks and presented during the week of camp. A CampMinder Intern was also working closely with the rest and was responsible for ensuring proper registration of the students to the Camp event as well as generating reports for data collection.

The camp was a great opportunity for high school students to understand that healthcare is not just one aspect, but a blend of medicine, science, security, and teamwork. As they engaged themselves in the different activities, they were also learning how each career represented was contributing to the ultimate goal of healthcare: improving the well-being of those who access it. For us Interns, the Camp Mentors, and Activity Station Coordinators, this was our chance to represent Marian University, and the Franciscan values it embodies. We served the high school students with dignity and became responsible stewards who ensured that each one of them had the opportunity to have a fulfilling experience during camp. Each day at the Healthcare Camp was an opportunity for us as leaders, to be mentors for our students. We educated and shared our passion for healthcare with the brightest students of the future. While we had the opportunity to teach them, they taught us every day too. From learning about the anatomy of a pig's heart, to icebreaker games in the courtyard, and everything in between, we remembered what it was about medicine we all loved so much. The ability to think critically, work as a team, and love science is what the Healthcare Camp and our careers is about.

The Future of Fatty Liver: New Names, New Drugs, New Hope!

Alexa Neff, M.S., OMS-II[1] and Brian Skinner[1], PharmD, BCPS

Did You Know? The condition formerly known as Non-Alcoholic Fatty Liver Disease (NAFLD) has been reclassified as Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD) to better reflect its underlying metabolic etiology. Similarly, Non-Alcoholic Steatohepatitis (NASH)—the progressive, inflammatory form—has been renamed Metabolic Dysfunction-Associated Steatohepatitis (MASH).

With these new classifications, the focus of treatment has shifted toward targeted therapies that address the underlying metabolic dysfunction, such as the role of insulin resistance, dyslipidemia, and visceral adiposity in disease progression. Beyond lifestyle interventions, emerging pharmacologic treatments such as resmetirom (a thyroid hormone receptor-β agonist) and lanifibranor (a pan-PPAR agonist) are currently in Phase 3 clinical trials to specifically target steatosis and fibrosis.

Additionally, GLP-1 receptor agonists like semaglutide and dual GLP-1/GIP receptor agonists like tirzepatide, that are already FDA approved for the treatment of type 2 diabetes mellitus and obesity, also show promise in reducing hepatic fat content and improving metabolic parameters. This shift towards a targeted approach to treating underlying metabolic dysfunction in these disorders is offering new hope for our patients.

Treating Victims of Child Physical and Sexual Abuse: The Perspective of a Child Abuse Victim

Robert Sessa, OMS-II

Trigger Warning: The following contains discussions of child physical and sexual abuse.

I spent the summer of 2024 working alongside the Child Protection Team (CPT) at Riley Children's Hospital. The CPT serves to consult for the Indiana Department of Child Services (DCS) on questionable alleged cases of physical and sexual abuse, rounds on victims of abuse at Riley, and connects children entering foster care with the resources they and their foster parents need. The number of reported cases daily in the state ranged from 10 to 30. The CPT reviewed images and the circumstances surrounding the abuse: the story of the child, any bystanders, and the abuser. I reviewed cases of trafficking, rape, patterned bruising, inflicted fractures, abusive head trauma, burns, torture, and many other sentinel injuries presenting in neonates to 17-year-olds. It immediately became evident how important it is to recognize a sentinel injury, which is an inflicted injury in a child that, when unnoticed, will likely lead to further trauma or death. Aspiring physicians working with children should be taught what these injuries can look like. They include patterned bruising, an unexplained fracture of a bone, a burn, head trauma, or other signs of injury. For example, a small bruise on a non-mobile infant may seem unassuming to some, but this is highly irregular. If the first duty of a physician is to do no harm, then this must include learning to recognize sentinel injuries and consulting child abuse specialists on the next steps.

The Adverse Childhood Experiences (ACE) Study was a monumental study that looked into the relationship between traumatic childhood events and the ability to predict future health risk behaviors and diseases (Felitti et al., 1998). The ACEs include experiencing any form of abuse (psychological, physical, or sexual), any household dysfunction (substance abuse, mental illness, parental separation or divorce, incarcerated household member, or domestic violence), and neglect (emotional or physical). Each of these experiences scores a 1 with a total of 10 if someone experiences all the listed traumatic events. The study found that any person who has an ACE score of greater than or equal to 4 has a far more likely chance to develop chronic diseases such as diabetes, cancer, or cardiovascular disease, a 12 times more likely chance to commit suicide, a higher chance of practicing risky health behaviors such as use of illicit substances, and an overall earlier death compared to those who have fewer than 4 ACEs.

My ACE score is 5. From the age of 9 to 12, I spent every other weekend and every Wednesday with my father, a doctor. Force fed. Starved. Beaten. Verbally assaulted. Attempted kidnapping. Afternoons spent at the police station. Lasting PTSD and depression. Trapped. Yet, he still practices medicine to this day.

I became an adult at the age of 9. I had to protect myself and my siblings and learned to recognize when he was in a good mood or a bad one. I learned to keep my distance and stay in my room. I learned how to turn a horrible situation into a good one. I learned how to become calm in otherwise stressful or harmful situations.

This is what these children experience daily. While professionals missed these sentinel events during my childhood, I now have the resources to better learn to identify these injuries and proactively intervene to prevent future trauma. Above all, these children need empathy. They need to feel heard, affirmed, and protected so they can continue to live and play as children should. It is vital to allow survivors to talk when they want to and not push the child to discuss their trauma—this must be on their terms. By forcing a child to discuss their trauma, we disrespect their innocence. A child should be allowed to remain ignorant or naïve. Their biggest concern should be when they will finish their homework, not having to contemplate hiding in their own homes versus running away. As physicians learn to identify these sentinel events and learn how to talk to survivors of trauma, we protect their innocence and their sense of self.

When we encounter the possibility of abse, we must remain objective in our suspicions. The health of the child must stay at the center of attention, and physicians must perform their due diligence. The evidence should guide the decision-making. We cannot ignore an unassuming parent, family member, or other assailant if a child presents with signs of abuse.

Whether I pursue a career in Child Abuse Pediatrics remains up in the air; many avoid this field. However, we will become the best physicians when we practice what is most meaningful to us. We will deliver better care when we practice what we are passionate about. In doing so, your future patients will receive the highest quality of care. We will be able to better empathize with each individual patient: treating them like the individual they are.

ACKNOWLEDGEMENTS

I would like to thank doctors Ralph Hicks, MD, Roberta Hibbard, MD, Shannon Thompson, MD, Ann Freshour DO, Tara Holloran MD, Marissa Luoma, MD, Leah Garvin, MD, and nurse practioners Barbara Mulvaney, Anna Gordon, and Andrea Powers of the Riley Child Protection Team.

Expanding Horizons: My Medical Journey with Humanity and Hope United in Honduras

Samuel Baule, OMS-II

Medical school is complex with immense didactic learning. This fact is repeated ad nauseum during the first few years and gives credence to the fact that clinical knowledge, while actively developed, is put on the back burner. As the priority should be building a breadth of knowledge for board exams and clinical rotations, students should ensure that patient contact remains part of their routine. MU-WCOM offers many options for students to work with patients such as the Near West Free Clinic which offers weekly shifts for students to practice taking vitals and histories. An opportunity during the summer that is often overlooked is the participation in global health trips such as those to Honduras. This year I had the opportunity to participate in the Humanity and Hope (H&H) United Medical Brigade trip to Honduras in partnership with Ascension St. Vincent's global health rotation.

An Eye-Opening Experience

The crux of the trip was spent in five different communities near the city of El Progreso, the villages visited were: La Cuchilla, La Coroza, El Remolino, Dos Caminos, and Caballo de Piedra. H&H has spent over a decade in Honduras developing these communities using a sustainable six pillar model: infrastructure, economy, health, education, community, and leadership. I had the opportunity to witness the changes H&H had initiated, as well as provide medical care to over 500 patients under the supervision of attending physicians.

Each community had its own atmosphere. For example, El Remolino relied on cattle and pineapple farms, while La Cuchilla thrived on chicken farming. Some areas had just received clean water and electricity, while others were building homes. The varying levels of sustainability stem from frequent floods and hurricanes. I do not envy the position of these Hondurans; however, I was reminded of their resilience. In every town, I saw smiling children and hardworking locals with a strong sense of hope, all greatly impacted by H&H's work.

MU-WCOM's mission is to provide an education that profoundly transforms lives, society, and the world. I can think of no better way to live this mission than to participate in global health trips like this one.

Building Practical Expertise

The volume of patient contact allowed me and another MU-WCOM student, Alexandra Reynolds, to take vitals and histories prior to the appointments with physicians. As first year medical students this was invaluable. With minimal clinical skills, we refined what we know and helped the doctors with routine tasks: blood glucose tests, urinalysis, pregnancy tests, blood pressure and other clinical tests. This practical experience helped develop our patient skills and confidence in the basics of medicine.

We were given the freedom to further investigate symptoms that were within our wheelhouse. Early in the trip when working at the triage station, I was taking a history with a patient's chief complaint of shortness of breath. This presenting symptom was common in Honduras during the elongated dry season with smog and dusty air. Upon auscultation, I heard bilateral wheezing. This finding, paired with a smoking history and wet cough, seemed like a textbook case of COPD. At the end of the day, I confirmed my diagnosis with the physician. While I was not the treating physician and did not provide medicine, this was the first real patient I diagnosed. This experience built my confidence and confirmed I have what it takes to become a doctor.

Honduras was inspirational. This story is one of dozens that I now have thanks to this trip. Patient contact, direct oversight by physicians, and exposure to unique populations should have any medical student lucky to take part in a truly awesome experience.

Leadership

Public speaking is crucial for physicians. Whether it is breaking bad news to a family or presenting at a conference, it permeates the practice of medicine. Every year H&H has an educational theme where members present information to the local communities to improve health awareness. This year's topic was mental health, more specifically anxiety. This opportunity was a perfect way to improve my skills in public speaking and translation of medical knowledge into digestible segments. Through the assistance of translators, our medical brigade was able to connect and assist Hondurans with the anxiety felt in everyday life. The presentation was split between education of the condition and how to overcome acute episodes. I was given the opportunity to walk locals through guided meditation and give them a toolbox of techniques to use when anxiety strikes.

Why should I go?

Medical students have limited time, with the only truly open summer following your first year. This trip only took a week and was by far the most beneficial week in my medical education thus far. I thought of it as the capstone to my first year, being able to practice what I learned in the real world prior to clinical rotations, and without risk of failure as you are not the one providing any of the treatments.

Speaking outside education, helping people is why anyone becomes a doctor. There is no better confirmation that the academic struggle one is enduring is worth it quite like the thanks of a patient. If you are interested in taking part in an experience like this one, the Global Health Alliance has an annual meeting the first semester of the academic year. You will not regret the opportunity.

OutRunning the Sun: The Fight Against Melanoma

William Patton, M.S., OMS-II

I was only three years old when I lost my father, Gary Ray Patton, to melanoma on August 24th, 2002. By the time the cancer was recognized, it had already metastasized and was denoted as a stage 4 cancer. There was not much that could be done at the time as the current research on melanoma in 2002 was limited. While my father's passing was something that drastically impacted my family, my three-year-old self along with my mother didn't realize the way in which this extreme circumstance would help us become motivated to bring more attention to melanoma, particularly by focusing on melanoma research within the medical field and melanoma awareness within the community.

Losing my father when I forced myself to learn how to deal with tough situations at a young age, and it also made me passionate about becoming a physician as that would allow me to both provide care to and educate patients in hopes that they do not go through anything similar to what I went through. Not only is my father's passing the reason that I am currently in medical school at Marian University's Wood College of Osteopathic Medicine, but it is also partly the reason that OutRun the Sun, a skin cancer organization based in Indiana, was founded.

In 2004, shortly after the passing of my father, my mother, Jennifer Sarno along with a few of her friends who were also impacted by melanoma decided that something needed to be done in order to better battle melanoma due to its capacity to uproot the lives of many individuals, their families, and their friends. This "something" became to be what is now known as OutRun the Sun. The creation of OutRun the Sun was, and still is, centered around raising awareness of melanoma and other types of skin cancer within communities as well as raising money for melanoma research in hopes of finding better treatments and eventually a cure.

In the early stages of the organization, most of the focus was on an annual event that was centered around a run/walk event (which obviously occurred later in the evening to avoid exposure to too much ultraviolet rays from the sun) with the purpose of bringing the community together to both raise money and awareness for skin cancer. Another important aspect of the annual event was to recognize survivors of melanoma, honor individuals who have passed away from melanoma, and show support for individuals that had family members and/or friends that were directly impacted by melanoma. Personally, one of the most fulfilling things that has come from being involved in OutRun the Sun has been being able to see the various teams of individuals that come to the event to support an individual that has been diagnosed with melanoma or another type of skin cancer. Not only is it inspiring to see numerous individuals arriving to the event each year wearing matching shirts honoring a family member or friend, but the sheer number of individuals on some teams shows the larger impact that a melanoma diagnosis, or any cancer diagnosis for that matter, can have. OutRun the Sun has been able to show the importance of a community in providing support for those individuals who have been impacted by melanoma, and the organization has also been able to show that it takes a community to both raise awareness for melanoma and raise money for melanoma research.

As OutRun the Sun continued to grow and moved from using my own childhood garage to prepare for events to using a much larger business office with many more volunteers, the outreach capability and recognition of the organization significantly increased as well. The annual events started to observe increased attendance, more money was being raised, and strong connections were made. The connections that have been made involve members of various universities and other organizations that have joined OutRun the Sun to offer guidance and support. Just to name a few, individuals involved with OutRun the Sun have strong associations with the Indianapolis Motor Speedway, the Melvin and Bren Simon Cancer Center at Indiana University, and the Mayo Clinic. Furthermore, the organization also names research scholars who are actively pursuing melanoma research. The current and recent OutRun the Sun melanoma research scholars have carried out their research in various places, including but not limited to Harvard University, Mayo Clinic, Cleveland Clinic, Indiana University, MD Anderson, and University of California.

OutRun the Sun has also been able to create educational programs that are used around the country. For example, the groups Boy Scouts of America and Girl Scouts of America are partners with OutRun the Sun and each group has a patch that can be earned by demonstrating knowledge of sun safety. As increasing awareness and early-detection of skin cancer is one of the main goals of OutRun the Sun, the organization has recently developed a free curriculum for medical schools to use to teach future physicians how to conduct a full-body exam and identify distinct types of skin cancer. OutRun the Sun understands that not all medical students want to be dermatologists, yet they strongly believe that skin cancer is something that can be identified by any specialty. By providing medical schools with this free curriculum, the organization hopes to provide a framework that students can use in their future practice as a physician and catch skin cancer earlier and decrease the number of poor outcomes associated with it.

Overall, being able to watch OutRun the Sun grow has not only continued to motivate myself to continue to pursue my dreams of becoming a physician, but it has also made clear the significant impact that can be made when a community comes together for one purpose.

Going the **DISTANCE**

Elijah Liu, M.S., OMS-II

This moss art embodies the resilience and perseverance of nature, mirroring the human journey of enduring unconventional challenges and striving toward a meaningful destination. Inspired by Robert Frost's poem The Road Not Taken, it reflects the transformative impact of initiation and choosing the less traveled path—a decision that shapes one's journey in profound and unexpected ways.

Winding paths of unstable bridges, moss gradients, and juxtaposed symbolisms are intentionally placed to evoke hidden beauty along a long, uncharted journey guided by the North Star. Such discoveries are portrayed in a pink-brownish tone that emphasizes an unseen world the well-paved path is adversely hidden from. Each twist and turn reflects decisions, struggles, and triumphs that define a deeply personal and rewarding journey.

Navigating Modern Medicine in Traditional Amish Communities

Jillian Niceley, OMS-III and Taylor Hartman, OMS-III

As osteopathic medical students and future physicians, it is of paramount importance to recognize differing preferences and barriers to care for specific patient populations. Medical students at Marian University Wood College of Osteopathic Medicine have the opportunity to complete a rotation in Shipshewana, Indiana, which is an area of the state that serves as home for many members of the Amish community. Therefore, it is important for medical students to be familiar with some of the illnesses that commonly plague this population, their preferences for care, and barriers they may face in receiving care. Dr. Kerry Keaffaber, a family medicine physician in Shipshewana and preceptor for students at MU-WCOM, provided an anecdote about one of his patients that illustrates the Amish perspective on health care. This patient likes to bike for exercise and "when he bikes, he wears a straw hat. He has commented that he knows it would be a good idea to wear a helmet, he would like to wear a helmet, but the Bishop of his church has declared that you do not wear helmets. So, he complies." This anecdote shows the devotion Amish people have to their community, which is a common theme behind their differing healthcare choices explored within this paper.

Because the Amish population typically has a higher rate of consanguineous births, certain genetic diseases are more prevalent in their community compared to the general population. For example, Hemophilia, an X-linked disease that impairs the process of blood clotting, is one disease that is observed more frequently in Shipshewana. There are 3 types of hemophilia: hemophilia A/factor VIII deficiency, hemophilia B/factor IX deficiency, and hemophilia C/factor XI deficiency (Hoots). In a study conducted by the Indiana Hemophilia and Thrombosis Center that examined cases of hemophilia in Indiana between 2011-2013, it was found that the Amish population accounted for 17.7% of all factor IX cases, despite only making up 7% of the study population (Okolo). Furthermore, hemophilia is categorized as mild (factor activity level >5% of normal and <40% of normal), moderate (factor activity level ≥1% of normal and ≤5 percent of normal), or severe (<1% factor activity) (Hoots). In the Indiana Amish community, 44 cases of moderate factor IX deficiency and 2 cases of severe factor VIII deficiency were identified (Okolo). The consequences of hemophilia include bleeding into joints, soft tissues, muscles, oral mucosa, and even intracranial hemorrhage. The risks posed by this bleeding disorder, compounded with the physical nature of many of the occupations within the Amish community, place these patients at an even greater risk for serious complications. Therefore, it is vital for clinicians serving these communities to be cognizant of the increased prevalence of hemophilia.

In addition to the genetic illnesses common among the Amish population, it is important to consider differences in their approach to care. Several members of the community abstain from receiving vaccinations. According to a survey of an Amish community in northeast Ohio, 59% of respondents reported not vaccinating their children, compared to only 14% that declined vaccinations a decade ago (Scott). The growing controversy and misinformation surrounding vaccines may be possible explanations for this increase in vaccine refusal in the Amish. Clinician awareness of vaccine hesitancy among Amish patients is essential for two reasons: formulating an appropriately expanded differential diagnosis and ensuring proper patient education. Dr. Keaffabber states that "[physicians] have to bring into the differential diagnosis many things that for fully vaccinated kids are not an issue like measles, pertussis, etc. and sometimes treat empirically." Organisms such as Haemophilus influenzae type B (Hib), Measles and Bordetella pertussis are typically protected against by childhood immunizations: the Hib, MMR and DTaP vaccines. While these organisms may not appear on the differential diagnosis of patients from the general population who receive vaccinations, they must be considered as a potential causative organism in any patient who has abstained from immunizations and presents with symptoms suspicious of the organism.

Moreover, the incidence of COVID-19 may be higher within the community due to low immunization rates. As a physician, it is crucial to respect patient autonomy while providing patients with information on how to best protect themselves from such infections. During the COVID-19 pandemic, Dr. Keaffaber conducted live broadcasts with the minister of a local church to answer questions from the community. He participated in a second live broadcast with the church once vaccines became available. Despite this outreach, the majority of community members refrained from receiving the vaccination. According to Dr. Keaffaber, some people received the vaccine only after finding out where they could get it without anyone in their community finding out. The rest of the population maintained the perspective that COVID was "just to be endured and if somebody passed away that was God's will" (Keaffaber). While a physician's nature is to prevent and treat illnesses whenever possible, this type of practice is not always in parallel with the beliefs of Amish patients.

"Many Amish face pressure to conform to the community beliefs, making it unacceptable to receive certain modern medical treatments."

The Amish face many barriers to standard care which physicians should be aware of. They refrain from using modern advancements, such as electricity, automobiles, and telephones. For transportation, they primarily rely on horse-and-buggies. However, this method can be very time-consuming and can only be utilized for shorter distances. If a further trip to a more specialized hospital or clinic is required, they must hire non-Amish drivers to transport them. As physicians caring for these populations, it is crucial to be sensitive to these obstacles to care and find ways to better accommodate their unique needs. This may include blocking appointment times for a family, so that they do not have to make as many trips out. Additionally, while many Amish have a shared neighborhood landline or telephone in the home, its use is often limited (Anderson). This can make it difficult for healthcare providers to communicate with these patients in a convenient and secure manner. Creating a shared agreement for communication preferences may be more important for these patients. In the family medicine clinic in Shipshewana, the physicians shared that they typically encounter two scenarios within their Amish patients. The first are those who attend traditional Amish schools with poor science education and are reluctant and suspicious of modern medicine, often turning to herbs and chiropractic care before coming to the office. The second type of Amish patient are those who have gone through the community school system with more exposure to sciences and pride themselves on being progressive with their medical care (Keaffaber). Additionally, many Amish face pressure to conform to the community beliefs, making it unacceptable to receive certain modern medical treatments (Keaffaber). Because of this spectrum, physicians need to assess how each patient thinks about healthcare and respect where they are coming from in order to build trust and provide treatments that they are comfortable with.

Overall, it is vital as healthcare providers caring for Amish communities to be aware of their beliefs and practices in order to offer the most appropriate care. An understanding of Amish beliefs surrounding healthcare can help clinicians tailor their care and thus optimize health outcomes for these patients.

SCIENTIFIC RESEARCH

Importance of PET/CT Imaging in Head and Neck Cancer: A Complex Case Study

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ABSTRACT
Cancer of the head and neck is largely preventable yet is expected to affect 65,630 people and claim the lives of 14,500 in 2020. 3 Though head and neck tumors are typically recognized late-stage, a combined usage of positron emission tomography (PET) and computed tomography (CT) can increase rates of early detection and diagnostic accuracy. This case study involves a 65-year-old female who was diagnosed with stage 4A squamous cell carcinoma of the tongue. The patient had a PET/CT scan, followed by a partial glossectomy (left, lateral) and a bilateral neck dissection to remove cancerous lymph node clusters 2, 3, and 4. A follow-up CT was conducted followed by adjuvant radiation plus chemotherapy. Prior to the end of the second week of treatment, the patient willfully discontinued treatment due to an ongoing substance abuse disorder.

INTRODUCTION

Medical imaging technology has allowed healthcare professionals and researchers to non-invasively visualize the inner structures and machineries of the body. In November of 1985, Wilhelm Conrad Roentgen noticed that the rays emitted by a cathode ray tube pass through human flesh more readily than denser materials such as bone. These rays—called X-rays—became the basis for early medical imaging techniques thereon out. 2D planar X-ray imaging is called "projection radiography" and is still the most common radiologic procedure conducted.

The fundamentals of radiation matter interactions lay the foundation of imaging technology. More advanced renditions of imaging machinery, such as computed tomography (CT) and positron emission tomography (PET) became popular in medical diagnostics and treatment monitoring in the late 1970s and early 1980s. CT imaging aims to generate 3D X-ray images to gain insight into tissue position on the x-y-z plane versus the PR's limited 2D plane. PET imaging takes advantage of nuclear medicine to image physiology rather than anatomy. Because both CT and PET acquire complementary 3D images, PET and CT are commonly used together, allowing physicians and researchers to view both anatomy and biological function within patients.

PET/CT is gaining traction in head and neck imaging, and may prove useful in early detection, treatment evaluation, and surveillance of cancers. [2,3] This case study observes a 65-year-old female who was diagnosed with stage 4A squamous cell carcinoma of the tongue (hereby named patient X). A PET/CT scan of the head and neck region was conducted to determine the tumor's location and dimensions as well as the extent of metastatic

spread. Patient X then underwent a partial glossectomy (left, lateral). Because the tongue maintains consistent, heavy lymph drainage, there is a heightened risk of metastasis to the nearby lymph nodes. In this case, lymph node clusters 2, 3, and 4 contained metastases as well as extracapsular extension (ECE). ECE involves the invasion of nodal cancer metastasis into the adjacent tissues outside the boundaries of a given lymph node capsule. Thus, patient X required a bilateral neck dissection to remove said lymph node clusters.

To combat remaining cancerous tissue, the patient was scheduled to receive adjuvant (post-surgical) radiation and chemotherapy. Due to the complexity of head and neck cancers, it is evident that treating these cases requires a multidisciplinary approach, from surgical oncology to radiology to palliative care. Unfortunately, patient X decided to discontinue treatment before the end of the second week of therapy. This was due to an ongoing substance abuse disorder. She had been taken off opioids after twice consecutively testing positive for hard/non-prescription painkillers during the course of pain management therapy (within 2 weeks).

Radiation-based Imaging at the Atomic Scale: There are many classes of radiation-based imaging techniques, the simplest being the projection radiograph (PR). PRs rely on the differential transmittance of X-ray waves through varying tissue types within an organism. The basis of all X-ray based imaging is dependent on how radiation interacts with matter. X-rays are first generated via Brehmsstahlung radiation (within an X-ray tube), where a charged particle passes through an atom, and an electron loses energy and emits a photon. Then, when the photon enters, for example, human adipose tissue, energy is "lost" or deposited in the tissue at each atomic interaction; the amount of energy deposited per centimeter of penetration is called linear energy transfer (LET). X-ray sensitive film will pick up X-rays as a function of position to generate a final image (21st century PRs use semiconductor detectors to produce instant digital images). Different tissues have different densities; thus, the final PR image will result in contrasted components of the scanned region.

Furthermore, the probability of absorption of photons in matter can be represented by Formula 1. The density of a certain material is directly related to the linear attenuation coefficient: μ(E). The attenuation coefficient indicates the probability that the incident photon (with given energy "E") will interact with a given material. "I" represents the number of photons exiting the given material, "Io" is the starting number of photons entering the material, and "x" is material's thickness.

Formula 1: $I = Io\ e^{-\mu(E)x}$

On the atomic scale, a photon's interaction with a certain atom will result in three possible outcomes: photoelectric effect, Compton scatter, or pair production. The photoelectric effect involves a photon being completely absorbed and the ejection of an electron from atomic orbit. Compton scatter is similar to the photoelectric effect in that an electron is ejected, however the incident photon reflects and loses energy while changing direction. These two processes can only take place if the energy of the photon is greater than the binding energy of the electron. On the other hand, pair production involves the energy of the incident photon to be converted into mass: one electron and one positron. The phenomenon of mass and energy being interchangeable can be explained by Albert Einstein's mass-energy equivalence equation: E=mc2. These basic concepts are vital to the functionality of CT and PET imaging.

Benefits of PET/CT Imaging before Radiation Treatment Planning: There is benefit in using hybrid PET/CT imaging for head and neck tumors during the pre-radiation therapy (RT) period to provide more accurate data for effective radiation treatment planning. PET alone provides necessary metabolic activity that directs and confirms presence/absence of primary tumors and metastases. However, without clearly defined anatomical structures imaged through CT, PET alone will not be able to provide accurate tumor loco-regional

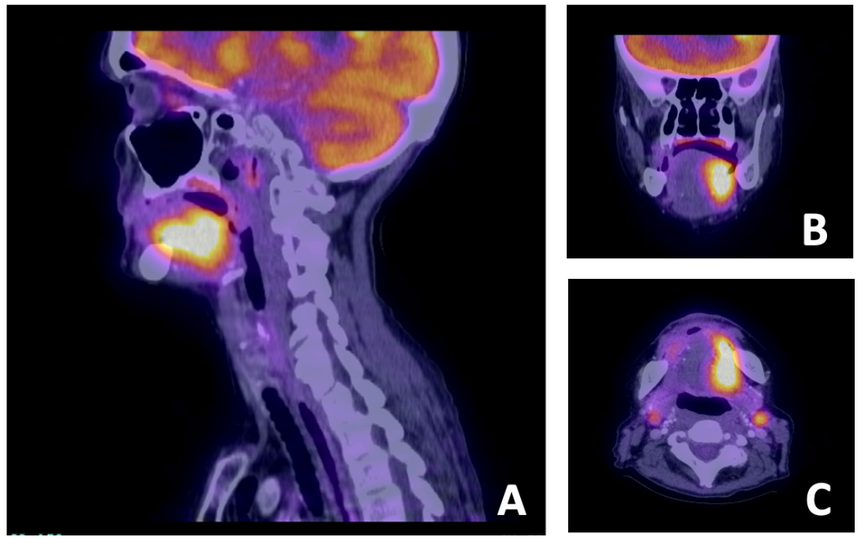

Figure 1. Pre-operative FDG-PET/CT scan of patient X. (A) 18-FDG-PET midsagittal view of the head and neck showing positive results for a primary tumor in the tongue: biopsy-confirmed squamous cell carcinoma. The brain normally metabolizes glucose readily and should not be of concern with PET/CT scans; typically, fMRI is used for metabolic imaging of the brain. (B) anterior coronal image of the head, hypermetabolic region confirming the primary tumor restricted to the left portion of the tongue. (C) inferior transverse image, immediately inferior to the mandible. In addition to the primary tumor, the bilateral presence of hypermetabolic hotspots can be attributed to neck lymph node cluster 2 (L & R). Left lymph node cluster 2 is more affected due to its proximity to the primary tumor.

data. Locating tumors alone is not enough; with CT imaging, the complex and sensitive structures of the head and neck can be identified to prevent unnecessary radiation from harming said tissues. Such structures include the esophagus, the spinal cord, the brainstem, parotid gland, and many more.

Moreover, the most obvious function of pre-RT PET/CT is to allow specialists to define radiation fields with accurate dosimetry [6]. PET/CT and treatment planning go hand-in-hand, allowing healthcare professionals to design 3D rendered dose maps (Figure 4B).

In a clinical investigation conducted by the Mayo Clinic College of Medicine, 26% of postoperative patients received biopsies of suspicious areas based on PET/CT results, and 45% of those patients ended up with positives, resulting in modifications to their treatment plan[6]. Though PET/CT may have a high false positive rate, a significant number of patients' original treatment plans were deemed ineffective based on newfound PET/CT data. Additionally, patients being treated for recurrent cancer or primary skin cancer significantly predicted biopsy-proven, treatment-modifying positive PET/CT [6]. However, postoperative PET/CT is an exception to the rule. Most patients receive pre-op PET/CT and a post-op, pre-RT clinical follow-up [5]. Due to the high false positive rate, the National Comprehensive Cancer Network recommends post-op patients to be tested for residual tumor, perineural/vascular/lymphatic invasion; if positive, patient should receive either re-resection or RT [5].

In the case of patient X, she received a positive PET/CT before her operations. If she had a negative PET/CT, the physician would avoid an unnecessary neck dissection (as it is quite invasive and survival outcomes are not compromised)[2].

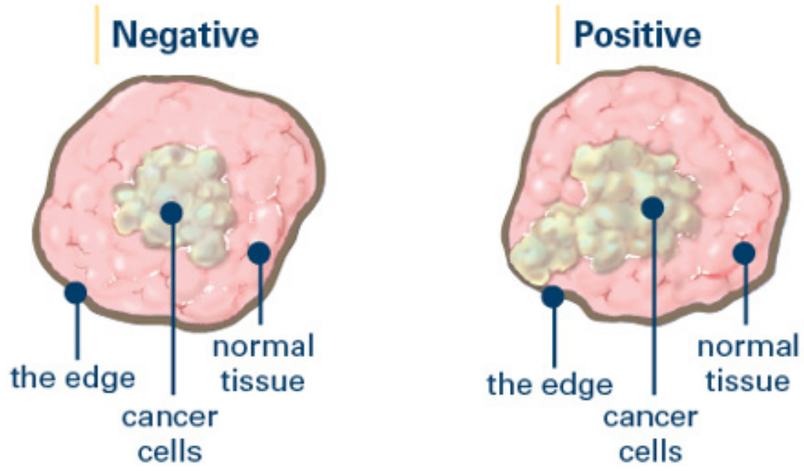

Figure 2. Surgical margins in tumor resections.1 Negative margins in a surgical resection mean that no cancer cells are observed at the outer edge of the removed tissue; typically, no additional surgery is required. Positive margins mean that there are cancerous cells at the removed tissue's edge, indicating the possibility of residual tumor within the patient.

Figure 1 demonstrates how FDG-PET/CT can clearly present hyper-metabolic zones, indicative of tumor presence. Patient X unfortunately has stage 4 squamous cell carcinoma of the tongue. Furthermore, many large tumors of the head and neck may result in a necrotic core due to lack of blood flow to the tumor's interior; patient X's primary tumor does not have a necrotic core (Figure 1). Additionally, metastases can be seen in the lymph nodes of the neck—bilateral, lymph node cluster 2 (Figure 1C).

Radiation Therapy: Radiation is used to bombard cancerous tissue with destructive high frequency waves, where the amount of radiation (Grays, Gy) can be adjusted depending on cancer prevalence. Radiologists, dosimetrists, and radiation therapists collaborate to contour artistic mapping of anatomical regions based on necessary dosage (Figure 3, Figure 4B). RT is utilized when post-op tumors present pathological evidence of positive margins: residual cancerous tissue that is present at the edge of the resected tissue vs. negative margins that have no tumor cells on the edge (Figure 2)[1,2]. Finally, factors influencing how radiation is administered include field, dose, and fractionation scheme [7]. Dosage involves intensity of radiation at a given moment while radiation fields involve specific anatomical regions that are contoured and treated with the same dose. Radiation fractionation is an optimized delivery method to reduce toxic effects on healthy cells by dosing targeted fields over several smaller doses.

Furthermore, extracapsular extension (ECE) is also of concern when designing a treatment plan. This occurs when cancerous tissue within a lymph node bursts out and infects the surrounding tissues. The ECE phenomenon is factored into RT by administering gradual decreasing dosage moving away from the target lymph node cluster (Figure 3). For patient X, variable dosage was achieved by targeting the most critical regions with 66 Gy, intermediate with 60 Gy, and mild with 54 Gy.

After the treatment plan was complete, radiation therapy should commence within a number of days to a couple weeks. The patient begins by laying down while a moving gantry rotates and maneuvers around the patient accordingly. A built-in linear accelerator is used to ultimately generate X-ray beams via Bremsstrahlung radiation. Moreover, to ensure accurate radiation targeting, dynamic collimation is achieved via multi-leaf collimators (MLCs). These collimators contain many individual lead/tungsten leaves that coordinate with the encoded treatment plan to prevent undesired scatter of X-ray radiation as well as alter the beam's shape and intensity. The latter is used during an advanced form of RT called intensity-modulated radiation therapy (IMRT), which allows the X-ray beam to conform to the organic shape of a target tumor. However, these precision quality control mechanisms would ultimately be futile if the patient is not positioned in the same way during every RT session. A mesh mask needs to be molded around the head and neck regionto be worn by the patient during each session. Patient X's mask was constructed prior to RT during a pre-RT CT scan (Figure 4A).

Radiotherapy can be used as the primary form of treatment (definitive RT = RT without surgical treatment) or as an adjuvant to surgical tumor resection [7]. The main goal for radiotherapy is to keep the target tumor from advancing and affecting other organs [7]. Studies have shown that one of the main culprits for post-op cancer recurrence is microscopic tumor dissemination; radiotherapy can control this microscopic spread and therefore prevent recurrence [4]. Pre-RT PET/CT can also give insight into whether the patient should receive palliative radiation therapy rather than standard dosage. Palliative doses are typically 5-10 fractions: 20 Gy in 5 fractions or 30 Gy in 10 fractions.5 This type of RT is administered only during advanced head and neck cancer, where it allows the patient to be relatively comfortable and prevents unnecessary healthy tissue damage.

DISCUSSION

To conclude, PET/CT imaging and radiation therapy are both essential to treating diseases as complex as head and neck tumors. The primary purpose of combining FDG-PET and CT for

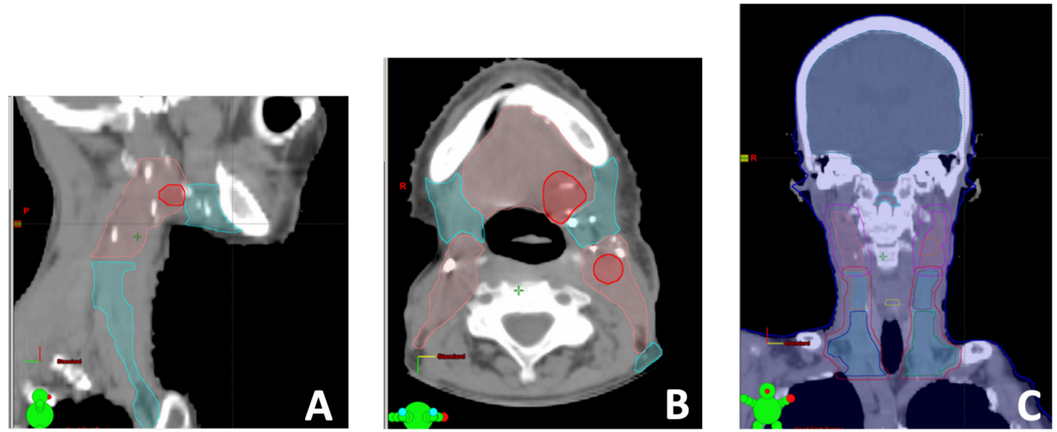

Figure 3. CT scan of lower neck region with indicated contouring for treatment planning. (A) inferior transverse CT image immediately inferior to mandible: differentially contoured fields indicate varying dosage. Bright red regions will receive the highest dosage of radiation (66 Gy), whereas blue regions will receive the lowest (54 Gy). (B) right mid-sagittal CT image showing lymph node cluster 2 marked for high dosage as well as other neck regions that contain lymph node clusters 3 and 4. Lymph nodes 3 and 4 require less radiation due to less metastatic presence as indicated via FDG-PET. (C) anterior coronal CT image of head and neck. The left, most superior field includes the previously mentioned high dosage hotspot for lymph node cluster 2.

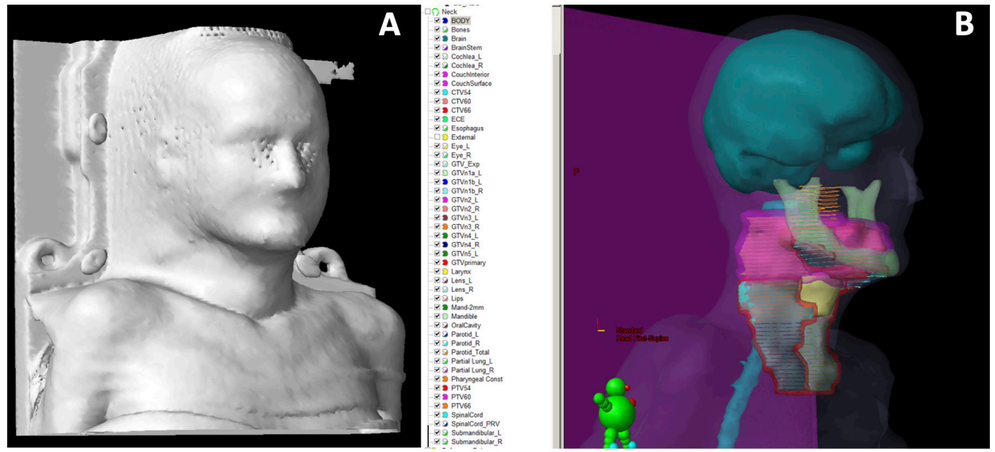

Figure 4. Radiotherapy mask fabrication and 3D contoured dose map during treatment planning phase. (A) A mesh mask was constructed for patient X to ensure consistent positioning during radiation therapy. (B) 3D constructed dose map. Notice the oropharynx (pink) distinguished from the fields in the neck; the lymph nodes and neck will receive less radiation than the oral cavity. The brain, mandible, and esophagus is also contoured to indicate sensitive, healthy tissues that need to be avoided.

this class of cancer is to construct a reliable 3D image of the patient's head and neck along with locoregional aspects of the primary and metastatic tumors. In accordance with the patient's scan, a thorough dose map with assigned dosimetry can be designed during treatment planning. Eventually, the radiation therapy machine will read these data to accurately and safely deliver radiation to the patient.

In the case of patient X, she had a pre-op FDG-PET/CT to confirm positive results, followed by a necessary partial glossectomy and bilateral neck dissection. After recovering from her operations, she received a second CT and a mask fabrication in preparation for RT. Her PET/CT was contoured and used to design a precision treatment plan for IMRT. After 2 weeks from her second CT, she began daily radiotherapy as well as weekly chemotherapy to combat remaining residual cancer in her oropharynx and neck lymph node regions.

This treatment had not gone as planned due to the abrupt discontinuation of treatment before the end of week two. Patients are human beings, with unique lives outside the structured confines of the hospital. Patient X, unfortunately, drank heavily, smoked multiple boxes of cigarettes per week, and was involved with non-prescription substance abuse. Due to complications with pain management, it resulted in her not receiving adequate treatment for her late-stage tongue cancer. Radiation oncologists could perhaps, in addition to technical treatment planning, try to relay the importance of receiving potentially life-saving treatment and resolve any barriers/complications that may prevent patients from adhering to their treatment schedule. Additionally, primary care providers should maintain communication with head and neck cancer patients, especially during and after their treatment timeline. Maintaining communication with patients can be difficult, especially during a new era of social distancing (COVID-19 pandemic). Thus, telemedicine may prove advantageous by promoting treatment-adherence via consistent reminders, follow-ups, and virtual Q&A sessions to avoid uncertainty.

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Early Bifurcation of the Brachioulnar Artery from the Axillary Artery

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ABSTRACT
This study investigates a rare arterial variation in a 90+ year-old male cadaver, focusing on the bilateral early bifurcation of the axillary artery into the brachial and ulnar arteries, and the unique pathway of the ulnar artery. The research addresses the anatomical and clinical implications of these variations, especially in surgical procedures and medical interventions. A detailed anatomical examination of the upper limb vasculature of a 90+ year-old male cadaver was performed, documenting variations through meticulous dissection and analysis. The axillary artery bifurcated early into the brachial and ulnar arteries bilaterally. The ulnar artery followed a distinctive superficial course along the medial arm, passing superficially to all forearm muscles in the right upper limb before re-entering the ulnar side of the wrist to form the palmar arch. These variations, not extensively documented, bear clinical significance in surgical and vascular interventions and blood pressure measurements. Recognizing these rare arterial variations is crucial for precision and safety during surgeries, highlighting the importance of comprehensive anatomical knowledge in upper limb interventions.

BACKGROUND

The upper extremities receive arterial blood from the axillary artery which is a continuation of the subclavian artery once it passes the outer border of the first rib. The axillary artery continues and is subdivided conceptually into three anatomical segments with their own respective arterial branches. The first segment of the axillary artery gives rise to the superior thoracic artery, and it is distal to the outer border of the first rib and proximal to the pectoralis minor. The second segment of the axillary artery gives rise to the lateral thoracic artery and thoracoacromial trunk, and it is deep to the pectoralis minor. The third segment of the axillary artery gives rise to the subscapular artery, anterior humeral circumflex artery, and posterior humeral circumflex artery, and it runs distal to the inferior border of the pectoralis minor and proximal to the inferior border of the teres major. At the inferior border of the teres major muscle, the axillary artery becomes the brachial artery where its branches provide arterial blood to the distal arm and forearm [1]. At the cubital fossa, the brachial artery bifurcates into the radial and ulnar arteries [1]. The radial and ulnar arteries give rise to several arterial branches that form the arterial anastomoses in the antebrachial region [2]. The radial and ulnar arteries continue from the cubital fossa to the most distal portion of the forearm where they meet to form the superficial and deep palmar arches.

Distal to the cubital fossa, the ulnar artery gives rise to the common interosseous artery. The anterior and posterior interosseous arteries branch from the common interosseous artery which provide blood to deep forearm muscles and the extensor muscles of the forearm respectively [1].

While this is the typical anatomical pattern of the arteries in the arm and forearm, anatomical variations are common with the most frequent arterial variation seen in the radial artery (13.8% occurrence) followed by the ulnar artery (0.26% occurrence) [3, 4]. An ulnar artery originating from a high origin with an anterior course to the median nerve is called a brachioulnar artery [3]. Typically, with a brachioulnar artery, the brachial artery continues distally as the radial artery with the common interosseous artery then branching from the radial artery instead of off the ulnar artery [3, 4]. Bilateral brachioulnar artery with early bifurcation from the axillary artery as seen in this report has been rarely reported in the literature [3, 5]. Unique to this report, the distal course of each brachioulnar artery varied where the right arm was more aligned with the definition of a superficial brachioulnar artery (SBU) since it coursed over the forearm flexor muscles while remaining deep to the brachial fascia [2, 3, 4]. The left brachioulnar traveled with the ulnar artery into the flexor compartment. Focusing on the bilateral occurrence of the unique high origin off the axillary artery deep to the pectoralis minor, this report presents this arterial variation as a bilateral brachioulnar artery. This report aims to contribute to the existing research in the field of clinical anatomy and raise the awareness of physicians and healthcare workers to the potential surgical and clinical risks due to this rare arterial pattern.

CASE PRESENTATION

During dissection of the upper extremities, a bilateral brachioulnar artery bifurcating at the second segment of the axillary artery was observed in a 90+ y/o Caucasian white male in the Essential Clinical Anatomy and Development course. Due to the length of the course, the schedule of dissections, and the timing of examinations, the arteries and nerves in the arm and forearm regions were preserved as much as possible so the arterial variation could be further analyzed and painted at the conclusion of the course.

The early bifurcation arterial variation in the cadaver was present bilaterally. The brachioulnar artery bifurcated from the second segment of the axillary artery, which lies deep to the pectoralis minor muscle. The brachioulnar artery bifurcation was also located between the contributions of the medial and lateral cords of the brachial plexus that form the median nerve, and the ulnar artery then coursed anterior to the median nerve. The superficial ulnar artery then coursed down the medial aspect of the right arm and forearm where it terminated at the typical location of the ulnar artery in the wrist. The ulnar artery travelled with the ulnar nerve distal to the left elbow.

The axillary artery continued its normal course bilaterally and became the brachial artery just distal to the inferior border of the teres major muscle. The brachial artery continued distally in the arm giving rise to the deep brachial artery and radial collateral arteries before reaching the cubital fossa. It was observed bilaterally that in the cubital fossa the brachial artery transitioned into the radial artery. Typically, the ulnar artery forms a branch that is the common interosseus artery which further branches into the anterior and posterior interosseus arteries, but it was observed in our donor that the common interosseus artery and its respective branches originated from the radial artery bilaterally.

Reeves acrylic paint was used to help visualize the anatomical structures. The larger arteries were painted red, and the nerves were painted yellow. Arterial branches from the second and third segments of the axillary artery were painted red to help identify the location of the ulnar artery bifurcation off the axillary artery. To help with better visualization, other arteries were not painted, such as the deep brachial arteries and radial collateral branches. The anatomical variation was photographed bilaterally for documentation (Fig. 1).

OUTCOME AND FOLLOW-UP

As this case report was completed on a cadaver in the anatomy course, the patient was deceased prior to our dissection findings, and therefore an outcome/ follow-up is not relevant to our paper.

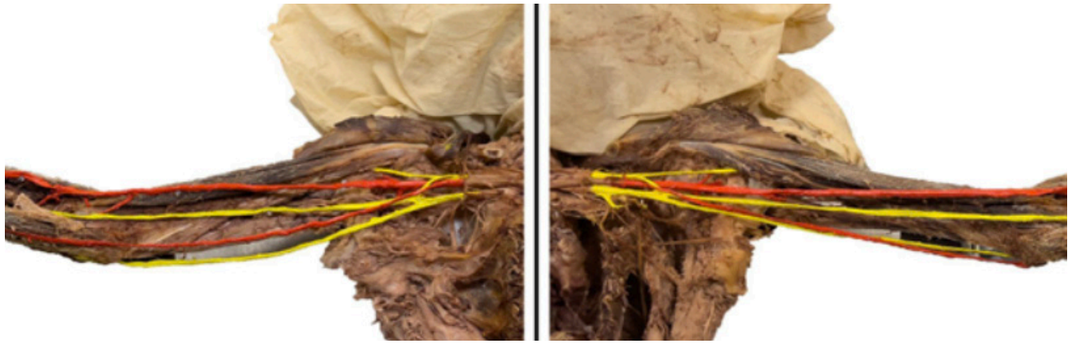

Figure 1. Cadaver bilateral arm showing the ulnar artery (red) arising proximal to the bifurcation of the median nerve (yellow).

DISCUSSION

Research supports that the variation of the axillary artery is common [3]. The previous research of the presence of a bilateral ulnar bifurcation from the axillary artery has been outside the United States [4]. This case presents a unique finding within the United States of a symmetric and bilateral high brachioulnar artery bifurcation off the axillary artery as well as an unique anterior relation of the ulnar artery with the median nerve. While several variations in upper extremity arterial patterns exist [3, 4], recognizing the typical embryological development of the upper extremity arteries aid in better understanding how variation can occur. In utero, major arteries such as the dorsal aorta form through vasculogenesis where angioblasts from lateral plate mesoderm coalesce [6]. Smaller arteries like the pharyngeal arches form through angiogenesis where the pharyngeal arches arise from the aortic sac during the fourth and fifth weeks of development [6], which overlap with Carnegie Stages 10-15 [7]. The proximal portion of the right subclavian artery arises out of the fourth pharyngeal arch, and the distal portion of the right subclavian artery is formed from a segment of the right dorsal aorta and the seventh thoracic intersegmental artery [6]. The left subclavian artery arises from the seventh thoracic intersegmental artery [6], but due to the caudal shift of the heart into the thoracic cavity the left subclavian artery shifts from the level of the seventh intersegmental artery to a more superior location near the left common carotid artery off of the aortic arch [6].

Concurrently with the pharyngeal arch formation, Rodriguez-Niedenfuhr, et al. (2001) confirmed through their examination of 112 serially sectioned human embryos (224 upper limbs) that the upper limb bud outgrowth has started. During Carnegie Stage 12, the upper limb bud begins to receive a capillary network originating from the dorsal aorta [4]. Through angiogenesis the capillary network expands and differentiates within the upper limb through its proximal to distal growth [4]. At Carnegie Stage 13, the subclavian artery begins to differentiate from the capillary network, and both the subclavian artery and axillary artery are visible at Carnegie Stage 15 [4]. Moving into Carnegie Stages 16-17, the brachial artery is forming concurrently with the humerus with a well-developed brachial artery visible at the elbow and branching into the forearm by Stage 17 [4]. By Stage 18 the ulnar artery and interosseous arteries have representations in the forearm as far distally to the hand while the radial artery is differentiated later through Stage 21 [4]. Through observing arterial variations at various Carnegie Stages, Rodriguez-Niedenfuhr, et al. (2001) conclude the theory that arteries sprouting from an axial trunk are outdated and instead posit developmental mechanisms (such as the enlargement and differentiation of vessels as well as the maintenance of or regression of vessels) guiding upper limb arterial differentiation from proximal to distal from an initial capillary

network [4]. Arterial variation is not confined to a particular Carnegie Stage and may be accounted for because of modifications that occur during the maintenance and regression of the capillary network [4]. It is likely the bilateral brachioulnar artery high bifurcation off the axillary artery as seen in this report could be linked to regulators of the maintenance and regression of the capillary network such as oxygenation and nutrient requirements or hemodynamic forces [4].

With the location of the brachioulnar artery being anterior to the median nerve of the brachial plexus, the patient could experience some pain or numbness if the artery were to compress the median nerve. This numbness would be located in the dorsal aspect of the distal first two digits of the hand, the palmar aspect of the thumb, index, middle, and half of the ring finger, the palm, medial aspect of the forearm, the elbow joint, and proximal radioulnar joint [8].

Another possible impact of this arterial variation is linked to the bilateral finding of the common interosseus artery (along with its anterior and posterior interosseous artery branches) arising from the radial artery rather than its typical branching from the ulnar artery. Since the common interosseus artery and its branches supply most of the forearm, a damaged radial artery could compromise blood supply to the hand [9].

This report's finding is also relevant regarding vascular injections, performing surgeries (particularly plastic, orthopedic, and vascular surgeries), imaging, and blood pressure readings. The brachioulnar artery remained more superficial in the right arm which increases the risk of intra-arterial injections, since the SBUA can be easily mistaken as a vein (Fig. 2). This presents a risk of accidental arterial cannulation and subsequent limb ischemia [10]. Another risk of a superficial high bifurcation of the brachioulnar artery is that it could easily be mistaken as a superficial artery during surgery. In addition, this variation could pose problems in arteriographic imaging. If a dye is used and is injected distal to the origin of the arterial variation, it may cause confusion or be missed when interpreting imaging [10]. Regarding blood pressure readings, typically the brachial artery is the only artery used to measure blood pressure. With the addition of the early bifurcation of the brachioulnar artery, it passing through the medial aspect of the arm with the brachial artery could lead to an erroneous reading when manually measuring someone's blood pressure. One benefit to this anatomical variation is that the presence of a superficial ulnar artery has been suggested as a basis for skin flap surgery [2]. Therefore, we hope this report benefits the field of clinical anatomy and can serve to educate physicians and healthcare workers on the various arterial variations they may encounter in their patients when performing vascular, orthopedic, or plastic surgeries.

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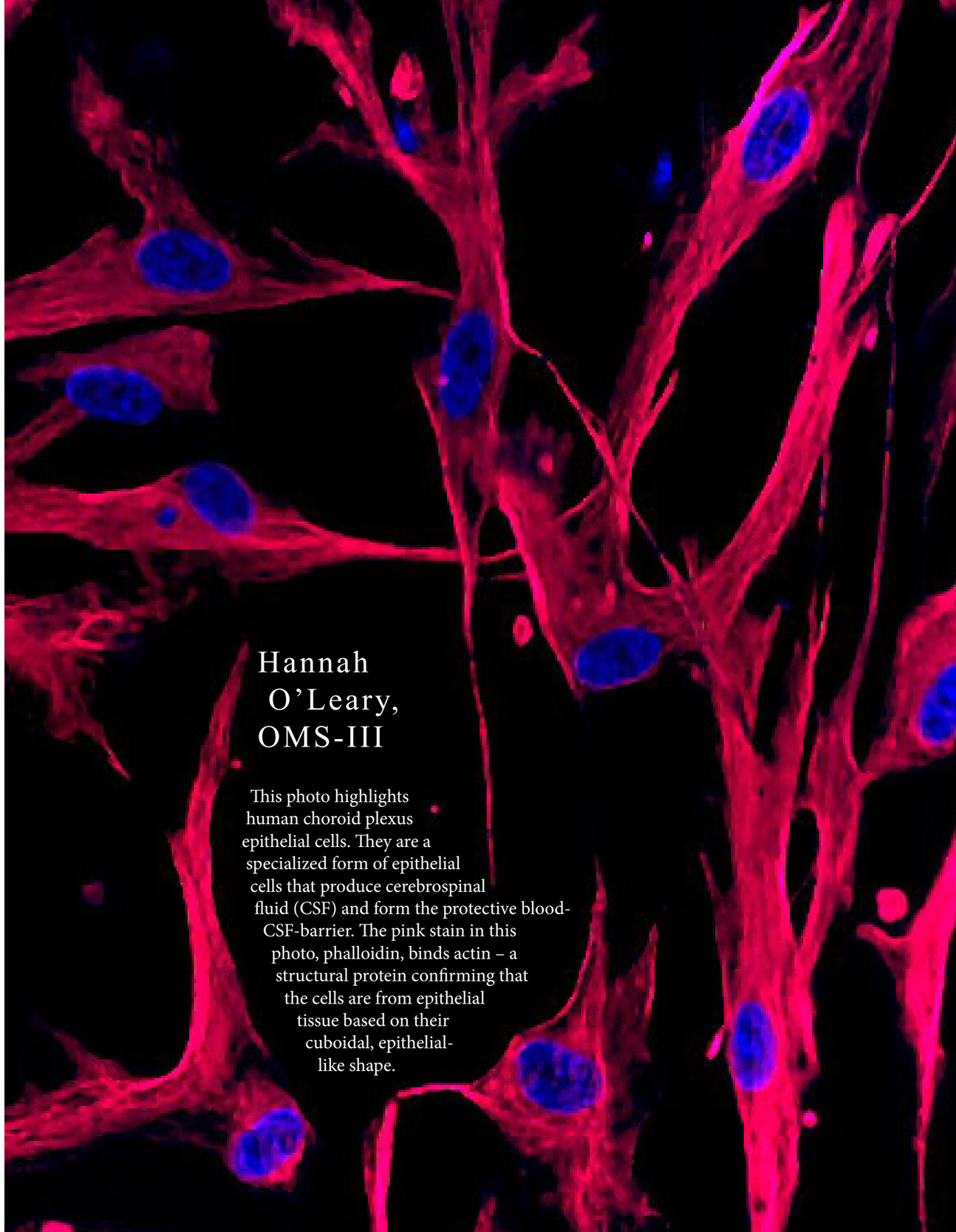
Figure 2. Cadaver right arm showing the ulnar artery (red) arising proximal to the bifurcation of the median nerve (yellow) and remaining superficial in the antebrachium.



External Oblique Intercostal Fascial Plane Block for Pain Control after LVAD

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[1]Marian University Wood College of Osteopathic Medicine , [2]UTHealth Houston-McGovern Medical School

INTRODUCTION

Heart failure affects over 26 million patients worldwide, and the use of left ventricular assist devices (LVADs) for both bridge-to-transplant treatment and destination therapy has increased over the past decade. The procedure involves sternotomy, as well as tunneling a driveline through the abdominal wall, and patients often require thoracostomy tubes postoperatively. Inadequate thoracic pain control with standard analgesic regimen results in decreased quality of recovery and pulmonary complications such as splinting. Promoting excellent respiratory mechanics is crucial in patients with tenuous right heart conditions, such as pulmonary hypertension (pHTN) and right heart strain or failure after LVAD implantation [1].

While various regional techniques have been utilized for opioid-sparing pain management, these prior techniques come with drawbacks. We present a case where we used an alternative block, the external oblique intercostal (EOI) fascial plane block, along with superficial parasternal blocks, to provide appropriate and adequate analgesia for a patient with severe refractory postoperative pain after LVAD implantation.

METHODS

As the case report is devoid of patient identifiable information, it is exempt from IRB review requirements as per UTHealth policy. Informed consent was obtained by the patient for both the procedure and submission for publication.

CASE PRESENTATION

A 53-year-old man with past medical history of congestive heart failure (CHF), biventricular non-ischemic cardiomyopathy with an EF <15%, and Automated Implantable Cardioverter Defibrillator (AICD) placement 6 months prior, severe pHTN, severe mitral regurgitation and tricuspid regurgitation presented to the hospital with shortness of breath, chest pain, abdominal pain, nausea, vomiting, diarrhea, and fever. He was admitted to the ICU for cardiogenic and septic shock with blood pressures in the 80s/60s. He was urgently initiated on mechanical circulatory support with an intra-aortic balloon pump. After resolution of his cardiogenic and septic shock, he was implanted with an LVAD. In addition to the driveline, the patient also had two thoracostomy tubes and one pigtail catheter for a pneumothorax.

Our acute pain service was consulted on postoperative day (POD) 1 for uncontrolled pain in his left lower thorax. On POD 2, we performed a single shot left external oblique intercostal fascial plane (EOI) under ultrasound guidance. Placing the ultrasound probe in the sagittal plane at the border of the 6th and 7th rib, we rotated the probe slightly to achieve the short axis view of the ribs between the mid axillary and the mid clavicular line. Approaching from the superior to inferior direction, we deposited 20 ml of 0.25% bupivacaine with 3 mg preservative free dexamethasone between the external oblique muscle and the 7th rib (Fig 1). The patient reported marked improvement in pain scores and requested a repeat block the next day. On POD 3, we repeated a left EOI along with bilateral superficial parasternal single shots with dexamethasone to cover his left thorax and sternum pain.

Before the nerve block on POD 1, the patient had received a total of 30 Morphine Milligram Equivalents (MMEs). However, after the nerve block on POD 2 and 3, the patient received 7.5 and 15 MMEs, respectively. Notably, both doses of oxycodone were requested by the patient prior to the blocks. After each block, the patient did not request any additional narcotics for the remainder of those days, and pain was controlled for about 10-14 hours. He was also able to participate in physical therapy, ambulate, and improved his ability to perform incentive spirometry after the first nerve block. His chest X-ray also demonstrated improvement in his atelectasis.

DISCUSSION

Perioperative pain management after LVAD implantation typically involves multimodal pharmacological agents and interventional techniques to provide adequate analgesia while minimizing narcotic use. Opioids are effective in providing pain relief in the immediate postoperative period after LVAD surgery, however, they are also associated with nausea, constipation, and, most importantly, respiratory depression. Therefore, pain management aiming to minimize opioid use is even more critical in this patient population.

Multiple regional anesthetic techniques, including neuraxial, paravertebral, erector spinae plane, and rectus sheath blocks, have been described to provide analgesia after LVAD implantation [2,3]. However, these previously described techniques have notable drawbacks. The current gold standards for regional management of acute

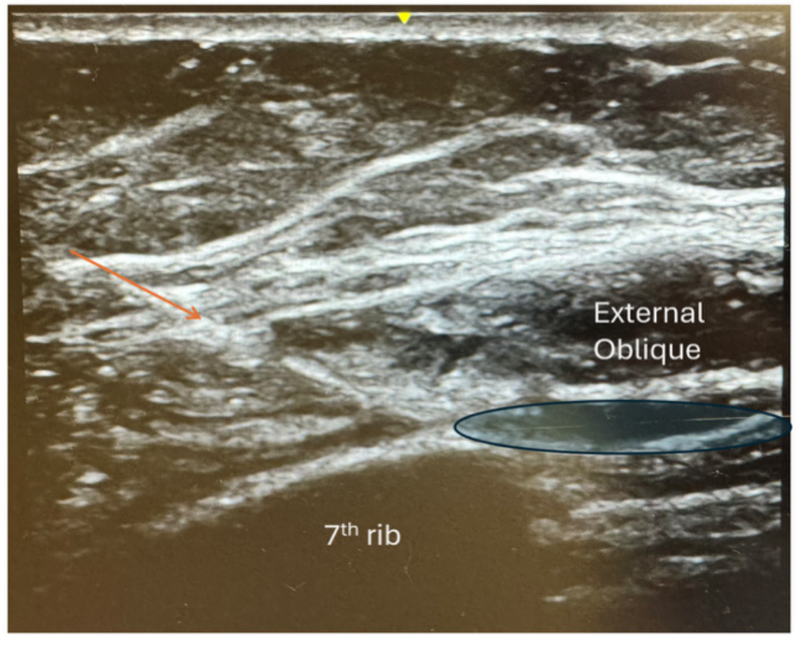

Figure 1. Ultrasound image of external oblique intercostal plane block

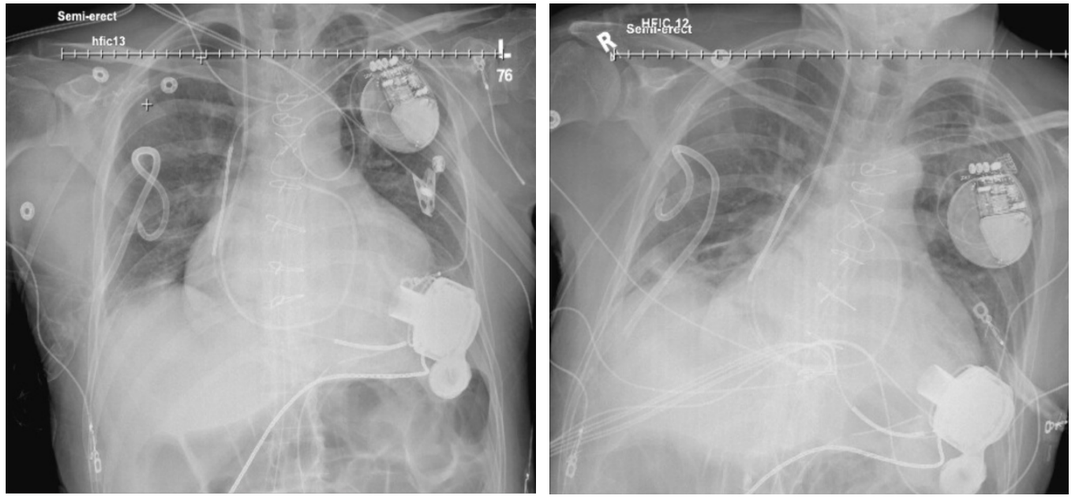

Figure 2. Chest X-Rays (CXR) of patient on POD0 (right) and POD3 (left). POD0 CXR taken on 6/11/23 shows right-sided small pneumothorax not significantly changed compared to prior study. Mild basilar opacities may represent aspiration or atelectasis. No definite right pleural effusion. Trace left pleural effusion. POD3 CXR taken on 6/13/23 shows right-sided small pneumothorax has resolved compared to prior study with no definite perceptible residual. Right basilar opacities are again noted slightly decreased compared to prior study likely represent resolving atelectasis.

thoracotomy pain are neuraxial and paravertebral techniques, but these require close monitoring of anticoagulation status. This can be challenging in LVAD patients who require systemic heparinization and lifelong anticoagulation. Repositioning the patients for these blocks can be difficult and painful in patients with multiple thoracostomy tubes. In addition, obesity is a common comorbidity in this population and can complicate placement of neuraxial and deep nerve blocks. Furthermore, previously described blocks (such as rectus sheath blocks) may not adequately cover the driveline insertion site, which tends to traverse the abdomen and exit more laterally.

The external oblique intercostal (EOI) fascial plane blockade is an emerging regional technique targeting the anterior and lateral cutaneous branches of the thoracoabdominal nerves. These nerves innervate the upper abdominal quadrant, including the skin, muscles, and parietal peritoneum. Cadaveric and prior EOI studies have demonstrated consistent coverage for the upper lateral abdominal wall from T6 to T11 for both anterior and lateral cutaneous branches [4]. Since the LVAD driveline usually traverses along the left abdominal wall and exits below the ribs, we hypothesized our patient's main source of pain was due to the driveline, and the EOI block provided excellent analgesic coverage.

CONCLUSION

In conclusion, the EOI fascial plane block is a promising new technique for patients with refractory postoperative pain after LVAD insertion, particularly those experiencing pain at the driveline site. It can be easily performed in the supine position and is a superficial block, mitigating concerns about anticoagulation and body habitus. Although more information on the analgesic efficacy, reliability, and distribution of the sensory block is needed, we propose that the EOI could be considered for other procedures to provide analgesia to the anterior and lateral upper abdomen.

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Traumatic Brain Injury Induced Epilepsy Literature Review

Madeline Pierson, OMS-III[1]
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ABSTRACT

Post-traumatic epilepsy (PTE) is a form of epilepsy that occurs after a traumatic brain injury. PTE is classified as immediate (within 24 hours), early (within one week), or late (beyond one week). PTE affects countless individuals each year, imposing significant financial, medical, and social burdens. Although many people are affected, the underlying pathology is not well understood, and ongoing research continues to explore it. Current research suggests that factors such as hippocampal damage, blood-brain barrier dysfunction, neuroinflammation, and synaptic reorganization play significant roles in the development of PTE. These theories are backed by numerous studies, some involving animal models. Multiple risk factors influence whether someone will develop epilepsy after a TBI, including severity, lesion location, genetic predisposition, and secondary complications. Important signs and symptoms of PTE to look for include hallucinations, changes in consciousness, abnormal behaviors, hyperkinetic movements, and autonomic dysfunction. Diagnosing PTE can be challenging; diagnostic techniques include video-EEG monitoring, neuroimaging, and clinical assessment. In addition to diagnosis, treatment can also be challenging. Current treatment options include anti-epileptic medications, surgical intervention, vagus nerve stimulation, and deep brain stimulation. Prevention methods include wearing helmets, using car seats, wearing a seat belt, and implementing programs that aim to decrease violence. PTE affects individuals differently, and many require assistance with activities of daily living and transportation. They may also need counseling for mood dysregulation and may have difficulties forming and maintaining relationships. It can also be difficult for those with PTE to maintain a job, leading to socioeconomic strains. Given the substantial burden PTE places on an individual and the healthcare system, continued research is essential to enhance understanding, improve treatments, and develop effective prevention strategies.

Beyond the Womb: Effects of Maternal Obesity and Diabetes on Fetal Development and Neurodevelopment

Faria Oviedo Fortin, M.S., OMS-II[1] and Dr. Erica Ausel, PhD[1]
[1]Marian University Wood Collegte of Osteopathic Medicine

ABSTRACT

Maternal obesity is associated with an increased risk of many pregnancy complications such as gestational diabetes mellitus, gestational hypertension, pre-eclampsia, pre-term labor, and certain developmental conditions. As the prevalence of obesity, neurodevelopmental and psychiatric disorders increase, this article discusses the effects of maternal obesity on attention-deficit hyperactivity disorder (ADHD) and autism spectrum disorders (ASD). The mechanisms behind the hormonal, systemic, and biological aspects of both disorders have been further explored to understand if there is a link between maternal obesity and ADHD and/or ASD. The findings conclude that while a causative relationship cannot be established, there is sufficient evidence to support that maternal obesity and gestational diabetes increase the risk of ADHD, autism, and other psychiatriccnditions

due to an adverse uterine environment during critical periods of development during gestation.

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Evaluating Betanin, β-Carotene, and Kaempferol on Breast Cancer Cell

Samuel DeWitt, OMS-II[1]
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ABSTRACT

Breast cancer is the leading cause of death for women, therefore research regarding therapeutic treatments is warranted. Many foods have phytochemicals which have been shown to have chemo-preventative properties. Beetroot contains many phytochemicals such as betanin, β-carotene and kaempferol. With the use of the MCF-7 breast cancer cell line, we conducted cell proliferation assays after exposure to these phytochemicals to determine if the total cell count was reduced individually and through synergistic effects. Research has indicated that betanin, β-carotene and kaempferol can reduce cancer cell growth. In this study, kaempferol and β-carotene resulted in a dose-dependent decrease in cell proliferation in the MCF-7 breast cancer cells. The combination of these phytochemicals resulted in an additive effect on reducing cell proliferation rather than a synergistic effect. This research will contribute to the development of phytochemical research and the possible emergence of a new breast cancer treatment.

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An Approach to Managing Diabetes

Caitlyn Philliips, OMS-II[1] and Tyler Watson, OMS-II[1]
1. Marian University Wood College of Osteopathic Medicine

Did You Know? The key to managing diabetes is a complex multifactorial approach, and the role of religious fasting adds another layer to the management plan. The most effective treatment is one that is a patient centered approach that encompasses the patient's values, the patient's religious fasting guidelines, and the patient's metabolic markers. Those who are diabetic and participate in religious fasting are at a superimposed risk for complications, such as hypoglycemia, dehydration, hyperglycemia, and ketoacidosis [1]. Risk stratification tools are a highly recommended quantifiable tool to adjust the physicians and patients fasting plan to reduce hypoglycemic and ketoacidotic attacks. In 2021, the most recent International Diabetes Federation - Diabetes and Ramadan Alliance (IDF-DAR) risk stratification tool was published, addressing various factors including: those related to Ramadan, the diabetes itself, and factors related to the fasting individual [2]. For the patient to remain in a healthy state, there must be an increase in the frequency of glucose monitoring. The timing of glucose monitoring is crucial, as over 50% of hypoglycemic events occur within the last few hours of a fast. Implementing a combined approach of continuous subcutaneous insulin infusion (CSII) and continuous glucose monitoring (CGM) has been proven to reduce hypoglycemic attacks and finger pricks [3]. Physicians should prioritize prescribing drugs with a lower risk of hypoglycemia, such as empagliflozin (SGLT2 inhibitor) and tirzepatide (GLP-1 and GIP analog), because they do not raise circulating insulin levels at low glucose plasma concentrations [3].

Depression's Shadow, Hope's Bloom

Dr. Brian Skinner, PharmD, BCPS

This piece captures the emotional journey from the isolating depths of depression to the vibrant hope of recovery. The left side depicts the heavy, dark shadows of emotional numbness, while the right side transitions to a scene of blooming life, symbolizing healing and resilience. The figure's posture reflects the shift from isolation to strength as light and life return. This artwork was created using DALL·E 3.

In 2018, the United States Environmental Protection Agency discovered that a staggering 292.4 million tons of municipal solid waste was generated, with plastic products alone accounting for 35,680,000 tons [7]. This significant contribution from plastic products highlights the pervasive use of plastic bags in our daily lives. Many individuals obtain plastic bags from grocery stores and various shopping experiences, leading to their frequent disposal into trash cans and accumulation in landfills [7]. Due to plastic bags' composition of polyethylene, they take an exceedingly long time to "break down" in a landfill [5]. Furthermore, they do not fully decompose; instead, they degrade into microplastics, which pollute the environment and wildlife [6].

In response to this growing concern, a 2018 study by the United Nations Environment Program and World Resources Institute, found that 127 of 192 countries have enacted legislation to limit plastic bag usage [6]. Our project aims to repurpose plastic bags into sleeping mats, benefiting both the environment and those in our community, while demonstrating how to upcycle material often viewed as waste. This initiative was inspired by a previous service project Johanna participated in. We plan to gather donations of plastic bags from students and staff at MU-WCOM to support our efforts in this service endeavor.

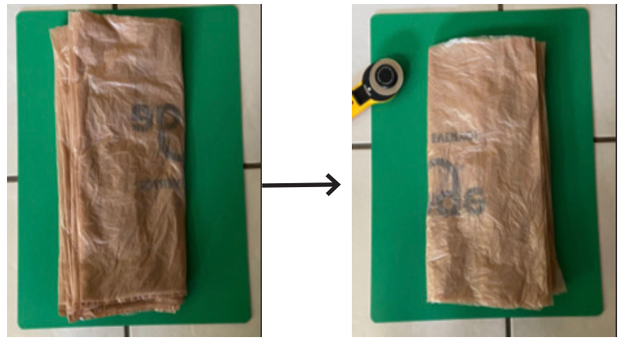
Through this project, we aspire to make a meaningful impact on those experiencing homelessness in Marion County, Indiana. According to the Coalition for Homelessness Intervention and Prevention (CHIP) Point-In-Time Count, the number of individuals seeking shelter has increased significantly since 2023 [2,3]. The Point-In-Time Count provides a snapshot of homelessness by calculating the number of people seeking permanent housing on a single night each January [2,3]. On January 24, 2024, 1,701 individuals were reported as lacking permanent housing.[3] This service project not only addresses the environmental impact of plastic waste, but also seeks to provide support to those experiencing homelessness, reflecting our belief in the connection between physical, emotional, and social health.

Crafting Change: Crocheting Plastic Bags into Plastic Mats

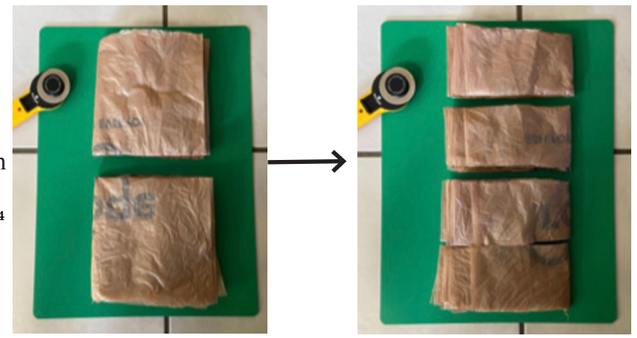
Johanna Feiner, OMS-III, Claire Eby, OMS-III and Veronica M. Miks, MD, FACEP

Step 1: Stack multiple grocery bags on each other and then longitudinally fold them.[1,4]

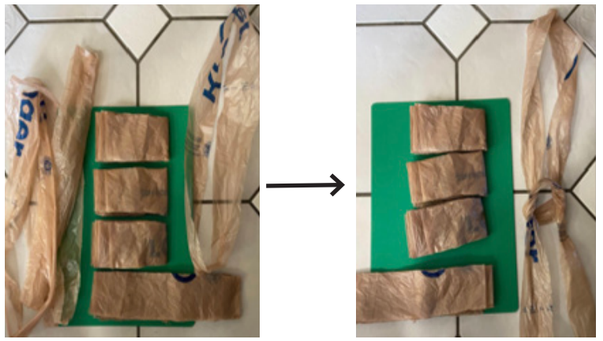
Step 2: Cut off both the top and bottom ends of the folded bags.[1,4]



Step 3: Cut perpendicular to the folded bags to make strips. The number of strips depends on the thickness of the plastic bag.[1,4]



Step 4: Unfold the strips of bags and combine them together by looping them together. Continue this process until there is a long strand of plastic bags.[1,4]



Step 5: Roll the "plarn" into a ball.[1,4]

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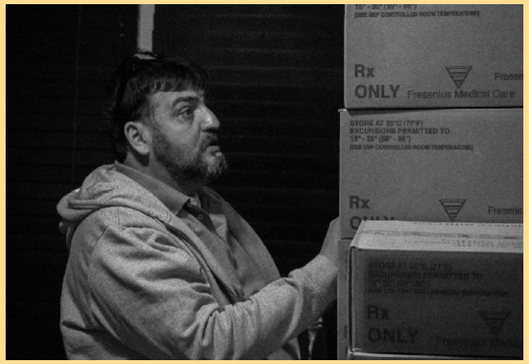
Peritoneal Di(e)alysis

John Ceucha, OMS-III

I want to first share my gratitude to my father who allowed me to capture this series of pictures and for becoming the source of this artistic endeavor. My hope was to depict the day-to-day routine that my father experienced, over a span of two years, when he was on peritoneal dialysis. In addition, there was a particular focus underneath that aspired to elucidate the mental anguish that individuals in similar circumstances face. Essentially, the "battle" being fought within, in other words, the despair associated with being physically dependent on a machine to live and the appreciativeness of modern technology for keeping oneself alive.



Stacks

Watch your Step

Disinfect

Reflective

Machine Prep

Connecting

Connected

MARIAN UNIVERSITY
Indianapolis ®
Tom and Julie Wood
College of Osteopathic Medicine

Beyond the White Coat
(ISSN print: 3067-7440 and ISSN online: 3067-7432)