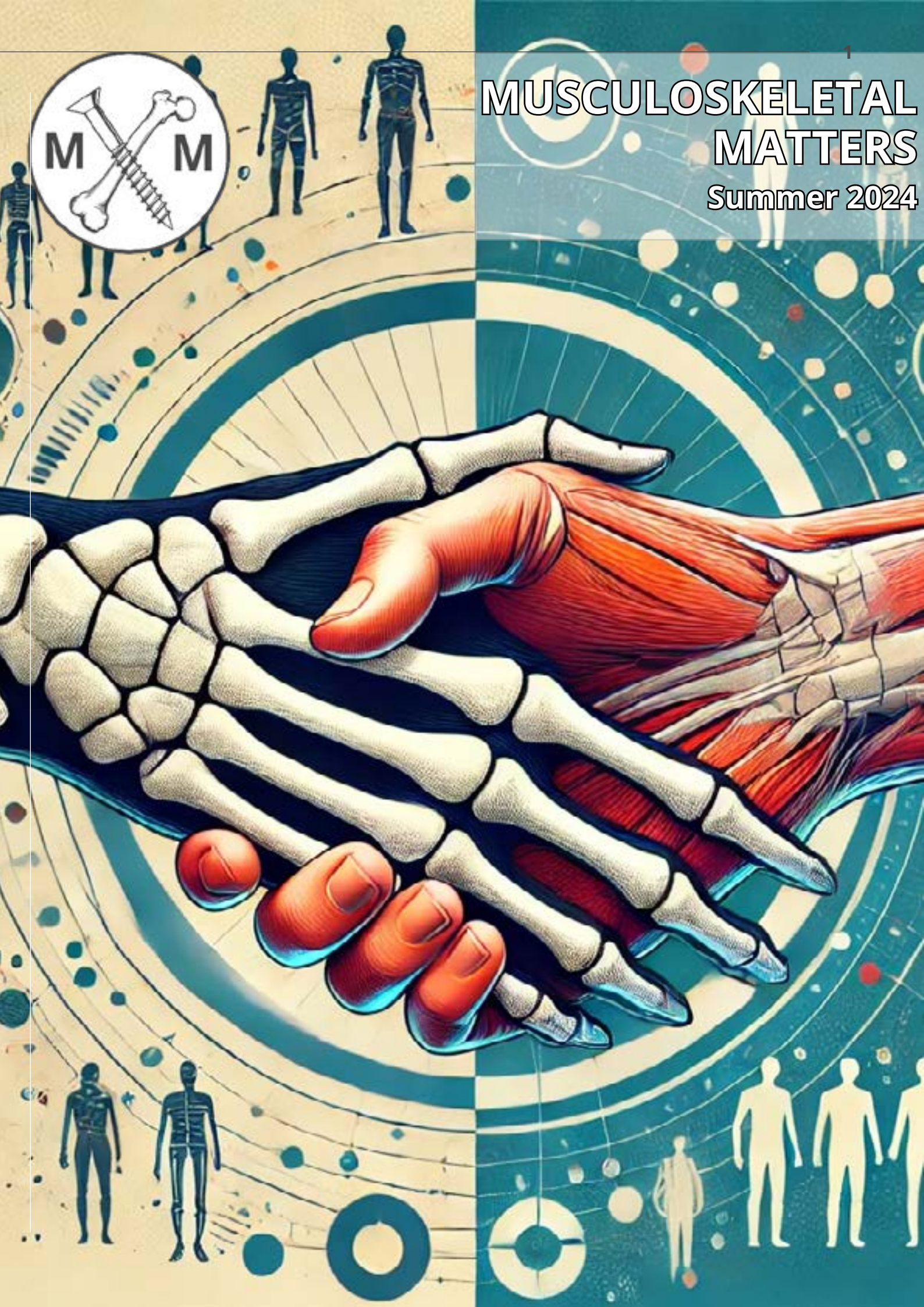


MUSCULOSKELETAL MATTERS

Summer 2024



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ONE LEG IN FRONT OF THE OTHER

Sagar Patel

The ability to put one leg in front of the other is a gift that is often taken for granted. All of us have learned to run at some point in our lives, whether it was running in soccer to steal the ball from the defender or running to the kitchen to turn off the oven while you were baking a cheese pizza. For me, running has changed my life for the better. I have benefited physically and mentally over the years from this simple yet complex activity. As I have gotten older, running is the one activity that I never take for granted anymore, especially as a graduate student. It has allowed me to connect with like-minded individuals and still stay physically active.

Everyone, including me, has run at some point in their lives...and hated it. As a child, I did not enjoy running at all. I dreaded running from home plate to first base after hitting the ball off the tee and felt so exhausted after three seconds of physical activity. In elementary school, I would have rather played on my Wii and eaten chicken nuggets that my mom made. Nonetheless, I joined the track team in middle school to get out of the house more. My brothers were not even a year old yet, so it was stressful dealing with crying infants every time I walked through the door to my house. When I started, I would feel fatigued and cramp after running up two flights of bleachers. But with more time, it did not get any better. There were races where I would walk because I got so tired and lost on the course. I would get mocked by other teams and even some of my teammates, as they did not believe in me. I continued to stay motivated because I enjoyed the company of some of my teammates and wanted to be seen as an athlete in high school. I always strived to break barriers since I was a child and did not want to be seen as your average Indian person. However, I slowly started asking myself regularly at fifteen years old: "Is any sport for me?"

Initially, my answer was no. For years, I jumped from soccer to basketball to even karate. I could not find a sport that I thoroughly enjoyed because everything involved physical activity. Everything changed when my

coach started to give me a pep talk on how I have the potential to be great in track and field. As an insecure teenager, I did not believe him at first. But he gave me the same pep talk the next day, and something stuck. After that, I was willing to push my body and get stronger and faster, and consequently, my times in the 1600-meter run and 3200-meter run significantly improved from my freshman to sophomore year. All this happened because I was willing to listen to others and break barriers that I would have never imagined breaking.

After I graduated from high school, I was beyond ecstatic to have been recruited to run NCAA Division III cross-country and track and field at Elizabethtown College. I worked so hard and diligently to get to this point, and I knew that anything was possible with hard work. My mind and body were changing for the better as I felt more optimistic about myself. I was running more miles than ever and getting more confident in my ability to get faster and stronger.

Then, the pandemic hit, and I felt lost as a person and as a runner. I did not know what to do with myself or what the world would look like. All anyone was talking about was how people were getting sick and hospitalized with COVID-19. To tune everyone out, I would run outside and forget about everything for a set amount of time. Sometimes, I would run for forty-five minutes. On other days, I would run for over ninety minutes. I would just put one leg in front of the other, and not worry about anything, including a pandemic. I was getting faster and feeling better about myself every day.

Fast forward a couple of years, and the pandemic was slowly winding down. Everything was slowly opening again, and mask mandates were being lifted. I was feeling great as I was getting ready for the first race of the college season. But in the middle of the race, I felt a slight crack in my left foot. After I finished, I could not put any pressure on my foot or stand up properly. I went to the hospital, and they confirmed that I had a stress fracture. Devastation was an understatement.

I sobbed as I worked on my biochemistry homework, and tears would end up on my notebook. I could not run for over a month, and I felt physically and mentally defeated. Once I started running again, I felt beyond out-of-shape and asked myself again as a twenty-year-old: "Is running really for me?"

I did not know how to answer that question, so I went to my teammates and asked them. Without any hesitation, they all said yes. They did not want me to quit on something that I genuinely cared about since they had known me. They wanted to see me put one leg in front of the other. I did not want to let my teammates, my younger brothers, and my younger self down. I wanted to show people who I truly was.

After graduating from college, I decided to keep on running and trained to get faster. I started to run for myself, which was something that I had never done. It was a strange adjustment initially, but I got used to it. This time, I did not have a coaching plan or anyone to tell me what workouts to do or how long my runs needed to be. I just started running for however long I wanted and stopped when it was necessary. I began registering for races, and before long I was consistently finishing in the top ten. These experiences were such a confidence booster for me; they allowed me to believe in myself as a runner. My biggest accomplishment was running the Scranton Half Marathon and finishing it in eighty-four minutes! I was overjoyed with the result and reflected with my family and friends about the achievement. I thanked them all for believing in me and allowing me to grow and blossom into the runner I am today.

Everyone has run at some point, whether it was a marathon or just across your house as a kid, and we may have taken it for granted. As I have gotten older, I have slowly realized how much it has changed my life for the better. All I have to do is put one leg in front of the other, and the rest is history.

FINDING CommuniTEA IN MEDICAL SCHOOL

Catherine Falkenstein, Olivia Bannister, Jin Hyeok Nam, Danyall Saeed, Kaitlin Toal

Tea is the world's second most consumed beverage, after water.¹ It is estimated that two billion cups of tea are sipped worldwide every day.¹ True tea, such as green, white, black, and oolong, come from a species of evergreen shrub called *Camellia Sinensis*.² *Camellia Sinensis* is native to Southeast Asia, most notably the Yunnan province of China.³ Tea became popularized during the Tang Dynasty of China, spanning from the fifth to the eighth centuries.⁴ At the same time, Zen Buddhism also started to flourish, which started incorporating tea as a medium to capture the present moment and reflect inward.⁵ Tea was introduced to the Western world during the fifteenth century by Dutch, Portuguese, and British explorers and merchants.⁶ Since then, tea has become a popular beverage in Europe and eventually in the American colonies. From ancient to modern societies, tea was a significant medium to connect people, promote new ideas, and promote wellness.⁷ As a group of authors, we noticed an excessive amount of stress among ourselves and our classmates and felt that our community would benefit from weekly tea meditations, just like the many cultures and civilizations have for centuries.

We extended invitations to everyone in our first-year medical school class and quickly welcomed over 40 new members. During the academic year, we also had faculty and second-year students join our sessions which regularly had 15-20 attendees. Members reported, "It was a great way to learn how to meditate and focus more on being in the present," and that they "enjoyed having time to decompress following our very busy weeks." We began each tea session by catching up with one another about how our weeks went. One way we accomplished this was by asking a different question of the day each meeting. They served as a lighthearted way to ease into the session with questions such as "What would your walk-up song be if you were a professional baseball player?" to "What is the most meaningful thing that you've learned throughout your time in medical school so far?" These questions allowed us to uncover more about our classmates regarding what makes us similar and unique. Following the weekly question, we would typically initiate the meditation portion of the session. The meditation portion was directed by our club president, Jin, who was gracious enough to make us tea using his

traditional tea set. We varied which tea was offered from week to week, with a different surprise flavor offered by either Jin or a club member. Our leader gathered the group's attention and gave a brief explanation of the purpose of meditation and provided tips on how to be successful. He reminded us of the importance of being in the moment, letting our thoughts naturally come and go, and above all, being grateful for this time that we got to spend with our tea and with each other. Jin then would ring a bell one singular time, indicating the start of a 5-minute meditation. It is hard to describe the serene energy in the room as we all sip our tea and cherish the moment when existing alongside each other is enough. After long hours of studying, memorization, and quizzes, it was hard to ask for more. What a privilege it has been to practice the art of being. While tea can be a great way to bring people together, it can be equally rewarding to brew a cup at home. Enjoying tea alone can serve as a stress-relieving ritual of self-care, provide warmth and comfort to the spirit, and be enjoyed alongside meditation at home. Depending on your goals of at-home tea practice, you can opt for tea bags or invest in a

loose-leaf teapot to enjoy loose-leaf teas.

Different types of tea require different brewing times and temperatures to create the optimal flavor and avoid issues like bitterness. Black tea, such as Earl Grey or English Breakfast, should be brewed at 212°F for 3-5 minutes. White tea is typically brewed at the lower temperature of 175-180°F for 1-2 minutes. In general, green tea is brewed at 175-180°F for 2 minutes.

Much like our community tea sessions, we encourage you to set a five-minute timer for a short meditation. You could use this time to clear your mind and practice enjoying the present moment while sipping your tea. One way to achieve this is by focusing your attention on the flavor, aroma, appearance, and temperature of both the tea and teacup. Alternatively, you could reflect on gratitude and everything that you are thankful for. We encourage you to find a practice routine that allows you to maximize the benefits of what tea meditations have to offer and hope you foster a love of tea through your journey.

[Click here to view references](#)



GETTING GIRLS TO GOWN-UP FOR ORTHO!

Taylor Moglia, Erin Welby, Rachael Tirjan, Amy Kennalley

Even today, orthopaedic surgery remains markedly underrepresented by women, comprising only 6% of orthopaedic surgeons. This disparity traces its roots back nearly a century. With the establishment of the American Association of Orthopaedic Surgeons (AAOS) in 1933, all existing orthopaedic surgeons were automatically admitted, except for Dr. Ruth Jackson, the sole woman in the field at that time. Dr. Jackson attended the University of Texas at Austin for her undergraduate studies and then attended Baylor College of Medicine where she received her medical degree. At Baylor, she was one of only four women in a class of 112 students. She faced several sexist policies, including being unable to take urology and needing to score 10 points higher than her male counterparts to achieve the same grade. However, in 1928 she graduated 8th in her class alongside the other three women in a class size that was reduced to 58 total graduates. Her remarkable achievement paved the way for her to become the first female orthopaedic surgeon in 1932 (www.rjos.org).

When she passed the American Board of Orthopaedic Surgery (ABOS) in 1937, she officially became the first board-certified woman orthopaedic surgeon in the United States. In addition to her accomplishments and success that paved the way for women in this field, she also served as the Chief of Orthopaedics at Parkland Hospital, became a cervical syndrome specialist, and was famous for performing wide-awake laminectomies under local anesthesia. Furthermore, she invented the Jackson Cervipillo, a specialized cervical neck pillow still utilized today to reduce neck pain. In 1983, she began an association for the few women in the field and called it the "Ruth Jackson Orthopaedic Society." Starting with just 42 members, the society has grown to over 1,400 members today, with more than 100 chapters at medical schools across the country.

First-year medical students at Geisinger Commonwealth School of Medicine (GCSOM) have launched a chapter of the Ruth Jackson Orthopaedic Society (RJOS), in collaboration with the Geisinger Orthopaedic Women's Network (GOWN). GOWN comprises of resident and attending women orthopaedic surgeons at Geisinger Health System. The establishment of these chapters was driven by a shared goal: fostering a supportive community for women in the field of orthopaedic surgery.

RJOS aims to enhance the professional growth of women across all stages of their career progression in orthopaedics, providing a community that fosters inclusivity and diversity in a tradition-

ally male-dominated field. Medical students who have held leadership positions within the National RJOS Chapter have shared their reflections, highlighting how RJOS positively influenced their journeys into orthopaedics.

"I came into medical school thinking orthopaedic surgery sounded interesting as a career, but not knowing if there was a place for me. Through RJOS I have met incredible female mentors who have shown me the space at the table that they've created for me. I've also made incredible friends who will be my peers in the years to come and with whom I know I will be able to take full advantage of that seat. RJOS has provided me with inspiration, motivation, and pride in myself knowing how powerful women can be in a field where they have been traditionally underrepresented. I am so grateful for the opportunities RJOS has afforded me, and having had the ability to co-found the RJOS Medical School Chapters initiative, I have seen firsthand how bright the future of women in orthopaedics is, and I am so proud to be a part of it."

- **Jessica Schmerler, Johns Hopkins University School of Medicine, Class of 2025**

"When I decided to join the field of orthopedics, I was used to being the odd one out. In college, I had been a female coxswain on the Men's Heavyweight rowing team. That was exactly how I described myself as an athlete, and in parallel I began to think of myself as a female orthopaedic surgery applicant, aspiring to be a 'female orthopaedic surgeon.' Incredibly, it was joining a community full of 'female' students and surgeons within RJOS - where gender no longer preceded my title - that reformatted my aspirations: to be an 'orthopaedic surgeon,' full stop, with no asterisk or qualifier. Being a part of RJOS has made all the difference, and it's been an enormous privilege. I hope through co-founding the RJOS Medical School Chapters initiative, we can bring this sense of confidence and belonging to students all over the country. Among the student members of RJOS, I see only future all-star orthopedic surgeons."

- **Jennifer Kunes, Columbia Vagelos College of Physicians & Surgeons, Class of 2024**

Geisinger's RJOS chapter is officially titled "Geisinger Orthopaedic Women's Network: Undergraduate Medical Education



Program" (GOWN-UP), in collaboration with GOWN. The inaugural GOWN-UP event took place on Sunday, March 3, 2024, at the Pine Barn Inn in Danville, Pennsylvania, to inspire young women to pursue

orthopaedic surgery careers. The event was led by orthopaedic surgery resident Dr. Sarah Hine, PGY-3, with support from Geisinger orthopaedic residents, attending physicians, medical students, and Stryker partners who generously funded the event.

A total of 93 women from local high schools and universities participated in the event, which included informative panels, engaging Q&A sessions, hands-on stations, and enlightening lectures.

As executive board members of GOWN-UP, we eagerly volunteered to play proactive roles in setting up GOWN and assisting at the hands-on stations. Witnessing the curiosity light up the faces of young women was immensely rewarding—it made the impact we were making feel tangible.

To gain deeper insight into what the event meant for others, we interviewed two residents who played crucial roles: Dr. Sarah Hine and Dr. Jessica Baylor.

Question 1: What was your favorite part of the GOWN event?

Dr. Hine: "Getting to see how many young women were interested in orthopaedics and how excited they were to learn how it works. It was really cool to see how some girls especially were really drawn to it and wanted to experience more."

Dr. Baylor: "My favorite part was how many young women were there to gain exposure to orthopaedics. It was incredible to be a part of that."

Question 2: What impact are you hoping that the GOWN event had on the women in attendance?

Dr. Hine: "Hopefully the event will stick with some of the girls as they move through their high school and college careers. The goal of the event was to get girls thinking about a career in ortho and to expose them early enough that they go into medical



school planning to pursue ortho."

Dr. Baylor: "I'm hoping that it opens their eyes to a career in medicine, orthopaedics in particular. There's a lot of power in seeing someone who looks like you in regards to opening up future career possibilities."

Question 3: If you had attended an event like GOWN when you were in high school or college, do you think you would have found a passion for orthopaedics sooner?

Dr. Hine: "Absolutely. I went into medical school thinking I would do something completely different, and I changed my mind to pursue ortho pretty much as soon as I learned more about it. It's a great specialty and I think it would appeal to many more women if they were exposed to it."

Dr. Baylor: "Absolutely! I didn't know much about the field at all. It wasn't until my first year of medical school that we had an orthopaedic surgeon come teach that I found out about the field."

Question 4: Can we anticipate annual GOWN events moving forward?

Dr. Hine: "Yes! A second event is in the works, although in its early stages. We're hoping to host events for both college and high school levels, possibly separately going forward in order to cater better to everyone's education level"

Dr. Baylor: "Yes! We are very grateful to have the support of our department in continuing GOWN events in the future."

To all women interested in medicine and orthopaedic surgery, we leave you with the words of Dr. Ruth Jackson herself: "If you have a burning desire to study medicine, **no one can stop you.**"



A WHOLE NEW WORLD

Luke Kappes

Throughout my time in high school, college, and now in medical school, I have always felt the need to do something exhilarating yet peaceful in order to relieve stress. Freediving quickly became my go-to hobby to get away from the classroom and into a whole new world. Living in Florida, we're blessed with so many different places to explore; from the barrier reefs to the freshwater springs, there is so much to see and immerse yourself in.

Imagine taking your first steps into the crystal-clear water of one of the springs. The cold water shocks your system for a second, but you continue on. It never gets easier getting into the 72-degree water, but as you continue into the spring, water slowly enters your wetsuit, and you begin to warm up. You get to the point where the water reaches your hips and it's time to put on your fins and mask.

You dive into the water and can see to the other side of the spring, unobstructed. You see fish, some people, and if you're lucky, manatees and turtles. The water is so clear that it looks like they are all suspended in the air.

The water feels cold on your head and face, bringing you back to reality and grounding you. You begin to swim toward the head of the spring, feeling more like a fish as waves of muscle energy flow from your fins throughout your body, from your knees to your hips and then out through your shoulders, elbows and hands.

You gather your breath and with a burst of energy you begin descending down into the cave entrance. As you look into the cave system with your flashlight, you see there's so many interesting formations and paths inside. Being that you're limited by your own breath, you begin your return to the surface. As you break the surface, energy rushes into you as you quickly take a breath of fresh air. You're back into the outside world again. For a second, you forgot about everything else that was going on above the water. You crave to see more, so as your breathing returns to normal, you go back into the underwater world and begin the process again.

One thing that most people don't realize is that freediving is quite a demanding exercise and puts a lot of stress on the body. From pushing the limits of holding your breath, to the quick bursts of fast twitch muscle fibers plunging your body down into the water, to the endurance requirements of swimming deeper and deeper and then propelling yourself back up to the surface on a single breath of air; your cells begin to tire out.

I have had to learn how to properly fuel myself before, during, and after a dive in order to avoid passing out from a lack of blood sugar.

I eat a lighter breakfast beforehand that is high in protein with no caffeine. About 30 minutes before the dive, I will have some healthy sugar, such as a banana, as well as an electrolyte beverage to provide my muscle cells with the energy they need. There needs to be a balance, however. If I eat too much food or drink too much, I will find myself feeling nauseous during my dive. After diving I replenish myself with healthy carbohydrates, electrolytes, and protein.

It may only be a one-day adventure, but the exhilaration of freediving provides me with the stamina to continue on with my academic studies and helps me focus on the weeks ahead.



INCREASING EXERCISE IN DEMENTIA PATIENTS – MOTIVATORS, BARRIERS, AND INTERVENTIONS

Adwait Chafale¹

¹Geisinger Commonwealth School of Medicine, Scranton, Pennsylvania

Dementia is a neuropathological process that disrupts cognition, personality, behavior and sensorimotor functions. This condition involves various molecular abnormalities including the loss of synaptic connections, cell death, gliosis, and inflammation¹. Dementia is typically classified by the pathologies underlying it. There are typically six classifications which include: amyloid-Beta, microtubule-associated protein tau, TAE DNA-binding protein 43 (TDP-43), fused in sarcoma (FUS), alpha-synuclein, and prion protein. These proteins can propagate and seed along healthy cells leading to pathophysiologic changes that vary in severity. Additionally, dementia can be categorized by age of onset, with 64 years often used as a threshold between early and late onset cases. Pathologies often associated with dementia include Alzheimer's disease, vascular dementia, frontotemporal dementia, Lewy body dementia, and prion disease¹.

Apart from the cognitive impact, dementia can also have a large economic cost for patients due to care costs and unpaid caregiving provided by family and friends. In 2019, the estimated annual cost per person with Alzheimer's disease was approximately \$81,000, four times the cost of care provided to individuals of similar age without this disease. However, these costs can vary depending on the method of care provided and individual behavior. These estimated costs aggregated across all patients are expected to increase to \$1.5 trillion by 2050. Due to these large costs, families are at risk for payment delinquency and financial exploitation². Given that symptom severity can be associated with increased financial costs, individual behavior changes may improve the health and financial outcomes of families affected by dementia.

Exercise is one such intervention that can improve health outcomes in patients with dementia. Specifically, exercise can improve cognitive function and enhance functional brain plasticity. Underlying mechanisms include raising brain-derived neurotrophic factor (BDNF) and insulin-like growth factor 1 (IGF-1), regulation of inflammatory cytokines, decreasing oxidative stress, increasing cerebral blood flow, decreasing Aβ concentration, and inhibiting tau phosphorylation and activa-

tion³. Studies have shown that resistance exercise exerts the greatest positive effects on slowing global cognitive decline and deficits in executive functioning, as well as improving memory functions for patients with cognitive dysfunction such as dementia³. Resistance training may benefit cognition by increasing levels of IGF-1 in the hippocampus and peripheral blood, modulating inflammatory cytokines such as interleukin-6 (IL-6), IL-1β, and IL-15, enhancing muscle strength which has been associated with brain size and cognition. Multicomponent exercises, which are combination exercises of at least two types of exercises, were best at improving symptoms related to mild cognitive impairment³. However, both resistance and anaerobic exercises individually showed improvement in physical functioning, though resistance training showed greater improvements³. These protective effects of exercise on cognition were also seen to improve activities of daily living³. Therefore, this intervention and lifestyle change can help alleviate the costs associated with dementia and its care.

Motivators and Barriers to Physical Activity in Older Adults

Motivators for physical activity include intrapersonal factors such as mobility aids. These increase the ability to execute physical activity, enjoyment related to physical activity, pastime and daily structure, willingness to remain physically active, physical activity to complete tasks, and maintenance of former activities. Interpersonal factors include group-based exercising with other residents, support for physical activity, physical activity as a joint activity with caregivers, and increased communication associated with activity. Institutional motivators included the outdoor environment⁴.

Intrapersonal barriers to physical activity were cited to include physical, psychological, cognitive, and societal factors, as well as individual perceptions of aging. Physical factors include general impairment of physical functioning, diseases associated with movement, and unpleasant physical feelings when exercising. Individual perceptions of aging factors included the use of age as an explanation for inactivity and lack of meaningfulness of physical activity because of age. Psychological factors include fear of injuries or falls, negative emotions, and a need for peace. Cognitive factors include a lack of motivation and an inability to remember exercises. Institutional factors include

the perception of missing opportunities for physical activity, feeling uneasy in current environments, design of outdoor areas, and no appropriate music. Societal barriers include a fear of negative judgment from society regarding physical activities. Interpersonal factors include refusing group-based exercising with other residents due to a fear of difference in performance levels and a lack of support⁴.

Individual Interventions

To address the intrapersonal barriers of physical activity, studies show that group activities may promote a sense of social integration and maintenance of social identity⁴. This may motivate dementia patients to begin exercise regimens and improve health outcomes. Additionally, integrating a behavior change theory approach to individual interventions by pairing resistance exercises with educational initiatives can boost motivation towards adhering to exercise programs. Such educational initiatives can include falls education. Lastly, multimodal formats that include both resistance and cognitive training, such as puzzles with obstacles that include resistance training or complex yoga routines, have been seen to be popular and effective in decreasing cognitive impairment⁵.

Community Interventions

Given that the outdoor environment is an institutional motivator, one intervention can involve developing more green spaces accessible to older adults. Studies show that walking in neighborhood green spaces increases contact with nature and improves psychosocial well-being. Characteristics of an effective green space include proximity, attractiveness including amenities, safety, and environmental quality, size, and total number of available green spaces. Particularly size of neighborhood green spaces has been associated with increased physical activity⁶. Additionally, integrating resistance training equipment and classes with these green spaces may lead to greater decreased cognitive impairment than one intervention alone.

Policy-based Interventions

Given the global impact of physical inactivity and its influence on national economics, interventions including policies are important in institutionalizing long-term programs for affected individuals. Current US initiatives include the National Physical Activity Plan, which recommends increasing physical activity. To better enact policies, governments, funders, and private stakeholders must collaborate to increase funding for such programs. However, even with adequate funding,

one barrier to care is a lack of public knowledge of the Medicare-covered annual wellness plan which offers personal prevention planning and counseling. Few Medicare enrollees were aware of this benefit indicating a lack of effective communication. Given this barrier, more emphasis must be placed on advertising benefits through interactions with patients and their care partners in high-foot-traffic locations such as hospitals, stores, and community spaces⁷. Other countries have also used fitness prescriptions where physicians can prescribe physical activity that is recognized and covered by wellness facilities⁸. While this can be prescribed in the US, it is not a common occurrence. Physicians and institutions should consider using this more often for dementia patients. Fitness prescriptions are most effectively done by integrating the prescription with the patient's lifestyle, tracking the patients' progress, and working with the patients' care partners or community trainers⁹.

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SILVERSNEAKERS – A GOLDEN OPPORTUNITY FOR SENIOR WELLNESS

James Gilmore

“How are you staying active?” This question, or something similar, is likely to pop up at your next annual wellness visit. For those 65 and older, its importance cannot be understated. According to the 2020 US Census, Americans 65 and older represent nearly 17% of the total US population after a period of unprecedented growth in this age group from 2010-2020.¹ While many advances in healthcare and medicine, alongside better social conditions, have afforded a longer life expectancy, this has not necessarily translated into a higher overall quality of life.^{2,3} Therefore, recent efforts in public health have increasingly focused on physical activity as a vital component of improved health-related quality of life.

Health-related quality of life, or HRQOL, is defined by the CDC as “an individual’s or a group’s perceived physical and mental health over time.”⁴ Numerous articles highlight the strong correlation between HRQOL and physical activity, demonstrating that staying active significantly improves physical and mental well-being. However, many practical barriers have impeded older individuals from participating in and benefiting from physical activity. These barriers can range from physical limitations or chronic conditions to a lack of access to exercise facilities, guidance, or resources to undertake a consistent exercise regimen.^{5,6,7}

One solution to these barriers is SilverSneakers. SilverSneakers is a national health and fitness program aimed at removing barriers to physical activity for those 65 and older. SilverSneakers offers specifically designed exercise community classes for all levels of fitness both online and in-person. SilverSneakers has over 15,000 locations, allowing eligible Medicare Advantage beneficiaries access to various facilities including pools, saunas, tennis courts, and walking tracks.⁸ The community environment and structure of SilverSneakers’ classes have shown improved physical fitness, fewer physically or mentally unhealthy days, and stronger perceptions of one’s health and sense of belonging in their community.⁹

I was happy to speak with Kathi Abati, a SilverSneakers instructor, to discuss her experience with the program and the benefits she has made with her class. Kathi has been a fitness expert for 45 years and spent 24 of those years as an instructor for SilverSneakers. She teaches at gyms

across the Pittsburgh area and has made a significant contribution to my community. She has led my mother on her health journey, and I’m grateful for the positive impact Kathi has made on my mother’s physical health and wellness.

Q: Could you tell us about your fitness journey and what inspired you to become an instructor?

“I come from a very athletic family. I have six brothers, and they were all extremely good athletes. And my sisters, we were all cheerleaders and always into some kind of physical activity. When I was in high school, my sister opened her own gym and I would go and help her out. I just loved being around it. When I graduated high school, I was supposed to go to business school, but I decided to go work with my sister, and that was in 1978. I’ve been doing it ever since. After my kids graduated, I had all this extra time, so I decided to work at different gyms, and that’s when I found SilverSneakers.”

Q: What inspired you to be a SilverSneakers instructor?

“The looks on their faces when I walked into my first class. When I was asked to teach SilverSneakers, I was told I would sit in a chair. My first thought was, ‘I don’t know that I want to sit in a chair because I’m always bouncing around and doing high-impact aerobics,’ but I did it. And the first day I did it, I just fell in love with it. It’s like a family. We call our class a family. Just today, one of our members returned to class after fracturing his leg eight months ago. As he walked in, everybody welcomed him back with cheering and hugs. It’s just the best, and it has really changed lives.”

Q: What types of classes do you offer in your SilverSneakers program?

“Right now, we do two types of classes. The classic SilverSneakers class involves chair exercises, which is helpful for those who might need to take a break in between exercises. If I have someone who has been going for a while, I’d upgrade them to my aerobics class without the chair. All my classes emphasize mobility and balance, which are very important, especially for my SilverSneakers group. We work on everything – ankles, hips, even our fingers. Hip and ankle mobility is one of the most important things for us. We work on our balance and do some strength training. It’s a great overall workout at any level.”

Q: In your experience, how has SilverSneakers impacted the physical health of your participants?

“People will say to me, ‘I’m finally able to go up the steps, carry my laundry, or finally able to back up out of my driveway and turn my head to look over my shoulder. I could never turn my head that way before!’ I think those stories really show how SilverSneakers impacts their physical health. One lady recently came back from Ireland and told me about all the walking she had done. She said she would have never been able to do that without starting SilverSneakers.”

Q: Have you noticed any improvements in the mental well-being of your participants?

“I have. I’ve seen people who have lost their spouse join the gym just to get out of the house. After a few visits, they start talking to new people and making friends. They end up going to the movies together, getting coffee, or just socializing at the gym before class. SilverSneakers gives people a reason to get up in the morning, get dressed, and get out of the house. It really lifts their spirits.”

Q: What role does social interaction play in the success of your students?

“It plays a huge role. If I have a class at 10:45am, I’ll see everyone at 10:00am outside talking and catching up. It’s not just exercise; it’s more of a social gathering. I know a lady who moved from New York and told me that SilverSneakers was how she made friends here in Pittsburgh. Even today, someone came up to me and thanked me for making her Independence Day holiday feel special. She loved the gathering and the USA music that we played as we exercised together.”

Q: What are some common challenges you believe older adults face when trying to stay active?

“Honestly, I think it’s just the uncertainty of what to expect. If they’re able to find transportation to class, they can complete the class. We help tailor the exercise to them. But I know anytime you start something new, you can be anxious about what to expect. I will say, however, that nine out of ten people who come in for the first time leave with a positive experience.”

Q: What advice would you give to anyone looking to achieve their exercise goals?

“You move it, or you lose it. You must move. I would say give it a try because you don’t know what you don’t know. If you try SilverSneakers, I’m sure they’ll see that it is a great community of people and the instructors love what they do. We are all there to help each other grow.”

My interview with Kathi demonstrated how SilverSneakers has not only improved participants’ physical health but also enriched their social well-being and overall quality of life. At a time when senior wellness and quality of life have become ever more important, fitness communities such as Kathi’s SilverSneakers classes provide an excellent outlet to get out and get moving.

[Click here to view references](#)



ECHOING ACCURACY: ULTRASOUND IN THE MODERN PHYSICAL EXAM

Srivennela Veeramachaneni

Ultrasound used to be an imaging tool mainly used in the practices of gynecologists to examine the female pelvic organs. Today, this tool is used in almost every medical specialty by physicians around the world. Using ultrasound in routine practice and as part of the physical exam should become a standard of care for every patient work-up. With the emerging distribution and access to handheld, easy-to-use ultrasound devices, every physician should reap the benefits of an extra tool in their toolbox for the overall improvement of patient care. However, there seems to be a widening learning curve between technological advancements and physician's scope of practice. To be at the forefront of patient diagnosis, ultrasound should be incorporated into the medical school curriculum early on as part of the physical exam. As students get accustomed to interpreting each sonogram, they will be more prepared to take on the clinical evaluation and management of their future patients.

I first became introduced to ultrasound early on in my medical

school radiology class. Having dedicated time to learn about the specifics of diagnostic imaging may seem redundant; however, I believe it has given me a great foundation in appreciating medical conditions and their corresponding physical findings. I was able to directly apply my knowledge as I shadowed PM&R physician, Dr. Lisa Valastro, who specializes in administering orthobiologic injections to aid in the treatment of musculoskeletal injuries and degenerative disease processes. As I tried to make sense of this moving, textured, black-and-white image on the ultrasound machine, I knew there was a steep learning curve ahead of me. I needed to take time to understand the various densities that were presented in front of me. As I heard Dr. Valastro seamlessly explaining her findings with ease, I felt a desire within me to better comprehend the ultrasound, a tool that is destined to be at every bedside.

Ultrasound can drastically improve the accuracy of a diagnosis quickly and effectively in many medical complications such as

cardiac abnormalities, gallstones, DVTs, and musculoskeletal injuries. With very few contraindications, this tool is non-invasive, cost-effective, and safe for patients of all types. This immediate interpretation is not only beneficial to act prophylactically but also in a way that is patient-centered. Physicians can use ultrasound to educate their patients in real-time on their medical condition, making way for patients to have a better understanding of their diagnosis and potentially greater compliance with their treatment.

In the context of musculoskeletal injuries and disease states, ultrasound has extended its use into evaluating patients during the basic components of an "MSK" physical exam, such as assessing a patient's range of motion (ROM). When evaluating ROM, it is important to assess passive, active, dynamic, and functional forms of movement; however, dynamic assessment with ultrasound seems to be the main area that is lacking. I believe this is due to the lack of early exposure to ultrasound interpretation. If current medical school students began

honing their ultrasound skills early, they would undoubtedly be in a better position to analyze their findings and come to a diagnosis. The list of uses for ultrasound in an MSK examination goes well beyond joint/muscle functionality and deformity assessments and further into identifying specific cartilage health and the interaction of every bone, muscle, ligament, and tendon, concerning the patient's diagnosis.

With early exposure to diagnostic medical imaging, physicians will also be able to seamlessly extend their scope of treatment by using ultrasound as a therapeutic modality. Using this tool to precisely drain abscesses or administer orthobiologic injections directly into the joint space can only enhance the success rate and longevity of the treatment. Ultimately, there is great potential for the future of medical analysis as diagnostic imaging only becomes better, and it is up to us, future physicians, to stay at the cutting edge of medical advancements.

THE POWER OF PILATES

Allyson Resnick & Erica Rankin

"Ok ladies, it's now time for feet-in-straps!" The sounds of deep breaths dwindle as everyone takes an almost synonymous sigh when this sentence slips out of our instructor's mouth - we know the cool-down flow is beginning. What started out of necessity has now become a passion, as Pilates has quickly become our escape from the rigors of medical school where we can spend an uninterrupted 50 minutes improving our mental and physical wellbeing. There is no doubt medical school is taxing - not only academically, but also on the mind, body, and spirit. During our very first semester of medical school, we found ourselves vegging out and ignoring our bodies when things got inevitably tough. It not only impacted our mood but also our self-esteem and physique. Upon completion of the Fall semester, we knew we had to make a change.

Within moments of being on the reformer, we are instantly transported to a space that is solely about ourselves. Pilates is a low-impact exercise that focuses on improving muscular strength and flexibility. Through finding a center point in our body, aiming to strengthen our core, every exercise involves low repetitions and low intensity. Breathwork is of extreme importance, as the instructor is quick to remind the class that without proper breathing, our form suffers. Within a few classes, we have been able to see a difference in not only our physique but also our posture and mood. Each class targets numerous muscle groups, including thigh adductors and abductors, hamstrings, quadriceps, core, and biceps. We are constantly reminded of the anatomy we learned in our very first semester as we move through various exercises. It is exciting to be able to feel which muscle group is being activated, and even more satisfying to wake up the next morning with feelings of soreness, knowing we worked muscle groups we would not have normally targeted. After our first few classes, and with approval from an instructor who spent time assessing our form, we were able to graduate to level 1.5 classes, further building our strength and technique.

Aside from the obvious physical benefit of showing up for a consistent workout, Pilates has opened the door for us, as future physicians, to better understand the importance of movement for our future patients. We have had the privilege to make connections in class, many of which are older men and women who have had some kind of injury in the past that limits them from the typical rigorous exercises many people promote. We have also come to learn that AARP covers the cost of some Pilates classes, providing a workout to retired individuals without the financial stress that often accompanies these classes. If we want our patients to be in the best state possible, it is important to lead by example and also try to live a healthy lifestyle. By incorporating Pilates into our lives now, we will be more versed in low-impact exercises. This will not only allow us to become better physicians in the future but will also allow us to make recommendations and exercise prescriptions that will help our future patients.

There is no denying Pilates has a learning curve. It can be initially taxing on the body and intimidating to observe the "veterans" perform movements in a succinct way. With all of the variation between equipment and muscle groups to activate, there is no shortage of exercises and enjoyment in each class. Of course, there are times when we turn to each other and look like we are about to reach our limit, but we persevere and leave every class so thankful we completed it. It has become a routine that we look forward to, especially during some of the tougher weeks of school. Over the past couple of months, we have taken almost 50 classes all while keeping up with the rigor of medical school. Taking Pilates classes with your best friend has been an amazing experience for us and we cannot wait for our next 50+ classes.



STRENGTHENING COMMUNITIES THROUGH VOLUNTEERING AND MSK HEALTH

Amy L. Kennalley

Volunteering is not only a way to give back to the community but also a vital part of professional and personal development, especially in the healthcare field. Through various volunteer programs, medical students and professionals gain unique insights and experiences that shape their careers and impact the communities they serve. As a second-year medical student at Geisinger Commonwealth School of Medicine (GCSOM), I have had the privilege of participating in several impactful programs: The Leahy Clinic, HiROC, Snow Angels, and Walk with a Doc. Alongside my experiences, I have interviewed fellow volunteers to share their inspiring stories and highlight the importance of volunteering and their impacts on musculoskeletal health.

HiROC: High Risk Osteoporosis Clinic

Osteoporosis is one of the most prevalent musculoskeletal issues affecting the global population. The HiROC Student Liaison Service, alongside the existing osteoporosis clinic at the Geisinger Community Medical Center, is here to help. HiROC aims to treat and educate patients experiencing low-impact fragility fractures. The goal is to improve patient health literacy through education and stress the importance of follow-up care for osteoporosis patients.

Julian Burwell, GCSOM MD Class of 2027

Jules's involvement with HiROC highlights the importance of addressing conditions such as osteoporosis. "Programs like HiROC are vital for musculoskeletal health and community support because they address under-treated and under-recognized conditions such as osteoporosis," Jules asserts. HiROC's efforts to destigmatize osteoporosis, particularly among men who may perceive the condition as a sign of weakness, are crucial in driving positive change within the community.

Jules's experience with HiROC has been influential. "Early clinical experience with HiROC has been instrumental in shaping my medical education and career aspirations," he reflects. Working closely with patients who had experienced life-changing events allowed him to develop a new degree of empathy and compassion, confirming his desire to specialize in a field where he can assist patients with traumatic injuries. The most rewarding aspect of his volunteer experience has been guiding patients through difficult health challenges and helping them gain a meaningful understanding of their condition.

Leahy Clinic

The Leahy Clinic, located at the University of Scranton, reopened in January 2024 through a partnership between Geisinger and The University of Scranton. The clinic operates under a "student-run" model that provides high-quality care in a welcoming, respectful, and compassionate environment for the region's uninsured patients. This model expands opportunities for practical experience in patient care, clinic management, and other aspects of healthcare for students.

Calvin Sitati Kiniale, GCSOM MD Class of 2027

For Calvin, volunteering at the Leahy Clinic marked the beginning of his journey in giving back to a community that has given him so much. "I knew the Leahy Clinic would be a good place to start on my journey of giving back to this community," Calvin shares. Despite not knowing what to expect when he started two months ago, he quickly realized the unique experience it offered, enabling him to be a vital part of an underserved patient population and apply the lessons he was learning in class for a greater good.

Calvin's time at the clinic has profoundly influenced his career aspirations. "The work I have been privileged to do at the clinic is the foundation of good clinical practice regardless of the specialty I end up serving in," he explains. The dedication and leadership demonstrated by the clinic staff, such as the Medical Director Dr. Susan Russell, MD, Dr. Gary Russell, MD, and Administrative Director, Maria Vital, PhD have left a lasting impression on him. "I admire how much care they put into every patient encounter, their attention to the socioeconomic determinants of health, and their dedication to the overall health and well-being of the patients we see," he says.

Dr. Gary Russell, MD, Family Medicine Doctor at Geisinger Medical Center

Dr. Russell, a seasoned volunteer at the Leahy Clinic, embodies the spirit of lifelong service. His motivations for volunteering are deeply rooted in his desire to serve people abroad on medical missions and his passion for teaching medical students. "The ultimate teachers of medicine are the patients," Dr. Russell notes, emphasizing the educational value of patient interactions. He finds immense joy in visiting with patients and discussing pathophysiology with medical students, fostering a rich learning environment for future healthcare providers.



When asked what motivated him to volunteer at the clinic, Dr. Russell humorously lists his reasons: "Number 1: The reason I went into medicine was to serve people and get involved in overseas medical missions, and this is a local way of service. Number 2: I enjoy teaching medical students. Number 3: My wife made me." This blend of service, education, and personal encouragement underscores his commitment to the clinic and its mission.

Snow Angels

To help alleviate the burden winter weather can create for older adults, NeighborWorks Northeastern Pennsylvania collaborated with the Geisinger Commonwealth School of Medicine to connect volunteers with older adults needing assistance with shoveling their sidewalks and driveways for the winter season. Volunteers are provided with a shovel, ice scraper, and rock salt before the start of service. This program not only ensures that elderly community members remain safe and mobile during the winter months but also significantly impacts their musculoskeletal health by preventing falls and related injuries, which can be detrimental to their overall well-being.

Olivia Bannister, GCSOM MD Class of 2027

Volunteering with Snow Angels presents unique challenges, particularly concerning the physical demands of snow removal. Olivia Bannister highlights the importance of resilience and community support in overcoming these challenges. "There were sometimes difficult driving conditions with lots of snow and icy roads, so we had to take the current weather into account when deciding when to drive to the house to shovel snow," she explains. Despite the physical demands, the opportunity to directly impact the safety and well-being of community members makes the effort worthwhile.

Olivia advises other students considering volunteering as Snow Angels to embrace the physical challenges and view them as opportunities for personal growth. "The physical demands of snow removal can be intense, but the reward of knowing you are helping someone stay safe and mobile during the winter months is incredibly fulfilling," she notes.

Walk with a Doc

Divya Sundararajan, GCSOM MD Class of 2027

Walk with a Doc is an innovative program that promotes mus-

culoskeletal health by encouraging regular physical activity and providing educational opportunities during walks led by healthcare professionals. Divya, the

Community Service Chair of GCSOM's Family Medicine Interest Group, explains how the program fosters community engagement and supports musculoskeletal health. "Walk with a Doc is about taking the time to engage with our student and local community and support each other's health by walking with one another," Divya states.

Divya's involvement in Walk with a Doc has meaningfully influenced her future plans in the healthcare field. "As someone interested in primary care, I am really interested in forming longitudinal relationships with my patients. I feel that Walk with a Doc creates an accessible way for students, providers, and community members to come together and care for one another outside the strict confines of that office," she shares. The most rewarding aspect of her volunteer experience has been witnessing the positive impact of regular physical activity on participants' overall health and well-being.

Get Involved:

Leahy Clinic

GCSOM students - contact Alejandra Marroquin at amarroquin@geisinger.edu. Research any free medical clinics in your area to volunteer!

HiROC

GCSOM students - sign up for the community immersion group in PPCC or email Dr. Olenginski for more information at tpolenginski@geisinger.edu.

Snow Angels

Open to anyone in the Northeastern Pennsylvania region. Individuals must be at least 14 years old. [Volunteer](#)

Walk with a Doc

GCSOM students - connect with the Family Medicine Club by emailing gcsomfmig@gmail.com. National Walk with a Doc email contact contact@walkwithadoc.org

[Walk with a Doc](#)

STRAIGHT FROM THE HORSE'S MOUTH: EQUESTRIANS AND TBI

Nimmi Matthews

The act of domesticating horses for riding purposes is said to have originated in Central Asia, specifically in Kazakhstan and parts of the Middle East, with documentation tracing back to 1350 B.C. in the South Asian subcontinent and India. In the modern version of the sport, there are two “fashions” of riding, known as English and Western. These two differ only slightly in some principles and in the activities in which the riders partake. A few examples of competitive equestrian events include dressage, show jumping, cross country, horse racing polo, etc. Equestrians participate in competitions year-round, with some of these occurring at the Olympic level.

Although being an equestrian has been shown to provide neurological benefits of improved balance (Byzova et al., 2020), and equine therapy has been shown to be beneficial for individuals with ADHD (Yoo et al., 2016), some risks are still associated with equine activity. This is supported by a study published in the *Journal of Neurosurgery*, wherein authors utilized the National Sample Program of the National Trauma Data Bank (NTDB) to retrospectively analyze sports-related TBI data from adults over the age of eighteen. This data was acquired from five categories: equestrian, aquatic and roller sports, fall or interpersonal contact (FIC), and skiing/snowboarding. The researchers reported that 45.2% of TBI among adults were related to riding accidents and modern sporting activities. Equestrian sports were found to cause some of the highest rates of total bodily

injury, severe brain injury, and mortality. Concussions accounted for 9-15% of all riding-related injuries.

Additionally, in a cross-sectional study conducted in 2013, researchers Heather Kuhl and Stephen Russo (from NSU!) found that in a sample of equestrians competing at Palm Beach Equestrian Center in Wellington, Florida, 44% had experienced a concussion in the course of their career, but 40% had never been educated about concussions or how to prevent or treat them. The researchers concluded that it is essential to educate riders and trainers on the likelihood of concussions as well as the measures that need to be taken immediately following the impact to reduce the severity of injuries before the rider can be seen by a medical professional.

The intensity of these injuries is affected by a myriad of factors and can range from a concussion to severe TBI. These include rider experience, riding surface, weather conditions, the possibility of equipment failure, and event participation. As one might expect, rider experience can be paramount to avoiding an accident, however, injuries cannot be avoided entirely despite the equestrian's skill level. Weather conditions can affect both the rider and the horse's ability to perform, and hence may result in injury. Lastly, some events (such as racing) are inherently more dangerous than others. A study by Waller et al found that from a sample of 2700 jockeys from 1993-1996,

6546 injuries occurred while racing. Of these injuries, 18.8% were to the head or neck, either due to the horse throwing the jockey, or the jockey being struck by the horse's head when leaving the starting gate. The authors supported their research with a study by Press et al, which surveyed jockeys for four months and found a 13% incidence of concussions.

This data raises the question of why there is such an increased susceptibility to head injuries in equestrian sport. There are a few possible phenomena that must be considered to explain this connection. Firstly, concussions have the strongest and most immediate impact on one's balance system, but this may be masked in equestrian patients due to their strong sense of balance. They may not show the usual signs of head injury in their normal daily activities. Additionally, rates of helmet use in horseback riding are fairly low, ranging from 9-25%, depending on the activity. Lastly, there is an unfortunate, pervasive, and toxic culture surrounding equestrian injuries. There is the expectation that if not severely hurt, the rider will “get back in the saddle,” and perform. The pressure to continue without a visible bruise or injury, combined with the lack of awareness regarding brain injury may prevent equestrians from seeking the immediate help they need.

To address these concerns, there are a few changes that can be made. Firstly, equestrian schools and competition grounds

should implement prevention programs that educate riders, trainers, and parents on the risks associated with the sport. There should also be the inclusion of on-site nurses or physicians with trauma and emergency experience during competitions. Secondly, there should be mandatory safety precautions, such as the use of helmets and other guards to soften the impact of injuries. There is currently ongoing research testing the effectiveness of new helmet designs that may help reduce the incidence and severity of concussions, and these designs should be made accessible to all equestrians, regardless of age, affiliation, skill, or experience.

[Click here to view references](#)



MOVEMENT FOR THE MIND AND FRIENDSHIP FOR THE SOUL

Kimberly Kluglein & Riley Nadolny

Some might say living with a stranger after moving over a thousand miles from home is a risky decision. For us, it turned out to be the best choice we could have made. For two years, we were fortunate to share a space as roommates and support each other through the challenges of medical school. One of the most difficult aspects of the journey is finding balance. It's easy to become consumed by the workload and forget there's a life outside of it. We struggled with “study guilt,” but pushed each other to stay true to ourselves. In doing so, we discovered a workout class we both enjoyed. Six days a week we challenged ourselves with various HIIT and strength training workouts, attending the classes that fit into our schedules.

At the end of our second year, we dreaded the dedicated period for boards studying. Keeping our minds and bodies sharp for over ten hours of daily studying was crucial. Every morning, we started our day with a gym class. This routine gave us the energy to persevere until our test dates and provided a sense of normalcy because studying all day and every day doesn't feel normal. Some days, we sat in the same room without speaking for hours, working on practice questions and memorizing content. But daily exercise reminds us of who we are.

That one hour of exercise brought us a sense of ease and community. It helped us destress, focus on ourselves, and find clarity. It helped us pass our boards. However, the end of boards

studying also meant the end of living together. The excitement of finishing this stressful chapter came with the bittersweet reality of moving states apart. Everything we had grown to love and find solace in over the last two years slowly became a distant memory. But with endings come new beginnings. We moved away to be closer to our third-year clinical sites, now over a thousand miles apart.

As we explored our new homes, we encouraged each other to focus on our social, mental, and overall well-being. To make this happen, we set a goal to inspire us and take us out of our comfort zones, leading to something neither of us thought we would do—training for a half marathon. Having a set goal holds us accountable to go outside, connect with nature, and move our bodies, even when we are unmotivated. It also creates excitement knowing we will accomplish this together, and once again have a physical outlet to

ground ourselves while entering another dedicated boards studying period. We look forward not only to the race but to being together again. While it's not the same as attending gym classes every day, it keeps us active and connected despite our different schedules. Running a half marathon is challenging, just as is medical school, but having a friend to support you through it makes all the difference.



ACHIEVING A BALANCE BETWEEN CLINICAL AND ACADEMIC INTERESTS IN MUSCULOSKELETAL MEDICINE: AN INTERVIEW WITH DR. PETER FABRICANT, MD, MPH.

Jeremy Saliba

Dr. Peter Fabricant is a board-certified orthopedic surgeon, fellowship trained in pediatric and adolescent orthopedic surgery and sports medicine, practicing at the Hospital for Special Surgery (HSS) in New York City. He attended medical school at Yale University and completed his orthopedic surgery residency at HSS. He is active in research and writing, serving on several national and international consortiums, while also receiving numerous prestigious awards for his clinical research and innovations.

Dr. Fabricant shares his story in achieving his personal goals, reflecting on the importance of mentorship in the pursuit of his interests, while offering advice for aspiring physicians interested in a career in musculoskeletal medicine.

Tell me about your journey to medical school and what led you towards orthopedics, specifically pediatrics and sports medicine?

"I went to medical school at Yale which is close to home and decided I really liked orthopedics. It was very concrete, problem-oriented, task-driven, involved manual dexterity, and was hands-on. I had also done some sports medicine research as a medical student. When I came to residency, a lot of our PGY1 and PGY2 years were done in trauma and in the ER, and I always found myself happier and more interested in the pediatric consults that I was getting in the ER. Within pediatrics, I really enjoyed the sports medicine side of it, and the idea of helping a kid who's going to go and use what you do for them for a long time."

As an attending physician, you remain very active in research. Would you be able to talk a little bit about some of your current work?

"A lot of my main research is in clinical outcomes, so I have designed and validated clinical outcome measures that are specific to kids because, in some instances, adult outcome measures aren't applicable to kids. I do a lot of clinical outcomes research on various topics of interest which tend to be my clinical interest, so sports and fractures. I am also involved with biomechanics research, cost-effectiveness research, and pediatric and adolescent sports and trauma."

When asked how he balances his time in the clinic with research endeavors and personal life, Dr. Fabricant notes how important it is for him to have an overlapping relationship between his clinic and research, allowing each to positively influence the other. He also has a built-in research day each

week when he can work uninterrupted: "Having that dedicated day not only gives me the time, space, and mental clarity that I need to perform research, but it allows me to not let it bleed over to nights and weekends when I try to be home and spend time with my family." Lastly, his research team and assistants at HSS further enhance the harmony of all these aspects.

What advice would you have for medical students looking to gain experience in research, specifically in the musculoskeletal field?

"Get involved early, I would say take on projects. The mentor is more important than the project, so seek out people who have a track record of mentorship. And not necessarily just the attending but residents, fellows, even other medical students who have had research experiences. I find that the most productive folks are the ones who get mentorship from multiple levels. Also, try to get involved in different types of research. Some of the most educational research projects I did as a student and a resident were biomechanics studies because you got to do cadaveric dissection. You're not only doing research, but you are learning anatomy or dissection skills and using your hands."

Dr. Fabricant then described the impact of mentorship in achieving his goals, and why he has been inspired to mentor many medical students throughout his career.

"I would say the most influential thing in getting to this point is that I had incredible mentors myself, so I wouldn't be where I am today without that mentorship. In the world of medicine, but also specifically within surgery and orthopedics, I think we're unique in that we really feel the drive to pass on to the next generation. I like to be a mentor to people coming up, it's something that is fun to do. In academic medicine, mentorship, leadership, and teaching are kind of baked into your ethos."

Dr. Fabricant reflected on his research experiences as his inspiration for his ongoing project of writing, editing, and soon-to-be publishing a 15-chapter book titled "Practical Clinical Research Design and Application: A Primer for Physicians, Surgeons, and Clinical Healthcare Professionals".

"I wanted to write a book on the practical aspects of performing clinical research for medical students, residents, fellows, faculty, research assistants, etc. I wanted to create a standalone textbook that someone could read or just

a standalone textbook that someone could read or just reference and make it interesting, engaging, and detailed enough where people could use the information. The book is structured in 15 chapters and 3 sections. The first section is about the foundational basics of research and statistics. Part two, which is the meat of the book, talks about choosing the appropriate study design. In the last section, there's three chapters on specialized studies, such as propensity score matching, reliability studies, scale development, and validation. Each chapter reviews the strengths and weaknesses of the study design, the best time to apply it, and ends with an existing example from the literature with analysis of why they chose that study design showing why it was the right design for that clinical question."

He explained the process of writing the book was like running a marathon, where his goal was to complete a chapter a month. While difficult to get started, with persistent effort for over a year, he is now enjoying a rewarding time of proofreading and seeing the book as a nearly final product. It is set to be released in September.

What current innovation in your field are you most excited about regarding its potential to benefit patient care?

"It's funny, I almost don't want to give the AI answer because it's basically what everyone says, but AI machine learning and the advances of technology are exciting. Technological advances happen exponentially, so I'm interested to see in the next several years to decades how automated machine learning helps us with the data-driven tasks of orthopedic surgery, allowing doctors to focus on things that can't be technologically driven, such as the patient-doctor relationship. More specifically, in each patient encounter more than half that time is spent doing data entry and documentation while less than half that time is me talking to a kid and their family, examining them, and connecting with them. I find I'm really interested to see how technology can flip that ratio to where you can spend more time with the patient and still get the computer-driven aspect done in the very heavily regulated environment of medicine and do it in a way that's efficient."

Dr. Fabricant also noted the potential for AI to improve patient care and clinical outcomes within his specialty with a unique and practical example.

"Using AI and technological advances for gait analysis, I think, is going to be really exciting. Another thing that could be impactful for clinical outcomes is wearable technology that allows the doctor to connect with the patient, both clin-

ically and through research. A basic example would be using a step counter or an Apple watch to understand how active patients are as they go through the recovery. I think wearables and how they communicate with us is a very exciting frontier for clinical research."

Dr. Fabricant closed with words of wisdom and encouragement for medical students:

"Be available and be personable, whether it's research, clinical rotations, or sub-I's. You want to be the first one in and the last one out, you want to be making everyone's life easier. Find the ways that you can facilitate the day. For example, consider a medical student who's a sub-I on an orthopedic rotation, find the things that hamper progress and take on those challenges. Show that you're reliable and that you're willing to help. I think that the best medical students I've worked with, sure they're knowledgeable, they read and prepare for cases; that's all important but they're the ones who show up wanting to help, always either early or on time and always there until the end of the day. They facilitate the day and they're great team players – I think that is the most important thing for any student."



Marianne Regius

“Submit.”

The most memorable exam I have taken to date in medical school was my Respiratory Midterm. It was after this exam that months of hard work, both in the classroom and on the track were paying off – I was going to run the Boston Marathon. The Boston Marathon is the “cream of the crop” of all marathons in the running world. One cannot simply enter, they must both run a qualifying time and get accepted – a feat that requires a significantly faster time than the cutoff for acceptance due to the competitive nature of the select spots to run 26.2 miles from Hopkinton to downtown Boston.

I have dreamed of running the Boston Marathon for years, but never thought I would be able to run that fast or remain disciplined long enough. It signifies that you have “made it” as a runner and are certifiably “fast.” In 2023 with the onset of medical school, I was able to qualify and get accepted after months of sacrifices and steadfast training. The cutoff alone for women in my age group was to run a marathon in under three and a half hours, a mile pace below the 8-minute average. However, to get accepted, you really need to run below three hours and twenty minutes. I was and am incredibly proud of this along with being able to balance

a demanding training schedule with the demands of medical school. It was not an easy feat, but it was worth it.

After my exam, I cheerfully strutted to the airport and flew to Boston to acclimate, pick up my packet, and obtain the infamous Boston Marathon jacket you can only get by running the race. I was overcome with joy, awe, and what felt like a Gordian Knot of anxiety. I was surrounded by some of the greatest runners in the world, and the environment felt like a celebration, but I still could not shake the feeling of “What if I failed, what if I miss the race, what if I get hurt during the run?” The self-doubt juxtaposed with elation felt like a knife to the gut that would not dislodge. Running, which has always helped to calm my anxiety and feel at peace, was suddenly the cause of it. I did not know what to do. On top of that, I was in a foreign city all alone. I never thought I would admit this, but I spent the entire day seriously contemplating not running the race, even though I had worked so assiduously to get there.

However, on race morning, I decided to put my fear beside



my part and take the stage regardless of the invisible knife lodged in my gut.

“Feel the fear. Do it anyway.” I whispered to myself as I got on the bus from the parking lot to Athletes Village, and then the starting line. Thankfully all of the volunteers and fellow racers were kind and supportive, cheering us on, helping us figure out where to go, and as such I took off for the starting line. It was an ecstasy of amazing athletes, vibrant music, and blue and yellow all around. The knife began to dislodge and suddenly I was off. There I was, running the

Boston Marathon, while in medical school! It was beyond my wildest dreams. The streets were lined with supporters from all walks of life cheering us on – it was a never-ending parade.

Suddenly I had made it out of Hopkinton, and then past the halfway mark at Wellesly – it was all downhill from here, metaphorically at least. The toughest hills, the Newton Hills, and the grueling Heartbreak Hill from miles 20 to 21 were still to come. Before I knew it I had made it to Heartbreak Hill, almost one full mile straight uphill.

don't give much attention to. Gymnastics focuses on stretching each of the muscles and improving range of motion beyond what most people have. We had a full 30-minute stretch at the beginning and end of each practice to make sure our muscles continued to lengthen even after a long workout. We would sit in over-splits to make sure that we hit all our leaps and jumps with correct angles. Now that I'm retired, I am so grateful to still maintain flexibility greater than average as it helps me move around easier in everyday life. I can fully stretch my muscles when sore and can bend into tight spaces, benefits I attribute to having the proper training from artistic sports. Additionally, artistic sports help improve balance. In gymnastics, one of the events, the balance beam, is solely targeted for gymnasts to show their superb balance skills. We are trained to be able to do difficult leaps, jumps, and tumbles on a 4-inch-wide surface up in the air. We know how to quickly straighten up when we are off-center and remain still when holding difficult positions. Because of this, simple daily skills such as balancing on one foot, walking along a skinny surface, or even being slightly pushed to the side become easier. The struggles of learning skills on the beam help us understand true disci-

The funny thing about Heartbreak Hill no one tells you is that it really does remind you of heartbreak when you start it, but it also saves your heart. Run hard, risk heartbreak. The solace I find in running found me at mile 21.5; my heart was full. The next 5 miles or so felt like heaven and then I crossed the finish line. I ran the Boston Marathon.

The rush of adrenaline was unparalleled crossing the finish line and having the blue and yellow striped medal draped around my neck. I was smiling like a goofy kid, but I did not care. It is truly moments like these that remind me it is all worth it – the late nights studying, the early mornings running, and the discipline to set boundaries conducive to my happiness. It is also a testament that you can do anything you set your mind to. I am truly grateful for the opportunity to have qualified for and run the Boston Marathon. Many go their whole lives without ever getting accepted. Yet, the most important lesson I learned was the importance of discipline and how it can take you almost anywhere.

With that, Boston – I will see you next year.

THE IMPORTANCE OF ARTISTRY IN ATHLETICISM

Jennifer Bekker

I hate gym class. What's the point in learning how to kick a ball across the court? What's the point in learning how to throw a ball 10 feet in the air into a tiny hoop? What's the point in learning how to hit a ball and then run to a ceramic square in the ground? I felt like a failure in gym class because I was afraid to get hit by the numerous flying objects thrown at me, yet I was also the one who maxed out the standardized fitness tests in flexibility, sit-ups, push-ups, and PACER. So why was I the one getting criticized by teachers for being unathletic?

No, I didn't hate gym class because I hated sports; in fact, I love sports and was a gymnast for 10 years. I hated gym class because it was tailored to classic American sports: football, basketball, baseball, etc. but failed to incorporate something important: artistic sports. Many sports fail to recognize the

importance of artistry in athletics. Athletics such as gymnastics, dancing, and yoga etc. get overlooked by the bigger and flashier sports on TV. Gymnastics has been glossed over for years, but I believe that teaching it can help achieve fitness in all aspects and is important for strength, flexibility, balance, and discipline that we use in our everyday lives.

Being a gymnast requires a balance between artistry and strength. We are known for having well-rounded strength because each of our skills focuses on using different muscles. We had “conditioning” every day during the last hour of practice when we worked on muscle training and cardiovascular fitness. As a gymnast, I can say that even easy skills require great coordination. One of the biggest benefits of gymnastics is its high focus on flexibility, something many other sports

pline and overcoming fear. It takes us hundreds of attempts to perfect a skill, and we are off balance for the majority of that time. Thus, we learn patience and perseverance and that eventually hard work pays off. Even when we're scared to try something new, we learn how to overcome our adversity and push through. With gymnastics, athletes develop skills of discipline and perseverance like in many other sports, but additionally learn flexibility and balance of the body and mind. While many children enroll in sports like football or soccer where they focus on strength training and fitness, those who enroll in gymnastics can learn additional skills and life lessons. Artistic sports like gymnastics incorporate flexibility, balance, and strength to promote all-around athleticism. It's important to teach these skills so that they can continue to live a healthy lifestyle post-retirement. So even if the gym teachers believed I was unathletic because I couldn't catch or hit a baseball, that shouldn't have discredited all the other skills gymnastics provided me, such as doing well at strength training or being able to do the splits. Thus, while many people cheer on the big sports on TV, we mustn't overlook or forget lesser-known sports that provide other life-long benefits.

THE POWER OF POTENTIAL

Sarthak Chakravarty

During high school basketball practice in 2015, one of my assistant coaches had a discussion that I still grapple with to this day. He asked me “Do you know what my least favorite word in the English language is? Potential.” This coach was known for being a bit finicky and philosophical with these sorts of discussions, but even with that knowledge, I struggled to see where this train of thought was headed. He said that “potential” implies pursuing a goal that will never be reached, that you will always be fruitlessly chasing an ideal that will always be beyond your grasp. At the age of 15 that sounded very deep and impressive, but a few years later I have come to have a different opinion on that concept. I am someone who has gone through a few different body transformations in my life, and through each one, having an ideal to look at always made doing the work more manageable. Whether it was as a chubby little boy, a lanky teenager working on his basketball game, or a postgrad

looking to put on muscle, it was incredibly helpful to have a picture in my head of what the end product looks like so you know how far you’ve come. That is why stories of human achievement like the Olympics and Everest climbers appeal so greatly to me because they show us that every human has unlimited potential, all we have to do is work for it. The mentality I have started to adopt and have tried to spread to others is, “If they can do it, why can’t I”. In my case, I had been working on three things from an athletic standpoint ever since I started college: weighing over 200 lbs, increasing my bench press to 225 pounds, and being able to routinely dunk a basketball during a game. Now obviously those goals are biased by me having the framework of a basketball player, but I guarantee that whatever shape or size you are, there is a role model out there who you can look up to. Since the majority of us currently reading are pursuing careers as physicians, adopting

this mindset can also help us in our academic endeavors and sharpen that competitive edge that is all but required for certain fields of practice. Personally, whenever times get tough in school, it’s comforting knowing that other people have gone through the exact same thing and prevailed, and that success is achievable if I put the hours in and break down the task into small, achievable pieces over multiple days.

This discussion has the potential to start controversy, most obviously with movements such as the body positivity movement and the media portraying unreasonable standards. To preface this, I am completely supportive of the idea of body positivity, and maintaining healthy and sustainable practices in regards to our health. To me, what body positivity entails is that we are comfortable in our skin, but are always looking for that little piece of improvement. That improvement could be

shaving a few seconds off that mile time, dropping/gaining a few pounds, increasing your squat PR, or many thousands of other athletic and personal achievements that we all strive for. Additionally, as future physicians, we are responsible for educating the general public on having a healthy relationship with their own bodies. In my opinion, the best thing we can do for our patients is to teach them how to help themselves. A doctor’s visit lasts about 20 minutes, but the rest of the time the patient is on their own. If we can teach them how to work on themselves through healthy competition between the self and an ideal, that will be much longer lasting than any medication or surgery we can offer. At the end of the day, how we choose to pursue our potential is personal. We are only truly accountable to ourselves, and we owe it to the person in the mirror to push our limits every day and find out what we are really capable of.



THE DYNAMIC ROLE OF MOVEMENT IN MITIGATING DEMENTIA

Zaneh Kahook

In the world of preventative medicine, exercise is known for its many benefits spanning cardiovascular health, mental health, and metabolic balance. Recent research has increasingly shed light on another potential advantage: the role of physical activity in mitigating the risk and progression of dementia.

Dementia, characterized by a decline in memory, language, and problem-solving abilities, significantly interferes with daily life. The concept of “cognitive reserve” has been pivotal in understanding how certain lifestyle factors, like exercise, contribute to the brain’s resilience against the pathological changes associated with dementia. Studies suggest that regular physical activity enhances this reserve, likely through improvements in brain structure and function (Cheng, 2016). Exercise promotes angiogenesis, neurogenesis, and the release of neurotrophic factors such as brain-derived neu-

rotrophic factor (BDNF), which supports neuron survival and cognitive function.

Neuroimaging studies have consistently demonstrated that exercise can lead to increased brain volume in regions crucial for cognitive processing, such as the hippocampus, a key area involved in memory formation and spatial navigation (Lauretta et al., 2022). Regular physical activity not only preserves existing brain tissue but also encourages the growth of new brain cells, enhancing neural plasticity. This results in improved connectivity and efficiency in neural networks, which are often compromised in dementia.

Exercise influences several pathways that directly affect the pathology underlying common forms of dementia, including Alzheimer’s disease. A 12-week program consisting of running

45 minutes per day, 5 days per week has been shown to facilitate the transition of microglia from the M1 phase to the M2 phase, resulting in improved neuroinflammation and decreased oxidative stress together with cognitive enhancement in the rodent hippocampus (Zhao, 2024). Dysregulation of inflammation and oxidative stress are both important processes in the development and progression of dementia. Exercise therefore may prevent neuronal degeneration and preserve cognitive function by lowering systemic inflammation and oxidative damage.

Moreover, a meta-analysis by Iso-Markku et al. (2022) reported that higher physical activity levels were associated with lower incidence of all-cause dementia, Alzheimer’s disease, and vascular dementia. These findings support public health initiatives promoting physical activity, especially among older adults. Current recommendations suggest that individuals engage in at least 150 minutes of moderate-intensity aerobic exercise per week, supplemented by muscle-strengthening activities on two

or more days per week, to maximize cognitive health benefits.

The interplay between exercise and reduced dementia risk is indicative of the power of movement in maintaining cognitive health and overall well-being. As novel research emerges, it is clear that regular physical activity is a promising strategy to combat the global challenge of dementia. Encouraging exercise is an effective and economically feasible way to reduce the burden of dementia on individuals and healthcare systems worldwide. This insight not only motivates future research but also inspires policy changes that promote physical activity in communities and will ultimately pave the way for healthier, more resilient aging populations.

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THE ECONOMIC BURDEN OF BACK PAIN IN AMERICA

Maru Saminath Gandhi

Back pain is expensive; not only to the average American, but also to the American healthcare system in general. Being one of the primary reasons for physician visits and missed workdays, low back pain (LBP) has sprawled massive industries stretching from pain management to therapeutics to pharmacological remedies. These industries have grown to exceed over \$100 billion each year in costs impacting over 70 million Americans experiencing back pain (Guin 2018). In recent years, new workplace trends have come out with ergonomic chairs, massage guns, standing tables, etc. to try and mitigate this epidemic. However, this enormous influx of capital into new products and therapies has not seemed to even deter the costs that LBP has on Americans.

The financial strain that LBP possesses on Americans annually amounts to around \$1226 per patient in direct costs (Fatoye et al 2023). These direct costs only include medical care, such as PCP visits and chiropractor adjustments, as well as the associated therapeutic costs, such as medications and pain management therapies. However, the true implications that LBP has on the American economy can only be appreciated through the examination of its indirect costs. These costs include the average American's loss of wages due to LBP and the productivity loss that employers suffer as a result. The indirect costs of LBP begin to demonstrate how employers are faced with the financial consequences especially considering how LBP is the leading cause of loss of productivity, workplace injury claims, and job-related disability in America (IRIS FMP 2018). The CDC estimates LBP annually costs employers an additional \$1685 per employee in loss of productivity. The financial ramifications of LBP through the lens of both direct and indirect costs severely begin to deteriorate the well-being of the American economy.

Mitigating the strain that LBP has on the American people and its economy possesses its own unique set of challenges compared to other major recent public health issues in America such as obesity, cardiovascular disease, diabetes, etc. These issues require a primarily physician-driven approach in educating the patient about necessary lifestyle and nutritional changes in controlling their disease. On the other hand, the risk factors for LBP are driven more by workplace activities such as lifting heavy loads and frequent repetitive movements with the trunk rather than by lifestyle or nutrition (Jia et al 2022). This requires that the responsibility of patient education is shared between the physician as well as the employer in effectively educating and protecting the patient.

Blue-collar jobs have already had long-standing policies and precautions to protect their employees from medical issues such as LBP, but the increasing shift in the United States to white-collar employment in much more sedentary workplaces has seemed to overshadow the importance of the employer's role in protecting their employees from issues such as LBP in the workplace. However, there have been recent strides taken by some major employers in the United States to address LBP and these workplace interventions have shown to be successful. For example, the occurrence of LBP in office workers introduced to behavioral counseling in the workplace has been shown to significantly decrease (Barone Gibbs et al 2018). Behavioral counseling coupled with intermittent exercises has been shown to decrease LBP by an even greater percentage. These workplace interventions may seem burdensome to white-collar employers especially as time and resources are siphoned away to prevent issues where the risk may not seem as tangible as it would be in jobs that require more manual labor, but the prevalence of LBP has been substantially growing in the United States and it is difficult to deny that this is impacting the financial wellbeing of employers. Simple workplace interventions such as intermittent breaks for employees to stretch or lightly exercise can end up saving employers thousands in lost productivity and missed workdays. Treating LBP and alleviating the stress that it has on the American economy must be done with these types of workplace interventions led by employers as back pain is unique in that its primary risk factor stems from the workplace.

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YOU CAN'T BURN THE CANDLE AT BOTH ENDS

Evelyn Echevarria Cruz and Aila Cordero

After receiving an acceptance to medical school, most prospective students seek advice on preparing for a seamless transition. The consensus on online forums is to set up an exercise routine and stress outlet that you can continue practicing long-term to maintain a school-life balance. Many incoming medical students attempt to keep up with previous routines, but we are abruptly confronted with a surge of new experiences. These experiences include adjusting to a rigorous academic schedule, fine-tuning study strategies, forming new friendships and connections, moving to a new city, and much more. Exercise and self-care are easily sacrificed for what seems to be a more pressing use of our time. There is an unspoken guilt and conflicting mental battle that we, as medical students, constantly experience when choosing to do anything for self-care instead of choosing to study. This guilt can manifest both mentally and physically through increasing tension migraines, neck and back pain, worsening posture, and weight gain/loss. The thought of taking hours during the day to exercise instead of studying and returning tired when trying to tackle the daily lectures seems daunting. If something has to be sacrificed to maximize the hours of the day, it is often exercise, as it is easier to procrastinate fulfilling a personal commitment rather than fail the commitment we made to our medical school and future patients. However, something that resonates with us is the advice of our beloved preceptor: "You can't burn the candle at both ends."

In my personal experience as student doctor Evelyn Echevarria Cruz, when the fall semester of my first year of medical school began, my daily hiking and walking with my two dogs took a spot on the back burner. This was a struggle that many of my classmates shared as well, and we looked for a solution together. Our solution was pickleball. Pickleball is a sport increasing in popularity that has become a class favorite and gained a more significant player base in recent years. Meeting with classmates and friends to play pickleball has been a great way to decompress after exams and bond. Those hours of playing and exercising which previously seemed like a waste of studying time, are now an investment as they provide relief of stress and keep me in better physical shape. For me, this translates into higher productivity during my studying time. However, despite adding a new sport, I was still challenged by the limitation of sitting most of the day to study. As humans and future physicians, we look at our bodies and know they are perfect movement machines. After looking for ways to limit my sedentary time, I found a solution by setting up a walking pad under a standup desk. The combination of pickleball and the walking pad has significantly improved my physical well-being,

as I no longer experience back pains from sitting for long hours at a time. As I move on to my second year, I wish I had known this sooner. I recommend all medical students and those who work at a desk for long periods to invest in these tools. Even at a slow speed, people can exercise and for those who are kinesthetic learners, this can help them retain information.

In my personal experience as student doctor Aila Cordero, one of the things I have learned in medical school is that our time is valuable and we need to be selective about how we manage it. I decided to exclude working out from my daily routine because I believed it was the best way to maximize my study time. Little did I know that what I thought was a waste of my study time, would make a significant impact on my life in a positive light. A few months ago, I had a wake-up call during my annual check-up. My doctor informed me that my cholesterol was borderline high. She warned me of the dangers that high cholesterol can cause and urged me to engage in physical activity every day. Suddenly, the clinical scenarios we learned about in class became real life for me, and honestly, it was so scary. I knew I needed to change my routine because I couldn't be a great future doctor and help the community if I didn't take care of my health first. So, I began working out every day. No matter what was happening or how much I needed to study, I started waking up early and walking a few laps around the block with my mom. I also began a daily yoga challenge on YouTube. It takes me about 2 hours to exercise and get ready to study. But those two hours have made such a difference in my life in ways that words cannot sufficiently express. I have noticed that when I sit down to study, I can focus more and keep up my stamina for longer hours without feeling as tired as before. Moving my body through exercise and yoga has helped me expand my mental potential, cope with the stress of our rigorous academics, and empower me to be a better version of myself.

Like us, many students are going through similar situations, and we want to emphasize that you are not alone. We urge you to take care of yourself; this is your wake-up call! Don't feel guilty for taking time out of your day to exercise. Your body, health, and mind will thank you. As scary as it seems to incorporate exercise into an already busy study schedule, it is not a waste of time. From our personal experiences, it has made us better student doctors. You don't need to travel to a gym or buy special equipment. Just find something you enjoy. These little changes have significantly impacted our lives as students and we hope to carry them into our lives as future residents and physicians. And always remember, "You can't burn the candle at both ends".



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