JOINING FORCES FOR BETTER JOINTS: A CRITICAL ANALYSIS OF THE CURRENT LITERATURE ON RACE AND ETHNICITY IN ORTHOPAEDIC SURGERY

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ABSTRACT

Osteoarthritis affects over 100 million people worldwide, with a greater impact on people of color compared to white patients. Race and ethnicity play a large role in modern medicine, particularly in urban communities. The paper will focus on knee and hip reconstruction and analyzing preoperative and postoperative management to identify disparities. We will explore the use of agency, solidarity, and social justice in implementing an urban bioethical toolbox. This thesis discusses the issue of racial disparities in joint surgery and explores the multifactorial systems that contribute to these inequities. I aim to emphasize the importance of recognizing and acknowledging these disparities and identifying several recommendations to address them, including an interdisciplinary approach to care, providing appropriate resources and care to underprivileged communities, prioritizing diet and exercise as primary preventive measures, increasing diversity in the field of orthopedics, and incorporating social workers into routine surgeries. I also aim to stress the significance of cultural competence and community engagement in improving patient outcomes and reducing disparities in healthcare.

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CHAPTER 1

INTRODUCTION

I decided very early in my medical school career that I wanted to specialize in a surgical field. As a student, orthopaedic surgery felt like one of the most intimate and remarkable fields in medicine that used standardized methods to ensure positive patient satisfaction and outcome. Orthopaedic surgeons and orthopaedic trainees like to believe our field treats everyone the same, and any work we do we would do for any of our patients. Though we have very strict algorithms for treating specific conditions we still must acknowledge not only our implicit biases but the social pressures that exist for certain patient populations. The effects of race and ethnicity on modern-day medicine are well documented. These disparities have also been known to be exacerbated within urbanized communities. As I study medicine in an inner-city community such as North Philadelphia, I observed first-hand the existence of these disparities and their long-term impact.

Orthopaedic surgery is one of the most innovative and meticulous surgical subspecialties to exist currently. With as far as it has come with clinical and anatomical knowledge, there is still room for improvement with regard to addressing social determinants of health. Many of the existing disparities between different racial and ethnic groups stem from access to care and the quality and outcome of care. Areas within orthopaedics that have been notable for apparent disparities span from trauma, joints, and spine surgery. The focus of my paper will pertain to the knee and hip which are the most commonly bony articulations utilized for joint replacements. Though these procedures

are extremely successful and beneficial, I will be critically analyzing the before and after or preoperative and postoperative management where most disparities can take effect. Understanding the past and present of these issues can serve to improve current methods and future directions.

Racial and ethnic disparities in general have become a realm of interest for our country given the controversy in recent years with the 2020 George Floyd protests and Black Lives Matter movement. With recent attention, there have been limited studies and focuses pertaining to the topic in orthopaedic care. This leaves much room for investigation and the need to critically examine where we are as clinicians and any room for improvement. As a bioethicist, I will attempt to introduce topics of advocacy/agency, social justice, and solidarity to offer my deconstruction of the literature and potential points of contention. Without addressing these issues that exist on a personal patient/provider-, socioeconomic-, and systemic level; they will continue to persist. As a future orthopaedic surgeon and urban bioethicist, I find it at my core to present these questions and ideas whilst also aiming to give some understanding and possible solutions.

Bioethical Principle

For many years Bioethics has been an evolving field that relies on 4 basic principles of autonomy, beneficence, nonmaleficence, and justice. These principles have been a staple in the field and create the backbone of most ideas and concepts for addressing bioethical issues. As for urban bioethics, we expand our toolbox for a more inclusive and situational circumstance that includes agency, social justice, and solidarity. The term "agency" encompasses our capability to identify all potential options in a situation and our ability to carry out the chosen option. Our capacity for agency and

decision-making is impacted by our past experiences, which are shaped by various factors such as gender, sexual orientation, skin tone, socio-economic status, education, and surroundings. These factors make up our context and influence the agency of all individuals. The principle of social justice mandates that we consider the effects of structural and contextual injustices when allocating resources. "Equality vs Equity" reflects the important idea that resources should be distributed in a manner that enables equal access to health for all. Adopting a social justice framework requires us to reevaluate the determinants of health and acknowledge that individual health behaviors are influenced by factors beyond personal choice. Solidarity unites each of us as humans rather than dividing us into separate, disconnected individuals. The principle of solidarity helps us recognize that the same social factors that grant some individuals advantages and success also make it much harder for others to achieve the same.

Over the past 4 years of medical school, I have been able to utilize these principles in shaping clinical decision-making and appreciating the individual lived experience of my patients. The concepts and terms discussed here will assist me in constructing a framework for this thesis on the racial disparities in joint health. By focusing on a specific subspecialty, I aim to shed light on or prompt consideration of similar issues that may occur in other areas of orthopedics. Our urban bioethics toolbox helps us to consider how the long-term impact of racism on Black and brown patients can lead to later diagnoses and more severe health prognoses.

Medical and Orthopaedic Terminology

- Osteoarthritis - also known as degenerative joint disease is a "wear and tear" arthritis. In this condition, the cartilage in a joint deteriorates and the bone underneath undergoes changes, usually gradually worsening over time. This can cause pain, stiffness, and swelling. In severe cases, it can result in decreased function and disability, making it difficult for some individuals to perform daily activities or work.
- Total Joint Arthroplasty (TJA) - also known as a total joint replacement, is a surgical procedure in which a damaged joint is replaced with a prosthetic (artificial) joint. This is typically done to relieve pain and improve joint function in people with arthritis or other joint diseases. The goal of total joint arthroplasty is to relieve pain and improve mobility, allowing patients to return to their normal activities.

Audience and Goal

In this thesis paper, I aim to gain the attention and cooperation of all orthopaedic surgeons involved with the diagnosis and treatment of osteoarthritis in America. I hope to provide insight and another approach to thinking about practical issues that persist in this day and age. I also write for other primary care providers that may be first in line to help identify these issues and advocate for their patients. My goal is to empower individuals with poor joint health and their loved ones to assert their agency and advocate for themselves in seeking the proper medical attention and follow-up. Additionally, I hope to educate and inspire future orthopedic surgeons to embrace diversity and promote

inclusiveness within the orthopaedic community to better represent and serve the diverse populations we care for.

My goal is to dive deep into highly notable orthopaedic journal articles that have studied the racial disparities that exist within joint health. We will begin by discussing the preoperative stages of the orthopaedic patient and other facets that take place before surgical solutions. This section will focus on the care of orthopaedic patients before operative management is considered fully. We will discuss management regarding access to care, longstanding history of mistrust between physicians and patients from different ethnic groups, preconceived notions of healthcare teams about different racial and ethnic groups, healthcare literacy of different patient populations, and pre-existing comorbidities that limit surgical options. We will then move into the postoperative period that takes place after a surgical solution is decided on. Here I will discuss postoperative management regarding complication rates, access to care, multimodal pain management, and communication between interdisciplinary healthcare teams. Finally, I will provide a space for discourse of possible solutions that can be used to create an environment of equity and understanding between healthcare providers and orthopaedic patients, and touch upon topics of community engagement, health literacy, and public policy.

CHAPTER 2

PREOPERATIVE CARE OF THE ORTHOPAEDIC PATIENT

Operative vs. Nonoperative Management

Osteoarthritis is a common joint disorder characterized by progressive loss of cartilage and bone damage. Osteoarthritis is one of the most common joint disorders, The Centers for Disease Control and Prevention reports a prevalence of approximately 32.5 million people in the United States and over 100 million people worldwide. The disease increases with age, with the highest rates of the disease occurring in people over 65 years old. Women are more likely to develop osteoarthritis than men and obesity is a major risk factor for being more likely to develop the disease. The most affected joints in osteoarthritis are the hips, knees, hands, and spine. Osteoarthritis is a leading cause of disability, affecting an estimated 9% of the US population (2020, CDC).

The diagnosis of osteoarthritis primarily relies on a set of symptoms and imaging. Symptoms include pain, activity-induced swelling, stiffness, and mechanical instability. The diagnostic criteria for osteoarthritis on imaging include plain radiographs of the affected joint displaying, decreased joint space, subchondral sclerosis, osteophytes, and subchondral cysts.

Treatment of this condition begins with nonoperative management before considering other surgical options. Lifestyle modification is the first step in treating osteoarthritis usually by maintaining a healthy weight, engaging in regular physical activity, and using assistive devices, such as canes or braces, to reduce stress on the affected joint. If the pain is too great to participate in lifestyle modification initially then,

over-the-counter pain relievers, such as acetaminophen, and nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen, can help relieve pain and reduce inflammation. In some cases, stronger pain medications may be necessary. Physical therapy can help improve joint mobility, reduce pain, and improve overall function. Physical therapists can also teach patients exercises to help strengthen the muscles around the affected joint. Corticosteroid injections and hyaluronic acid injections can help reduce pain and improve joint function. If the patient's pain is severe and non-surgical treatments are not effective, surgery may be considered.

Joint health plays a big role in your overall health as an individual and its relation to other medical comorbidities has been very understated. As a medical student following patients in a clinic, I have seen firsthand how all these things relate. Figure 1 illustrates the interplay between joint health and overall health. As patients begin to have joint pain from osteoarthritis, it can lead to limited mobility and decreased daily activity levels. This decrease in physical activity and exercise can put patients at increased risk for obesity and increased adipose in their bodies. As a person’s weight increases, they enter the category of morbid obesity; body mass index (BMI) of 35 -39.9 with one or more severe health conditions or a BMI of 40 or greater. Excess weight is the biggest modifiable risk factor that can increase the risk of developing osteoarthritis due to additional stress placed on weight-bearing joints, particularly the knees and hips.

Obesity has been one of the most prevalent risk factors for many medical comorbidities. Obesity can lead to an increased risk of heart disease, diabetes, and depression. According to the U.S. Department of Health and Human Services, non-Hispanic blacks were 1.3 times more likely to be obese as compared to non-Hispanic

whites noted back in 2018. Specifically, African American women also had the highest rates of obesity or being overweight compared to other groups in the United States. With such objective data, it is hard to believe that such a condition could face scrutiny for racial and ethnic disparities. As an urban bioethicist, there are a multitude of historical and social factors that have negatively impacted the health and weight of individuals. Obesity is a huge issue for most Americans but, we need to try to understand why it plagues certain communities more than others.

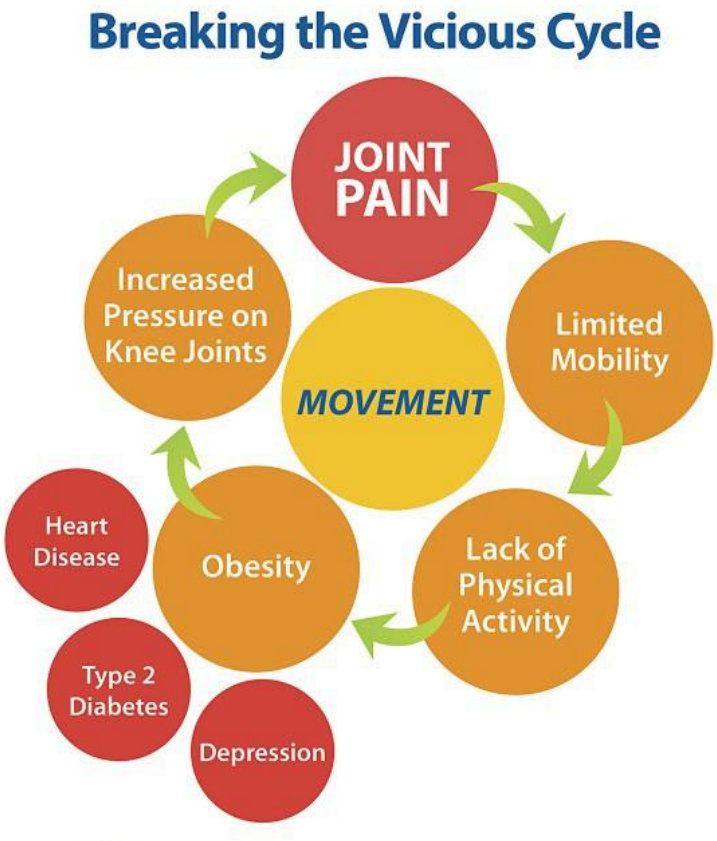

Figure 1: Breaking the Vicious Cycle (Movement for Life™)

Historically, minorities have made up the increased number of individuals in disadvantaged neighborhoods. These neighborhoods have experienced discrimination through redlining and the creation of food deserts. It reinforced the racialized distribution of resources and services, and it was a form of structural racism known as "redlining," which undoubtedly contributed to the poor health outcomes in Black communities and other minority groups ("Justice Department Announces New Initiative to Combat Redlining" 2022).This aided in the creation of "food deserts" in which, low-income tracts in which a substantial number or proportion of the population has low access to supermarkets or large grocery stores. This limits individuals' ability to access healthy foods such as fruits, vegetables and unprocessed foods. There is also an increased presence of fast-food restaurants in these neighborhoods which also increases the risk for obesity and other comorbidities.

When I moved to North Philadelphia for medical school, I saw firsthand how the lack of food choices and advertisements for unhealthy options plagued the surrounding neighborhoods. These neighborhoods also have an increased exposure to over-policing and violent crimes. Concerns around safety can restrict the level of outdoor physical activity that individuals feel comfortable engaging in. This can even include something as simple as walking outside, which is a beneficial activity for weight control. Research has shown that women who incorporate brisk walking or walking as a mode of transportation into their routines have a lower risk of developing obesity compared to those who engage in minimal walking (2012, Palmer.) These are just additional factors that can contribute to the obesity issue with less access or capabilities to walk outside or exercise with local community resources.

Access to Care: Who is an Appropriate Surgical Candidate?

As surgeons, it is our responsibility to perform procedures and operations with the utmost care and attention to safety and sterility. We must prioritize the values of beneficence, which means doing what is in the best interest of the patient, and nonmaleficence, which means avoiding harm to the patient. By upholding these values, we can ensure that we are providing the best possible care to our patients. For patients to be deemed an appropriate candidate for surgery, a person should be in good physical and mental health and have a favorable prognosis for the procedure. Criteria for candidacy may vary based on the type of surgery, but generally include the willingness to follow post-operative care instructions. Factors that may impact candidacy include age, overall health, medical history, lifestyle factors, and mental health. Ultimately, a qualified medical professional should assess a patient's individual circumstances and medical history to determine if they are a suitable candidate for surgery.

Though beneficence and nonmaleficence are important values to keep in mind when selecting surgical options for patients, we must also keep in mind social justice. It is important that we are aware of how racial health disparity may illuminate with our current standards. An article from Journal of Bone and Joint Surgery (JBJS), showed that compared with white patients (4.65 per 1,000 population per yr), black (3.90), Hispanic (3.71), Asian (3.89), Native American (4.40), and mixed-race (3.69) patients had lower rates of total knee arthroplasty utilization (Zhang et al, 2016). With this operation being one of the most successful and beneficial surgeries to exist, it is alarming that different patient populations associated with race carry such a disparity in the treatment.

TJA was less likely for African American patients than white patients of similar age and disease severity (OR = 0.41), but the difference was reduced after adjusting for a recommendation for the procedure at the index visit (Hausmann et al). This point alone shows how the guidance and impact of physicians can empower patients to increase their decision-making capabilities that best suit the lives they want to live. This also plays into the principle of agency by considering the different experiences individuals go through and how to best serve them. Doctors should always pay special attention to groups that are known to be vulnerable in health care and keep an open mind when discussing options.

CHAPTER 3

POSTOPERATIVE CARE OF THE ORTHOPAEDIC PATIENT

Outcomes and Sequela

When patients overcome the initial barrier of being able to be evaluated by an experienced orthopaedic surgeon and obtaining the necessary procedure or surgery for their needs, that is only the beginning. Recovery and rehabilitation can be the most important aspect of the needed care to see the best results after an operation. There are many things that can go well after an excellent joint replacement. There are also many things that can go in the wrong direction if not tended too quickly enough or made aware to the patient to seek medical attention. Complications can vary but they range from hardware failure, infections, and readmissions. These numbers, to no surprise disproportionately affect minority patients and outcomes can be catastrophic, especially in joint surgery.

An article from Annals of the Rheumatic Diseases noted that for "30-d readmission after TKA, rates for African American patients after TKA were 24% higher than white patients." (Singh et al.) Another 2016 article from JBJS notes, "The rates of mortality were markedly higher for black (OR = 1.52), Native Americans (OR = 6.52), and mixed-race patients (OR = 4.35) compared with white patients. Black (OR = 1.08) and mixed-race patients (OR = 1.17) had higher rates of complications than white patients" (Zhang et al.) These numbers are alarming for the simple fact that there is a clear disproportionate effect on people of color. A major concern that comes to mind that explains these disparities could be social support systems in place for patients or lack

thereof. People of color are more likely to live in lower socioeconomic standards compared to that of white people. Lower socioeconomic populations have less access to transportation, the feasibility to afford antibiotics, and assistance from home health aides. Health insurance may play a big factor in these examples due to how much coverage certain plans may have. According to the Assistant Secretary for Planning and Evaluation (ASPE) Office of Health Policy, "White Americans were more likely to have private insurance coverage (73 percent) compared to Black Americans (55 percent), while Black Americans were more likely to have public insurance coverage (30 vs. 18 percent) or be uninsured (15 vs. 9 percent)."People who have superior or exclusive medical insurance typically receive greater financial protection when it comes to healthcare expenses, thereby preventing the debilitating financial burden associated with medical and surgical treatments.

It is essential that individuals experiencing health issues are not discriminated against or denied access to health insurance due to their financial status or inability to afford private coverage. To address disparities in postoperative care and prevent unequal exposure to complications, we need to prioritize solidarity and explore various options. We must acknowledge that healthcare is not a commodity but a fundamental human right that must be available to everyone. I strongly believe that implementing universal health care would significantly reduce these inequities by promoting fairness, reducing healthcare costs, and enhancing overall public health. Such a system would benefit all citizens and ensure that every life is treated with equal worth and respect.

Education of our patients also plays a big role in avoiding postoperative complications. 2010 journal article from Clinical Orthopaedics and Related Research

stated that “Black patients had a higher odds ratio for pulmonary embolism within 90 days after discharge and Hispanic patients also had a higher OR for infection compared to other races.” (SooHoo et al.) As physicians, it is our responsibility to be transparent with patients regarding their health and treatment options. We must also provide them with clear instructions on what to do if they experience any unusual or painful symptoms. It is crucial to communicate with patients in a way that they can understand, taking into account their pace, tone, and level of familiarity with medical terminology. Assuming that patients understand medical jargon can be dangerous and irresponsible. Instead, we should recognize and respect the diverse experiences of all patients and take the necessary time to ensure that they fully comprehend their condition and treatment options. Using closed-loop dialogue is the safest and most effective way to confirm that patients have absorbed the information and can repeat it back to us.

CHAPTER 4

WHERE DO WE GO FROM HERE?

While I have discussed several reasons and scenarios that may contribute to racial disparities in joint surgery, I recognize that there are many other multifactorial systems that also play a role in these inequities, which I have only scratched the surface of. Given the multitude of factors involved, it can be difficult to devise a comprehensive solution to reducing or eliminating them altogether. However, the first step in addressing this issue is to recognize that it exists. While surgeons typically view surgery as an impartial means of providing standardized care to all patients, it's essential to acknowledge that surgery carries inherent risk and unpredictability, despite our best efforts to minimize it. Additionally, it's important to identify which patients may be at greater risk of negative outcomes. By recognizing and appreciating our patients' backgrounds, we can avoid creating narratives or treating them as "others."

After studying urban bioethics over the past four years, I have made some observations and recommendations that could be valuable for the field in the long term. To address high-risk patient populations, it is important to engage in contingency planning, which involves conducting a thorough history and physical examination with a focus on social history. In addition, establishing a joint surgery team with various disciplines can prevent patients from being overlooked and provide holistic care. Finally, community engagement is critical because involving patients more closely in their care can lead to personalized and optimized treatment instead of standardized care.

Interdisciplinary Care

We have extensively discussed the issue of access to joint health in America, and I strongly believe that an interdisciplinary approach would be beneficial not only for patients but also for the healthcare system as a whole. In the preoperative stage of joint diseases, primary care providers play a critical role as they are often the first point of contact for patients with chronic health issues. PCPs should receive additional training in musculoskeletal pathology to detect any signs of joint disease early on. Timely diagnosis and treatment of conditions like osteoarthritis could potentially prevent patients from undergoing surgeries and experiencing years of chronic pain. Additionally, physical therapy can help patients maintain their daily activities and functionality. It is essential to ensure that all patients, particularly those from minority or underprivileged communities with limited insurance options, receive appropriate resources and care. In cases where patients cannot afford routine therapy with a trained professional, alternative strategies such as teaching them or their caregivers at home how to rehab properly must be explored.

Given that obesity is the leading risk factor for osteoarthritis, it is essential to prioritize diet and exercise as primary preventive measures. However, certain populations, particularly those from disadvantaged racial and ethnic backgrounds, often live in areas with limited access to nutritious food and safe recreational facilities such as parks and gyms. To address this issue, outreach programs such as Farm to Families at Temple University and the creation of safe spaces for physical activity could be highly beneficial. The Farm to Families initiative aims to increase access to fresh and affordable produce for families residing in North Philadelphia. By presenting a FreshRx

"prescription" from a Temple doctor or their food stamps, families can purchase fresh and organic produce at a reduced cost throughout the year. The program not only provides affordable produce but also offers a community hub near their doctor's office where families can learn how to adopt healthy habits.

If non-surgical interventions fail to alleviate symptoms, it is essential for the primary care team to be aware of when and how to appropriately refer the patient to an orthopedic surgeon. While orthopedic surgeons are well-equipped to manage patients with surgical interventions, it is important to consider cultural competence during the initial evaluation. When orthopedic surgeons can relate to their patients on a social level, it can make a significant difference in their treatment outcomes. Increasing diversity in the field of orthopedics can give patients the opportunity to connect with a surgeon who shares their cultural background and experiences, which may help address disparities in healthcare based on race and ethnicity caused by a lack of cultural competency and social identification.

Incorporating social workers into routine surgeries like total joint replacement could yield additional benefits. Currently, social workers tend to work with trauma patients who have been victims of violence, so exploring ways to involve them in elective procedures requires some investigation. Social workers can help determine patients' needs and work alongside interdisciplinary teams to optimize treatment execution. They can also provide valuable education and link patients to other resources such as mental health support and government assistance. Social workers can assess whether patients are safe to rehabilitate at home or if they require additional support to achieve full recovery. Given the prevalence of comorbidities among certain patients, linking them with other

doctors can be beneficial overall. Programs that allow patients to speak with previous patients with similar backgrounds who have undergone the same procedure may also prove successful in helping patients understand firsthand the risks and benefits of people in similar situations. This may be a reasonable solution to health literacy by not only getting an explanation from the physicians but also from nonmedical personnel as well.

CHAPTER 5

CONCLUSION

There are a multitude of factors that contribute to overall joint health and the well-being of patients. Race and ethnicity have played a big role throughout the years in determining the long-term outcomes for one's joint health. The current literature from well-known and reputable sources seems to support this case but they do not offer much of an alternative to combat it. I believe understanding social determinants of health and how they play a role in orthopaedics could be an area of interest for further investigation. In this paper, I highlighted several areas where the use of my urban bioethics' toolbox has been able to possibly place a magnifying glass over these disparities.

By addressing agency, solidarity, and social justice within this topic of joint health and surgery, I was able to create a line of thinking that could give reason as to why we have observed the effects of race and ethnicity in this subsection of medicine. The idea of agency, in simple terms, is a concept that everyone has a set of choices to choose from that allows them to weigh and determine a line of thinking that best serves them given their current life position. Agency can be found in knowing the best ways to ward off the effects of osteoarthritis. Patients can display their agency through the help of their doctor by deciding what treatment options are best for them. Sometimes surgery is not always the best decision or even the best time for patients and as orthopaedic surgeons we must do everything in our power to help our patients come to the decision that is right for them regardless of what we think is best.

Solidarity brings on a "one for all and all for one" mindset. Solidarity creates access and understanding that everyone is deserving of healthcare. When dealing with pain and the inability to do daily tasks for yourself, the blame should not be placed on the patient. As our health deteriorates as we get older, we should not be penalized as if it is our own fault. That also applies to the social effects of race and ethnicity. Being a part of a vulnerable population who has had trouble past and present with regards to race, should not be a reason for not providing equitable treatment. We must understand these different groups and find different ways to support them in the areas they need it most.

In the year 2023, the strides toward social justice in regard to race and ethnicity have met great attention since the 2020 George Floyd protests. These social justice measures must also be spread throughout our hospitals and health facilities. Understanding that though surgery is a very science and algorithm-based specialty, we must also note the pre- and postoperative effects that come with it and what groups seem to be more at risk than others. Minorities tend to be less likely to receive the surgery and when they do, they are more likely to have complications or worse outcomes than their white counterparts. Social justice does not mean stopping supporting white patients, but it means we need to start supporting minorities more than we are at this time. Creating policies and plans for individualized care instead of defaulting to the "standard of care" could be the difference that improves or even saves a life.

As an incoming orthopaedic surgery resident, I am excited to take all that I have learned in my Urban Bioethics curriculum into the real world. I have learned so much from the city of Philadelphia and will be all that I have learned to a new city to continue the fight for inner-city equity. My goal is to implement these tools daily as I practice

medicine and always remember to meet my patients where they are and continue to make their voices heard. I hope that soon I can focus my efforts on further research to illuminate this field and benefit my patients on a wider scale.

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