

Athlete Participation in Orthopedic Elective Surgery

STS Research Paper
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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

The culture of athletics fosters values such as grit, determination, and competition in athletes. These values become the root of identity for individuals that are immersed in the culture of athletics their whole lives. Coaches become respected mentors and life begins to revolve around reaching the next level of success athletically. When an athlete experiences an injury that requires surgical intervention, this surgery is often in nature. In other words, continuing to play without surgical intervention is possible but can be incredibly painful, and often, detrimental to future health of that athlete. These surgeries are most commonly orthopedic, meaning that they resolve injury to ligaments and bone caused by trauma on the playing field. Often times athletes will continue to play through injury against the better judgment of medical professionals that wish to preserve their health. In this thesis, I will explore the motivational factors, instilled by the culture of athletics, that influence the use of orthopedic elective surgery. I will do this by understanding relationships between the athlete, treating medical professionals and other stakeholders in their athletic performance. I will also understand this issue from the perspective of both external stakeholders and the athletes themselves. In doing so, I will uncover how the culture of athletics can influence the use of orthopedic elective surgery.

Case Context

I became interested in orthopedics while working in Dr. Shawn Russell's Motion Analysis and Motor Performance Lab (MAMP). The mission of Dr. Russell's lab is to use motion capture to evaluate walking gait of patients with motor control issues or recovering from injury. From my work in the lab, I have had the opportunity to interact with patients and see, first

hand, their progress through recovery. Additionally, this past summer I had the opportunity to shadow Dr. Stephan Brockmeier in the UVA Sports Medicine Clinic. This orthopedic clinic sees patients that range widely in age, background and socioeconomic status. Dr. Brockmeier's patients consist of men and women who suffer from shoulder and knee ailments of all ages and backgrounds. He then advises his patients on whether they are suitable candidates for surgery to correct these ailments based on pain and function limitations to everyday life. The orthopedic surgery advised by this clinic is deemed by the healthcare industry as elective. Elective surgery is any surgery medically unnecessary for survival. Even though a patient may be experiencing a great deal of pain, the surgery required to fix their ailment is still considered elective. In the event that surgery is deemed medically unnecessary either by the treating physician or insurance company, alternative solutions become pain management through rehab or opioid medication. These alternatives can result in extensive medical expense, or even long-term addiction to pain medication.

I have been a patient in the UVA Sports Medicine clinic twice under the University of Virginia Athletics insurance for both an ACL reconstruction and meniscus repair. Because of my status as a UVA student athlete during the time of surgery and recovery, I was fortunately able to receive incredible care and rehabilitation from the UVA healthcare system. Although I was advised to immediately undergo surgery, I witnessed teammates with greater pressure to perform on the field choose short term pain management solutions to similar orthopedic ailments knowing the risk to long term health. I recognized that this difference in treatment is largely due to the cultural pressure for scholarship collegiate athletes to return the investment made on their education in the form of athletic performance. In reflecting on my exposure to the UVA healthcare system from many different perspectives, it was evident that there are defiant

sociological and cultural factors that affect patient access to an elective surgery. Everyone has differing the life circumstances and health insurance coverage, making accessibility to care unequal. Orthopedic surgery, designed to alleviate chronic pain, is not accessible to all patients due to cultural and socioeconomic barriers that they face.

STS Framework

I will examine the factors that influence patient care using Latour's Actor Network Theory. This is the idea that, "artifacts can be deliberately designed to both replace human action and constrain and shape the actions of other humans" (Latour, 1992, p. X). The theory analyzes a sociotechnical system by the interactions of actors and artifacts. Actors are the people, organizations and institutions that shape technology. Artifacts are the technology that results in interactions between actors. Artifacts have the ability to perform tasks beyond human control yet barriers to access them can also dictate who is allowed to use the artifacts (Latour, 1992).

The category of actor with sociotechnical system can be further broken down into human and nonhuman actors (Latour, 1992). Human actors are any person that influences the use of technology. This includes any medical professional related to healthcare that gives healthcare technologies action. They influence the use of medical technology and therefore have the power to control the population of its use. Non-human actors are any entity that replaces or restricts technical human action. Within the context of medicine, surgery procedures, medical devices and medications perform tasks that the doctors could not perform on their own and therefore are non-human actors. Non-human actors do not always have to be technical in nature. They can also come in the form of cultural values, political views that constrain the use of a technology. Non-

technical actors play an important role in delegating the standards through which technology is used (Latour, 1992).

In a paper written by Kristina Manderbaka and her research team, it was concluded that life circumstance plays a key role in the accessibility to elective surgery. Manderbaka and her research team examined all public and private records of elective surgeries between the years 1992 and 2003 on patients between the ages of 25 and 84. They then focused on coronary revascularization, primary hip replacement, primary knee replacement, lumbar disk operation, hysterectomy, prostatectomy and cataract surgeries. Each patient was then segmented based on socioeconomic factors such as employment and disposable income. Additionally, surgeries were standardized by age and categorized by gender. Researchers on this project also hoped to evaluate gender equality in the accessibility to elective surgery. From the analysis, it was concluded that those of higher socioeconomics generally had better access to elective surgery. This paper is vastly important to my understanding of factors that can affect patient accessibility to treatment. Even in a system where there is universal healthcare, other factors associated with socioeconomics can affect accessibility.

Cultural norms also have a significant impact in the access patients have to medical care. According to a study conducted by Shin-Lin Chiu and his research team, cultural beliefs surrounding lunar events in Taiwan affect patient participation in elective orthopedic surgeries. These lunar events include, the Chinese New Year, the Dragon Boat Festival, the Ghost Month and the Moon Festival. The Chinese New Year occurs from the 16th day of the 12th lunar month to the 15th day of the 1st lunar month of the New Year and it is believed that it is bad luck to begin the year with an illness. The Ghost Month occurs during the 7th month and is believed to be a month of misfortune. Therefore, during these months, surgery is deemed an unnecessary

risk in accordance with Taiwanese customs (Chiu, 2018). In order to determine this phenomenon, they decided to examine total knee replacement (TKR) and proximal femur fracture (PFF) surgeries between the years 2000 and 2011. It was then further categorized by geographical residence and gender of patients. Chiu and his team hoped to not only see a trend in sociocultural impact on scheduling surgery but also what demographics were most affected by Taiwan's cultural beliefs. Findings from this study confirmed that there was a significant dip in the amount of elective TKR surgeries during the 7th and 12th months, but not in the amount of PFF surgeries. It was also noted by researchers that there was a significant decrease in TKR surgeries for the 1st lunar month for females.

In analyzing these results, it was determined that PFF surgeries are more time sensitive and therefore cannot be delayed without further health concerns. It was also speculated that there was a steeper decrease in female participation of TKR surgery during the Chinese New Year due to their customary responsibility to carry out chores during this time. Social norms in Taiwan actually limit accessibility to the care that women receive. Although there are many factors that affect the scheduling of elective surgery, Chiu and his team proved that it is statistically probable that Taiwanese customs are a strong influence in elective surgery (Chiu, 2018). Cultural factors can dictate patient motivation to seek care. Despite the fact that this was a choice made by the patient, ingrained cultural beliefs are non-technical actors that prevent patients from allowing themselves to receive treatment and alleviate the pain that they experienced. This study shows how the complexity of social interaction can influence a deviation from what scientists and doctors believe to be logical. Culture has the ability to dictate perception of logic when deciding whether or not to use a technology.

Research Question and Methods

The question that became subject of my research is: How does the culture of sports influence the usage of elective orthopedic surgery among athletes? Analysis of this issue primarily focuses on injuries where functionality is in question. In these instances, functionality can be improved solely with pain management. However, surgical intervention is inevitable. It is vastly important that my research better defines the culture of athletics in order to completely answer my research question.

To begin my research, I conducted interviews with stakeholders in sports orthopedics that would be directly affected by the answers to my research question. I made sure that my questions were broad and non-judgmental of the value system within the organization of University of Virginia athletics. My sample consisted of a UVA athletic trainer, an orthopedic surgeon for UVA sports medicine, and three athletes that have experienced an injury requiring elective orthopedic surgery. Each interview began with a script of questions, but was adjusted as conversation progressed. Although detailed notes were taken, no interviews were recorded as to maintain the anonymity of each interviewee. Additionally, I will omit the names of the student athletes in this report as to respect their privacy since they are currently enrolled students at UVA.

The head UVA football athletic trainer, Keli Pugh, was the first to be interviewed for this research. It was important to understand an athletic trainer's viewpoint because they are responsible for facilitating the interaction of multiple stakeholders in this issue on a day to day basis. Next, I interviewed Dr. Steven Brockmeier. Dr. Brockmeier is an orthopedic surgeon at the UVA Sports Medicine Clinic. Brockmeier commonly sees athletes and diagnoses cases where orthopedic surgical intervention may be necessary. It was believed that an orthopedic

surgeon's perspective would explain the protocol for assessing a need for surgical intervention as well as the technical implications of forgoing elective surgery. Additionally, I hoped that Brockmeier could explain exactly what authority a treating physician had during the decision-making process, according to professional ethical standards. From interviews with Pugh and Brockmeier, I could better understand factors within the sports community that influence the use of orthopedic surgery from the perspective of those diagnosing, advising, and treating sports injury.

The next step was understanding the perspective of the patient. To do so, three athletes were chosen to be interviewed. Each of whom had previously experienced injury that required surgical intervention. All three varied in circumstance. The first was a fourth-year female soccer player who has suffered from multiple injuries during her soccer career thus far. She continues to play despite her medical history. The second was a fifth-year, male football player who experienced ACL reconstruction surgery and recovery twice during his career. This athlete has since retired from football but continues to finish his graduate degree at UVA. The third was a fourth-year male football player who is currently recovering from an ankle fusion surgery. However, this player participated in four games with strained ligaments in his ankle prior to being diagnosed and advised to undergo surgery. He plans to continue playing next year as a redshirt senior. I carefully selected all three of these athletes because I had previously known the general details of their medical history and circumstance. More specific details of such were questioned during the interviews. I felt that each athlete has had a unique experience with orthopedic surgery required to continue playing their respective sports. All three athletes played sports at the youth, high school and collegiate levels making them great sources to define the culture of athletics from the athlete point of view.

Results

From the interviews I conducted, there are numerous motivations rooted in the culture of athletics that influence the use of orthopedic elective surgery among athletes. Although they vary between athletes, these motivations can be categorized as internal or external. Internal motivations are rooted in personal experience and are specific to each athlete. The most common factors that drive internal motivation are competition and self-identity to their sport. Competition is fostered by athletics. The very nature of sport pushes athletes to compete with themselves and others to achieve the highest level of play possible. External motivations are driven by pressures inflicted on the athlete by other stakeholders in their performance or orthopedic surgery. As a result, athletes will forgo an orthopedic elective surgery to avoid loss of time where they can use sport to foster their competitive nature.

During my analysis, I decided to compare Kelly Pugh and Dr. Steven Brockmeier responds in order to understand the perspective of medical professionals that are treating the patient. According to them, a medical professional's only ethical responsibility in the process of deciding the need for surgery is to diagnose and advise patients who experience injury. Legally, have complete medical anatomy from the organizations that athletes play for. Advice, especially at the non-professional or collegiate level, is rooted in their ethical obligation to preserve the long-term health of the athlete. The strength of professional opinion is based on the functionality of the patient and the time of injury. If the pain can be managed and the injury will not progress with activity, they may suggest postponing surgery until the off season. The final to participate in a surgery is entirely the patient's decision. Athletes make these decisions based on a risk analysis between long term health and motivations that they experience.

According to the experience of both Kelly Pugh and Dr. Brockmeier, the main source of external pressure comes from parents. They will often take their son or daughter to other orthopedic specialists in order to get an opinion that justifies the decision for their child to continue playing. Additionally, coaches can serve as another source of external pressure. This is because they can directly impact the playing time of each athlete. Pugh felt that surgery can almost lead to a loss of credibility in the eyes of coaches. Additionally, coaches will The NCAA even allows for a medical examination of athletes in order to determine if they are physically fit to play. Pugh explained that some players can arrive as “damaged goods” due to a lifetime of specialization in their sport. She and Brockmeier both agree that specialization can leave to soft tissue damage that will ultimately require surgical intervention later in life. Both stated that internal motivations include a deep value of competition and, what Pugh called, “the problem of youth.” This is the idea that current athletes do not understand the damage that their respective sport is doing to their body. The simultaneous existence of these internal and external motivations results in athlete decisions to forgo elective orthopedic surgery and continue playing.

It was noted that motivations may change at the professional level of sports. Motivations that are unique to professionals come from their job security, pay, advice of agents and their credibility to perform within the organization that they are employed. Time not spent on the field leads and in injury rehabilitation leads to job insecurity and loss of credibility. Brockmeier called this idea the “secondary game,” where professionals are constantly battling on the field for the roster spots that they possess. The consequence of the culture of professional sports is an even greater devaluation of long-term health. Professional athletes will forgo any surgical intervention if they are able to retain functionality with pain management.

Although Dr. Brockmeier and Kelly Pugh reported incredibly helpful information on external motivations, I did not have a full understanding of internal motivations to forgo surgery or the overall culture of athletics until I spoke directly to the athletes themselves. All three athletes that I interviewed have battled sports injury their entire life. They have played through pain or functional limitations caused but these injuries numerous times throughout their career. Many of their responses directly reflected the observations made by Brockmeier and Pugh.

All athletes interviewed agreed that the value of competition is the most influential factor in deciding to continue playing through injury. One football player exclaimed during an interview, “Thank god I had football to channel my competitiveness.” Deciding to forgo surgery when possible meant they could continue to have a medium to exercise this seemingly compulsive aspect of their nature. An internal motivation that was unique to the athlete perspective was a sense value or self-identity to their sport and the overall culture of athletics. All three felt that when they retire, they will have a difficult time finding other cultural spheres that resemble athletics. The football player that I interviewed claimed, “the atmosphere of division I football cannot be replicated.” He then went on to explain that there is no other culture that simultaneously holds principles of competition and support at the same level as a division I sports team. This reinforces the reality that external pressures exist in sports. However, these external pressures also feed some aspects of the culture of athletics, such as competition, that athletes love the most.

The female soccer player’s concluding thought to our interview was, “I would not trade the experiences I have had in sports for anything.” To these athletes, sports reach far beyond the bounds of the game itself. The culture of athletics is a formative support network that is crucial to their continued development as functional members of the greater society. From their

perspective, injury threatens their participation in athletics. The fear of losing this identity is faced by accepting the advice to undergo surgery. Therefore, making this decision, becomes a last resort option. The final factor that all three athletes agree influence the use of surgery is time of injury. All of the work that goes into preparing for a season is wasted when you cannot play due to injury. Additionally, there are crucial transitional points during every athlete's career where they must prove to scouts or recruiters that they are good enough for the next level of play. Time lost to post-operative rehabilitation does not outweigh the desire to participate in sports if the athlete can avoid it.

Discussion

Within the context of Latour's (1992) Actor Network Theory, two distinct groups of actors exist in the network of athletics as it pertains to orthopedic surgery. The first group of actors are medical professionals, parents, coaches and anyone that expresses opinion with the result of inflicting external pressure on an athlete. The second group of actors are the actual athletes who suffer from injury. Both groups of actors have designated the use of orthopedic surgery based on their own values or ethical obligation. However, the distinct difference between actor groups is their power of influence over action. The athletes themselves are the only actor group who can directly designate the use of orthopedic surgery. However, the actor group inflicting external pressures force the athlete to evaluate internal motivations in making a decision to participate in surgical intervention. Therefore, they have indirect influence over the decision. As a result, the athlete must also designate other actors as valid sources of information. This secondary designation is based on influence and alignment with an athlete's internal motivations for their love of athletics. The complexity of the sports network that exists within the

culture of athletics is better understood by identifying each actor's motivations and resulting utility from making the decision to forgo elective orthopedic surgery. Understanding this network explains how the culture of athletics influences the use of orthopedic elective surgery in athletes (Latour, 1992).

A major limitation to my research was my sample population. All of those that I interviewed were within the University of Virginia athletics organization. Specifically, four of them were associated with the University of Virginia football program while only one of them was a member of the University of Virginia women's soccer team. As a result, my sample may lack diversity in thought. Additionally, they all share or learn similar values and motivations that are aligned with those of the University of Virginia Athletics organization as a whole or the individual sport organization that they belong to. Additionally, I personally selected and have a prior relationship with everyone that was interviewed. As a result, there is potential for unintentional bias due to the fact that I may have subconsciously chosen those who agree with my personal beliefs. Because of my prior relationships with the interviewees, our mutual understanding of each other's values could have inadvertently influenced the questions I asked them, the answers they gave or the way that I interpreted their answers. However, I selected these individuals not only because of my prior relationship with them that allowed for easy communication, but also because I previously knew their backgrounds would be helpful in answering my research question. Being mindful of these limitations allows for a more objective view of the results of my research.

In the future, I will structure my research to mitigate all bias by implementing multiple sources through which I receive information. This will allow for diversity in values, and backgrounds. It can be accomplished by conducting interviews with stakeholders that have

different motivations and goals. I will also find a source of data that gives quantitative support of the qualitative observations of the issue thus far. I will contact Dr. Brockmeier and other research institutions to inquire about raw data of sports injury demographics and variety that may support my current findings. Unfortunately, concerns surrounding the COVID-19 pandemic during the final months of my research made obtaining this raw data difficult. Finally, I will look at other social theories that help explain the complexity of interaction between actors of different backgrounds in the world of athletics. This will hopefully highlight how actors within a network share and interpret information. By doing so, I will better understand the relationship between internal and external motivations that influence the athlete's decision making.

This research will advance my engineering practice by providing a medium through which I can learn to conduct interviews and qualitatively interpret that information. I will use the skills I learn in interacting with interviewees for interactions with clients or coworkers in my professional career. These skills include the ability to inquire about sensitive topics that are central to the value system of those I am interacting with. This experience also taught me empathy in dealing with those who have been afflicted by adverse situations that have altered their life goal. This research was almost entirely qualitative, but I hope to learn exercise more quantitative skills with future research.

Conclusion

This research can help inform decision making in the future regarding the health of athletes. By understanding how interactions between actors are influenced by the culture of athletics, the designation of orthopedic surgery as a technology will better reflect the needs of the patient. Stakeholders in the use of orthopedic surgery should understand the complexity of this

network and look for solutions that will make it more transparent. In doing so, athletes will receive better treatment for injuries since external motivation that influences treatment methodology is more aligned with their own values and internal motivations. Future research of this topic will lead to more effective treatment strategies for sports injury. Sports impact a magnitude of people and can motivate, inspire, support, and foster parts of ourselves, in ways that do not exist anywhere else. By perfecting the injury treatment process, we ensure that the culture of athletics continues to be constructive to the health and aspirations of athletes.

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