The Impact of Gym Equipment Incorporating New Technologies

Insight into Major League Baseball's History with Anabolic Steroids

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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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General Research Problem

How is technology making methods of physical improvement more efficient and are they considered fair? Humans want to improve oneself. Whether that field is business, art, or athletics, there is always a "correct" path to improvement. For example, if a person runs a business and wants to make a larger profit, a reasonable way is to work harder and longer hours. On the other hand, a frowned upon way for said business owner would be to exploit a loophole in the law and somehow avoid taxes or fines, thus increasing profit. Likewise, Athletics has this "correct" or socially acceptable path to improvement. It has the frowned upon path too. However, the division between these two sides is very foggy.

Two ways of accelerating physical improvement that lay on opposite ends of the "fairness" spectrum are the improvement of gym equipment and the use of steroids. Gym equipment have different lifespans. For example, cardio equipment, such as the treadmill, lasts about 7-10 years, whereas strength equipment, such as the leg press machine, lasts 10+ years (Shanbhag & Trac, 2014). What they share in common is when they get replaced, the newer machine has an upgrade in technology. A stark example is the evolution of the treadmill. In 1991, a treadmill was basically a conveyor belt with handles and a mechanical display (Measom & Watterson, 1991). Now, recent treadmills possess the ability to track the user's heart rate, pace, calories burned, and other biometrics (Treadmill Buying Guide 2019, n.d.). This improvement in treadmill technology has allowed athletes to enhance their workouts. It is safe to say that no one will frown upon an athlete using a new treadmill to increase their athleticism. The same cannot be said for steroids as athletes have been stripped of titles due to them (Macur, 2012). Just like the improvement in gym equipment, the medical field has created and upgraded steroids. It is undisputed that using anabolic steroids can boost an athlete's workout. So, why is

one method of athletic improvement accepted, whereas another is not? Is there a defined line that determines if something is deemed “right” and “wrong”? The next section studies how new exercise technologies have affected athletes and the STS section analyzes the mutual shaping of anabolic steroids through studies on two specific MLB cases.

The Impact of Exercise Equipment Incorporating New Technologies

Exercise equipment has been evolving through the ages to account for peoples’ want for a more beneficial workout. New technologies integrated into gym equipment have allowed athletes to better track their progress. For example, the age-old bicycle has evolved to an indoor spin machine that allows users to track calories burned and miles cycled. One does not even need to look in a gym to see the impact of technology in exercise equipment. Wearable devices can also be counted as exercise equipment too. Fitbits allow the wearer to track total steps, calories, and distance, thus playing a part in one’s exercise routine. The device has such accurate tracking capabilities that physicians can make use of the data to check how well their patient is keeping up with their fitness (Diaz et al.,2015). Both of these examples give additional feedback to its users, allowing them to track their progress and improve their fitness and strength.

Not only does incorporated technology give users a more beneficial workout, but some more dangerous activities can be made safer. Before a leg press machine was invented, the most iconic leg exercise was the barbell squat. With no spotters available, a free weight squat can cause potential injuries if the user is unable to complete a repetition (Sissons, 2019). The technical project I will be working on is to create a device called The SmartBell. It is a relatively small device that will be attached to a barbell in order to give the weightlifter relevant

and useful feedback. It will be in line with how gym technology has improved recently, thus The SmartBell will give feedback on calories burned, repetitions completed, and rest time between sets. Furthermore, it will increase a barbell exercise's safety by giving real time feedback on whether or not the weightlifter is using correct form.

Overall, The SmartBell will be able to display the number of repetitions completed, calories burned, time during rest, and if there are any muscle imbalances. For clarification, muscle imbalances occur when the user asserts more pressure on either side of the lift, thus causing the barbell to tilt. Muscle imbalances lead to a higher probability of injury and cause one side of the body to be stronger than the other (Nadler et al., 2001). The SmartBell will be able to notify the weightlifter if the barbell is not completely parallel to the floor by lighting up its array of LEDs. If the weightlifter is putting more pressure on the right side of the barbell, then the array of LEDs will light up on the right side warning the weightlifter to correct the tilt. In addition, the user will be able to see the other aforementioned items displayed on the LCD screen of the SmartBell.

The project will deal heavily with embedded system design. This means that there will be a CPU where my team and I will code in C to get the CPU to do what we want. The CPU of choice is the MSP430 as it is a very low power microcontroller that has the capability to interact with the LCD display and array of LEDs. One interesting feature is that all the major calculations and processes will be asynchronous, meaning they will not depend on the each other. So, information shown on the LCD screen, such as the number of repetitions completed, will not depend on what is shown on the array of LEDs, which again indicates if the user is causing the barbell to tilt. As a summary, the main goal of the SmartBell is to enhance the user's workout. The completed device will be boxed shaped with an LCD screen and an array of LEDs

that can be attached to a barbell, via Velcro, in order to give feedback to the weightlifter.

Insight into Major League Baseball's History with Anabolic Steroids

Where is the line drawn between fair and unfair methods of athletic improvement?

Introduction

Athletes are celebrated for incredible feats of agility, power, and strength. The public marvels when a formerly impossible and unreachable record is broken. On October 12, 2019, Eliud Kipchoge was the first man to ever run a sub 2-hour marathon (Dalek & Sgobba, 2019). The running world is still in awe of his almost superhuman speed and machinelike consistency. However, his sub 2-hour marathon is not counted in the top ten fastest marathon finishes as the race conditions were not standard (Woodward, 2019). On the other hand, Barry Bonds is a world-famous baseball player that holds the record for most home runs in a season with 73 and most home runs in a career with 762 ("Sortable Player Stats | MLB", n.d.). Bonds was the subject of controversy as he is known to have been aided by anabolic steroids to break these homerun records. Unlike the public's reception to Kipchoge's achievement, the public holds a split opinion on Bonds as some do not even care about his PED usage, but some do, as he has not been inducted in the Baseball Hall of Fame (Cisyk & Courty, 2015). Yet, the MLB still credits him with both these records. So, where is the line that separates the honest athlete from a dishonest one? With the advent of new technology into sports, what are the factors that determine what is considered fair and what is not?

Background

Athletes from all different sports have been found using anabolic steroids to enhance their performance. Three of the most famous athletes who have used performance enhancing

drugs (PEDs) are MLB players. Sammy Sosa, Mark Mcgwire, and Barry Bonds filled their respective home run totals and currently populate the top 6 places in the history books for most home runs in a single season (Corcoran, 2013). They are still credited with this achievement, as there is no asterisk beside these three players' achievements on baseball websites. However, none of these three have been inducted into the Baseball Hall of Fame although statistically worse players have been in the past. PED usage is the reason why they are being kept out of the Hall of Fame (De Piccioto, 2018).

In order to answer the question of what makes methods of athletic improvement fair and unfair, the history of MLB issued drug rules is a good place to start since the MLB took more time than other sports leagues to implement some sort of rule. As an overview, Mark Mcgwire was caught using PEDs in the 1998 season during which he ended up hitting 70 home runs, breaking the previous record of 61 home runs ("Sortable Player Stats | MLB", n.d.). At this point in time, PEDs were completely legal in the MLB. It wasn't until the US government pressured the MLB to enact a random drug test policy on their players that doping led to play suspensions (Spira, n.d.). One of the most publicized incidents was the Bay Area Laboratory Co-Operative (BALCO) case in 2003 since it involved Barry Bonds, the all-time home run leader (BALCO Fast Facts—CNN, 2019). The distribution of anabolic steroids without a valid medical subscription went against the Anabolic Steroids Act of 1990 and the Controlled Substances Act of 1991 (Collins, 2005). Barry Bonds was charged with obstruction of justice, but the more considerable blame was placed on the distributer, Bonds' personal trainer, Greg Anderson. These two US laws made it more difficult for athletes from acquiring anabolic steroids to enhance their performance. Yet, it was still possible as Bond did not need anabolic steroids for health reasons, but was able to get them with a middle man. Although the US

government's agenda was clear to not allow anabolic steroid use except for certain medical conditions, the MLB needed some more poking and nudging to advance their steroid use rules.

The major actors in MLBs history of drug policy are the athletes, US government, MLB as an organization, steroid producers, and the public. Studying these 5 different parties and understanding how they connect in terms of MLB drug policy progression, will give insight as to why some actors are very lenient on PED use and others are not. It will also show how one group was able to influence another group. The paper will use social construction of technology (SCOT) method to analyze all the different perspectives on PEDs. The paper will focus on how these different actors, with differing interpretations, have shaped the advancement of new anabolic steroids and vice versa. Studying PED history in the MLB, will allow me to hone in on the research question of what is factored in when determining if a form of athletic improvement is deemed fair or unfair.

Evidence

The paper will focus on two major case studies both related to the MLB. The first will deal with Barry Bonds and the controversy with the Bay Area Laboratory Co-Operative. The second will be Sammy Sosa and Mark Mcgwire's competition to break the single season home run record. The evidence collected will be MLB players' response to anabolic steroids, US laws written on the subject matter, speeches made by MLB representatives, speeches made by US senators against anabolic steroids, reports on improved anabolic steroids, and a wide variety of newspaper articles on these MLB players' records. The variety of newspaper articles will give a good sense of the general public's viewpoint and reasons why the athletes are not in the Hall of Fame. Analyzing the aforementioned evidence as a whole will give insight on how the differing actors' views changed over time and how one actor was able, or not able, to influence another.

Methods

In order to gain a better understanding of what method of athletic improvement is fair or unfair, I will be conducting the two case studies. I will keep notes on the major actors separate and track if their opinion has changed at some point. I will extrapolate the different reasons as to why these actors have come up with these differing opinions. For example, health and safety is the main reason the US Senators disagreed with the use of steroids. Then, I will combine how these actors have interacted with each other to see how the whole has shaped PED technology.

Importance

By the end of the STS research paper, the reader should gain a better understanding of the mutual shaping of anabolic steroids and society. In other words, knowing how the major actors' viewpoints changed as newer anabolic steroid technology/improvements were made. By the end of the paper, the main objective is not to be able to draw an explicit line on what is deemed to be fair and unfair in terms of athletic improvement tools. The imaginary moral line will always be unclear and each technological improvement or invention of an athletic tool will be different from the other. Instead, the reader should be able to understand the different forces and factors that sway the public to one side or the other. Lastly, the reader should be able to come up with their own opinion, or prediction, as to what will happened to PED usage in sports.

Conclusion

Technological improvement in athletics has caused for more efficient training and higher athletic achievement. As new technology is incorporated into athletics, it is important to note what constitutes it as fair or unfair. Who gets to decide and what do they consider? Studying the two case studies of PED usage in the MLB will show that this imaginary line of fair and unfair

is blurry and difficult to determine. The STS research will teach readers the factors that went into the banning of PEDs in the MLB. The answer to this question will hopefully give insight as to what will be considered and discussed when the introduction of new technology finds its way into other sports.

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