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Review article

## History of doping in world baseball

## Historia del dopaje en el beisbol mundial

## História do doping no beisebol mundial

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### ABSTRACT

**Introduction:** Baseball has been constantly under the threat of doping, and currently there are criteria issued by some experts that suggest the possibility that many successes achieved by famous baseball players who nowadays appear as the main big stars of this sport in the ballroom fame, have been related to the consumption of prohibited substances.

**Objective:** The objective of this study was to explore the data published in the specialized world bibliography that reveal how doping, as well as other forms of fraud, have affected baseball in both the major and minor categories.

**Materials and methods:** This bibliographic review work is carried out as a suggestion from baseball fans and the sports press interested in knowing how the problem of doping and the use of prohibited substances has influenced this sport since its origins.

**Results:** Currently, doping control tests are carried out on amateur and professional players in the sport's leagues around the world. The tests, measures and sanctions that



are applied conform to the prohibitions and standards issued by the World Anti-Doping Agency and the World Anti-Doping Code. The substances used most frequently have been anabolic steroids, stimulants, Growth Hormone and narcotics.

**Conclusions:** Once the competitive stage is over and with the passage to retirement, many baseball players begin to consume tobacco, alcohol and other drugs that significantly affect their health and quality of life.

**Keywords:** AMA; BALCO; Baseball; Drugs.

## RESUMEN

**Introducción:** El béisbol ha estado constantemente bajo la amenaza del dopaje, y actualmente existen criterios emitidos por algunos expertos que sugieren la posibilidad de que muchos éxitos alcanzados por famosos beisbolistas que en nuestros días aparecen como las principales grandes estrellas de este deporte en el salón de la fama, hayan estado relacionados con el consumo de sustancias prohibidas.

**Objetivo:** El objetivo del presente estudio fue explorar los datos publicados en la bibliografía mundial especializada que revelan cómo el dopaje, así como otras formas de fraudes, han afectado al beisbol tanto en las categorías de mayores como en las menores.

**Materiales y métodos:** El presente trabajo de revisión bibliográfica se realiza como una sugerencia de aficionados al béisbol y la prensa deportiva interesada en conocer cómo ha influido el problema del dopaje y el uso de sustancias prohibidas en este deporte desde sus orígenes.

**Resultados:** Actualmente, se realizan pruebas para el control antidopaje a los jugadores aficionados y profesionales de las ligas de este deporte en todo el mundo. Las pruebas, medidas y sanciones que se aplican se ajustan a las prohibiciones y estándares emitidas por la Agencia Mundial Antidopaje y el Código Mundial Antidopaje. Las sustancias utilizadas con mayor frecuencia han sido los esteroides anabólicos, estimulantes, hormona de crecimiento y narcóticos.

**Conclusiones:** una vez concluida la etapa competitiva y con el paso al retiro, muchos beisbolistas se inician en el consumo de tabaco, alcohol y otras drogas que afectan de manera significativa su salud y calidad de vida.

**Palabras clave:** AMA; BALCO; Beisbol; Drogas.

## SÍNTESE

**Introdução:** O beisebol tem estado constantemente sob a ameaça do doping, e agora há algumas opiniões de especialistas sugerindo a possibilidade de que muitos sucessos alcançados por jogadores famosos de beisebol que hoje aparecem como as maiores estrelas do esporte podem ter sido relacionados ao uso de substâncias proibidas.

**Objetivo:** O objetivo deste estudo foi explorar os dados publicados na literatura mundial especializada que revelam como o doping, assim como outras formas de fraude, afetaram o beisebol tanto no nível sênior quanto no júnior.

**Materiais e métodos:** Esta revisão de literatura foi realizada por sugestão dos fãs de beisebol e da imprensa esportiva interessada em descobrir como o problema do doping e do uso de substâncias proibidas tem afetado este esporte desde suas origens.

**Resultados:** Atualmente, jogadores amadores e profissionais das ligas de beisebol em todo o mundo são testados para o controle do doping. Os testes, medidas e sanções



aplicadas estão de acordo com as proibições e normas emitidas pela Agência Mundial Antidoping e o Código Mundial Antidoping. As substâncias mais utilizadas têm sido esteróides anabolizantes, estimulantes, hormônios de crescimento e narcóticos.

**Conclusões:** uma vez terminada a fase competitiva e com a transição para a aposentadoria, muitos jogadores de beisebol começam a usar tabaco, álcool e outras drogas que afetam significativamente sua saúde e qualidade de vida.

**Palavras-chave:** AMA; BALCO; Beisebol; Drogas.

## INTRODUCTION

### Brief history of world baseball

Beisbol (literal translation into Spanish from the English term Baseball) refers to a team sport created in the United States by Abner Doubleday, in the town of Cooperstown (state of New York) in the year 1839, however, it was Alexander J. Cartwright who in 1845 designed the first baseball field and established the first rules for this game (Henderson, 1939; Benson M, 1989). Baseball had its origins in cricket and rounders, brought to America by English settlers, but in cultures as old as the Greek, Egyptian and Persian, sports and ceremonies were practiced in which a stick and a ball were used as implements, which possibly reached the European region where they were assimilated by their populations (Peterson, 1973; Thorn, J, 2011).

In other regions of the world, such as Cuba, the native populations practiced a similar sport which they called batos. The ruins of the ancient city of Teotihuacán, in Mexico, still preserve playgrounds where a sport was practiced that consisted of a rubber ball passing through a slot made in a vertical wall.

Baseball spread to many regions of the world associated with wars, migrations, the installation of military bases and the increase in maritime trade, and it became the national sport or pastime of many countries. Baseball is currently played in Asia, Africa, Latin America and the Caribbean, North America, South America, Central America, Oceania and Europe. The first official baseball game to be played in the United States using the new rules was held on June 19, 1846. In Cuba, it began when the Havana Baseball Club was formed in 1868, but the game was banned by the rulers. Spaniards and it was not until December 27, 1874 that the first documented game was recorded on the island, according to what was published in the newspaper El Artista four days later. This developed into a professional league that began to be played in 1878 (Gonzalez-Echevarria, 1999).

## DEVELOPMENT

### Doping in baseball

For fans and followers of baseball, it is a difficult and bitter task to recognize that their favorite sport or hobby cannot be considered the cleanest and most honest sport in the world, and that it has been a victim of the doping phenomenon as has happened with the most sports.



Currently, when the history of baseball and the most famous baseball players in the history of this sport are analyzed, doubts arise related to the possibility that the phenomenon of doping has had great influences on the historical results of this sport. It is also quite possible that most of the outstanding results were achieved under the influence of prohibited substances. It is probable that the historical statistics and its great protagonists were biased by the use of doping.

Today the date on which the use of prohibited substances or doping in this sport began is known with considerable certainty. In addition, it can be fairly accurately stated that its fans and lovers generally do not know the effects and damage that the use of prohibited substances, doping and corruption have caused throughout the history of this sport (Carroll, 2005; Plata N, 2006).

It's hard to name a sport that hasn't been overtaken by the tentacles of doping, and baseball has been no exception.

Due to suggestions made by sports commentators, it has been attempted to review the phenomenon of doping in baseball; the characteristics of this harmful phenomenon in sports, the arrival of the use of prohibited substances, their presence in the past and present and the forms of struggle in search of their elimination.

### **The origin of the word "doping"**

The word doping is derived from a Bantu dialect that was spoken in some Zulu tribes of the East Coast of South Africa, where it was used to name an alcohol-based drink, cola nut and xanthine that the natives of the region used as a stimulant during religious ceremonies. Later this word passed into the language of the Boers (farmer in Dutch, Boers or Afrikaner), where it was used to name any type of stimulating drink (Cabrera-Oliva, VM, 2013a, 2013b).

This term began to be used in the English language firstly to name a paste that was used as a lubricant, which was applied to the soles of shoes to facilitate movement on the snow. It was later used to identify a mixture of opium and narcotics given to racehorses as a stimulant (Thevis, Kuuranne, Geyer, 2018; Kayser, Broers, 2012).

### **The arrival of drugs in sport**

Some researchers and historians (Tynes, JR, 2006; Prokop, L., 1970; Rosen, DM 2008) have pointed out that the first drugs that came to baseball were amphetamines. During World War II, the Allied and Axis powers systematically provided this drug to their troops, mainly to aviators during night flights and to improve the soldiers' endurance and mental focus. After the end of the war, many of the returning soldiers who attended college were put on college baseball teams, and when they did, they applied their knowledge of the benefits of amphetamine use. They first inserted themselves into college sports and then into professional sports, including professional baseball.

However, historical records have confirmed that since the beginning of the practice of baseball as a sport, players have tried to gain an advantage based on the use of prohibited chemical substances. This is the general criterion on which the practice of doping is based (Kanayama, Pope, 2018; Piacentino, D., Georgios, DK, 2015).



The practice of empirical doping in baseball had its beginnings with the preparation and administration of a macerate created at the end of the 19th century by a French doctor named Charle-Édouard Brown-Séguard. This was made based on the testicles of dogs, rabbits, guinea pigs and rams that became known as the "elixir of life" (Jorge, M., 2016). Although until the beginning of its use, players were unaware of the composition of the elixir, the active ingredient was surely testosterone. This macerate or extract became the first known drug to improve the performance of athletes in the professional leagues of the United States, when the baseball player Pud Galvin, of the Pittsburgh Alleghenys, used it in 1889. Galvin won his first game under the elixir, and *The Washington Post* reported the power of the drug and the player's ingenuity (Rao, Boulet, Mehta, 2013; Brennan, Wells, VanHout, 2017).

### **The phenomenon of doping in world baseball**

Generally, statistics on positive cases of doping in baseball only record players who participate in the Major Leagues of the United States, known as "The Big Top", because the best players from around the world win the Major Leagues where they are subjected to doping control tests, which does not happen frequently in their countries of origin (Bryant, 2005).

Every year cases of doping are registered in all the leagues and franchises of world baseball, with the highest incidences in the minor and university leagues (Stahl, 2009).

### **Doping as the main threat to baseball and sports**

The use of prohibited substances by elite athletes is a serious problem that goes beyond the fact of being detected and, therefore, disqualified in a sports competition. The problem, much more important, is related to health due to all the physical, endocrine and metabolic repercussions. Among others, the psychic repercussion predominates due to the use of this type of stimulant substances, which usually brings with it causing a deterioration that is sometimes irreversible on the organism, sometimes even leading to death (Office of the Commissioner, MLB, 1991).

The athlete of our time is subject to constant personal and social pressure, a requirement that subjects him to achieving ever better levels of performance, zealously searching for new formulas that allow him to respond and win in competition at any cost.

On the other hand, the incessant search for success and social recognition that this often means linked to a high economic remuneration make the athlete complement the ergogenic-physiological help. This is based on food, training programs, the use of specific clothing, etc., with supplements or methods that exceed the limits of what is allowed by the competent sports organizations and, of course, breaking the laws of sport.

The reasons that drive sports organizations to prohibit the use of substances that allow an improvement in physical work capacity are essentially two: a) On the one hand, to avoid the risk of the athlete, since many stimulants used in doping can cause death and no athlete is exempt from it, b) Avoid unfair competition, otherwise the same would be done to evaluate the effectiveness of the methods that induce a better performance stimulus. Unfortunately, the only objective data available to detect the use of prohibited agents in sports comes from the control analyzes that are implemented through the study of urine and blood in numerous international competitions (Yesalis Barke, 2002; Millán Aguilar- Navarro, Muñoz-Guerra, Del Coso, 2020).



Unfortunately, and as happens in all sciences, the vertiginous growth of research also sharpens the minds of those who unscrupulously offer new compounds to take advantage of the competition but who do not warn about the dangers that this implies for health. For this reason, the International Olympic Committee annually publishes a report on the different compounds that are being used and regulations on them (Lists of prohibited substances and methods in sport) (World Antidoping Agency, 2022).

The professionalism promoted by companies and television lead athletes to tremendous efforts and constant improvement. Also, the athlete, faced with an expectation of greater benefits, gets on that unbridled race and since it is difficult for him to maintain that rhythm with natural means, he resorts to doping.

### **Substances currently used in the practice of doping in baseball**

Current technological development has made it possible to identify and characterize the chemical and physiological properties of doping substances known as new generation.

The development, synthesis and production of new substances with the ability to increase physical performance have significantly expanded the arsenal of doping substances available to fans to take advantage of competitions ignoring the side effects that drugs can have on the health of athletes who resort to this type of ergogenic resource that can, in cases of abuse or high predisposition to adverse side effects, cause serious damage to the body (Birzniece, 2015).

### **The arrival of doping and banned substances in modern baseball**

Doping broke out with its greatest force in baseball when a group of the best players in the major professional leagues began to use different types of steroids and hormones almost massively.

The pioneer and main promoter of the introduction into practice of the use of anabolic steroids and prohibited substances was the baseball player José Canseco, who in his own words stated: "After this, baseball will never be the same again" (Canseco, 2005).

Another famous major league baseball player (Álex Rodríguez) and one of the historically highest paid players in the Major Leagues explained the reasons why he used prohibited substances: "I wanted to defend my \$253 million contract" (Sinn, 2017). However, during tests carried out in 2003, another 104 players tested positive for doping, according to data published by Sports magazine. Illustrated (Brenan, 2013; Bryant, H., 2005).

### **Doping in college baseball**

Although the NCAA (National Collegiate Athletic Association) conducts random drug tests on student athletes, performance-enhancing drug abuse is not uncommon at the college level. It's up to schools and colleges if they want to implement their own drug testing policy, which most do. The MLB division is at the Junior College or NJCAA level. The NJCAA does not drug test its student athletes, so it is up to those universities whether or not players are drug tested (Blum, R., 2022)



## **The fight against doping in baseball**

In 1973, the Senate subcommittee on the judiciary, charged with investigating juvenile delinquency in the United States, called hearings to address the issue of "proper and inappropriate use of drugs by athletes." At the time, verified information was hard to find and few academic studies existed on the many drugs used by athletes (Kirk, C. 2019; Fidler, Marcano, 2007).

In February 1999, the International Olympic Committee (IOC) convened the World Conference on Doping in Sport in Lausanne, Switzerland and recommended the creation of the World Anti-Doping Agency (WADA). One of WADA's mandates was to harmonize the Olympic Anti-Doping Code and develop a single code applicable and acceptable to all stakeholders. The Code included the creation of several international standards (IS) for laboratories, tests, the prohibited list and for the Authorization of Therapeutic Use of prohibited substances (TUE) (World Antidoping Agency, World Antidoping Code, 2009).

In order to solve the problem of drug use in baseball, the AMA, the IOC and the MLB adopted a policy of more rigorous anti-doping control tests and an increase in increasingly harsh sanctions. However, the cases continued to be frequent and there were no significant changes in drug use among athletes despite the pressure put on them.

Steroids made it to baseball's banned substance list in 1991, however testing for Major League Baseball players did not begin until the 2003 season (Shaun, Keating, 2005). While the steroid tests were beginning, their use continued (Butterworth, 2010).

## **The "fatal triad", amphetamines, anabolic steroids and growth hormone**

### **Amphetamine use in baseball**

In his autobiography "I Had a Hammer," co-written with Lonnie Wheeler and published in 1992, outfielder Hank Aaron wrote that he accepted an amphetamine pill from an unknown teammate and took it before a game during the 1968 season, after of feeling frustrated by his lack of offensive performance (Hank, Wheeler, 1992).

Third baseman Mike Schmidt, an active player from 1972-1989, admitted to Murray Chass in his book "Clearing the Bases" in 2006 who had used amphetamines "a couple of times" The Goose relief pitcher Gossage, active from 1972 to 1994, also admitted to using amphetamines during his playing career (Davidoff, 2013; Carroll, W. 2021).

Contrary to what is generally suspected, many drugs and prohibited substances currently used in the practice of doping were not originally designed for this purpose, and had their origins in medical practice, wars and other events.

### **Use of anabolic steroids in baseball**

The use of steroids affects the integrity of the sport and when an athlete is caught using these substances, they can face a suspension that can vary from a few games to a full season (Erikson, *et al.*, 2015).

It is currently known that the main promoter and key to the introduction of steroids in baseball was Josh Ziegler, which began what is now known as the 'Steroid Era' (Brave, Roberts 2019).





In 1958, CIBA marketed it in the form of pink pills called Dianabol (A designer anabolic steroid). These pills allow to improve the protein synthesis of the organism and considerably increase the muscle mass. This was the first steroid in history (Elks, 2014; Yesalis, 1990; Cisyk, J. 2020).

Former pitcher Tom House, drafted in 1967 and active in MLB from 1971 to 1978, admitted to using "steroids that wouldn't hit horses" during his playing career (Crouch, I., 2013). According to House, the use of performance-enhancing drugs at the time was widespread (Chavez, A., 2022), and that "six or seven" pitchers on each team were at least experimental users of steroids or human growth hormone (Nathan, 2009; Nightengale, 2019).

### **Popularization of steroids**

Only four years later, CIBA marketed the anabolic steroid Winstrol (Stanozolol) to be used intramuscularly, which quickly became popular among weightlifters, but without analyzing the possible risks that it could cause to health and supporting the hypothesis: "Are anabolic steroids good for people with medical problems? Why shouldn't they also be beneficial for healthy people? Will they make them stronger? (Brenan, Wells, Van Hout, 2017; Hildebrandt, Langenbucher, Carr, Sanjuan, 2007).

### **Use and abuse of growth hormone in baseball**

Growth hormone (HGH) and the anabolic steroid tetrahydrogestrinone (THG) have revolutionized the field of doping, both because of their effects on athletes and because of the difficulty of detecting them in controls. Different analogs of HGH, Insulin-Like Growth Factors, Metabolic Modulators and Erythropoietin are currently used in doping (Holt, et al., 2019).

HGH increases muscle mass and enhances the effects of anabolic. It also promotes bone development and accelerates the growth of tissues and organs such as the heart or liver.

### **The great scandals involving the use of prohibited substances in baseball: The BALCO case and the Biogenesis Clinic**

In June 2003, the well-known sports doping scandal known as the BALCO affair broke out. The United States Anti-Doping Agency (USADA) anonymously received a syringe containing residues of a designer anabolic steroid that could not be detected in laboratory control tests. At the same time, the anonymous person declared that the substance in question had been synthesized in the BALCO laboratories (located in San Francisco, California) and reported the names of the athletes who were using it (Meyer, 2008).

### **The case of the Biogenesis Clinic**

The Biogenesis Clinic (Elfrink, Garcia-Robert, 2014) was theoretically intended to provide anti-aging treatments to its clients, but the records found made it clear that it supplied human growth hormones, anabolic steroids, and pills to improve sports performance to its clients. clients, which included not only professional athletes but also teenagers.

The clinic represented a typical case of corruption in the city of Miami and the different Biogenesis employees tried to acquire all kinds of documentation to legalize the clinic and to try to hide the guilt of the main defendants.



## **The steroid era**

Sluggers Mark McGwire, Barry Bonds, Jason Giambi and Gary Sheffield; Jose Canseco and Rafael Palmeiro; Miguel Tejada, in addition to pitchers Andy Pettitte and Roger Clemens, were some players (confessed or not) accused of guilt or doubts in the so-called 'Steroid Era' in baseball (McCain, 2010).

In the research carried out, it was confirmed that 89 Major League players were involved in the use of these drugs; and that BALCO Laboratories and the Miami Biogenesis clinic supplied doping substances to various athletes, including baseball players.

## **The Mitchell investigation and report and the "culture of doping" in MLB**

On March 29, 2006, former Senator George J. Mitchell was appointed to lead an investigation into past steroid use by Major League Baseball players. The investigation included more than 80 baseball players.

Mitchell denounced that in each team of the 30 that made up the Major Leagues, he had one, two or more players who had used steroids, without doing anything to correct the serious problem (Bloom, Barry, 2007; Duff, Schmidt, 2007). The research clearly established that a "doping culture" existed during the 1980s and 1990s. "For more than a decade, the use of steroids and other banned performance-enhancing substances in Major League Baseball players was widespread violation of federal law and baseball policy" (Mitchell Report, 2007; Buechel, B., Emrich, E., Pohlkamp, S. 2016).

The "doping culture" extended to great legends whose names were included in the report, the big surprise being pitcher Roger Clemens, a winner of seven Cy Young Awards (Thompson, T. 2010; Vinton, 2010).

## **The policy of sanctions applied to baseball players who use doping**

In August 2002, MLB players and team owners reached an agreement to implement a testing program, but sanctions began in 2004, when it was determined that mandatory and random testing was necessary (Office of the Commissioner, MLB, 1991; Major League Baseball, 2021).

On March 28, 2014, the players and owners announced that the penalties for a positive test would be increased to an 80-game suspension for the first time. Then escalate to a 162-game suspension for the second violation and a lifetime suspension from the sport for the third. Players suspended during the season would not be able to participate in the postseason. These suspensions did not allow the player's salary to be paid while he was suspended. This is the strictest policy against doping that the MLB (Office of the Commissioner, MLB, 1991; Major League Baseball, 2021).

This program replaced the previous one, established in 2002, according to which a first-time violation would only result in treatment of the player, and the player would not be named (Ezra, 2121; Verducci, 2010).

Although every year the Major Leagues are more rigorous with their anti-doping system, new cases of athletes who ingest prohibited substances or so-called performance-enhancing drugs are discovered, which, despite certain clarifications, does not cease to question their performance, leaving them with a stain for life.



## Hall of Fame Effects

The Baseball Hall of Fame was inaugurated on June 12, 1939, although the main baseball stars were inducted into the hall of fame, the current reality about the use of prohibited substances to artificially increase the possibilities of increasing performance sport, have questioned the true sporting merits of the first great baseball players (Bill, J., 1995; Núñez, E., and Seiner, 2021; Swartz, C, 2009). However, both in the cases of past times and in the current times, many baseball players achieved glory on their own merits, and it would be unfair to think or blame everyone equally. The merits of a baseball player to be inducted into the Hall of Fame continue to be very strict (Boswell, 2015).

With the topic of steroid use coming into the picture during these players' careers and the Mitchell report published in 2007 (Nathan, 2009; Banks, 2020) researching the past use of steroids and human growth hormones, the perception of these achievements has been debated as "controversial for the game of baseball and America's view of the sport".

## Current perspectives, criteria of baseball players on doping and reviews of one of baseball's greats: Mickey Mantle

We must acknowledge the reality that baseball is no longer the same as it was 50, 60 or 70 years ago, many of the players who were once caught and fined for doping have come to recognize their mistake and apologize to fans and families. Many gave statements that were useful in the proceedings and helped to clarify the guilt not only of the players.

Baseball will continue to be the king of sports for many, but like the rest of sports, it will continue to be under the sword of Damocles of doping and additions.

One player who clearly illustrated this dynamic was baseball legend; Mickey Charles Mantle. (Major League Baseball, The Baseball Encyclopedia, 1969; (Nemec, 2006). He was born in Spavinaw, Oklahoma, on October 20, 1931 and died in Dallas, Texas, on August 13, 1995). He was a baseball player, one of the most popular players in the history of the American major leagues. He played his entire professional career for the New York Yankees.

In a written confession left by the player, he acknowledged: "Alcohol has terribly damaged my career."

In his final will, "El Mick " left a handwritten letter addressed to baseball players, friends and family in which he asks the children to stay away from drugs and alcohol, acknowledging that alcohol ruined his career.

## CONCLUSIONS

The history of doping and corruption in baseball is not a new phenomenon and is possibly part of the very beginning of this sport. Although the use of prohibited substances was enhanced during the post-war periods, the era of new designer drugs, hormones and anabolic steroids reached baseball in a similar way to what happened in the rest of sports.



The scandals associated with the production, distribution and use of prohibited substances, sometimes hidden under the pretext of therapeutic and health-preserving use, have involved famous athletes in many sports, and baseball has not been the exception.

Few data are currently published related to the incidence of doping and other negative phenomena that occur in baseball in many countries in which it represents the national sport or pastime. The highest statistics are registered in the Major Leagues and Minor Leagues of the United States, but many cases of doped athletes are registered annually in the domestic leagues.

Although attempts have been made in some countries to develop and implement anti-doping programs, economic and other interests have turned out to be the winning players.

The negative effects of doping have been felt strongly in baseball, where there have been cases of death due to the side effects of drugs.

The World Anti-Doping Agency and the International Olympic Committee have regulated the use of anti-doping controls and the World Anti-Doping Code as mandatory in baseball, although it is known that baseball as a team sport has special characteristics that make it possible to avoid some tests.

Currently baseball is a sport that has been eliminated from the Olympic program, despite the fact that it is practiced in many countries of the world and will only compete in Olympics that are held in countries where this is the national sport.

In Cuba, programs to fight, educate and prevent doping are applied in all sports and categories; however, in this country the phenomenon of doping does not represent a threat to baseball or other sports.

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## REFERENCES

- Benson, M. (1989). Ballparks of North America: A Comprehensive Historical Reference to Baseball Grounds, Yards, and Stadiums, 1845 to Present. En Jefferson, N.C: McFarland. (Eds).  
[https://books.google.com/cu/books/about/Ballparks\\_of\\_North\\_America.html?id=YHITAQAIAAJ&redir\\_esc=y](https://books.google.com/cu/books/about/Ballparks_of_North_America.html?id=YHITAQAIAAJ&redir_esc=y)



- Birzniece, V. (2015). Doping in sport: effects, harm and misconceptions. *Internal Medical Journal*, 45, 239-248. <https://pubmed.ncbi.nlm.nih.gov/25369881/>
- Brave, S. A., Roberts, K. A. (2019). The competitive effects of performance-enhancing drugs: MLB in the posttesting era. *Journal of Sports Economics*, 20, 747781. <https://journals.sagepub.com/doi/abs/10.1177/1527002518817584?journalCode=jsea>
- Brennan, R., Wells, J., & Van Hout, M. C. (2017). The injecting use of image and performance-enhancing drugs (IPED) in the general population: a systematic review. *Health & social care in the community*, 25(5), 1459-1531. <https://doi.org/10.1111/hsc.12326>
- Bryant, H. (2005). *Juicing the game: Drugs, power, and the fight for the soul of Major League Baseball*. New York: Viking. [https://books.google.ps/books?id=c9TtAAAAMAAJ&hl=ar&source=gbs\\_navlinks\\_s](https://books.google.ps/books?id=c9TtAAAAMAAJ&hl=ar&source=gbs_navlinks_s)
- Buechel, B., Emrich, E., Pohlkamp, S. (2016). Nobody's innocent: The role of customers in the doping dilemma. *Journal of Sports Economics*, 17, 767-789. <https://mpa.ub.uni-muenchen.de/44627/>
- Cabrera Oliva, V.M. (2013a). *Dopaje y drogas*. Deportes (Ed.), La Habana, Cuba. <https://dialnet.unirioja.es/servlet/libro?codigo=735849>
- Cabrera Oliva, V.M. (2013b). *Control de calidad en la determinación de sustancias doping y drogas de abuso*. Deportes (Ed.), La Habana, Cuba.
- Canseco, J. (2005). *Juiced: Wild Times, Rampant `Roids, Smash Hits and How Baseball Got Big*, William Morrow, Harper Collins Publishers, New York, NY. [https://books.google.com.cu/books/about/El\\_Hombre\\_Quimico.html?id=pVVuLbO8njUC&source=kp\\_book\\_description&redir\\_esc=y](https://books.google.com.cu/books/about/El_Hombre_Quimico.html?id=pVVuLbO8njUC&source=kp_book_description&redir_esc=y)
- Carroll, W. (2005). *The Juice: La verdadera historia de los problemas de drogas del béisbol*. En Ivan R. Dee. (Ed), ISBN 1-56663-668-X.
- Cisyk, J. (2020). Impacts of Performance-Enhancing Drug Suspensions on the Demand for Major League Baseball. *Journal of Sports Economics*, 21(4), 391-419, DOI: 10.1177/1527002520906529. <https://journals.sagepub.com/doi/abs/10.1177/1527002520906529?journalCode=jsea>
- Elfrink, T., Garcia-Roberts, G. (2014). *Blood Sport: Alex Rodriguez, Biogenesis and the Quest to End Baseball's Steroid Era*, Dutton, Penguin Books, New York, NY, 2014. ISBN 978-0525954637 [https://books.google.com.cu/books/about/Blood\\_Sport.html?id=V\\_wnwEACAAJ&redir\\_esc=y](https://books.google.com.cu/books/about/Blood_Sport.html?id=V_wnwEACAAJ&redir_esc=y)
- Elks, J. (2014). *The Dictionary of Drugs: Chemical Data: Chemical Data, Structures and Bibliographies*. Springer. pp. 781-. ISBN 978-1-4757-2085-3. <https://link.springer.com/book/10.1007/978-1-4757-2085-3>



- Erickson, B.J., Yanke, A., Monson, B., Romeo, A. (2015). The Effect of the Steroid Era on Major League Baseball Hitters: Did It Enhance Hitting?. *J Sports Med Doping Stud* 5: 161. doi:10.4172/2161-0673.1000161. <https://www.hilarispublisher.com/open-access/the-effect-of-the-steroid-era-on-major-league-baseball-hitters-did-it-enhance-hitting-2161-0673-1000161.pdf>
- Fidler, D.P., Marcano, G. A. (2007). Fighting Baseball Doping in Latin America: A Critical Analysis of Major League Baseball's Drug Prevention and Treatment Program in the Dominican Republic and Venezuela. *Articles by Maurer Faculty*. 372. <https://www.repository.law.indiana.edu/facpub/372>
- González, E.R. (1999). *The Pride of Havana: A History of Cuban Baseball*. Editorial: OUP USA; Illustrated edición; ISBN-10 : 0195146050. [https://books.google.com/cu/books/about/The\\_Pride\\_of\\_Havana.html?id=vSXRd4C3ihEC&redir\\_esc=y](https://books.google.com/cu/books/about/The_Pride_of_Havana.html?id=vSXRd4C3ihEC&redir_esc=y)
- Hank, A., Wheeler, L. *I Had a Hamme*. (1992). The Hank Aaron Story, Harper Collins, pp. 268.
- Henderson R.W. (1939). *Baseball and Rounders*. En *The New York Public Library* (Ed.), New York.
- Hildebrandt, T., Langenbucher, J. W., Carr, S. J., & Sanjuan, P. (2007). Modeling population heterogeneity in appearance- and performance-enhancing drug (APED) use: Applications of mixture modeling in 400 regular APED users. *Journal of Abnormal Psychology*, 116(4), 717-733. <https://doi.org/10.1037/0021-843X.116.4.717>
- Holt, R.I.G., Ken K Y Ho, K.K.Y. (2019). The Use and Abuse of Growth Hormone in Sports. *Endocrine Reviews*, 40(4), 1163-1185, <https://doi.org/10.1210/er.2018-00265>
- Kanayama, G., & Pope, H. G., Jr (2018). History and epidemiology of anabolic androgens in athletes and non-athletes. *Molecular and cellular endocrinology*, 464, 413. <https://doi.org/10.1016/j.mce.2017.02.039>
- yser, B., Broers, B. (2012). The Olympics and harm reduction?. *Harm Reduct J.*, 13, 9-33. doi: 10.1186/1477-7517-9-33. <https://harmreductionjournal.biomedcentral.com/articles/10.1186/1477-7517-9-33>
- Meyer, P. (2008). BALCO, the Steroids Scandal, and What the Already Fragile Secrecy of Federal Grand Juries Means to the Debate over a Potential Federal Media Shield Law. *Indiana Law Journal*, 83 (Iss. 4), Article 18. <https://www.repository.law.indiana.edu/ilj/vol83/iss4/18>.
- Millán, Aguilar-Navarro., Muñoz-Guerra, J., M.M, Plata, Juan Del Coso. (2020). Analysis of doping control test results in individual and team sports from 2003 to 2015. *Journal of Sport and Health Science*. 9(2), 160-169. <https://www.sciencedirect.com/science/article/pii/S209525461930095X>



- Mitchell, G. J. (2007). Report to the Commissioner of Baseball of an Independent Investigation into the Illegal Use of Steroids and Other Performance Enhancing Substances by Players in Major League Baseball, <http://mlb.mlb.com/mlb/news/mitchell>.
- Nathan, A.M. (2009). The Possible Effect of Steroids on Home-Run Production, in The Baseball Research Journal, SABR. 38(1), 36-38. <http://baseball.physics.illinois.edu/BRJ-Steroids-v3.pdf>
- Nemec, D. (2006). The Great Encyclopedia of Nineteenth Century Major League Baseball. 2nd ed. Tuscaloosa, Ala: University of Alabama Press. <https://library.villanova.edu/Find/Record/1746563/Similar>
- Peterson, H. (1973). The Man Who Invented Baseball, New York: Charles Scribner's Sons.(Ed.), ISBN 978-0-684-13185-6.
- Piacentino, D., Georgios, D. K., (2015). Anabolic-androgenic Steroid use and Psychopathology in Athletes. A Systematic Review. Current Neuropharmacol 13(1) 101-121, <https://doi.org/10.2174/1570159x13666141210222725>.
- Plata, N. (2006). ¿Cuánto nos dicen las estadísticas acerca de los esteroides. En Keri, Jonah. Béisbol entre los números. Nueva York: Basic Books. pp. 326342. ISBN 0-465-00596-9.
- Prokop L. The struggle against doping and its history. The Journal of Sports Medicine and Physical Fitness. 1970, 10(1), 45-48. PMID: 4912894. <https://pubmed.ncbi.nlm.nih.gov/4912894/>
- Rao, P. K., Boulet, S. L., Mehta, A., Hotaling, J., Eisenberg, M. L., Honig, S. C., et al. (2017). Trends in Testosterone Replacement Therapy Use from 2003 to 2013 among Reproductive-Age Men in the United States. The Journal of urology, 197(4), 1121-1126. <https://doi.org/10.1016/j.juro.2016.10.063>
- Rosen, D. M. (2008). Dope: a history of performance enhancement in sports from the nineteenth century to today. ABC-CLIO, Praeger (Ed), 264pp. [https://books.google.com/cu/books/about/Dope.html?id=yCzbk7F8DGgC&redir\\_esc=y](https://books.google.com/cu/books/about/Dope.html?id=yCzbk7F8DGgC&redir_esc=y)
- Thevis, M., Kuuranne, T., Geyer, H. (2018). Annual banned-substance review: Analytical approaches in human sports drug testing. Drug Test Anal. 10(1), 927. <https://pubmed.ncbi.nlm.nih.gov/29149502/>
- Thorn, J. (2011). Baseball in the Garden of Eden. The Secret History of the Early Game. New York: Simon & Schuster. [https://books.google.com/cu/books/about/Baseball\\_in\\_the\\_Garden\\_of\\_Eden.html?id=gqF84JTKCNoC&redir\\_esc=y](https://books.google.com/cu/books/about/Baseball_in_the_Garden_of_Eden.html?id=gqF84JTKCNoC&redir_esc=y)
- Tynes, J. R. (2006). Performance enhancing substances: Effects, regulations, and the pervasive efforts to control doping in Major League Baseball. J Leg Med. 27(4), 493-509.doi: 10.1080/01947640601021113.



Yesalis, C., Anderson, W., Buckley, W., & Wright, J. (1990). Incidence of the non-medical use of anabolic-androgenic steroids. In G. Lin & L. Erinoff (Eds.), *Anabolic steroid abuse* (National Institute on Drug Abuse Research Monograph Series No. 102) (pp. 97-112). Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, and Alcohol, Drug Abuse, and Mental Health Administration. <https://nida.nih.gov/publications/drugfacts/anabolic-steroids>

Yesalis, C., & Bahrke, M. (2003). History of Doping in Sport. *International Sports Studies*, 24(1), pp.42-76  
<https://www.doping.nl/media/kb/6495/Yesalis%20et%20al%202002.pdf>

**Conflict of interests:**

The authors declare not to have any interest conflicts.

**Authors contribution:**

**Victor M Cabrera Oliva:** Writing the original draft, annotating the bibliography, final review, writing, editing and proofreading the manuscript.

**Pablo Castillo Díaz:** Search and collection of information, theoretical conceptualization.



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