



RESEARCH ARTICLE

Ethical Challenges of Cyborgization in Disabled Sports: The Case of Oscar Pistorius

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ABSTRACT

The aim of this study is to explore the ethical issues that may arise from the use of equipment in disability sport and to examine the extent to which technology is necessary for a disabled person to play their sport and when it provides an unfair advantage. This study was designed as a qualitative study. For the research, information was collected and analyzed by scanning documents in the field. Document analysis is a qualitative research method used to rigorously and systematically analyze the content of written documents. Document analysis is a systematic method of examining and evaluating all documents, both printed and electronic materials. Like other methods of qualitative research, document analysis requires the examination and interpretation of data in order to make sense of it, create an understanding of the subject matter and develop empirical knowledge. In disability sport, athletes often rely on some form of equipment to enable and maintain the activities of daily living, including the ability to participate in sport. Determining exactly when technology supports athletic performance and when it alters or distorts it presents a philosophical and ethical dilemma. There is thought to be a fine line between banning augmentative technology because it gives disabled athletes an unfair advantage and promoting their right to access equipment that provides equal opportunities. In summary, prosthetic leg technology has made great strides for amputee athletes and enables many people with disabilities to participate in sport. However, it is difficult for everyone to have access to the same advanced technology. The cost of prosthetic legs can be high and access to this technology can be limited in some countries or regions. For this reason, some athletes have access to advanced technology, while others unfortunately have limited resources. The Oscar Pistorius case, as mentioned earlier, has become a very complex issue. Some people believe that the prosthetic legs have given him an advantage, while others believe the opposite. Therefore, it is felt that more research should be done on the subject and the necessary regulations can be put in place for a fair racing environment.

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INTRODUCTION

Disability is one of the factors that make it difficult for individuals to adapt to the life they lead. Disability is defined as the limitation or inability to fulfill roles due to gender, age and social factors, due to deficits, inadequacies or disabilities due to physiological, anatomical, mental or psychological

factors (Uslu, 2016). In terms of the degree of disability, people are affected by being restricted in their movements, facing incompatibility problems due to lack of sensory satisfaction and lagging behind other people in social relationships (Tekkurşun et al., 2018). There are different classifications of disabilities. In the most general form, these are mental disabilities, physical disabilities, hearing disabilities and visual disabilities (Akay, 2008).

Although the concept of disability is used interchangeably with the words handicapped and disabled, they have different meanings. For example, the term "disabled" is a concept that requires "disability" to be the focus, i.e. to objectify the phenomenon of disability. On the other hand, disability or incapacity seems to be a term that softens our notions and provides flexibility to get rid of the current constraining situation over time, if not immediately (Kara, 2016). Sporting activities are important for people with disabilities in order to better express themselves in social life and improve their interactions with other people in a positive way. In this sense, especially physical education and sports activities enable disabled people to control emotions such as anger, aggression or jealousy caused by both the moods caused by their disability and the negative attitudes of other people in society towards them, and help disabled people in this regard (Kinalı, 2003, p.244). It is recognized that sport is an important factor in the socialization of individuals as it enables them to participate in a social environment. Through sporting activities, it is possible for individuals to leave their own world and be in the same environment with other people from different cultures and with different beliefs, influencing them and being influenced by them at the same time. Therefore, considering that this aspect of sport supports both the creation of new friendships and the development of these friendships and thus social cohesion, it can be said that it plays a very important role, especially in the inclusion of disabled people in society (Yetim, 2005, p.119). In this direction, it can be assumed that sport is an important factor when it comes to positively influencing the physical activity, inclusion and rehabilitation processes of people with disabilities. For example, it has been shown that games and physical activities play a very important role in the growth and development phase for both healthy and disabled children. In particular, the participation of children with disabilities in sports and recreational activities is said to have a positive effect on their socialization and also a positive effect on their ability to use their physical functions better (Murphy & Carbone, 2008). Therefore, it can be said that participation in sports activities is important to enable more comfortable and easier physical activity and to fulfill the necessary functions.

In the sports sectors for disabled people, certain rules are established and competitions are held according to these rules by classifying them according to their disability status. Disabled people who play sport professionally within a particular discipline, in addition to the benefits of regular physical activity, also pay attention to their diet and sleep patterns in everyday life and avoid bad habits such as alcohol and smoking. Thus, the complications caused by these habits are minimized (Yalçın, 2015). The importance of sports activities for the rehabilitation of disabled people is undoubtedly undisputed. Sports activities are very important both for their integration into society and for their good relationships with themselves (Çeviker, 2018). An event is not carried out directly in a professional manner. Generally, a certain amount of time must pass. Only after a certain time, after a new activity has emerged, is it practiced as a professional activity (Argan & Katırcı, 2008). Similarly, disability sport is primarily an activity practiced during the treatment and recovery process. However, over time, it has evolved into a sporting activity with different branches and undertakings. As is well known, sporting activities are practiced for various purposes. These purposes can range from recreation, fun and entertainment to health protection, physical exercise, socializing or financial gain (Amman, 2005, 28). The aim of disability sport is to rehabilitate disabled people and integrate them into society. In this sense, the aim of rehabilitation is to ensure positive development in the medical, mental and social areas of the disabled person (Konar, 2011).

All this requires that the training programs used to develop the performance of disabled athletes must be compatible with their medical conditions. Because in this way, the risk of injury of disabled

athletes is minimized and maximizing their performance (İnal, 2011). For this reason, measures and methods that minimize the possibility of injury should be used when training disabled athletes.

The word ethics is derived from ethos, a word of Greek origin. The root of the word ethos is ethika and its plural form is ethe. The first known meaning of ethos is "the place of a living being, the place where it always goes and takes refuge" (Kuçuradi, 1997). Ethics is the discipline that critically distinguishes and examines the actions, values, intentions and beliefs of individuals as good-bad, right-wrong (Thiroux & Krasemann, 2014, p.2). Ethics is a philosophical discipline that examines the foundations and qualities of moral values that exist in society and that are evaluated/described as right-wrong, good-bad (Girgin, 2001).

Most diagnoses of ethics have the following in common: Ethics is a branch of philosophy based on certain values and norms (Dolaşır, 2006). Actions, practices or principles are given an ethical value because of the reasons that justify and support them. Therefore, individuals must decide what their duties, rights and obligations are. However, due to conflicting interests, it is often not easy to make decisions about actions, goals and duties (Satyanarayana, 2010, p.10). (Satyanarayana, 2010, p.10) Therefore, the decisions individuals make or the actions they take based on their competencies are subject to ethical evaluation.

Ethics appears in every area in which there are people. Sport is one of these areas. It is known that the global sports industry has reached a value of 1.5 trillion dollars and its brand value is increasing day by day (Dumont, 2017). Day by day, this growth of the sports industry leads to the emergence of undesirable problems in moral or ethical terms. This situation prepares the ground for sports to move away from its very essence and go back to business as usual in an undesirable way. Therefore, the emergence of ethical problems in the field of sport seems inevitable.

Today, sport has become an important area of political, economic or cultural competition between countries. This situation, i.e. the competitive side of sport, does indeed lead to people connecting with each other and forming friendships. On the other hand, it has also led to disputes arising from the competition between individuals and the countries they belong to (Özcan & Çavuşoğlu, 2016). When we examine the concept of sport, first of all, it is an activity that brings with it positive concepts such as peace, equality, tolerance, virtue, discipline, justice, love, respect and happiness, but also negative concepts such as grief, stress, sadness, despair, etc., which are the opposite of these (Sarıakçalı et al., 2020; Sarıakçalı et al., 2021; Ceylan et al., 2022; Sarıakçalı et al., 2022; Küçük & Ceylan, 2022; Karadeniz et al., 2024). With all these aspects, sport is of course a phenomenon that affects both the entire human existence and the entire existence of people (Pehlivan, 2004; Çakıroğlu, 2022; Isık & Ozer, 2022; Oztas & Vural, 2023).

Sports ethics aims to ensure that the actors of sport, who play a very important role in the development and progress of sport, fulfill their duties, powers and responsibilities in accordance with universal values such as justice, impartiality, honesty and respect (Dolaşır, 2006). Morality in sports can be exemplified by behaviors such as equality of opportunity, not giving an unfair advantage, not considering the opponent as an enemy, acting in accordance with cooperation and team spirit, acting in accordance with friendship and empathy (Balçıkanlı, 2017). While sport is defined as a social bond that includes values suitable for sport such as peace, brotherhood, love and respect and thus can bring together almost all segments of society, the structure and perception of sport has changed with the concretization of the perception of winning and losing thanks to the deepening and adoption of the phenomenon of competition, in addition to the economic evaluation of competition (Yücel et al., 2015).

Sport is considered one of the most ideal means of developing one's talents and abilities. However, as it has become a field that is all about winning, it raises concerns about the current sports culture and leads to the rise of unethical behaviors in sports (Murray, 2014). Ethics is a discipline of

philosophy that morally examines, analyzes and evaluates phenomena such as values, norms, rules, right and wrong or good and bad, which form the basis of individual and social relationships. As mentioned earlier, ethics is the classification of all activities and goals in life, knowing what one should or should not do, what one wants or does not want, what one should or should not have. As can be seen, the concept of ethics is a social concept like disability. Considering the social nature of the concepts of disability and ethics, or the fact that the focus of both concepts is to regulate social life through the behavior of individuals, a third concept called "disability ethics" emerges. Disability ethics is an area that requires the adaptation of ethical issues to situations involving people with disabilities and multidisciplinary work. The concept of disability ethics, which brings together many fields such as medicine, social sciences, ethics and law, aims to develop the understanding of "living together with differences" by interpreting disadvantaged situations arising from disability in social life in accordance with social norms (Şahin, 2017, p.7-8). As can be seen from the definition, this concept can be said to apply to any area where disability is involved.

METHOD

This study was designed as qualitative research. For the research, information was collected and analyzed by scanning the documents on site. Document analysis is a qualitative research method used to rigorously and systematically analyze the content of written documents (Wach, 2013). Document analysis is a systematic method for examining and evaluating all documents, both printed and electronic materials. Like other qualitative research methods, document analysis requires the examination and interpretation of data in order to make sense of it, create an understanding of the subject matter, and develop empirical knowledge (Corbin & Strauss, 2008).

Oscar Pistorius

In Paralympic sports, athletes often rely on some form of equipment to enable the activities of daily living, including the ability to participate in sport. Determining exactly when technology supports athletic performance and when it alters or distorts it presents a philosophical and ethical dilemma. There is thought to be a fine line between banning assistive technology because it gives disabled athletes an unfair advantage and at the same time promoting their right to access equipment that provides equal opportunities. It is unclear to what extent the technology is necessary for a person with a disability to play their sport and when it creates an unfair advantage (Burkett, McNamee & Potthast, 2011).

Until recently, disability was seen as a significant limitation to athletic performance. But technological innovation is now closing this gap. In selected individuals such as Oscar Pistorius, technology is approaching a stage where the disabled athlete can overcome natural limitations (Lippi & Mattiuzzi, 2008). According to McNamee (2016), "the International Paralympic Committee (IPC) sets out four values: courage, determination, inspiration and equality. While courage is undoubtedly a moral virtue, there are several concepts in this context that can influence Paralympism in both active and passive contexts. Determination is an instrumental character trait that is not necessarily ethically praiseworthy. While the efforts and abilities of Paralympic athletes can be inspiring, they need not depend on the reception of spectators over whom they have no control. It is also recognized that this is an important ethical idea, although it is not clear what kind of ethical idea it is. Mostly it is about how to realize equality in sport in terms of access to expensive technology, which is a prerequisite for Paralympic sporting success. The conclusion is that the Paralympic movement has not yet made a sufficient intellectual effort to formulate its ethical foundations and that these four values, while relevant to Paralympism, are not sufficient to formulate the concept.

The International Association of Athletics Federations (IAAF) prohibits 'the use of technical devices containing springs, wheels or other elements that give the user an advantage over another athlete who does not use such a device' (IAAF). Oscar Pistorius, a South African Paralympic athlete, is one of

the most controversial figures in this issue. Oscar Pistorius, a disabled athlete, is a bilateral transtibial amputee and runs with state-of-the-art prosthetic legs.

The question of whether Oscar Pistorius' situation violates the above rule has been raised and has sparked serious debate. Studies have been conducted to determine whether the technological assistance on which Pistorius' performance was based merely neutralized his disability, made the competition fairer or actually gave him an unfair advantage (Burkett et al., 2011). Technology is seen as a technical tool or a means to achieve certain goals. According to this view, technology is ethically neutral, i.e. in other words, technology in itself is neither good nor bad. While devices such as prostheses or wheelchairs are essential for some people with disabilities to maintain their daily lives (Haisma et al. 2006; Pasquina et al. 2006), advances in this technology, such as energy-storing prosthetic feet, can make the gait of a transtibial amputee faster and more efficient (Brodtkorb et al. 2008; Nolan and Lees 2000).

As the world record holder in the 100 meters, 200 meters and 400 meters at the Paralympics, Oscar's dream is to qualify for the Olympic Games in Beijing. However, the International Association of Athletics Federations has banned the prostheses and the International Olympic Committee has confirmed this decision. The IAAF's decision is based on a statement by German professor Gert Peter Brüggemann, who carried out tests on them. The tests showed that prostheses and blades could give the 21-year-old double amputee sprinter a competitive advantage. According to Professor Brüggemann, Pistorius' energy consumption is lower than that of able-bodied athletes at the same speed, so that he can achieve significant advantages, possibly more than 30%, over athletes without prostheses. In practice, athletes with prostheses require less additional energy than other athletes when the runner takes a certain stride. In a way, what the IAAF has done is an expected outcome. After all, in 2007 the IAAF banned the use of any "technical aids" that give one athlete an advantage over another. Both the IAAF and the International Olympic Committee are committed to ensuring fair competition. Most international governing bodies share the view that any sporting practice should be banned if it causes injury or gives an athlete an unfair technical or sporting advantage that is too expensive or too innovative for many other competitors (Lippi & Mattiuzzi, 2008). In addition, Brüggemann et al. (2008) found that lower external joint moments at the knee and hip joint, lower mechanical work at the knee joint during stance, lower energy loss at the prosthetic ankle joint, and lower total body mechanical work at each ground contact lead to the assumption that running is better. Custom-made prostheses allow double below-knee amputee sprinters to run at the same level of performance as healthy controls, but at a lower metabolic cost. Furthermore, the disadvantage of accelerating off the starting block (Willwacher et al., 2016; Taboga et al., 2014) and the advantage of the energy return of prostheses when running at maximal speed (Beck et al., 2018; Brüggemann et al., 2008; Hobara et al., 2016) have been demonstrated compared to running in non-disabled individuals. Based on this information and some additional data, the IAAF decided that Pistorius should not participate in the 2008 Olympic Games in Beijing. The Court of Arbitration for Sport (CAS) overturned this decision on legal grounds. However, Oscar Pistorius was unable to take part in the Beijing Games because he did not meet the qualification criteria for the 400 m sprint (Potthast and Brüggemann, 2010). The use of prostheses in running competitions has attracted considerable attention since Pistorius represented South Africa in the 400 m sprint at the 2012 London Olympics, following scientific controversy over the performance of prosthetic aids (Brüggemann et al., 2008; Weyand et al., 2009).

In 2011, Pistorius set a personal best of 45.07 seconds over 400 meters at the World Championships and the Olympic qualifying standard A. At the 2011 World Championships in Daegu, he reached the semi-finals of the 400-meter individual medley and won a silver medal after running in the qualifying for South Africa's 4x400-meter relay. On July 4, 2012, the South African Athletic Association and the Olympic Committee named him to the Olympic team for London 2012. Pistorius was the first amputee runner to compete at the Olympics. He reached the semi-finals of the 400 meter individual medley

and finished eighth in the relay final. At the closing ceremony, he was chosen to carry the South African flag in the stadium, where he will return for the Paralympics starting in 17 days. Less than six months after the London 2012 Paralympics, Oscar Pistorius was investigated for the murder of his girlfriend Reeva Steenkamp (Rowbottom, 2022). Pistorius was initially convicted of "involuntary manslaughter" and then the course of the trial was changed to "premeditated but not planned murder". In this context, South Africa's Supreme Court of Appeal reviewed the sentence for Pistorius, who had previously been sentenced to 6 years in prison, following an appeal by the prosecution and increased his sentence to 13 years and 5 months in 2017. Pistorius, who was released on parole in November 2023 and is now 37 years old, has spent almost nine years in prison. In South Africa, serious criminals have the right to parole after serving at least half of their sentence. The South African Department of Corrections announced that South African Paralympic athlete Pistorius has been released from prison on parole and is now home (Euronews & AP, 2024).

The International Olympic Committee called the incident "a human tragedy for the family of Reeva Steenkamp and also for Oscar Pistorius", but declined to comment on his eligibility. "We hope that time will bring comfort to all those affected, but we cannot comment further at this time," said IOC spokesman Mark Adams. The International Association of Athletics Federations said, "The IAAF has no comment to make on Oscar Pistorius." (USA TODAY, 2014).

Media reports about Oscar Pistorius

Scientists gathered at Rice University to conduct a study to understand the effects of the prosthetics on Pistorius' body. Scientists including Peter Weyand, Rodger Kram, Hugh Herr and other experts measured Pistorius' oxygen consumption, leg movement, ground strength and endurance. They also examined the time it took him to straighten his leg. This is defined as the time it takes Pistorius to swing his leg from back to front. A few months later, in an article published in the *Journal of Applied Physiology*, the team described their conclusion that Pistorius was "physiologically similar but mechanically different" to a person walking with intact legs. He uses oxygen in the same way as a runner with natural legs, but moves his body differently. It was only later that scientific debates on this topic were resumed.

The members of the team that published the paper had very different ideas about what exactly "mechanically different" meant. For example, one group felt that Pistorius' differences put him on the same level as other athletes, while another felt that Pistorius was mechanically different in a way that gave him a serious competitive advantage. One of the biggest points of contention is the time it takes to reposition the limbs. The average elite male sprinter moves his leg from back to front in 0.37 seconds. The five most recent world record holders in the 100-meter dash took an average of 0.34 seconds. Pistorius swings his leg in 0.28 seconds. This is mainly due to the fact that the prosthesis (that of the Cheetah) weighs less than a normal human leg. While his competitors swing the lower leg, which weighs around 5.7 kilograms, Pistorius's lower leg weighs just 2.4 kilograms (Eveleth, 2012).

Are Oscar Pistorius' prosthetic legs an unfair advantage? Herr, the inventor of the advanced prosthetics, says his tests show that the Cheetah Flex-Foot put Oscar on par with his competitors. "We ran energy tests to see how much oxygen Oscar used. We looked at fatigue rate; we looked at biomechanics, how much force he was exerting, stride length and stride frequency." He also said: "People claimed that Oscar had an unnatural fatigue rate and that his artificial legs gave him extra endurance." Tests show that this is not the case. "To measure the fatigue rate, you take a treadmill and turn it on at a certain speed. He jumps off and starts running and you measure how long he can maintain that speed. You do this at different speeds and then record the normalized speed. You get a curve over time. Many athletes who sprint follow a similar curve. We have seen that Oscar follows the same trend." This means that he gets just as tired with his blades as everyone else does with their

calves and ankles. In their experiments, Herr and his colleagues concluded that Pistorius moves his body slightly differently than other athletes, but uses the same amount of energy and oxygen. His lightweight carbon blades swing back and forth slightly faster than most of his competitors swing their heavier legs, but he still has to push off harder on the ground to get the same thrust; overall, these factors seem to balance each other out (Wolchover, 2012).

The International Association of Athletics Federations has decided that double amputee Oscar Pistorius will not be allowed to take part in the Olympic Games. The IAAF announced the results of a two-day independent investigation into whether Pistorius' running prostheses give him an unfair advantage over other athletes: "The South African's "Cheetah" running prostheses are intended as a technical aid and are therefore clearly in breach of IAAF rules, which means that he is effectively excluded from competing against non-disabled athletes. It is obvious that an athlete using the prosthesis can run at the same speed as a healthy athlete while with less energy. Furthermore, running with prosthetic blades results in less vertical movement and less mechanical work to lift the body. In addition, the energy loss in the blade when sprinting at maximum speed is significantly lower than in human ankles. An athlete using this prosthetic blade has a demonstrable mechanical advantage (more than 30%) compared to someone not using the blade" (Bull, 2008).

Alena M. Grabowski, a professor of physiology and biomechanics who was part of a research group that investigated whether Pistorius' prostheses gave him an advantage after he was banned from the 2008 Olympics, concluded that the length of the prosthesis had no effect on running speed. In their opinion, the stiffness helps runners, but at high running speeds the effects are negligible. Therefore, the benefits of a prosthesis are more likely to be seen in long-distance running than in sprinting. Based on these research findings, Grabowski hopes that future prosthetic development can be better tailored to the specific abilities of the user prior to amputation. The world of prostheses opens up the possibility for many amputees to run in a barrier-free society. While many are still skeptical about the use of prostheses in competition, especially in running, there is evidence that these effects are minimal or non-existent in short distance runners. With the help of researchers like Alena Grabowski, more athletes like Oscar Pistorius are taking big steps into the future, and hopefully they will be successful (Schoolman, 2019).

DISCUSSION AND CONCLUSION

Most sports participants accept procedural justice in sport at some level. This is what athletes commit to in any competition when they play by the rules. Of course, this understanding does not take into account the full range of fairness and ethical considerations in sport. In the case of Paralympic sport, where technology cannot be completely eliminated, the concern for procedural justice should be complemented by a concern for outcome-based justice, particularly background justice. It is clear that the IPC's equipment policy is an important step in the right direction to distribute success primarily on the basis of physical strength. This is a meritocratic norm that should exist in all sports. However, it is not clear whether its criteria of fairness and universality work effectively enough to guarantee a fair level playing field for all para-athletes (McNamee, Parnell & Vanlandewijck, 2021).

A series of debates about whether Oscar's situation is fair or not has subsequently developed. Do Pistorius' legs give him an unfair advantage? Will he hurt other athletes if he falls while running, as one commentator warned? At a time when there are many concerns about the use of technology (including doping) in sport, whether it is fair to say that Pistorius can be considered an athlete whose potential success can be attributed to his body (like the bodies of his able-bodied competitors) is a common question that needs to be answered.

If there is any reason to believe that Pistorius' prostheses gave him some unfair advantage when he competed in athletics - and there are reports that this was the case - then surely there is a similar, if

not greater, risk of unfair competition. After all, they have given him an advantage in every Paralympic competition he has ever competed in. Is it the harsh reality that the IAAF's attitude towards Paralympic competitions, on closer inspection, reflects a laissez faire attitude that has nothing to do with the seriousness of the competition? The image of Paralympic athletics that immediately comes to mind with this question begs the question that 'participation' is the 'most important thing' and the question of who wins the prizes is not so important. Or does the IAAF have undiscovered or unexplored difficulties in setting boundaries in its competition rules for athletes with disabilities (Swartz and Watermeyer, 2008)?

The use of increasingly sophisticated technologies in Paralympic sport is significantly altering results and can therefore undermine fairness in competition. For example, mobile prostheses are very expensive. Most modern prostheses are made of composite materials, but the quality and weight of these materials vary considerably. We can distinguish between non-specialised prostheses designed with athletic performance in mind and prostheses customised for specific athletes (McNamee et al., 2021).

Jones and Wilson (2009) analyzed the concept of unfairness and found that it is difficult to categorize the advantages that often occur in sport into fair and unfair categories. It was also argued that sporting performance is a complex and multifaceted thing that cannot be easily determined or measured.

Is access to this technology widespread enough in terms of equality or social justice so that all athletes with similar abilities can realize or exploit their potential through its use? The question of setting precedents in the use of technology is a difficult one. One of the clear roles of sports regulators is to articulate the nature of sporting competition to determine whether a particular proposed technology usurps it. For example, is Oscar Pistorius really running (Edwards, 2008). This is not a simple empirical question that can be answered by biomechanical analysis alone. In contrast, an important feature of the case of Oscar Pistorius is that it raises issues of equality beyond the technologically advanced Western world. Developed countries should have access to both the materials and the knowledge behind the technology and can therefore adapt it to their specific requirements if competitions are to fully meet the conditions of fair play that are so important to the health and future of sport. These developments could have far-reaching implications for Paralympic athletes. Not only will they become more 'functionally efficient' with their new assistive anatomy, but this new level of functionality may also enable greater efficiency in everyday tasks through more effective performance in competition (Burkett, McNamee and Potthast, 2011).

One potential solution to this problem is to standardize this technology so that all athletes have access to the same equipment (Loland, 2002). However, it is incumbent upon the IPC and other disability sport regulators to develop transparent guidelines that ensure a reasonably level playing field for the different assistive devices for all athletes representing all countries worldwide (Burkett et al., 2011).

In summary, prosthetic leg technology has made great strides for amputee athletes, enabling many disabled people to participate in sport. However, it is difficult to provide equal access to this advanced technology for all people. The cost of prosthetic legs can be high and access to this technology can be limited in some countries or regions. For this reason, some athletes have access to advanced technology, while others unfortunately have limited resources. The case of Oscar Pistorius, as mentioned earlier, has become a very complex issue. Some people believe that the prosthetic legs have given him an advantage, while others believe the opposite. Therefore, it is felt that more research should be done on the subject and the necessary regulations can be put in place for a fair racing environment.

REFERENCES

- Akay, V. (2008). *İşitme engellilerde beden eğitimi spor ve rekreasyon aktivitelerinin eğitim bütünlüğü açısından incelenmesi ve değerlendirilmesi*, (Yüksek Lisans Tezi), Kütahya:Dumlupınar Üniversitesi, Sosyal Bilimler Enstitüsü.
- Amman, M.T. (2005). *Kadın ve Spor*. İstanbul: Morpa Kültür Yayınları.
- Argan, M. ve Katırcı, H. (2008). *Spor Pazarlaması*. Ankara: Nobel Yayın Dağıtım.
- Balçıklı, G.S. (2017). Yarışma sporlarının ahlaksal amacı. *Spor ve Performans Araştırmaları Dergisi*, 8(1): 47-51.
- Beck, O.N. & Grabowski, A.M. (2018). The biomechanics of the fastest sprinter with a unilateral transtibial amputation. *Journal of Applied Physiology*, 1;124(3), 641-645.
- Brodtkorb, T., M. Henriksson, K. Johannesen-Munk, & F. Thidell. (2008). Cost-effectiveness of c-leg compared with non-microprocessor-controlled knees: A modeling approach. *Archives of Physical Medicine and Rehabilitation*, 89, 24–30.
- Brüggemann, G-P, Arampatzis A, Emrich F, & Potthast W. (2008). Biomechanics of double transtibial amputee sprinting using dedicated sprinting prostheses. *Sports Technology*. 1(4-5):220-7.
- Bull, A. (2008). *Pistorius's unfair advantage keeps him out of Olympics*. <https://www.theguardian.com/sport/2008/jan/14/athletics.andybull>) Erişim tarihi: 03.02.2024
- Burkett, B., McNamee, M. & Potthast, W. (2011). Shifting boundaries in sports technology and disability: equal rights or unfair advantage in the case of Oscar Pistorius?, *Disability & Society*, 26:5, 643-654, DOI: 10.1080/09687599.2011.589197
- Ceylan, L., Akkaya Boyraz, D. E., Çaldıran, S., Ceylan, T., & Küçük, H. (2022). Examination of nutrition knowledge levels of individuals who received sports training. *International Journal of Life Science and Pharma Research*, 12(5), 11–17. <https://doi.org/10.22376/ijpbs/lpr.2022.12.5.L11-17>
- Corbin, J. & Strauss, A. (2008). Basics of qualitative research: techniques and procedures for developing
- Çakıroğlu, T. (2022). Negative effects of inactivity on human health. *Journal of ROL Sport Sciences*, 3(1), 99–114. <https://doi.org/10.29228/roljournal.57818>
- Çeviker, A. (2018). *Sporda Antrenörlük Meslek Etiği (Bedensel Engelli Sporlar Örneği)*. Akademisyen Kitabevi.
- Dolaşır, S. (2006). *Antrenörlük Etiği ve İlkeleri*. Ankara: Gazi Kitabevi.
- Dumont, G. (2017). *The Ethics Of Neuromarketing In Sports*. In *Ethics And Neuromarketing* (Pp. 187-196). Springer International Publishing.
- Edwards, S.D. (2008). Should Oscar Pistorius be excluded from the 2008 olympic games? *Sport, Ethics and Philosophy*, 2(2), 112–25.
- Euronews. (2024). *Athlete Oscar Pistorius released from prison, say authorities*, <https://www.euronews.com/2024/01/05/athlete-oscar-pistorius-has-been-released-from-prison-say-authorities> erişim:02.02.2024
- Eveleth, R. (2012). *Does Double-Amputee Oscar Pistorius Have an Unfair Advantage at the 2012 Olympic Games?*, <https://www.smithsonianmag.com/summerolympics/does-double-amputee-oscar-pistorius-have-an-unfair-advantage-at-the-2012-olympic-games-2655123/> Erişim tarihi: 03.02.2024
- Girgin, A. (2000). *Yazılı Basında Haber ve Habercilik Etik'i*. İstanbul. İnkılap grounded theory (3rd ed.). *Sage Publications, Inc*. <https://doi.org/10.4135/9781452230153>
- Haisma, J., L. Van Der Woude, H. Stam, M. Bergen, T. Sluis, & J. Bussmann. (2006). Physical capacity in wheelchair-dependent persons with a spinal cord injury: A critical review of the literature. *Spinal Cord*, 44, 642–52.

- Hobara H., Potthast W., Müller R., Kobayashi Y., Helder T.A., & Mochimaru M. (2016). Normative Spatiotemporal Parameters during 100-m Sprints in Amputee Sprinters Using Running-Specific Prostheses. *Journal of Applied Biomechanics*, 32, 93 -96.
- IAAF. https://www.taf.org.tr/wp-content/uploads/2021/06/taf_atk_2020_baski.pdf
- Isık, Ü. & Ozer, M. K. (2022). The study of the relationship between physical activity and sleep quality of individuals between the ages 40-65. *Journal of ROL Sport Sciences*, 3(3), 29-44. <https://doi.org/10.5281/zenodo.7060244>
- İnal, H.S. (2011). Engelliler sporunda performans geliştirme. *I. Uluslararası Katılımlı Engellilerde Beden Eğitimi ve Spor Kongresi*, s. 47
- Jones, C. & Wilson, C. (2009). Defining advantage and athletic performance: The case of Oscar Pistorius. *European Journal of Sport Science - Eur J Sport Sci.* 9. 125-131. 10.1080/17461390802635483.
- Kara, B. (2016). Rusya federasyonu ve Türkiye’de engellilerin genel sosyo-ekonomik görünüşleri, *Dergi Karadeniz*, 30,180.
- Karadeniz, S., Suveren Erdoğan, C., Arslan, Y., Ayyıldız Durhan, T., Ceylan, T., Albay, F., ... Ceylan, L. (2024). Examination of basic motor skills in children and adolescents. *Frontiers in Physiology*, 14, 1346750. <https://dx.doi.org/10.3389/fphys.2023.1346750>
- Kınalı, G. (2003), *Zihin Engellilerde Beden - Resim - Müzik Eğitimi. Farklı Gelişen Çocuklar*. (Ed: A. Kulaksızoğlu), İstanbul: Epsilon Yayınları.
- Konar, N. (2011). Rehabilitasyon-engelliler sporu ve paralimpikler. *Spor Bilimleri Dergisi*, 3. <http://dergipark.ulakbim.gov.tr/iuspor/article/viewFile/1023019850/1023018811>
- Kuçuradi, İ. (1997). “Etiğe Yaklaşımlar, Etikte Yaklaşımlar ve Bir ‘Evrensel Etik’ Düşüncesi”. 1997 yılında Uluslararası Felsefe Kuruluşları Federasyonu ile Türkiye Felsefe Kurumunun Göreme’de düzenlediği, Etik üzerine bir seminerde, İngilizce olarak yapılan konuşmanın Türkçesidir.
- Küçük, H., & Ceylan, L. (2022). Researching of hormone parameters of football players. *Journal Of Pharmaceutical Negative Results*, 13(1), 754-759. <https://doi.org/10.47750/pnr.2022.13.S01.94>
- Lippi, G. & Mattiuzzi, C. (2008). Pistorius ineligible for the Olympic Games: the right decision. *Br J Sports Med.* 42(3):160-1. doi: 10.1136/bjism.2008.046730. PMID: 18334623.
- Loland, S. 2002. *Fair Play in Sport. A Moral Norm System*. London: Taylor & Francis Group.
- McNamee, M. J. (2016). Paralympism, Paralympic values and disability sport: a conceptual and ethical critique. *Disability and Rehabilitation*, 39(2), 201-209.
- McNamee, M., Parnell, R., & Vanlandewijck, Y. (2021). Fairness, technology and the ethics of Paralympic sport classification. *European Journal of Sport Science*, 21(11), 1510-1517.
- Murphy, N.A. & Carbon E, P.S. (2008). Promoting the participation of children with disabilities in sports, recreation, and physical activities. *Pediatrics*, 121(5): 1057- 1061.
- Murray, D. (2014). *The Ethics of Coaching Sports: Moral, Social, and Legal Issues*, By Robert L. Simon
- Nolan, L., & Lees, A. (2000). The functional demands on the intact limb during walking for active trans-femoral and trans-tibial amputees. *Prosthetics and Orthotics International* 24, 2: 117-25.
- Oztas, M., & Vural, M. (2023). The relationship between ruminative thought styles and decision-making styles in individuals doing physical activity in the context of bad habits. *Journal of ROL Sport Sciences*, 4(2), 657-668. <https://doi.org/10.5281/zenodo.7944238>
- Özcan, B. ve Çavuşoğlu, S.B. (2016). İstanbul gençlik hizmetleri ve spor il müdürlüğünde çalışan personelin iş tatmin düzeyinin belirlenmesi. *Spor Bilimleri Dergisi*, 6(2), 25- 33.
- Pasquina, P.F., P.R. Bryant, M.E. Huang, T.L. Roberts, V.S. Nelson, & K.M. Flood. (2006). Advances in amputee care. *Archives of Physical Medicine and Rehabilitation* 87,3.
- Pehlivan, Z. (2004). Fair-Play kavramının geliştirilmesinde okul sporunun yeri ve önemi. *Sportmetre Beden Eğitimi ve Spor Bilimleri Dergisi*, II (2): 49-53.

- Potthast, W. & Brueggemann, G.P. (2010). Comparison of sprinting mechanics of the double transtibial amputee oscar pistorius with able bodied athletes. *Institute of Biomechanics and Orthopaedics*, German Sport University Cologne, Germany.
- Rowbottom, M. (2022). *Before the fall: How the Olympic ambitions of Oscar Pistorius came with a price*, <https://www.insidethegames.biz/articles/1127160/oscar-pistorius-london-2012-paralympics>, Erişim tarihi:03.01.2024
- Sariakçalı, B., Ceylan, L., & Çeviker, A. (2022). Evaluation of head trauma on pituitary function in professional soccer players. *Acta Medica Mediterranea*, 38(2), 945–950. https://dx.doi.org/10.19193/0393-6384_2022_2_145
- Sariakçalı, B., Ceylan, L., & Eliöz, M. (2020). Evaluation of end-seasonal vitamin d plasma lipid and other biochemical measurements in professional football players The case of sivas province in turkey. *Progress In Nutrition*, 22(2), 1–8. <https://dx.doi.org/10.23751/pn.v22i2-S.10611>
- Sariakçalı, B., Duman, G., Ceylan, L., Polat, M., Hazar, S., & Eliöz, M. (2021). Spor Bilimleri fakültesinde uygulama eğitimin biyokimyasal ve hematolojik parametrelere etkisi. *Spor Ve Performans Araştırmaları Dergisi*, 12(3), 222–232. <https://dx.doi.org/10.17155/omuspd.976834>
- Satyanarayana, Y.V. (2010). *Ethics: Theory and Practices*, Delhi: Pearson.
- Schoolman, K. (2019). *The Unfair Advantage: Prosthetics and Their Role in the Olympics*, <https://sites.nd.edu/biomechanics-in-the-wild/2019/03/06/the-unfair-advantage-prosthetics-and-their-role-in-the-olympics/> Erişim tarihi: 03.02.2024
- Swartz, L., & Watermeyer, B. (2008). *Cyborg anxiety: Oscar Pistorius and the boundaries of what it means to be human*. *Disability & Society*, 23(2), 187–190. doi:10.1080/09687590701841232
- Şahin, H., Çepiş, A., Yılmaz, G., Gedik, Z., Yavuz, M., Oral, E., ... & Alpöz, E. (2017). Engellilik ve Etik. *Dokuz Eylül Üniversitesi Yayınları*, 1.
- Taboga P., Grabowski A.M., di Prampero P.E., Kram R. (2014). Optimal Starting Block Configuration in Sprint Running: A Comparison of Biological and Prosthetic Legs, *Journal of Applied Biomechanics*, 30, 381-389.
- Tekkurşun, D. G., İlhan, E. L., Esentürk, O. K., ve Kan, A. (2018). Engelli bireylerde spora katılım motivasyon ölçeği (eskmö): geçerlik ve güvenilirlik çalışması. *Spor metre Beden Eğitimi ve Spor Bilimleri Dergisi*, 16(1), 95-106.
- Thiroux, J.P. & Krasemann, K.W. (2014). *Ethics: Theory and Practice*, Pearson Publishing.
- USA TODAY. (2014). *Oscar Pistorius banned from Paralympics for five year*, <https://www.usatoday.com/story/sports/olympics/2014/10/21/oscar-pistorius-prison-reeva-steenkamp-paralympics/17651187/> Erişim tarihi:03.01.2024
- Uslu, F. (2016). *Spor Hukuku Dersleri*. Ankara: Adalet Yayınevi.
- Wach, E. (2013). *Learning about Qualitative Document Analysis*. IDS Practice Papers.
- Weyand, P.G., Bundle, M.W., McGowan, C.P., Grabowski, A., Brown, M.B. Kram R. & Herr, H. (2009). The fastest Runner on Artificial Legs: Different Limbs, Similar Function? *Journal of Applied Physiology* 107(3): 903-911.
- Willwacher S., Herrmann V., Heinrich K., Funken J., Strutzenberger G., Goldmann JP., et al., (2016). Sprint Start Kinetics of Amputee and Non-Amputee Sprinters. *PLoS ONE*, 11(11).
- Wolchover, N. (2012). *Are Oscar Pistorius' Prosthetic Limbs an Unfair Advantage?* <https://www.nbcnews.com/id/wbna48335839> Erişim tarihi: 03.02.2024
- Yalçın, İ.A. (2015). *Farklı klasifikasyon puanlarına sahip tekerlekli sandalye basketbol oyuncularında üst ekstremite fiziksel uygunluk parametreleri ile spora özgü beceriler arasındaki ilişkinin incelenmesi*. (Yüksek Lisans Tezi), Ankara: Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü.
- Yetim, A., (2005), *Sosyoloji ve Spor*. Topkar Matbaacılık, Trabzon, 119.
- Yücel, A.S., Atalay, A. ve Gürkan, A. (2015). Sporda şiddet ve saldırganlığı etkileyen unsurlar. *Uluslararası Hakemli Psikiyatri ve Psikoloji Araştırmaları Dergisi*, 2(2), 68- 90.