Case study
OSCAR PISTORIUS v the IAAF

Learning Legacies

***'We are not disabled by our disabilities but abled by our abilities'*- Oscar Pistorius**

South African sprinter Oscar Pistorius is a multiple world record holder and Paralympic gold medallist in the 100m, 200m and 400m Paralympic events. Pistorius, a double-amputee, recently captured the attention of the world in his landmark legal victory over the International Association of Athletics Federations (IAAF).

Background

Oscar Pistorius was born with a congenital disorder, which required the amputation of the lower part of both legs at the age of 11 months. Despite having no lower legs, Oscar went on to establish a successful sports career at school and university, playing rugby, water polo and tennis before discovering track as part of a rehabilitative programme for a rugby injury. Pistorius went on to dominate the Paralympic podium in the 100m, 200m and 400m events, also competing against, and beating, many elite able-bodied runners in races such as the 2007 South African Championships (which he won) and the Golden Gala in Rome.

As Pistorius improved, it became clear that he had a shot at qualification for the Beijing Olympic Games (already having secured the right to compete in the Paralympic Games). The IAAF proved to be the only hurdle blocking his way.

The IAAF v Oscar Pistorius: A Landmark Legal Battle

The IAAF had banned Pistorius from competing in the Beijing Olympic 200m sprint event, regardless of whether he achieved the qualifying time for the event. The rationale for the ban was that Oscar used prosthetic legs which gave him a competitive advantage over 'able-bodied' athletes.

The ban was not at this point underpinned by scientific research, and Pistorius' camp thus levelled charges of unfairness and possible discrimination against the IAAF for their actions. Facing the might of the most powerful athletic organisation in the world, and also facing doubt from detractors that included some of his well respected peers, Pistorius stood his ground and refused to accept the ban.

In retaliation, the IAAF commissioned a scientific study to prove their claims. The results of the tests, they claimed, proved their right to ban Pistorius on the grounds that his Cheeta's gave him a competitive advantage over able-bodied athletes.

Oscar Pistorius subsequently took his fight to the European Court of Sport Arbitration, who overturned the IAAF's ban, on the basis that the scientific study did not in fact provide evidence that could support a ban.

Throughout the course of his legal battle, Oscar has raised some interesting fundamental, conceptual and philosophical questions about the nature of disability, and has become a role model to many.

In 2007, the IAAF passed a regulation prohibiting technological aids on the competitive field, stating that springs, wheels or other such devices gave athletes with a disability an unfair advantage over athletes competing with their natural legs.
(Photo: Athlete wearing prosthetic)

Pistorius disagreed vehemently. He appealed the decision, arguing that his carbon-fiber Cheetahs had disadvantages, too. On a wet track, the blades had less traction, and even not-so-heavy winds could blow them out of sync. Overall, he stated that his "legs" allowed him the capability of running just like able-bodied athletes, not worse than, but also not better than them.

The Court of Arbitration for Sport agreed. In May 2008, the arbitration body made a ruling that overturned the IAAF regulation, specifically in Pistorius' case. He was given the green light to compete in the Olympic Games. If he qualified, that is.

A more detailed overview of the IAAF research:

A scientific study was carried out on behalf of the IAAF by Professor Peter Brüggemann at the German Sport University in Cologne. The study constituted a biomechanical and physiological analysis of long sprint running by the double transtibial amputee athlete Oscar Pistorius, who uses "cheetah" prosthetics, and five able-bodied athletes who are capable of similar levels of performance at 400m.

The tests, which took place over a two day period at the Institute of Biomechanics and Orthopaedics, were initiated by the International Association of Athletic Federations (IAAF) with the approval and participation of Oscar Pistorius, in order to see whether his prosthetics provide him with an advantage over other athletes not using them (which would place Oscar Pistorius in direct contravention of IAAF competition rule 144.2).*

Analysis was carried out by a team of more than 10 scientists, including staff from the physiology laboratory of Professor J. Mester (Institute of Training Science and Sport Informatics). 12 high speed cameras (250 frames per second) were used to record 3D kinematics, with another 4 high-speed cameras to observe sagittal plane motion. Force platforms were used to record ground reaction forces and point of force application. Athletes ran the 400m test with a K4 mask to record max VO2. VO2 testing was also carried out in the laboratory (Wingate and Ramp Test)

on static bicycles. Blood lactate records were taken regularly. A 3D scanner was used to record body mass and anthropometric measures of all the control athletes. The prosthetics were also subjected to material testing.

The results of the research study were reported by the IAAF as objective proof that:

- Pistorius was able to run with his prosthetic blades at the same speed as the able-bodied sprinters with about **25% less energy expenditure**. As soon as a given speed is reached, running with the prosthetics needs less additional energy than running with natural limbs.

- Once the physiological potential of Oscar Pistorius and the able-bodied control athletes had been estimated, using three different methods, it is clear that Pistorius' potential was not higher than that of the controls, even though their performance results were similar.

- The biomechanical analysis demonstrated major differences in the sprint mechanics used by a below-knee amputee using prosthetics when compared to athletes with natural legs. The maximum vertical ground reaction forces and the vertical impulses are different in a highly significant way and the amount of energy return of the prosthetic blade have never been reported for a human muscle driven ankle joint in sprint running.

- The positive work, or returned energy, from the prosthetic blade is close to **three times higher** than with the human ankle joint in maximum sprinting.

- The energy loss in the prosthetic blade was measured at 9.3% during the stance phase while the average energy loss in the ankle joint of the able bodied control athletes was measured at 41.4%. **This means that the mechanical advantage of the blade in relation to the healthy ankle joint of an able bodied athlete is higher than 30%**.

Conclusion of the IAAF:

The IAAF released the following statement:

'It is evident that an athlete using the Cheetah prosthetic is able to run at the same speed as able bodied athletes with lower energy consumption. Running with prosthetic blades leads to less vertical motion combined with less mechanical work for lifting the body. Additionally, the energy loss in the blade is significantly lower than in the human ankle

joints in sprinting at maximum speed. An athlete using this prosthetic blade has a demonstrable mechanical advantage (more than 30%) when compared to someone not using the blade. The IAAF Council has ruled that the prosthetic blades known as "cheetahs" should be considered as technical aids in clear contravention of IAAF Rule 144.2. As a result, Oscar Pistorius is not eligible to compete in competitions organised under IAAF Rules. This deems him ineligible to compete in the Olympic Games.'

*** IAAF Rule 144.2 extract**

Relates to the use of "technical aids" during competition

This rule prohibits:

'(e) Use of any technical device that incorporates springs, wheels or any other element that provides the user with an advantage over another athlete not using such a device.'

ADDENDUM

Although the South African Olympic Committee delayed finalising their Olympic delegation to allow Pistorius a chance to qualify, the sprinter fell short of the 45.95-second Olympic qualifying mark for the 400m. His personal best time of 46.25s was still not fast enough to get him on the start list for the 4 X 400m Relay team for South Africa. Had he made the squad, he would have gone down in history as the first leg amputee to compete in a running event in the Olympic Games. It remains to be seen if we will witness such a historic moment at London 2012.

FIND OUT MORE

Oscar Pistorius Biography

http://www.ossur.com/?PageID=13008

Paralympic Sport TV

http://www.Paralympicsport.tv

Paralympic Sport website

http://www.paralympic.org

UK Sport Funding Breakdown (per sport)

http://www.uksport.gov.uk/pages/summer_olympic_sports_-_london_2012/

CREDITS

This resource was produced as part of the 2012 Learning Legacies Project managed by the HEA Hospitality, Leisure, Sport and Tourism Subject Centre at Oxford Brookes University and was released as an Open Educational Resource. The project was funded by HEFCE and part of the JISC/HE Academy UKOER programme.

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