

Inquiring into Human Enhancement

Interdisciplinary and International Perspectives

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From Repair to Enhancement: The Use of Technical Aids in the Field of Disability

Myriam Winance, Anne Marcellini and Éric de Léséleuc

Introduction

There is nothing new in the use of technology to repair and compensate for human disabilities. Throughout the centuries we find examples of prostheses and artificial limbs being used to replace lost limbs (Avan et al., 1988). Various technical aids were also used to compensate for the body's failings or to facilitate treatment – wheeled vehicles were used to carry invalids, for example. During the 16th and 17th centuries, the first wheelchairs that could be propelled by the users themselves appeared. But the majority of these vehicles were made of wood; they were heavy, cumbersome and difficult to manoeuvre. During the 19th century, medical progress (the discovery of anaesthesia, asepsis, antibiotics, radiology, and so on) made it possible to develop new techniques to repair and compensate for deficiencies. Furthermore, the end of the 19th century saw the beginning of a change in the social treatment of disabled persons, leading to the emergence of the notion of 'handicap' as a replacement for the notions of infirmity, invalidity, idiocy, and so on. In other words, developments in the modes of repairing deficiencies and of compensating for disabilities correlate with changes in the definition of 'disability' (as 'handicap') and in the way persons with disabilities are integrated into society.

In this chapter, we wish to focus on the history of this correlation and analyse the ways in which repair and compensation have been handled throughout the 20th century and are being handled today. We will examine and compare compensation in everyday life and in sport, by addressing two issues: that of the social legitimacy of repair

and compensation, and that of people's experiences – their relationships with technical aids. In both areas, we will analyse the challenges and the objectives of the processes of repair and compensation for deficiencies and disabilities.¹ In both areas, the objective is to acquire the capacity 'to do', but what this means differs according to the area: in the context of everyday life, the normative objective is 'to be able to do what the average person can do'; in the context of sport, the normative objective is to go beyond average capacities. As we will see, this process of acquiring capacities is based on the process of the body adjusting to the technical aid and on the process of coming to a practical arrangement with one's human or physical environment – processes which are then hidden, made invisible by social attitude. By thus examining the ways in which people with impairments use technical aids – uses that create a tension between an impairment-reduction logic and a capacity-enhancement logic – this chapter aims to shed light on the subject of the enhancement of the human body and related ethical issues.

The everyday world: acquiring the capacity 'to cope'

From rehabilitation to accessibility: being and doing the same as everyone else

Rehabilitation practices began to take shape at the beginning of the 20th century. They contributed to a great change in the representations and practices regarding people with impairments, an evolution which led to the notion that deficiencies and impairments must be repaired, both physically and socially. This led, in the 1950s, to the use of the terms 'handicap' and 'handicapped persons' to designate people with impairments. The notion of 'handicap' designated a deviation from the social norm (defined in terms of social performance), that was the consequence of a deviation from the bodily and functional norm.

H.J. Stiker (1997) dates the beginning of this transformation at the end of the 19th century, with the issue of accidents at work. In France, this issue was resolved by law in 1898 (Ewald, 1986). It set out the principle of *social repair*, in the shape of financial compensation for the damage caused by an accident at work. The First World War continued this approach by extending the same right to disabled ex-servicemen, for whom a system of disability pensions was created. However, the First World War also caused a shift. Due to the lack of workers, it became necessary to reintegrate the disabled ex-servicemen into the workplace. This meant developing a rehabilitation system that was then extended

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to all disabled civilians. From a social standpoint, the purpose of these practices was to allow people to return to work; from a medical point of view, the objective was to reduce impairments and to restore all functions to the body, so that people could once again live an ordinary life. This was achieved with prostheses and orthoses and by muscular exercises. It was a case of doing what able-bodied people did, *in the way that they did it*. Rehabilitation and functional re-education were designed to bring disabled persons in line with the model of the able-bodied, both in terms of social aptitude and with regard to physical and functional skills. For survivors of poliomyelitis (Wilson, 2009) and for paraplegics, the purpose of rehabilitation was to learn to walk again and not to acquire a capacity to move around; recovery of the capacity to walk meant one was cured and had returned to normality, whereas the need for a wheelchair signified failure and 'definitive impairment'. The objective was thus alignment, in the strongest sense of the word, because rehabilitation was aimed not just at the acquisition of average ordinary capacities, but also at the similarity of appearance. This pursuit of 'visible normality' guided the changes made in prostheses, designed so as to resemble the limb that they were replacing, in colour, shape and even texture.

The 1930s saw the creation in the United States of the ancestor of our current wheelchairs, the manual foldable wheelchair, a lightweight chair with a tubular iron structure. The purpose of the wheelchair was no longer to repair the body but to compensate for the loss of mobility. In describing the experience of paraplegic Canadian veterans, M. Tremblay (Tremblay, 1996; Tremblay et al., 2005) describes how the shift from pendular walking to wheelchair use had represented, for them, the opportunity to leave hospital and return to mainstream society. To achieve this, they adapted to the existing environment (by finding accommodation with no stairs, and so on) and relied on help from other people (to carry them when they were unable to avoid stairs). A wheelchair enabled the person to live as part of the community. It granted them social and functional normalisation, without directly normalising their bodies and without making them 'standing persons'. In France, the abandonment of pendular walking as a means of movement² and the more systematic recourse to wheelchairs is probably more recent, dating back to the 1960s or 1970s.³ In both cases, the use of manual wheelchairs as a means of movement marked a shift in attitude: whereas the objective was still to acquire normal capacities, this no longer involved an alignment with ordinary physical and functional capacities but the acquisition of new functional capacities pertaining specifically to the use of the wheelchair.

In the 1970s and 1980s there was another shift under the impetus of the disabled people's movements created at that time (Barton and Oliver, 1997; Campbell, 1997; Oliver and Barnes, 1998). These people – and wheelchair users in particular – were regularly confronted with obstacles in their environment: unsuitable workplaces, a lack of accessible and adapted housing, and so on. They became aware that they were not disabled because of their impairments, but because they were excluded from an inaccessible society. So instead of adapting themselves to that society, they asked society to change.⁴ On the basis of their experience of exclusion, disabled activists developed what is known as the social model of disability. It states that disability is not the result of an impairment, but of the obstacles (physical, cultural, and so on) set up by society that prevent disabled persons from participating. Within the social model, the objective is still to allow people to acquire ordinary capacities⁵ making it possible for them to live in 'ordinary' society. But by reversing the causal process of disability, the social model also changes the process through which these capacities are acquired. It takes for granted the existence of a variation in humankind and places the weight of normalisation on society's shoulders. In other words, the starting point is no longer 'the person who cannot walk', but 'the person in a wheelchair', to whom society must adapt.

During the 20th century, the field of disability was constructed through reference to a logic of normalisation in terms of an alignment with the 'able-bodied' person; the extent of this alignment has varied over the years (integrating appearance and/or functional capacities) and taken different concrete forms: the rehabilitation of the individual or adaptation to the environment. Recourse to technical objects – orthoses, prostheses and technical aids – was central to this normalisation process. In the field of rehabilitation, technical aids were used to repair the body and to compensate for incapacities. The purpose of the work done by professionals was to improve the disabled person's interaction with technical objects. Conversely, the social model takes, as the starting point for its logic,⁶ people as they are – in wheelchairs, with walking sticks, with hearing aids – without worrying about their relationships to technical aids. In the next section, we will describe the work through which people's abilities are defined, by looking at the interaction between people and their wheelchairs.

Living and making do with a technical aid: adjusting, accommodating, making arrangements

The wheelchair is one of the most ordinary technical aids. It is used by a wide variety of persons in terms of sex, age, type of disability, place of

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residence (ordinary or institution), and so on (Vignier et al., 2008). To this diversity of users corresponds a diversity of uses: use may be temporary or permanent, partial (just for certain activities) or total (all day long). But as Mr Doris, a paraplegic who has had one limb amputated, says:⁷ 'It's true that it is easier to move around on two legs than on four wheels, but when you don't have a choice, you have to do it' (December 13, 2007). What does *do* mean here? Having to use a wheelchair means no longer moving around on two legs and having to experience a different body (seated, maybe partially paralysed and numb, or maybe stricken by uncoordinated movements). It means moving around on four wheels and living in, with, through a technical object that people normally do without. Hence a process of adaptation that has two facets: a process of adjustment and a process of accommodation.

The adjustment process refers to the mutual and planned adaptation between person and chair. This process can be seen when people are choosing and trying out a new wheelchair. The question that guides the wheelchair trial is: 'What are you going to do with your chair each day?' (Interview with an ergotherapist in charge of tests, December 2007). To provide an answer to this question, the wheelchair trial must take on the form of a joint analysis of the disabled person's situation. The idea is to explore how they feel and what they will be able to do 'in this wheelchair' on an everyday basis. This exploration goes hand in hand with work on transforming one's perceptions and possibilities for action. On the one hand, people are confronted with their perceptions in each chair they test and, on the other hand, their perceptions are modified by gradual changes to their position (position of their arms, legs, and so on) and to the wheelchair itself⁸ (adjustments to the back, the arm rests, the footrests, the addition of a head rest or of a cushion, and so on). This adjustment process is reflexive, in as much as it involves putting a distance between the subject, their body and their wheelchair. The purpose of this process is to discover the position in which people feel 'comfortable' and to find them new abilities or possibilities for action. Through this process, which continues in day-to-day life, people's experiences – their perceptions, opportunities for action, mobility range, social space, and so on – are gradually shaped.

The process of accommodation (Thévenot, 1994) takes place both during and after the adjustment phase; it involves the non-reflexive adaptation to and of the wheelchair, the 'material' shaping of the body and chair. The more people use their wheelchairs, the more they become used to it, in terms of their bodies, their positions and their ways of acting. Mrs Debra's story illustrates this process. Mrs Debra, aged 57, has problems walking long distances. She uses a wheelchair for group

outings. She explained to me [Myriam Winance] that she felt that her footrests were too high, so she had removed them; when she used them, her legs were too bent. At the end of the interview, I asked if I could see her wheelchair and she agreed. It was a standard model. She once again explained that she did not use the footrests and she sat in the chair to show me that they were not suitable. Her legs were indeed a bit high. I looked at the footrests and saw that they could be lowered a notch. I explained this to her; she hesitated and I offered to adjust them for her. She hesitated again and then told me:

'But aside from that, what I'm saying is ... you see, I'm sitting like this, you see for example, ... I use my feet ... so ... and then ... it takes up a lot of room, be careful ... because in a minibus for example, sometimes, when there are one or two other persons, well, ... it's a bit cramped ... no, what I'm saying is that I don't really need footrests, they get in the way when I want to move my legs forward [that is when she stretches them out in front of her] ... I don't know ... maybe I will adjust them, maybe I won't adjust them because ... [she removes them and places them in a corner of the garage]' (September 5, 2008).

In this example, we first see the adjustment process; Mrs Debra finds the footrests to be a nuisance, so she removes them from the wheelchair. She thus feels more comfortable when seated. But when she is being pushed, she is obliged to hold her legs straight out in front of her, which does not seem to be very comfortable. Yet she finally becomes accustomed to this position and, when she is offered an alternative solution, she is very hesitant about changing. Adjustment continues through the process of accommodation, that is the incorporation of a position initially experienced as uncomfortable, but to which the person adjusts because the position finally appears more practical. And this process implies not only an adjustment of the person to the chair, but also of the person in the chair to their usual environment. In Mrs Debra's example, the removal of the footrests is also an adjustment with regard to the minibus and to the lack of room when there are several people. A person's abilities are not only the result of the dual processes of adjustment and accommodation, but also of the practical arrangements that people make in order to be able to go about their daily activities.

These practical arrangements involve a process of adaptation between wheelchair users and their environments, in accordance with the human and non-human resources available within the latter. The different ways in which people go shopping provide a good illustration of this process.

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For example, Mr Doris, who is very much at ease when using his wheelchair, chooses to do his shopping in medium-sized supermarkets, preferring to avoid hypermarkets, despite the fact that both are accessible by wheelchair. However, when he does his shopping, he has to operate his wheelchair with one hand and push the trolley with the other. This is not easy because, when the trolley is full, it rolls all over the place. So he cannot push it over long distances. Because he wishes to cope on his own, he has therefore opted to do his shopping in medium-sized supermarkets, where the distances are better suited to his 'shopping mobility'. Mrs Lepetit, who suffers from amyotrophic lateral sclerosis and who uses a wheelchair on a permanent basis, no longer does her own shopping, letting her husband do it on his own. Mrs Pichard, who is hemiplegic and who currently uses a standard wheelchair with a simple handrim,⁹ accompanies her husband into hypermarkets; they use a special trolley which attaches to the wheelchair, with Mr Pichard pushing the whole unit. The latter example shows that practical arrangements depend on the human and non-human resources available in the environment of the person in question (in this case, special trolleys and the husband's assistance). In the same way, when buying his medication, Mr Doris has set up an arrangement that relies on the human resources available to him in his environment:

Mr Doris: Making everything accessible is a great idea, but you mustn't get carried away [The pharmacist had some work done on his shop to make it accessible]. They installed a ramp inside the shop; ... due to the lack of space they had to make a spiral ramp ... there was quite a height to go up and the ramp took up about 4 square metres in the shop. Was it really worth it? If I need medication, I give them a ring and then I stop outside the shop ... it's easier for the pharmacist to bring me the medication than it is for me to get out of the car. ... When I go there every month, there's a lot to cope with – what with all my stuff and the fuss with all the full bags. If I had to get out of the car, go into the pharmacy and especially come out again with packages, how do I manage if I have my hands full? How can I push my wheelchair when I'm on my own? ... They do have a ramp. But in any case it's not always easy to park. It's one thing to park on the road. But then to get the wheelchair out with all the traffic going by, it's not easy (December 13, 2007).

This example demonstrates the difference between accessibility and real mobility – activity.¹⁰ Accessibility requires the physical and social

environment to be adapted to individual specificities. But it never covers all individual specificities. Hence the need for practical arrangements that reduce the gap between opportunities for action and actual actions through a process of adjustment. This is what can be seen in the above example. Although the pharmacy is now accessible, it is still difficult to get in and out; indeed for Mr Doris it is potentially dangerous as, with all the traffic, he cannot easily transfer from the car to the chair and, when leaving the pharmacy, both carry his packages and operate his wheelchair. He has therefore come up with an alternative, based on anticipation and relying on the resources available in his social space – in this case his pharmacist, who is prepared to leave her shop. For the ‘person-in-a-wheelchair’, because the action is the result of practical arrangements, it has to be thought out and organised in advance.

In a given situation, the extent to which these anticipated practical arrangements can be adapted or avoided depends in part on the individual’s expertise in using a wheelchair, and in part on the resources on which they can rely in order to organise new arrangements. Let us imagine a wheelchair user who is alone, and who regularly takes the Paris Metro to travel to the Forum des Halles. The Châtelet–Les Halles station has a lift, but it is sometimes out of order. In such a situation, either the person can go no further or they have acquired enough skill to use the escalators on their own or else they ask for (or passers-by offer) help in using the escalators or stairs. In the latter case, as Quéré says (Quéré and Relieu, 2001), the offer or request for help puts the wheelchair user in a situation of visibility; this breaks the vagueness and anonymity that govern relations within public space. Finally, depending on the practical compromises which have been made in each case, what the person is will vary: they will be either ‘a-mobile-person (-in-a-wheelchair)’, or ‘a-person-in-a-wheelchair’. In the first instance, the wheelchair becomes an integral part of that person; in the second instance, it is a world object in relation to which the person must either act or be acted upon, as shown by the following extract:

Sociologist: You never have anyone push you?

Mr Doris: Oh no. I hate that. I hate that. Sometimes when I’m with other people, able-bodied people always think they are helping me by pushing me, but... It increases my impression that I’m disabled. When I push myself, I move around, I go wherever I want. It’s true that I’m disabled but I don’t feel it. Whereas if someone pushes me, and then... It’s always the same... imagine you are somewhere where there are lots of people, the person who is pushing you

doesn't have the same feeling as the person in the wheelchair, you know, someone who is pushing does not look too carefully. Whereas me, I've always... I have to steer, I've always got both my hands on the handrims to avoid hitting someone.... I can judge distances better, I can move fairly quickly in the middle of a sizeable crowd, ... I can stop, I can ... it's automatic, a little touch on the rim, I go right, I go left and I avoid the obstacle (December 13, 2007).

Gradually, with regular use, people get to know their wheelchair, feel its reactions and incorporate it. The person no longer merely uses (actions) the wheelchair; the chair becomes that through which they act. The chair becomes easy to use, indicating a oneness of perception and action. The wheelchair truly becomes part of them. At this point, the process of adjustment and of accommodation has become invisible, imperceptible. It is concealed by action which unfolds naturally. But the wheelchair is not always 'my legs'; it can also become 'my disability'. As Mr Doris notes, the simple fact of being pushed makes him feel disabled; in other words, it changes the status of the wheelchair, from that of 'his legs' to 'a wheelchair in which he is pushed'. The capacity to fully incorporate the wheelchair can be called into question at any moment by certain situations: a breakdown, a pain, getting old, putting on weight or even the environment. Moving around becomes more difficult or even impossible, reminding persons that they are in a wheelchair. A disconnection occurs: people no longer act through their wheelchairs but on them, needing to think about how to handle them or to have them handled, in order to get to a given place. Bodies with prostheses are feeble bodies: their abilities are shaped by a process of adjustment and accommodation that can be disrupted at any moment, causing the disability and the sensation of being disabled to emerge.

The capacity to cope with everyday life thus results, on the one hand, from the expertise acquired during the process of adjustment and accommodation to the wheelchair, and, on the other hand, from the implementation of practical arrangements. These practical arrangements rely upon resources (human and non-human) offered by the environment, hence the importance of accessibility, in terms of buildings and services. Finally, the status of the wheelchair, as an incorporated or a world object, varies not only according to the process of adjustment/accommodation, but also to the situation of its use.

Functional rehabilitation practices, the use of technical aids and the accessibilisation of society thus aim to improve the physical, functional

and social situation of disabled persons, albeit an improvement that is limited to the objective of 'autonomy in everyday life' and 'the return to normal life': the objective and end point are an average value. 'Repair' and 'compensation' aim to increase the range of abilities of disabled persons, but always within the framework of a project delimited by a normative reference – that of 'ordinary activities'. Indeed, the logic of improving capacities and the conditions of life necessary to such improvement acquires its social legitimacy through its reference to the ideology of the fight against inequality, the aim of which is to align the 'unfit' with the average able-bodied person. Conversely, the world of sport, and, more generally, contemporary society, sustain a logic of perpetually improving performance and capacities.

The sports world: always try to surpass your performance

'Disabled' sportspeople: from rehabilitation to pushing one's boundaries

Rehabilitation through sport is a logical way to develop the capacities of people with disabilities, until they reach 'normal' capacities. But there is already a difference when one goes from rehabilitation through sport to Paralympic sport, which requires the mindset of permanently pushing one's boundaries. Over the second half of the 20th century, the world of sport was divided into two domains corresponding to two categories of people: one reserved for able-bodied people and the other for disabled persons. This separation was made on the basis of two criteria: the biological impairment which affects certain persons and the inferior sports performances which supposedly result from this. This also led to another difference between the two categories of sportspeople – the role of technical aids. In Olympic sports, athletes compete 'naked' and are not allowed to use technical aids. On the other hand, in Paralympic sports, which bring together sportspeople with different types of disability, recourse to technical aids is legitimate and difficult to challenge. Technical aids are not only tools that people use to recover their normal capacities (that compensate for incapacities caused by impairments), but also tools that allow athletes to develop their greatest possible capacities and performances. Research on technical sports aids is thus developing rapidly, with the development of ground-breaking technology that aims to constantly push the boundaries of existing performances. Indeed, in sport, be it Olympic or Paralympic, the objective of normalisation is replaced by the objective of surpassing what are considered to be the

human body's 'natural' capacities. It is no longer a question of becoming 'ordinary' but of aiming to become 'extra-ordinary'. Within this framework, which goes beyond any logic of rehabilitation, the performances of disabled athletes will gradually improve, but on the basis of a sporting principle that sets no *a priori* limits. Only one symbolic barrier remains, that of a hierarchical ordering of athletes according to their initial 'natural' aptitudes, implying that people who are physically impaired cannot put in better performances than people who have no impairment.

Sportspeople with prostheses: the logical irruption of endless disorder, or the destabilisation of the hierarchy of 'natural qualities'

Recently, the case of one particular athlete, Oscar Pistorius, arose to challenge the established distinctions between 'able-bodied sport' and 'disabled sport': a bilateral tibial amputee who uses prostheses – 100 per cent carbon fibre blades ('Flex-Foot Cheetah') – to run, was on the point of equalling the performances of able-bodied athletes. The controversy broke out during the Paralympics in 2004. Pistorius, aged 18, won the 200 m gold medal and the 100 m bronze, racing against veteran runners with single tibial amputations. The controversy exploded when Pistorius, whose performances were improving – in the 2007 'able-bodied' championships held in South Africa, he had finished second in the 400 m race –, asked to be allowed to take part in international athletic competitions. The entire debate revolved around the role of his prostheses, which were claimed to represent a potential advantage for his performances. During this debate, Oscar Pistorius became the human who had been improved by technology. The sports world was to qualify this supposed 'artificial' improvement to his results by a 'technical aid' as 'technodoping'. Indeed, in sport, 'real doping' is that which alters a being, which changes his/her essential identity, which modifies the 'natural' biological identity of a human, and which in so doing ruins the sporting objective of setting the hierarchical order of mankind's 'natural' value.

This aspect of the essential 'naturalness' of champions is explained by Dr. Giuseppe Lippi, a specialist in clinical biochemistry, haematology and doping at the University of Verona. In March 2008, in the midst of the Pistorius controversy, he co-authored an article entitled 'Pistorius ineligible for the Olympic Games: the right decision' (Lippi and Mattiuzzi, 2008). For the authors, '[a]thletic performances (and champions) are largely genetically determined and genes are the product of natural

selection. Technology is a great aid and the most favourable opportunity to overcome disabilities in daily life. It has nothing to do with traditional competitive sports, however, especially if 'cyborgization' is challenging to replace nature's own evolutionary scheme'. The article clearly asserts the legitimacy of technical aids in 'overcoming physical disabilities in everyday life', whilst at the same time denying any such legitimacy in the world of 'traditional sport'.

It was indeed the 'technologically hybrid' nature of Pistorius, equipped to run, that was being called into question in the controversy surrounding the athlete, in as much as this nature seriously disturbs the sports logic of comparison and hierarchical ordering of natural human capacities. Hence Pistorius' battle to break out of the 'doped athlete' category and enter the category of champions. This battle involved an administrative project to prove that his sporting performances were due to his 'qualities', to his natural aptitudes and not to his prostheses. In other words, he had to show that his performances were 'his own' and not linked to the technical device that he had used to run. To achieve this, he stressed his 'personal qualities': 'This type of prosthesis has been used for 14 years by other athletes who have never achieved my results. Which proves that my performances are due to my talent and to my training' (Hirsch and Mathiot, 2007).

The Oscar Pistorius case is a major problem for the sporting institution, because it combines two issues in a way never before seen: the production of a performance potentially superior to that of able-bodied athletes and the fact that the performance was produced by using a prosthesis that replaces a part of the athlete's body. In the history of Olympic sport, there have of course been occasions in which Paralympic athletes were accepted as competitors: in 1984, Neroli Fairhall, a wheelchair athlete, came 35th in archery at the Olympic Games. Marla Runyan, a partially sighted American runner, took part in the Olympic Games in 2000 and 2004. In 2000, Terence Parkin, a deaf swimmer, won the silver medal in the 200 m breaststroke. But all of these 'Olympic athletes with impairments' competed 'naked'; none of them used any type of technical aid to compensate for their disability.¹¹ The sporting institution could therefore consider them to be legitimate. They did indeed have certain 'anomalies' or impairments of their biological bodies but, biologically speaking, they could nonetheless be considered as 'pure' and 'natural' athletes. Whether the 'anomaly' was a difference in the biological body considered as an 'impairment' when compared to theoretical organic integrity, or a difference considered to be a biological 'peculiarity' providing an

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advantage compared to the norm (such as the difference in the size of Usain Bolt's calcaneum, which supposedly explains his extraordinary performances), in both cases, what makes sense in sports logic are the diversity in the biological realities of the human body and the differences in performance that such diversity entails. The runner Oscar Pistorius describes himself as a problematic 'mixture' of man and machine.¹²

Unlike other Paralympic athletes who have become Olympic athletes, Oscar Pistorius' body is a human and high-tech hybrid; the question of his status must therefore be raised. As a technological hybrid, his participation on the 'disabled sportsmen' circuit cannot be questioned. He falls within the T43 category for 'bilateral tibial amputation' and runs in the T44 category for 'single tibial amputation' where all runners use a carbon fibre blade.¹³ In this category, having prostheses is therefore the norm. On the other hand, the 'ordinary' sports world, that guarantees the theoretical equality of competition, hesitates to recognise him as a legitimate sportsman within this order, because he uses a technical device. However, this reluctance, or even resistance, to authorise the integration in sports competitions of new technologies that allow athletes to optimise their performances may seem surprising. Georges Vigarello has shown how the discovery of new materials, and in particular fibres that make poles and boards more flexible, or composite structures that strengthen rackets and skis, have revolutionised motor skills in sports, generating, as he puts it, 'audacious new motor skills for new materials' (Vigarello, 1988, p. 68). The running blades used by amputated runners are part of this analysis. Banning new materials therefore seems relatively nonsensical when looked at solely from the perspective of the history of sports techniques.

However, Vigarello draws our attention to the specific case of a 'utensil' that he qualifies as 'close to cheating': a shoe sole 3–4 cm thick, known as a 'built-up sole', tested by Yuri Stepanov in 1957 during a high jump, and with which he beat the world record. The tool spread rapidly among other athletes, until in 1958 the IAAF introduced a regulation limiting sole thickness to 12.7 mm. A rapid institutional consensus thus seems to have been reached regarding the illegitimacy of such a technical 'invention' in sport, without clearly explaining in what way it differed from legitimate performance-optimising techniques.

As a mirror for the Pistorius case, the Stepanov story is nevertheless instructive. He was presented as using a 'miniature portable trampoline' to produce such a performance, so the structural link with the Pistorius controversy is a striking one. They both 'wear' their devices, which thus

become in some way a very part of them as sportsmen. Indeed, it is this 'incorporation' of the technological device which is debated or refused by the sports authorities. Technical aids are here seen as artificial transformations of a sportsperson's biological identity,¹⁴ assimilated to 'real doping' (de Léséleuc and Marcellini, 2005) and rejected as an attack on the ideal of fair competition between the 'biological pureness' or 'naturalness' at stake in sports competitions. It is therefore very interesting to see that at no time is the principle of prosthesis 'normalisation' brought up during the debates. Everything happens as if the sports organisation cannot apply the standard procedure of material normalisation to prostheses, which it nevertheless places in the category of 'technical aids'. This apparent paradox reveals a distinction that the sports institution makes between a technical aid that is added to a whole body (such as the built-up sole or the swimsuit) and a technical aid that 'replaces' a part of the body. In this way it confirms its interpretation of the runner Oscar Pistorius as a 'biotechnological hybrid' who, as such, is situated beyond the limits that define the legitimate participants in the common sporting game. The 'mixture' of technology and human that he has become, as an athlete, challenges official sports categories. Categories based on age, sex and weight have already been devised, so where does Pistorius fit? He becomes an 'uncategorisable' case for sports law.

This controversy surrounding the Pistorius case focuses on his prostheses which thus become 'highly' visible; conversely, it renders totally invisible the work needed to adjust to the prostheses and to make arrangements with the physical and social environment, work that underlies the execution of a 'performance in situation'. Indeed, Pistorius' performances, which equal and are deemed capable of beating those of able-bodied sportsmen, are associated with the 'qualities' of his technical aids, in this case the high-tech prostheses. The work of adjusting to technical aids, of learning to act with them and thus developing one's capacities, is hidden and even denied. The importance of practical arrangements with the environment is also ignored; the normalised aspect of the running track allows Pistorius to work on the fluidity of his running, but any change to the track could destroy the adjustment that has been achieved – for example, if it rains, Pistorius cannot hold the bends. Conversely, what is highlighted is the meeting point between human 'qualities' and the 'qualities of the prostheses', the latter in some way artificially modifying – fraudulently as far as the sporting world is concerned – the sportsperson's aptitudes, which thus become suspect.¹⁵

Conclusion: from the rehabilitation of the 'impaired' to the surpassing of 'natural' aptitudes

The biotechnological illusion or the return of the 'man-machine'

This comparison between studies of the subjective experience of a disabled person's relationship with technical aids and of the social attitude towards bodies with prostheses highlights the invisible nature of the process of adjusting to technical aids. Such invisibility creates the illusion that humans can be enhanced by technology, without any effort, learning or process of construction. One can see in this the return of a biologising and mechanical way of perceiving the human body, as if an individual's capacities were all 'given' by biology or by biotechnology, with a strange eviction of things psychological or social from the process of building human capacities. In this biotechnological illusion, everything takes place as if people's physical capacities were exclusively related to their physical aptitudes. This confusion is of the same order as that which assimilates people's physical impairments to their deficiency, that is, the harm inflicted on their organic being by illness or trauma. However, what distinguishes a subject's aptitudes from their initial capacities is the process of individual development, and in particular the processes of learning and adaptation. The biotechnological illusion contributes to the invisibility of this distinction because it suggests that technological aids will *ipso facto* improve capacities, thus removing any need for the subject to work on adjusting to the technical object or making arrangements with the environment. We like to think, in a mechanical shortcut, that cochlear implants will 'automatically' allow the deaf to hear, just as an amputated runner's prosthesis will 'automatically' allow them to achieve super-performances.

Pistorius thus appears to be a cyborg prototype, both literally (through his prostheses) and figuratively (in discourse, advertisements and representations).¹⁶ The issue of enhancement acquires meaning within this context because we tend to forget the processes of adjustment, accommodation and arrangement that technical aids and the environment require, processes through which the status of the technical aid, as part of the person or as an outside object, is defined. In ordinary situations, the prosthesis that replaces a leg is used to strengthen the normality and humanity of the publicly perceived person. Pistorius shows his prostheses: he makes them visible, publicly perceptible and claims an identity as a 'human with prostheses'.¹⁷

The cult of performance and increasing debate about enhancements to the human body

A society which promotes infinite performance (just like infinite growth) cannot avoid producing technosciences for the enhancement of the human body. The scientific popularisation of this enterprise echoes the mental shortcuts which obliterate the complexity of the processes that lead from the use of prostheses to the development of new capacities. There is also the issue of limits: limits to rehabilitation (the 'normal' human), limits to sport (the biologically pure human), limits to the modern society of performance and competition. The social legitimacy of 'normalisation' through rehabilitation and technical aids is strong, based on a therapeutic principle and a logic of empowering people who must become 'ordinary'. The social legitimacy of surpassing one's sporting performances *via* technical aids is always contested in the name of the principle of 'biological purity' in competitive sports. The social legitimacy of enhancing humans through technical, biotechnological or biochemical aids in the daily competition of modern life is still open to question. Biological, mechanical and technological visions of the body are not restricted to the human being's physical and motor performances. Far from it.

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Notes

1. This chapter is based on two research projects. The first concerns the use of wheelchairs, was carried out by Myriam Winance (2006, 2010) and involved observing wheelchair trials and interviews with wheelchair users (all of whom gave their consent to be interviewed for this project). The second, by Anne Marcellini and Éric de Léséleuc (Marcellini et al., 2010), looks at the controversy surrounding the 'Pistorius case'. It is based on an analysis of certain institutional sources, and of data from the press and from scientific literature.
2. Pendular walking/verticalisation is still used, but to different ends; in particular to allow people to become aware of their new bodies and for its benefits in terms of blood circulation and intestinal transit.
3. There is little literature on the history of the wheelchair in France.
4. J. Sanchez (1997) has shown how, in France, rehabilitation led to the issue of accessibilisation.
5. It would be useful to clarify what is meant by 'normal capacities'; indeed, we might hypothesise that the concept of 'normal capacities' has changed over the course of the 20th century, with respect to changes in the concept of 'personhood'. One of the constant issues is 'being able to work'.

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6. As Stuart Blume (2010) argues, the social model has not shown much interest in technology.
7. Mr Doris – not his real name – is 55 years old, has been using a wheelchair for 30 years and lives alone in a house. All names are fictional to protect the identity of the persons interviewed.
8. There exists a diversity of models. Each model comes in different sizes. Some can also be adjusted in different ways: position of the seat in relation to the wheel axis, backs which can be set at different angles, and so on.
9. That is, one on each side.
10. This difference was frequently mentioned during the interviews. On the one hand, people point out the greater accessibility of places and services; on the other, they say that greater accessibility does not necessarily mean greater access to places and services.
11. We must nevertheless emphasise the specific situation of Neroli Fairhall, who used his bow while sitting in a wheelchair, and who was questioned about this issue.
12. See, for example, the Nike advertisement where Oscar Pistorius is shown against a black background, standing on his two racing prostheses, in a tight-fitting and futuristic suit, with a first-person text in which he defines himself as a 'thing': 'I was born without bones below the knee. I only stand 5 feet 2. But this is the body I have been given. This is my weapon... How I became the fastest thing with no legs... '.
13. This category-based grouping is organised with regard to the low number of athletes with bilateral amputations.
14. The 2009 controversy surrounding the new polyurethane swimsuits which were forbidden and then re-accepted by FINA (the International Swimming Federation) also provide an interesting case (see for example the article on unapproved swimsuits, "Combinaisons: la FINA fait trainer", *L'Équipe*, 19/05/2009).
15. Following the authorisation to compete in 'normal' sporting events, given by the Court of Arbitration for Sport (CAS) in May 2008, Oscar Pistorius took part in his country's (South Africa) Olympic selection process, but did not achieve the minimum results required. On the other hand, on July 19 2011, he qualified for the Athletics World Championships, taking part in August 2011. He won a medal for his participation in the 4 × 400 m relay.
16. S.L. Kurzman's work (2001, 2002) demonstrates this contrast between the daily use of prostheses on the one hand, based on what he calls a work of alignment (which we call adjustment) and, on the other hand, the production of cyborgs: 'I am not a cyborg simply because I wear an artificial limb. I see cyborg more as a subject position than an identity, and believe it is more descriptive of my position vis-a-vis the relationships of production, delivery, and use surrounding my prosthesis than my actual physical interface with it' (Kurzman, 2001, p. 382).
17. See note 12.

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