Gene Doping and the Ethics of Sport: between Enhancement and Posthumanism

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Abstract   The genetic enhancement in the sport performance seems unavoidable and therefore, it is necessary establish rational criteria on genetic doping. A strategy to establish these normative parameters is to attend to two criteria: the extension of the effects of the treatment and the type of genetic intervention.

Keywords   Genetics, Enhancement, Gene Doping, Posthumanism, Sport Ethics

1. Introduction

The decryption of the human genome, which was completed several years ago, has opened up a broad range of possibilities for genetic manipulation as well as for technologies that can implement it, both in the therapeutic and in the enhancement scope. The field of sport will not be immune to these future changes; in fact it is very probable that this is one of the social areas in which those genetic transformations on the human body will be experienced for the first time[1]. Given athletes' idiosyncratic desire to reach new aims, as well as the possible attraction of fame, substantial incomes or other similar objectives, it is more than likely that they have already been the first to experiment these genetic transfer advances. In any case, the new genetic techniques would question what it means to be a human being, but also what sport is all about.

Scientific advances aimed at improving the physical performance of human beings, and of athletes in particular, have explored new lines of research, and have arrived at what is known as a gene doping[2],

"the introduction and subsequent expression of a transgene, or modulation of the activity of an existing gene to achieve an additional physiological advantage[3]

The Word Anti-Doping Agency (WADA) defines gene doping in similar terms .

Scientists have pointed out that certain genes are candidates for gene doping, including Erythropoietin (EPO), insulin-like growth factor 1(IGF-1), growth hormone(GH) and Hypoxia-inducible factor-1(HIFs). Each of these genes is linked to the enhancement of a specific performance: greater oxygen delivery to the muscles, growth of the muscular mass and height increase.

The enhancement of our physical(or cognitive) qualities as humans is a widespread socially accepted practice. Nowadays there are enhancements that make use of surgery, implants and pharmaceutical products, all of which are perfectly accepted socially.

This brings about the following moral issue: is the enhancement of the physical skills of the individuals (and of the athletes in particular) through a specific means such as genetic manipulation (also called "gene transfer technology") ethically permissible and, if so, to what extent?[4] With a view to answering these questions, I will carry out a classification of the genetic interventions according to the extent or degree and to the type of genetic manipulation.

Let us begin with reference to the first criterion. When dealing with questions of extent or degree, it is usual to distinguish between[5]:

a) Therapy, that is, medical treatments which aim to cure an illnesses. The nature of this kind of intervention is restorative. As this type of intervention does not present a great many justification issues, I will not discuss it within the bounds of this paper[6]

b) Enhancement: this is an increase of natural human potential within the range of a typical human being, such as, increasing the intelligence quotient of an individual from 100 to 104. This is what Tännsjö calls "positive" interventions.

c) Posthumanism(or Transhumanist): this deals with superhuman enhancements, that is, increasing the personal skills above the range typical of the human species, as for example increasing the intelligence quotient from 100 to 200. While Tännsjö uses here the term "enhancement" here, I believe that it is more suitable to call these "transhumans" interventions.

With regard to the kind of genetic intervention, there is often a distinction between[7]

a) Somatic interventions: this type of treatments denotes an intervention at the cell level in order to modify the

genome(the genetic structure) of already existing beings with the aim of making them more resistant to certain illnesses or to improve their physical abilities.

This type of interventions has already been applied in both the seed growth and animal food industries. However, its use in human beings is still incipient. In the case of sport, these treatments might be used to obtain better sport performances. These types of interventions aimed at modifying those genes linked to the physical performance are local in so far as they operate in somatic cells.   As a result these treatments do not involve variations that can be genetically transmitted from an individual to his offspring.

b) Germline treatment: here the modifications are made in the germinal line of cells(sperm, non-fertilized eggs or in the just-fertilized embryos) to increase their metabolic skills and thus to improve the health or the skills of physical performance. Since many of the basic structures of the human body are established in very early phases of life, these modifications have to be carried out before individuals are born, as most skills are determined prior to cellular development. Through the use of this treatment, results of this kind of genetic intervention would be inheritable and may be transmitted from one generation to the following.

Up to now those modification procedures have rarely been applied to human beings. It is known that this therapeutic genetic treatment was used with a patient suffering from "Leber's Congential Amaurosis", an inherited ocular disease[8]

A strategy to establish ethical parameters with regard to possibilities and limits of genetic intervention in sport is to use these two criteria: the level or extent of the treatment's effects and the kind of genetic intervention. A combination of these two criteria gives four possibles cases:

Case 1: the treatment is on an athlete modifying his genome so that he acquires physical skills within a range that we could qualify as "human".

Case 2: the treatment implies interfering in the germline (sperm, non-fertilized eggs or in the just-fertilized embryos) so that the future individual improves his physical performance skills, thus becoming hereditary skills that will be transmitted to future generations.

Case 3: the treatment is applied to an athlete modifying his genome so that he acquires physical skills within the range that could qualify as suprahuman.

Case 4: This case is characterised by a germline intervention with a suprahuman area of improvement of physical skills.

In this essay I will analyse these two aspects (the type of genetic intervention and its extent), with their different variations in the field of competitive professional sport. In this arena, the debate on removing the gene doping ban can obtain a greater degree of accuracy. Most current debates deal with genetic enhancement in a very broad sense without examining the alternatives I propose. As will be seen later, it is not possible to equate the ethical questions raised in a treatment that makes a relatively small modification to an

adult, giving him the physical skills of an athlete with that of a genetic modification that will affect future individuals and that could be of transhuman level.

In what follows, I will examine the main arguments used within the field of sport against gene doping, leaving aside the more general question of whether the genetic human enhancement is justified. Rather, I will focus on the more specific question of whether such type of enhancement is ethically valid in the field of sport and I will explain the main arguments used to reach at such conclusions [9]: a) the harm argument; and b) the significance of the spirit of sport, especially, the equality among competitors.   I will also discuss these objections in the light of the previous classification and I will attempt to justify which of these enhancement cases could be justified in the field of sport.

2. The Harm Argument

Authors that are opposed to doping in general, and to gene doping in particular, have pointed out that these practices entail some type of harm.

a) The harm to self

One of the more frequent arguments against doping is that adult athletes need to be protected from threats that can cause harm to their health (or even put their life at risk). These arguments traditionally appeal to claims that substances or doping practices (and gene doping, in particular) can adversely affect their health. There are some reasons to say that: 1) there is a lack of control in their medical use; and 2) there is insufficient current knowledge about there long-term effects on the human body[10].

Cases 1 and 3 of the chart would be affected by this argument, that is, somatic genetic enhancements and transhuman interventions insofar as they can affect the health of the sportsman.

The problem of this objection is that it is an unjustified paternalistic argument. The harm argument implies that the State has to interfere in the will of a rational and autonomous athlete limiting his free decision sphere.

As Tamburrini states:

"the present objection to free doping is paternalistic: the ban on doping is justified in order to secure the wellbeing of sport practitioners. Thus, sportsmen are impeded from practising their activity in the way they judge appropriate. Professional athletes are not allowed to decide for themselves what risks they are disposed to confront in the pursuit of their careers"[11].

The classic antipaternalistic objection establishes that the only legitimate reason that the State has to coercively interfere in the free sphere of individuals is to avoid harm to others. Thus, the appeal to individuals' well-being does not constitute in itself a good reason to coercively limit their autonomy' in the decision. If we apply this argument to athletes, their freedom to decide to take doping substances should not be limited, even when this decision may entail

certain risks to their health. The only exception is that these risks are excessive[12]. Any ban on taking doping substances or manipulation to genetic structure based on the argument that it can adversely affect their health would be an illegitimate paternalistic measure[13] . Along the same lines, Schneider points out that:

"By adopting a paternalistic stance of insisting that we know better than the athletes themselves what is in their best interest, we deny them self-reliance, personal achievement and autonomy[...](it) is to treat them as children, unable to make the choices that most affect them. This position is generally inconsistent with them limit-pushing nature of the of high performance sport[14]

As for the claim according to which the health of the athlete is better protected with the doping ban, it has been pointed out that this is debatable. There is limited evidence that banning doping truly does protect athletes.

Even if doping is forbidden, given its powerful attraction to athletes, it is likely that many would continue taking performance enhancing substances in a clandestine way. Therefore sportsmen would take even greater risks to their health, given the sub-par medical environment in which doping would take place, especially, gene doping. Anti-doping testing programs have been up to now a general failure. On the other hand, the ban of a substance that is already in demand causes intrinsic harm, as was the case of the well-known prohibition of alcohol in the USA in the 1920s[15].

b) Harm to others

In the current debate on doping in sport this argument has been used in different ways (the harm to other athletes, to society, etc.)[16]. However, I will only refer here to a specific type of harm to others: the harm of offspring. As has been previously seen, the nature of this kind of genetic intervention affects future individuals who will most likely inherit modifications applied in the progenitor.

Culbertson demands a prudent attitude in relation to developments of gene technology applied to sport, especially in the germline treatments[17]. In his opinion it is necessary to take the unpredictability of the long-term enhancement into account, which implies questioning, provisionally, arguments in favour of the germline genetic enhancement.

As Culbertson points out:

"So a problem here would be that if we lack sufficient information and the changes to a linear equation, we are in no position to predict the outcome, and if the chances conform to a nonlinear equation then we would be unwise to make such changes because we could have absolutely no idea of the outcome because of the degree to which our calculations can be inaccurate in nonlinear equations. …"[18]

Culbertson attempts to graphically illustrate the unpredictable changes that result from changes to the germline. Consequently he compares the application of the germline treatment to a "normal" case such as cystic fibrosis, an illness that is the result of a flawed gene(and not the result of the complicated interaction of several genes) and in which it is possible to replace the flawed gene.

In the case of the modification in the germline of the athlete to improve his sport performance, there would be some differences with the above mentioned case:

• the sport performance is not the result of one single gene;

• the successful performance in sport is not the only factor because there are different sports that demand different kinds of physical and psychological skills.

• modifications to improve performance imply genetic changes to achieve an external aim, whereas the modification in the gene causing cystic fibrosis attempts to correct a flawed gene and finally cure a serious illness.

• the germline modification would potentially carry on genetic changes for future generations that simply cannot be predicted. Such implications may be problematic in that it may be difficult in future generations to trace the changes back to their origin.

Unlike traditional doping, genetic technology transfer is still in an experimental stage of development. Genetic engineering is still, despite all investments, an incipient technology. It has achieved reasonable advances, but there are still issues that make it advisable to adopt a prudent attitude towards it. Especially relevant is the problem that some genetic transfer methods are irreversible and complex, so that certain complications would have no current solution. The interaction of genes between themselves and interactions between genes and the environment are just now beginning to be analysed and realised by scientists. The development of tragic cancers is a well-known risk of genetic manipulation. The Gelsinger case, the first person publicly identified as having died in a clinical trial for gene therapy, shows that unexpected problems can emerge in the development of new therapies.

Because of these considerations based on the caution in scientific research on genetic manipulation, Rupert Schneider-Rupert concludes:

"For these reasons, one could argue that athletes cannot make an informed decision to "gene dope"(nor could a trained geneticist for that matter) as there simply is no information, on either the probability or magnitude of potential adverse effects(especially in the long term) or, perhaps more importantly from the athlete's perspective, the actual ergogenic benefits of the treatment. With the avail- able evidence, this particular aspect of the argument from harm to users is the only one that is availing."[19]

As a result of all these considerations it seems reasonable to maintain a provisional ban on germline treatments. The basis of that conclusion is that this kind of research is still in an initial phase, and the final effects on athletes' health are unknown.

3. Doping and Rules of Sport

A very widespread objection to athlete's use of enhancement performance substances is that it perverts the true na-

ture of sport competitions.

The argument that is presented here is especially interesting insofar as it poses an objection to the use of the transfer technologies in the framework of sport without necessarily implying that these can be valid out of this sphere [20]. Tännsjö has pointed out that operations are seen in a very different way in general medical practice and in sports medicine[21]. The initial impression is that it is more feasible to carry out risky operations in the field of sport as athletes would normally have a more decided and risky attitude towards new medical operations and towards uncertain results. The reason for this attitude is their interest in returning to their sport as soon as possible. In this sense A. Miah points out that that the current anti-doping policy is inconsistent with the ethic of technologisation: "In relation to gene-doping, WADA does not appear to be in dialogue with bioethical committees, legal authorities, think-tanks or governmental advisory boards. In this sense, policymaking concerning gene-doping has the potential to be inconsistent with broader bioethical and bio-legal decisions concerning acceptability"[22].

However, to a certain extent, there can be specific reasons in the field of sport that prevent a certain type of medical operations, especially on those whose objective is the enhancement of the athletic performance. This is due to the current regulations of sport practices and to the appeal to certain values in the sport. Those values would be at risk if that type of interventions were allowed.

Sandel emphasises this idea when he writes:

"Arguments about the ethics of the enhancement are always, at least partly, arguments about the telos or the point of the sport in question, and of relevant virtues of the game". [23]

There are several conceptions inside this generic appeal to the "nature of sport", nevertheless what seems most interesting to me is to analyse the many objections to genetic manipulation in sport:

1. the result of the competitions would be seen as adulterated because there would not be equality between normal athletes and genetic enhanced athletes;

2. doping would remove the uncertainty and emotional component of sport;

3. with genetics in sports, athletes would not need to strive or make sacrifices to obtain good results;

4. the loss of the sport practice spirit;

5. the loss of popularity of sport.

I will examine these arguments as well as the objections in turn. Later I will attempt to look deeper into the debate taking into consideration the distinctions between somatic and transhumanist enhancements.

1. With the gene technology in sport, competitions would not be won by the best athletes. Instead the winner would be anyone genetically modified to obtain a certain skill[24]. Therefore in this way the equality and justice between competitors, which should govern the practice of any sport, would lose meaning. Allowing the participation in the same competition of normal athletes and genetically-improved athletes would be as unfair as allowing motorbikes to run in a bicycle race.

2. As a result of that asymmetry among competitors, the sport would lose excitement because the final result would be more predictable. Instead of being a dispute between individuals the competition would be transformed into a fight between technologically-improved bodies. The result of the competition would be more predictable given the technical nature of the athletes.

In a sense, the rules of sport, certainly in some disciplines more than in others, are based on a competition between a number of athletes(or teams), the result of which are unpredictable. This degree of uncertainty boosts spectators' interest. In the contest, they expect to see a fight or dispute on equal terms; this creates a sense of expectancy, a desire to know what the final results or who the winner will be. Professional sport owes its success to this connection between unpredictability and emotion.

3. A third objection would be that with genetic enhancement the athlete would not need to strive to make an effort or a sacrifice to obtain results. The genetic acquisition of physical power, height, or other relevant skills for the sport would make the physical sacrifice of the sportsman irrelevant to obtaining the sport victory.

4. Another objection is that the genetic engineering would corrupt sport. It would not retain the interest that it currently has: values that are specifically meaningful to sport would be seen as negatively affected. Tamburrini offers the following intrinsic values of "the sport" game[25]

1. flow: a good game needs to have a certain fluidity that allows different combinations so that it is allowed to flourish;

2. skill: in a good game participants should develop a relatively high level of abilities;

3. challenge: a good game should be a competition between rivals. A game between competitors in conditions of inequality is not a good game. Therefore there would be no intensity and the result could almost be given in advance.

4. excitement: if the result is uncertain and if the level of abilities is high, then the game would probably be exciting;

5. drama: when there exist conditions of equality in a game, the result will only be decided in the final moments, a characteristic which adds drama to the competition;

6. joy: when the game is fluid, the skill level is high and the contest even and exciting, competitors and the public will experience the sensation of joy, since they are involved in a hedonistic practice.

5. Another argument that has been put forward against the use of gene doping is that it would seriously affect the features of sport that we currently praise. The consequence would be that sport would lose popularity among followers. It is reasonable to think that with the existence of competitions in which athletes have genetically been modified, the interest in following the sport would decrease since excitement would be lacking; spectators would not enjoy the

physical displays in the same way. Examined from this perspective, sport would not be especially different from a horse race where the most significant aspects of the competition would be the speed and the physical endurance of the animals.

In the following section I will summarize the responses to these objections on gene doping's adverse affects on certain key features of sport:

1. An initial observation is that it is not necessarily negative(or at least, in some of its more popular practices) for there to be a decreased level of excitement in sport. Tännsjö has pointed out that sometimes, in some popular sport demonstrations, that passion becomes fanatic that can be dangerous and even fascistoid[26]

2. In second place, the criticism based on the loss of emotion cannot be extended to all sport practices. The improvement of technical factors via the use of performance enhancing substances would reduce the uncertainty in some sports, but not in all. Tamburrini points out that it is fair to say that it would affect those sport practices in which the sport results are valued within a temporary frame (in metres, seconds or kilograms), as is the case with weightlifting, jumps, or throws (of weights, javelins, etc)[27]. But there is no doubt that there are other sport disciplines where the relevant factor for success and victory is not the measure of some skill but the athlete's creative element. In this type of games where other factors rather than the purely temporary are involved, the influence of the doping substances would be smaller and therefore, the unpredictable emotional component would still exist. As Tamburrini points out,

"After all, there is not yet(a) pill or technique that can ensure the rise of the ball's control, of the rhythm and the creativity"[28]

3. In the third place, sport would not necessarily lose its popularity if athletes used gene doping. The current eting and professionalisation of sport does not seem to have affected its popularity. On the contrary it could be argued that quite the opposite has occurred. It is possible that the same phenomenon could be seen with gene doping. On the other hand, even in those sports where in recent technical improvements have been introduced and have become major elements of the competition, such as with motor racing, not only has interest not decreased, it has actually risen[29]

Additionally, more general responses to the objections to gene doping are that: 1) the physical improvements derived from the genetic interventions would not be so great as to affect equality among athletes or the emotion of the competition; 2) the genetic modifications would not give way to the loss of sports' key traits.

1.

Some people think that genetic physical enhancement would be so extraordinary that equality among athletes would disappear altogether. But, in fact, this perception is rather exaggerated. Actually, the impact of gene technologies in sport practice will likely not affect equality to such an extent. Gene doping, at least in its current situation, does not offer such miraculous results that the athlete will obtain

stratospheric results. The athlete still needs to train and make sacrifices to ensure top performance. In the end, doping simly offers a small difference in the results; if an athlete relied on the miraculous effects of a pill and stopped training, it is highly unlikely that he would be in the elite of his field.

As several authors have pointed out, the equality that would be produced as a consequence of the spread of these treatments would lead to the opposite situation: the effort, the dedication and the sacrifice would become a still more decisive factor for the sport than it is at present. The reason seems simple: doped athletes would not be so different from others with regard to their physical skills. Then, the victory in a competition would depend more on the creative aspect of the athlete, on the excellence of his character, on his technical decisions or on his ability to deal with risks, and not so much on accidental circumstances resulting from genetic lottery[30], or on the economic power of a country[31].

In the second place, the appeal to the injustice of the results due to the inequality of the competitors is relatively weak if we examine that in the current historical context. Sport competitions could also be considered unfair given each athlete's different genetic lottery. In the situation at issue an athlete who has made a great effort in his training and in improving his physical talents is in general unable to defeat another that has the luck of being genetically better equipped. The question is if it would not be fairer for the sport practice that athletes had greater gene equality. In that framework, the victory would not depend on the gene factor but instead on the effort made, or on the excellence of their personality or technical skills[32].

2.

Sport specific characteristics would not be diluted by genetic engineering. None of the types of genetic enhancement of athletes would affect sport negatively. As Tamburrini clearly points out in reference to the flow and skill elements of sport, the situation would remain equal if athletes were genetically modified. It could even be argued that both elements would improve if athletes were genetically treated.

If we consider the other elements of the game, the balance would also be favourable in terms of gene technology. Nowadays competitions tend to be won by that the athlete that is favoured by the unequal genetic lottery. If enhancements were medically controlled and criteria were established for their implementation for every sport practice, it is likely that competitions would be more equal than is the case now. And the greater equality among athletes, the greater the likelihood that the competition would be more exciting and dramatic, and this would finally result in greater enjoyment as well. Although it is impossible to predict future scenarios with certainty, it seems quite likely that this might come true.

If these objections are examined taking in consideration the somatic treatments referred to in the chart, then is possible to conclude that:

1. if the genetic interventions are of the enhancement type, just as the first criticism shows, then neither the equality among competitors nor the harm principle would be affected. Therefore, I see no compelling reason to forbid these treat-

ments. Of course, in order to accept such treatments other conditions would also be necessary such as: 1) respect in the continuity of the enhancement progress; 2) equal opportunities among athletes with regard to access to such enhancements; and 3) official medical control. [33]

2. If the genetic interventions are of transhuman type, the specific features of sport do not seem be affected negatively. On the contrary, they are improved by the superior skills of transhuman sportsmen.

However, with regard to the equality among competitors it seems obvious that if genetic interventions are of transhuman type, the current sport practices will be altered substantially. The possibility that athletes with transhuman physical improvements and non-genetically treated athletes could compete together in the same contest would completely distort the results and that would deprive the sport of excitement

Nonetheless, the solution is not necessarily forbidding such modifications; instead it would be reasonable to establish new and separate contests for those transhuman athletes.[34]

4. Conclusions

Genetic performance enhancement in sport is almost unavoidable and therefore, it is necessary to establish rational criteria on gene doping. In the previous pages I have examined some relevant arguments that can be taken into consideration in establishing those criteria.

A strategy to establish those regulatory parameters with regard to gene doping is to consider two criteria: the extent of the treatment effects and the type of genetic intervention. With regard to the extent, it is common to distinguish between enhancement interventions and transhuman interventions. In terms of the type of intervention it is possible to distinguish between somatic and germline interventions. A combination of these two criteria offers the following genetic modifications: 1) somatic enhancement interventions; 2) somatic transhuman interventions; 3) germline enhancement interventions; 4) germline transhuman interventions.

Having examined these possibilities for genetic modification in relation with sport some conclusions can be suggested:

1. Somatic enhancement interventions: their application in sport could be qualified as legitimate since these types of interventions do not fall within the scope of the harm argument (except when the risk is excessive) nor do they affect the spirit of the sport. Indeed, objections based on the harm principle would be of an unjustified paternalistic nature. And objections based on the spirit of sport would not be valid because these kinds of modifications would not substantially effect the equality principle or other values of sport. In order to be able to accept such treatments it would be necessary to comply with other conditions such as: 1) continuity in the enhancement progress; 2) equal opportunities among athletes with regard to the access to such enhancements; and 3)

medical official control. As Miah, points out, making a comparison between impaired athletes and enhanced sportsmen: "If sport is valuable because it promotes equality of opportunity and fairness, then the organisation of sports must be commited to making elite sports participation open. Such a commitment would need to entail making elite sports participation open to all kinds tos persons, regardless of their genetic predisposition" [36].

2. Somatic transhuman modifications: as in the case above, this kind of enhancement interventions would not be affected by the objections based on the harm principle. But they would be affected by the principle of equality between competitors. The problem would arise if there were transhuman and non-transhuman athletes in the same competition. A possible solution could be to establish separate competitions for this type of transhuman athletes.

3. Germline enhancements and transhuman germline interventions: both cases would be affected by the harm principle given that germline research and tests performed up to now show that they are still in an early stage and it is impossible to foresee the results. For this reason, the recommendation, at least provisionally is that they remain forbidden until scientific evidence can certify that this genetic modifications will not affect the health of offspring. Only in this limited area of genetic enhancement I agree with MacNamee when says that we are mortal beings, our vulnerability to disease, injury and the waning of our powers far from something we can overcome or eliminate, represent natural limits both for morality and medicine generally and sports medicine in particular[36]. This conclusion does not deny the need for ongoing research on germline treatments. My recommendation is that the ban is reduced to the use of germline intervention in sportsmen.

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