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Improvement in sprint performance: doping or nature?

We read with interest Ernst and Simon's article on a quantitative approach for assessing significant improvements in elite sprint performance, and we found several uncertain aspects in their analysis.[1] In particular, although the authors mention that other possible explanations may have contributed to explain the observed trends, they inherently underscore the likelihood that these major improvements are attributable to doping, principally to the unfair use of human growth hormone (hGH), insulin-like growth factor-1 (IGF-1) and 'designer steroids' such as oestrogen receptor antagonists.[1] Nevertheless, there are several aspects that would make this reasoning substantially questionable.

First, we believe that the remarkable improvements observed in the 100 and 200 m are mostly due to the performance of one single athlete, Usain Bolt, who has repeatedly broken the world record of these sprint disciplines in 2008 and 2009, by lowering the limits by notable coefficients of 0.984 and 0.993, respectively. As such, Figures 3 and 4 in Ernst and Simon's paper are misleading, since the dramatic drop of the polynomial lines is almost entirely due to the performance of one athlete, and cannot be attributed to an entire group of athletes. This phenomenon has been recently defined as the Usain Bolt effect,[2] and has been attributed to stature and reduction in stiffness as a consequence of the increased contact time and lower step frequency, which both result in an advantage in relative power development and mechanical efficiency.[3] This would not support the theory of improvement by doping but – rather – the well known possibility of 'extreme outliers' that seldom occur in a normal distribution of athletes, and may remarkably account for an improvement in records.[4]

A second important aspect that argues against the Ernst and Simon's conclusions is that Usain Bolt, the athlete who has dramatically improved both 100 and 200 m world records, has never been found positive during anti-doping controls, either in- or out-of-competition, by whatever anti-doping authorities. Until opposite evidence can be provided, this is the only reliable proof that we have that the world records were broken by a fair athlete.

Then, it is also questionable to assert that the use of hGH and/or IGF-1 explains the effect on 100 m performance between 2006 to 2011, since it has been clearly acknowledged that athletes have been abusing hGH for its anabolic effects since the early 1980s, whereas the first test was not introduced until 2004.[5] Accordingly, it is much more likely that the abuse of hGH had been commonplace before 2006, and not afterwards. An identical consideration can be made on the potential abuse of IGF-1, since this substance appeared much earlier than 2006 on the black market.[6]

In conclusion, we believe that it is wicked to put forward the hypothesis that 'effective doping procedure with IGF-1 is the primary candidate explaining the observed effects', at least at this point in time. We believe, however, that these major improvements in elite sprint performance may be principally attributable to the occurrence of an extreme outlier among athletes, i.e. Usain Bolt. It is also noteworthy that additional aspects that may have contributed to remarkable advances in sport performances were overlooked by Ernst and Simon. These entail environmental and technological issues, such as improvements in training and sport physiology, licit ergogenic aids, ergonomics/wind-resistant clothes, better running shoes, and new innovations in athletic tracks, such as new tartans and surfaces.[4,7,8]

Yours,

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