The Age of Genetically Optimized Sports

We are entering a brave new world of athletes-by-design.

By DOV GREENBAUM AND MARK B. GERSTEIN

The eyes of the world will be on Oscar Pistorius when he competes at the London Olympics. Mr. Pistorius, a double amputee who runs with the aid of carbon-fiber artificial legs, will contest the 400-meter sprint and the 4 x 400-meter relay against non-disabled athletes.

Mr. Pistorius, and others like him, present a real dilemma for sports competitions: When does an artificial enhancement become an unfair advantage?

Lasik eye surgery can give an athlete better than average vision. Elbow joints can be reconstructed with stronger ligaments. Swimsuits may reduce friction in water. Oxygen tents can boost cardiovascular capacity. While sports organizations typically draw the line at taking performance-enhancing drugs, such as steroids, these other apparent enhancements are permitted by most major sports associations.

Yet retired American sprinter Michael Johnson spoke for many when he claimed that "because we don't know for sure whether [Mr. Pistorius] gets an advantage from the prosthetics that he wears it is unfair to the able-bodied competitors."

Of course top athletes are often defined by their success in a genetic lottery that granted them natural yet "unfair" advantages over their peers.

Even more radical changes are on the way. Future developments in genetics, particularly as a result of the growing personal genomics industry, will allow individuals to sequence and partially decipher their own genomes. This will draw public awareness to genetics in athletics, creating a paradigm shift in our appreciation of the quality of competition in sports. Genomics may eventually accentuate the inequality among athletes, allowing those with genomic knowledge to better focus their abilities and strengths.

Some companies that sequence human genomes already claim to be able to identify genetic sports-related health risks and the genes that maximize individual athletic potential. In fact, sports may be one of the first really successful applications of personal genomics, as it presents some potentially simple genetic correlations, given easily identifiable physical traits in successful athletes.
Thanks to a greater popular appreciation of the genetics behind athleticism coupled with advances in genetic manipulation, we may soon see athletes-by-design, either from conception or a childhood tailored to sports for which the budding athlete is already genetically optimized. Will society discriminate against the athlete whose parents selected a child with superhuman resting and maximum heart rates, a disproportionate arm span or double-jointed ankles? After all, these super-competitive traits were naturally endowed to Lance Armstrong and Michael Phelps.

The genomics industry will introduce transparency into an otherwise opaque system, eventually allowing athletes, fans and spectators alike to pull back the curtain and look under the genetic hood. By taking away much of the mystery of athletic talent through correlating athleticism with observable genetic variations, and bringing that technology to the masses, science will eventually prove to the public just how uneven the playing field already is.

Genome analyses may be able to predict athletic prowess and the likelihood of sport-related illnesses and injuries. But such knowledge will likely come at the expense of privacy.

Coaches and fans today demand to know players’ height, weight and other pertinent statistics. Tomorrow, they might insist on knowing athletes’ genomic sequences to determine how they have leveraged their genetic gifts.

Analyzing genomes raises numerous non-trivial ethical challenges, with an inevitable shift to viewing athletic accomplishment through the prism of genetics. Whereas traditionally one’s medical records are thought to be private information, we may soon see organizations divulging their athletes’ genome sequences in the interest of transparency—just as athletes’ drug-testing results eventually become public knowledge and fodder.

Mr. Pistorius is thus at an athletic and scientific vanguard. He may catalyze a whole new way of looking at sports when he runs, and perhaps finds success, among his able-bodied peers.

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