Reconsideration of a Tour de France cyclist

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In 2005, this author published a paper in the Journal of Applied Physiology that described physiological changes that occurred in a Tour de France cyclist as he matured from 21 to 28 years of age during the period of 1992 to 1999 (2). This cyclist has recently admitted to using performance-enhancing drugs. That leads us to wonder if any of the physiological changes reported in the 2005 paper might have been influenced by his drug use. The author’s only knowledge of his use of drugs or performance-enhancing procedures comes from a televised interview when he reported using erythropoietin, red blood cell reinfusion, testosterone, cortisone, and human growth hormone (Oprah Winfrey Network; January 17 and 18, 2013). In the televised interview this cyclist stated that use of some drugs began in the mid-1990s. The main physiological improvements he displayed over this 7-year period during which the author was testing him were an improved gross mechanical efficiency and a reduced body weight. It is also worth noting that four of the five laboratory-based physiological testing sessions were performed in the precompetitive season or with reduced training, although one session was conducted at the end of the competitive season.

It is not possible to know the extent to which his drug use might have improved his gross mechanical efficiency because there have not been direct studies conducted to the author’s knowledge. Erythropoietin and/or red blood cell reinfusion would seem to be taken acutely during the competitive season to boost blood volume during a race, although it is conceivable that erythropoietin could be taken as a training aid. The author has no knowledge of how it is actually used. However, it seems unlikely that this cyclist had elevated blood volume at the time of physiological laboratory testing. Furthermore, it is unlikely that an elevated blood volume would improve gross mechanical efficiency, because studies that have acutely infused red blood cells into athletes have not reported changes in efficiency measured from open circuit spirometry (1).

Since publication of the 2005 paper (2), there have been several reports of champion athletes displaying improved efficiency of movement. The world record holder in the women’s marathon, Paula Radcliffe, displayed a remarkable 15% improvement in running economy between 1992 and 2003 (3). Furthermore, there have been reports of efficiency improving in competitive cyclists (4). Therefore, there is growing evidence that mechanical efficiency can improve with chronic training. However, we cannot be absolutely certain that the improved gross mechanical efficiency and reduced body weight displayed in the subject of the 2005 paper (2) was not somehow influenced by his reported drug use.

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REFERENCES

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