Systematic Training: From “Master Classes” to “Science”

In the 1960s and ’70s, people like L.P. Matveyev from Moscow and H.D. Harre from Leipzig laid the foundation for current principles of training in high-performance sports that nowadays are widely applied in all areas of physical exercise and training. However, as I remember my early days at university and in coaching and training, these concepts of systematic intervention to improve human performance were taught in classes called Trainingslehre, which is possibly best translated as master classes in training or school of training rather than training science. This early nomenclature reflected an approach to disseminate observations of what seemed to work in athletes within a systematic and primarily mechanistic framework. Reading this literature carefully and reflecting on daily challenges in high-performance sport led to the conclusion that efficient training is not just the simple application of recipes with limited generalized validity. However, the idea of a systematic training approach put forward by the pioneering scientists helped immensely to maneuver through myriads of options to take on new targets. It was possibly a bit premature to take the semantic step to “Training Science” in the 1980s. Even today, fundamental bases of Training Science seem to be torn between traditional views and a lack of evidence, as discussed by John Kiely in his article “Periodization Paradigms in the 21st Century” in the current issue.

However, the notion that Training Science is still a prominent headline compared with real knowledge about how it works should not be seen as a demoralizing defeat of several decades of academic effort. In essence, the disconnect between knowledge and application in sport reflects the challenge of manipulating highly complex mechanisms representing a variety of options to increase performance (and in different subjects) in a complex interplay of various adaptive processes triggered by distinct combinations of exercise mode, intensity, and volume in given individual socioeconomic settings. Another potential pitfall in Training Science still seems to be the lack of clearly defined limits of performance. Obviously, in many events world-record attempts require different strategies than Olympic qualification rounds and finals, or multistage events like the Tour de France. The factors that regulate individual performance profiles in most game and combat sports are still rather vague. However, a rapidly increasing spectrum of modern technologies, multidisciplinary approaches, and coordinated interaction between athletes, coaches, and scientists offers real opportunities for sports-performance researchers and practitioners. Much work remains, however, to illuminate the large number of “black boxes” that determine how top performance works, even in events such as the Tour de France with a history of almost 11 decades, as described in the review of Santalla et al, starting out this issue. The 2012 London Olympics will have yielded many surprises in terms of favorites performing below expectations, as well as some exceptional performances of young or unheralded athletes who even seem to diminish the gender gap in highly physical events like swimming. The scientific challenge to better understand the processes of training, adaptation, and performance seems greater than ever.

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