Where motor disability and elite sports science meet

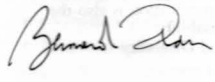
The love story of sports and disability has long been passionate and inspiring.[1] In recent years, it has generated countless fields of practice, both as leisure and at the highest Paralympic level. These developments tell us a great deal about enjoyment, self-fulfillment, and empowerment. But another more recent romance has blossomed from the encounter between sports science and motor disability in the academic arena of motor control. The pair has been thriving thanks to conceptual advances, technology, and unifying theories woven around functional and statistical developments.

Normality can be approached statistically, but at both ends of the curve stand individuals scoring abnormally low and those scoring extraordinarily high. This variation places achievements obtained with impaired function within the same dimension as those reflecting elite skills – at opposite but symmetrical extremities of the spectrum. Variation provides justification for the practice of 'handicapping' (no pun intended) in sports such as golf or ski racing, i.e. assigning weighting to competitors according to their experience in order to maintain everyone's fair chances of winning.

Based on this view, theoretical interpretations are suggested in regards to how motor patterns emerge. For example, average individuals (synonymous with normative or control participants) show similar normal patterns for given motor tasks, ascribed to how their motor system prioritizes coordination rules. More or less effective patterns emerge respectively in elite athletes as a result of specialized skill and training, and in people with motor disorders secondary to an impaired system. Consequently, individuals with impairments are considered (at least potentially) differently able, and we may question whether coaches or therapists should try to promote what they consider to be 'normal' motor patterns, or instead optimize the way in which the central nervous system may reconsider priorities in order to improve performance.[2] A famous illustration of an advantageous alternative motor coordination pattern is the Fosbury Flop, which won Dick Fosbury a gold medal for high jump at the 1968 Olympics and is now used universally. Many a therapist searches for similarly innovative strategies for individuals with motor impairments in skill learning and consolidation.

The rapprochement between motor disability and sport science has led to convergent interests in technological movement analysis providing kinematics, kinetics, muscle activation patterns, and even brain activation patterns. Both domains increasingly rely on such analysis for intervention planning and evaluation of change. There has also been parallel reflection on personal factors that are relevant to both. Examples include attention, motivation, anticipatory action, biomechanical constraints, postural control, sensorimotor integration, and modulation of reflex activity. In addition, physical fitness, fatigue, diet, respiration, biochemical factors, specific garments, and many other aspects of human enhancement technologies generate both interest and debate. This harmonization has also fostered cross-fertilization of coaching techniques, use of training equipment, muscle strengthening, constraint-induced exercising, mental imagery approaches, biofeedback, serious gaming, and virtual reality programmes.

All these developments result in new frameworks and perspectives, and a host of new questions about how to support individuals with motor impairments. For example, what are the respective benefits of training (directed towards skill acquisition and improvement, under professional or lay persons' supervision) and therapy (by therapists aiming to comprehensively improve function)? This question touches on the more fundamental issue of setting goals for management. In elite sports, goals typically reflect the Latin motto *Citius, Altius, Fortius* (Faster, Higher, Stronger) proposed by Pierre de Coubertin when he founded the International Olympic Committee in 1894. This is an invitation to give one's best and experience this as victory. It remains consistent with current societal pressure towards best performance, which may also affect the life of people with disabilities. For some people the pressure to win at any cost may overrule other elements, at least in selected situations. If pursued in that sole dimension, management might miss the adage that de Coubertin put forward in his other Olympic principle: *L'important c'est de participer* (The important thing is to participate). This latter value, in all its complexity, resonates in harmony with participation as defined within the International Classification of Functioning, Disability and Health.[3]



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doi: 10.1111/dmcn.13056

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