

## COACHING RUNNING TECHNIQUE FOR CLOSED AND OPEN SKILL SPORT Frans Bosch<sup>1</sup>

Fontys School for Sport Studies, Oude Delft 203, 2611 HD Delft, The Netherlands<sup>1</sup>

It is known running technique should be considered with knowledge of functionality of anatomy and physiology. The principles of variability, specificity and transfer of training should play a central role in instructing running technique. This applied Session demonstrates Using Dynamic systems to implement generic aspects of running: how Japan Rugby was prepared for World Cup 2015.

**KEY WORDS:** Strength, conditioning and training

**INTRODUCTION:** In Recent developments in research in the field of motor control and motor learning have shifted towards the influence of the non-static real world environment on the execution of movement patterns. This combined with scientific discussions, pointing out the limitations of brain central models of motor control in estimating the effects of feed-forward signals, gives rise to the assumption that dynamic systems theory is the best available approach to understand high intensity movement especially in open skill sports.

**METHODS:** Key component in dynamic systems theory applied in movement is the concept of self-organized attractor-fluctuation landscapes, providing stability and controllability of movement. Attractors are self-organized and highly stable components of movement that reduce the degrees of freedom and so improve motor control. Fluctuations are less stable components that can change and make for the adaptation to the requirements of the environment. The successful combinations of attractors and fluctuations provide a bandwidth of possible successful solutions (movement variability). Though science hardly has mapped out any attractors of sporting movement, there a number of assumptions that can be made, when searching for optimal attractors in contextual movement.

- attractors are anatomy based and should occur where the anatomical structures are under pressure.
- in high intensity movement the possible set of effective attractors is reduced, because the constraints of the anatomy on performance become stronger.
- between variations of an optimal executed skill (like agility being a variation on basic running) attractor sets change as little as possible.
- peripheral self-organized attractors occur when the effectiveness of these attractors is under time pressure.

Based on these search rules a number of basic hypothetical attractors for running can be formulated. If formulated well, this approach has a big advantage in understanding motor learning, especially in understanding transfer of training. It makes sense to assume that attractors, since they are environments independent, will transfer between related movement patterns, whilst fluctuations are so environment dependent that they will not transfer easily. Therefore in teaching running skills, focus on the important attractors gives best guarantee for transfer.

The Japan National Team Rugby in the run up to the last World cup heavily relied on the above training strategy, selecting a number of running based attractors to mainly improve their attacking capabilities. Using intrinsic learning methods resulted in significant improvement in skill levels.