

The roots of return to sport

Las raíces de la vuelta al deporte

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doi: 10.18176/archmeddeporte.00158

Training and sports rehabilitation are based on the same rules, originating from the Theory and Methodology of Training¹. In both cases it is the results that matter. Unlike training, sports rehabilitation does not develop through multi-year programming, but it is unluckily inserted into the athlete's life for a limited span of time. Hence, in sports rehabilitation the training theory must adapt to the limitations imposed by the pathology and its evolution, so for sports physicians and athletic trainers it is necessary the acquisition of a sound knowledge regarding the different pathologies and their treatments together with a sound knowledge of the Theory and Methodology of Training.

Some years ago, the concept of "*functional outcome*" was introduced to point out "*the functional result of a treatment process*"². This concept implies that the physical condition of an injured athlete must be periodically measured conducting specific tests and analyzed to implement the corrections imposed by the evolution of the pathology, from the moment of diagnosis to that of discharge³. In this way, thinking in terms of *measurable expected results*⁴ pushes to raise the threshold of attention of healthcare professionals, improving the quality of therapeutic decisions. This approach increases the awareness of the physician in charge of the patients, stimulating to face the effectiveness of her/his intervention and that of the colleagues and collaborators, which must work together in a team.

The rehabilitation process is a complex phenomenon since it is influenced by multiple factors. However, it is also dynamic⁵ since it continually evolves over time because of the interaction of different factors with each other. There is strong evidence for considerable heterogeneity in the responsiveness to regular physical activity and rehabilitation. Age, sex, and ethnic origin are not major determinants of human responses, whereas the pretraining level of a phenotype has

a considerable impact in some cases⁶. Familial factors also contribute significantly to variability in training response⁵ and in cardiorespiratory fitness⁷ affecting the sports rehabilitation process.

Therefore, modern sports rehabilitation must overcome the reductionist approach, based on static and simplistic analyzes⁸ without considering not only the complexity, but also the dynamicity of biological phenomena regulated by several delicate feedback mechanisms.

In 1995 Wilson and Cleary⁹ proposed a model with five levels of outcome, starting from the cellular one, and moving to that of the individual (the person), up to the interactions of the individual as a member of the society. The conceptual complexity of each level increases proceeding from the cellular to the social level, which therefore becomes of increasing difficulty to define and measure.

Overcoming the reductionist approach can only be achieved by intimately understanding the different components of the *functional outcome*. These components are embodied by the various professionals met by an injured athlete during her/his personal therapeutic journey. These operators too often struggle communicating with each other, since they come from different educational backgrounds, leading to focus on their discipline (or knowledge) and on their specific skills. In this way they *reduce* the human body to a set of individual parts (or functions) and sub-parts (or sub-functions), which cannot necessarily represent the complexity and the unicity of the human being. This attitude leads them to *reduce* the possibilities of impacting the functional recovery and to conceive the injured athlete as a person as a whole, the same way conceiving the rehabilitation as a whole¹⁰.

There is a prerequisite to access the anti-reductionist approach, which derives from the definition of health proposed by the World Health Organization: "*State of complete physical, mental and social well-being and not simply the absence of disease or infirmity*". By adopting this

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definition, the post-injury recovery process cannot be limited to the *restitutio ad integrum* of the affected zone of the body, but must consider also the psychological and social aspects, increasing the complexity of the intervention. Despite the variability in the definition of return to sport (RTS) used in the literature^{11,12}, RTS is actually a very complex process developed along a continuum that includes the return to training (RTT), the return to competitions (RTC) and finally, the return to performance (RTP)¹³. It follows that to establish whether an athlete can return to sport, both in training and/or in competition, we should adopt almost five criteria. 1) Clinical criteria: consisting of absence of pain, swelling, other signs of inflammation, complete healing process, complete range of motion, and good joint stability. 2) Functional criteria: investigated by functional assessment tests, including body composition (often ignored), recovery of strength and absence of deficits in the strength tests carried-out in the laboratory and in the field, also including the recovery of endurance and rate of force development; recovery of physical fitness and aerobic and anaerobic power and endurance. 3) Biomechanical criteria: investigated by tests referring to the recovery of motor patterns, certifying the absence of deficits in movement analysis tests. 4) Psychological criteria: fear of reinjury and psychological attitudes of the patients, identifying those who could benefit from psychological support. 5) Specific sport and social criteria: shared with coaches and technicians, reaching specific objectives relating to the sport practiced, including the ability to sustain volumes and intensities of trainings and competitions, but also overall lifestyle indicators including nutrition and sleep, together with other healthy measures (i.e., smoking habit).

Finally, it is interesting to note that there are numerous questionnaires available to evaluate functional outcomes also from the patient's point of view¹⁴. Even the use of these questionnaires can indicate the adoption of a reductionist or anti-reductionist approach. In fact, there are questionnaires to evaluate *only* the functionality of the injured limb (e.g., the IKDC questionnaire), and questionnaires to evaluate the *overall* state

of health and the quality of life (e.g., the SF-36 questionnaire). Obviously, we should use both, working in team to overcome the antireductionist approach to RTS.

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