

MONITORING AND PERIODIZATION OF PERFORMANCE FROM SPORTS PHYSIOTHERAPY. WHERE ARE WE GOING?

MONITORIZACIÓN Y PERIODIZACIÓN DEL RENDIMIENTO DESDE LA FISIOTERAPIA DEPORTIVA ¿HACIA DÓNDE VAMOS?

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ABSTRACT

Introduction The concept of monitoring and periodization is a vision that has been developed in the last decade, where it is sought to have control of the internal and external load in athletes of different sports disciplines produced by the process of interaction with exercise prescription variables. that cause changes at the physiological, biochemical, biomechanical, muscular, neuromuscular level, causing tension in the subsystems of human body movement, generating adaptations to a given load, which can be measured through the use of specific technology or indirect tests. **Methodology** Review of the literature with the combination of keywords such as Monitoring, Performance, sports training load, Periodization in databases such as Pubmed, Ebsco, Medline, Scopus, Science Direct **Results**, it was possible to identify 65 articles that refer to the existence of technological tools to carry out a monitoring process and periodization from rehabilitation, prevention, load control, recovery and sports readaptation that allow the generation of statistical data and the creation of profiles from each area of action of the sports physiotherapist. **Conclusion** Physiotherapy is a profession in charge of many sports processes that must be monitored and allow the generation of data to standardize processes, create performance profiles to facilitate decision-making from the biomedical team and research in high-performance sports merging practice with scientific evidence.

KEY WORDS: monitoring, performance, sports, adaptation, training load, periodization

RESUMEN

Introducción El concepto de monitorización y periodización es un visión que se ha desarrollado en la última década, donde se busca tener un control de la carga interna y externa en los deportistas de distintas disciplinas deportivas producidas por el proceso de interacción con variables de prescripción de ejercicio que causan modificaciones a nivel fisiológico, bioquímico, biomecánico, muscular, neuromuscular ocasionando la tensión en los subsistemas del movimiento corporal humano generando adaptaciones ante una carga determinada la cual puede ser medida mediante el uso de tecnología específica o test indirectos **Metodología** Revisión de la literatura con la combinación de palabras clave como Monitoring, Performance, sports training load, Periodization en bases de datos como Pubmed, Ebsco, Medline, Scopus, Science Direct **Resultados** se pudo identificar 65 artículos que referencian la existencia de herramientas tecnológicas para realizar un proceso de monitorización y periodización desde la rehabilitación, prevención, control de carga, recuperación y readaptación deportiva que permiten la generación de datos estadísticos y creación de perfiles desde cada área de actuación del fisioterapeuta deportivo. **Conclusión** la fisioterapia es una profesión encargada de muchos procesos deportivos que deben ser monitorizados y permitan la generación de datos para estandarizar procesos, crear perfiles de rendimiento para facilitar la toma de decisiones desde el equipo biomédico e investigaciones en el deporte de alto rendimiento fusionando la práctica con la evidencia científica.

PALABRAS CLAVE: seguimiento, rendimiento, deportes, adaptación, carga de entrenamiento, periodización.

INTRODUCTION

Physiotherapy is a profession in charge of the study of human body movement that is constantly evolving in different areas of knowledge. For example, the physiotherapist in the sports area is a professional who is recognized for knowledge in areas such as physical activity, injury rehabilitation, performance enhancement, sports rehabilitation, promotion of healthy lifestyles, research, evidence-based practice and innovation in athletes of different sports disciplines developing specific competencies of the physiotherapist in sport(1, 2).

At present, sports physiotherapy has come to be considered a specialization of the professional branch where higher level clinical competencies are developed related to high performance sport and focused on health where a dynamic process of interaction between social areas is established that allow the development of the specialty of sports physiotherapy from specific concepts involved with the human being and the sports discipline practiced(3).

Physiotherapy, being considered a specialty for high performance sport, is obliged to offer interventions with world quality standards focused on the high performance athlete(4) where the concept of periodization and monitoring of specific processes by physiotherapy begins to be discussed, where the implementation of any process must specifically follow the principles of prescription and progression, making an adaptation to the interventions that have an effect on the musculoskeletal, neuromuscular and cardiovascular systems, neuromuscular and cardiovascular systems, where by carrying out these processes it will be possible to create periodization and evolution curves in athletes that will allow the physiotherapist to make decisions in different contexts of sport(4-6).

High performance sport has faced numerous challenges as the game has evolved, where it has become evident that athletes are exposed to scenarios with high physical demands that make visible the importance of physical preparation adapted to the sport discipline that contains all the elements that can cause alterations at physiological, physical and body level, for which an adequate monitoring process and data analysis will be vital in achieving objectives in any sport discipline(7-10).

Monitoring and periodization is a concept that has been developed in the last decade where the aim is to have a control of the internal and external load in athletes of different sports disciplines that are exposed to exercise prescription factors that produce modifications at physiological, biochemical, biomechanical, muscular, cardiovascular level and cause stress in the subsystems of human body movement that seek a specific adaptation to a specific load that can be measured by using specific technology or indirect tests through the application of tests(11), From physiotherapy it has always been established as a challenge to control the processes of rehabilitation, recovery, prevention and sports readaptation where specific monitoring profiles are established by player, position and sports discipline at the level of injuries, return to play, load control and recovery processes that allow to improve decision making by physiotherapy(12-14).

The processes carried out in physiotherapy in sports should be monitored by means of elements that can generate quantitative and qualitative data at the level of rehabilitation, prevention, readaptation and recovery to improve decision making by professionals. For this reason, the aim of this article is to carry out a narrative review of the tools that allow a process of periodization and monitoring of sports performance for physiotherapists in the sports field.

MATERIAL AND METHODS

Type of study

A narrative review of the literature was carried out in the main databases such as: Pubmed, Ebsco, Medline, Scopus, Science Direct, and the documentary technique was used to collect the information using specific files.

Inclusion and exclusion criteria

Inclusion: Literature contemplated from the year 2017-2022, literature that contemplated the following DeCS terms: Monitoring, Performance, sports, adaptation, training load, periodization, and language of evidence English, Spanish and Portuguese.

Exclusion: Studies that were not available for download, studies that did not comply with the established search year.

Search for information

The search for evidence was performed using the combination of key concepts such as: [Monitoring] AND [Performance]; [Monitoring] AND [sports]; [Monitoring] AND [training load]; [Monitoring] AND [Periodization]; [Periodization] AND [training load]; [Periodization] AND [sports]; [Periodization] AND [sports]; [Periodization] AND [sports]; [Periodization] AND [training load] AND [Sports].

RESULTS

With the evidence consulted in a total of (65) documents, it could be evidenced that there are technological and monitoring type tools that should be used to improve the intervention processes by physical therapists in the spheres

of rehabilitation, sports readaptation, prevention and recovery working in high performance sport, Figure 1 summarizes the tools used for the monitoring and periodization process.

Rehabilitation and sports readaptation

Within the rehabilitation processes, technological tools should be used to monitor the process and create profiles to establish follow-up parameters for specific injuries, controlling load, type of exercise, series, repetitions, adaptation, strength in order to create processes that adapt from the control and create performance curves in rehabilitation and analyze the process by specific injury that allows to have a unified and standardized process for each step in the process of functional recovery of the athlete(15-17). Among the technological tools to create follow-up profiles within the rehabilitation process are the following: Nordbord device specialized in measuring and profiling hamstring strength(18-22), Groinbar device for profiling and tracking adductor strength(23-25), Linear and rotary encoder device specialized in coding mechanical movement in a specific plane of motion or the combination of the same that generate impulses that are decoded by software that generate quantitative data for monitoring in professional athletes(26-29), Force plates device that measures the force exerted on the ground by a body called reaction forces where the behavior of specific patterns is studied at a biomechanical level and at a sporting level of functional patterns of sport(30-32). Isokinetic device is a system that allows the evaluation of muscle strength and power between the agonist and antagonist musculature of different joints at a certain speed and specific angle expressed in physical units of force, allowing the monitoring of the rehabilitation process (33-35). Field tests are recognized as tests of physical characteristics such as speed, acceleration, deceleration, agility, distance traveled, power done in the field monitored by global positioning systems (GPS) that allow real-time monitoring of all game actions of the sport discipline and its correlation with normality data of the tests and measurements in the sports rehabilitation process (36-40).

Load Control and Recovery

One of the pillars of the process in the sport success is the recovery of the athlete at functional, physiological and psychological level(12, 41-43). This process can be achieved by controlling the intrinsic and extrinsic load in the training processes of any sport discipline(44, 45). It has been reported the use of different types of tools for load control to obtain optimal recovery processes and reduce the risk of injury based on the monitoring of different elements such as global positioning systems (GPS), Accelerometry, metabolic power production, perceived exertion scale, heart rate, state of well-being of the athlete, biochemical examinations, biochemical tests and control of the athlete, biochemical examinations and neuromuscular fatigue control characterized by strength and jumping tests with strength plates and jumping surfaces used within the structured microcycles of specific training where the adequate control and follow-up allow generating statistical cycles of variables per athlete achieving standardization of the loading and recovery processes by the professionals generating statistical control models(46-51).

Injury prevention

The monitoring of neuromuscular fatigue is a relevant factor in the process of control of behavioral factors and the evolution of the correlation of load acceptance in high performance athletes where tests are performed using applied technology such as force plates, jumping platform and movement sensors to control the loss of muscle strength and its relationship with factors such as jumping, Through specific monitoring, it is possible to follow up the athlete and perform statistical algorithms standardizing the load control process to optimize performance from the specific microcycle control(52-55).

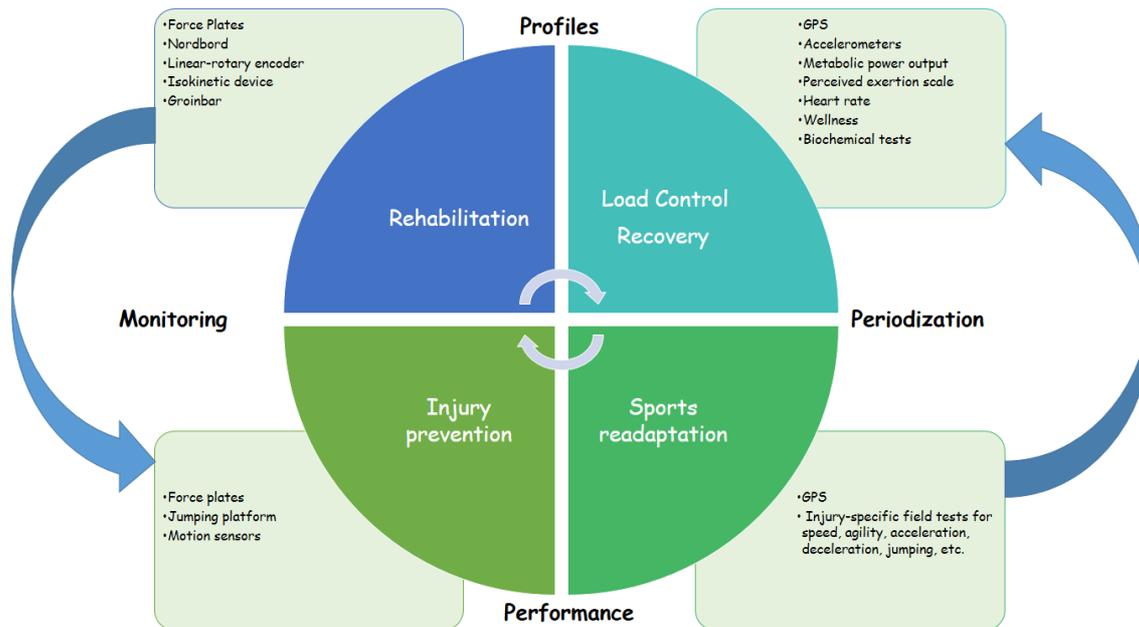


Figure 1. Elements used in monitoring and periodization used by physiotherapy. Source of own elaboration: 2022

DISCUSSION

Within the whole process that physiotherapy performs, monitoring and periodization have been highlighted as a pillar in the intervention processes at a sports level, allowing processes based on a quantitative and qualitative follow-up to be carried out consistently in high performance sports(17, 56). The load control of any process where there is an interaction of exercise prescription factors that stimulate the work of structures at biomechanical, articular, cardiovascular, muscular, neuromuscular level must have a control through constant measurement and production of statistical data that allow the generation of statistical bases and work on the performance profile of athletes by sport discipline, This process allows creating a standardized path in terms of interventions, improving the quality of the service and follow-up that is performed with the athletes allowing the reduction of errors, increase of production, monitored follow-up and adequate decision making for the athletes(57-59).

The development of technology and evaluation and follow-up tools has allowed in the last decade the evolution of specific follow-up processes in high performance sport from the creation of performance profiles by sport, playing

position, gender, injury, prevention, recovery, achieving the adaptation of statistics as an indispensable tool for professionals in the sports area that in combination with experience allows developing processes from evidence based on science and practice adapted to a context of sport that is characterized by not having a linear process but cyclical with different factors that condition it in different spheres(60-65).

CONCLUSIONS

The monitoring and periodization of all physiotherapy processes in high performance sport should be carried out to improve all interventions performed with athletes from rehabilitation, prevention, recovery and sports readaptation, converting interventions into data that can be evaluated and constantly followed up to make decisions based on a monitored and controlled process that guarantees the combination of evidence and practice. High performance sport is not characterized by magic numbers or by being a process where all intrinsic and extrinsic factors are controlled within a field where only the athlete and the sport combine to give joy to fans, coaching staff and staff. Additionally, it is not possible to control several factors that affect the whole process. However, if a process is carried out where variables can be controlled within the interventions performed by physiotherapy, statistical data and standardized processes can be generated in the analysis of high performance sport where research will be the future for the continuous improvement and empowerment of the profession and its importance within the world of sport from the generation of high quality scientific evidence.

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