



Syllabus: Cardiac adaptation to exercise and cardiovascular assessment of the athlete



SYLLABUS

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TOPICS

≡ **Module 1. Athlete definition, training types, sports classification.**

≡ **Module 2. Physiological structural and electrical remodeling induced by exercise.**

≡ **Module 3. Sudden death in athletes.**

≡ **Module 4. Cardiovascular assessment in athletes.**

Justification

Sports cardiology focuses on detecting cardiovascular conditions that could lead to sudden death in athletes and providing medical and sports advice to those diagnosed with cardiovascular diseases. This sub-specialty has exponentially developed over the past two decades, with related publications quintupled. The growing interest in this cardiology field stems from several factors:

High training volumes are associated with atrial fibrillation development and pathological remodeling of the right ventricle in genetically predisposed athletes. Understanding factors that promote this pathological atrial and/or ventricular remodeling is essential for prevention or at least slowing its onset.

Exercise-induced structural and electrical remodeling can mimic characteristics of heart diseases where high-intensity exercise can act as a sudden death trigger. Cardiac imaging advancements have introduced new tools for differential diagnosis between athlete's heart and cardiomyopathy. Technological advances now allow us to monitor heart rate and even evaluate ECG during sports activities,

greatly enhancing our diagnostic and management capabilities for arrhythmias in elite and recreational athletes.

Physical training offers numerous cardiovascular health benefits in both healthy individuals and patients with cardiovascular diseases. Prescribing exercise at the appropriate dose allows the cardiovascular benefits of physical training while preserving the patient's heart health. Providing clear guidance on the "dose" of physical activity has medical, social, and political implications, making it a priority in international policies. Economic implications include cost reductions in cardiovascular health due to physical activity and growing investments in technology related to this cardiology field.

Currently, no certification in sports cardiology matches the characteristics of the one being proposed. National and international scientific societies offer one- to two-day courses focused on sports cardiology annually. Additionally, various sports cardiology centers offer a year-long clinical and research training to specialize as a sports cardiologist, available to one or two individuals depending on the center, with theoretical content derived indirectly from daily clinical practice with athletes. The European Society of Cardiology is developing an international exam for certification in sports cardiology, accompanied by a preparatory training program. This certificate could serve as a basis for Spanish-speaking professionals preparing for this exam.

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Objectives

By establishing objectives, we give ourselves a clear idea of what we want to achieve once the teaching and learning process of this course has finished. But our aims are even more specific: we also want to establish what you will need to accomplish in order for this new knowledge to contribute to your educational goals.

To achieve these objectives, you must complete the entire process laid out in the different stages of the course.

Thus, if you work in the way suggested, you will be well-positioned to meet the following objectives:

General objective

To acquire the necessary knowledge to safeguard the cardiovascular health of both healthy athletes and those with cardiac conditions.

Specific objectives



Understand the causes of sudden death in athletes and current diagnostic strategies for early detection.

2

Differentiate between adaptive remodeling induced by physical training and pathological remodeling underlying cardiac disease.

3

Grasp the diagnostic and management peculiarities of structural or electrical heart disease in an athlete.

4

Prescribe an appropriate exercise volume for recreational or elite athletes with a heart condition.

CONTINUE

Skills

The skills we hope you will develop throughout this course are:

General skills

- 1** **Group and collaborative work:** the ability to work with colleagues in order to accomplish shared goals and to achieve the synergy typical of a high performance group.
- 2** **The capacity of analysis/reflection:** the capacity to methodically examine the different aspects of a certain reality or situation and to carry out an assessment of that situation.
- 3** **Creativity and innovative, knowledge-based solutions:** the capacity to find alternative solutions to existing problems based on formal knowledge.

Specific skills

Upon completing this certification, students will have extensive knowledge of sudden death causes associated with sports and current strategies for early detection. They will be able to differentiate between adaptive remodeling induced by exercise and pathological remodeling underlying cardiac

disease, whether structural or electrical. Students will also gain skills to guide athletes with heart disease (structural and/or electrical) on suitable treatment and understand the sports implications of their condition. Finally, the certificate will equip students with tools to guide exercise prescriptions for cardiovascular patients engaging in recreational or competitive sports.

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Graduate Profile

The certificate provides graduates with knowledge, skills, and abilities in sports cardiology. By completing the certificate, students will have extensive theoretical knowledge of sudden cardiac death causes in recreational and elite athletes and current athlete assessment strategies based on competitive level and age. They will develop the necessary skills to distinguish between adaptive structural and/or electrical changes induced by sports and warning signs of potential underlying cardiopathy. They will also acquire extensive theoretical knowledge supplemented with practical examples on managing athletes with cardiovascular conditions, enabling them to advise athletes on disease management and exercise type and intensity. These skills will allow students to fulfill the primary goal of a sports cardiologist: early detection of cardiovascular conditions causing sudden death and providing medical and sports guidance to athletes with heart disease.

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Intended Audience

This certificate is aimed at professionals in the sports field with a special interest in cardiology, such as sports doctors, graduates in physical activity and sports sciences, sports physiotherapists, or those specializing in cardiac rehabilitation. It is also intended for cardiology specialists who wish to train in this field. This certificate is relevant for elite and recreational athletes and cardiac patients who want to engage in sports activities.

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Bibliography

Corraze, J. (1987) Las bases neuropsicológicas del movimiento [The neuropsychological basis of movement]. Paidotribo, Barcelona.

Cratty, B. (1974). Motricidad y psiquismo [Motor function and the psyche]. Miñón, Madrid.

Le Boulch, J. (1975). Hacia una ciencia del movimiento humano [Towards a science of human movement]. Paidós, Buenos Aires.

Le Boulch, J. (1989). El deporte educativo; psicokinética y aprendizaje motor [Educational sports; the mind in movement and motor learning]. Paidós, Buenos Aires.

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Criteria for participation and approval

Participation criteria

During the month of course, the student is expected to:

- Browse the multimedia contents of each of the modules that make up the course.
- Solve the evaluations assigned in each module.
- Carry out the proposed activities, whether group or individual.
- Take the final exam.

Approval criteria

For the approval of the course, the student is required to complete the (4) proposed activities in the course and pass the final exam. The student must obtain a final score of 70% or more. This grade will be the average between the activities and the final exam.

CONTINUE

Module 1. Athlete definition, training types, sports classification.

CONTINUE

Module 2. Physiological structural and electrical remodeling induced by exercise.

CONTINUE

Lesson 10 of 11

Module 3. Sudden death in athletes.

CONTINUE

Lesson 11 of 11

Module 4. Cardiovascular assessment in athletes.

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