



EDITORIAL

Cardiovascular screening prior to sport practice in children and adolescents[☆]



La evaluación cardiovascular predeportiva en niños y adolescentes

D. Crespo Marcos^{a,*}, F.J. Pérez-Lescure Picarzo^a, A. Boraita Pérez^b

^a *Cardiología Pediátrica, Área de Pediatría y Neonatología, Hospital Universitario Fundación Alcorcón, Alcorcón, Madrid, Spain*

^b *Servicio de Cardiología, Centro de Medicina del Deporte, Departamento de Deporte y Salud, Agencia Española de Protección de la Salud en el Deporte, Madrid, Spain*

Cardiovascular events related to sport practice are fortunately rare in the paediatric age group. An incidence of sport-related sudden death of 1 per 43,000–100,000 individuals aged less than 35 years has been described, the great majority (75–98%) due to cardiovascular causes.^{1,2} In addition, the prevalence of cardiovascular disorders predisposing young athletes to sudden cardiac death episodes is estimated to be around 0.3%.³ Contrary to the widespread belief that these events are related to high-level competitive sport, Marijon et al.¹ found in a prospective study carried out in France in the period 2005–2010 that over 90% occurred during recreational sport practice.

It is difficult to analyse the epidemiology of this devastating health problem, as there are wide variations in the published incidence, the data collection methods and the reported causes of sudden cardiac death in athletes at both competitive and recreational level. Indeed, there is no universally accepted definition of sports-related sudden cardiac death, though it is generally considered to be that which occurs during physical exercise or in the hour following its cessation. For this reason, the Sport Cardiology Section of the European Association for Cardiovascular Prevention and Rehabilitation has produced a document⁴

containing proposals for establishing a uniform register at international level, which will enable us to ascertain the true magnitude of the issue before us.

There is a general consensus that screening prior to sport practice, making it possible to detect potentially lethal cardiovascular diseases, is justified and may be beneficial, but there are wide divergences in protocols and legal provisions. In many European countries screening is limited to elite athletes, and there are currently only 2 countries worldwide, Italy and Israel, in which screening, including an electrocardiogram (ECG), is systematically performed for sport practice at all levels.

In Italy a decree has existed since 1982 making it obligatory for such examinations to be performed by doctors with specific training. In the rest of the world learned societies recommend that this should be done, but without legislative backing. In Spain, Organic Act 3/2013 on the protection of athletes' health and the fight against doping in sports activity came into force in June 2013. Here is an extract from Section 46 of this Act ('On medical examinations'):

1. The Spanish Agency for Health Protection in Sport shall progressively determine the obligation to carry out medical examinations before the corresponding federation licence is issued in those sports in which this is considered necessary in order to provide better prevention of risks to the health of their practitioners.
2. The purpose of carrying out these medical examinations is to protect the health of athletes with respect to the sports activity. In designing the examinations and

[☆] Please cite this article as: Crespo Marcos D, Pérez-Lescure Picarzo FJ, Boraita Pérez A. La evaluación cardiovascular predeportiva en niños y adolescentes. *An Pediatr (Barc)*. 2016;84:187–188.

* Corresponding author.

E-mail address: davidkrespo@yahoo.com (D. Crespo Marcos).

applying them to each sports discipline the following shall be taken into account: [...]d) The specific needs of women and men, of minors and of disabled persons...].

This Act will regulate medical examinations prior to sport practice for affiliated members of federations, but it will not affect sport practised outside this context by a large number of children and adolescents at local, municipal or school level.

The main argument is over the need to perform an ECG systematically in these evaluations. In the great majority of European countries it is recommended as a matter of routine, while in the United States it is not advised. The American Heart Association (AHA) and the American College of Cardiology (ACC) reaffirmed their position on this issue in 2015,⁵ maintaining that performing an ECG is not indicated as they do not consider that there is sufficient evidence to demonstrate its benefit. A recent meta-analysis carried out by Harmon et al.,³ whose aim was to analyse the various pre-participation cardiovascular screening strategies, concluded that ECG is the most effective strategy, being five times more sensitive than medical history and ten times more sensitive than physical examination, with a false positive rate of 6%, lower than that of medical history (8%) and physical examination (10%). Another area of divergence concerns who should perform these examinations. In the United States non-medical and even non-healthcare staff are allowed to carry them out, whereas in Europe it is advocated that medical staff with specific training in this area should be responsible. Super-specialisation is becoming so important that the European Cardiology Society has developed a 12-month training programme⁶ in Sports Cardiology, available to those specialising in Cardiology and Sports Medicine.

There are numerous guidelines for pre-participation cardiovascular evaluation designed primarily for adults and focusing in many cases on high-level competitive athletes; few of them, however, refer to children and adolescents practising physical activity at any level of competition. For this reason the Sociedad Española de Cardiología Pediátrica y Cardiopatías Congénitas (SECPCC: Spanish Paediatric Cardiology and Congenital Heart Disease Society) and the Consejo Superior de Deportes (CSD: Higher Sports Council) have produced the *Clinical Guidelines for Cardiovascular Evaluation Prior to Sport Practice in Paediatrics*, published in February 2015 with the endorsement of the following learned societies: Sociedad Española de Cardiología (SEC: Spanish Cardiology Society), Fundación Española del Corazón (FEC: Spanish Heart Foundation), Asociación Española de Pediatría (AEP: Spanish Association of

Paediatrics), Asociación Española de Pediatría de Atención Primaria (AEPap: Spanish Association of Primary Care Paediatrics), Sociedad Española de Pediatría Extrahospitalaria y Atención Primaria (SEPEAP: Spanish Association of Ambulatory Paediatrics and Primary Care), Sociedad Española de Medicina de Familia y Comunitaria (semFYC: Spanish Society of Family and Community Medicine), Sociedad Española de Médicos de Atención Primaria (SEMERGEN: Spanish Society of Primary Care Physicians), Sociedad Española de Médicos Generales y de Familia (SEMG: Spanish Society of General and Family Practitioners).

The main purpose of these guidelines, which include medical history, physical examination and ECG, is to serve as a tool for protecting the health of young athletes through early detection of cardiovascular disease that could put the lives of children practising sport at risk. It is freely available online at the websites of the SECPCC (<http://ow.ly/JhbH9>) and of the Ministry of Education, Culture and Sport (<https://sede.educacion.gob.es/publivent/a/detalle.action?cod=20251>).

References

1. Marijon E, Tafflet M, Celermajer DS, Dumas F, Perier MC, Mustafic H, et al. Sports-related sudden death in the general population. *Circulation*. 2011;124:672–81.
2. Harmon KG, Asif IM, Klossner D, Drezner JA. Incidence of sudden cardiac death in national collegiate athletic association athletes. *Circulation*. 2011;123:1594–600.
3. Harmon KG, Zigman M, Drezner JA. The effectiveness of screening history, physical exam, and ECG to detect potentially lethal cardiac disorders in athletes: a systematic review/meta-analysis. *J Electrocardiol*. 2015;48:329–38.
4. Solberg EE, Borjesson M, Sharma S, Papadakis M, Wilhelm M, Drezner JA, et al., Sport Cardiology Section of the EACPR of the ESC. Sudden cardiac arrest in sports – need for uniform registration: a position paper from the sport cardiology section of the European association for cardiovascular prevention and rehabilitation. *Eur J Prev Cardiol*. 2015, pii: 2047487315599891 [Epub ahead of print].
5. Maron BJ, Levine BD, Washington RL, Baggish AL, Kovacs RJ, Maron MS. Eligibility and disqualification recommendations for competitive athletes with cardiovascular abnormalities: task force 2: preparticipation screening for cardiovascular disease in competitive athletes: a scientific statement from the American heart association and American college of cardiology. *J Am Coll Cardiol*. 2015;66:2356–61.
6. Heidbuchel H, Papadakis M, Panhuyzen-Goedkoop N, Carré F, Dugmore D, Mellwig KP, et al. Position paper: proposal for a core curriculum for a European Sports Cardiology qualification. *Eur J Prev Cardiol*. 2013;20:889–903.