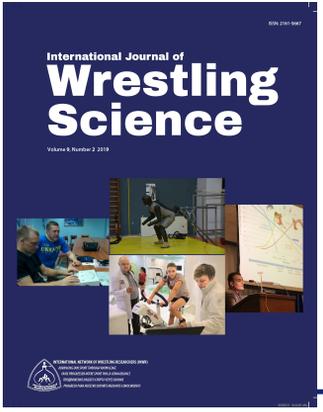
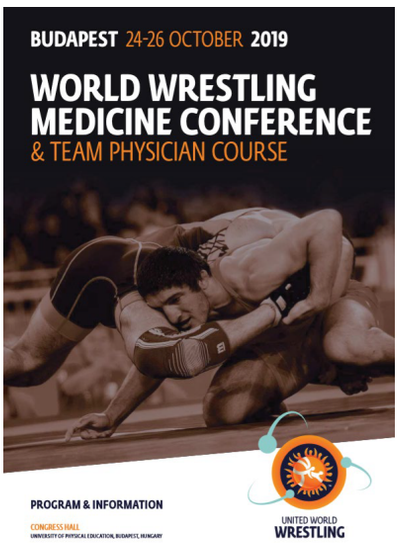


International Journal of Wrestling Science

ISSN: 2161-5667 (Print) 2161-3524 (Online) Journal homepage: http://inwr-wrestling.com

Special Section: Summaries of Presentations from the Wrestling Medicine Conference & Wrestling Team Physician Course, United World Wrestling, Budapest, October 24-26, 2019




# PREPARTICIPATION MEDICAL EVALUATION: WHY WHEN HOW

**José Alfredo Cavalcante Padilha**

Published online:December 2019.

**To cite this article:** José Alfredo Cavalcante Padilha (2019) PREPARTICIPATION MEDICAL EVALUATION: WHY WHEN HOW. International Journal of Wrestling Science, 9:2, 79-85.

# PREPARTICIPATION MEDICAL EVALUATION: WHY WHEN HOW

José Alfredo Cavalcante Padilha

josealfredopadilha@uol.com.br

**Preparticipation Sports Evaluation** (PPE)
"The sports preparticipation physical (or preparticipation physical examination PPE) is a clinical examination used to evaluate athletes for injuries, illnesses, or other conditions that might increase the risk of harm to themselves or others when participating in sports."
*Source: British Medical Journal Best Practice, Sports preparticipation physical, last updated Oct. 30, 2017*

"The goal of the PPE is to MAXIMIZE SAFE PARTICIPATION: … NOT to disqualify, but to INTERVENE"
*Source: Scott Hall, MD: "The Preparticipation Physical Exam")*

**Objectives of PPE**

PRIMARY OBJECTIVES

- Detect potentially life-threatening or disabling conditions
- Detect conditions that may predispose the athlete or others to increased risk of injury or illness (this includes evaluating the athlete for sport-specific fitness)
- Fulfill legal, administrative, and insurance requirements, which vary by context and location.

SECONDARY OBJECTIVES

- Determine general health
- Serve as an entry point to the healthcare system for adolescents
- Provide opportunity to initiate discussion of health-related topics.

*Source: British Medical Journal Best Practice, Sports preparticipation physical, last updated Oct. 30, 2017*

**PPE & High Intensity Sports**
Sports are divided in categories according to Risk of Impact (and Educational background):

Impact expected
Impact may occur
Impact not expected

Wrestling figures among those sports with expected impact (comparable to American football, Ice hockey, Lacrosse, Karate/Judo, Fencing and Boxing, Downhill skiing, Squash, Soccer, Basketball)
*Source: "Eligibility and Disqualification. Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Preamble, Principles, and General Considerations. A Scientific Statement From the American Heart Association and American College of Cardiology. By: Barry J. Maron, MD, FACC, Co-Chair, Douglas P. Zipes, MD, FAHA, MACC, Co-Chair and Richard J. Kovacs, MD, FAHA, FACC, Co-Chair. JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY VOL. -, NO. -, 2015 ª 2015 BY THE AMERICAN HEART ASSOCIATION, INC. AND THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION ISSN 0735-1097*
The 36th Bethesda Conference in 2005 elaborated eligibility recommendations for competitive athletes with cardiovascular abnormalities. Together with the European Society of Cardiology consensus documents, they form the 2 consensus documents physicians from different parts of the world rely upon.

**UWW Medical Regulations** *Source: UWW Medical Regulations, Article 4*

- Medical Examinations and Conditions for Participation in the Competition
- Medical examinations must take place once a year for the senior age group as well as for the junior and cadet age groups at a medical institution approved and authorized by their respective Wrestling Federations.
- These medical examinations must be carried out by a specialist in sports medicine or by a sports medicine institution and are compulsory to obtain an international license delivered by UWW.
- In the veterans age group, special conditions apply regarding medical examinations. They are described in the UWW General Regulations for the Veteran World Championship.

**PPE & High-Performance Athletes**
"The high-performance athlete is the athlete who competes on equal terms with the best in his category and modality, regardless of the sport, dedicating his life to competitive performance. This includes rest, specific nutrition, periodization and training, often giving up optimal health conditions for what needs to be accomplished in a given period of preparation."
*Source: Pedro Gama Filho, UWW Bureau Member, CBW President, July 2019*

**PPE frequency: Once a year.**

In high performance sport like professional wrestling, it is advised to conduct a PPE at least 6 weeks in advance of the start of the competition season to detect any problem and to allow for further evaluation, treatment, or rehabilitation as needed.

In case of specific diseases (e.g asthma, diabetes,...) the exams should be more frequent. (OBS: TUE)

Ensuring the health of the elite athlete is embedded in the Olympic Movement Medical Code and pre-participation screening is, among others, recommended by the IOC.

**Question: Should PPE be repeated?**

No prospective studies shed light on the question whether the sports-medicine pre-participation examination should be repeated, and, if so, when.

The current literature consistently recommends repeating the PPE as follows:

- every 2–3 years in persons under age 35
- every 1–2 years in persons over age 35, or who have more than one risk factor, or whose examination reveals an abnormal finding (…)
- persons who have developed new symptoms or signs of disease should undergo an additional short-term examination.

*Source: "The Pre-Participation Examination for Leisure Time Physical Activity. General Medical and Cardiological Issues." By: Herbert Löllgen, Dieter Leyk, Jochen Hansel. In: Deutsches Ärzteblatt International | Dtsch Arztebl Int 2010; 107(42): 742–9*

The medical examination shall include*: (UWW Medical Regulations, Article 5)*

- Medical history and past history
- Family history
- Complete clinical examination including:
  - cardiopulmonary examination
  - orthopedic examination
  - neuropsychiatric evaluation
  - dermatological examination
- Routine laboratory examination, as well as venereal disease and AIDS detection
- Functional and ergonomic evaluation

**Suggestions for extra exams**

Based on medical history:

Diseases transmissible by blood (such as hepatites C, ...)

Diseases susceptible to vaccination (hepatites B, yellow fever, measles,...)

Cat-scan/MRI post-concussion

**AHA:14-ELEMENT SCREENING** AMERICAN HEART ASSOCIATION (Maron BJ Circulation 2014)

**Medical History**

Personal history

1. Exertional chest pain/discomfort
2. Exertional syncope or near-syncope
3. Excessive exertional and unexplained fatigue and/or fatigue associated with exercise
4. Prior recognition of a heart murmur
5. Elevated systemic blood pressure
6. Prior restriction from participation in sports
7. Prior testing for the heart ordered by a physician

**Family history**

8. Premature death, sudden and unexpected, before age 50 years due to heart disease, in one or more relatives
9. Disability from heart disease in a close relative < 50 years of age
10. Specific knowledge of certain cardiac conditions in family members: hypertrophic or dilated cardiomyopathy, long QT-syndrome or other ion channelopathies, Marfan syndrome, or clinically important arrhythmias

**Physical exam**

11. Heart Murmur-exam supine and standing or with valsalva, specifically to identify murmurs of dynamic L ventricular outflow tract obstruction
12. Femoral pulses to exclude aortic stenosis
13. Physical stigmata of Marfan syndrome
14. Brachial artery blood pressure (sitting, preferably taken in both arms)

- Positive/abnormal screen warrants further investigation and 12-lead ECG
- AHA does NOT currently recommend routine 12-lead ECG

**THE PHYSICAL EXAMINATION**

*(Source: British Medical Journal Best Practice, Sports preparticipation physical, last updated Oct. 30, 2017*

The physical examination may include:

1. Injury identification: Orthopedic problems (dynamic instability of the shoulders, knees, and ankles), chronic injuries to the fingers, wrists, feet, and toes and tell-tale scars (previous surgeries or injuries that the athlete may not be aware of or may not wish to disclose).
2. Risk assessment of existing injury: The orthopedic exam should be focused towards the particular demands of the athlete's sport as the impact a particular injury may have on an athlete will vary with the sport involved.
3. Cardiac assessment: Auscultation for heart murmurs, simultaneous palpation of radial and femoral pulses to evaluate for aortic coarctation, examination for the physical features of Marfansyndrome, brachial artery blood pressure measurement (sitting position).
4. The AHA does not recommend routine augmented screening with ECG or other cardiovascular testing as part of the PPE.
5. Dental assessment: Lack of access to routine dental care and lack of regular dental hygiene may cause serious gingival and periodontal disease. Implications: poorly fitting or uncomfortable mouthguards, pain, need for urgent dental procedures due to infection, abscess formation, and other complications.
6. Absence of paired organ: (e.g. blindness in 1 eye, absent testicle

**AGE-RELATED SPECIAL ATTENTION**

YOUNG FIRST TIME WRESTLERS

Perform a preparticipation history and physical examination and identify children and adolescents who may be at increased risk for morbidity or mortality from sport participation.

*Source: "The Preparticipation Sports Evaluation", Published in American Family Physician, September 1, 2015 – Volume 92, Number 5, Table 1, page 373.Written by: Mark H. Mirabelli, MD, and Mathew J. Devine, DO, University of Rochester Medical Center, Rochester, New York. Jaskaran Singh, MD Brampton, el Mendoza, MD, MPH, MS, University of Rochester Medical Center, Rochester, New York.*

ELDERLY WRESTLERS

Beside physical examination, pre-participation screening of elderly wrestling athletes with ECG and exercise testing is feasible and recommended in the presence of coronary risk factors or cardiac symptoms. Echocardiography can also be recommended to detect other relevant abnormalities when there is a clue in the standard history, physical examination or ECG.

*Source: "Pre-participation Cardiovascular Screening of Elderly Wrestlers" by Ali Vasheghani Farahani*1,2, MD; Hossein Asheri1, MD; Saeed Alipour3, MD; Alireza Amirbeigloo2, MD.10 by Sports Medicine Research Center, Tehran University of Medical Sciences*

**ELECTROCARDIOGRAM (ECG)**

- The American Heart Association (AHA), the European Society of Cardiology (ESC) and SBMEE all agree on recommending PPE to be performed on all professional athletes, but there is no general consensus on recommending ECG.
- Examination in known cases should be requested but it will be a consensus for all PPE's
- Italy, Israel and Brazil mandate national ECG screening for competitive athletes.
- Only Israel, Italy and the US have mandatory national cardiovascular screening for athletes. (Japan has them for all citizens)
- Denmark has specifically chosen not to mandate national ECG screening, due to perceived low risk.
- Up to 30% to 40% of potentially fatal cardiovascular diseases may have a negative/normal ECG, so false negatives are a real problem.*
    - *Source: British Medical Journal Best Practice – Sports preparticipation physical; last updated Oct 30, 2017*
- Examination in known cases should be requested but it will be a consensus for all PPE's

**ECG + ECHOCARDIOGRAM (CARDIAC SCREENING) SWOT** Analysis (strengths, weaknesses, opportunities and threats)

**POSITIVE**

**Strengths**

- Italy has a national screening protocol for PPE of competitive athletes (history, physical exam and 12-lead ECG), and was able to document a 89% reduction in the annual incidence of SCD among this group

- 1/3 of the deaths are due to hypertrophic cardiomyopathy (hence the importance of echocardiogram)

**Opportunities**

- Anticipate a treatable disease
- Avoid SCD

**NEGATIVE**

**Weaknesses**

- False positives*
- › False negatives*
- › Costs

*Obs: The rate of false positives and false negatives has decreased nowadays to levels deemed acceptable.

**(Source: "Should Cardiac screening be compulsory in athletes", Nathan Riding & Guido Pieles, in Aspetar Sports Medicine Journal. September 2019*

**Threats**

- Unnecessary treatment
- Unfair disqualification
- Generate false security

**CONTRAINDICATIONS FOR SPORTS PARTICIPATION**

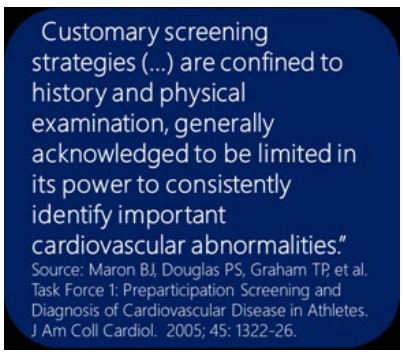
- ✓ Active myocarditis or pericarditis
- ✓ Acute enlargement of spleen or liver
- ✓ Eating disorder in which athlete is not compliant with therapy and follow-up, or when there is evidence of diminished performance or potential injury because of the eating disorder
- ✓ History of recent concussion and symptoms of post-concussion syndrome (no contact or collision sports)
- ✓ Hypertrophic cardiomyopathy
- ✓ Long QT syndrome
- ✓ Poorly controlled convulsive disorder (no archery, riflery, swimming, weightlifting or powerlifting, strength training, or sports involving heights)
- ✓ Recurrent episodes of burning upper-extremity pain or weakness, or episodes of transient quadriplegia until stability of cervical spine can be assured (no contact or collision sports)
- ✓ Severe hypertension until controlled by therapy (static resistance activities, such as weightlifting, are particularly contraindicated)
- ✓ Sickle cell disease (no high-exertion, contact, or collision sports)
- ✓ Suspected coronary artery disease until fully evaluated (patients with impaired resting left ventricular systolic function less than 50%, 2000;61(9):2688

*Source: "The Preparticipation Sports Evaluation", Published in American Family Physician, September 1, 2015 – Volume 92, Number 5, Table 1, page 373. Written by: Mark H. Mirabelli,*
*, University of Rochester Medical Center, Rochester, New York. Jaskaran Singh, MD Brampton, Ontario. Michael Mendoza, MD, MPH, MS, University of edical Center, Rochester, New York.*

**SUDDEN DEATH**

"(...) approximately 30% of athletes with SCD have been reported to have had symptoms such as chest pain, shortness of breath, performance decline, palpitations, pre-syncope, or syncope leading up to the event.
Source: Marijon E, Uy-Evanado A, Reinier K, et al. Sudden cardiac arrest during sports activity in middle age. Circulation. 2015 Apr 21;131(16):1384-91.

Evaluation of such exertional symptoms by a qualified team of sports medicine and cardiology physicians is an important aspect of the medical care of athletes and of SCD prevention."
Source: Lawless CE, Olshansky B, Washington RL, et al. Sports and exercise cardiology in the United States: cardiovascular specialists as members of the athlete healthcare team. J Am Coll Cardiol. 2014 Apr 22;63(15):1461-72.




**CAUSES OF SCD IN ATHLETES**

**Congenital/Genetic**

Structurally Abnormal Heart

Hypertrophic cardiomyopathy
Arrhythmogenic right ventricular cardiomyopathy
Dilated cardiomyopathy
Congenital anomalies of coronary origin & course
Other cardiomyopathy (i.e., left ventricular noncompaction)
Aortopathy (i.e., Marfan syndrome & ascending aortic aneurysm/dissection)
Valvular heart disease (i.e., congenital aortic stenosis, mitral valveprolapse)

Structurally Normal Heart
- Congenital long QT syndrome
- Catecholaminergic polymorphic ventricular tachycardia
- Wolf-Parkinson-White syndrome or other accessory pathway
- Brugada syndrome
- Other ion channelopathies

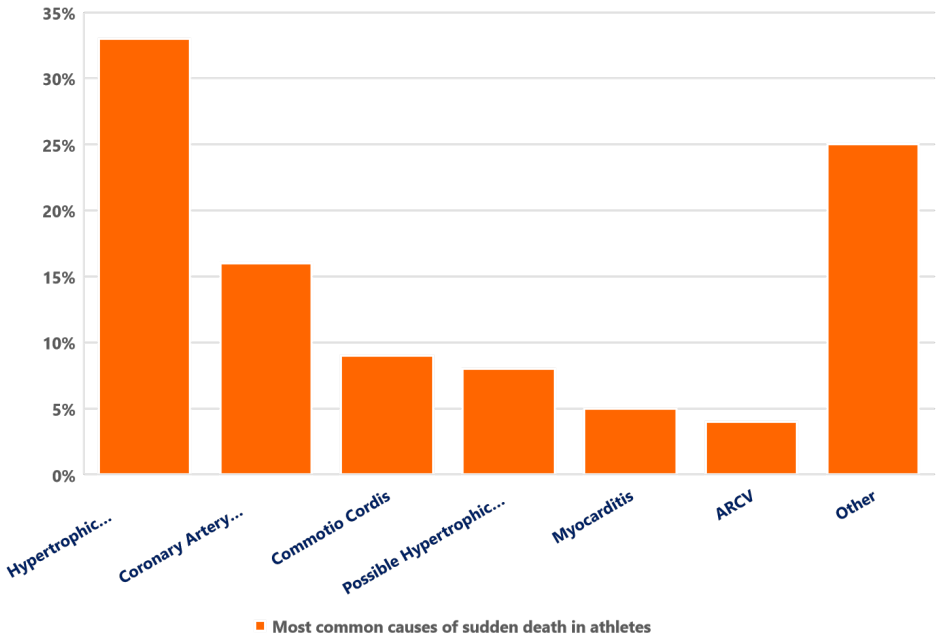
**Acquired**

Structurally Abnormal Heart
- Atherosclerotic coronary artery disease
- Kawasaki's disease
- Myocarditis

Structurally Normal Heart
- Commotio cordis
- Acquired long QT (i.e., drug-induced)
- Other substance ingestion or environmental factors (i.e., hypo- or hyperthermia)

*Source: "Table 2. Common cardiovascular conditions associated with sudden cardiac death (SCD) in athletes." p.77. SUDDEN CARDIAC DEATH IN ATHLETES; Meagan M. Wasfy, M.D.; Adolph M. Hutter, M.D.; Rory B. Weiner, M.D.; Massachusetts General Hospital, Boston, Massachusetts; MDCVJ | XII (2) 2016*

## MOST COMMOM CAUSES OF SUDDEN DEATH IN ATHLETES

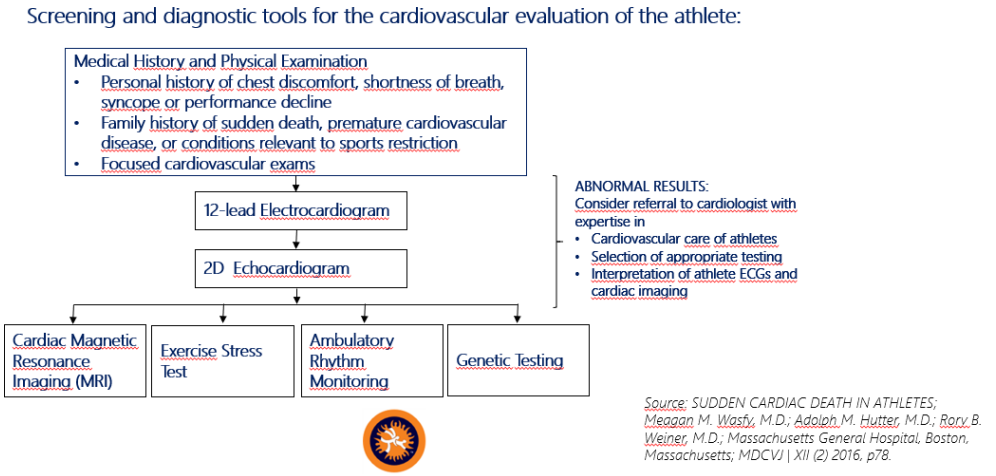



1. Hypertrophic Cardiomyopathy
2. Coronary Artery Anomalies
3. Commotio Cordis
4. Possible Hypertrophic Cardiomyopathy
5. Myocarditis
6. Arrhythmogenic right ventricular cardiomyopathy (ARCV)
7. Other

*Source: British Medical Journal Best Practice –Sports preparticipation physical; last updated ct 30, 2017*

## SUDDEN CARDIAC DEATH & PREVENTION

Since many of the cardiac conditions that cause SCD in athletes may not present with warning symptoms, there has been considerable discussion about the role of preparticipation screening tests to evaluate for occult cardiovascular disease.




1. The value of any screening test is determined by the characteristics of the population to which it is applied. As demonstrated above, the incidence and causes of SCD vary widely depending on the age, gender, race, country, and sport of the athlete group. Therefore, it is unlikely that any single screening program will be effective across all groups. Issues such as resource utilization and cost-effectiveness also must be considered.
2. In summary, the role of the ECG in preparticipation athlete screening remains unclear, and athletic programs should consider using ECG-inclusive screening based on the characteristics of their athlete population, the local screening resources available, and access to expert ECG interpretation specific to athletes.
3. It is critical that downstream testing, which can include cardiac imaging, exercise testing, and electrophysiological evaluation, is delivered and interpreted by physicians (typically cardiologists) who understand the cardiovascular adaptations to exercise training and resultant physiologic changes in the heart's structure and function—the so-called "athlete's heart."

*Source: SUDDEN CARDIAC DEATH IN ATHLETES; Meagan M. Wasfy, M.D.; Adolph M. Hutter, M.D.; Rory B. Weiner, M.D.; Massachusetts General Hospital, Boston, Massachusetts; MDCVJ | XII (2) 2016, p78.*

Conclusion:
No method exists by itself. UWW rules should be followed and screening methods be added in case of suspected need.
This evaluation should be based on geography, predisposition, good personal and family history, and additional examination if the suspicion is founded.

## CONTROVERSIES IN PPE

*Source: British Medical Journal Best Practice – Sports preparticipation physical; last updated Oct 30, 2017*

QUESTION: Do we need to include more exams for:

1. Cardiovascular testing?
   - Data do not indicate that screening echo in the young athlete population is of demonstrated
   - benefit. Other techniques have been shown not to be cost-effective for mass screening of young
   - athletes.
   - Certain cardiac abnormalities do not become phenotypically apparent until later in life. The
   - potential danger of such a false negative result should not be underestimated.
   - Despite the lack of beneficial data, it is possible that screening echo (like screening ECG) may
   - become more commonplace in the future.
2. Anemia?
   The usefulness of routine laboratory tests as part of the PPE has not been shown, but there are data suggesting that screening for iron deficiency and anemia may be cost-effective in high-risk athletes.
3. Sickle Cell?
   Screening for sickle cell trait in high-risk populations has been associated with an increased risk of lysis and sudden death during periods of intense exertion, especially in extreme environmental conditions.

4. Prior concussions?
    - Requirement for athlete with case of prior concussion(s) to present results of CT-scan, MRI, … during next PPE.
    - Use of bedside and formal neuropsychological testing to evaluate for persistent concussion-induced deficits.
    - Perform a baseline neurologic evaluation, including neuropsychological testing, as part of the PPE in athletes at high risk for concussion (contact athletes, athletes with multiple prior head injuries).

**THE CHALLENGE OF PPE**

Unify the medical standard of PPE in countries with distinct cultures, economic conditions, social realities, health systems, and support for wrestlers and a different local interpretation of sports medicine.
185 different countries are affiliated to UWW.

- ✓ The mission of sports medicine is to care for and preserve the health of athletes, minimizing the risk of sudden death that arises from causes that are detectable.The PPE is a very important instrument in this process.
- ✓ UWW recommendations should be followed at all times.
- ✓ UWW could seize the opportunity and create a commission of UWW doctors to discuss and elaborate a UWW standard for PPE for wrestling athletes that participate in UWW competitions.
- ✓ Special attention is needed to contagious blood diseases and prior concussions.
- ✓ It is important to educate health care professionals to correctly interpret screening results.