

## The Pre-Participation Physical Evaluation

By Aloiya Earl, MD

The pre-participation evaluation of athletes is an essential component of fostering the well-being and performance potential for sports participants of all ages and levels of competition. In the United States, a pre-participation physical evaluation (PPE), commonly referred to as a "sports physical," is required for children and adolescents prior to participation in sports by most states. Even if not required by law, all physically active individuals should have an annual evaluation specifically tailored to address the elements of the PPE prior to beginning a competitive season.

There are two main elements of the PPE: (1) An assessment of the athlete's medical history and (2) A physical examination with pertinent emphases for the active individual.

### Medical history:

The medical history should review past illness and surgeries, current ongoing conditions and a focused family medical history. Specifically, it's important to know about any heart conditions the athlete is aware of in him/herself or family members, like murmurs, high blood pressure or an enlarged heart. It's also important for the physician to be aware of any symptoms the athlete has experienced during exercise that could raise concern for heart problems; these symptoms might include chest discomfort, feeling short of breath, sensing skipped heartbeats, feeling lightheaded or fainting.

A review of past injuries to muscles or bones is included, as well as a review of concussion history. Other focus areas include discussing history of blood



disorders, asthma, seizures, infections, vision, nutrition and response to exercising in the heat.

In regards to blood disorders, athletes should discuss known sickle cell disease with their physician, since the dehydration that can accompany sports participation is a risk factor for a sickle cell crisis.

Knowing about a history of asthma is important, for example, so the practitioner can ensure the athlete will have a rescue inhaler available at all practices and games.

As far as infections, it's important to know if an athlete has been diagnosed with infectious mononucleosis ("mono"). Mono is usually transmitted by a virus and can cause enlarged spleen with a risk of rupture during contact sports. It's also significant to know if an athlete is prone to skin infections with staph bacteria, particularly MRSA, to allow the physician to counsel the athlete on how to minimize recurrence and transmission of the bacteria to teammates.

Discussing nutrition is imperative because athletes have very specialized caloric demands and personalized dietary needs in order to maintain a healthy weight and perform optimally.

Various different body types are desired for different sports and positions. For example, distance runners and dancers typically strive for lean body types, while offensive linemen celebrate large muscular forms. It's important for practitioners to ensure athletes know how to fuel their bodies appropriately to keep a healthy body composition while still achieving their athletic goals.

Any allergies are important to note so teams may avoid allergic foods (such as peanuts or shellfish) and also any medication allergies. Knowing the severity of the allergy is important, as well, so proper prevention and resources for a reaction are available, such as an Epi-pen and Benadryl.

### Physical examination:

A comprehensive physical examination should always be performed for every athlete. This includes vital signs and an exam of each of the following: general appearance, vision, hearing, lymph nodes, heart, lungs, abdomen, skin, nervous system and musculoskeletal system. In males, an exam to screen for hernias or testicular masses is included as part of a general comprehensive *continued on next page...*

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physical exam. However, finding a hernia that is not otherwise causing symptoms for the athlete will not prevent sports participation clearance.

The heart exam should include the practitioner listening to the athlete's heart while the athlete is standing, lying down and squatting; this technique is better than a standard sitting heart exam for detecting the murmurs which can be more dangerous in athletes. The musculoskeletal exam should assess strength, range-of-motion, asymmetries or deficiencies and functional analysis with special tests like the "duck-walk" and "single leg hop test."

### What happens if there is concern for an athlete's heart health?

One of the most concerning and potentially important findings during a PPE is a murmur consistent with an enlarged heart, termed "hypertrophic obstructive cardiomyopathy". This is a heart muscle disease thought to be due to a gene mutation, and it could have no symptoms at all. While rare, it can be life-threatening. The biggest risk with this condition is sudden cardiac death.

If there is a concern for enlarged heart during the PPE, or a concern for any other heart condition, the athlete will be referred for further medical workup including an electrocardiogram (ECG), echocardiogram (ultrasound of the heart) and/or referral to a cardiologist prior to clearance for sports participation. Some schools include an ECG as part of their routine screening although this is not a universal recommendation.

### Does the physical include testing for brain health?

In short, yes. A neurological exam is universally performed which could detect focal deficits due to disease of the brain or spinal cord. There is more variation, however, in the application of baseline testing for concussion. This type of testing is becoming more common, specifically if the athlete has a known history of concussions or plays a contact sport or position prone to head injuries. It can be valuable, but it is not mandatory. The assessment could include a neurologic-specific questionnaire, balance and coordination testing, written testing and/or computer-based testing.

### Conclusion of the PPE

After the above components are sufficiently addressed, the physician makes a decision to clear the athlete for all sports without restriction, to clear the athlete with recommendations for further evaluation and/or treatment or to not clear the athlete. The "not cleared" designation could be pending further testing, not cleared for certain sports or not cleared for all sports. If an athlete is not cleared, there is apparent clinical concern for the athlete's well-being. The overarching goal of physicians performing PPEs is to promote physical activity and sports participation in all athletes while ensuring maximal health and safety.

To reference the pre-participation physical evaluation (PPE) form developed by American Academy of Family Physicians, American Academy of Pediatrics, American College of Sports Medicine, American Medical Society for Sports Medicine, American Orthopaedic Society for Sports Medicine and American Osteopathic Academy of Sports Medicine, please visit: <https://www.amssm.org/PPEMono.php>.

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## Ask 5 Things: About concussion treatment

By Anne Marie Zeller, DO, MSc

Concussion is defined as a traumatically induced transient disturbance of brain function. It is estimated that as many as 3.8 million concussions occur in the United States per year during competitive sports and recreational activities, but as many as 50 percent of the concussions may go unreported. Concussions occur in all sports with the highest incidence in football, hockey, rugby, soccer and basketball. Concussion remains a clinical diagnosis ideally made by a healthcare provider familiar with the athlete and knowledgeable in the recognition and evaluation of concussion (Excerpt from 2013 AMSSM Position Statement on Concussion in Sport).

### 1) When can I return to school or work?

In regards to returning to school after a concussion, this depends on the severity of symptoms. Every concussion presents differently, and most physicians will have a discussion with the patient, parents or guardians regarding their school schedule, intensity of coursework, frequency and duration of computer

and electronic usage in the classroom. In the past, it was common practice to rest a week or more before returning to full schoolwork, but we now know that staying away from school and social interaction can negatively affect recovery. Returning to school as soon as tolerated is recommended.

Once symptoms are tolerable, it may be recommended to start with a half day of school with limited electronics and breaks every two or three hours, modified homework and tests and progress as tolerated to full days. Make sure to ask your physician to write specific recommendations and keep your follow-up appointments to aid in progressing successfully and safely back to school.

In regards to work, this again depends on your severity of your symptoms. Physicians understand that in regards to work, it is very difficult to take too much time off for work, as there is an added stress of financial issues. It is best to be very specific with your physician regarding your work's physical activity requirements (which might include lifting, driving, pushing, climbing, etc.).



To formulate the best return-to-work plan, determine the intensity of your coursework/work duties, electronic and computer usage and work hours. The same recommendations apply as with returning to school, decreasing computer and electronic usage, taking breaks and scaling back the hours at work to start, followed by reducing the intensity of physical activity at work.

### 2) When can I drive?

A large percentage of concussions include some component of slowed reaction time that can put a driver at risk  
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for a car accident. In the initial days of a concussion, we recommend not driving until seen by your physician to discuss your symptoms, and he/she will give you final clearance to drive. If you have symptoms of dizziness, "slowed down", fogginess, lightheadness, to name a few, it is recommended not to drive. Your doctor will most likely test your balance, coordination and possibly your reaction time with electronic concussion testing before giving you final clearance to operate a vehicle.

### 3) When can I start activity?

Once you are symptom free for 24 hours, you can start activity. Most physicians follow the gradual return to activity over five days, depending on your activity level or sport. You will start with light activities and progress in intensity (if symptom-free) each day until you are at your full activity. If symptoms reoccur during your return to activity, it is recommended to rest 24 hours until symptoms are gone. For some patients in which symptoms last longer than two to three weeks, your physician may

recommend light activity, even though you are not totally symptom-free.

### 4) What medications can I take?

In the initial period of a concussion, we recommend acetaminophen every 6-8 hours as needed for symptoms, if allowed by your physician. NSAIDs (such as naproxen, ibuprofen and aspirin) are cautiously recommended because if there is a more severe injury that may not be detected immediately, such as increased brain bleeding, these medications can cause increased bleeding. With concussion and continued headaches, it is recommended to use acetaminophen and NSAIDs sparingly, as they can cause rebound headaches (medication over-use headaches) that may be confused with headaches from a concussion.

Your daily prescription medications can be taken unless your physician recommends stopping them. If you are having trouble falling asleep or staying asleep after a concussion, we do not recommend taking prescription or over-the-counter sleep aids unless prescribed to you before your

concussion. In regards to supplements, melatonin 2mg-5mg taken 45-60 minutes before bed has been shown to improve headaches and sleep patterns in concussion patients.

### 5) What can physical therapy offer in treatment of concussions (neck, dizziness, exercise, etc.)?

Physical therapy can help in many ways with concussion recovery. In regards to headaches, neck pain, shoulder stiffness and back pain stemming from a concussion, physical therapy can use different techniques with soft tissue, manual medicine and home exercises to help reduce these symptoms. If symptoms increase with head position changes, driving, dizziness, reading, electronics and/or balance issues, physical therapists can work with your vestibular (inner ear/balance) and eye coordination to help speed up recovery. In special cases where there are symptoms lasting more than 3-4 weeks, some physicians will prescribe a physical therapist who can take you through a treadmill exercise program that can help reduce symptoms.

## COACH'S CORNER

### Motivating Athletes

By Jennifer Gaitley, MD

All coaches, whether working with athletes at recreational or elite levels, will struggle with how to best motivate their players. First, it is important to recognize how the athlete you are working with is best motivated. There are two main kinds of motivation: intrinsic and achievement-based. Intrinsically motivated athletes wish to become competent at their sport and are often motivated by their enjoyment of the game and desire to learn new skills. Achievement-based athletes are interested in competition and performing better than their peers. Knowing which type of athlete you are coaching allows you to better determine how you will motivate them.

There are two well-recognized ways to motivate athletes. Reinforcement is a commonly used technique and can be divided into two components. The

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first is positive reinforcement, where a coach follows a desired behavior with positive feedback or praise. The second is negative reinforcement, which occurs when a coach follows a desired behavior by taking away an unpleasant act, such as running sprints. Both of these strategies encourage athletes to continue optimal behaviors.

In contrast to reinforcement, which is designed to increase the frequency of a desired behavior, punishment is a technique whereby coaches try to decrease the frequency of an unwanted behavior, such as poor effort or careless mistakes. Similar to reinforcement, punishment is broken down into two categories. Positive punishment occurs when a coach introduces an act, such

as sprints, following an undesirable behavior. Negative punishment involves taking away something valued, such as playing time.

Positive reinforcement techniques are often the most beneficial because they allow the athlete to focus on improving the skill at hand, rather than on a potential punishment for making mistakes. Remembering which type of athlete you are working with, as mentioned at the beginning of the article, will allow you to personalize your motivational strategy. For instance, if you are coaching an achievement-based athlete, you can praise the attainment or perfection of a skill and mention how useful it will be in upcoming games or against certain opponents. For intrinsically motivated athletes, the same scenario can be used to applaud

their hard work and dedication. Both approaches acknowledge the effort these athletes have put into their sport and inspire them to continue practicing.

Although coaching is a difficult job and not all athletes are easily motivated, you have the rare opportunity to show children how hard work and dedication can pay off. Furthermore, helping athletes identify how they are motivated allows them to transfer those skills off the field and into the classroom — and eventually to their careers.

### References:

Larsen, Amber. The Science and Psychology of Motivation for Athletes. Article retrieved from <http://breakingmuscle.com/sports-psychology/the-science-and-psychology-of-motivation-for-athletes>.

## Choosing Wisely®: Understanding the risk and benefits of NSAIDs

Jeremy Johnson, MD

Non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Advil), naproxen (Aleve), celecoxib (Celebrex), are one of the most common classes of medications used for pain. An estimated 35 percent of individuals used NSAIDs at least once in the past week. Another study revealed 95 percent of collegiate football players used NSAIDs regularly. Prescribers and consumers should understand the risks of NSAIDs when using them for pain control.

NSAIDs and Tylenol (Acetaminophen) have similar pain control in treating lower back pain as well as knee and hip osteoarthritis, but those who use NSAIDs often experience more side effects and higher risk of heart disease. At some point, we may be able to individualize which medications will offer the maximum benefit and minimize one's risk.

### Understanding the Risks:

**Cardiovascular:** All NSAIDs have the potential to increase blood pressure, heart failure and leg swelling. All NSAIDs are associated with some increased risk of heart attack as well.

**Gastrointestinal (GI):** 10-20 percent of individuals using NSAIDs complain of nausea, indigestion and heartburn. The most significant risk is for bleeding ulcers in the stomach and small intestine. Bleeding ulcers cause approximately 32,000 hospitalizations and 3,200 deaths in the U.S. every year. This risk significantly increases with age, in that GI bleeding occurs at a rate of 1 in 2,100 in those under 45 years old and of 1 in 110 in those older than 75 years old. Stomach acid-reducing medications can lower this risk, though long-term use of these medications can also have harmful side-effects.

**Kidney Function:** NSAID use also increases one's relative risk of kidney failure. Those who take higher doses and

have pre-existing kidney problems are at the highest risk.

**Approach to pain control:** NSAIDs are effective at controlling pain, but also carry risks. I recommend the following approach to treating pain:

First, maximize non-drug pain control using the "PRICE" approach, which includes Protection (bracing), Rest (avoiding exacerbating activities), Ice, Compression and Elevation. If you choose to use medications, consider starting with Acetaminophen two to three times a day. If you still have pain, then add NSAIDs at the lowest effective dose, for the shortest amount of time. Individuals with high blood pressure, heart failure, kidney failure, coronary artery disease or are prescribed blood thinners (such as Coumadin) should avoid NSAIDs until discussing with a physician. If you're having difficulty controlling your pain, see a physician to confirm the cause of your pain and discuss how to treat it.



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