

## HEART OF A CHAMPION

OCTOBER 2010

In sport you often hear of champions who “played with heart” or coaches who advise athletes to “put your heart into the game”. These phrases describe positive characteristics for athletes such as conviction, commitment, and effort – giving 100% of yourself physically and mentally. **Did you ever consider *literally* what your heart is doing while you are playing tennis?**

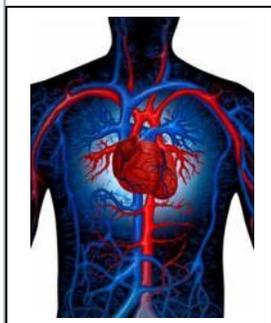
Athletes understand that “cardio” training promotes on-court endurance and is a vital part of conditioning for sport. But did you know that some symptoms, the same as those of poor fitness, may be due to something more serious? Take notice if you ever feel:

- ✓ short of breath
- ✓ dizziness
- ✓ tightness in your chest
- ✓ a racing heart

If you include regular aerobic, cardiovascular, and/or interval training activities in your fitness program but frequently or occasionally experience these symptoms, a cardiovascular assessment with a health care professional is recommended.



Photos: Getty Images



### Blue Blood

The heart is a muscular pump at the center of the complex cardiovascular (circulatory) system. It propels blood through blood vessels to each part of the body, delivering oxygen and other nutrients essential for normal function. Thus, the heart is a vital organ which:

- Is made of cardiac muscle tissue that works involuntarily – it does not require purposeful thought to function such as skeletal muscle like your biceps.
- Runs on a built-in battery – an electrical impulse within the heart initiates each cardiac cycle which includes one contraction and one relaxation of the muscle.
- Consists of 4 chambers separated by walls with one-way doors (valves) between to direct the blood to flow in a specific direction.

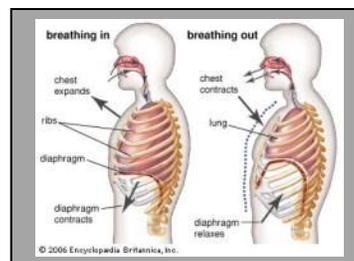
Used blood from the body flows into the **right side of the heart** until it is full → the heart contracts pushing the blood into the **pulmonary artery to the lungs** where it collects oxygen → the heart relaxes so the oxygenated blood can enter the **left side of the heart** until it is full → the heart contracts pushing the blood into the **aorta** which delivers the oxygenated blood to the **various parts of the body** → each body part takes the oxygen and other nutrients it needs from the blood and sends the used blood through veins back to the heart to replenish.

### A Breathe of Fresh Air

While the heart acts as the distribution center for vital oxygen and nutrients which are delivered to the body through the blood, the lungs act as the loading dock for receiving these vital nutrients from the air.

The pulmonary (respiratory) system works closely with the cardiovascular system to sustain life. The pulmonary system, primarily housed inside the thorax (rib cage) includes:

- **Nose & Mouth**—where air comes in and out of the body as we breathe.
- **Trachea** (throat /wind-pipe)—tunnel that directs air from the nose & mouth to the lungs and vice versa.
- **Bronchial tubes**—2 branches from the trachea going to the left & right lungs.
- **Lungs**—a left and a right “sac” that hold smaller branches from the bronchial tubes and alveoli (small clusters of tissue that collect oxygen).
- **Diaphragm**—a thin broad muscle separating the abdominal cavity and thorax, which contracts to pull fresh air into the lungs and relaxes to push the used air out of the lungs.



As we **breathe in** (inhale) through the nose and mouth, oxygenated air travels through the trachea and bronchial tubes to the alveoli which **collect oxygen** and pass it to the pulmonary artery (blood vessel) to be **returned to the heart** for distribution to the body. The alveoli take **carbon dioxide waste** from the blood to be **removed** from the body as we **breathe out** (exhale).



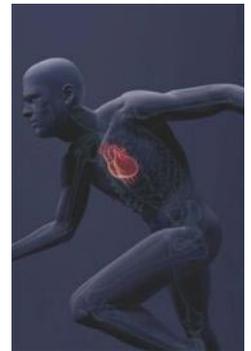
## THE HEART OF THE MATTER!

### Pump Up Your Performance

During exercise the body uses more oxygen and nutrients to sustain the activity of the muscles and subsequently produces more waste products (carbon dioxide). To keep up with these demands, an athlete will increase her respiratory rate (breathing faster) and heart rate (pumping faster) to deliver the required oxygen and nutrients to the muscles. Aerobic conditioning for sport through the years may cause the heart and lungs to adapt to the demands. Some of the changes that may occur are:

- ✓ Dilation (expansion) of heart chambers
- ✓ Thickening of walls of heart
- ✓ Slower resting heart rate
- ✓ Quicker recovery of heart rate after exercise

These changes are part of what is termed “**athletic heart syndrome**”, which is considered a normal response to intense training over time. These changes allow the heart to function more efficiently. However, if the change in size or thickness of the heart muscle is extreme it may be difficult for the medical team to determine during a routine physical exam if this is normal or related to a more serious condition(s), such as those described below. A cardiovascular assessment by a medical specialist may be recommended to confirm or deny any suspicious findings.



### CAUTION – HEART BREAK AHEAD!

**Lung disease** such as *asthma* more commonly affects Tour-level tennis players than heart disease. Other lung problems that can affect athletes are *pulmonary embolism* (a blood clot in the artery of the lung), *pneumonia* (lung infection), and *pneumothorax* (collapsed lung). Luckily these are much less common, but are very serious illnesses.

Typical symptoms of lung disease may include:

- shortness of breath
- chest tightness
- wheezing
- reduced exercise tolerance



Athletes experiencing these symptoms should speak to a PHCP or seek further medical evaluation by their doctor as these illnesses may cause sudden death or long term health problems if left untreated.

Many teens and young adults do not feel that **heart disease** will affect them. While *coronary artery disease* (narrowing of the arteries that carry blood to the heart) and *heart attack* are rare in athletes < 35 years old, there are a number of other causes of heart problems that occur in the younger age group. Some of these conditions are dangerous, i.e. increasing risk of sudden death. It is very important to seek medical evaluation by a PHCP, tournament physician, or private medical team for the possibility of heart disease as a cause for the following symptoms:

- irregular heart beat (palpitation)
- racing heart beat
- passing out (fainting)
- chest pain
- shortness of breath
- family history of heart disease
- family history of unexplained sudden death in males < 50 or females < 60

**“It is not the size of a man but the size of his heart that matters.”**  
Evander Holyfield, Champion Boxer

### A Real Cardio Work Out

If an athlete develops any of the symptoms above, it is important to first see a doctor. Upon review of the history of symptoms and examination of the athlete’s heart and lungs, the doctor may determine that further testing is necessary.

- Testing for breathing trouble may be as simple as a **chest x-ray** to look for infection, collapsed lung or other abnormalities. More specific testing of the lungs may involve **pulmonary function testing** to measure lung volumes. This test is useful as a first step in evaluating many lung problems including asthma. Based on results of this test, further testing may be necessary to differentiate the diagnosis.
- With respect to heart disease, some tennis federations obtain screening tests of their athletes such as: **electrocardiogram (ECG)**, **echocardiogram (ECHO)** or **treadmill stress testing**. Some countries do not perform these tests routinely on all athletes. However, if an athlete experiences related symptoms a doctor may recommend these standard tests and possibly additional testing.



**Every situation is different, but the best way to have the heart of a champion is to play with a healthy one!**