

## Atrial Septal Defect (ASD)

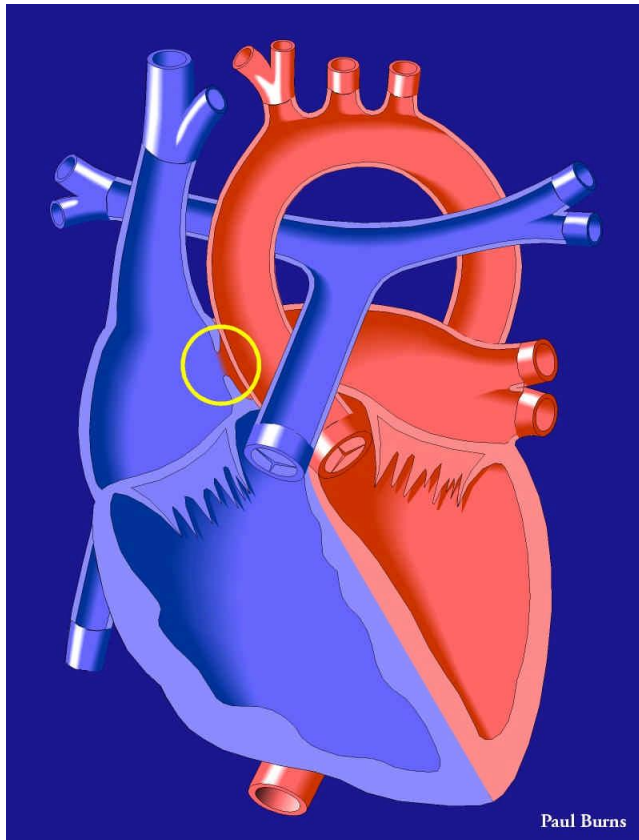


### What Is It?

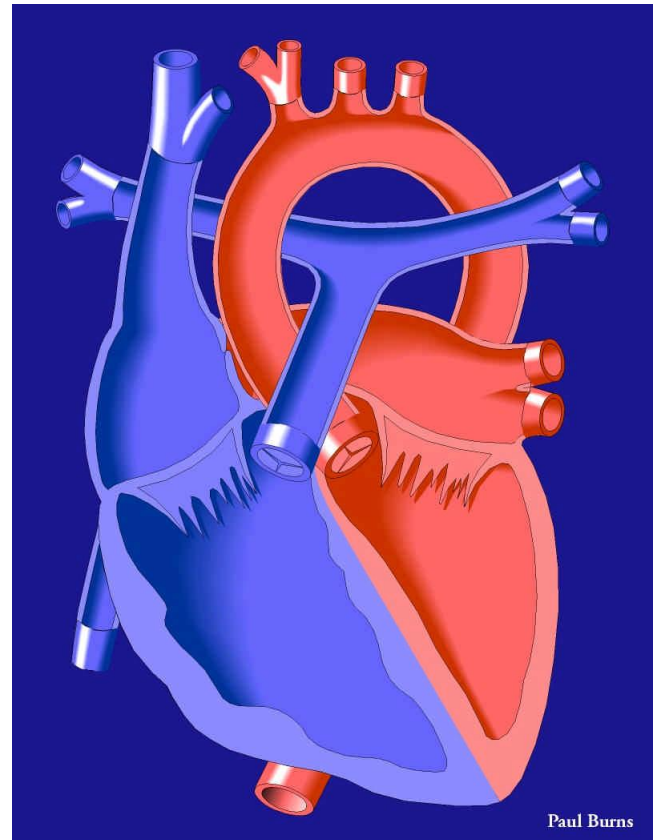
An Atrial Septal Defect (ASD) is a hole in the atrial septum, or muscle wall, that separates the right and left atria (singular = atrium), or upper chambers of the heart.

Because of the lower pressure in the right atrium, this hole allows oxygenated blood from the lungs to move, or shunt, from the left into the right atrium. This blood proceeds into the right ventricle, which pumps it back to the lungs rather than to the body.

ASDs vary in size and in the severity of symptoms they may cause. They account for between 5 and 10 per cent of all cases of congenital heart disease and are twice as prevalent among girls as boys.



**Atrial Septal Defect**



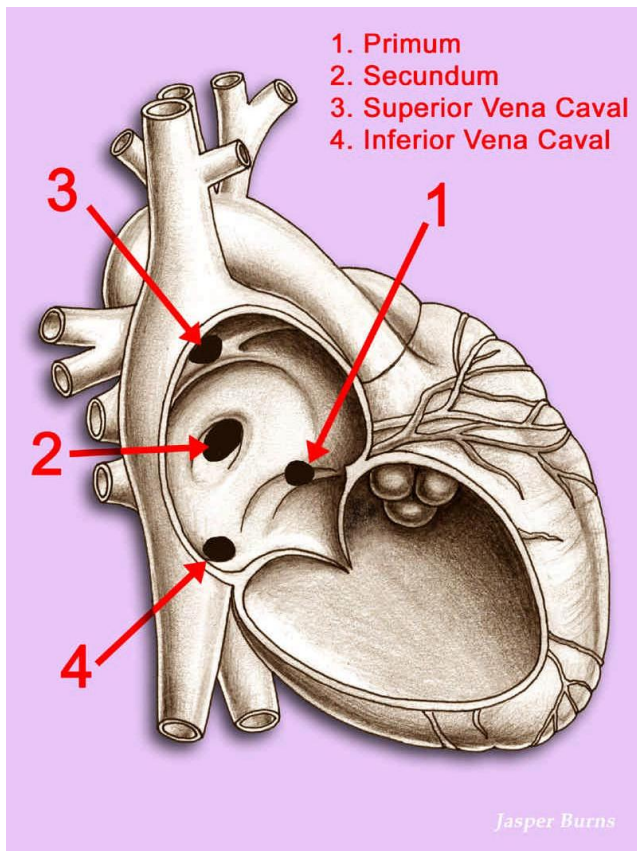
**Normal Heart**

Atrial Septal Defects are divided into three different types on the basis of the position of the hole (or holes) in the atrial septum.

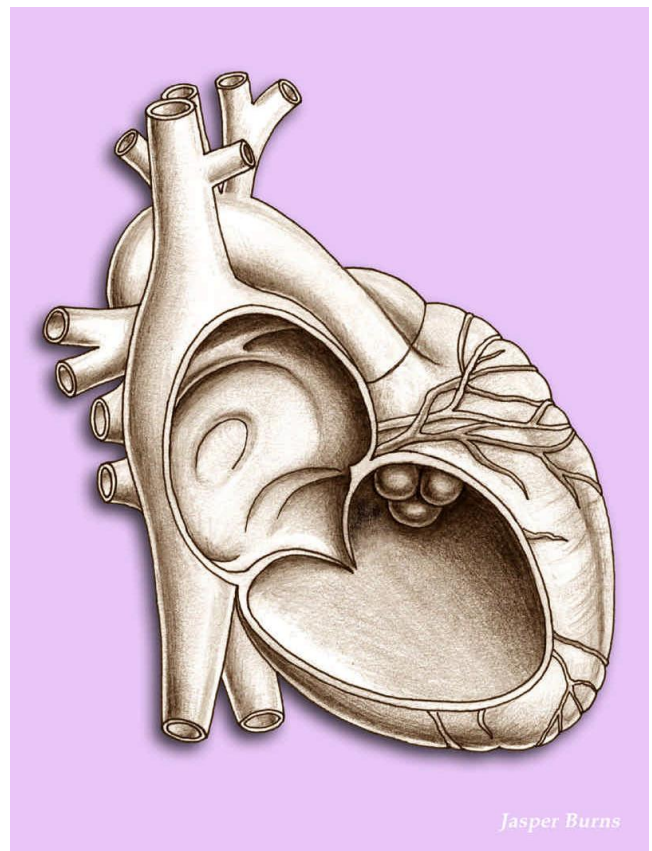
The first type of ASD is known as ostium primum defect, or simply, primum (number 1 in the diagram). In this kind of defect, the hole is located in the lower part of the atrial septum, near the tricuspid valve, which opens into the right ventricle.

The most common type of ASD (accounting for 50-70% of all cases) is known as ostium secundum defect, or simply, secundum (2). In this case, the hole is located near the center of the atrial septum.

The third type of ASD is known as the sinus venosus defect, in which the hole is located near one of the two places where the vena cava (the vein that carries blood from the body to the heart) enters the right atrium. The two kinds of sinus venosus defect are distinguished by whether the hole is near the entry point of the superior vena cava (SVC) (superior vena caval type - 3 in diagram) or of the inferior vena cava (IVC) (inferior vena caval type - 4 in diagram).



**Variations of Atrial Septal Defect**



**Normal Heart**

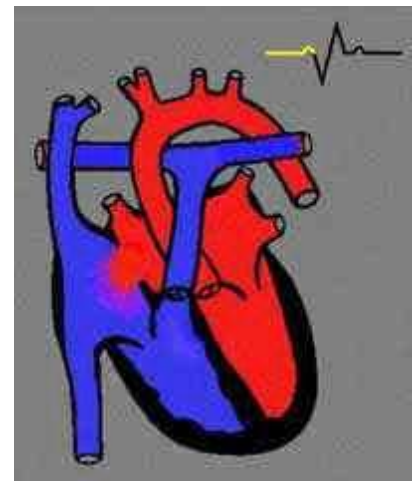
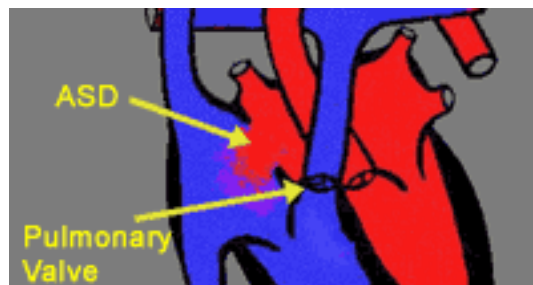
## What Are Its Effects?

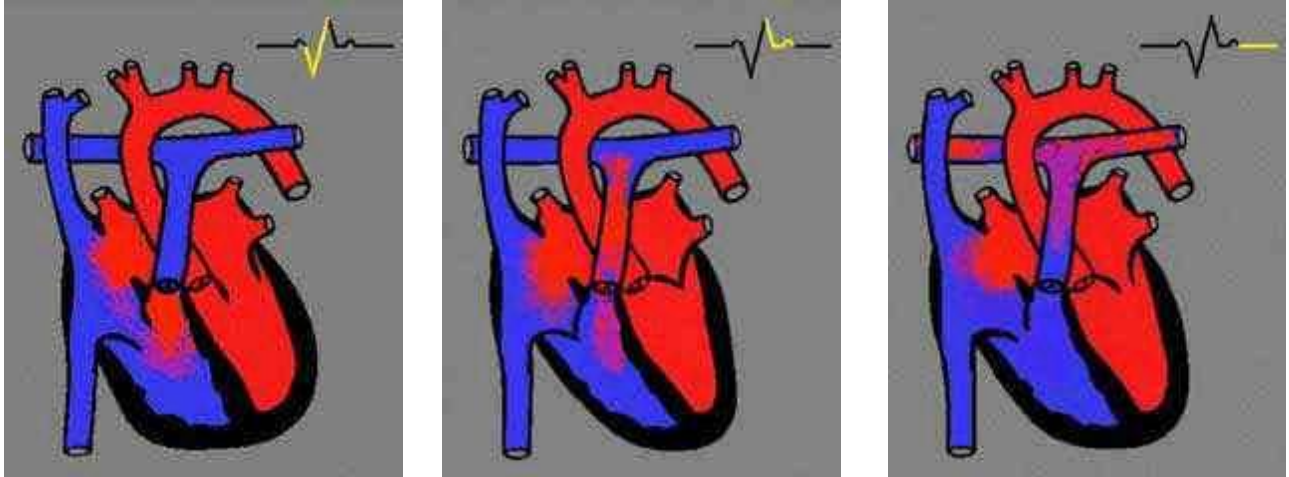
Children with large ASDs are characteristically slender of build and have a heart murmur. The murmur is caused by the extra blood flow across the pulmonary valve. Some children may experience shortness of breath or heart palpitations. However, they are normally active and show no other outward symptoms. There are no exercise restrictions for these children.

The larger the defect, the more likely children will have symptoms. Infants with a large ASD may develop congestive heart failure. However, if the defect is small (less than 2 millimeters), there is a very high probability that it will close on its own. Surgery is not usually performed in these cases.

Larger ASDs, which are more likely to remain open, cause an excessive flow of blood into the right atrium, right ventricle and pulmonary artery (see illustrations). This enlarges the right atrium and right ventricle (dilatation) and causes high pressures in the pulmonary artery that will eventually distort its shape and may also damage the blood vessels in the lungs.

The enlargement of the right atrium can result in abnormal heart rhythms. These effects are not reversed by closing the ASD after the damage has been done. Heart failure is likely when a person with an untreated ASD reaches young adulthood.



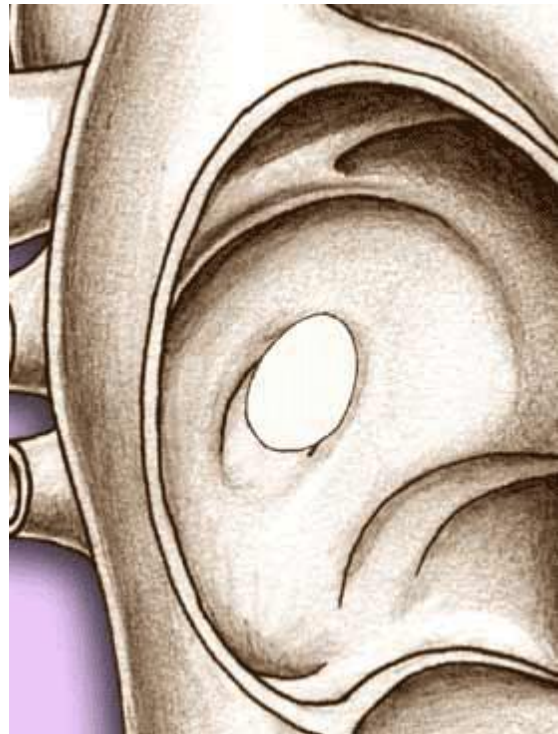
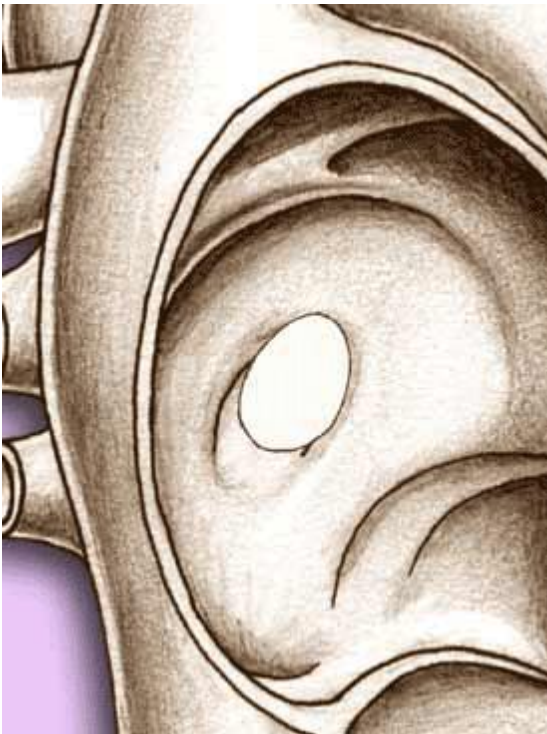
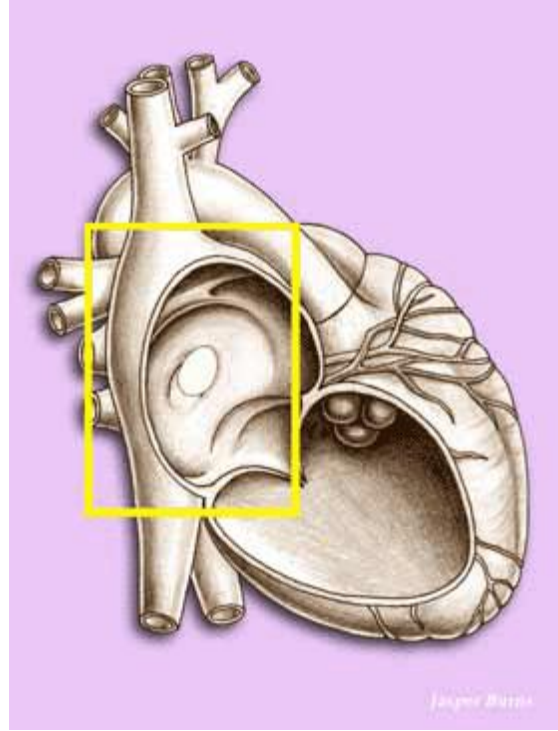
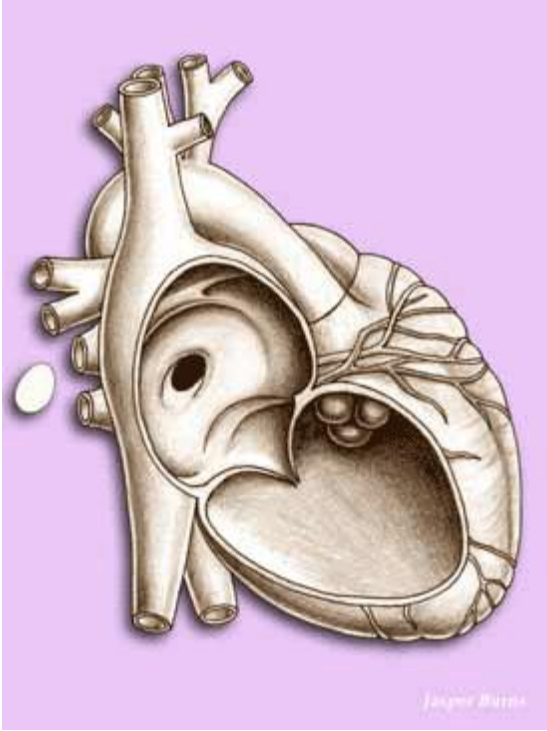


### **How Is It Treated?**

ASDs may be closed by patching or suturing during open heart surgery or through the use of a transcatheter device, such as a septal occluder. In addition, there are chemical treatments that may promote tissue growth, as well as minimally invasive surgical procedures involving special instruments that are inserted into 3 or 4 holes in the chest.

In open heart surgery, small defects may be closed with simple sutures using a monofilament thread made of Prolene or Polypropylene. Larger holes may be covered with patches made of pieces of pericardium (the membrane that covers the heart) or of silk or a synthetic material such as Dacron or Teflon (See illustrations).



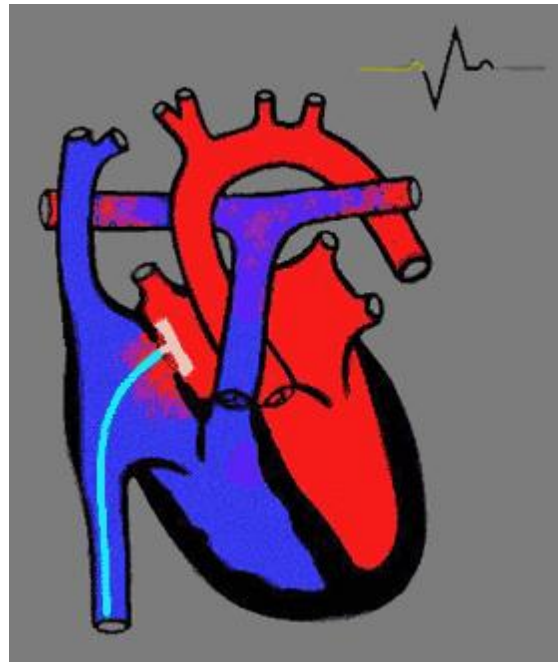
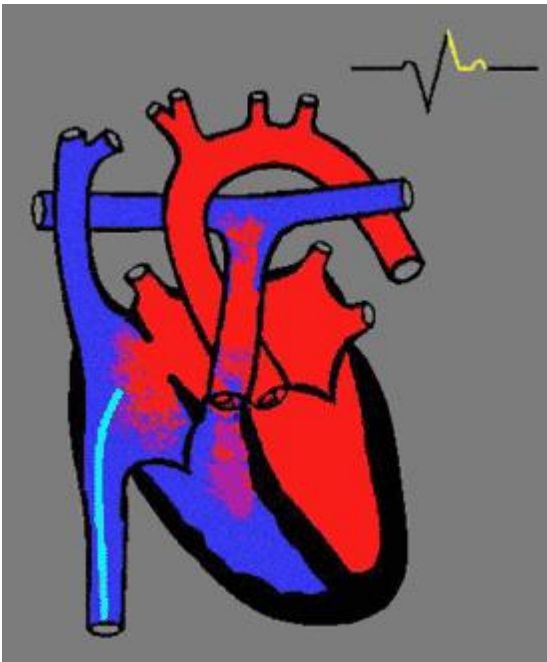


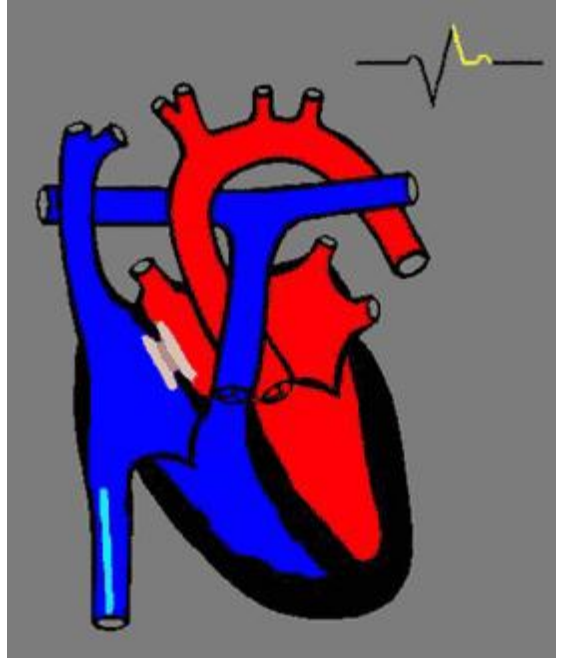
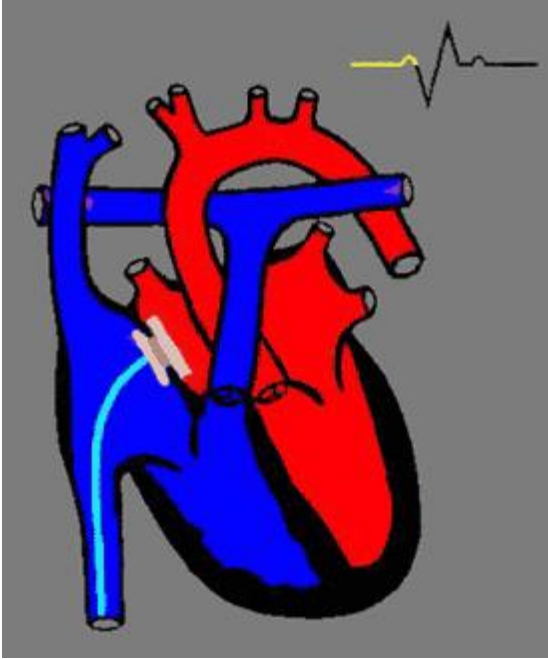
### **Surgical Repair of Atrial Septal Defect**

An alternative to open heart surgery in the treatment of ASDs is the use of devices that are introduced into the heart with the use of a catheter during a catheterization procedure. (See illustrations)

Before closing an ASD with a transcatheter device, the size of the hole or holes must be determined. One way to accomplish this is to use the Amplatzer® Sizing Balloon. A catheter containing a balloon is introduced into the heart and the balloon is inflated to measure the diameter of the ASD. There are radiopaque markers at regular intervals on the balloon which may be read radiometrically, with ultrasound, or with a sizing plate.

When the ASD has been accurately measured, an appropriately sized septal occluder is introduced in a separate catheterization to close the hole. The catheter enters from the groin or forearm, and continues into the heart via the Vena Cava.





**Closure of ASD with a Septal Occluder**