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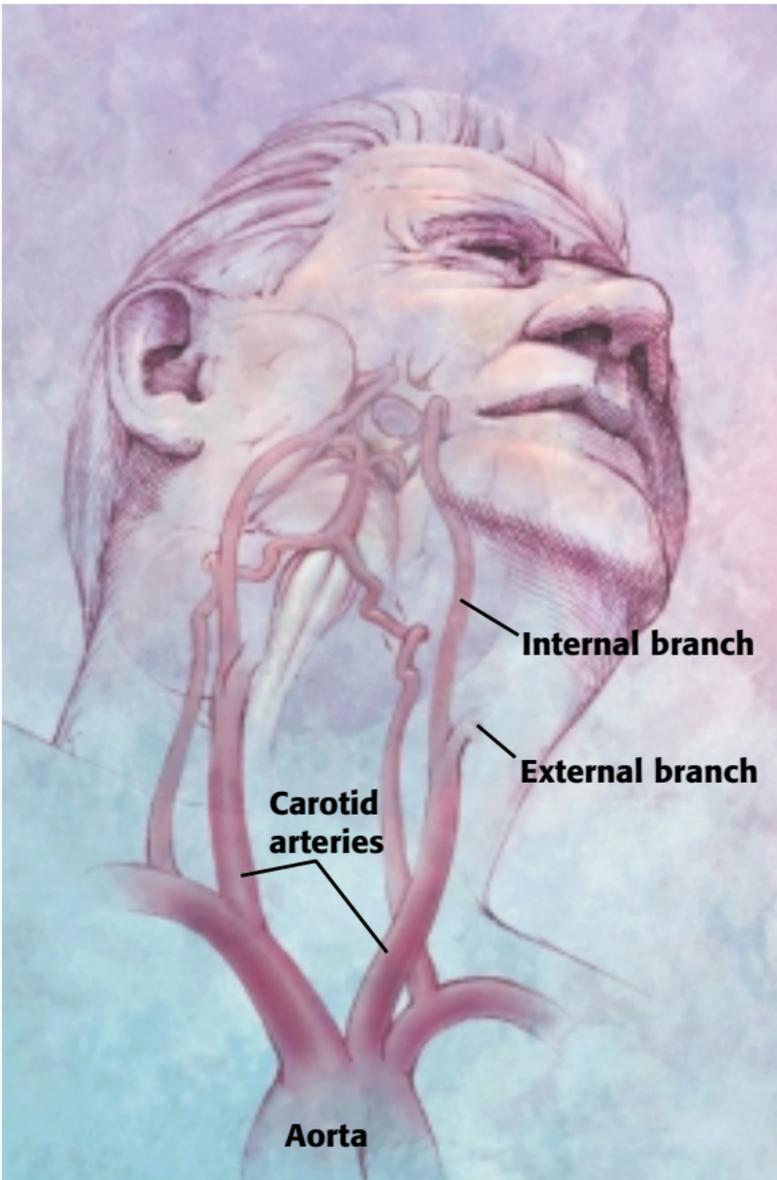
**PATIENT  
GUIDE**

An anatomical illustration of a human head and neck, rendered in a reddish-pink, etched style. The illustration shows the brain, facial features, and major blood vessels, including the carotid and jugular veins. The text 'Cerebrovascular Disease' is overlaid on the right side of the illustration.

# Cerebrovascular Disease

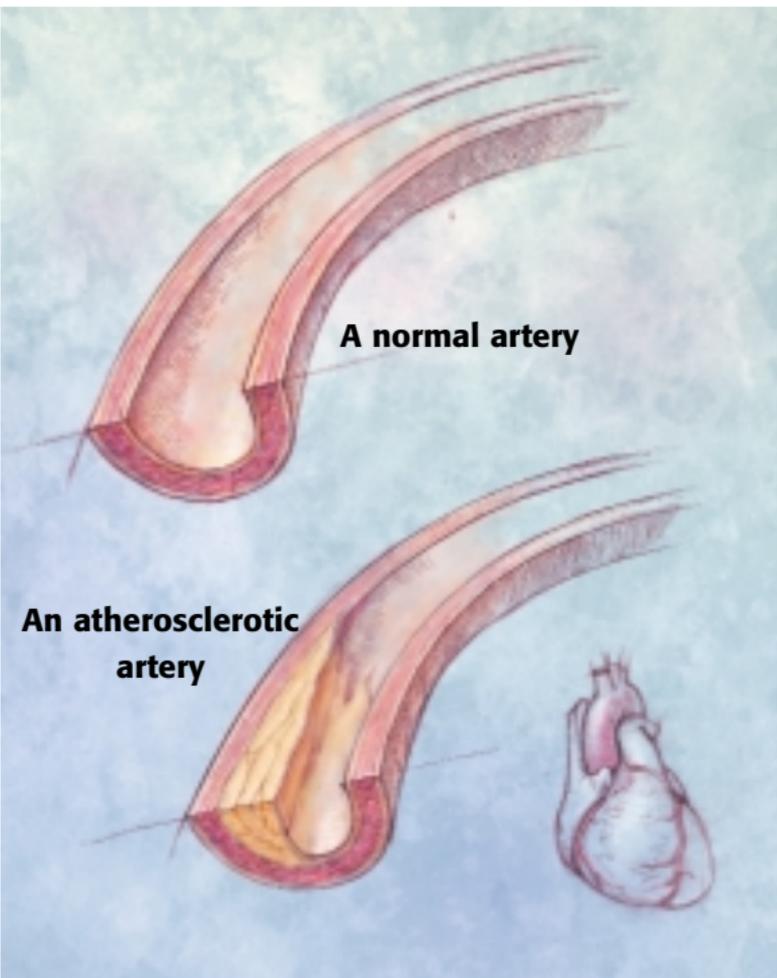
# How Circulation Works

Blood leaves the heart via the **aorta** and circulates up the **carotid arteries** on each side of the neck to the brain. The carotid artery divides into two branches, **internal** and **external**. The external carotid supplies blood to the face; the internal carotid delivers blood to the eye and the brain.



# Atherosclerosis

Normally the inner wall of an artery is smooth and firm, allowing blood to flow freely. As years go by, the arteries carrying blood to the brain may be affected by atherosclerosis. The inner lining of the artery becomes thickened and rough by a build-up of cholesterol or fatty materials. This build-up, much like rust in a pipe, is called **plaque**. It may cause the artery to narrow or even close off completely, thus reducing the flow through other vessels to circulate around the blockages. This type of alternate circulation is called **collateral circulation**. Atherosclerosis





**When faced with an arterial blockage (left) blood will flow through other vessels creating collateral circulation (right).**

occurs in all vessels to some extent, although the arteries of the heart, neck, and legs are the most commonly affected.

## Stroke

Stroke (cerebrovascular accident or CVA) is a condition which results from an **interruption** in the blood supply to the brain. There are basically three types of stroke: hemorrhagic, embolic, and thrombotic.

**HEMORRHAGIC STROKE** occurs when an artery in the brain bursts and the normal flow of blood is interrupted.

**EMBOLIC STROKE** results when a small blood clot or fatty material breaks away from a diseased area in the artery and floats along with the blood until the artery becomes too small. At this point,

the clot lodges and normal blood flow to the area is stopped.

**THROMBOTIC STROKE** is the result of a build up of atherosclerotic material in the wall of the artery. If the plaque narrows the vessel significantly or completely blocks the artery, the blood supply to the brain is reduced.



Often a stroke is preceded by a warning signal, called transient ischemic attack or TIA. Transient means temporary and ischemic means lacking in blood supply. Therefore, a TIA is the temporary interruption of the normal blood supply to the brain. The warning sign may last a few seconds or several hours. Many people ignore the signs because they do go away, usually within 24 hours. Because each area of the brain controls very specific bodily functions, the signs will vary with the artery involved. It is very important to recognize the warning signs and report them to your physician. The following list includes the most common types of TIA's:

# Asymptomatic Bruit

**BRUIT** is a French word meaning noise and is used to describe a sound heard in an artery. Asymptomatic means has no warning signs or symptoms xxxx. When atherosclerosis narrows an artery, blood flow is disturbed. This disturbed flow produces a bruit that can be heard with a stethoscope. The presence of a bruit is usually indicative of atherosclerosis but, in and of itself, does not mean that symptoms will occur. It is

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**NUMBNESS OR WEAKNESS** of one side of the body, involving the arm, leg or face.

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**TEMPORARY LOSS OF VISION** in one eye.

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**FALLING** for no apparent reason.

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**LOSS OF BALANCE** or staggering.

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**BLURRED OR DOUBLE VISION** with return of clear vision in a short time.

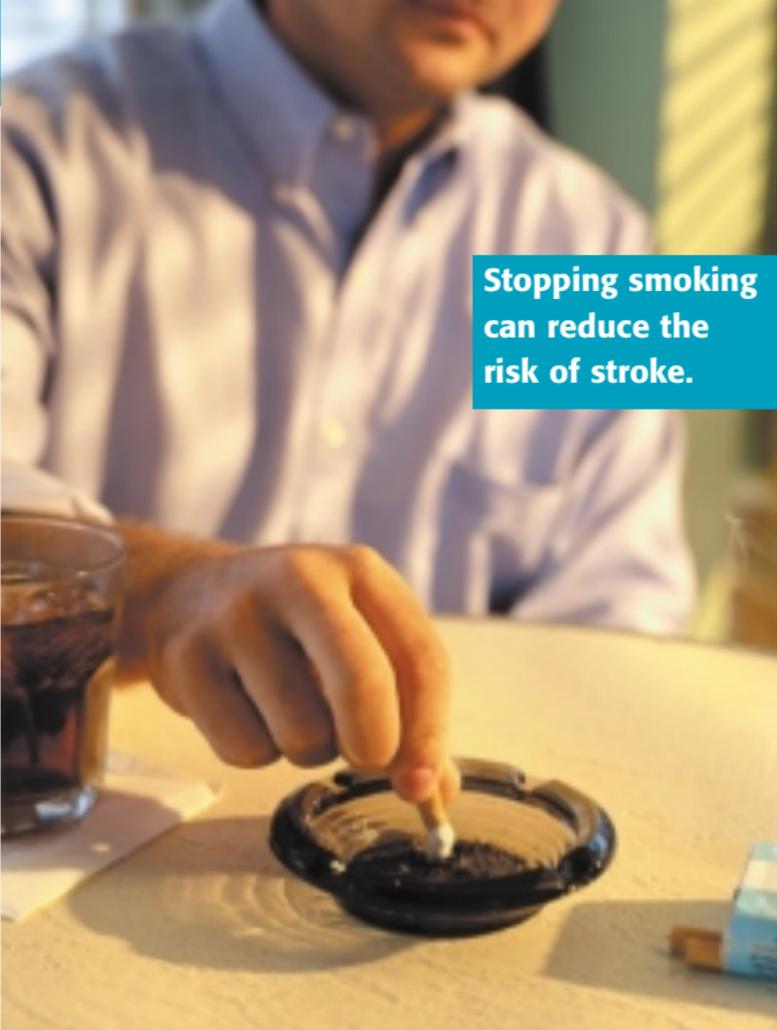
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**DIFFICULTY IN SPEAKING** or understanding spoken or written words.

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**LOSS OF MEMORY**, brief periods of time that cannot be recalled.

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**Stopping smoking  
can reduce the  
risk of stroke.**

important that a bruit be evaluated and checked at regular intervals.

## Risk Factors

While stroke may affect anyone at any age, it is more likely to occur in people after age 45. The frequency of stroke increases with age. There is no sure way of knowing who will develop a stroke. Some individuals are more “stroke-prone” than others and share many of the same characteristics:

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- ▶ Heart disease
  - ▶ High blood pressure
  - ▶ Smoking
  - ▶ Diabetes
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- ▶ Elevated cholesterol levels
  - ▶ Family history of vascular disease
  - ▶ Abnormalities in the blood
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## Reducing Risk

Since most strokes are preceded by warning signs, early recognition is the first step in prevention. Prompt notification of your physician should you experience one of the warning signs will decrease your chances of developing a stroke.

We cannot totally prevent the occurrence of atherosclerosis or alter the part heredity plays in its development. However, many of the risk factors can be controlled by re-evaluating your lifestyle and making necessary changes.

**SMOKING.** Tobacco causes constriction of the blood vessels, thus decreasing the flow of blood, and exacerbates atherosclerosis. Therefore, all attempts should be made to stop smoking.

**EXERCISE.** Exercise has been known to improve collateral circulation. It is important to gradually increase physical activity and begin an exercise program as directed by your physician.

**DIET.** Reduction of cholesterol and saturated fats in the diet and maintenance of normal weight may decrease the risks of atherosclerosis.

**HYPERTENSION AND DIABETES.** Regular check-

**This vascular technologist examines a patient's carotid vessels for any vascular abnormalities utilizing ultrasound technology.**



Photo courtesy ATL Ultrasound

ups are a necessity. Keeping doctors' appointment and following their instructions cannot be overemphasized.

## Diagnosis

If your physician suspects that you have had a TIA or other signs of cerebrovascular disease, he/she may order diagnostic studies to determine the extent of the problem. Diagnostic procedures can be noninvasive or invasive.

**NONINVASIVE METHODS:** Noninvasive procedures are those that are performed on the outside of the body and do not require the use of needles, catheters, or dye. There is no use of x-

ray and the tests are painless and without side effects. There are a variety of noninvasive methods which can be performed on an inpatient or outpatient basis. Many of the studies use sound-waves or ultrasound to listen to blood flow and/or visualize the arteries of the neck and head directly.

**INVASIVE METHODS:** An arteriogram is an x-ray picture of the artery. It is obtained by putting a contrast material (a dye that shows up on x-ray) into the artery and then taking x-ray pictures. The dye is injected via a small tube (catheter) which is inserted into one of the blood vessels. An arteriogram usually requires hospitalization.

## Treatment

With all of the advances in vascular surgery, it would appear that medical treatment is declining and that surgical treatment may be replacing it. However, this is not entirely true. Disorders of the cerebrovascular circulation may be treat-



ed medically. By reducing the risk factors, progression of disease may be reduced. Treatment seldom, if ever, consists of only one method. Even if surgery is performed, the underlying atherosclerosis is still present and continuous medical care is required.