

## CT of the Sinuses

*This procedure is reviewed by a physician with expertise in the area presented and is further reviewed by committees from the American College of Radiology (ACR) and the Radiological Society of North America (RSNA), comprising physicians with expertise in several radiologic areas.*

### What is CT of the Sinuses?

Computed tomography (CT) scanning, also called CAT scanning, uses special x-ray equipment to obtain many images of the interior of the body from different angles and then joins them together to show a cross-section of body tissues and organs. A physician may order a CT scan of the facial area to view a patient's sinus cavity.

The paranasal sinuses are hollow, air-filled spaces located within the bones of the face and surrounding the nasal cavity. The nasal cavity is a system of air channels connecting the nose with the back of the throat. There are four pairs of sinuses, each connected to the nasal cavity by small openings. The paranasal sinuses are lined with a special tissue called a nasal mucous membrane that secretes mucus to keep the nose and sinuses moist and thus to humidify the air passing toward the lungs. Normally, air passes in and out of the sinuses and mucous drains from the sinuses into the nose.

### What are some common uses of the procedure?

Computed tomography (CT) can provide important information about sinus and nasal structure. CT is able to detect sinuses that are filled with fluid or sinus membranes that are thickened. It can assist your physician in diagnosing sinusitis, which can be due to either infection or inflammation in one or more of the sinuses. This condition may be acute (sudden and short), chronic (ongoing and long-term) or recurring (repeated). Among the causes of sinusitis are allergies, upper respiratory infection and an obstruction in the nose. When the nasal mucous membrane swells, the opening from the sinuses to the nasal cavity can become blocked. Fluids that would normally drain into the nose become trapped in the sinuses and infection can set in. Pressure, pain, headache, fever and tenderness in the sinus area can result.

CT may also be used to define the anatomy before surgery or to give further information about certain tumors of the nasal cavity and sinuses.

### How should I prepare for the CAT scan?

No special preparation is needed for a CT scan of the facial region unless you are to receive contrast material—a substance that highlights certain tissues and blood vessels making certain abnormalities easier to see. If your radiologist believes that an intravenous (IV) injection of a contrast material will be helpful, you may be asked in advance whether you have had allergies in the past or have ever had a serious reaction to medication. Contrast materials can rarely cause an allergic reaction. The radiologist also should know if you have asthma, multiple myeloma, any disorder of the heart, kidneys, or thyroid gland, or if you have diabetes—and particularly if you are taking the medication metformin (Glucophage).

Women should always inform their doctor and x-ray technologist if there is any possibility of pregnancy. In some cases, an alternate imaging exam will be performed.

You should wear comfortable, loose-fitting clothing for your CT exam. Anything that contains metal might interfere with imaging of the head. Items such as earrings, eyeglasses, dentures, dental appliances or hairpins should be removed.

## What does the equipment look like?

The CT scanner is a large, square machine with a hole in the center. You will lie still on a table that can move up or down, and slide into and out of the center of the hole. Within the machine, an x-ray tube on a rotating gantry (or frame) moves around your body to produce the images, making clicking and whirring noises as the arm moves.



## How does the procedure work?

Unlike conventional x-rays, which produce pictures of the shadows cast by body structures of different density, CT scanning uses x-rays in a much different way. Numerous x-ray beams will be passed through the facial region at different angles and special sensors measure the amount of radiation absorbed by different tissues (and lesions such as a tumor). As you lie still, the scanner parts revolve around you, emitting and recording x-ray beams from as many as a thousand points on the circle. A special computer program then uses the differences in x-ray absorption to form cross-sectional images, or slices, of the facial region. These slices are called tomograms, hence the name computed tomography.

## How is the CAT scan performed?

For your CT scan, you will lie on a table that will be guided into the center of the scanner. You may be positioned face-down with your chin elevated. During the procedure, you will be asked to lie very still. You will be alone in the room during the exam although the technologist will be able to see and speak to you.

Some patients require an injection of a contrast material to enhance the visibility of certain tissues or blood vessels. A small needle connected to an intravenous line is placed in an arm or hand vein. The contrast material will be injected through this line.

The actual CT scan takes less than a minute. The entire process may take up to 45 minutes. When it is completed, you will be asked to wait until the technologist examines the images to determine if more are needed.

## What will I experience during the procedure?

When you enter the scanner, special lights may be turned on to ensure correct positioning. A CT scan of the sinuses requires a special head holder that uses soft straps to keep the head and neck in proper alignment.

CT itself causes no pain, though there may be some discomfort from having to remain perfectly still for several minutes. If contrast material is injected you may have a warm, flushed sensation during the injection. You may also experience a metallic taste in your mouth that lasts for about two minutes. Occasionally, for a few hours a patient will develop itching and hives, which can be relieved by medication. If you become light-headed or experience difficulty breathing, you should notify the technologist or nurse, as it may indicate a more severe allergic reaction. Because CT uses x-rays, you may not have a relative or friend in the CT room during the exam.

## Who interprets the results and how do I get them?

A radiologist, a physician experienced in CT and other imaging examinations, will analyze the images and provide a report to your referring physician. You will most often receive these results from your primary care physician.

## What are the benefits vs. risks?

### Benefits

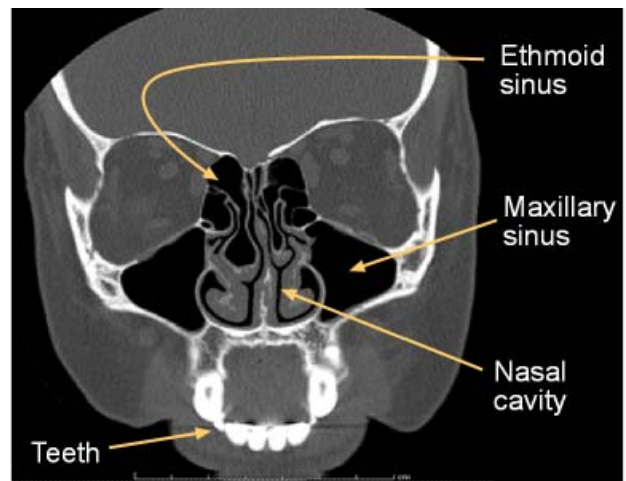
- A CT scan, one of the safest means of studying the head, can help the physician diagnose the cause of sinus problems.
- CT is the most reliable imaging technique for determining if the sinuses are obstructed.
- CT of the sinuses is now widely available and is performed in a relatively short time, especially when compared to magnetic resonance imaging (MRI).

### Risks

- CT involves exposure to radiation in the form of x-rays, but the benefit of an accurate diagnosis far outweighs the risk. See the Safety page on the RadiologyInfo.org Web site for more information about radiation dose.
- Women should always inform their doctor and the x-ray technologist if there is any possibility of pregnancy.
- Nursing mothers should wait for 24 hours after contrast material injection before resuming breast-feeding.
- Severe allergic reactions to the contrast materials now in use are uncommon, however, CT scanning facilities are well-equipped to deal with them.

## What are the limitations of CT of the Sinuses?

CT of the facial region is primarily used to determine the presence of inflammatory disease and for surgical planning. While CT is occasionally used to detect the presence of tumors, magnetic resonance imaging (MRI) is the primary choice for this purpose.



*Sample image: CT scan - direct coronal (from the top of the head) view of the ethmoid and maxillary sinuses.*

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