

# DOWNLOAD PDF COMPUTED TOMOGRAPHY, ANATOMY, AND MORPHOMETRY OF THE LOWER EXTREMITY

## Chapter 1 : anatomy of the lower extremity | Download eBook PDF/EPUB

*Computed Tomography, Anatomy, and Morphometry of the Lower Extremity Softcover reprint of the original 1st ed. Edition.*

You should wear comfortable, loose-fitting clothing to your exam. You may be given a gown to wear during the procedure. Metal objects, including jewelry, eyeglasses, dentures and hairpins, may affect the CT images and should be left at home or removed prior to your exam. You may also be asked to remove hearing aids and removable dental work. Women will be asked to remove bras containing metal underwire. You may be asked to remove any piercings, if possible. You will be asked not to eat or drink anything for a few hours beforehand, if contrast material will be used in your exam. You should inform your physician of all medications you are taking and if you have any allergies. If you have a known allergy to contrast material, your doctor may prescribe medications usually a steroid to reduce the risk of an allergic reaction. To avoid unnecessary delays, contact your doctor before the exact time of your exam. Also inform your doctor of any recent illnesses or other medical conditions and whether you have a history of heart disease, asthma, diabetes, kidney disease or thyroid problems. Any of these conditions may increase the risk of an unusual adverse effect. Women should always inform their physician and the CT technologist if there is any possibility that they may be pregnant. See the Safety page for more information about pregnancy and x-rays. If you are breastfeeding at the time of the exam, you should ask your doctor how to proceed. It may help to pump breast milk ahead of time and keep it on hand for use after contrast material has cleared from your body, about 24 hours after the test. The CT scanner is typically a large, box-like machine with a hole, or short tunnel, in the center. You will lie on a narrow examination table that slides into and out of this tunnel. Rotating around you, the x-ray tube and electronic x-ray detectors are located opposite each other in a ring, called a gantry. The computer workstation that processes the imaging information is located in a separate control room, where the technologist operates the scanner and monitors your examination in direct visual contact and usually with the ability to hear and talk to you with the use of a speaker and microphone. In many ways, CT scanning works very much like other x-ray examinations. X-rays are a form of radiation—like light or radio waves—that can be directed at the body. Different body parts absorb the x-rays in varying degrees. In a conventional x-ray exam, a small amount of radiation is aimed at and passes through the body, recording an image on a special image recording plate. Bones appear white on the x-ray; soft tissue, such as organs like the heart or liver, shows up in shades of gray and air appears black. With CT scanning, numerous x-ray beams and a set of electronic x-ray detectors rotate around you, measuring the amount of radiation being absorbed throughout your body. At the same time, the examination table is moving through the scanner, so that the x-ray beam follows a spiral path. A special computer program processes this large volume of data to create two-dimensional cross-sectional images slices of your body, which are then displayed on a monitor. This technique is called helical or spiral CT. CT imaging is sometimes compared to looking into a loaf of bread by cutting the loaf into thin slices. When a contrast material is introduced to the bloodstream during the procedure, it clearly defines the blood vessels being examined by making them appear bright white. Prior to, or on the day of the procedure, you may be asked to complete a questionnaire to ensure your safety during this procedure. Before the procedure, a nurse or technologist will insert an intravenous IV catheter into a vein, usually in your arm or hand. Rarely, a small amount of blood may be withdrawn through the catheter or finger stick to test your kidney function. The technologist begins by positioning you on the CT examination table, usually lying flat on your back. Straps and pillows may be used to help you maintain the correct position and to help you remain still during the exam. An automatic injection pump connected to the IV will give contrast material at a controlled rate. In some cases, especially in children and patients with fragile and small veins, the contrast is hand-injected using a syringe. A small amount of contrast material may initially be injected through the IV to determine how long it will take for the contrast to reach the body part that is being evaluated. During

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scanning, the table is positioned at the start point of imaging and will then move relatively rapidly through the opening of the machine as the actual CT scanning is performed. With some new scanners, if the area to be scanned is limited, like the heart or the chest of a baby, the entire scan may be completed with a single rotation without any table movement. During CT angiography of the coronary arteries or aorta in the chest, electrocardiogram ECG leads sticky patches will be placed on your chest to record heart rhythm during scanning. Depending upon how fast and regular your heart beats, your heart rate may be temporarily slowed down for the duration of the exam with medication to obtain motion free images of the heart. If heart rate medication is given, you will be monitored during and for a brief period after the procedure. You may be asked to hold your breath during the scanning. Any motion, whether breathing or body movements, can lead to artifacts on the images. This loss of image quality can resemble the blurring seen on a photograph taken of a moving object. Occasionally, sedation may be needed for children to keep them still during scanning. This usually needs to be prearranged when the CT scan is scheduled as there will be special instructions. For example, eating and drinking may be stopped for a longer duration prior to the exam to prevent complications such as aspiration, and longer monitoring following the scan may be required while the medication used for sedation wears off. When the examination is completed, you will be asked to wait until the technologist verifies that the images are of high enough quality for accurate interpretation. Following the exam, the intravenous catheter will be removed. A bandage will be placed over the needle puncture site. The entire CT angiography exam may be completed within a few seconds. Your actual time in the scanner room will be longer as the technologist will have to appropriately position you on the table, check or place an IV line, do preliminary imaging to verify the beginning and end points of the exam, and set up the scanner and contrast injection pump settings based on the part of the body being imaged. CT angiography may be performed in children. Since children are more sensitive to radiation than adults, the scan is usually performed with an appropriate amount of radiation delivered for the size of the child. For children and adults of reproductive age, radiation protective shields are used for protection to reproductive parts. Depending upon the body part being examined, thyroid gland radiation protective shields may also be used. CT exams are generally painless, fast and easy. With multidetector CT, the amount of time that the patient needs to lie still is reduced. Though the scanning itself causes no pain, there may be some discomfort from having to remain still for several minutes and with placement of an IV. If you have a hard time staying still, are very nervous or anxious or have chronic pain, you may find a CT exam to be stressful. The technologist or nurse, under the direction of a physician, may offer you some medication to help you tolerate the CT scanning procedure. For exams excluding head and neck your head will remain outside the hole in the center of the scanner. The scanner is approximately 24 inches wide, therefore, your entire body will be "inside" the scanner at one time such as with MRI. If an intravenous contrast material is used, you will feel a pin prick when the needle is inserted into your vein. You will likely have a warm, flushed sensation during the injection of the contrast materials and a metallic taste in your mouth that lasts for at most a minute or two. You may experience a sensation like you have to urinate; however, this is actually a contrast effect and subsides quickly. When you enter the CT scanner, special light lines may be seen projected onto your body, and are used to ensure that you are properly positioned. You will be alone in the exam room during the CT scan, unless there are special circumstances. For example, sometimes a parent wearing a lead shield may stay in the room with their child. However, the technologist will always be able to see, hear and speak with you through a built-in intercom system. After a CT exam, the intravenous line used to inject the contrast material will be removed by the technologist, and the tiny hole made by the needle will be covered with a small dressing. You can return to your normal activities. A radiologist, who is a physician with special skills and expertise in supervising and interpreting radiology examinations, will analyze the images and send an official report to your primary care physician or physician who referred you for the exam, who will discuss the results with you. Follow-up examinations may be necessary. Your doctor will explain the exact reason why another exam is requested. Sometimes a follow-up exam is done because a potential abnormality needs further evaluation with additional views or a special

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imaging technique. A follow-up examination may also be necessary so that any change in a known abnormality can be monitored over time. Follow-up examinations are sometimes the best way to see if treatment is working or if a finding is stable or changed over time. What are the benefits vs. Benefits Angiography may eliminate the need for surgery. If surgery remains necessary, it can be performed more accurately. CT angiography is able to detect narrowing or obstruction of blood vessels allowing for potentially corrective therapy to be done. CT angiography may give more precise anatomical detail than magnetic resonance imaging MRI , particularly in small blood vessels. Many patients can undergo CT angiography instead of a conventional catheter angiography catheterization to diagnose blood vessel problems. Compared to catheter angiography which involves placing a catheter plastic tube , usually at the groin, into your major blood vessels and injecting contrast material, and may require sedation or general anesthesia, CT angiography is faster, non-invasive and has less complications. CT angiography is a useful way of detecting arterial such as narrowing of blood vessels in the heart and venous disease as well as structural abnormalities of the heart before there are symptoms or when symptoms are not clearly related to blood vessel disease, such as a heart attack. CT angiography is a lower cost examination compared to catheter angiography. There is also potentially less discomfort because contrast material is injected into an arm vein rather than into a catheter inserted into a large artery or vein. X-rays used in CT scans should have no immediate side effects. Risks Most patients complete CT angiography with no adverse events. There is always a slight chance of cancer from excessive exposure to radiation. However, the benefit of an accurate diagnosis far outweighs the risk. If you have a history of allergy to x-ray contrast material, your doctor may advise you to take special precautionary medication, such as a steroid, for a few hours or the day before CT angiography to lessen the chances of allergic reaction. Another option is to undergo a different exam that does not require iodinated contrast material. In patients who are at risk for kidney failure and who already have borderline kidney function, administering iodinated contrast material could potentially further damage kidney function. Check with your referring doctor and radiologist to obtain more information regarding this risk.

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*Computed Tomography, Anatomy, and Morphometry of the Lower Extremity. Authors (view affiliations) restricting ourselves to the analysis of the lower extremity.*

### Chapter 4 : Computed Tomography (CT) Angiography (Angiogram)

*This atlas contains comparative sections on normal and abnormal computed tomography of the neck, chest, abdomen, pelvis, upper and lower limbs, fascia, and peritoneum. Also included is a subject index to aid in the identification of abnormal scans.*

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### Chapter 6 : Computed Tomography, Anatomy, and Morphometry of the Lower Extremity - Sinopsis y Precisión

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*When computed tomography (CT) was developed and introduced by Hounsfield (), a new era of clinical diagnostic potential began. At the same time CT created new difficulties, in that the physicians who had to deal with the CT images were not acquainted with their interpretation.*

### Chapter 7 : Untitled Document

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