

Radiology and its Analysis of Images

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DESCRIPTION

Radiology is the medical discipline that uses medical imaging to diagnose and treat diseases in the body of animals and humans. It is used to diagnose or treat patients by taking pictures of the internal structure of the body to assess the presence or absence of disease, foreign objects, and structural damage or abnormalities. An X-ray procedure involves sending a beam of X-rays through the body. Various imaging methods are used to diagnose or treat disease, including X-ray, ultrasound, Computed Tomography (CT), nuclear medicine, including Positron Emission Tomography (PET), fluoroscopy, and Magnetic Resonance Imaging (MRI). Interventional radiology is the implementation of mostly minimally invasive medical procedures under the guidance of imaging technologies such as those mentioned above. In modern radiology, several different health professions work as a team.

The radiologist is a physician who has completed appropriate training and interprets medical images, transmits these findings to other physicians in a report or orally, and performs minimally invasive medical procedures using images. The nurse is involved in caring for patients before and after an imaging procedure or procedure, including administering medications, monitoring vital signs, and monitoring sedated patients. The radiologist, also known as the "radiologic technologist" in some countries such as the United States and Canada, is a specially trained healthcare professional who uses sophisticated technology and positioning techniques to create medical images that the radiologist can interpret. Depending on the person's training and country of assignment, the radiologist may specialize in one of the above imaging procedures or take on additional tasks in image reporting.

ANALYSIS OF IMAGES

Plain or general radiography

The basic technique is the evaluation of the optical density. Then it is described that an area has a different optical density,

for example, a cancer metastasis in the bone can cause radiation permeability. The further development of this is digital radiological subtraction. It consists of superimposing two X-ray images of the same region examined and subtracting the optical densities. The resulting image only contains the time-dependent differences between the two examined X-ray images. The advantage of this technique is the accurate determination of the dynamics of density changes and the location of their occurrence. However, before doing this, geometric adjustment and general optical density alignment must be performed. Another possibility of X-ray image analysis is to examine second order features, for example digital texture analysis or fractal dimension. On this basis, it is possible to evaluate the places where biomaterials are implanted in the bone for the purpose of guided bone regeneration. An intact bone image sample is taken and a sample of the implantation site can be evaluated numerically/objectively to what extent the implantation site mimics healthy bone and to what extent the bone regeneration process has progressed. It can also be checked whether the bone healing process is influenced by some systemic factors.

Teleradiology

Teleradiology is the transmission of X-ray images from one place to another for interpretation by a suitably trained professional, usually a radiologist or a reporting radiologist. It is most commonly used to provide quick interpretation of emergency rooms, intensive care, and other emergency examinations after normal opening hours, at night, and on weekends. In these cases, the images can be sent across time zones while the receiving physician works his normal time of day. However, today, the large private teleradiology companies in the United States provide most of the night services used by night radiologists in the United States. In US many hospitals are outsourcing their radiology departments to radiologists in India due to the lower cost and availability of high speed internet access.

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