

Chapter 1

1.1: Introduction

x-ray is discovered in 1899 by William Rontgen which has many good properties let it occupied space in many important fields such as (medical diagnostic, medical therapeutic, and industrial fields) as we see in common time it's rarely to find hospital without x-ray machine with it's variety applications (diagnostic and interventional radiology, and radiotherapy).

Computed tomography is the standard imaging modality. Additionally, due to its ease of use, clear interpretation in terms of physical attenuation values, progress in detector technology, reconstruction mathematics, and reduction of radiation exposure, computed tomography will maintain and expand its established position in the fields of radiology.

The mathematics of CT image reconstruction has influenced other scientific fields and vice versa. The backprojection technique, for instance, is used in both geophysics and radar applications. Clearly, the fundamental problem of computed tomography can be easily described: Reconstruct an object from its shadows or, more precisely, from its projections. An X-ray source with a fan- or cone-beam geometry penetrates the object to be examined as a patient in medical applications, a skull found in archeology or a specimen in nondestructive testing (NDT). In the so-called third generation scanners, the fan-shaped X-ray beam fully covers a slice section of the object to be examined.

Applications of x-ray radiation gives the worker in medical field big benefits make many diagnostic operators so easy with high resolutions and reply many diagnostic questions that can't replied before x-ray discovery.

From types of using x-ray in medical diagnostic examinations is conventional x-ray tube and computer tomography scan (ct tomography) which one of top five medical innovations, according to most medical surveys (Sutton, 2008).

Ct technology and it's clinical applications have shown enormous resilience against alternative diagnostic methods and the moment is stronger than ever .

The last 20 years have seen multiple modalities are available to asses the chest wall, CT is powerful tool for the examination of chest disease

because it can depict the disease process far more clearly than chest radiographs .it's high sensitivity for detecting small pulmonary modules, which are the most common early manifestation of lung cancer .ct is an important and sometimes life-saving tool for diagnostic medical examinations and guidance of interventional and therapeutic procedures. it allows rapid acquisition of high- resolution three- dimensional images, providing radiologists and other physicians with cross sectional views of patient's anatomy .ct can be used to image many types of tissues ,such as soft tissues , bones, lungs, and blood vessels. ct examinations are also non-invasive, although a contrast agent is sometimes administered to the patient. as a consequence of the benefits of ct examinations .it has become the gold standard for a variety of clinical indications, such as diagnosing certain cancers, surgical planning, and identifying internal injuries and bleeding in trauma cases .

Statements of problem:

Study the Computer Tomography physically and components of Computer Tomography machine.

Objectives of study:

Chapter one: introduction to CT technology and it's applications and medical field.

Chapter two: simple explain about x-ray and it's nature, interaction of X-ray with matter, and method of produce X-ray in addition to X-ray machine.

Chapter three : is the theoretical background to Computer Tomography ,historical development for Computed Tomography, principles of helical Computer Tomography and it's components ,finally we introduce scan parameter

Chapter four: is containing images for Computed Tomography operation, conclusion to this thesis, recommendations and future studies.