SNS COLLEGE OF ALLIED HEALTH SCIENCES

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DEPARTMENT OF RADIOGRAPHY AND IMAGING TECHNOLOGY
I YEAR

COURSE NAME : RADIOGRAPHY EQUIPMENTS,MAINTENANCE & QUALITY CONTROL RELATED TO X-RAY ONLY

TOPIC – TOMOGRAPHY

INTRODUCTION

- The body section radiography is called tomography.

- The Conventional radiography gives 2D images in which the overlying and underlying structure of the body are superimposed.

- During the tomography examination,a specific layer of the organ can be demonstrated by eliminating overlying and underlying structure.

- So the deep internal structures of an organ on a specific plane can be clearly obtained.

TERMINOLOGIES

➢Tomogram – A radiograph produced by a tomography unit is called a tomogram.

➢Fulcrum – It is a pivot point between the X-ray tube and image receptor.
Fulcrum Level – Distance from table to the fulcrum is called fulcrum level. It is adjustable.

➢Focal plane or Objective plane – It is the area where the specific plane of object or organ is focused.

➢The tomographic Angle – The angle of the X-ray tube during movement is called the tomographic angle.The tomographic angle is greater than the exposure angle.

➢Exposure Angle – The angle of the X-ray beam during tube movement.It is shorter than the tomography angle.

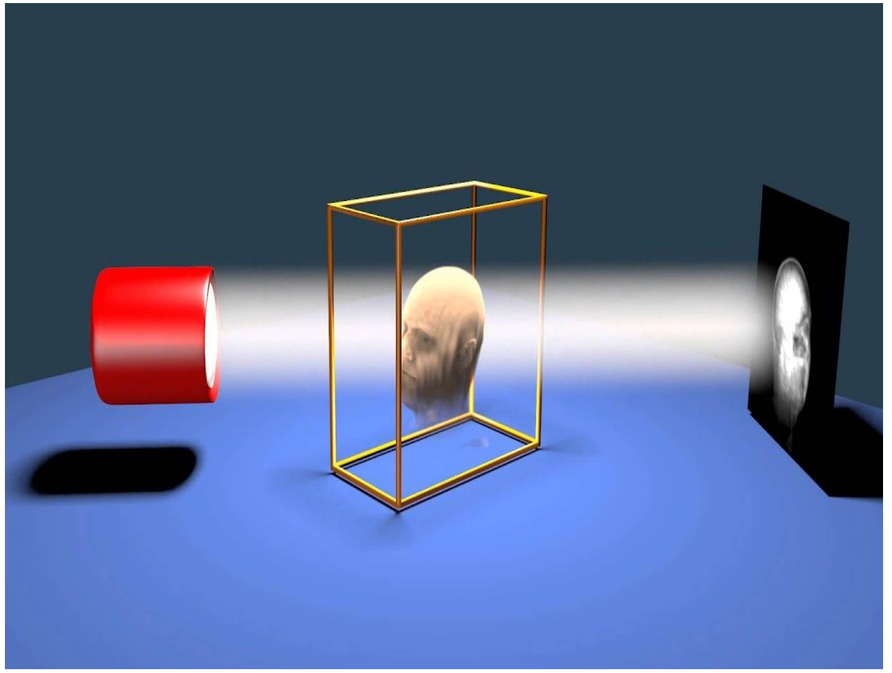
PRINCIPLE OF TOMOGRAPHY

➢The tomography image is produced by relative movement between the X-ray tube and image receptor.

➢The X-ray tube is linked with the image receptor by a connecting rod.

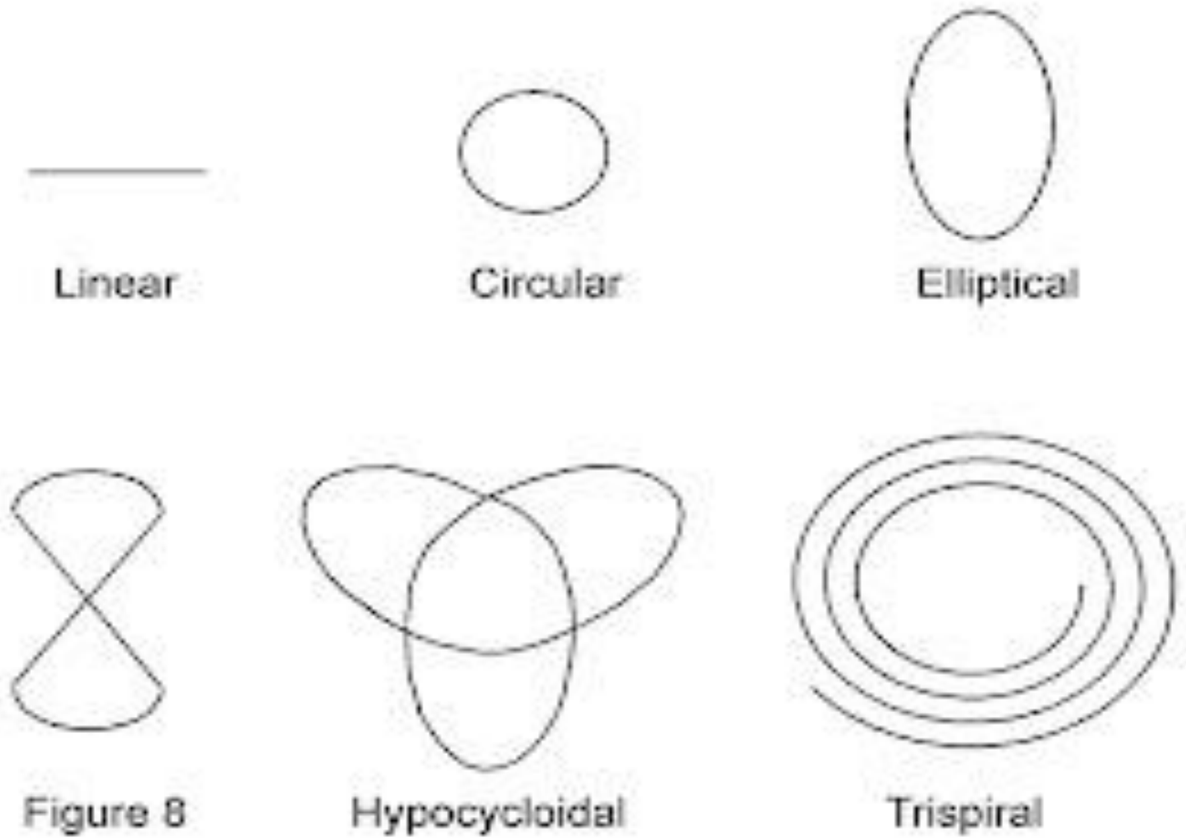
➢During the procedure,the patient remains stationary and the X-ray table and image receptor move at the same velocity and in the opposite direction.

➢So the specific layer of organ/object which lies in the focal plane is clearly viewed and the underlying structure and overlying structure of the object becomes blurred.



TYPES OF TOMOGRAPHY MOVEMENTS

- Linear
  Circular
  Elliptical
  Spiral
  Hypocycloidal



LINEAR TOMOGRAPHY

- It is the simplest and very common tomographic examination.

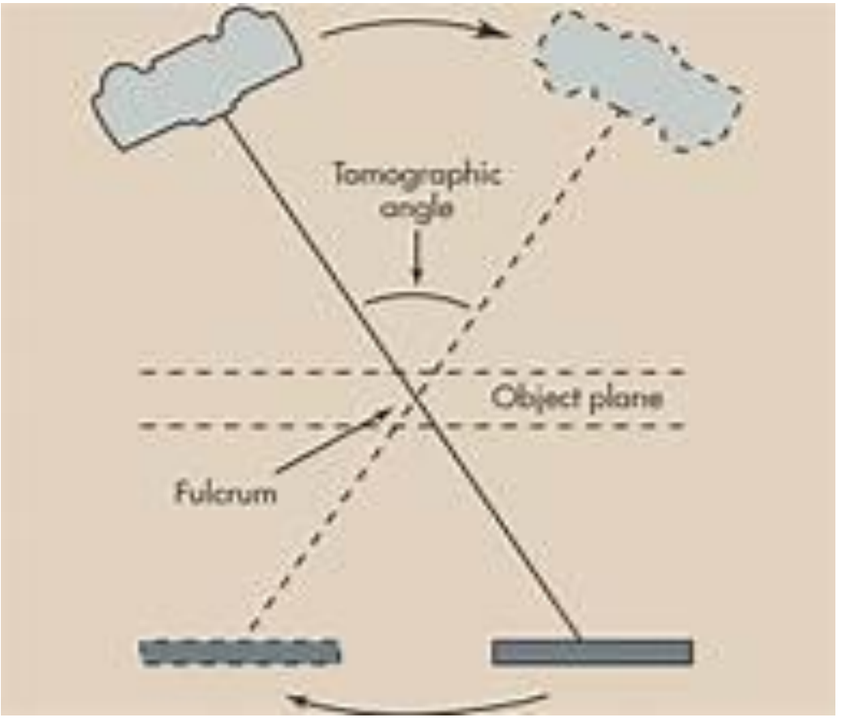
- In linear tomography,the X-ray table and image receptor are attached with connecting rod and tube and the image receptor moves in the opposite direction.

- The angle of the movement,known as the tomographic angle,determines the slice thickness of the selected plane.

- If the angle is large,it will result in a thin section.

- If the angle is small or narrow,it will result in a thick section.

- The selected plane of an object which lies in the focal plane is clearly imaged,but the over and below planes are blurred.



Cont.,

- When the tomographic angle is 10 degrees, the slice thickness is approximately 7mm if the tomographic angle is 45 degrees, the slice thickness is approximately 1mm.

- To determine the fulcrum level of an object or an organ,the plain radiographs are taken in AP and lateral position then the area of interest and distance is selected with the help of radiographs.

- After the measurement of a specific area distance,set the region of interest at the fulcrum level.

- After the exposure,the specific layer of organ/object which lies in the focal plane is clearly viewed on the radiograph. Liner movement is adequate for lungs,kidney,and simply body structure examination.

MULTIDIRECTIONAL TUBE MOVEMENT

- Circular Movement – It is the simplest movement. It is adequate for viewing of lumbar spine study.

- Elliptical Movement – Appears as like a circle.It is usually used for the study of lateral projections of lungs.

- Hypocycloidal Movement – It is the most complex movement,it is usually used for skull and joints study.

BLURRING

Following factors influencing blurring :

- If the distance of an object from a focal plane increases,the blurring increases.
- If the exposure angle increases,the blurring increases.
- If the distance of an object from the image receptor increases,the blurring increases.
- Multidirectional tube movements cause more blurring than the linear direction tube movements.

RADIATION PROTECTION DURING THE TOMOGRAPHY

- The tomography exposures are longer than the normal radiographic exposure,so it increases the possibility of patient motion.
- Before the exposure, the breathing instructions are given to the patient to avoid repeat exposure.
- Before the exposure, the measurement of lesions in the organ should be done accurately.
- Before the exposure,the area of interest should be parallel to the image receptor.

DISADVANTAGE OF TOMOGRAPHY

- Tomography is a high dose procedure,during this procedure,approximately 10 to 15 films are taken.
- It increases the patient dose.
- Now a days,CT scan has replaced the tomography.

REFERENCE

- Concise Text book on Imaging Modalities & Recent Advances In Diagnostic Radiology by Dr.K.B.Gehlot and Lalit Agarwal.