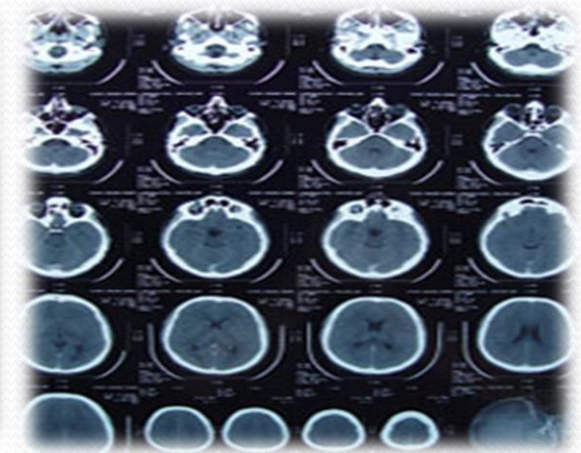*AL-Mustaqbal University College*
Department of Medical Physics
The Second Stage
Medical Imaging

كلية المستقبل الجامعة
قسم الفيزياء الطبية
المرحلة الثانية
التصوير الطبي

LECTURE FIVE

Computed Tomography (CT Scan)

Dr. Forat Hamzah

- **Definition of Computed Tomography (CT Scan)**

- **History of Computed Tomography (CT Scan)**

- **Description of Computed Tomography (CT Scan)**

- **How a CT scan system works ?**

- **Why used CT scan instead the plain radiograph/X-ray ?**

- **Benefits and risks of a CT scan**

Definition of Computed Tomography (CT Scan)

مستعرضة
او مقطعية

- It is a medical imaging system that creates 3D <u>cross-sectional</u> images of the internal body used for diagnostic

- Using complex x-ray

- It is represent the virtual pile of 3D cross-sectional images
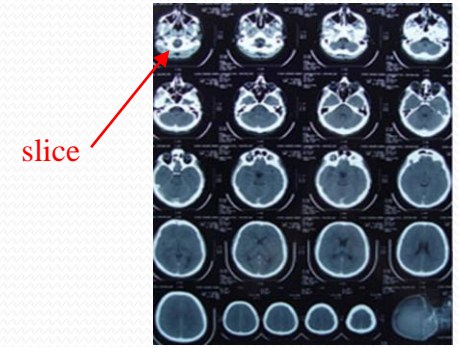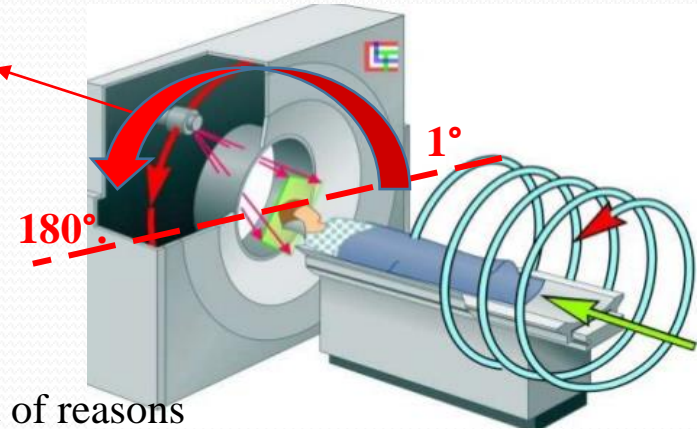
History of Computed Tomography (CT Scan)

The word 'tomography' comes from the Greek: tomos means slice, graphein stands for 'to write'. So, tomography literally means 'writing slices'.

الإغريقي
Greek

شريحة
slice ⟵ Tomography ⟶ للكتابة
to write

↓

writing slices

كتابة الشرائح
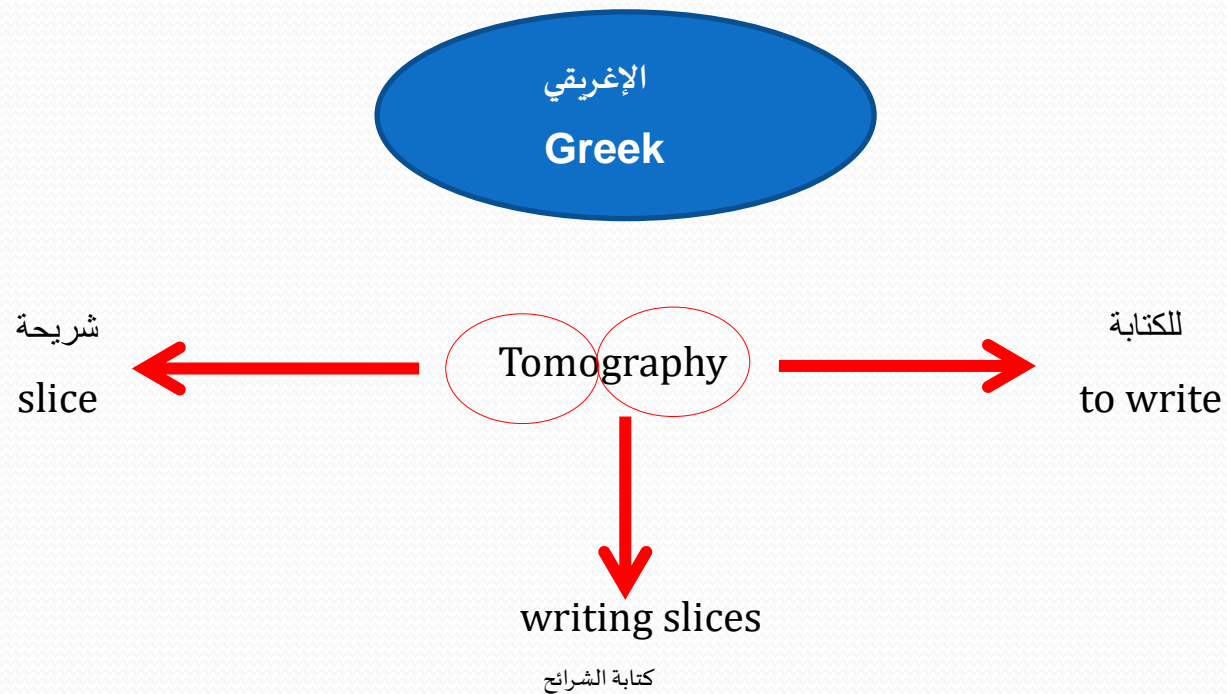
Description of CT scan system

(i) CT scan is medical images system of the body using complex x-ray.

(ii) CT scan creates 3D cross-sectional

(iii) CT scan can be performed on every part of the body for a different of reasons

(iv) CT scan is a scan for many points and angles

(v) Each scan represents an one of the x-ray dropping on the patient

(vi) Each scan represents one of the slice

x-ray tube
(X-ray –generator)

180°.

1°

slice

Computed Tomography (CT Scan)

How a CT scan system works ?

- The x-ray tube and detector rotate <u>as a fan-shaped on a semi-circular</u>

- The x-ray tube and detector rotate <u>at the same time</u> in <u>opposite directions</u> within a semi-circular, to collect the multitude of x-ray projections (dropping)

  - The x-ray generator is rotated within 1° to 180°.

  - The patient is placed between the source and detector.

  - Each scan represents an one of the x-ray dropping on the patient **, which represents the slices.**
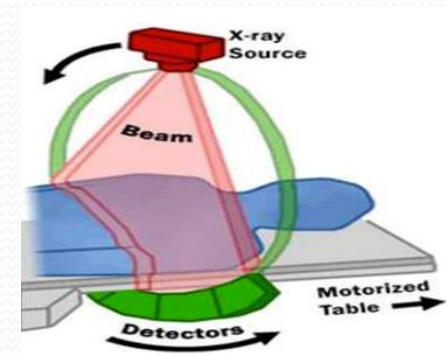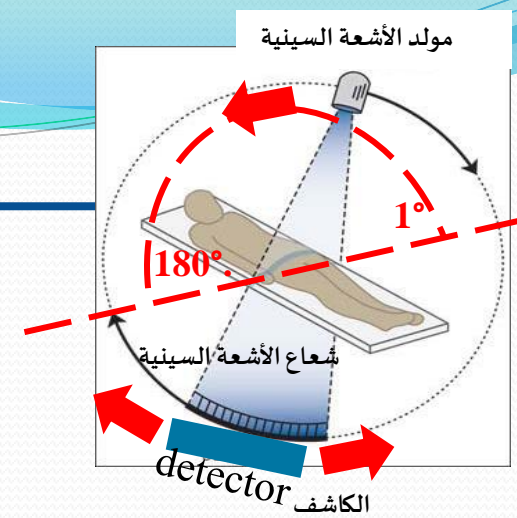
Why used CT scan instead the plain radiograph/X-ray ?

CT scans provide more detailed information to diagnose

- For example, in case there is a small lung cancer at a front-to-back chest

- By using the plain radiograph/X-ray cannot determine the location of this cancer because the cancer might disappear behind a ribs

- So, this case need to a cross-sectional medical images (CT scan)

Figure 3: Typical AP (anterior-posterior or front-to-back) chest X-ray photograph.

Figure 4: Transversal CT slice of the chest.

Benefits/Risks

Benefits of a CT scan:

CT scans provide <u>more detailed information</u> to diagnose, compared with plain radiograph/X-ray

Risks of a CT scan:

The risks of a CT scan is <u>long exposure to x-rays</u> which make it more dangerous,

compared with plain radiograph / X-ray