



جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

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قسم الأنظمة الطبية الذكية
LAB

Subject: **X-Ray Machine**

Level: First

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X-ray

- X-rays are electromagnetic radiation.
- X-ray light is very strong and is not visible to human eye
- That rays can penetrate objects opaque. X-rays are commonly used to look at something we cannot see directly
- X-rays are commonly used in the diagnosis of medical images and X-ray crystallography

X-ray



PARTS OF X-RAY MACHINE

- X-ray has three main components:

- Operating Console

- High Frequency Generator

- X-ray Tube

- Internal

- External

- Other Parts include

- Collimator and Grid

- X-ray Film

Operating Console

- The operating console allows the radiologic technologist to control the x-ray tube current and voltage so that the useful x-ray beam is of proper quantity and quality.
- Radiation quantity refers to the number of x-rays or the intensity of the x-ray beam.
- Radiation quantity is usually expressed in milliroentgens (mR) or milliroentgens/milliamperes-second (mR/mAs).
- The operating console usually provides for control of line compensation, kVp, mA, and exposure time. Meters are provided for monitoring kVp, mA, and exposure time



High Frequency Generator

- A high frequency generator powers the X-ray tube.

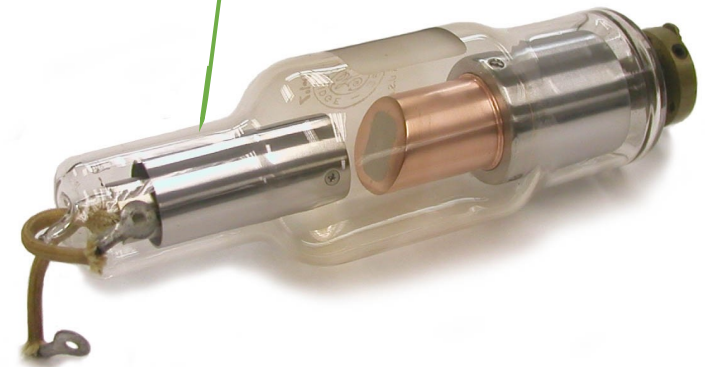
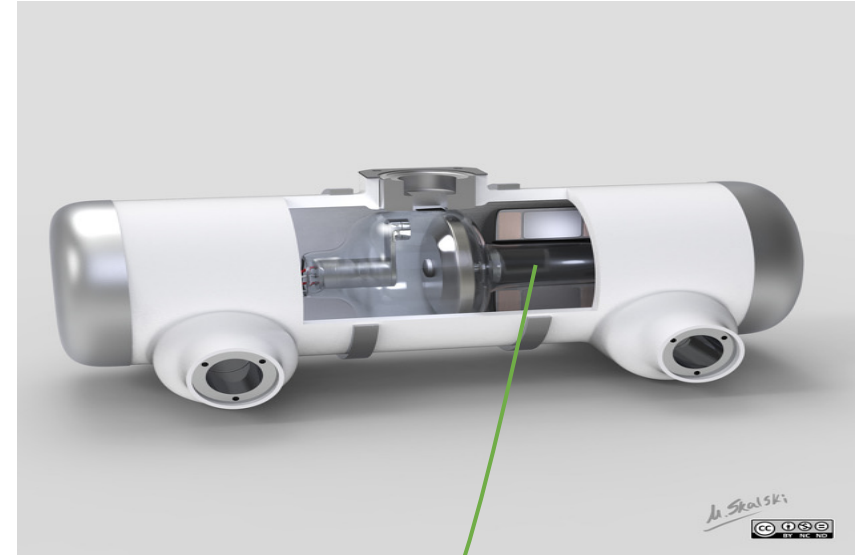
Earlier, high voltage generators were used.

- High frequency generators are used for X-ray because they operate on single phase and give less voltage ripples.
- Another reason for using is its small size, which makes it portable



X-ray Tube

- The X-ray tube can be classified as:
 - Internal
 - External
- External
 - The external part includes:
 - Tube Support
 - Protective Housing
 - Glass or Metal Envelop

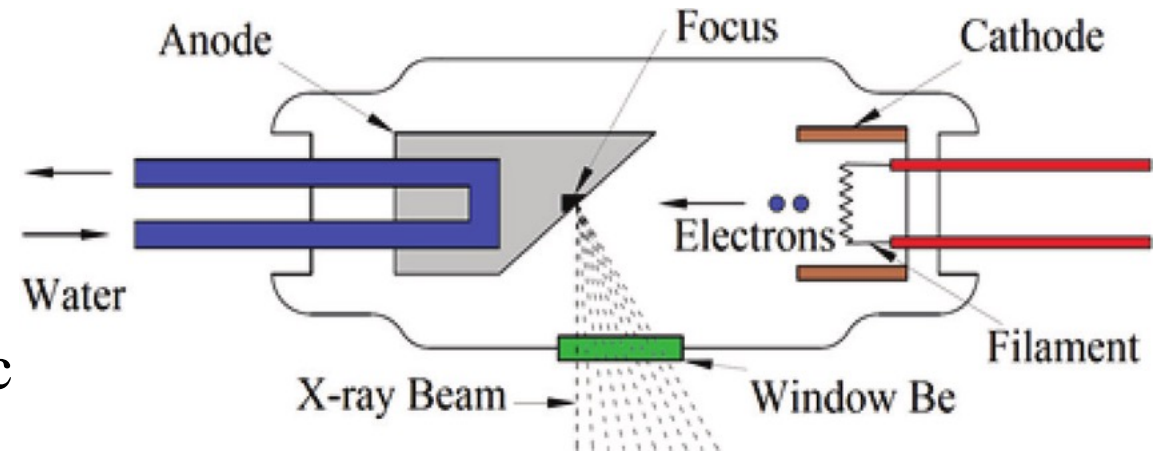


X-ray Tube

➤ Internal

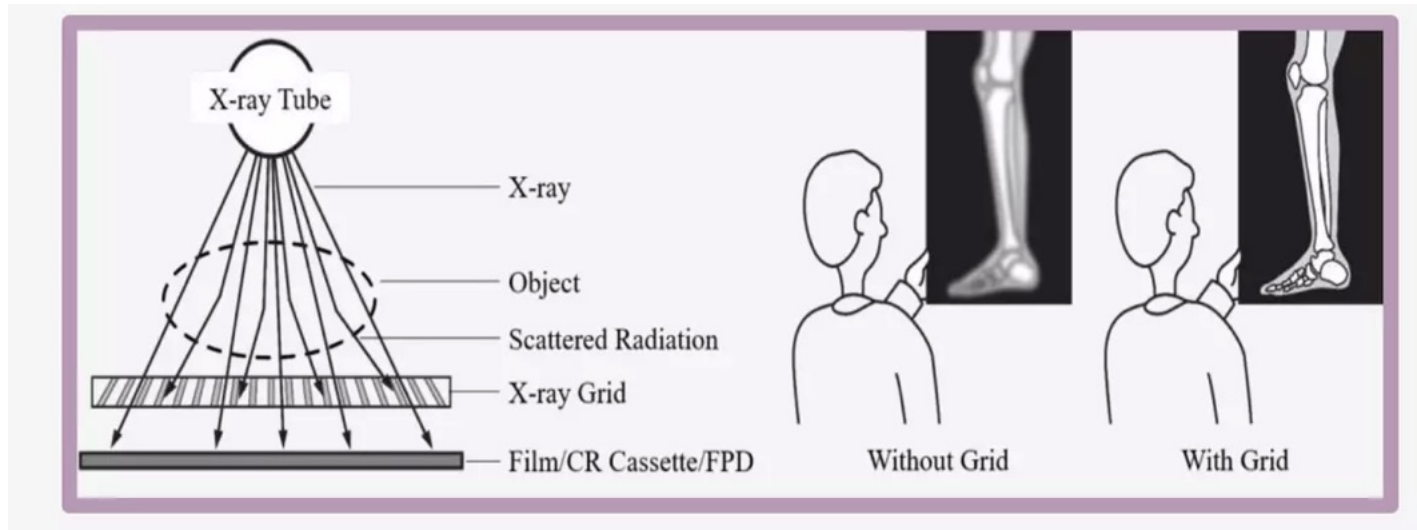
-The internal parts include

- **Cathode** : The filament that causes thermionic emission
- **Anode**: A flat disc made of tungsten that draws the electrons across the tube
- The inside of the tube is vacuumed so that the X-rays are produced isotropically



Collimator and Grid

- **Collimator** is a device used to minimize the field of view, avoid unnecessary exposure using lead plates.
- **Grid** is similar to a collimator except they have different positions. Grid is placed right after the patient. It is made up of lead strips, which is used to elimin light. These strips only allow rays at 90°



DO YOU HAVE ANY QUESTION!!!

Thank you!

