

How does an X-ray machine work?

Hello everyone, in this video, we will talk about x-rays and how does an x-ray machine work? X-rays are type of light rays. A light ray is a form of electromagnetic radiation. At some wavelengths, it appears as a visible light, at others it takes the form of radiation that human eyes cannot see such as ultraviolet, infrared and x-rays. X-rays have a very short wavelength, unlike the visible light, are able to pass right through most tissues of human body.

X-ray or x-light is formed from a highly evacuated (No air) glass tube or in an x-ray tube that consists of Tungsten filament of metal with high melting point (Cathode side, with negative charge of the electricity) and target made up of high atomic weight (Anode side, with positive charge of the electricity). When a current is applied, the filament heats up. Negatively charged and boiled electrons are produced. This process is called thermionic emission. Afterwards, a created stream of fast-moving electrons is attracted and directed from the cathode electrode to the anode electrode. As the electrons collide and interact with the atoms on the anode target, a high voltage field between the cathode and anode is created. The target starts to convert the electrons to x-ray photons. The anode, which attracts the negatively charged electrons, is constructed at an angle so that the produced x-rays are directed downward to produce an x-ray beam.

Bones are a denser material than any other body tissues, they contain calcium therefore, they are able to block some of the x-ray light resulting in a shadow to form a clear image of bones. That's why, on X-rays, bones appear white, air appears black, while muscles and soft tissues appear grey to show a clear image. X-ray is used to detect bone fractures, arthritis, tumors, osteoporosis and the presence of fluid in the lungs. Images may be taken from different views (front and side) or from different body positions. To summarize this video, an X-ray is a diagnostic test that uses radiation waves, called x-rays, to take pictures of your body tissues.