How Wilhelm Conrad Roentgen's X-ray Technology Revolutionized the Diagnosis and Treatment of Diseases

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The discovery of X-ray radiation by Wilhelm Conrad Roentgen on November 8th, 1895, has undoubtedly made a significant contribution to the development of science (Panchbhai, 2015). As a result of this discovery, a new discipline in medicine emerged, known as radiology, which deals with the use of radiation methods for the diagnosis and treatment of various diseases. The International Day of Radiology and the Day of the Radiologist are both celebrated on November 8th in honor of this important event in the field of physics.

Wilhelm Conrad Roentgen was a German physicist and the first winner of the Nobel Prize in Physics in 1901 (Panchbhai, 2015). He studied physics at the Polytechnic Institute in Zurich, where he was advised by Professor August Kundt, a German physicist, to pursue a career in physics. After defending his doctoral dissertation, he worked as a laboratory assistant with Professor Kundt. They later moved to the universities of Würzburg and Strasbourg, where Roentgen started teaching and conducting experimental studies.

In 1888, Roentgen returned to the University of Würzburg, where he began to do experimental electrical research on discharge in glass vacuum tubes. It was during these experiments that he discovered X-rays unexpectedly. One day, while working late in his laboratory, he put out the lamp and suddenly saw a slight greenish glow in the dark. Roentgen concluded that the device was emitting some unknown radiation and named it X-rays (Foulger, 1995). He found that almost all items become transparent in the rays, and by May 1897, he had published two scientific articles detailing the main properties of X-rays.

X-ray radiation's ability to penetrate opaque bodies was found to be its most

valuable practical property, leading to wide applications in various fields, including medicine and dentistry. Today, an X-ray examination is an essential diagnostic method in dentistry and medicine, helping healthcare professionals to diagnose and treat a wide range of diseases and medical conditions. It has saved millions of lives by enabling such professionals to detect diseases early and start treatment promptly. For instance, an X-ray examination is used in detecting bone fractures, foreign objects, and cancerous tumors. Moreover, X-ray radiation is used in radiotherapy, a common cancer treatment method, which involves the use of high-energy X-rays to destroy cancer cells (Sanghani et al., 2021). In the field of dentistry, X-rays are used to help dental professionals provide accurate diagnoses and effective treatments when detecting cavities, assessing tooth roots and surrounding bone structures, evaluating wisdom teeth, planning various dental procedures like implants and root canals, and monitoring the development of teeth in children or detecting any problems early on.

Another positive impact of the discovery of X-ray radiation is the contribution it made to the development of science. The discovery of X-ray radiation has led to the development of new imaging techniques, such as computed tomography (CT), magnetic resonance imaging (MRI), and ultrasound. These imaging techniques provide high-resolution images of the internal structures of the body, helping doctors detect and diagnose various diseases and medical conditions. Furthermore, the discovery of X-ray radiation has led to the development of new materials and technologies, such as X-ray crystallography, which is used in determining the structure of proteins and other molecules (Goldstein, 2016).

Despite the positive impacts of the discovery of X-ray radiation, it also has some

negative impacts. One of the most significant negative impacts is radiation exposure. Prolonged exposure to X-ray radiation can cause various health problems, such as cancer, genetic mutations, and cataracts. The risk of radiation exposure is higher for patients who undergo multiple X-ray examinations, pregnant women, and children. Therefore, it is crucial to minimize the radiation dose during X-ray examinations and avoid unnecessary X-ray examinations (Sanghani et al 2021).

Moreover, the overuse of X-ray examinations can lead to increased healthcare costs. The cost of X-ray examinations and other imaging techniques is relatively high, and the overuse of these techniques can lead to unnecessary healthcare costs. Not only this, but the overuse of imaging techniques can lead to false-positive results, which can result in unnecessary treatments and interventions (Scatliff & Morris, 2014).

In conclusion, the discovery of X-ray radiation by Wilhelm Conrad Roentgen has made significant contributions to the development of science and medicine. The discovery of X-ray radiation has led to the emergence of radiology as a discipline and has contributed to the development of new imaging techniques and technologies. Moreover, an X-ray examination is an important diagnostic method in dentistry and medicine, helping healthcare professionals diagnose and treat various diseases and medical conditions. However, the overuse of X-ray examinations can lead to increased healthcare costs and radiation exposure, which can cause various health problems. Therefore, it is essential to minimize the radiation dose during X-ray examinations and avoid unnecessary X-ray examinations to mitigate the negative impacts of the discovery of radiation.

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