MedCrave
Step into the World of Research
Journal of Dental Health, Oral Disorders & Therapy

Short Communication
Open Access
CrossMark

First dental radiograph (1896)

Short communication

Volume 9 Issue 1 - 2018

Xavier Riaud
Department of History of Sciences and Techniques, France

Correspondence: Xavier Riaud, Department of History of Sciences and Technics, Laureate and Associate member of the National Academy of Dental Surgery, Free member of the National Academy of Surgery, 145, route de Vannes, 44800 Saint Herblain, France, Email xavier.riaud@wanadoo.fr

Received: October 20, 2017 | **Published:** January 16, 2018

In 1838, Faraday, the British chemist and physicist (1791-1867) focused his research on electric discharges in rarefied gas. He set up two facing sides with an anode and a cathode in a glass tube. He powered up the cathode, and if the voltage was high enough, it led to a spark between the two electrodes. When he diminished the gas pressure in the light bulb, he noticed that the appearance of the spark turned into a purple emanation. Faraday then thought he had just discovered the fourth state of matter which he called "radiant matter". This experience was carried out all along the 19th century. In 1869, Hittorf (1824-1914) proved that this glow was due to rays which were coming on the glass and which propagated in straight line from the cathode. He also showed that those rays could be deviated by an obstacle. The arrival of cathode rays on the tube wall caused the fluorescence of the glass, and the obstacle which those rays came up against generated a shadow on the tube wall.[1]

In 1895, the German physicist, Wilhelm Conrad Röntgen (1845-1923), who was 50 years old by then, studied cathode rays with Crookes tubes. He was more precisely concerned with the penetration of the rays through the glass. At the time, it had already been established that cathode rays could pass through the tube wall and penetrate a few centimetres in the air. In the evening of November 8, during his preliminary work, he decided to cover the tube with a black cardboard pannel. He thus observed that a screen which was covered with a layer of platinocyanide barium and which had been placed incidentally in front of the tube became fluorescent during the discharge. However, he knew that at this distance, the fluorescence could not be caused by cathode rays. He thus pushed further the screen and noticed the persistence of fluorescence despite the increasing layer of air it had to cross. Then, he inserted objects between the light bulb and the screen: a sheet of paper, aluminium foil, wood, glass and even a thousand-page book. Each time, the fluorescence persisted: he concluded that he had just discovered some ray which was distinct to that produced by the cathode and which was very penetrating for it was able to go through matter. As those rays were unknown by then, he named them "the X rays", after the unknown in mathematics. He devoted the last weeks of 1895 to manipulate X rays by himself, and managed to allocate them the following features:

1. They were scarcely absorbed by matter. But this absorption increased with the atomic mass of the absorbing atoms: a thin layer of lead was enough to stop the radiation made with those X ray sources.
2. They were emitted by the matter. It was the origin of fluorescent radiation.
3. They impressed upon the photographic plate.
4. They discharged the bodies which were electrically charged.

He also showed that the rays came from the glass tube wall, where the cathode ray hit. In his first communication entitled "About a new type of ray" delivered in front of the physico-chemical Society of Würzburg, he noted that *"if we put the hand between the electric discharge device and the screen, we could see the darker shadow of the hand bones in the less dark figure of the hand."* Röntgen was describing the first radiograph. On December 22, 1895, he also captured the first X-ray picture by interposing his wife's hand between a Crookes tube and a photographic plate. The most dense and thick parts were the darkest on the plate. We could see a ring on the middle finger.[1]

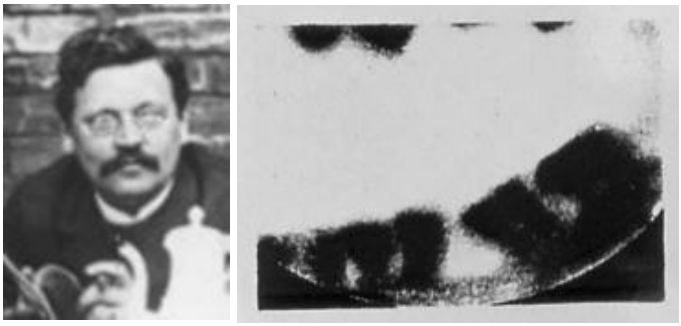
Wilhelm Conrad Roentgen and the first radiograph of his wife's hand (1895).

Röntgen was awarded the first Nobel Prize in physics in 1901 for *"the extraordinary services made possible thanks to his discovery of the remarkable rays which bear his name"*.

The X rays immediately attracted much interest within the public. The first radiographs spread around the world in the media and it did not take long for radioscopy (observation without captured pictures) and radiography to become fair attractions. For its part, the medical profession soon understood the strategic interest offered by this imaging technique.[1]

Otto Walkhoff was born on April 23 1860, in Braunschweig, Germany. He died on June 8 1934, in Berlin. He was a dentist who published his first book in 1928, entitled *"System of the medical treatments of pulp and periodontal pathologies."* In 1931, he published a second book entitled *"The problem of dental infections and the means used in conservative dentistry to treat them"*. Nowadays, Walkhoff is still considered as one of the founding fathers of endodontics. He is notably responsible for the shift to an everyday use of camphorated chlorophenol to sterilise the canals and in 1896, accompanied with Fritz Giesel, he was the author of the first dental radiograph.

Fourteen days after Roentgen's first publication (December 28, 1895), Walkhoff captured the first dental radiograph of his own teeth. For this, he asked Fritz Giesel, a professor of physics also coming from Braunschweig, to assist him. He asked him to take a radiograph of his molars. Little pieces were cut from the original plates and were then wrapped to keep them as a testimony. Walkhoff received the first intraoral rays after a 25-minute exposure. In his account, he reported: *"It was a real torture but I felt tremendously happy when I saw the results. It was when I weighed up the importance of Roentgen's discovery for future dentistry."* However, this application did not proceed smoothly and was not without side effects for his generous "guinea-pig" subsequently lost his hair [2].



Dr Otto Walkhoff, German dentist, and his first dental radiograph (1896).

The use of X rays for medical pictures spread worldwide from 1896. France had its first X-ray equipment in 1897. Indeed, on that year, Dr Béclère settled some X-ray equipment which aimed at capturing radiographs of the chest and lungs for the early detection of tuberculosis, in his service of general medicine at the Tenon hospital.[2]

Funding details

None.

Acknowledgments

None.

Conflicts of interest

The author declares that there is no conflict of interest.

References

1. Demirdjian H. Radiography (I) - History of radiography and its medical applications. *Culture Sciences Chemistry*. 2007.
2. Forrai Judith. History of X-Ray in Dentistry. *Rev Clín Pesq Odontol*. 2007;3(3):205−211.