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The pioneering steps of radiology in Turkey (1896–1923)

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Abstract

The discovery of X-rays (1895) by W.C. Roentgen has been a very important step of the modern civilization as a revolutionary technique for scientists all around the world and it has immediately been applied in medical field. The aim of this study is to search the start of radiology in Turkey on the basis of archival and first hand sources.

This study shows that Roentgen apparatus was first installed in Turkey by an intern doctor Esad Feyzi who took the first radiographies at the Imperial Medical School (Istanbul) in 1896. He made use of X-ray method for medical diagnosis later on when Turkish-Greek war broke out in 1897. Esad Feyzi worked in the clinical team led by professor Salih Effendi, MD, at the Yildiz Temporary Military Hospital in Istanbul to take radiographies of soldiers wounded at war in cooperation with the German Red Cross medical delegation. This event is most probably the earliest examples of the application of X-ray technique into military surgery all over the world. Researches have also proven that medical radiography technique was also applied in Greece by Greek and English doctors during that war. This war gave the opportunity to German and British medical teams to use X-ray as a radiographic imaging technique at the two confronting sides that was used in consequent wars in other parts of the world, later on.

The paper deals with the progress of clinical radiology in Turkey until the foundation of the Turkish Republic in 1923.
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1. Discovery of X-rays

One of the revolutionary turning points of the history of medicine is the discovery of X-rays and its implementation for medical purposes. Perceiving the rays which can penetrate through solid materials and reflect their shadows onto a screen, German physicist W.C. Roentgen (1845–1923) called them "X-rays", and took the first radiographies on this method. He gave the first announcement of the discovery to the scientific circles by a paper on 28 December 1895. This paper was immediately translated and issued in scientific periodicals around the world. Roentgen was decorated with many scientific awards including the Nobel Prize on 10 December 1901. X-rays created a worldwide public interest and sensation in as much as to be published even at the popular newspapers all around the world [1] including Turkey.

Wars at the turn of the century motivated the medical use of Roentgen rays, as doctors in the armed forces quickly grasped the importance of them with regards to military surgery. In Germany, the Royal Prussian Army immediately established a training school for radiographers. The British Army acquired its first X-ray set at the Royal Victoria Hospital, and clinical radiographs were produced by November 1896 [2]. In May 1896, Lieutenant Colonel Guiseppe Alvaro performed X-ray examination on soldiers returning from Ethiopian campaign and succeeded in removing their bullets in the Military Hospital of Naples. [3].

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Fig. 1. Private Mehmet from Boyabat before the Roentgen apparatus: La recherche d'une balle perdue par les rayons X à l'Hopital de Yıldız (the search of a bullet piece by means of X-rays): Esad Feyzi. In: Besim Ömer, editor. The produce and medical use of X-rays, *Nevsal-i Afiyet*. 1899;1:226.

2. Earlier practices with Roentgen rays in Turkey

Roentgen's discovery echoed in the Ottoman Empire, and a lot of articles were published even in daily newspapers, as well [4]. The topic attracted attention of the people occupied in physics and photography too. For instance, M. Isoard, the mathematics teacher of Galatasaray College managed to take picture of metal coins within a purse and took hand radiography of his son aged 11. Besides, Halit Bey, a photographer in Istanbul, succeeded in viewing the lead pieces inside a pencil in 1896 [5].

The start of medical and surgical radiology in Turkey owes a great deal to the scientific curiosity of Esad Feyzi, a medical student, who was specifically interested in physics since his medical high school years. In the beginning of 1896, Esad Feyzi (1874–1902) read an article in *Semaine Médicale* on the photography technique by X-rays [6]. Desiring to put what he had learnt into practice, he acquired a Ruhmkoff coil, a Crookes tube and a powerful battery and installed the Roentgen apparatus (Fig. 1) at the Physics Laboratory of the Imperial Medical School, and took the hand radiographies of his colleagues by X-rays. These curious and emotional moments were narrated by Dr. Akil Muhtar (Özden) (1877–1949), one of the witnesses of this historic event [7].

3. Use of X-rays on the wounded soldiers during the Turkish-Greek War of 1897

Esad Feyzi was also one of the pioneers in the world to apply X-rays technique for diagnostic and therapeutic purposes. During the Turkish-Greek (or Greco-Turkish) war in 1897, Yildiz Temporary Military Hospital in Istanbul was assigned to the service of the increasing casualties. The Hospital was directed by Dr. Cemil (Topuzlu) Pasha (1866–1958), the professor of general surgery of the Imperial Medical School. Medical students, Esad and Rifat Osman proposed the transfer of the Roentgen apparatus from the Medical School to Yildiz Hospital in order to use it for radiographic examination on wounded soldiers coming from the campaign in Thessaly (Greece). Being truly satisfied with this demand, Cemil Pasha gave a report to the Sultan Abdülhamid (1842–1909) asking for permission for Lieutenant Dr. Salih (internist and pediatrician) and his assistants Esad Feyzi (fifth year medical student) and Rıfat Osman (fourth year medical student) to apply radiography technique at Yildiz Temporary Military Hospital. Upon the Sultan's approval, the Commander in Chief, Rıza Pasha was endorsed to have the doctors attend at Yildiz [8]. The medical team succeeded in imaging the bullets and shrapnels embedded into the body of the wounded soldiers. The first patient was Private Mehmet from Boyabat whose radiography was published on 10 June 1897 at *Servet-i Fünun*, a popular weekly journal, and it was reported by that article that this was the first capture of bullet in the body of the wounded soldier in the world [9].

The radiographic film of the arm was presented to the Sultan by Divisional General Cemil Pasha. The team was awarded by the Sultan with medals [10]. Cemil Pasha also sent some Roentgen pictures of the wounded soldiers to the French Association of Surgery [11] and he presented 30 radiographies of simple and complicated fractures of the wounded soldiers in a scientific session at the Imperial Medical Society in Istanbul on 4 June 1897 [12].

In the meantime, the German Red Cross Medical Delegation composed of Radiologist Drs. D. Nasse, H. Küttner and Fessler who visited Yıldız Military Hospital expressed their admiration at this early application of radiography which was, then, an emerging branch of medicine all over the world [13]. The German team who wanted to experience the feasibility of X-rays in war surgery, installed a Roentgen apparatus they brought with them at Yildiz Military Hospital in May 1897 and worked together with the Turkish colleagues. This has been the second Roentgen device installed in Turkey succeeding the earlier one at Yildiz. The Turkish and German medical teams worked at Yildiz together. Dr. Küttner wrote a report in 1898 dealing with their works and gave detailed

information on the cases they operated, and inserted several radiographies they took at Yildiz Hospital [14].

The interesting thing is that X-ray method was also used on the other side of the front in Greece. Dr. Francis C. Abbott, chief surgeon to the "Daily Chronicle" National Fund for Greek Wounded, installed a Roentgen apparatus at a villa (assigned as a hospital by the Oueen Olga) in Phalerum (Athens) and made use of X-rays for the detection of hidden bullets in the bodies of Greek soldiers coming from the front [15]. Dr. Abbott reported the cases he treated at hospitals in Phalerum and Chalcis in two articles at *The Lancet* (1899) which were regarded as the first application of X-rays in surgery in Greece [16].

4. A Pioneering book of clinical radiology

After his graduation in December 1897, Capt. Dr. Esad Feyzi was charged in teaching physics at the Military Medical School, and geology and mineralogy at the Civilian Medical School, in Istanbul. His second book is "Roentgen Rays, its Medical and Surgical Application" issued as a manuscript in 1898. Binded with red leather cover and gilded embroidery, it contains 176 pages. This is the first work ever written on X-rays in Turkey and one of the pioneering works in clinical radiology in the world. At the foreword, Surg. Dr. Cemil Pasha emphasizes the importance of the book as the first example, relates the early practices of radiography at the Istanbul Medical School and drags attention to the necessity of establishing radiological wards at hospitals. The book comprises the author's experiences on X-rays in a 2-year period. Dr. Esad Feyzi gives information on electricity, introduces tubes, explains the X-ray photography technique and film development. He excerpts various medical and surgical applications of Roentgen rays. He notifies that radiography and radioscopy methods were successfully used in war-surgery by the Turkish physicians during the Turkish-Greek war of 1897, but it was overlooked by the international literature since no statistical data were kept. The book includes many sketches of upper and lower extremities drawn by Esad Feyzi himself; and supplemented with 12 X-ray films in original dimensions [17] (Fig. 2). Next year he published a long article on the same subject in Nevsal-i Afiyet (Yearbook of Health), an esteemed medical journal of the time, which is regarded as the first scientific article on clinical use of X-rays in the Turkish medical literature. Author also narrates the surgical cases operated by Surg. Dr. Cemil Pasha at the surgical clinic of the Medical School such as the extract of a metal coin from the stomach of a child managed successfully in a few minutes owing to the radiological screening technique [18]. Dr. Esad Feyzi succeeded in covering the school curriculum with therapeutic teaching of Roentgen rays and established radiological examination as a specific branch at the surgical clinic [19].The third X-ray machine was imported from Germany (Hirschman) and installed in 1899 at that clinic under direction of Cemil Pasha and used by Dr. Esad Feyzi [20].



Fig. 2. A radiograpy taken by Dr. Esad Feyzi: Esad Feyzi, *Roentgen Şu'â'âtıve Tatbikat-ı Tıbbiye ve Cerrahiyesi* (Roentgen rays, its medical and surgical applications), Istanbul. 1898: annex.

5. The early years, the first installed machines, martyrs, society, private clinics

After Dr. Esad Feyzi's sudden death of sepsis due to erysipelas in 1902, Dr. Sufyan Bey worked and led the Roentgen laboratory where treatment of cancer by X-rays was started by Dr. Cemil Pasha from 20 June 1903 on [21]. Protection from the harmful effects of X-rays was unknown at those early years, therefore the some of the first radiologist have been the first martyrs too. For instance, succeeding Sufyan Bey, Dr. Ibrahim Vasif (1879–1926), who worked as assistant at the same laboratory, died of cancer due to the severe damage of X rays, like his colleague Dr. Sevki Bey from the same department (d.1930) [22].

The fourth X-ray machine was brought from Germany to Gulhane postdoctoral clinic attached to the Medical Faculty (1899) at the disposal of professor Dr. Deycke, the chief of staff and of Dr. Rifat Osman (1874—Edirne 1933) was charged in the Roentgen department. The fifth machine was put into use at Haydarpasha Military Hospital in Istanbul; the sixth at Hamidiye Children's Hospital (14 October 1902) under the direction of Dr. Rasih Emin (1878–1948), who was raised by Esad Feyzi, specialised in France, and died of can-

cer due to radiodermatitis [23]. The seventh machine was the first to be implemented in the provinces, that is Thessalonica Civilian Hospital in 1902 to be operated by Chem. Kamil Mazhar Bey [20].

In the following years oculist Albert Englaender started his career as radiologist by opening a private laboratory in Istanbul (Pera) in 1905 and published his first radiological findings on cancer therapy by X-rays in 1906 [24]. In 1908, the Greek Hospital in Istanbul installed an X-ray machine that was operated by Dr. Vassilios Savvaides.[25]. Dimitrios Chilaiditi (1883–1975), a Greek national born in Vienna, a student of Guido Holzknecht (1872–1931), opened his practice at Istanbul in 1910 and soon acquired international recognition due to his observations of the syndrome that bears his name [26].

In Izmir (Smyrna), the first to use X-rays was Greek doctor, George Illiadhès (1871–1916) who was offered the civilian title of Pasha in recognition of his services to the public after the devastating earthquake that hit the area around Aidin in 1900. Instead of the title he bargained for a permission to import an X-ray machine. The Sublime Porte agreed and he installed the machine in his private clinic in 1902 [27].

A great step forward for radiology was the foundation of the Radiological Society of Turkey in 1924 by Drs. Sevki Bey, Suphi Neset, Burhanettin (Toker), Dimitrios Chilaiditi, Zakar, Sukru Bey and Selahaddin (Erk) [28]. An independent department of roentgenlogy was created within the Istanbul Medical Faculty to be taught by Dr. Selahaddin (Erk) in 1924 [29].

6. Conclusion

Owing to his leading role on the first implementation of X-rays into medicine at Istanbul Medical School, Dr. Esad Feyzi has unique place in Turkish medical history within his very short span of life. His works have a triggering effect on the way of adoption radiology as a medical branch in Turkey, and are more significant in as much as the socio-historical background is considered when the fall of the Ottoman Empire was at hand replacing with the new Turkish Republic, at the turn of the 20th century. Turkish-Greek war of 1897 offered both sides of the front the opportunity for the pioneering steps of radiological examination and clinical use of roentgenology to the pride of their countries. Thanks to the known and unknown pioneers of radiology in the world, the use of X-rays for diagnostical and therapeutic means soon became medical routine and set sturdy foundations to what has become modern, much more complicated imaging techniques of contemporary medicine of today.

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