

Session L8

L8.1 Double Indemnity: The arrival of the Digital Twin

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The concept of a digital twin is not new - the term first appearing in relation to radiology in 1994.[1] However, the growth of artificial intelligence algorithms in recent years has seen an exponential rise in publications using this term within the medical literature over the past five years,[2] and is drawing the attention of mainstream media.[3] The use of digital simulations, whether of individual patients, specialist clinics or healthcare systems at a national level is said to promise major health benefits across the board.[4] Both radiologists and oncologists will welcome the opportunity to deliver more personalised care, moving away from the notional “average” patient. Nevertheless, a comparator or exploitable “twin”, digital or otherwise, is a longstanding idea within and beyond medicine.

This paper delves into literature, movies and TV to explore what twins and body doubles, and their perception within the popular imagination, can teach us as we move into the era of the digital twin. From Kazuo Ishiguro to Black Mirror, Michael Bay to Christopher Nolan and from The Dark Knight to The Two Ronnies, an eclectic range of References will demonstrate a longstanding fascination with duality and alter-egos. Applying a thought experiment inspired by these reflections provides insight into how best to utilise healthcare resources as we embark upon the era of artificial intelligence.

L8.2 John Poland of Blackheath and the development of paediatric orthopaedics

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Background John Poland (1855-1937) was an orthopaedic surgeon at the Miller General Hospital in Greenwich. He was particularly interested in paediatric skeletal trauma which was a difficult area of clinical practice before radiography. Poland became interested in the newly discovered X-rays, and produced his hugely influential book ‘Traumatic Separation of the Epiphyses’ in 1898 incorporating new knowledge gained from radiography. In that same year he published the first bone age atlas.

At the Miller Hospital Poland worked with the surgeon Thomas Moore and the scientist William Webster. In the March of 1896 Moore and Webster had radiographed the fractured ribs of a child attending the Miller Hospital, and this persuaded the committee of the Miller Hospital to install an X-ray apparatus. This X-ray Department, founded in 1896, was one of the first in the world.

Purpose

- To understand how radiography contributed to the understanding of normal, developmental and pathological anatomy.
- To learn about John Poland’s insights into the optimal way to introduce new technology.
- To celebrate the life of this remarkable surgeon.

Summary of Content A presentation will be made of:

- The life and times of John Poland FRCS.
- Poland’s contributions to paediatric orthopaedics.
- Early radiology at the Miller Hospital.

References

Thomas, A.M.K. (2022) *Invisible Light, The Remarkable Story of Radiology*. Boca Raton: CRC Press (Taylor and Francis Group).

L8.3 Florence Stoney: formidable feminism in the history of radiology

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Background: Florence Ada Stoney is a pioneer of Radiology, but her successes often remain overlooked. She is credited as being the first female radiologist in the United Kingdom, but her life and work are not well documented compared with other pioneers of the time. Florence Stoney’s life and work are evidence of the struggles she faced due to her gender. She overcame many social constraints faced by women of the period, to train in medicine and contribute to the medical effort during World War I. Even today a gender gap in Radiology is evident. Each year fewer female students choose Radiology

as their medical specialism, compared with their male peers. On the other hand, Radiography is a female dominated profession, with fewer male students studying and working in this field of healthcare. **Purpose:** - To celebrate the life of Florence Stoney. - To consider Florence Stoney's achievements, and their impact on Radiology. - To explore the current position of medical/radiography education in the UK. **Summary of Content:** This submission focusses on Florence's life, education, and work, celebrating Florence's achievements and her contribution to Radiology. This submission also explores the socio-economic and gender issues of the period, which created barriers for Florence to overcome, some of which continue to have an impact on medical education in the United Kingdom today.

L8.4 The million volt radiotherapy x-ray set at St Bartholomew's Hospital in 1938

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Background In the 1930s high voltage X-ray tubes were in use, including 200-250kV x-rays, to treat cancer.

It was realised that X-rays at higher energies were needed to penetrate further into the body. Several attempts around the world, and particularly in the USA, will be discussed; however very few units were successful at treating large numbers of patients.

St. Bartholomew's Hospital was fortunate to have a major donation from Mrs Myer Sassoon, and appointed George Innes to investigate this problem, and on May 21, 1948, Innes presented his results in a presentation to the Section of Radiology of the Royal Society of Medicine.

Purpose

- To understand the supply and installation of a continuously evacuated X-ray tube.
- To learn about the high voltage D.C. generators that were needed to operate at a guaranteed voltage of 600,000 volts.
- To have an understanding of an X-ray therapy unit that was designed to operate continuously at one million volts.
- To celebrate this remarkable machine, the last major development in X-ray therapy before modern apparatus.

Summary of Content

Metropolitan Vickers Electrical Company installed an X-ray tube, which by 1938, operated successfully at 1MV, and treated treating patients until 1962. The presentation will discuss:

- X-ray Tube design.
- The high voltage generator.
- Room design and its protection.
- X-ray properties at 1MV.
- Treatment Plans compared with 200-250kV.

References

Innes GS. The million-volt X-ray plant; its development and application. *Proc R Soc Med.* 1948 Oct; 41(10):691-703.

Phillips R (with the technical assistance of Innes G). Supervoltage X-ray therapy: a report for the years 1937-1942 on the Mozelle Sassoon supervoltage x-ray therapy department, St. Bartholomew's hospital. Wellcome Collection

L8.5 Francis H Williams – an American radiology pioneer

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Francis Henry Williams was born in Massachusetts on July 15, 1852. He graduated from Harvard Med School and followed this with two years of training in Vienna and Paris. His early research was in infections, in particular the use of diphtheria antitoxin.

Although Williams started of as a physician, the discovery of X-rays by Rontgen fired his interest in its potential applications. In 1896 he reproduced Rontgen's experiments in the laboratory of physics at the Massachusetts Institute of Technology, which was headed by Charles Cross. In 1896 Williams opened a radiology unit in the basement of Boston City Hospital and X-rayed patients from Harvard, Tufts, and Boston Universities.

By 1897 had produced over 409 volumes (each of around 250 pages) of drawings of patients with chest diseases. He was one of the earliest radiologists to describe the apical changes on chest X-ray in patients with tuberculosis. He also described other chest X-ray findings such as emphysema and pleural effusions.

He was an early adopter of fluoroscopy and collaborated with Walter Cannon. In 1901 he produced his famous book 'The Rontgen Rays in Medicine and Surgery' one of the early radiology textbooks.

He became President of the Association of American Physicians from 1917-18 and an honorary member of the American Rontgen Ray Society and the Radiology Society of North America. He died on June 22, 1936 at the age of eighty-three.

Today he is remembered as the father of American radiology.
