■ HISTORICAL NOTE

Shenton's line

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This paper considers the history of Shenton's line.

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On 8 November 1895, Wilhelm Conrad Röntgen discovered X-rays and took the first radiograph, which was of his wife's hand. By December he had written up his discovery, and it was published in the New Year.¹ Two further papers followed,^{2,3} the foundations of radiology were laid, and Röntgen received many honours during the remaining 25 years of his life. News of the discovery spread rapidly. By February 1896, three months after the discovery, Robert Jones and Oliver Lodge in Liverpool created an X-ray machine and published the first radiograph of a foreign body, a bullet in a boy's hand.⁴ The exposure took two hours.

At this time, Edward William Hine Shenton (1872–1955; Fig. 1) was a medical student at Guy's Hospital, London, United Kingdom, having enrolled in October 1893. We have no details of his prowess as a student, but it is clear

that he had a particular interest in the early development and practice of radiology. In many hospitals around the world, apparatus was being bought and space cleared in order to establish facilities for 'skiagraphy', as the technique was called. Guy's Hospital was no exception, and in 1897 a skiagraphic service was established in the accident ward.⁵ Shenton and a fellow medical student, A. H. B. Kirkman, were early protagonists of the specialty, and in 1899 they were appointed radiographers to Guy's Hospital.⁶ Later that year, the two collaborated to give a practical demonstration of the medical applications of Röntgen rays before The Pupils' Physical Society.⁷ After qualification, Kirkman joined the army and went to the war in South Africa. Shenton remained and went on to create the Radiology Department of Guy's Hospital. He soon established an exami-

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Fig. 1

Edward Warren Hine Shenton, 1872 to 1955.

Fig. 2

Shenton's day book, 1900.

No. 404 Date Nov. 16/00

Physician, Surgeon, or House-Surgeon _____ Ward _____ Department _____ Bed _____

Name and Age Mr Jenner (General orderly) Occupation Orderly

Address _____

Nature of Case and what is required to be shown Shoulder - Mr. Jenner
Pt shot in shoulder at the relief of
Ladysmith

Exposure _____ Distance _____ Tube Is Brown

Plate humeral Size 12x10 How many taken 2

Current in Amperes _____ No. of Volts 25

Result _____

Remarks _____

Fig. 3a

Fig. 3b

Figure 3a – General Buller's orderly, a Mr Jenner, who was shot in the shoulder at the relief of Ladysmith. Figure 3b – the humeral head has been shot away (arrow). Jenner obviously survived and without evidence of infection, probably because of the dry environment of the Boer War.

No. 376 Date Nov 6

Physician, Surgeon, or House-Surgeon _____ Ward _____ Department Orthopaedic

Name and Age Lillian Glenister 19 months Occupation _____

Address 11 Ossory Rd. Old Kent Rd.

Nature of Case and what is required to be shown Left hip dislocation
has been for 4 months Marking of hip by

Exposure _____ Distance _____ Tube T.G.

Plate _____ Size 12x10 How many taken 1

Current in Amperes _____ No. of Volts 25

Result _____

Remarks Congenital dislocation of left side

Fig. 4a

Fig. 4b

Figure 4a – 19-month-old child diagnosed with congenital dislocation of the left hip. Figure 4b – the skiagram shows the right hip is also dysplastic.

nation sequence for each patient, which consisted of preliminary screening (radioscopy), followed by exposure of a single 'hard copy', plate or print (radiography). His system of radiography was presented to The Roentgen Society in 1901⁸ and is vividly displayed in his Day Book for 1900⁹ (Fig. 2). This consists of almost 500 original 'skiagrams', as well as snippets of information about the patients and their surgeons (Figs 3 to 5). It is a hugely informative archive, not only of Shenton's practice, but also of the work of his orthopaedic contemporaries at Guy's Hospital. These included pioneers, notably William Arbuthnot Lane, an early proponent of operative reduction and internal fixation of fractures. Thanks to Shenton, the Day Book shows many examples of early successes and failures of fixation.

Shenton's achievements by this time were remarkable, for within a few years of the discovery of X-rays, and while he was still a medical student (he did not qualify until 1901), he had developed an X-ray department, established a systematic approach to the emerging specialty and produced an important early archive of musculoskeletal disorders.

But where do we find 'Shenton's line'? It is not mentioned in his Day Book, and we have to wait until 1902 for the first description. This came in the form of a presentation to the British Electrotherapeutic Society, later to become the Radiology Section of the Royal Society of Medicine, on 10 January 1902 in the rooms of the Medical Society of London. It was reported later that year in the *Journal of Physical Therapeutics*.¹⁰ At that meeting, the president

Fig. 5a

Fig. 5b

Figure 5a – injury to the interphalangeal joint eight weeks earlier. Shenton has drawn the deformity and questioned how it came about. Figure 5b – this remarkably clear image shows what is probably the earliest radiograph of a traumatic boutonnière deformity.

Fig. 6

A normal hip showing the diagnostic line in Shenton's monograph.¹¹

introduced Shenton as 'radiographer to Guy's Hospital' and invited him to read his paper on 'A Diagnostic Line about the Hip Joint'. In his presentation, Shenton is quoted as saying, "It was while looking for some constant relationship which would be unaffected by any of the normal movements, that I found a line, the broken continuity of which infallibly indicates displacement or trouble in the hip region. This line is formed by the outlines of the upper margin of the obturator foramen and the inner margin of the neck of the femur. These lines are, of course, not quite

continuous, but if connected mentally, we have an arch formed, any interference of which at once arrests the attention. Dislocations, fracture about the neck of the femur, disease of the joint surfaces or fracture of the pelvis itself may give rise to this imperfection in the normal arch."

Unfortunately, no illustration of the line survives from that presentation, and although it is also mentioned briefly in *A System of Radiography* (1901),⁸ it is not illustrated there either. In order to see what is probably the only contemporary surviving picture of Shenton's line, we have to go to his 70-page monograph *Disease in Bone* which was published in 1911.¹¹ This book is indeed a gem. Shenton, who by this stage describes himself as 'Senior Surgical Radiographer', not only writes well, but the clarity of the radiographs shows just how far radiology had advanced in a short time and how valuable the specialty had become.

On page 42 we see the line (Fig. 6), and in his description Shenton highlights its value in the early detection of tuberculosis. In the book we also learn that Shenton was a generous and modest man. He thanks many colleagues, particularly his seniors, Drs Morton and Jordan, and the staff of Guy's Hospital. He writes: "...but for nothing am I more grateful than their attitude to the whole subject of X-ray work. In my opinion, it has raised radiographs from a branch of photography to a branch of practical medicine. As a pioneer I might have had the rough time pioneers look for, but my way has been considerably smoothed by their generous encouragement."

An endorsement of Shenton's many talents and kindly nature is found in his obituary,¹² which charts a full and active life. He resigned from Guy's Hospital in 1919 because of the pressure of emergency work, particularly as radiologist to the Royal Air Force Central Hospital. For these services during the Great War he was awarded the Red Cross gold medal. After the war he developed a flourishing

practice in Harley Street and as honorary radiologist to St Peter's Hospital, London, United Kingdom. From 1933 until his retirement in 1950 at the age of 78, he was honorary radiologist to St Bartholomew's Hospital, Rochester, where he was fondly remembered for his cheerful personality, enthusiasm and kindness. Shenton was also a talented musician, singer and actor. He composed music, mostly songs for children, played the violin in orchestras and as a soloist, and wrote the libretto and most of the musical score of a revue which was performed at the Hippodrome, Golders Green, in aid of charity and in which he played a leading role. He was a gifted craftsman who made violins, and built a ten-ton yacht in the grounds of his home. It was subsequently wrecked off the coast of Kent. In his later years he became an authority on roses. In 1900, he married Phoebe Hollis and she collaborated in his many activities.

We orthopaedic surgeons should remember and respect him as a major contributor and historical figure, not only to radiology, but also to our specialty. His life deserves further research, and I am sure there is much more to learn about this remarkable man.

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