

Edward Harrison and the treatment of spinal deformities in the nineteenth century

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ABSTRACT At the beginning of the nineteenth century, doctors and lay practitioners became interested in the treatment of spinal deformity, but it took two centuries for the specialty to become established. The provision of care was fragmented, and treatment was in the hands of physicians, surgeons, mechanics, masseurs and bonesetters. In 1837, Dr Edward Harrison founded the first infirmary for spinal diseases in London with only six beds. Harrison was a forceful character who had trained in Scotland. He held no voluntary hospital appointment and faced great opposition from the London Royal Colleges and the orthodox establishment, including Sir Charles Bell and John Shaw. This paper describes Harrison's treatment of patients afflicted by spinal deformity and analyses the medical environment of the time as well as Harrison's legacy.

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INTRODUCTION

In the early nineteenth century, when doctors in England, France, Germany and Italy devoted considerable energy to the treatment of spinal deformity, Edward Harrison (1766–1838) founded a spinal institute in London.¹ While his contribution to medical reform is well recognised, little is known about his management of spinal deformity or his institute. This paper explores the role of this forceful man in this field and the opposition he generated among established practitioners.

At the time, doctors and patients were particularly interested in the treatment of spinal curvature, which was not life threatening. Innumerable suggestions of a bizarre nature were advanced to explain the cause, including faulty posture, inappropriate use of stays, muscular imbalance, trauma following a fall, constitutional defects, indolence, short-sightedness, menstruation, running and standing on one leg.

It was speculated that the condition was related to occupations, with those working in confined spaces and adopting faulty postures, such as milliners, dressmakers and cobblers, or those who placed an undue load upon their spines, such as draymen, barrel carriers and Thames watermen, particularly at risk.²

Prior to the nineteenth century, doctors showed very little interest in spinal deformity, but in the early 1800s doctors throughout Europe became involved in its management. Orthopaedics was not yet established, and treatment was in the hands of physicians, surgeons,

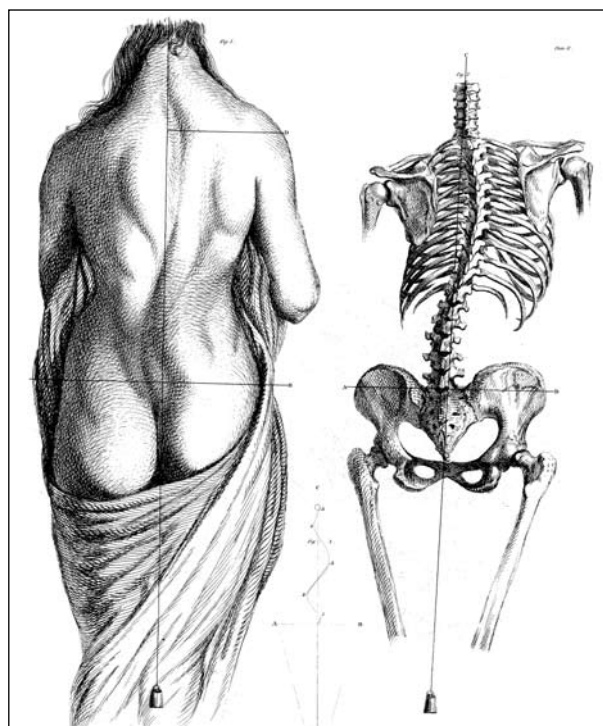


FIGURE 1 Lateral curvature of the spine. 'The expanded form of the ribs on the right is seen to be a consequence of their rising from the convexity of the curve, while those to the left, being attached to the concavity, are depressed.'³

mechanics or machine makers, mechanic-bandagists, 'rubbers' (masseurs) and bonesetters. Bonesetters and appliance makers such as Timothy Sheldrake and Robert Chessher, the latter also a surgeon from Hinckley in Leicestershire, used equipment to relieve the weight

TABLE 1 The variety of locations where nineteenth-century doctors treated patients with spinal deformity

Doctor	Place of treatment
Harrison	Treated patients in their homes ⁷
Verral	Treated patients in their homes through charitable foundation ⁵
Epps	Treated patients in their homes ⁷
Chessher	Treated patients outside London in their homes ⁸
Tilleard-Ward	Treated patients as 'out-patients' ⁹
Brodie	Described a case seen in his hospital ward ¹⁰
Bell	Treated patients with traumatic injury in his ward at the Middlesex Hospital ¹¹
Cooper	Treated patients at Guy's Hospital ¹¹
Pott	Treated patients at Saint Bartholomew's Hospital ¹²
Earle	Treated patients at Saint Bartholomew's Hospital ¹³

on the spine. Although unconventional, their skills were respected by their medically qualified colleagues. Indeed, in 1820 John Shaw recommended that doctors and surgeons should observe how 'rubbers' got their results.³

WHERE WERE PATIENTS TREATED?

Today, patients with spinal injuries would be treated in a specialist hospital, but these only appeared towards the latter half of the nineteenth century. In the mid-1800s, London only had three small orthopaedic hospitals: an orthopaedic infirmary founded by William John Little in 1840, which became the Royal Orthopaedic Institution in 1845; the City Orthopaedic Hospital, founded in 1851; and the New National Orthopaedic Hospital, founded in 1873.

There were no hospitals treating patients with spinal deformities, and voluntary hospitals rarely admitted such cases.⁴ Charles Verral summarised the situation:

The cases to which this Society directs its attention are those to which Hospitals and Infirmarys offer no, or no effectual assistance. In the first place, cases of mere distortion they will not admit at all. Cases of actual disease, either of the Spine or the Hip, they must of course sometimes receive; but they do not and they cannot retain them long enough to afford them a fair chance of cure.⁵

Although Verral's contribution to the treatment of deformity was minimal, he set up a charitable institution to treat poor patients in their homes and wanted to establish a spinal unit, but was unable to do so.⁶

Patients with spinal deformity were not congregated in a given hospital but were under the care of doctors interested in the condition (see Table 1). Wealthy upper- and middle-class patients suffering from caries or lateral curvature of the spine were seen and treated at their homes,⁷ while poor patients with advanced caries of the spine might be admitted to a voluntary hospital. Most of Percivall Pott's patients, for example, came under this category. Robert Chessher was different: his patients were outside London and he treated them as outpatients. They resided in dedicated accommodation near his consulting rooms, and he made rounds every day.¹⁴ Mechanics were outside the medical profession and treated patients in their rooms, for example in London's Tottenham Court Road.

METHODS OF TREATMENT

Nineteenth-century surgeons and physicians wrote prolific and often verbose accounts on the treatment and pathogenesis of spinal disease. We list their various methods below:

- Immobilisation
- Corsets
- Stays
- Traction
- Suspension
- Massage
- Friction
- Exercise
- Use of caustics to create a fistula and drain the pus (issues)
- Bleeding
- Putting weights on the patient's head or shoulders
- Inclined plane
- Division of the muscles
- Swinging of clubs

Pott was a seminal figure. He believed that spinal curvature could always be attributed to caries of a diseased vertebra, and recommended draining the pus by means of a fistula. He was the first to correlate caries of the vertebrae accompanied by paraplegia with a general malaise:

If the affection be of the dorsal vertebrae, the general marks of a distempered habit, such as loss of appetite, hard dry cough, laborious respiration, quick pulse, and disposition to hectic, appear pretty early, and in such manner as to demand attention.^{12,15}

Sir Benjamin Collins Brodie,¹⁰ Sir James Earle,¹³ Sir Charles Bell^{16,17} and Shaw¹⁸ endorsed Pott's views.

Shaw, like Pott, believed paralysis was secondary to caries of the vertebrae, but he also recognised that curvature of the spine could be due to many other conditions. Shaw believed that exercise was essential – otherwise secondary degeneration of the vertebrae,

such as osteoporosis, could occur.³ Shaw's work (see Figure 1) was acknowledged by Jacques-Mathieu Delpech, a French master in the field.¹⁹

Sir Charles Bell, an influential surgeon and neurologist at Middlesex Hospital and professor of anatomy and surgery at the Royal College of Surgeons, believed that the spine, vertebrae and the ligaments worked together as a functional whole and, therefore, one could not distinguish or attribute deformity to a single entity. He was the first to discuss the pathology of the condition, and his conclusions were firmly based on pathology and not on hypothetical assertions.^{16,17}

Other lesser-known practitioners, such as John B. Serny,²⁰ John Epps,⁷ Charles William Hoyland²¹ and Chessher,⁸ successfully treated spinal deformity. They worked outside the 'orthodox establishment' and did not have appointments at the voluntary hospitals.

HARRISON THE REFORMER

Edward Harrison (see Figure 2) was born in Lancashire and qualified in Edinburgh in 1784. He studied in London, Edinburgh and Paris before settling in Lincolnshire in 1789, where he founded the Horncastle Dispensary and practised until 1821. He followed a conventional medical career at Horncastle but was clearly a man of considerable drive, founding the Lincolnshire Benevolent Medical Society and becoming president of both the Royal Medical Society and the Royal Physical Society.²²

In the first half of the nineteenth century, medical practice was not regulated. The Royal College of Physicians of London (RCPL) had attempted reform and John Latham had produced the 'College Plan', but this was never implemented. As a result, qualified practitioners felt threatened, and there was widespread disquiet among them about the state of medical practice.

Harrison had carried out a survey of practitioners in the county of Lincolnshire and showed the scandalous extent of quackery, with nine quacks to every qualified practitioner.²³ As a result of these findings, Sir Joseph Banks, a local magnate and the president of the Royal Society, invited Harrison to London to undertake a national survey of medical practice. A committee was set up with Fellows of the RCPL, the master of the surgeons and several censors from the RCPL.²⁴ Sir Lucas Pepys, the president of the RCPL, refused to preside at the meetings held in Banks' house. (Study of the archives of the RCPL has yielded a remarkable treasure trove of information. There are handwritten letters between Harrison, the RCPL and the Attorney General that make fascinating reading.)

Harrison's bill, which resulted from this survey, recommended a £2.2s annual fee for all qualified practitioners, with an initial registration fee of £20. It



FIGURE 2 Portrait of Dr Edward Harrison, a formidable character not afraid to confront the establishment. (Courtesy of the National Gallery of Ireland.)

also recommended the setting up of a medical school, the recognition of other medical degrees than those from Oxford and Cambridge and, finally, that doctors should put up a notice outside their practice giving their field of expertise. Harrison believed that medical regulation should not rest with the RCPL but with an independent body (such as parliament), as was the case for those in other professions such as lawyers and the clergy.²⁵ These were remarkably modern and sensible suggestions.

Initially, Harrison's bill appeared to be favourably received by the RCPL, and Pepys offered to take it to comitia where it could be discussed. After consideration, however, the RCPL rejected the bill, considering it 'highly objectionable' and producing a 23-page diatribe against Harrison²⁶ and his proposals which claimed that:

- Harrison's aim was to usurp the power of the RCPL and subvert the existing authority;
- Regulation could not provide for qualified practitioners in poor areas where inferior orders resided and where unqualified practitioners served a purpose. Furthermore, abuses were inherent in the nature of man. Unlike the clergy, doctors practised in private and were therefore beyond regulation;
- Medical education was already at an exalted height. If state medical schools were set up, lecturers would become languid as they would be on a fixed income and have no incentive to seek private students to come to their lectures; additionally there would be large classes where students would not be able to see;
- The proposed fees were excessively high and would result in a decline in the number of doctors;
- Scottish medical degrees were of little value as they could be purchased. They gave no indication of medical knowledge;

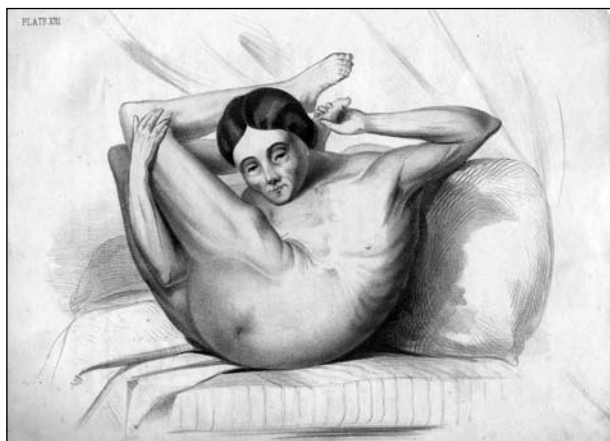


FIGURE 3 The extraordinary contortion of Sarah Hawkes: 'At the age of 14, she received a blow to the neck, she felt a lump in her throat and fell down in a fainting fit. She experienced further fits and was confined to bed. She became afflicted with severe contortion and loss of the power and sensation of her lower limbs so that the soles of her feet pressed together. The joints became stiff and immobile and she was incontinent of urine and faeces. She was examined by no less than 40 medical men. She came to London and Dr Harrison treated her. He thrust soft linen between the knees and ankles and mechanically extended the limbs. He stretched her neck to replace all the vertebrae in the correct position. He held the reduction in place with wooden stays. Gradually power and strength returned to her lower limbs. She regained control of her bladder and bowels and began to walk normally.'²⁷

- Displaying a notice outside a practice was frivolous, would degrade the profession and was obnoxious to its higher members;
- Harrison was not qualified to practise in London, and his whole report was replete with insinuations, gratuitous charges and misrepresentation.

Over the next two decades the RCPL pursued its vendetta against Harrison, taking legal advice from the Attorney General in order to sue him for illegal practice.²⁷ In 1827 the censors, refusing to recognise Harrison's Edinburgh qualification, wrote to him forbidding him to practise without a licence. There was an 'anti-Scottish' feeling in London and 'outsiders' such as Harrison who had no social standing or reputation, having trained in Scotland and practised in the provinces, were not welcomed.

The case was the last prosecution of its kind to be heard in court. The censors selected the example of Sarah Tribet, a patient suffering from spinal curvature, to support their prosecution. They had to establish that Harrison had been in continuous practice for a period of 28 days and that he was practising medicine as opposed to surgery. The judge considered Tribet's case to be surgical and outside the province of the physicians, and in consequence ruled in Harrison's favour. The RCPL asked Harrison to provide the prescriptions as evidence, which he refused. The apothecaries also refused as they thought it was a breach of confidence.²⁸

The College claimed that in addition to treating a young waiter, Harrison had treated Tribet's maidservant. The case attracted wide publicity in the *London Medical Gazette*, *The Lancet* and the *Medico-Chirurgical Review*.²⁹ The former accused the RCPL of discriminating in favour of London graduates when issuing licences to practise. Harrison continued to taunt the RCPL, and in a letter dated 28 September 1830 wrote arrogantly: 'I have anxiously expected the voluntary repeal of your illegal and oppressive by laws. As they now stand, they are equally injurious to medical science and prejudicial to the higher grades of medical practice.'³⁰

HARRISON'S METHODS

Defeated and frustrated in his efforts to reform the medical profession, Harrison devoted himself to his medical career. His interest in spinal deformity was initiated after he treated his wife's cousin, who was suffering from curvature of the spine. She had been treated by caustic local applications to create a fistula without success. As she had suffered little or no pain during the early stages of her disease, Harrison concluded that the condition must be 'confined to the connecting ligaments of the vertebrae'. He designed a long course of mechanical treatment, which cured her.²²

Harrison communicated his findings in the medical press, and in 1827 published *Pathological and Practical Observations on Spinal Diseases*; a second edition came out in 1831. He successfully treated many severe cases of spinal deformity and gained recognition.³¹ He was an enthusiast devoted to his patients and not afraid to take on difficult cases abandoned by other surgeons, such as Sarah Hawkes (see Figure 3). Hawkes sustained a dislocated cervical vertebra, as a result of a blow to the back of the neck, which led to incomplete tetraplegia. Harrison reduced it late on and cured her. The treatment consisted of reducing the dislocation and stretching the spine. A wooden plinth was then used to keep the vertebrae in place. 'By the usual practice of recumbency, frictions, elongation, and machinery, the back-bone soon became straight,' Harrison wrote in a letter.³²

Harrison challenged Pott's accepted method of creating fistulae and using exercise, and refuted the previously held view (which he referred to as the 'antiquated doctrine of Mr Pott') that spinal curvature was due to diseases of the bones in the spinal column. Harrison considered that if the spine was not tender it was due to the laxity of the ligaments, resulting in a dislocation of the vertebrae. If the spine was moved out of its original position, whatever the cause, distortion pressed on the spinal cord. All the symptoms from scoliosis could be attributed to the effects of the distorted spine upon the viscera of the chest, the heart and lungs and the abdomen. It is not clear from his writings, however, whether he saw these as secondary or primary effects.

Harrison was an educated, studious man who spoke fluent Latin and wrote well, as evidenced by the following extract from *Pathological and Practical Observations on Spinal Diseases*:

On taking my evening walk, I heard a loud cry for help issuing simultaneously from many mouths. I ran to the spot and saw a man lying on the ground. A horse was standing near. Twenty voices anxiously vociferated as I came along saying that he had just fallen from his horse and broken his neck. He lay on the ground motionless and apparently quite dead. I instantly placed my knees against his shoulders and grasping his chin and the back of his head firmly between my hands proceeded to stretch his neck with all my strength. The patient immediately showed signs of returning animation by moving his limbs and soon afterwards raising himself from the ground. He speedily recovered and remounted his horse. I visualise that he had a subluxation or concussion of his brain or spine. There was then discussion at a dinner party as to what was the cause of it. For my part, I believe that the vertebrae was displaced compressing the cord and phrenic nerve.³³

He was also a forceful character, not afraid to quarrel with the establishment:

The power which I have successfully exercised over the spinal column for more than ten years, and which I challenge the most incredulous and prejudiced to contradict has established a new era in medicine ... the authority of great names, and the influence of high medical stations, may for a time retard, but cannot wholly arrest its progress; it will ultimately surmount every obstacle, and triumph in defiance of all opposition.³⁴

Harrison was meticulous in his observations and treatment of patients. He referred extensively to the literature, quoting John Mayow (1643–79) and Francis Glisson (1597–1677), among others. He taught well and was a respected figure with devoted disciples. His description in 1789 of the condition ‘Harrison Sulcus’ – a horizontal depression along the lower border of the thorax seen in advanced rickets in children – is still used today.³⁵ His views are quoted uncritically in Epps’ book, published in 1849.⁷

Furthermore, Harrison cared greatly for his patients, observing:

When we take into account the shoals of destitute cripples, from diseased backs or limbs, who are condemned through life to stump about, or lean upon sticks and crutches, it is not merely an affair of real benevolence to allay their pressing wants, but the policy of a well-regulated community to institute proper measures to lessen the calamity.³³

HARRISON’S SPINAL INSTITUTE

Harrison held no appointment at a voluntary hospital. In response to this exclusion, he opened his own private institute to treat such conditions as curvature of the spine, inequality of the limbs and distortions of the spine. Plans were first discussed in November 1833, at the instigation of John Underwood, after Harrison cured his ward of spinal curvature. In July 1834, a public meeting took place in the Gothic Hall in London, and resolutions were passed to set up a benevolent charity to treat spinal deformities.

Initially only female patients were admitted upon weekly payment of one guinea, and a separate ward was allocated for poor patients, funds permitting. Funding of the institute relied on a £1,000 donation by Harrison himself, patronage by the Duchess of Kent, subscriptions from benefactors directly to Coutts’ Bank, donations from Underwood and Hoyland and the gratuitous medical and surgical input of Harrison, Serny and Hoyland. Furthermore, Harrison intended to publish a valuable letter on his mode of treatment addressed to Sir Benjamin Collins Brodie, the proceeds of which would also go to fund the institute.¹

The unit opened in 1837, a year before Harrison’s death, in a private house in Stanhope Street, London (see Figure 4). There were only six beds and no other facilities. Upon his death, Harrison bequeathed another £3,000 to Underwood for the benefit of his institution. This large monetary gift was an indication of Harrison’s success.³⁶ By 1851 there were still only six beds, but the waiting list reached 50 through lack of funding.³⁷

Information on Harrison’s spinal unit is incomplete and there is no description of the types of treatment used. Harrison died too soon after the setting up of the unit. All of Epps and Harrison’s descriptions refer to patients treated at home, and there is no record of their work at the institute. We believe that it closed down as there is no mention of it in Kershaw’s book on special hospitals.⁴

DEBATES AND DISPUTES ON TREATMENT

The treatment of spinal injuries was contentious and led to arguments among doctors. The main controversies rested with defining the cause of spinal deformity and the different means of treatment. Doctors were weak on theory and strong on polemic.

Pott’s fundamental work attributing paralysis to a diseased vertebra was the beginning of scientific treatment, and his views were endorsed by Brodie and Earle. Despite support from Epps, Chessher and Hoyland, Harrison was considered preposterous by the establishment because of his attacks on Pott. In consequence, he made adversaries among orthodox practitioners trained at the Great Windmill Street School, and some tried to exclude him



FIGURE 4 The site of Harrison's Infirmary for Spinal Diseases in Stanhope Street, London, as seen today. Much of the site been replaced by modern flats, but there are four houses of the period still standing. The small infirmary would have been in one of these.

from practising in London. Shaw attacked Harrison's views and accused him of secrecy. Harrison described two patients with dislocations of their vertebrae. When Shaw carried out post mortems on these patients he did not confirm the dislocations, stating, to the contrary: 'These effects, however, the author would have us believe, were in consequence of the change which he produced on the spinal marrow by his operations!!'¹⁸ The word 'operation' does not imply cutting but refers to Harrison's manipulations.

Rubbing and massage, which Harrison advocated, were popular, but Shaw was ambivalent about their benefits. Having once commended rubbers, he nevertheless could not see how rubbing could cure spinal deformities: '... the facts discoverable by examination of the skeleton of a person who has had distortion of the spine, are sufficient to prove that such means as friction, shampooing, &c. cannot restore the distorted spine to its natural condition.'¹⁹ Shaw believed that manipulation was dangerous as it could impinge on the spinal cord, and he thought people were gullible to believe in rubbing.

Bell joined Shaw in opposing Harrison and considered it both useless and dangerous to try to reduce a fused vertebra.¹⁷ Nevertheless, there is a fascinating account by Serny who, assisted by Hoyland, performed an operation on the spine. He followed the practice of Louis Stromeyer and carried out a division of the ligaments of the spine, a form of tenotomy, and then followed the Harrison regime to correct the deformity. We have found no other account of surgical attempts to correct the deformity.²¹

Exercise as a means of therapy was also controversial. Shaw, Bell, Brodie, James Wilson and Earle believed in the virtue of strengthening the muscles,³⁸ but RW Bampfield opposed it.³⁹ The use of machinery was also contentious

despite its popularity. Unqualified machinists and bandagists used it for gentle relief. Qualified practitioners such as Harrison, Chessher, Thomas Jarrold and Wilson used machinery cautiously.

DISCUSSION

Although the disabled were rejected and ostracised by society, doctors saw the correction of spinal deformity as a medical and intellectual challenge. This is corroborated by the proliferation of papers and books on the subject, numerous lectures at the Great Windmill Street School and the Royal Colleges and the creation of a prize for the treatment of spinal deformity, the Fothergill Medal, awarded by the Medical Society of London.³⁹ Altruistic doctors such as Verral⁵ and Harrison³² carried out humanitarian work by helping the poor afflicted by spinal curvature.

Spinal deformity was more prevalent in the middle and upper classes,^{10,16} possibly because it was socially fashionable among upper-class ladies to have sloping shoulders. Doctors earned a lucrative living through private practice, and as there was a surplus of physicians in addition to unlicensed practitioners, the 'medical' correction of deformity was a valuable source of income. Lateral curvature could be rapidly (although transiently) corrected by traction. This impressed the patients' devoted families, thereby enhancing a doctor's reputation, and a long and lucrative course of treatment ensued. The treatment of spinal deformity was not marginal but integral to medical practice at the time.

Harrison's findings were not based upon anatomy and pathology but were empirical. During his lifetime, his methods and institute flourished. Doctors at private institutions published their findings, treated the poor benevolently and sought approval and patronage from distinguished people. Harrison followed the same pattern when establishing his spinal institute. Upon his death, his associate Serny inherited the large practice. However, Serny lacked personality, and within a few years he was almost without a patient and the unit closed down.

Harrison's disciples lacked his charisma and did not hold positions at voluntary hospitals. Although they were all fully qualified doctors, they practised outside mainstream medicine and subsequently followed unconventional careers, often outside London. Serny became an osteopathic doctor, possibly because of the importance Harrison gave to the distortion of the vertebrae. Hoyland, a one-time surgeon at Harrison's spinal institute, travelled to the Middle East and became interested in Kabbala Jewish mysticism.⁴⁰ Epps became a leading homeopathic doctor, enjoying a large practice to which he was devoted.⁴¹

Far from being a footnote of medical treatment, spinal deformity was at the forefront of medicine. The

profound interest shown by the most distinguished surgeons of the era in the causation and treatment of spinal deformity gives a fascinating insight into the practice of medicine in nineteenth-century London, its prevailing prejudices and the exclusion of outsiders. It also reveals the medical politics and the rivalries among the colleges, universities and personalities.

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REFERENCES

- 1 Infirmity for diseases of the spine. *Lancet* 1834; 2(3 May):207.
- 2 Le Vay D. Scoliosis. In: *The history of orthopaedics*. New Jersey: The Parthenon Publishing Group; 1990. p. 529–45.
- 3 Shaw J. *On the nature and treatment of the distortions to which the spine and the bones of the chest are subject*. London: Longman, Hurst, Rees, Orme, Brown & Green; 1823. p. 92–7, 152.
- 4 Kershaw R. Special hospitals – chronology. In: *Special hospitals: their origin, development, and relationship to medical education; their economic aspects and relative freedom from abuse*. London: Geo. Pulman & Sons; 1909. p. 25–32.
- 5 *The second report of the society for the treatment and attendance of poor persons afflicted with diseases and distortions of the spine, chest and hips*. London: Houlston; 1841. p. 1–8.
- 6 *Report of the Verral Society for the treatment of poor persons afflicted with diseases and distortions of the spine, chest and hips*. London: Houlston & Hughes; 1844.
- 7 Epps GN. *Spinal curvature, its theory; its cure*. London: Sherwood and Co; 1849.
- 8 Valentin B. Robert Chessher (1750–1831): an English pioneer in orthopaedics. *Med Hist* 1958; 2(4):308–13.
- 9 Ward WT. *Practical observations on distortion of the spine, chest and limbs*. London: Thomas and George Underwood; 1822.
- 10 Brodie BC. *Pathological and surgical observations on the diseases of the joints*. London: Longman, Brown, Green & Longmans; 1850.
- 11 Silver JR. *History of the treatment of spinal injuries*. New York: Kluwer Academic/Plenum Publishers; 2003. p. 11–84.
- 12 Pott P. *Remarks on that kind of palsy of the lower limbs, which is frequently found to accompany a curvature of the spine*. London: J Johnson; 1779.
- 13 Earle J. *Observations on the cure of the curved spine in which the effect of mechanical assistance is considered*. London: W Flint; 1803. p. 1–81.
- 14 Le Vay D. National histories – Great Britain. In: *The history of orthopaedics*. New Jersey: The Parthenon Publishing Group; 1990. p. 63–177.
- 15 Pott P. *Farther remarks on the useless state of the lower limbs in consequence of a curvature of the spine*. London: J Johnson; 1782.
- 16 Bell C. Clinical lecture on distortion of the spine. *London Medical Gazette* 1835/1836; 17:231–6.
- 17 Bell C. Clinical lecture on distortion of the spine. *London Medical Gazette* 1829/30: 232–5.
- 18 Shaw J. Is lateral distortion ever consequent upon dislocation of the vertebrae? In: *On the nature and treatment of the distortions to which the spine and the bones of the chest are subject*. London: Longman, Hurst, Rees, Orme, Brown & Green; 1823. p. 71–97.
- 19 Delpech J-M. *De l'orthomorphie par rapport à l'espèce humaine*. Paris: Editions Medicina Rara; 1828. p. 95.
- 20 Serny JB. *Spinal curvature, its consequences, and its cure: illustrated by the history of thirty-three cases successfully treated*. London: Sherwood and Co; 1840.
- 21 Serny JB. Three subcutaneous operations on one patient for a formidable double lateral curvature of the spine. *Lancet* 1841; 2:748–9.
- 22 Editorial: A victory over prejudice – Harrison's spinal institution – abusing the man and pirating his discoveries. *J Health Disease* September 1847; 3:65–9.
- 23 Clark Sir G. *A history of the Royal College of Physicians of London*. Vol. 2. Oxford: Clarendon Press; 1966. p. 615–32.
- 24 Royal College of Physicians of London archives: Notes taken from the reforms – 1804 Lincolnshire report.
- 25 Royal College of Physicians of London archives: 1808 Harrison's bill; January 1811 Dr Harrison's letter to the Royal College of Physicians.
- 26 Royal College of Physicians of London archives: Legal document dated January 1811 p.11 – ref 4/4/3 envelope 39 Royal College of Physicians of London.
- 27 Royal College of Physicians of London archives: Letter from the Attorney General to Royal College of Physicians of London dated 14 August 1827, p.88 of legal document signed Scarlett.
- 28 Ashworth Underwood E. *A history of the Worshipful Society of Apothecaries of London*. Vol 1, 1617–1815. London: Oxford University Press; 1963. p. 196–202.
- 29 *Medico Chirurgical Review*, Vol. VII, VIII, IX.
- 30 Memorandum from Harrison to the Royal College of Physicians of London dated 28 September 1830 envelope 39/4/41/2.
- 31 *London Med Surg J* 1833; 11(50):758.
- 32 Harrison E. Letter addressed to Sir Benjamin C. Brodie. London: J Haddon and Co; 1836. p. 1–78.
- 33 Harrison E. *Pathological and practical observations on spinal disease*. London: Thomas and George Underwood; 1827. p. 173, 31–63.
- 34 Harrison E. On Spinal deformity. *Lancet* 1828; 1:649–50.
- 35 Harrison Sulcus. In: Newman Dorland WA, editor. *Dorland's Illustrated Medical Dictionary*. 30th ed. Philadelphia: Saunders; 2003. p. 799.
- 36 Obituary. *Lancet* 1838; 2:262–3.
- 37 Pendell B. Personal communications 2007.
- 38 Wilson JA. *Observations on incurvation of the spine arising from softening of the bones*. London: Royal College of Surgeons: Burgess and Hill; 1821. p. 187–212.
- 39 Bampffield RW. *An essay on curvatures and diseases of the spine, including all the forms of spinal distortion*. London: Longman, Hurst, Rees, Orme, Brown & Green; 1824.
- 40 Archive material on C Hoyland from the Wellcome library online resources catalogue. Record no. MS2950 1865. Available from: <http://catalogue.wellcome.ac.uk>
- 41 Matthew HCG, Harrison B, editors. *Oxford Dictionary of National Biography*. Vol 18. Oxford: Oxford University Press; p.473–4.