“THIS MOST TERRIBLE OF ALL DEFORMITIES”

THE VICTORIANS AND SCOLIOSIS, 1849-1899

by

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DEDICATION

For my mother, Sherie Shayesteh. Your painstaking research to ensure that I received the best care for my back has inspired my work more than books or articles ever could.

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I. INTRODUCTION

In 1888, a well-respected orthopedist named Bernard Roth wrote in the *British Medical Journal* that scoliosis was the "most terrible, in its severe forms, of all the deformities which come under the care of orthopedic surgeons."[1] What would prompt such a bold statement? At first glance, scoliosis, a condition which causes side-to-side curvature of the spine, may not strike one as the most worrying of deformities that a Victorian surgeon would have to deal with. Although scoliosis could significantly impact physical functioning and quality of life, it rarely ever led to total loss of mobility, and to an extent could be hidden underneath clothing. It did not even affect a "hunched" appearance of the back, unlike its infamous close cousin kyphosis. Yet Victorian surgeons recognized scoliosis as being a highly prevalent, insidious condition that presented a considerable challenge to the medical profession to treat. Moreover, despite that the Victorians knew a great deal about the symptoms, prognosis, and epidemiology of scoliosis, its causes were not well-understood. As a result, throughout the era orthopedic surgeons engaged in a considerable amount of debate and discussion in British medical literature about the causes of and best methods to treat scoliosis.

One issue that heavily informed the Victorian understanding of scoliosis was that orthopedists observed it affecting women far more often than men, and they generally diagnosed it at the onset of adolescence. Therefore, the predominantly male medical profession constructed scoliosis as a gendered disorder, and linked its causes to the behaviors and bodies of young women. This gendered understanding of scoliosis

[1] Bernard Roth, "Scoliosiometry; or an Accurate and Practical Method of Recording Cases of Lateral Curvature of the Spine," *The British Medical Journal* 2, no. 1452 (27 October 1888): 927.

artificially created a connection between it and a number of contemporary societal issues concerning women, despite the fact that it could and did affect both women and men. Therefore, this thesis will employ gender as a crucial category of analysis in examining the medical literature that dealt with scoliosis.

Much work has already been done by historians on gender and Victorian popular literature. Sermons and periodicals produced during the era perpetuated a culture of domesticity for women and marked gender divisions. While to some extent such cultural products reflected the reality of life at the time, the work of historians such as Gerda Lerner has revealed that the fixation upon female domesticity in Victorian literature actually reflected anxieties about society moving in the opposite direction.[2] Rather than being confined to the home, Victorian women participated more and more over the course of the century in the workplace, school, sports, and the public sphere. The idealized "cult of True Womanhood" in Victorian literature was, in fact, a reactionary expression of tension about traditional values being threatened by the shifting status of women.[3]

I argue that this societal shift was reflected in and deeply impacted Victorian medicine, as well, particularly in the treatment of scoliosis. Fears about female education, female participation in the workplace, and female clothing choices pervaded the medical profession's many theories about the causes of scoliosis. Moreover, the onus for the deformity was always placed upon the patient herself, therefore perpetuating a tendency

[2] Gerda Lerner, "Placing Women in History: Definitions and Challenges," *Feminist Studies* 3, no. ½ (Autumn, 1975): 7.

[3] Barbara Welter, "The Cult of True Womanhood: 1820-1860," *American Quarterly* 18, no. 2 (Summer, 1966): 151-2; Lerner, "Placing Women in History," 7.

in patriarchal societies to blame women for their own victimization.[4] Individuals who abused evolutionary theory also highlighted scoliosis as an indicator of the purported weakness of the female body, which in turn reinforced cultural beliefs about the overall weakness of the female sex. Scoliosis was thus a useful tool in maintaining female oppression, as it could be pointed to as "scientific" evidence of biological determinism.

On the other hand, women also informed and guided trends in scoliosis treatment through their choices. Surgeons throughout the century treated scoliosis by supporting, strengthening, and manipulating the back with bracing and exercise. The designs of spinal braces strongly resembled contemporary styles of corsetry, marking a notable anomaly in the traditional debate between nineteenth-century doctors and female supporters of corsetry and stays. Much work has already been done on the controversies surrounding Victorian stays by historians such as Leigh Summers and Valerie Steele. Although they disagree on the extent to which corsetry was or was not oppressive and harmful to women, both they and evidence from primary source material suggest that the medical profession was overwhelmingly opposed to the wearing of stays.[5] The issue was more ambiguous in the case of scoliosis, however, as orthopedists identified corsets as being both a cause of and a cure for spinal curvature. Such a contradiction and exception to the norm merits deeper investigation. My analysis of the connection between the corset controversy and scoliosis will reveal that women were unwilling to submit to the medical profession's disparaging attitude towards female fashion choices and the female body,

[4] Valerie Steele, *The Corset: A Cultural History* (New Haven: Yale University Press, 2003): 80.

[5] Steele, *The Corset*, 67-85; Leigh Summers, *Bound to Please: A History of the Victorian Corset* (Oxford: Berg, 2001) 1-8.

and this unwillingness to submit in turn dictated the direction of trends in scoliosis treatment.

Female participation in sports also had a significant impact upon scoliosis treatment. The participation of women in sports and recreational activities has received little prioritization from historians, in comparison to other aspects of women's history.[6] In Victorian society for much of the century, sports were viewed as an activity appropriate only for men, as it required behaviors and attitudes that were deemed unnatural for women.[7] Nevertheless, Victorian women by the end of the century made significant inroads into athletic pursuits, encouraging and encouraged by an emerging societal fixation upon physical fitness. Thus women began to perforate a sphere of activity formerly dominated by men, which in turn influenced what treatments orthopedists deemed acceptable and, indeed, preferable for female patients. In the last two decades of the century, gymnastic exercises suddenly became the frontline treatment for scoliosis, receiving an overwhelming amount of praise and attention in the medical literature. This, much like the relationship between corsetry and scoliosis treatment, presented an interesting contradiction. Scoliosis was utilized as scientific "proof" by some surgeons of female physical weakness, yet athletic activities—in which female participation directly counteracted the myth of female frailty—were proscribed as a popular treatment for scoliosis.[8] Thus, as with the corsetry controversy, women's choices in the social sphere

[6] Tom Hunt, "Women and Sport in Victorian Westmeath," *Irish Economic and Social History* 34 (2007): 29.

[7] Kathleen E. McCrone, "Play Up! Play Up! And Play the Game! Sport at the Late Victorian Girls' Public School," *Journal of British Studies* 23, no. 2 (Spring, 1984): 107.

[8] McCrone, "Play Up!," 108.

served to dictate trends in the medical sphere, in spite of patriarchal attitudes upheld by the medical profession.

The principle source of information for this study comes from articles printed in the *British Medical Journal*. First printed in 1840 as the *Provincial Medical and Surgical Journal*, the *British Medical Journal* (henceforth the *BMJ*) contains a veritable treasure trove of publications on lateral curvature, which historians have not yet explored in depth.[9] Within these articles, surgeons expounded their own theories, presented new research and ideas, and educated each other on orthopedics. They also directly challenged each other and their colleagues abroad (most notably the famed American surgeon Lewis A. Sayre) when their beliefs clashed—which they frequently did. One can also occasionally find within the publications short anecdotes and case studies about surgeons' patients, providing a small but valuable window of insight into the lives of those whom they cared for. Finally, many of the articles in the *BMJ* also included drawings and photos of specimens of scoliotic spines retrieved from autopsies, spinal brace designs, deformity measurement techniques, and, perhaps most frequently, the surgeons' patients themselves. This visual documentation is invaluable in helping one to understand how scoliosis surgeons worked, how they crafted their arguments to their fellows in the field, and how they devised new methods for measuring and treating spinal deformity. Moreover, it provides insight into the lives and conditions of the patients themselves through their pictorial depictions in the medical literature.

[9] My abbreviation for the journal should not be confused with the contemporary title, *The BMJ*.

The second chapter of this thesis also features articles from *The Lancet*, one of the world's oldest and most famous medical journals. In particular, I make heavy use of *The Lancet* for its many articles debating the practice of wearing of tightly-laced stays, a topic salient to the discussion of scoliosis treatment. I also feature a number of independently-published monographs written by orthopedic surgeons who were leaders in the field. These monographs offered much more detailed explanations of the arguments and viewpoints espoused in the *BMJ*. Moreover, monograph authors often gave appraisals of the practices of their fellows in the field, providing a valuable insight into how surgeons evaluated members of their own profession and competed for prominence in the business of orthopedics.

Historians of medicine so far have paid little heed to scoliosis as a topic worthy of serious historical study. Beth Linker has produced some of the only academic works which feature scoliosis as their main focal point, but her articles concentrate solely on twentieth-century America, leaving much more history yet to be explored.[10] Medical professionals have made a few attempts at documenting the earlier, Western history of scoliosis in medical journals and textbooks. However, while their efforts are commendable, they lack the depth and attention to source material required in academic history.[11] Therefore, this thesis serves to add to the hitherto inadequate historical

[10] Beth Linker, "A Dangerous Curve: The Role of History in America's Scoliosis Screening Programs," *American Journal of Public Health* 102, no. 4 (April 2012): 606-16; Beth Linker, "Spines of Steel: A Case of Surgical Enthusiasm in America," *Bulletin of the History of Medicine* 90, no. 2 (2016): 222-249.

[11] Kathleen Y. Moen and Alf L. Nachemson, "Treatment of Scoliosis: An Historical Perspective," *Spine* 24, no. 24 (15 December 1999): 2570; and Robert A. Dickson, "History of the Treatment of Scoliosis," in

discussion of scoliosis. Furthermore, my research uncovers the link that Victorians created between scoliosis, gender, and contemporary societal trends, which demonstrates the importance of the study of scoliosis to the history of medicine.

Idiopathic Scoliosis: The Harms Study Group Treatment Guide, ed. Peter O. Newton et al. (New York: Thieme, 2011): Kindle edition.

II. THEORIES ON THE CAUSES OF SCOLIOSIS

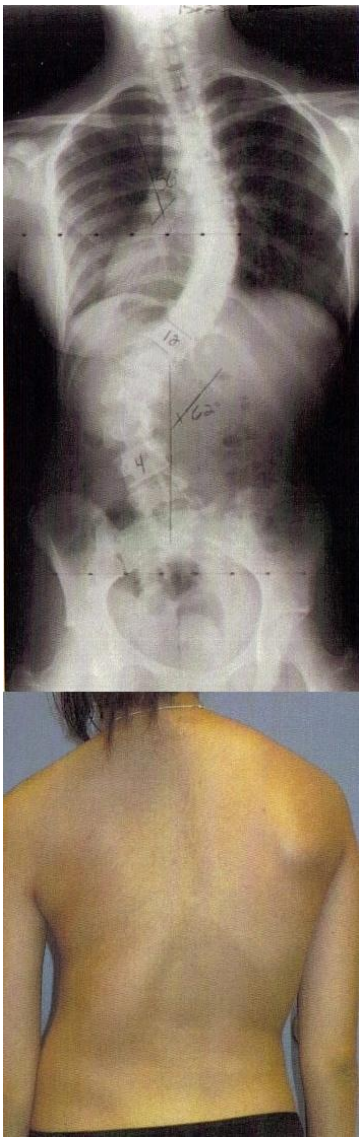

Figure 1: The author's pre-op x-ray and photograph, showing a scoliotic curve accompanied by deformity of the ribcage, shoulder blades, shoulders, pelvis, etc.

The Nature of Scoliosis

Scoliosis is an exceedingly complex disorder. In 1889, Bernard Roth defined lateral curvature of the spine as "a deformity due to lateral deviation and distortion of the spinal column, nearly always accompanied by more or less exaggeration or diminution of the normal antero-posterior curves."[12] Scoliosis was understood to be a progressive condition that caused side-to-side curvature of the spine, and as early as the 1860s, British practitioners recognized that the pattern of curvature seen in scoliosis was linked to rotation of the vertebrae.[13] Surgeons also noted that the condition affected more than just the vertebral column. Other parts of the skeleton could be compromised, resulting in rotation of the shoulder blades, deformity of the ribcage, tilting of the head, or obliquity of the shoulders and/or pelvis, the latter of which caused a disparity in leg length.

Skeletal deformity also often resulted in further complications. Bernard Brodhurst, an orthopedic surgeon who wrote extensively on spinal deformities, described in 1864 how in every severe form of lateral curvature, "the

[12] Bernard Roth, *The Treatment of Lateral Curvature of the Spine* (London: H. K. Lewis, 1889): 1.

[13] Bernard E. Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," *The British Medical Journal* 1, no. 161 (30 January 1864): 114.

viscera both of the thorax and the abdomen are compressed," and that "one is apt to wonder how, in numerous instances, the functions of respiration and circulation can be carried on; so great is the change from the normal condition."[14] Roth stated that even in cases of only mild deformity, a patient's health could be "affected in other ways: by indigestion, headache, shortness of breath, etc."[15] Victorian surgeons also noted that physical pain was one of the most common symptoms of scoliosis. As Roth put it, for many patients, life can "become almost unbearable on account of constant backache," and most cases "do suffer from backache at one period or another."[16]

The Victorians typically diagnosed scoliosis at the onset of puberty. Oftentimes, it was the patient's mother who would first notice the signs of curvature, while helping the young teen get dressed.[17] As a result, treatment to attempt to correct or halt the progression of curvature often began during adolescence. Although direct testimonies from Victorian teens are lacking, surgeons did occasionally publish case studies that provide rare glimpses into the experiences of patients, albeit as told through the lenses of their doctors. Some of the most detailed case studies can be found in the aforementioned 1889 monograph published by Roth. The names of the patients in these cases were kept anonymous, presumably to protect their identities, but Roth does provide details of their conditions and daily struggles with scoliosis. One patient, who was diagnosed at the age of fourteen, could not go for a walk or sit upright "for half an hour any time of the day"

[14] Bernard E. Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," *The British Medical Journal* 1, no. 163 (13 February 1864): 171.

[15] Bernard Roth, *The Treatment of Lateral Curvature of the Spine*, 4.

[16] Roth, *The Treatment of Lateral Curvature of the Spine*, 4.

[17] Roth, *The Treatment of Lateral Curvature of the Spine*, 4-5.

without bringing on severe backache.[18] The same patient was noted to be very thin and lacking in appetite. In another case, the father of a sixteen-year-old girl wrote to Roth after his daughter began treatment for her scoliosis. Roth quoted him as saying that his daughter's condition was finally improving, and that she "walks more uprightly, and does not become so easily fatigued" as she did before.[19] As these cases indicate, Victorian teenagers with scoliosis dealt with some degree of adversity, at least prior to treatment. In every case, the parents of the patients were said to have consulted with multiple surgeons and tried at least one other type of treatment before coming to Roth. For the caregivers of these adolescents, scoliosis must have been a frustrating and tragic disorder with which to grapple. Their best efforts to access medical care were often fruitless, and they were forced to watch their once able-bodied child become gradually more debilitated by the year.

The Early History of Scoliosis

British medical practitioners only began to gain a clearer understanding of scoliosis in the latter half of the nineteenth century, as research methods and medical practice overall advanced. Of course, as with many other conditions, various hypotheses had emerged about the nature of scoliosis prior to the Victorian era. The first written descriptions of scoliosis in Western medical literature are ascribed to Hippocrates, who made mention of various spinal deformities in the fifth century BCE, in his treatise "On Joints." Not only did he recognize the progressive nature of spinal curvature, its frequent onset during youth, and its impact on breathing and other bodily functions, but he also

[18] Roth, *The Treatment of Lateral Curvature of the Spine*, 33-6.

[19] Roth, *The Treatment of Lateral Curvature of the Spine*, 44-5.

proposed procedures of treatment via traction.[20] (Traction is still used in physical therapy for scoliosis in the present day, though with updated apparatuses.) Even though Hippocrates did make explicit mention of lateral curvature as distinct from other forms of spinal deformity, he attributed its cause primarily to tuberculosis of the spine.[21] In a few instances, Galen receives credit in medical literature for having coined the term "scoliosis," along with "kyphosis" and "lordosis."[22] Whether he did or not, the word does without question come from the Greek *skoliōsis*, meaning "a crookedness," which in turn is derived from *skolios*, meaning "curved" or "bent."[23]

Barber-surgeons and physicians from France and Switzerland (namely, Ambroise Paré, Nicolas Andry de Bois-Regard, François-Guillaume and Thomas Le Vacher, and Jean-André Venel) produced some noteworthy writings about spinal curvature and orthopedics from the sixteenth to eighteenth centuries.[24] However, the word "orthopaedy" was not adopted by English physicians and surgeons until 1843, following the

[20] Tuberculosis of the spine would later come to be known as Pott's disease, which is a separate condition altogether from scoliosis. See: Hippocrates, *Hippocrates: Vol. III*, trans. E. T. Withington, ed. T. E. Page et al., Loeb Classical Library (Cambridge, MA: Harvard University Press, 1928): 283-9.

[21] Hippocrates, *Hippocrates*, 283; Moen and Nachemson, "Treatment of Scoliosis," 2570, a modern account, claims that Hippocrates believed scoliosis to be primarily caused by poor posture. This is demonstrably inaccurate, since in his original texts he claimed posture to be only secondary to Pott's disease in causing lateral curvature of the spine. See: Hippocrates, *Hippocrates*, 283.

[22] Galen of Pergamon (129-210 CE) was a renowned Greek physician and surgeon of the Roman Empire, who wrote extensively on anatomy and medicine. Unfortunately, the perpetuation of the idea that he coined the term "scoliosis" would appear to be a case of modern authors (primarily medical practitioners writing for their fellows in the field, rather than by professional historians) basing their claims on other secondary sources without consulting Galen's original work. Despite following a number of arduous leads, I have not thus far been able to trace this claim back to its original source, nor have my searches through the texts of Galen proven fruitful in identifying any instance where he produces the term "scoliosis". See: Moen and Nachemson, "Treatment of Scoliosis," 2570; Dickson, "History of the Treatment of Scoliosis," Kindle edition.

[23] John H. Dirckx, ed., *Stedman's Medical Dictionary for the Health Professions and Nursing, Illustrated Seventh Edition* (Philadelphia: Lippincott Williams & Wilkins, 2012): 1507-8.

[24] Dickson, "History of the Treatment of Scoliosis," Kindle edition.

publications of William John Little's "The Art of Orthopaedy" and "Practical Orthopaedist." Up to that point, despite the fact that Nicolas Andry's treatise *L'orthopédie* had been published and translated into English a full century prior, English surgeons continued to speak of orthopedic disabilities in terms of 'distortions' or 'deformities' of the body.[25] This is not to suggest that pre-1843 British medical practitioners were not concerned with what we would now identify as orthopedic ailments, or even spinal deformities. Sir Percivall Pott, for instance, studied tuberculosis-induced spinal curvature in the late 1790s, which led to the condition being named for him: Pott's disease.[26] But it was only after the 1840s that serious and numerous theories about, and treatments of, scoliosis became widely discussed in the British medical community.

British Surgeons and Scoliosis

The medical field underwent significant changes throughout the nineteenth century in the United Kingdom. However, the medical profession remained organized on a very different set of principles than those prevailing in modern medicine. References to "medical practitioners" or "the medical profession" in the context of the Victorian era, despite being useful and convenient terms, are misleading and imply a false sense of

[25] John Kirkup, "Nicolas Andry et l'Orthopédie," *Histoire des Sciences Médicales* 28, no. 3 (1994): 208.

[26] [No Author Identified], "Pott's Paraplegia," *The British Medical Journal* 2, no. 5606 (15 June 1968): 638.

unity.[27] The profession was in fact defined by its separation of medical men into specialties: physicians, surgeons, and apothecaries.

The men who treated scoliosis very definitively spoke of themselves as surgeons. Such terminology may strike one as odd, considering that invasive 'surgery'—the core of a modern surgeon's work—was not practiced for the most part during the nineteenth century in cases of scoliosis. A handful of experimental invasive procedures *were* attempted by European surgeons for scoliosis, starting most notably in 1865 with Jules Guérin, a French surgeon who advanced the idea of treating lateral curvature with tenotomy (i.e. the surgical cutting of a tendon, inspired by Achillotenotomy for the treatment of club foot). However, the useless, often crippling, and sometimes even fatal nature of this procedure was exposed, culminating in one of the most famous orthopedic lawsuits in history: *Guérin vs. Malgaigne*.[28] The result was Guérin's banishment from the medical profession and his method being wholly discredited.[29] Following this debacle there were few surgical experiments worth noting, other than perhaps Richard Volkmann's rib osteotomy and resection, developed in 1889. Respectively, these procedures involved the cutting of the bone and removal of one or more of the ribs in cases of severe scoliosis-induced rib deformities.[30] For the most part, though, nineteenth-

[27] M. Jeanne Peterson, *The Medical Profession in Mid-Victorian London* (Berkeley, CA: University of California Press, 1978): 6.

[28] Louis Bauer, *Lectures on Orthopaedic Surgery* (New York: William Wood & Co., 1868): 149-50.

[29] Some of the criticism of Guérin and his technique in the decades following 1865 was quite biting: "The abandonment of tenotomy in lateral curvature by *that prince of tenotomists* [my italics], Jules Guerin [sic]…was an advance in the right direction." See: "The Treatment of Lateral Curvature of the Spine," in *The Medical News: A Weekly Medical Journal, Vol. 64*, ed. George M. Gould (Philadelphia: Lea Brothers & Co., 1894): 274-5.

[30] Leonard F. Peltier, *Orthopedics: A History and Iconography* (San Francisco: Norman Publishing, 1993): 211.

century surgeons across Europe were of the opinion that scoliosis did not need to be treated with the knife.[31]

So why then did British practitioners style themselves as "surgeons"? To answer this, we must go back to the issue of the medical profession being divided into separate fields of specialty that were entirely distinct from each other. These divisions were deeply-rooted in history. Physicians had for centuries been the sole practitioners of 'physic' (examining patients, producing diagnoses, and giving prescriptions—which apothecaries would then dispense), and were distinguished by their possession of university degrees.[32] This distinction set them apart from surgeons and apothecaries. These practitioners were trained in apprenticeship settings and did more "hands-on" work. They thus occupied a lower position on the professional hierarchy. The surgical craft was considered a form of "skilled manual labor," one requiring "speed, dexterity, and physical strength, as well as expertise," as noted by historian Jeanne Peterson.[33] Surgeons in London had been organized in a guild since the Middle Ages, and in 1540 formed the Barber-Surgeon's Company of the City of London. This organization existed until 1745, at which time the surgeons severed their connections with the barbers.

After the 1840s, the ranking of surgeons began to shift as specialized training emerged as a desired qualification. In 1843, English surgeons received a charter that established the Royal College of Surgeons of England and created the higher professional rank of "Membership" and, higher still, "Fellowship" for surgeons. The Royal College of

[31] Dickson, "History of the Treatment of Scoliosis," Kindle edition.

[32] Peterson, *The Medical Profession in Mid-Victorian London*, 5-7.

[33] Peterson, *The Medical Profession in Mid-Victorian London,* 9.

Surgeons transformed surgeons into a "legally defined group whose membership was controlled and whose occupational functions were defined"—thus disconnecting them from the guild tradition and elevating them closer to the status of the more esteemed College of Physicians.[34] Surgery also increasingly gained a more favorable reputation as a "true" science. After the 1840s, apprenticeship training became less common, replaced by university and hospital training in Oxbridge and London.[35] The surgeons whose works I utilize in this research were all Fellows of the Royal College of Surgeons and were thus held in higher esteem by their colleagues in the medical field.

Although our orthopedic surgeons clearly viewed themselves as men of science and frequently debated theoretical matters and research in regards to scoliosis, their work remained decidedly practical in nature. The treatment which most surgeons employed for scoliosis still involved skilled, hands-on work. Victorians recognized lateral curvature as a biomechanical deformity—a *condition* as opposed to a contagion. Consequently, even if no invasive operation was employed in its treatment, addressing scoliosis still required physical manipulation of the body. In addition, though surgery in the modern sense of the word was rarely, if ever, applied to cases of scoliosis, the same surgeons who wrote about it were often not specialists who solely treated spinal deformities. While their knives may have never been used to rectify lateral curvature, that does not mean they did not employ their surgical instruments elsewhere for conditions that did require invasive operations. Bernard Brodhurst, for example, was one of the most prolific writers in the *British Medical Journal* on the topic of lateral curvature. Yet he was originally trained in

[34] Peterson, *The Medical Profession in Mid-Victorian London,* 9.

[35] Peterson, *The Medical Profession in Mid-Victorian London,* 14-15.

ophthalmic, not spinal, surgery and wrote extensively on a number of different orthopedic and surgical matters other than scoliosis.[36]

Victorians' treatment of scoliosis reflects not only the diversified nature of orthopedic surgeons during the late nineteenth century, but also the development of the profession itself during that era. Orthopedic surgery underwent a revolution in the 1860s and 1870s with the advent of subcutaneous osteotomy, a technique for cutting bones under the skin that reduced the risk of blood poisoning. Invasive surgery in general saw tremendous growth during this time, mainly thanks to the development of Listerian antiseptics. But as historian Roger Cooter demonstrates in *Surgery and Society in Peace and War*, late Victorians did not necessarily consider antiseptic, invasive surgery as being solely responsible for the advancement of surgery as a whole. Conservative surgery, which relied on non-invasive manipulation of the body, was believed to require just as much skill as radical, invasive surgery. The medical community thus began to accept physiotherapeutic treatments of muscular-skeletal disorders like scoliosis, and this "conservative surgery" was celebrated as preserving the integrity of the body and sacrificing as little as possible to the scalpel.[37]

[36] [No Author Identified], "Biographical Entry: Brodhurst, Bernard Edward (1822-1900)," *Plarr's Lives of the Fellows* Online, The Royal College of Surgeons, accessed 25 February 2017, http://livesonline.rcseng.ac.uk/biogs/E000972b.htm.

[37] Cooter, *Surgery and Society in Peace and War*, 18-23.

Theories Concerning the Causes of Scoliosis

The Victorians had no proven or even generally accepted cause which they could point to as being responsible for spinal curvature. Nevertheless, individual surgeons and laypersons alike produced a plethora of theories on the matter, some of which were accorded more weight than others, depending on the audience in question. The accuracy of these theories is far less important than their social implications. Educators' attitudes regarding the health of both male and female adolescents, perceptions of the female body, as well as the tendency to dehumanize patients with spinal deformities all show the link between the construction of ideas about physical abnormality and broader societal attitudes.

Current medical knowledge recognizes a genetic component to scoliosis, though the particulars behind it are not understood in their entirety. While scoliosis can be a symptom of other diseases such as Marfan syndrome, neurofibromatosis, cerebral palsy, polio, and muscular dystrophy, in the vast majority (80-90%) of cases the condition is idiopathic, the precise cause remaining unknown.[38] Genetics as a discipline had not yet been developed in the nineteenth century, despite the fact that Gregor Mendel had published his findings on the subject in 1866. Victorian surgeons typically did not view heredity as being a vital causative agent of spinal curvature, although British medical practitioners considered its influence to some extent. Indeed, in his seven-part series titled "Lectures on Orthopaedic Surgery," published from 1863 to 1864 in the *BMJ*, Bernard

[38] Brooke Lyons et al., *Scoliosis: Ascending the Curve* (New York: M. Evans and Company, Inc., 1999): 286-7; De Smet, *Radiology of Spinal Curvature*, 3.

Brodhurst made a point of noting that scoliosis was "seldom hereditary."[39] In those instances, he concluded, it was usually "due to rachitis," (rickets, which in itself is not a disease of genetics but of malnutrition), "or to malformation of the spinal column itself, or to nervous irritation."[40] Inaccuracies aside, there was at least clearly some awareness that heredity could *potentially* be a contributing factor to lateral curvature. Even so, it was not a favorite contender in the debates—at least not until Bernard Roth made it so with a study in 1897 at the very end of the century.

If not heredity, then what did British surgeons argue was the major culprit behind scoliosis? While no true consensus developed amongst orthopedists, the most frequently-cited cause was pelvic obliquity. Lateral curvature commonly causes misalignment of the hips, which in turn can lead to a patient putting her weight on one leg most of the time while standing. However, observant surgeons in the Victorian period regarded this phenomenon and concluded not that it was a symptom of scoliosis, but in fact was the cause of it. Consequently, many orthopedists argued that a habit of favoring one leg over the other led to the spine producing a curve in order to compensate for the lack of equilibrium. Figure 2 shows Brodhurst's visual explanation of pelvic obliquity: if lines AB and CD represent the able-bodied spine and hips respectively, then line EF represents a case of misaligned hips. Thus the scoliotic spine, line GB, is thrown off-balance and attempts to realign itself with line AB by producing a curve. The drawing below the

[39] Bernard E. Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," *The British Medical Journal* 2, no. 155 (19 December 1863): 656.

[40] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (19 December 1863): 656.

diagram demonstrates how this would appear in an actual patient.[41] A number of surgeons adhered to the pelvic obliquity theory, the unbalanced-legs theory, and combinations thereof up to the very end of the century. Richard Barwell stood as the last major defender of pelvic obliquity in four separate articles published in 1897 and 1899 (although for mysterious reasons, he felt the need to coin a new term for pelvic obliquity several years prior in 1895, and exclusively referred to it as "pelvic amesiality" in his own work).[42]

[41] Bernard E. Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," *The British Medical Journal* 1, no. 157 (2 January 1864): 3-4.

[42] Fred Churchill, "Mechanical Distortions of the Spine," *The British Medical Journal* 1, no. 546 (17 June 1871): 638; "…does Dr. Drummond doubt that obliquity of the pelvis, from whatever cause occurring, may give rise to spinal curvature?" from E. Noble Smith, "The Cause of Lateral Curvature of the Spine," *The British Medical Journal* 2, no. 989 (13 December 1879): 938; Richard Barwell, "Certain Points in the Causation and Treatment of Spinal Curvature," *The British Medical Journal* 2, no. 1907 (17 July 1897): 132; see also: Richard Barwell, "Certain Points in the Causation and Treatment of Spinal Curvature. II," *The British Medical Journal* 2, no. 1910 (7 August 1897): 335-6; Richard Barwell, "On Lateral Curvature of the Spine: Its Prevention and Treatment. I," *The British Medical Journal* 1, no. 1986 (21 January 1899): 137-9; and Richard Barwell, "On Lateral Curvature of the Spine: Its Prevention and Treatment. II," *The British Medical Journal* 1, no. 1988 (4 February 1899): 265-8.

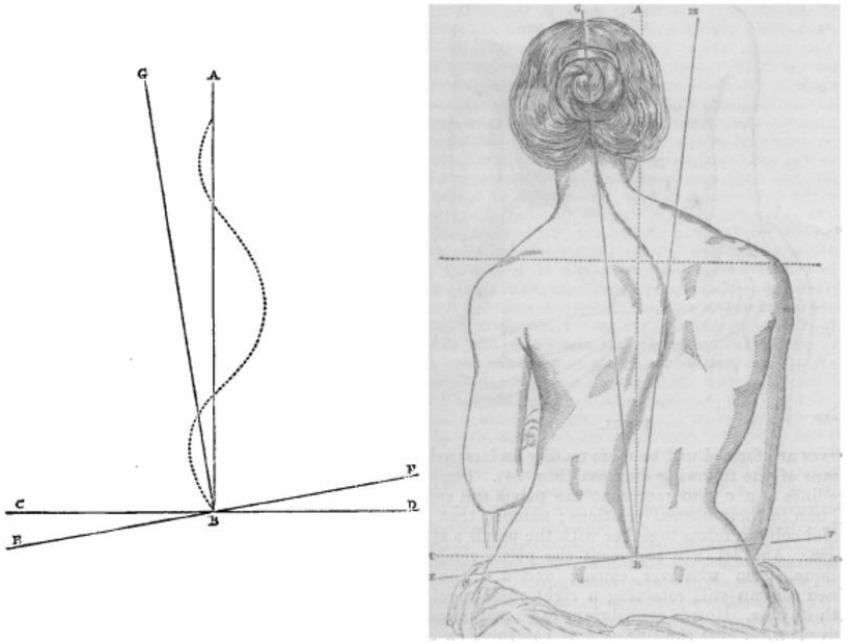

Figure 2: Brodhurst's representation of pelvic obliquity.[43]

The discussions within the *BMJ*, and some discussions without, contained other allusions to generative causes of lateral curvature. "Debility" and "feebleness" cropped up in relation to scoliosis, though almost always in conjunction with other conditions. "Debility alone," according to Brodhurst, would not cause curvature without "superadded bad habits of standing or sitting," and feebleness was not an inherent, autonomous condition, but one which was caused by "overgrowth" or "convalescence."[44] Additionally, certain occupations and lifestyle choices, when combined with debility or feebleness, were seen as rendering one particularly susceptible to spinal curvature. The constant wearing of stays (a type of corsetry which was in fashion for women throughout the century), for example, was attacked by some medical professionals and laypersons for

[43] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (2 January 1864): 3-4.

[44] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (19 December 1863): 656.

purportedly making the back muscles weak and atrophied, thus leading to deformity.[45] Even surgeons who did not directly accuse stays of causing scoliosis were careful to warn patients against wearing stays that were too confining, lest they further exacerbate the deformity. In Roth's 1889 monograph, he carefully outlines the type of clothing a female scoliosis patient should wear, and over half of the section is devoted to the subject of stays.[46] Some physicians likewise shared the concerns of surgeons over the potential harm caused by stays. In 1854, Scottish physician Andrew Combe argued that stays caused the muscles of young girls to become "enfeebled," which then resulted in spinal curvature.[47] Additionally, in publications not produced by medical professionals, considerable vitriol was leveled against contemporary fashion for the harmful effects it was perceived to have on adolescent girls. A marvelously biting example of such was Mrs. G.W.M. Reynolds' series of articles "The Evil Consequences of Tight Lacing" and "The Evils, Absurdity, and Monstrous Taste of Tight Stay-Lacing [Numbers II & III]" (the titles truly reveal all), wherein she expressed wonder that mothers and guardians failed to realize the deleterious effects of "confining their little victims in stays."[48] Throughout all three articles, Mrs. Reynolds, an essayist who was not employed in the medical field, steadfastly asserted in no uncertain terms that tightly-laced corsets were the chief cause of scoliosis in young girls. She concluded her first article of the series with a

[45] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (19 December 1863): 657; Helene E. Roberts, "The Exquisite Slave: The Role of Clothes in the Making of the Victorian Woman," *Signs* 2, no. 3 (1977): 560.

[46] Roth, *The Treatment of Lateral Curvature of the Spine*, 22-23.

[47] Andrew Combe, *The Principles of Physiology Applied to the Preservation of Health, and to the Improvement of Physical and Mental Education* (New York: Fowlers and Wells, 1854): 108-9.

[48] Mrs. G.W.M. Reynolds, "The Evil Consequences of Tight Lacing," *Reynold's Miscellany of Romance, General Literature, Science, and Art* 3, no. 74 (8 December 1849): 317.

derisive request for society at large: "If we wished to produce curved spine [sic], could we adopt a more scientific or certain plan?"[49]

Brodhurst speculated that certain occupations might contribute to the development of spinal deformity, particularly trades which required the use of one arm more than the other, as was the case with "tailors, shoemakers, compositors, dressmakers, embroiderers, needlewomen, and others."[50] Nurses, however, and particularly those who favored one arm over the other for carrying children, were in his view at the greatest risk for deformity (see: Figure 3).[51] Brodhurst was not alone in his belief that certain occupations could cause or exacerbate scoliosis: in 1871, Fred Churchill lamented that young girls who were "too early put out to service," before their bones had matured, were frequently the victims of spinal deformities.[52]

[49] Reynolds, "The Evil Consequences of Tight Lacing," 318; see also: Mrs. G.W.M. Reynolds, "The Evils, Absurdity, and Monstrous Taste of Tight Stay-Lacing, Number II," *Reynold's Miscellany of Romance, General Literature, Science, and Art* 10, no. 247 (8 December 1853): 136; and Mrs. G.W.M. Reynolds, "The Evils, Absurdity, and Monstrous Taste of Tight Stay-Lacing, Number III," *Reynold's Miscellany of Romance, General Literature, Science, and Art* 10, no. 246 (2 April 1853): 152.

[50] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (December 19, 1863): 657.

[51] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (December 19, 1863): 656-7.

[52] Churchill, "Mechanical Distortions of the Spine," 638; Such perceived risks for women in the workplace may also speak to the Victorian discourse on the "proper female sphere," and the increase of female activity outside of the home. See: Amanda Vickery, "Golden Age to Separate Spheres? A Review of the Categories and Chronology of English Women's History," *Historical Journal* 36, no. 2 (June 1993): 400.

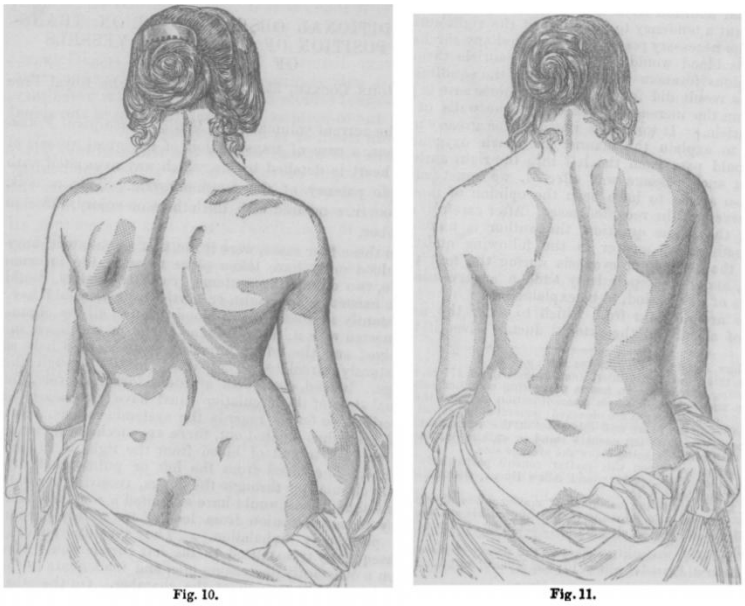

Figure 3: Two of Brodhurst's patients, both young nurses who habitually carried their charges on one arm.[53]

Similarly, the habits of students, particularly concerning their posture while writing, were commented upon by surgeons and schoolmasters alike. In 1872, a study conducted amongst 731 young scholars found that 218 of them bore "distortion," with girls representing "the great majority of cases of scoliosis."[54] In the absence of genetic studies, contemporaries were left to puzzle blindly over the reason why girls—and specifically adolescent girls—would be so much more affected than boys. The question of age especially generated suspicion toward classrooms: educators posited that students who were subjected to "faulty school benches" and adopted "bent attitudes during writing" over the course of their young academic career would be more vulnerable to spinal deformity than their peers who practiced "vertical writing" (i.e. sitting up straight).[55] Concern over posture was enough that one unnamed British author observed

[53] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (December 19, 1863): 656-7.

[54] [No Author Identified], "School Hygiene," *The British Medical Journal* 1, no. 594 (18 May 1872): 516.

[55] [No Author Identified], "Education Abroad," *The Practical Teacher* 16, no. 12 (June 1896): 682.

in 1884 in the *BMJ* that French teachers had taken to enforcing the use of elbow rests (*accoudoirs*), in order to compel their students to sit up straight.[56] Though the writer in question did not condone such measures, what remains clear is that the classroom environment was viewed as having a very real bearing on the physical well-being of students. In 1889, Roth stated that "sitting writing and reading with the trunk leaning to one side … or with the thighs crossed" was the most frequent initial cause of scoliosis and other types of spinal curvature, especially in individuals who already suffered "weakness of the spinal muscles."[57]

A certain logic existed here: because scoliosis was generally diagnosed around the onset of puberty, reason dictated (again, in the absence of genetic studies) that some behavior beginning in childhood would lead to the development of the deformity in the early years of adolescence. Because classrooms were sites where relatively large numbers of children congregated—amassing in one place a larger number of scoliosis cases than adults would regularly observe elsewhere—schools may have artificially created the impression that there was a link between classrooms and curvature.

Whether or not this was the case, contemporaries recognized that educators *did* indeed have more access to emerging scoliosis cases than perhaps anyone else in the population. Thanks to Britain's introduction of compulsory education in 1880, the classroom became a veritable "laboratory" in which medical and psychological theories

[56] [No Author Identified], "Crossing the Legs, and the Mode of Sitting," *The British Medical Journal* 1, No. 1219 (10 May 1884): 914.

[57] Roth, *The Treatment of Lateral Curvature of the Spine,* 1; note that Roth's opinion on the cause of scoliosis was fluid throughout his career.

could be tested and implemented, and orthopedic interests were no exception.[58] During the sixty-fifth annual meeting of the British Medical Association, an international affair hosted in 1897 in Montreal, one surgeon from New York brought up the crucial importance of diagnosing scoliosis in the earliest stages of its development. Towards this end, he proposed that "systematic examinations of young persons' backs" should be performed in schools, where the largest number of cases could be identified at a given time.[59] After the genesis of this idea in the late 1800s, school screenings for scoliosis gradually become standard practice in twentieth-century British and American schools, though not without ongoing controversy in both countries over the cost-effectiveness of such programs.[60]

Questions about age of onset and early detection clearly were indicators for how Victorians constructed their notions of scoliosis. At the same time, nineteenth-century observers used the language of gender to discuss the condition. More went into their connection of the disease than just the fact that they diagnosed more adolescent girls than boys with the condition. Indeed, they constructed scoliosis as a 'gendered' condition.

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[58] Cooter, *Surgery and Society in Peace and War*, 53.

[59] R. Tait McKenzie, "Accurate Measurement of Spinal Curvatures, with Description of a New Instrument for the Purpose," *The British Medical Journal* 2, no. 1919 (9 October 1897): 961; [No Author Identified], "Sixty-Fifth Annual Meeting of the British Medical Association," *The British Medical Journal* 2, no. 1916 (18 September 1897): 711; and [No Author Identified], "The Sections: Surgery," *The British Medical Journal* 2, no. 1916 (18 September 1897): 722. The surgeon in question who proposed the idea of school screenings was only referred to as "Dr. Ketch" of New York. This could very well have been Samuel Ketch, a reputed American orthopedic surgeon of this time period, but the sources are not clear on the matter. See: [No Author Identified], "Obituary Notes," in *Medical Record: A Weekly Journal of Medicine and Surgery, Volume 56*, ed. George F. Shrady (New York: William Wood and Company, 1899): 938.

[60] Junainah Sabirin, "School Scoliosis Screening Programme: A Systematic Review," *Medical Journal of Malaysia* 65, no. 4 (December 2010): 261; Geoffrey Burwell, "The British Decision and Subsequent Events," *Spine* 13, no. 10 (October 1988): 1192; and Linker, "A Dangerous Curve," 606.

Some of the discussions which revealed attitudes about gender and scoliosis focused on physical activity. Those who believed that curvature was caused by poor posture in school also theorized that girls—and particularly middle- and upper-class girls—were more susceptible to deformity because they were not as physically active outside of the classroom as boys. Such thinking may have also reflected larger contemporary anxieties about the education of women. For those opposed to female participation in the classroom, scoliosis would have served as "evidence" as to why education was harmful for girls.[61] As late as 1896, educators argued that girls, "with their more impressionable bodily structure," were "given less chance of healthy exercise and development than their brothers," and consequently were unable to offset the negative impacts of poor posture.[62] The earliest instance of this argument appearing in the *BMJ*, though, was in 1872. An anonymous author, his arguments purportedly borrowed from the great German physician Rudolf Virchow, made the case that whereas boys regularly engaged in vigorous exercise that employed "nearly all the muscles of the body," thus compensating for bad studying posture, girls did "not practise any kind of gymnastics."[63] Roth concurred in 1889 that "the much larger proportion of girls than boys affected [by lateral curvature] is due to the fact that girls do not enjoy, as a rule, one-fourth of the usual amount of physical exercise … allowed to boys."[64] Orthopedists were clearly concerned about the threat of inactivity to physical health.

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[61] Steele, *The Corset*, 78.

[62] [No Author Identified], "Education Abroad," 682.

[63] [No Author Identified], "School Hygiene," 516.

[64] Roth, *The Treatment of Lateral Curvature of the Spine*, 1-2.

The 1860s and 1870s saw the beginnings of a change in attitude towards the female body. As the phrase *mens sana in corpore sano*—a healthy mind in a healthy body—became a truism for gentlemen of the Victorian era, so too were sports increasingly embraced for women.[65] Leisure activities were a visible component of middle-class Victorian life during the latter half of the nineteenth century, and sports in particular commanded a significant place in British society.[66] Though competitive and team-based sports were considered inappropriately "masculine" and therefore unsuitable for female participation, middle- and upper-class women nonetheless joined in the fervor for physical fitness and became active participants in more "genteel" sports, such as croquet, archery, yachting, fox-hunting, riding, and swimming.[67] Despite the reservations that many conservatives (including physicians) maintained over the appropriateness and safety of women's participation in sports, the numerous books, pamphlets, and magazines published during this time on the subjects of health, diet, exercise, and sports for middle-class women demonstrate a growing public acceptance of female physical fitness.[68]

In this atmosphere of increased enthusiasm for exercise, surgeons grappling with scoliosis adopted the pro-physical health zeitgeist and prescribed exercises that gained

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[65] Claire Parker, "Swimming: The 'Ideal' Sport for Nineteenth-Century British Women," *The International Journal of the History of Sport* 27, no. 4 (March 2010): 678; and Tony Mason, "Sport," in *Victorian Periodicals and Victorian Society* (Toronto: University of Toronto Press, 1994): 292.

[66] Mason, "Sport," 292; Allen Guttmann, a prolific scholar of sports history, even went so far as to assert that in their enthusiasm for athletics, the English "can be said to have invented modern sports." See: Allen Guttmann, "'Made in England': The Invention of Modern Sports," in *Sports* (Amherst, MA: University of Massachusetts Press, 2004): 69.

[67] Parker, "Swimming: The 'Ideal' Sport for Nineteenth-Century British Women," 678-9; Hunt, "Women and Sport in Victorian Westmeath," 30; Precious McKenzie-Stearns, "Venturesome Women: Nineteenth-Century British Women Travel Writers and Sport" (PhD. diss, University of South Florida, 2007): 7.

[68] Parker, "Swimming: The 'Ideal' Sport for Nineteenth-Century British Women," 678.

considerable sway as a method for treating spinal curvature. As a result, the implementation of a specialized exercise regimen, and the efficacy thereof, was a core component of the discourse on scoliosis in the late nineteenth-century.[69] This conclusion was perhaps only possible in the context of an era which embraced two concurrent societal trends: increasing female attendance in schools and encouraging female physical fitness. The former prompted the theory that poor posture in school was a contributing factor to scoliosis, and that female students were not getting enough exercise vis-à-vis their male peers. The latter trend encouraged contemporaries to consider exercise as a viable—and even desirable—solution for young women afflicted with scoliosis. Somewhat ironically then, the late nineteenth-century's burgeoning rejection of the "ideology of female bodily incapacity" allowed those girls who *did* bear actual physical incapacities because of spinal deformity to have their scoliosis treated with physical exercises.[70] This nineteenth-century shift in attitudes towards the female body is no small matter for historical considerations of scoliosis treatment. Physical therapy (PT) and physiotherapeutic scoliosis-specific exercises (PSSE), often in conjunction with bracing, developed from the late nineteenth century onwards into one of the most well-known (if not always efficacious) "conservative" means of addressing lateral curvature of the spine, particularly in cases where the patient hoped to avoid surgery.[71]

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[69] Hippocrates, *Hippocrates*, 283.

[70] Parker, "Swimming: The 'Ideal' Sport for Nineteenth-Century British Women," 677-8.

[71] True correction with PT and PSSE is not possible in every case of scoliosis, as some cases will progress no matter what efforts (short of surgical correction) the patient takes to prevent it. The current debate over the efficacy of exercise and bracing versus surgery is far too complex to explore within the confines of this paper, but the reader should be aware that such a debate exists and that while exercise is a well-known option for scoliosis patients, it is *not* always or even usually effective in stopping progression of moderate to severe scoliosis cases. See: Hans-Rudolf Weiss and Axel Maier-Hennes, "Specific Exercises in the

In addition to this gender dynamic, my analysis of the nineteenth-century theories of the causes of scoliosis reveals a universal assumption that the 'victim' of scoliosis was somehow responsible for her or his condition. In each of the dominant theories put forward by surgeons and other contemporaries, certain behaviors or lifestyle choices were seen as leading to the deformity. Consequently, they contain an implicit suggestion that the condition could have been avoided had the patient, especially girls, simply acted differently. This is not to say that Victorian surgeons actively condemned their patients for their circumstances—after all, we do not have a direct account of their exchanges—but they certainly implied that the problem would not exist if not for the "fact" that the patient maintained poor posture while sitting or standing, wore certain clothes, chose an occupation which required the use of one arm over the other, or failed to exercise properly. Necessarily, this assumption put the onus for having developed the deformity on the patient herself (or her parents, or societal values at large, as was explicitly demonstrated in the aforementioned Reynolds articles).

Modern awareness of the genetic component to scoliosis and the patient's inability to prevent the deformity might lead to accusations that Victorians were eager to blame the victim. However, given the lack of available resources and technology, Victorians may have merely adopted what appeared to them to be the most logical explanations for a complicated and enigmatic disorder. But still, Victorian adolescent patients were almost certainly affected by these attitudes. Unfortunately, in lieu of direct testimonies from Victorian teenagers, we can only speculate regarding their exact emotional reactions to these assumptions. Studies of recent cases of victim-blaming (if

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Treatment of Scoliosis—Differential Indication," in *The Conservative Scoliosis Treatment* (Amsterdam: IOS Press, 2008): 173-176.

we may borrow the term for this situation) suggest that it is practiced out of the need to believe in a "just" or "controllable" world, and that "the apparent inevitability of events when viewed with hindsight may result, in large part, from the individual's tendency to seek antecedent causes for the event."[72] (For instance: a patient has a deformed spine and is not sitting upright. Ergo, the patient must have a deformed spine *because* they have not been sitting upright.) As a result of such disapproving reactions, victims suffered not only the physical and emotional repercussions of the victimizing event or condition, but also from the insinuation, implicit or explicit, that they themselves were responsible for their fate.[73] It is possible that Victorian patients experienced something similar.

Additionally, with the advent of evolutionary theory and eugenics during the nineteenth century, posture became linked with the very notion of what it meant to be human. Adherents to this school of thought reasoned that what made human beings "special," as compared to other animals, was mankind's ability to walk upright. Subsequently, an entire sub-specialty emerged within the pro-eugenics camp of the medical profession that "defined the healthy body and treated the ill body based on notions of acceptable posture," and viewed poor posture as representing not only physical pathology but also moral degeneration.[74]

From its inception, the profession of orthopedics was imbued with ambiguous social implications. Unlike other medical specializations, which acquired their names

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[72] Ronnie Janoff-Bulman, Christine Timko, and Linda L. Carli, "Cognitive Biases in Blaming the Victim," *Journal of Experiential Social Psychology* 21 (1985): 162-3.

[73]Janoff-Bulman, "Cognitive Biases in Blaming the Victim," 161-2.

[74] Sander L. Gilman, "'Stand Up Straight': Notes Toward a History of Posture," *Journal of Medical Humanities* 35 (2014): 66.

after practitioners recognized their shared interests, orthopedics was not widely practiced until *after* the term "orthopaedia" itself was invented. The meaning and implications of the term, therefore, was open to interpretation as the profession developed throughout the late eighteenth and nineteenth centuries. When Nicholas Andry first coined the word "orthopaedia," a combination of the Greek words for "straightening" and "child," his philosophy was concerned with more than just the medical practice of straightening bones. Orthopedics was also seen as encompassing the power of education, for it involved not only the straightening of the physical body, but also of impressionable young minds.[75] There is no explicit indication that orthopedic surgeons writing for the *BMJ* subscribed to this way of thinking or to eugenics, but the same surgeons made no great effort to debunk such ideas, either. Professional and popular attitudes about the moral implications of physical deformity may easily have affected the way that surgeons thought about scoliosis and their patients.

That such thinking permeated circles of society outside of the medical profession is demonstrated by H. G. Wells's *The Island of Doctor Moreau* (1896). H. G. Wells was a prolific and popular author of science fiction, well-known during his time for novels such as *The Invisible Man* (1897) and *The War of the Worlds* (1898). Wells had some background in the sciences, which informed the subject matter of his works. As a teen, he was apprentice to a chemist, which rewarded him with a scholarship to the Royal College of Science in South Kensington, where he studied for three years. Before *Moreau,* he

[75] Cooter, *Surgery and Society in Peace and War*, 11-13.

published four other books, including an amateur textbook on biology.[76] Wells was certainly not a professional scientist or medical practitioner, but his works and their popularity reflect the late nineteenth-century popular fascination with science. *Moreau* in particular provides insight into the nineteenth-century popular connection between "erect posture" and "humanness." In the narrative, experimentations are performed which merge humans with animals, creating "Things" which are described in decidedly bestial, primitive, and uncannily non-human terms. These "Things" are subhuman, creatures which lack the erect posture "that defines what is imagined to be the civilized being."[77] Critical reception to *Moreau* was decidedly more negative than had been the case with Wells's previous publications. Many readers were so intensely disgusted by *Moreau*'s creatures that the book could not even be appreciated for its literary merits.[78] One critic noted that some of his fellow readers called the book "revolting," and although his own reaction was more subdued, he nevertheless described Wells's creatures as "half-human monsters" that were "horrid semblances of humanity."[79] The repulsion which readers felt was in reaction to Wells's subhuman creatures and the processes which created them, and in the book, compromised posture was one of the distinct manifestations of their non-humanness. Wells was surprised by the profoundly negative reviews received by *Moreau*, and in some cases he responded to the book's detractors. In one such correspondence, he

[76] Bernard Bergonzi, *The Early H.G. Wells: A Study of the Scientific Romances* (Toronto: University of Toronto Press, 1961): 23-4.

[77] Gilman, "'Stand Up Straight'," 68; and Herbert George Wells, *The Island of Dr. Moreau* (Garden City, NY: Garden City Publishing Company, 1896): 69-71.

[78] Bergonzi, *The Early H.G. Wells*, 97.

[79] Richard le Gallienne, "Wanderings in Bookland," in *The Idler, vol. 9*, ed. Jerome K. Jerome (London: Chatto & Windus, 1896):724.

refuted an accusation that a grafting procedure described in *Moreau* was unrealistic by citing the *British Medical Journal* as his source of information.[80] Wells revealed himself to not only be a reader of the *BMJ*, but also that the journal informed his widely-read writings. So again, while orthopedic surgeons writing for the *BMJ* did not themselves construct dehumanizing ideas about spinal abnormalities, their publications were utilized by influential writers who did.

Perhaps in connection with the rise of eugenics, towards the very end of the century there was a new awareness among some surgeons that heredity was, in fact, a salient factor in spinal deformity. Roth, one of the leading specialists on lateral curvature, produced two very telling studies in 1885 and 1897. The first was a survey of two-hundred cases of scoliosis, complete with very detailed tables, while the second was an analysis of one-thousand cases (sadly without tables, though still highly informative).[81] In the second study he concluded that while in 231 cases, "no assignable cause of the deformity could be found," in the remaining 769 cases, 297 were hereditary.[82] 297 out of 769 may not seem a particularly overwhelming ratio, considering that another 203 were attributed "to rapid growth", 176 to delicacy, and the remainder to a veritable hodgepodge of maladies, including being born in the tropics, violin-playing, being a twin,

[80] H. G. Wells, "Correspondance: 'The Island of Doctor Moreau'," *The Sunday Review*, 7 November 1896, 497.

[81] These tables included the patients' name, sex, age at the onset of deformity, causes of deformity, description of curvature, degree of pain, previous treatment, the duration and result of Roth's treatment, and who referred the patient to Roth. See: Bernard Roth, "Two Hundred Consecutive Cases of Lateral Curvature of the Spine Treated Without Mechanical Supports," *The British Medical Journal* 2, no. 1296 (31 October 1885): 820-3.

[82] Bernard Roth, "Analysis of 1,000 Cases of Lateral Curvature of the Spine. Treated by 'Posture and Exercise' Exclusively (Without Mechanical Supports)," *The British Medical Journal* 2, no. 1919 (9 October 1897): 958-9.

or being over six feet tall. In some cases, he must have judged that more than one cause was responsible for the condition, as the numbers he provided do not add up to a neat one thousand.[83] However, the fact that heredity accounted for more cases than any other single cause (including those which could not be attributed to any 'known' cause) was a remarkable conclusion, considering that thirty-four years prior Bernard Brodhurst had insisted that scoliosis was rarely ever an inherited disorder. The professional medical understanding of lateral curvature was clearly beginning to shift.

[83] Roth, "Analysis of 1,000 Cases of Lateral Curvature," (9 October 1897): 958-9.

III. VICTORIAN TREATMENTS OF SCOLIOSIS

The treatment of scoliosis was a hotly-debated issue amongst Victorian orthopedists. While they observed that some cases of spinal curvature could be arrested and even corrected, there was an enormous degree of dissent on which program of treatment was the safest, most efficacious, and most likely to encourage compliance from patients. Contemporary writers created categories into which all methods of treatment could be neatly sorted, and individual surgeons typically favored the methods of one category over the others. For this reason, I unpack the complicated debates of this era by describing surgeons as belonging to three different "camps," with each camp representing the methodologies and theories of one category of treatment.

This chapter examines the rise and fall in popularity of different camps in different decades, the arguments that surgeons in each camp used against their rivals, and the reasoning of each camp for extolling their respective treatments. To present the arguments of these three camps, I will utilize writings of a number of orthopedists and other contemporary authors, especially those by and about Henry Bigg, Lewis Sayre, and Bernard Roth. Each man represented the views of one of the three different camps, and the latter two in particular were highly-regarded authorities in their respective camps. In examining the publications of orthopedists regarding the treatment of scoliosis, I argue that the Victorian medical profession and society's attitude toward the treatment of scoliosis continued to rely on the link between the condition and women and all that such a link implied, as described in Chapter I. Although scoliosis was not an exclusively female condition, it was overwhelmingly considered as such, and the implications of the connections between scoliosis and women influenced the attitudes of the surgeons and

the female response to medical opinion and practice. Specifically matters pertaining to female fashion choices and female participation in sports strongly influenced the development of scoliosis treatments and women's sometimes forceful insistence that they play a role in determining the nature of their treatment.

One of the major ways which surgeons attempted to treat scoliosis was by fitting the patient with a spinal brace, which promoted healthier posture and corrected spinal curvature. Because braces had to be worn throughout the day, patients tended to prefer those braces which most closely resembled their regular clothing. Contemporary trends in corsetry thus strongly impacted brace designs, as female patients tended to reject braces which showed through clothing or otherwise were too aesthetically unappealing. This pitted them against medical practitioners who believed that tight-lacing was harmful to female health. Medical literature reveals that surgeons bore an often dismissive attitude towards their female patients, and in turn, women's responses to medical practitioners demonstrate their insistence that their interests and concerns be taken seriously. Between the 1870s and early 1880s, detractors of corsetry lost out to consumer demand when the most popular braces ultimately began mimicking corsetry, demonstrating that women were unwilling to let medical practitioners bully them into altering their lifestyle choices. Furthermore, during the late 1880s and the 1890s, the increasing participation of upper- and middle-class women in sports had the effect of swaying the medical profession's preference in scoliosis treatment towards exercise-based methodologies. Additionally towards the end of the century, some practitioners adapted concepts from evolutionary theory to scoliotic patients and the treatment of scoliosis. Consequently, lateral curvature

became involved in a larger, late-nineteenth century tendency to use science and Darwinism to reinforce cultural beliefs about female weakness and inferiority.

The "Camps" of Surgeons

By and large, Victorian surgeons preferred non-invasive methods for treating scoliosis, which they sorted into two distinct categories. The names that they used throughout the century for these categories were: 1) the "Mechanical Treatment," involving the use of specialized instruments which shaped the spine into a straighter position; and 2) the "Constitutional Treatment," which focused on the strengthening of the body as a whole via exercise and "healthy" lifestyle choices.[84] Each category contained a number of different methods of treatment, but surgeons viewed all methods as definitively belonging to either one category or the other. Some practitioners supported one category to the total exclusion of the other. These writers defended their chosen category and criticized its opposite with almost religious zeal. However, other surgeons embraced both mechanical *and* constitutional treatments. Such an approach was not given a specific name by contemporaries, and was not quite as controversial as a purely mechanical or constitutional stance. Therefore, it did not feature as strongly in debates and receives slightly less discussion in my own analysis. Nevertheless, those practitioners who did combine treatments from both categories adamantly defended the benefits of such an approach, and resented being mistaken by their peers as only supporting one of the two categories. As such, I feel it necessary to identify their position as a third option altogether, which I have labeled the integrative approach. In order to understand why

[84] Bernard E. Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," *The British Medical Journal* 1, no. 163 (13 February, 1864): 172; and Bernard E. Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," *The British Medical Journal* 1, no. 166 (5 March 1864): 253.

arguments over scoliosis became so heated, and what deeper implications may be gleaned from them, one must understand precisely what these surgeons were arguing about. Therefore, the following sections are devoted to unwrapping the methods, beliefs, and development over time of what I will refer to as the mechanical, constitutional, and integrative "camps" of surgeons.

The Mechanical Camp

The mechanical treatment of scoliosis relied on instruments which were designed to correct posture and shape the skeleton back into a healthy position. The oldest of these instruments were large, stationary devices, affixed to couches, chairs, or other frames, and intended to be used for only a few hours at a time.[85] Patients would be strapped or otherwise secured to these instruments, and would lie in either a prone or recumbent position, passively allowing the instrument to push, pull, or twist their body in order to counteract the spinal curvature. Many instruments also suspended the patient or parts of their body in some way, in order to incorporate the effects of traction upon the vertebrae. Manuals on orthopedics published during the nineteenth century credited Hippocrates for describing the earliest known uses of both traction and stationary spinal instruments in the treatment of lateral curvature. However, the methods and instruments used in antiquity up to the sixteenth century were deemed "barbarous" by Victorians, for they involved the use of succession (violently shaking the body through acute physical shock,

[85] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (5 March 1864): 253.

as seen on the left in figure 4) and "forcible extension of the spine" (as seen on the right in figure 4).[86]

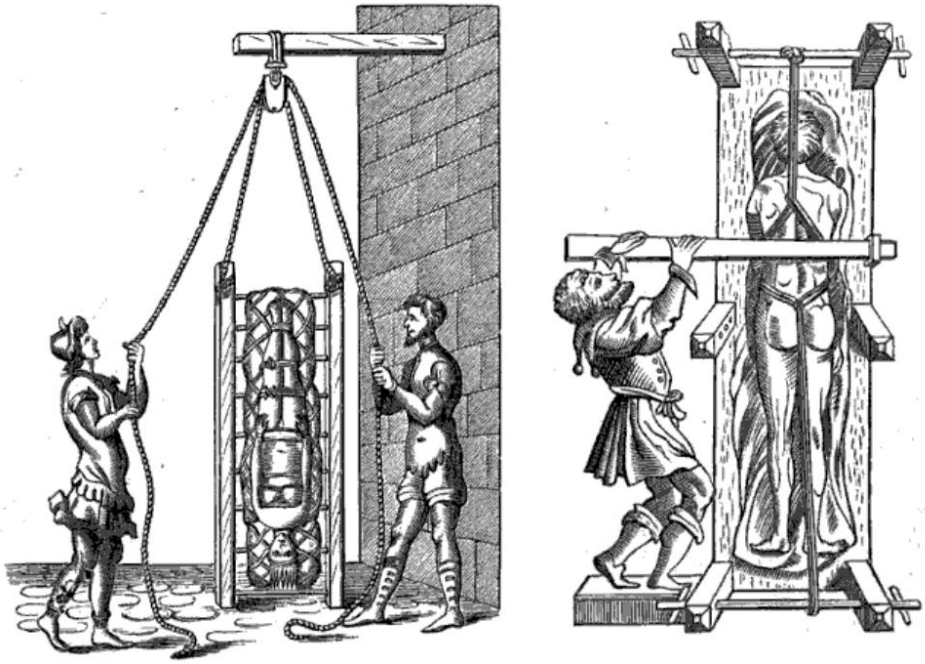

Figure 4: Illustrations of early devices used to treat scoliosis, based on Hippocratic texts.[87]

Victorian surgeons took a gentler approach with their instruments, though there were still numerous examples of devices that garnered criticism for being dangerous to the patient. Henry Bigg, for example, published some of the most illuminating manuals on the treatment of scoliosis. He was a respected authority on orthopedics and held a number of titles and honors, not the least of which was serving as the official "anatomical mechanist" for both the queen and prince of Wales.[88] As a proponent of mechanical treatment, his publications contained some of the best illustrations and explanations of

[86] Henry Heather Bigg, *The Gentle Treatment of Spinal Curvature* (London: J. & A. Churchill, 1875): 1-4.

[87] Henry Heather Bigg, *An Essay on the General Principles of the Treatment of Spinal Curvatures* (London: J. & A. Churchill, 1905): 15-6.

[88] Henry Heather Bigg, *Orthopraxy: The Mechanical Treatment of Deformities, Debilities, and Deficiencies of the Human Frame, A Manual* (London: John Churchill and Sons, 1865): iii.

the benefits of spinal instruments. However, loyalty did not prevent him from critiquing some instrument designs as harmful, even if they were favored by surgeons in his camp. Figure 5 shows a sample of stationary spinal instruments which he judged useful for various reasons, along with his own instrument design, which he believed combined all the best virtues of the others. Figure 6, on the other hand, shows an instrument used by a surgeon whom Bigg identified as a "late Mr. Lonsdale," whose followers believed that only one spinal curve typically existed in cases of scoliosis. Accordingly, his instrument was designed to focus entirely on the thoracic region, ignoring any lumbar curvature. Bigg claimed that the result of using such a device was an "evil of considerable magnitude, namely, a tendency of the ribs to rotate around their vertebral axes, and thus obliterate the natural curves of the spine."[89] Bigg's observation was an early example of surgeons realizing that pushing and pulling indiscriminately on the scoliotic spine did not always produce the desired results, and in fact could be quite dangerous.

Faulty use of spinal instruments could have grave consequences for patients, which was a point of concern for those in the mechanical camp, and a major source of criticism for those outside it. Even Brodhurst, who was an advocate of the integrative approach to treating scoliosis, noted that "nothing has been more abused than the mechanical treatment of spinal curvature."[90] He complained that too many orthopedists indiscriminately applied the same instruments to every case, which created misconceptions about the curability of scoliosis. He argued that scoliosis was far more

[89] Bigg, *Orthopraxy*, 283-7,

[90] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (5 March 1864): 254.

treatable than many believed, if only orthopedists paid greater attention to the nuances of individual cases, and prescribed treatment accordingly.

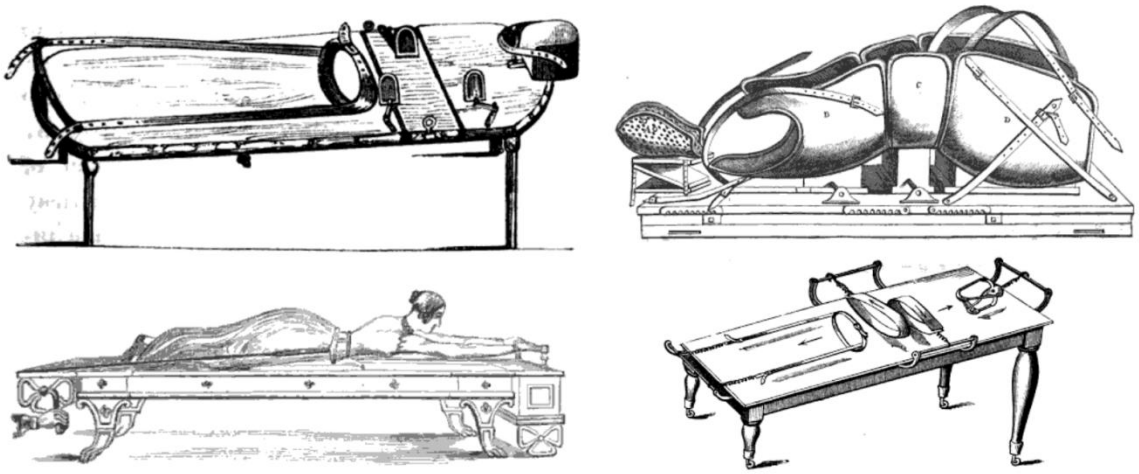

Figure 5: Stationary spinal instruments, including Bigg's own design (bottom-right)[91]

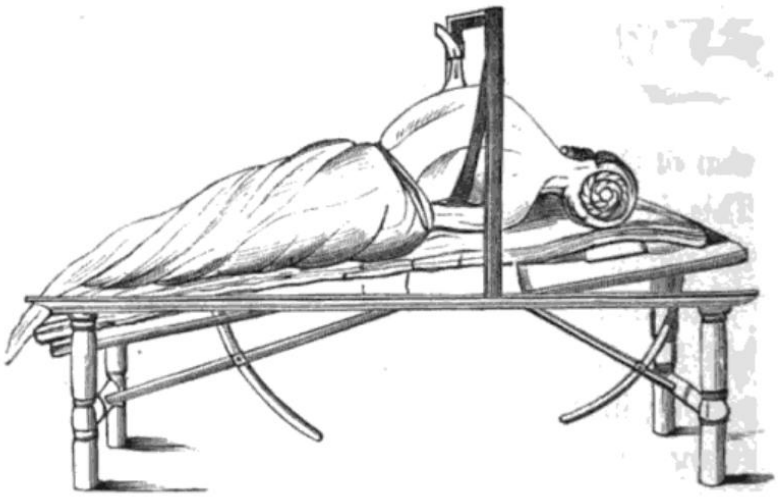

Figure 6: The instrument used by Lonsdale and his followers[92]

[91] Bigg, *Orthopraxy*, 279-87.

[92] Bigg, *Orthopraxy*, 284.

Bracing

Although disagreements did arise between surgeons over stationary spinal instruments, they were never as controversial or as frequently-discussed as portable spinal instruments. A patient was only expected to use a stationary instrument for several hours at a time, whereas a portable instrument was one that could be worn on the body for long stretches of time—even for months without being removed. The number of different designs for portable instruments exploded during the nineteenth century, and they became a focal point for surgeons in their battle over which was the superior method of treatment for lateral curvature. Many of the debates between the different camps revolved around the issue of whether or not portable instruments were efficient and ethical to use. The reason why surgeons in the constitutional camp did not support an integrative approach was because they found portable instruments to not only be ineffective for treating scoliosis, but often detrimental for the patient to wear. Regardless of what aspect of portable instruments they criticized, the fact remained that their arguments in support of their own camp during the 1870s and early 1880s nearly always hinged upon the premise that portable instruments were wrong in some way and therefore constitutional treatment methods were preferable. Even those who supported the integrative approach often made a point of noting that mechanical instruments were best used in moderation and could be dangerous if not supplemented with constitutional treatments.

The theory and history behind the design of portable instruments reveals much about the arguments revolving around them. For the sake of convenience and clarity, I will refer to portable spinal instruments as “braces” and their application by medical

practitioners as "bracing."[93] The functions of a brace depended on the needs of a given case, and the beliefs of the surgeon prescribing the brace. In theory, a brace could hold the patient upright, push or pull on the apexes of curves (or other protruding or misaligned parts of the torso) to gradually force the spine into a straighter position, help the patient maintain better sitting or standing posture, provide support to weak muscles, alleviate breathing problems, and/or relieve pain. Braces tended to be prescribed to patients who had not yet reached full skeletal maturity. By the 1870s, surgeons observed that lateral curvature typically began to present itself in early adolescence. They argued that this was the best period of time to arrest and correct deformity, "for during the period of adolescence the recuperative powers are so active, and the frame so yielding to external influences, that the restoration of perfect symmetry may be hoped for even in bad cases of spinal deformity."[94]

By the mid-nineteenth century, bracing was the method chiefly relied upon for the treatment of spinal curvature.[95] This was due in part to bracing's long history. Since the 1500s, and possibly earlier, metal braces had been used to support those with spinal deformities, including scoliosis. One of the earliest-known illustrations of a spinal brace was included in the famous sixteenth-century surgeon Ambroise Paré's *Oeuvres*. Paré's brace (figure 7) was made from iron, and had holes bored into it in order to reduce its

[93] One should note though that nineteenth-century surgeons used a number of different terms to discuss braces and the practice of bracing. Certain terms came in and out of vogue over the course of the century, and surgeons sometimes used a variety of expressions to refer to the one brace design. Examples of terms include: cuirasses, corsets, braces, jackets, instruments, supports, devices, and appliances.

[94] Bigg, *The Gentle Treatment of Spinal Curvature*, 37.

[95] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (5 March 1864): 253.

weight for the wearer.[96] He called his brace a "corcelet," which might imply that its design was modeled after armor, specifically the combination of a breastplate and backpiece. However, "corcelet" (as well as "corset" and "corcelette," all diminutives of the root word *cors/corps*) referred to both armor and tightly-fitted bodices for both sexes, the latter of which had come into fashion in Western Europe during this era.[97] In fact, a common belief, which perpetuated well into the late nineteenth century, held that Catherine de Medici introduced metal corsets into France for the purpose of enforcing extremely narrow waists among her female contemporaries.[98] Modern scholars of fashion history believe that it was actually the proliferation of metal orthopedic braces such as Paré's which inspired this myth.[99] Ironically, Paré himself believed (much like some later writers, including Roth, Combe, and Reynolds, who were mentioned in chapter one) that the contemporary rise of corsetry was much to blame for scoliosis: he theorized that it was mainly young girls whose spines became "arched or in the figure of an S," because their bodies were "softer." Such malleable bodies were too often "restrained and overly-tightened" by corsets, to the point that it produced deformity.[100] Yet Paré's brace design and its successors so closely resembled corsetry themselves that, by the nineteenth

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[96] Ambroise Paré, "Le Vingttroisiesme livre, traictant des moyens & arfifices d'adiouster ce qui defaut naturellement ou par accident," in *Les Oeuvres d'Ambroise Paré ... Divisées en vingt neuf livres ...* (Paris: Chez la Vve Gabriel Buon, 1598): 898.

[97] Steele, *The Corset*, 6; Jacques Dupuys, *Dictionnaire Francois-Latin: auquel les mots François, avec les manieres d'user d'iceulx, sont tournez en Latin* (Paris: Gaspar de Huis, 1573): 167; Aimar de Ranconnet, *Thresor de la Langue Francoyse tant Ancienne que Moderne* (Paris: David Douceur, 1606): 152; and Robert Estienne, *Dictionarium Latinogallicum* (Paris: Jacques Dupuys, 1570): 330.

[98] William Barry Lord, *The Corset and the Crinoline: A Book of Modes and Costumes from Remote Periods to the Present Time* (Ward, Lock, and Tyler: London, 1868): 66-75.

[99] Steele, *The Corset*, 5.

[100] Ambroise Paré, "Le Vingttroisiesme livre," 898.

century, the terms “brace,” “stays,” and “corset” became interchangeable for orthopedic braces, even amongst surgeons.[101]

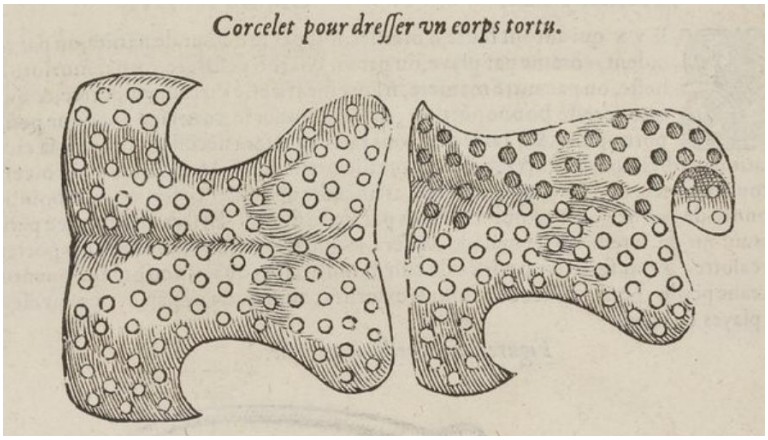

Figure 7: Paré’s spinal brace

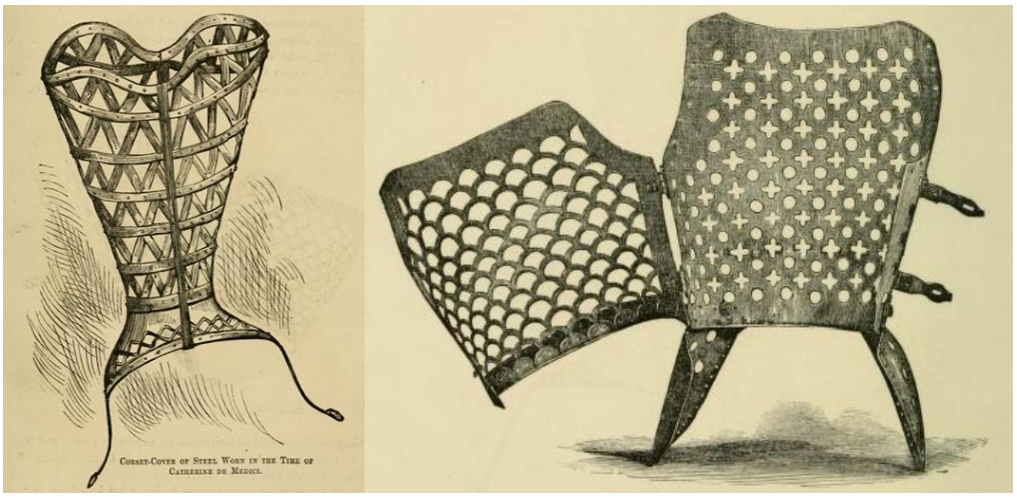

Figure 8: Nineteenth-century depictions of sixteenth-century iron braces.[102]

[101] There are many instances of the terms “corset” and “stays” being used by English-speaking surgeons in reference to orthopedic spinal braces. A non-exhaustive list of examples includes: H. Macnaughton Jones, “Dr. Sayre’s Treatment and the Jury-Mast in Spinal Curvature,” *The British Medical Journal* 1, no. 1239 (27 September, 1884): 638; Douglas Graham, “The Treatment of Scoliosis by Means of Massage,” *Annals of Surgery* 6, no. 6 (December 1887): 491; and A.M. Phelps, “The Plaster of Paris, Wood, Aluminum, and other Spinal Supports” (lecture, presented to the New York Academy of Medicine in the discussion of Lewis Sayre’s paper on the history of the treatment of spondylitis and scoliosis, New York, 1895), 50-4.

[102] Lord, *The Corset and the Crinoline*, 71-2.

Early brace designs seemed to primarily serve the function of supporting the patient's body in an upright position. By the 1860s, brace designs had evolved to where they actively put force upon different parts of the body in order to coax the spine into a straightened position. Bigg noted that from 1830 to 1870, "the application of direct force to the trunk was effected by steel plates." These steel plates were pressed against the "errant parts" of the spine, using what he referred to as "racked bars" or "rackwork" to maintain pressure against the body.[103] The brace also sported a pair of torso-length crutches affixed to its sides, in order to support the weight of the patient's body, keeping the torso upright. Several scoliosis specialists who wrote for the *BMJ*, including Brodhurst and Paget, adopted this style of brace with only minor modifications. However, they recognized that the brace had certain flaws. Even Bigg, whose own father had contributed to the invention of the rackwork design, noted that it was heavy and aesthetically unappealing. Most concerning, though, was that it tended to compress the ribs when applied incorrectly, which multiple surgeons witnessed and described.[104] Brodhurst detailed the gravity of this problem in 1864, stating that he had to remove rackwork braces from two patients who had previously been attended to by a different, unnamed surgeon. The patients both displayed flattened ribs, for their braces had been tightened daily over the space of several years. Brodhurst noted that "the plates of the spinal instruments were entirely imbedded in the ribs," and that "any treatment more

[103] Bigg, *An Essay*, 114-5.

[104] Bigg, *An Essay*, 51-2; Holmes Coote, "A Course of Clinical Lectures on Chronic Diseases of Bones and Joints, Chiefly in Relation to the Treatment of Deformities," *The Lancet* 1 (5 January 1861): 210; and [No Author Identified], "The Great International Exhibition: XII. Report on Surgical Instruments," *The Lancet* 2 (5 July 1862): 125.

barbarous, and termed surgical, [he] never before witnessed."[105] He included drawings of both patients, which can be seen in figure 9. The images graphically illustrate the extreme damage that could be done to a patient's body by faulty bracing.

Innovations in brace design came about not because of the rackwork model's potential to harm patients, but rather because of its unattractiveness and inability to be hidden underneath clothing. Bigg, writing later on in 1905, explained that he invented a new brace model in the 1860s, owing to the number of women who refused to wear the rackwork model. He claimed that "the fair sex–and they constitute by far the greater number of sufferers from ordinary lateral curvatures—were naturally biassed [sic] against an appliance that could not be concealed from view."[106] Therefore, he designed a brace that still utilized steel plates, but unlike the rackwork model, it used steel springs in order to exert pressure on the plates. The spring-borne plate brace was lighter than its predecessor and was embedded within a corset so that, "when worn, it had precisely the same appearance as if an ordinary corset was being worn and it could not be in any way distinguished beneath the dress."[107] Thus the direction of brace development had been set for the next two decades. At the insistence of female patients, discretion and the ability to disguise a brace as a corset became top priorities for brace designers who hoped to achieve any degree of success.

[105] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (5 March 1864): 254.

[106] Bigg, *An Essay*, 57.

[107] Bigg, *An Essay*, 60.

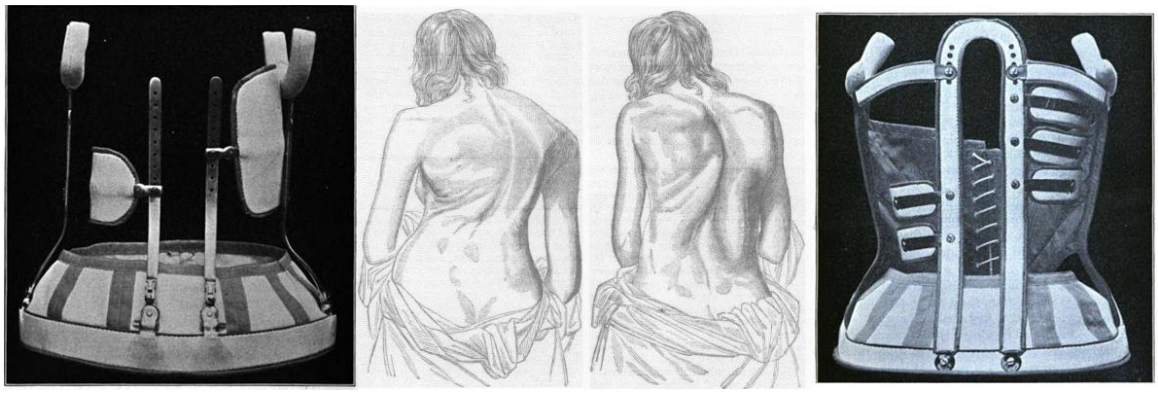

Figure 9: Rackwork steel plate brace, circa 1849 (left)[108], patients with flattened ribs (middle)[109], concept drawing of a spring-borne plate brace (right)[110]

Bracing and Corsetry

Not only did surgeons use the words "corset" and "stays" to refer to brace designs, but Bigg's design demonstrates how, beginning in at least the 1860s, brace designs were being modeled to explicitly resemble corsetry. Considering that some surgeons were of the opinion that corsets could cause scoliosis, why would they employ a brace which deliberately emulated corsetry? Did they not consider such a method of treatment to be self-defeating? Of course, braces did not function in precisely the same way as corsets, so to draw direct parallels is slightly misleading. Still, the fact that scoliosis specialists within the mechanical camp were so openly willing to model their instrument of choice after corsets is curious, considering that medical practitioners of the era often had a dismal view towards corsetry. This paradox is not one which only stands out to retrospective observers; contemporaries saw it, as well. Richard Barwell, a surgeon

[108] Bigg, *An Essay*, 50.

[109] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (5 March 1864): 254.

[110] Bigg, *An Essay*, 59.

who frequently wrote on the subject of scoliosis, noted in 1867 that attention need not "be called to the singular fact that tight rigid stays have always, with justice, been regarded as productive of lateral curvature; yet as soon as a girl shows any inclination to that deformity, she … is fixed in stays, more tight, more heavy, and more onerous than the most tyrannous devotee of a barbarous fashion could invent."[111] To Barwell, treating the deformity with its cause was ludicrous enough in itself. Even worse though, in his opinion and the opinions of others who disparaged bracing, was that the braces of the 1860s could be even more harmful than the tightest of stays.

Such an accusation was no small matter, for the very decade in which Bigg introduced the spring-borne plate brace coincides with the years in which British surgeons and physicians began commenting frequently on the medical dangers of stays and tight-lacing.[112] Fears about the medical consequences of wearing tightly-laced corsetry were hardly a new phenomenon in European culture. Fashion historian Clare Haru Crowston traced similar medical debates over whale-bone stays back to the eighteenth century, at least as early as 1741.[113] From the mid-1780s up through the 1810s, corsetry fell out of fashion, partly due to French Revolutionary politics disfavoring former aristocratic styles of dress. At the end of the Napoleonic Wars, however, corsetry came back into style in France, England, and other parts of the world

[111] Richard Barwell, "The Natural History & Treatment of Lateral Curvature of the Spine," *The Lancet* 2 (1867): 483.

[112] Steele, *The Corset*, 67.

[113] Clare Haru Crowston, *Fabricating Women: The Seamstresses of Old Regime France, 1675-1791* (Durham: Duke University Press, 2001): 59.

influenced by Western European trends.[114] With the return of stays came the return of medical concerns. Medical practitioners writing for *The Lancet,* for instance, published numerous articles during the 1860s on the adverse physiological effects of corsetry. The two volumes of the journal released in 1869 alone featured articles that blamed corsets for prolapsed kidneys, deformity of the chest, digestive problems, impaired breathing, muscle atrophy, compromised posture, displaced abdominal organs, nervous symptoms, weakened contractions during labor, degeneration of the heart, general frailty, the ruination of marriages and home life, and death.[115] The purported negative influence of stays on the back and posture were of particular concern, and not just to writers like Barwell who specialized in scoliosis. One editorial written in 1868 accused corsets of impairing nearly every function of the torso, including the muscles supporting the spine, so that "the victim of tight-lacing feels wretched the moment her artificial supports are removed."[116]

The surgeons and physicians who penned these injunctions against corsetry were of the opinion that women themselves had very little worthwhile insight on the matter.[117] In actuality, women did write arguments in refutation of the enormous number of health problems that medical men claimed were caused by stays. Many women observed that their own experiences with corsets did not at all reflect the extreme harmful effects

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[114] Steele, *The Corset*, 29-33.

[115] [No Author Identified], "A Case of Floating Kidney," *The Lancet* 1 (1869): 565; Henry McScroft, "Aneurism in the Army," *The Lancet* 1 (1869): 625; [No Author Identified], "Tight-Lacing," *The Lancet* 1 (1869): 554; [No Author Identified], "Tight-Lacing," *The Lancet* 2 (1869): 348-9; [No Author Identified], "The Perils of Fashion," *The Lancet* 2 (1869): 485; [No Author Identified], "The Waist of the Period," *The Lancet* 2 (1869): 311; [No Author Identified], "Tight-Lacing," *The Lancet* 2 (1868): 488; and Graily Hewitt, "Obstetrical Society of London," *The Lancet* 2 (1869): 543.

[116] [No Author Identified], "Tight-Lacing," *The Lancet* 1 (1868): 729-3.

[117] See below for the debate between surgeons and women.

attributed to them by the medical profession, and they made this fact known in their own journal publications. Moreover, class-based pressures encouraged female loyalty to corsetry in the face of criticism from doctors. Middle- and upper-class Victorians believed that "costume could be read as easily as any text," and that proper clothing demonstrated the morality, respectability, and "class power" of its wearer. A woman's outfit and all of its various components were intrinsically connected to her reputation, as it was a very visible representation of her social station and the extent to which she did or did not have to work. When a woman wore restrictive clothing that rendered her unfit for physical labor, she actively displayed her position of financial comfort to society. Consequently, working-class women also began to adopt the styles of middle-class corsets, in order to improve the appearance of their own social standing. Particularly after the introduction of the home sewing machine, which made it possible for working-class women to make their own corsets, corsetry became "democratized" and was increasingly worn by Victorian women across the class spectrum.[118]

Corsetry was also an important aspect of a girl's transition into adulthood, as women typically began wearing corsets in their juvenile years. Whereas in the eighteenth century, the corset had been worn by both sexes, by the nineteenth century it had become a gender-specific garment that served to reinforce gender divisions and conceptions of femininity and womanhood. Although men did occasionally wear "men's stays" during the earlier decades of the century, by the 1850s, men wore looser, plainer clothing, and were expected not to concern themselves with the more trivial points of fashion.

[118] Summers, *Bound to Please*, 19-22; Joan Perkin, *Victorian Women* (New York: New York University Press, 1993): 93-7; and Elizabeth Langland, *Nobody's Angels: Middle-Class Women and Domestic Ideology in Victorian Culture* (Ithaca: Cornell University Press, 1995): 34-7.

Overwhelmingly during the Victorian era, men who wore corsets were viewed as being effeminate and vain.[119] So increasingly, corsetry became associated exclusively with womanliness, especially in the minds of young girls. Female children, unlike their male counterparts, were publically acknowledged as adult women only after marriage. Therefore, corsetry became a meaningful private symbol of a girl's journey through puberty, and the fitting of a first corset was a coveted milestone in life for many young girls. Because scoliosis typically was diagnosed during adolescence, young girls, who often "actively campaigned" for their first tightly-fitted corset, would have been especially loathe to abandon stays in favor of an unsightly spinal brace.[120]

A number of female defenses of corsetry were compiled in William Barry Lord's *The Corset and the Crinoline*, which was published in 1868. This book was a work of fashion history, surveying the use of corsetry and similar articles of clothing in European cultures since antiquity. It also discussed and exhibited examples of the contemporary debates occurring between medical men and female supporters of corsetry.[121] As was common practice up until the 1890s, the female authors of these articles wrote anonymously, in order to evade backlash for participating in a public form of discourse.[122] One woman writing under the pseudonym of "Mignonette," whose letter to an unnamed journal was reprinted in *The Corset and the Crinoline*, pointed out that only

[119] Steele, *The Corset*, 38-9.

[120] Summers, *Bound to Please*, 63, 67, 77-8.

[121] Note that Lord proclaimed himself to be neutral on the issue of whether or not corsetry was detrimental to health. Lord, *The Corset and the Crinoline*, v-vii.

[122] Hilary Fraser, Stephanie Green and Judith Johnston, *Gender and the Victorian Periodical* (Cambridge: Cambridge University Press, 2003): 27, 41.

those who had the actual experience of wearing tight-fitting corsets were qualified to pass judgment upon their use. She declared that if tight-lacing should be reviewed as a practice, then it should be done by those who had personal knowledge on the subject, rather than by those who did not. Another correspondent, who went by "Débutante," spoke even more directly against the medical profession. She commented upon the "remarkable" and "sweeping" manner in which doctors condemned stays, noting that "had the qualities attributed to them been one-thousandth part as deadly as they were represented, the civilised [sic] world would long ere this have been utterly depopulated." After presenting a lengthy list of unrelated conditions that physicians "laid at the door of the stays," she adds that "we are rather surprised that large ears and wooden legs were not added to the category, as they might have been with an equal show of reason." Other women questioned how it was that they and many of their corset-wearing friends were of good health and lived to an old age, if tight-lacing was truly so dangerous.[123]

Writers in *The Lancet* occasionally responded to criticisms launched at it by female supporters of corsetry, though they did so with considerable derision. As previously mentioned, surgeons and physicians were of the opinion that female insight into female clothing was negligible, and bore little weight in matters concerning health. To the minds of medical men, women were "bent upon destroying their health" for the sake of vanity—and indeed, their appraisals of women who wore stays nearly always carried such moralistic overtones.[124] One of the best examples of these exchanges between doctors and female writers occurred over the month of September in 1869, and

[123] Lord, *The Corset and the Crinoline*, 149-156.

[124] [No Author Identified], "Tight-Lacing," The Lancet 1 (1869): 554.

revolved around the issue of tight-lacing's effect on posture. In late August, a short piece appeared in the "Medical Annotations" section of *The Lancet* entitled "The Waist of the Period." In it, an anonymous medical practitioner lamented that one could observe "at every turn a woman, young or old, who moves forward in a stooping position, unable even to hold herself upright in consequence of the constraint upon the muscles of the back" due to tight-lacing.[125] The author went on to state that if the effects of tight-lacing were solely aesthetic, then corsetry would hardly be the concern of men in his profession. However, because he believed that tight-lacing could produce permanent internal injury to the torso, it was imperative for doctors to condemn it.

"The Waist of the Period" was reproduced in the London daily newspaper *The Times*, and "excited some discussion among those affected by it"—namely, women.[126] Within a few days, a female writer who signed herself as "Not 'A Girl of the Period'" (abbreviated hereafter as NGP) wrote in response to the article, defending those who chose to wear stays. She informed the writer from *The Lancet* that, contrary to his claim that tight-lacing produced stooping, "any person of experience knows that wearing tight stays of proper construction, and stiff enough in the front, produces exactly the contrary effect." The only stays that did produce stooping were those with weak steels in the front, which NGP blamed on the doctors, as their unsolicited advice on tight-lacing had led to the production of stays which were designed contrary to what was actually beneficial for women. She went on to point out that, in spite of denunciations from medical men, corsetry had long been a part of European fashion—and not only for women. It was

[125] [No Author Identified], "The Waist of the Period," 311.

[126] Not "A Girl of the Period," "The Waist of the Period," *The Times*, 2 September 1869, 4.

neither a dangerously new nor an exclusively feminine trend. Her letter scolds that if the writer to *The Lancet* "will for once consult instead of advising those who have had real experience of [tight-lacing], he will learn that when practiced judiciously, it is not only harmless, but often beneficial to health, and extremely pleasant."[127] Before signing off, she mentioned that many other women had written letters to the same effect as hers, but it was usually to periodicals less popular than *The Times*. Unfortunately, she did not specify which periodicals she was referring to. Nevertheless, the very next day after NGP's letter was published, another woman did in fact write to *The Times* in response to "The Waist of the Period." While she herself did not wear stays, and disagreed with the opinion that they were pleasant to wear, she did concur with NGP that stays were not the cause of stooped posture. Instead, she pointed to the high-heeled shoes of the period, which she believed caused women to bend forward in order to keep their balance while walking.[128]

Multiple authors from *The Lancet* commented on the defense written by NGP. One article in particular, titled "Tight Lacing" and presumably penned by the original author of "The Waist of the Period," was again published in both *The Lancet* and *The Times.* It responded directly to NGP, though not directly to the major arguments that she made. While both she and "The Waist of the Period" focused primarily on the issue of posture, "Tight Lacing" inexplicably shifted focus instead to the effects of corsetry on breathing. With an unmistakable hint of disdain, its author wrote that "our fair critic [NGP] is not probably aware that the human body is so constituted that the very free movement of the chest-walls … is just as necessary for the supply of air to the lungs as

[127] Not "A Girl of the Period," "The Waist of the Period," 4.

[128] Anti-Slavery, "The Waist of the Period," *The Times*, 3 September 1869, 9.

are the movements of the bellows by which the blacksmith blows his furnace"—as though breathing had been the main point of the debate, all along.[129] He expounded more on the finer points of breathing, as well as indigestion and the supposed marital strife that was engendered by corsetry. Not once, however, did his reply to NGP ever readdress the subject of posture. Another *Lancet* correspondent, writing two weeks after his colleague, stated his lack of surprise over the fact that NGP had praised tight-lacing. He surmised that she may be among a group of women who also wrote in support of stays to a certain unnamed periodical. The periodical also purportedly contained letters in praise of "girl-flogging," which the *Lancet* writer references by saying that "if [NGP] were so stupid as to take to tight-lacing, she might, perhaps, deserve a flogging." The violent language did not end there, though, for the author concluded that if NGP wished to be laced so tightly as to prevent breathing, then "her actual death by suffocation might even do more good than her theories will do harm."[130] Again, there was no reference to posture, nor to any of the other points on health which NGP made in her letter. Neither of the authors from *The Lancet* were willing to directly engage with NGP on the health-related arguments that she made, yet because she had defended her choice (and the choice of like-minded women) of clothing against the word of learned medical men, she was deemed deserving of physical harm or even death. The exchange suggests that it was not her actual arguments with which the writers in *The Lancet* took issue, but rather the fact that she, a woman, challenged the authority of a predominantly male professional opinion on female bodies and female agency in clothing choices.

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[129] The Lancet, "Tight Lacing," *The Times*, 4 September 1869, 8; and [No Author Identified], "Tight-Lacing," *The Lancet* 2 (1869): 348-9.

[130] [No Author Identified], "Tight-Lacing," *The Lancet* 2 (1869): 426.

The NGP exchange demonstrates the seriousness and heated nature of the dialogue between detractors and supporters of corsetry. Overwhelmingly, physicians and surgeons alike used the medical literature of this period to champion the side of the detractors. Yet the contradiction is striking that scoliosis specialists knowingly modeled their braces on corsetry despite the dogmatic insistence of the medical profession that corsets were extremely dangerous to the health of women. The resemblance of braces to corsets only continued to increase over the course of the century, and indeed, the more popular braces were those which closely resembled corsetry. The surgeons in the mechanical camp who supported braces compromised on the issue of corsetry in ways that their peers in the medical profession—physicians as well as many fellow surgeons—were unwilling to emulate. Of course, this was partly due to the fact that they had a need to compromise in order to convince women to wear their braces, whereas physicians and surgeons who dealt with other conditions and other parts of the body could afford to remain steadfast in their views.

Those who believed that scoliosis was best treated with bracing found themselves confronted with the problem of marketability: brace designs up to the 1860s were aesthetically displeasing, making them less appealing to patients. Even when a patient (or their parents) could be persuaded to purchase one, the success of the brace then hinged upon the patient's willingness to wear it for most hours of the day, every day, at home and in public. Surgeons were aware that braces conflicted with the dominant fashion trends of the time, which threatened the likelihood of patients complying with bracing regimens. Bigg stated that the main reason he developed his new spring-borne plate brace design was because his father's rackwork design was so visually unappealing to buyers.

The appearance of the rackwork design proved to be a greater barrier to public acceptance of bracing than the fear that bracing would result in a deformed ribcage.[131] Similarly, an unnamed surgeon writing in *The Lancet* about one brace design noted that although its construction was "ingenious and sound" in principle, its large frame made it "open to the grave objection of causing numerous projections" underneath tight-fitted clothing. Such aesthetical flaws "might seriously interfere with [the brace's] popularity."[132]

Additionally, from the 1860s to the 1880s, surgeons discovered another problem that complicated brace design: scoliosis did not only involve side-to-side curvature of the spine, but rotation of the vertebrae, as well. In earlier decades, lateral curvature had long been observed to cause satellite deformities (such as protruding shoulder blades and misaligned shoulders) that resulted from rotation of the vertebrae, but the rotation itself was not well-understood. In 1864, Brodhurst published a lecture on lateral curvature that explained vertebral rotation, but he noted that this was an aspect of the condition of which few surgeons who worked with scoliosis were aware, at the time. When the spines of those with scoliosis were articulated after death, they were almost always reconstructed with the vertebrae aligned perfectly around the vertical axis. Brodhurst determined that not a single scoliotic spine in the museum of the College of Surgeons was articulated correctly. That such an error continued to be perpetuated was an issue, for the rotational aspect of the deformity was, in his opinion, "a fact of the greatest

[131] Bigg, *An Essay*, 57.

[132] [No Author Identified], "The Great International Exhibition: II. Report on Surgical Instruments," *The Lancet* 1 (4 January 1862): 525.

importance."[133] By the 1880s Bigg and his patients discovered the importance of vertebral rotation. After having experimented more with the efficacy of the spring-borne plate brace design, Bigg found that it worked for other types of spinal curvature, such as lordosis and kyphosis, but because of the vertebral rotation present in scoliosis, Bigg determined that simply exerting force on the sides of the spine was not enough to correct the deformity. Additional force had to be applied "indirectly over the errant parts of the trunk," in order to de-rotate the spine as well as push upon its curves.[134] Therefore the spring-borne plate brace had done little to help his patients, and his hopes for the brace's applicability to scoliosis cases were dashed. Bigg never stopped supporting the mechanical camp, however, and remained a steadfast and observant writer on developments in scoliosis treatment, even after giving up on his own brace design.

Lewis Sayre and the Plaster-of-Paris Brace

Not only did surgeons need to develop a brace that patients were comfortable with wearing, both in terms of physical comfort and comfort with their appearance, but braces also needed to become more sophisticated in order to address the increasingly-understood discoveries about vertebral rotation. Accordingly, an enormous number of new brace designs emerged from both sides of the Atlantic during the remainder of the nineteenth century. The famous American orthopedist Lewis Sayre went so far as to proclaim in 1883 that more instruments had been devised for the relief of scoliosis than for "any other

[133] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (30 January 1864): 113-114.

[134] Bigg, *An Essay*, 104-8.

deformity that may occur in the human body."[135] Surgeons began using a number of different materials besides steel and iron to make braces, including wood, aluminum, leather, canvas, celluloid, sodium silicate, rawhide, Manila paper, papier-mâché, elastic, porous felt, and perforated felt.[136] Felt was among the most frequently-discussed materials used to make braces among British surgeons. However, felt braces had a tendency to lose their shape, as they would soften when exposed to perspiration.[137] In some cases, surgeons found that felt braces collapsed after only a few days of wear.[138] As for the other materials listed, they received only scattered support in the literature. During the earlier part of the nineteenth century, braces were made solely from steel plates, leaving few other options to choose from. By contrast, the sheer number of different brace materials during the latter part of the century left the British surgical community with no overwhelming consensus on which design was superior. Nevertheless, despite the vast array of materials from which they were constructed, late nineteenth-century braces shared one feature: they tended to resemble corsetry more than ever before (figure 10). This was largely due to the emergence of Lewis Sayre's plaster-of-Paris jacket, the brace

[135] Lewis Sayre, *Lectures on Orthopedic Surgery and Diseases of the Joints, Delivered at Bellevue Hospital Medical College, During the Winter Session of 1874-1875*, 2nd ed. (New York: Dr. Appleton and Co., 1883): 491.

[136] Phelps, "The Plaster of Paris, Wood, Aluminum, and other Spinal Supports," 49-57; H. Nelson Hardy, "Dr. Sayre's Treatment and the Jury-Mast in Spinal Curvature," *The British Medical Journal* 2, no. 1239 (27 September 1884): 638; Lewis Sayre, "Remarks on the Treatment of Spinal Curvatures," *The British Medical Journal* 2, no. 1233 (16 August 1884): 314-5; and Henry Bigg, *Spinal Curvature: Comprising a Description of the Various Types of Curvature of the Spine with the Mechanical Appliances Best Suited for their Treatment* (London: J. & A. Churchill, 1882): 72-3.

[137] Sayre, "Remarks on the Treatment of Spinal Curvatures," 315.

[138] Edward L. Freer, "Porous Felt in the Treatment of Spinal Curvature," *The British Medical Journal* 2, no. 1240 (4 October 1884): 691.

material and design which generated more discussion on an international scale than any other.

Lewis Sayre was an American physician and surgeon who received international acclaim during the 1870s and 1880s, in large part thanks to his work on lateral curvature. One contemporary biographer hailed him as "the greatest living practitioner in his profession," and even Bigg, who strongly disagreed with Sayre's methodology, recognized that Sayre was "one of the highest orthopaedic authorities in the world."[139] Sayre understood the rotational aspect of lateral curvature, which he preferred to call rotary-lateral curvature. He argued that many former brace designs which attempted to correct curvature by simply applying pressure to the sides of the spine were "absolutely useless, and compel the patient to undergo untold misery and torture."[140] His approach to brace design hinged upon the premise that de-rotation could be achieved with traction: the patient would be suspended by the head, lifting the heels off of the floor (figure 11). Sayre believed that relieving pressure from the neck and back helped to elongate, de-rotate, and straighten the spine. Only in this improved position would he then apply the mold for a brace. The other element of his brace design which propelled it into the international limelight was that it was constructed from plaster-of-Paris bandages. This made it extremely affordable, lightweight, aesthetically pleasing, and easy to apply by the surgeon, when done correctly. The patient would first be suspended while wearing a knitted shirt. The surgeon would then apply the bandages over the shirt, and after the

[139] Bigg, *Spinal Curvature*, 110; and [No Author Identified], *Biographical Sketch of Dr. Lewis A. Sayre, Reprinted from Contemporary American Biography* (New York: Atlantic Publishing and Engraving Co., 1893): 5.

[140] Sayre, *Lectures on Orthopedic Surgery*, 501.

plaster hardened sufficiently to hold its shape, the brace was cut down the middle and removed from the patient. The brace was then fortified with more bandages, allowed to completely harden, trimmed of any excess material, and sent to an instrument-maker. There, the brace's opening was fitted with leather strips and eyelet-hooks, "for the purpose of lacing it; thus forming a complete corset."[141] Sayre's depiction of the finished brace is shown below in figure 10.

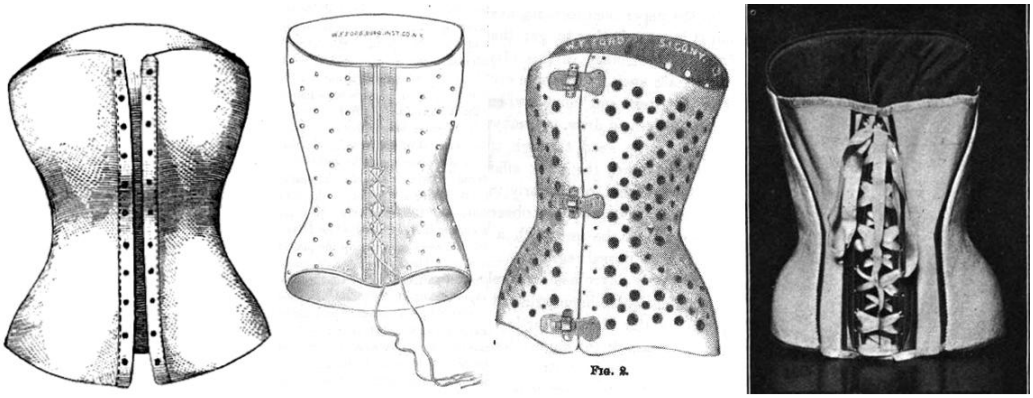

Figure 10: Examples of late nineteenth-century braces, including Sayre's plaster-of-Paris jacket on the far left.[142]

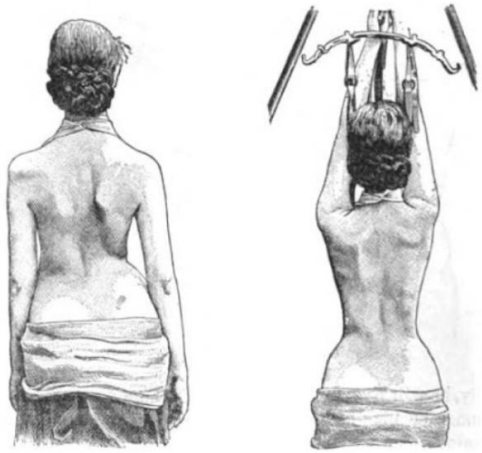

Figure 11: Sayre's use of the jury-mast for suspension during brace-fitting.[143]

[141] Sayre, *Lectures on Orthopedic Surgery*, 502-4.

[142] Far left: Sayre, *Lectures on Orthopedic Surgery*, 504; center images: Phelps, "The Plaster of Paris, Wood, Aluminum, and other Spinal Supports," 52-3; and far right: Bigg, *An Essay*, 137.

The plaster-of-Paris brace closely resembled a normal corset; and there is no mention in the literature of it being rejected by patients for its appearance, which is significant, considering that it was mentioned more frequently in the international discussion of braces than any other design. Even Sayre's detractors had nothing negative to say about the brace's visual appeal. In 1884, Sayre released a study in the *BMJ* which compiled the results from 123 different patients, who had all used the plaster-of-Paris brace from 1878 to 1884. He records only one as having abandoned treatment, and this was due to her rejection of the appearance of the jury-mast (the apparatus used to suspend the patient), rather than the appearance of the brace itself. He does not explain what aspect of the jury-mast's appearance she took issue with. Since a patient only needed to use it once in order to have the brace fitted, she was possibly more concerned or nervous about the prospect of being suspended by the jury-mast, rather than objecting to it for its lack of visual appeal. In any case, Sayre refused to take further charge of her case and recorded no other instances of patients complaining about matters relating to appearances.[144]

Again, the appearance of the brace was no trivial concern, for Sayre typically required his patients to wear it every day for full effectiveness, only allowing it to be removed at night. Since treatment could, and often did, take years to complete, this meant that patients had to make a long-term commitment to accepting the brace as a part of their everyday wardrobe. Moreover, Britain in the second half of the nineteenth-century was experiencing a "consumer revolution" in fashion. The large number of available brace

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[143] Sayre, *Lectures on Orthopedic Surgery,* 508.

[144] Sayre, "Remarks on the Treatment of Spinal Curvatures," 315.

designs on the market meant that surgeons had to compete to promote their design of choice. In an era where shopping habits were changing, income was becoming more disposable, and wardrobes were expanding for all classes, appearance stood as a major factor in a brace's marketability.[145] The plaster-of-Paris brace was admired by consumers (patients) and vendors (surgeons) both in America and abroad, but it was especially popular in Britain. Sayre was not the first to use plaster-of-Paris for spinal bracing, but he was the first to champion its utilization so successfully. Bigg, writing retrospectively in 1905, recalled that "almost within a few weeks" of the brace's introduction to Britain, "medical periodicals of the time began to teem … with extraordinary testimonials to the efficacy of the new method."[146] Bigg's father, desperate to meet with the sudden demand for the new design, was forced to delegate the construction of plaster-of-Paris braces to his son. Bigg claimed that on average, he found himself making no less than half a dozen plaster-of-Paris braces every day during the late 1870s.[147] Whether this number was accurate or inflated by hindsight, it nevertheless reflects the unprecedented way in which Sayre's brace came into vogue amongst patients and practitioners alike.

Other surgeons writing in the *BMJ* and *The Lancet* corroborated Bigg's declarations about the popularity of Sayre's brace with their own accounts. The British medical literature of the 1870s and 1880s is rife with excited discussion about the brace and its efficacy, and Sayre's demonstrations on how to apply it became akin to a

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[145] Sayre, *Lectures on Orthopedic Surgery*, 504-5; and Susan L. Steinbach, *Understanding the Victorians: Politics, culture and society in nineteenth-century Britain*, 2nd edition (Abingdon: Routledge, 2017): 106-13.

[146] Bigg, *An Essay*, 164-9.

[147] Bigg, *An Essay*, 167.

spectator sport, generally drawing large crowds of students and experienced surgeons alike. One such demonstration that took place in Birmingham in 1877 lasted for nearly two hours, and alternately elicited "marked attention" and "loud applause" from the audience as they watched patients being measured on stage before and after the application of the brace.[148] Henry McNaughton Jones, an accomplished Irish surgeon and physician, also attended one of these demonstrations in 1877. Jones normally worked in Cork, and hinted that he may have traveled to Manchester for the express purpose of seeing Sayre. In 1884, he reported that he had adopted Sayre's brace within a week after the demonstration and had faithfully continued using it thereafter.[149] Edward Freer, who frequently wrote for the *BMJ* on the topic of scoliosis, noted that the plaster-of-Paris brace was exceptional for its "cleanliness, coolness, and (if properly applied) lightness," and was "far more sightly than any other appliance." He cited the testimony of one of his patients who had formerly worn a felt brace, but switched to a plaster-of-Paris brace. Not only did she speak to the superior comfort of the plaster-of-Paris, but she also claimed that it added at least a full inch to her height by straightening out her torso.[150]

The international spotlight that shined on Sayre's brace brought considerable accolade, but also made it the target of choice for critics from all three of the different camps of scoliosis surgeons. Sayre himself was a strong proponent of the integrative approach to treatment, and lamented the fact that many mistakenly believed that use of the plaster-of-Paris brace alone was enough to affect a cure for scoliosis. In his own

[148] [No Author Identified], "Dr. Sayre at Birmingham," *The Lancet* 2 (1877): 177.

[149] Jones, "Dr. Sayre's Treatment and the Jury-Mast in Spinal Curvature," 638.

[150] Edward L. Freer, "Poroplastic Felt in the Treatment of Spinal Curvature," *The British Medical Journal* 2, no. 1247 (22 November 1884): 1043.

writing, he stated in no uncertain terms that the brace was only to be worn as support during the day, *after* gymnastic exercises were completed in the morning.[151] The brace was then removed at night, allowing the body to rest. The only time the brace was prescribed at night was to relieve pain that prevented patients from sleeping.[152] But even Sayre's fellows in the integrative camp did not always support him, as evidenced by preeminent integrative surgeon Bernard Brodhurst's denouncement of "Sayre's jacket and other like appliances." Brodhurst favored the older steel plate model of brace—perhaps because he did belong to an older generation of surgeons.[153] British surgeons in the constitutional camp either out-and-out rejected the plaster-of-Paris brace, or questioned its efficacy specifically when applied to scoliosis, as opposed to other deformities of the spine. Critics in the mechanical camp, on the other hand, promoted braces of other materials over plaster-of-Paris, and resented Sayre's condemnation of all other brace models. Thus, in the latter part of the nineteenth century, Sayre's brace became the focal point around which the majority of British debates on the treatment of scoliosis pivoted.

An example of one such debate occurred during 1884 in both the *BMJ* and in face-to-face confrontations between Sayre and members of the British Medical Association. In 1884, the Association held its annual meeting at Queen's College in Belfast, where a number of different topics concerning medicine were discussed. The presentations, lectures, and comments given at the meeting were recorded and then

[151] Sayre, *Lectures on Orthopedic Surgery*, 504-5.

[152] Sayre, "Remarks on the Treatment of Spinal Curvatures," 315.

[153] [No Author Identified], "Review of *Curvatures and Diseases of the Spine* by Bernard E. Brodhurst," *The British Medical Journal* 2, no. 1438 (21 July 1888): 128.

published together in the *BMJ*. Prior to the meeting, Sayre had given many demonstrations to the British medical community on how to properly apply his brace, along with presentations on his results with using plaster-of-Paris as a brace material. The first such demonstration that he gave to the Association was in 1877, and during the seven-year interval that followed, he had time to experiment and develop responses to some of the questions and concerns that had been voiced to him by the British surgeons. The 1884 Belfast meeting was where he took the opportunity to present his responses. He asserted, having compared various other methods for applying the brace as well as substitute materials for the plaster-of-Paris, that his original design remained the superior option. The undesirable observations that some other surgeons reported when they tried using the brace were, he argued, the results of incorrect application or improper maintenance. Sayre emphatically stated that neither he nor his brace design could be held responsible for the mistakes of other surgeons when they did not follow his instructions to the letter. "The lack of interest and professional knowledge of medical men in this department of surgery," he lamented, was responsible for the suffering of many patients who could have otherwise been relieved of their pain and deformity.[154]

Bernard Roth, a scoliosis expert who frequently wrote for the *BMJ*, responded to Sayre's defense of his brace at the Belfast meeting. Roth would, in the last two decades of the nineteenth century, emerge as the champion of the constitutional treatment of lateral curvature and stood wholly against the use of braces for treating scoliosis. He conceded that Sayre's brace was the cleanest and most efficient of all spinal braces but argued that it was only effective for the treatment of spinal caries (also known as Pott's

[154] Sayre, "Remarks on the Treatment of Spinal Curvatures," 314-5.

disease, or tuberculosis of the spine). In the case of lateral curvature, he was "totally opposed" to the use of Sayre's brace or any similar instrument, except in cases where paralysis prevented the patient from maintaining an "improved posture." Roth was of the firm belief that muscular weakness was linked to scoliosis, and therefore bracing did nothing but worsen curvature for it artificially held the patient in an upright position while allowing the muscles to atrophy. In the mind of Roth and his followers in the constitutional camp, exercise and strengthening of the back muscles was the only way to truly correct curvature.[155] Sayre replied by pointing out that Roth had not actually been present at the earlier demonstration of the brace's application, which Sayre found regrettable. He felt that if Roth had heard the lecture given at the demonstration, he would find that their views were in reality very similar, as Sayre agreed that gymnastics were the true cure for scoliosis—with the brace only serving as a support for patients with severe deformity.[156] This was not the only instance of Sayre emphasizing that his methodology did not only hinge upon the use of spinal instruments, which suggests that he was commonly mistaken as belonging exclusively to the mechanical camp of surgeons. The misconception may have persisted purely out of miscommunication or ignorance, or alternatively, surgeons in the constitutional camp may have been using Sayre's brace as a proverbial whipping boy for all spinal instruments in general. Because Sayre's brace was so famous and frequently-discussed in the literature, it served as an easy referential point for those wishing to make criticisms against the practice of bracing.

[155] Bernard Roth, "Remarks on the Treatment of Spinal Curvatures," *The British Medical Journal* 2, no. 1233 (16 August 1884): 315-6.

[156] Sayre, "Remarks on the Treatment of Spinal Curvatures," 317.

Besides Roth, seven other attendees' remarks were recorded from the 1884 Belfast demonstration. One notable commentator was Charles Keetley, another frequent writer in the *BMJ*. Keetley disagreed with practitioners like Roth who indiscriminately condemned Sayre's brace. According to Keetley, many of the objections against the brace from the constitutional camp were at such odds with the observations of those who "had taken the trouble to learn to apply it properly," that they "were probably often the result of ignorance and prejudice."[157] Nevertheless, Keetley saw flaws with the brace that had not yet been voiced. One major concern of his was whether or not the time and cost of constructing the brace netted sufficient remuneration for surgeons. Additionally, he felt that the supposed successes of the brace were open to question, as its effects had been vaguely and imprecisely recorded by those who favored it.

Perhaps most damning of Keetley's commentary was his objection to a case that Roth cited as evidence against Sayre's brace. The patient was one whom Roth had treated without the assistance of spinal instruments, but Keetley argued that the case was "not true scoliosis at all." Though this began as an indictment against Roth, Keetley expanded this line of criticism to include Sayre, as neither man in Keetley's opinion seemed capable of accurately diagnosing scoliosis. Keetley charged that neither understood the true nature of lateral curvature. Both saw a connection between debility of the back muscles and scoliosis, and therefore advocated that scoliosis could be prevented even "before osseous deformity has set in."[158] Therefore, Keetley accused them of presenting

[157] Charles B. Keetley, "Remarks on the Treatment of Spinal Curvatures," *The British Medical Journal* 2, no. 1233 (16 August 1884): 316.

[158] Keetley, "Spinal Curvature," 447; Sayre, *Lectures on Orthopedic Surgery*, 491-2; and Roth, "Remarks on the Treatment of Spinal Curvatures," 316.

cases of "scoliosis" in their results that could not possibly be confirmed as true scoliosis, as the patients had not yet shown any sign of actual spinal deformity. Consequently, their claims about their preferred methods of treatment could not be taken at face value.[159] This issue was symptomatic of a much larger problem, according to Keetley. He asserted that his peers were not critical enough in their reading of the literature because they did not bother investigating claims of new cures, and were often unintentionally deceived by studies based on unsound findings. When surgeons gave their support to such studies, the public "may be gulled by quacks who can point to high medical authority as supporting their utterly pretentious claims to cure genuine scoliosis."[160] It was in the interest of the profession, therefore, to cultivate more skepticism in its evaluation of orthopedic authorities such as Sayre and Roth. This sort of damning language, which questioned the competence and professionalism of leaders in the study of scoliosis, resulted in an ongoing debate amongst the demonstration's attendees that lasted for a full three months in the *BMJ*.

Half a month after the Belfast meeting, Keetley continued his attack in the *BMJ* by openly challenging Roth, Sayre, and those who shared their mindset "to produce before one of the London Societies a single case of true lateral curvature or scoliosis at a stage so early as to show no signs of alteration in the bones."[161] Roth did rise to Keetley's challenge, offering to find and exhibit a patient in the purported early stages of scoliosis

[159] Roth, "Remarks on the Treatment of Spinal Curvatures," 316; Keetley, "Remarks on the Treatment of Spinal Curvatures," 316; and Charles B. Keetley, "Spinal Curvature," *The British Medical Journal* 2, no. 1235 (30 August 1884): 447.

[160] Keetley, "Spinal Curvature," 447.

[161] Keetley, "Spinal Curvature," 447.

prior to the onset of osseous deformity. His promise was noted by Keetley in a follow-up letter to the *BMJ*, though unfortunately there is no record of whether or not Roth ever managed to procure such a patient. Nevertheless, Keetley remained confident that it was he, not Roth, who could determine either that the patient actually did demonstrate some degree of bone deformity or that the case was not scoliotic at all, and never would be. In spite of this, he took the time and space to clarify that he did, in fact, respect Roth and his opinions in general. He declined though to apologize for his choice of words at the meeting and thereafter, as he felt that such harshness was necessary "partly in order to awaken the profession from the apathy with which both its leaders and the main body of it seem to accept any orthopaedic inanity that may be placed before them."[162]

Among Keetley's peers, he was not the only one who demonstrated skepticism about Sayre, Roth, and other top authorities' conclusions concerning scoliosis. As previously mentioned, the debate generated by Sayre's visit to Belfast raged on from August to November 1884, and many of the published letters were equally as biting as Keetley's. One writer, Hardy, charged that Sayre's pronouncements about felt braces contained "as many inaccuracies as sentences" and that his experiment with bracing was little more than "smoke inside a plaster-cup."[163] Edward Freer, a staunch supporter of the plaster-of-Paris brace, rose to Sayre's support, arguing with Hardy for two months on the

[162] Charles B. Keetley, "Lateral Curvature of the Spine," *The British Medical Journal* 2, no. 1238 (20 September 1884): 595.

[163] Hardy, "Dr. Sayre's Treatment and the Jury-Mast in Spinal Curvature," 638.

issue and citing his own experiences with the relative inefficacy of felt braces.[164] Suffice to say, medical practitioners did not shy away from challenging each other's views.

Yet, Keetley's complaints about the profession's tendency to get swept away by whatever new treatment was in vogue echoed similar observations made by Bigg about the 1870s-1890s. While Sayre's brace saw immediate, almost explosive popularity amongst the British medical community, their colleagues in continental Europe received it with slightly more reservation. Bigg recalled that in France, Germany, and Italy, the plaster-of-Paris brace "took the ordinary quiet course by which that which is new is generally and with reason tested. But [in Britain] many surgeons accepted Sayre's statements at once, and before these statements had been in the least degree put to the proof."[165] Bigg surmised that part of the success the brace saw in Britain was due to the fact that Sayre could address (and thus beguile) British audiences in their native language. Much like Keetley, Bigg's appraisal of his peers was slightly jaundiced, as many of them had demonstrated in publications that they had done at least some experimentation with Sayre's brace before publicly stating their approval of it. Nevertheless, there remained a perception on the part of some contemporaries that the British medical community during the latter part of the nineteenth century was too easily swayed by certain authorities in the field, simply because their methodologies saw sudden—but ultimately temporary—moments of trendiness.

[164] Freer, "Porous Felt in the Treatment of Spinal Curvature," 691; and Freer, "Poroplastic Felt in the Treatment of Spinal Curvature," 1043.

[165] Bigg, *An Essay*, 168-9.

The Rise of the Constitutional Camp

The notion that fads were a reality in orthopedics held true for Sayre's brace. Bigg claimed that the plaster-of-Paris brace's reputation began to sharply decrease in 1881, which is patently untrue as demonstrated by the number of Sayre's supporters and their vigorous defense of the apparatus in the 1884 debates.[166] Nevertheless, Bigg's view was accurate that general excitement over the brace began to wane during the course of the 1880s. By the late 1880s and early 1890s, there was little mention at all of the plaster-of-Paris brace in the *BMJ*. Instead, the pendulum of popular support swung instead, and with equal force and conviction, towards the constitutional camp. This is not to suggest that Sayre's brace fizzled out of existence entirely, or that bracing as a practice ceased to exist or garner any support. However, the preeminence of bracing (and specifically Sayre's brace) in discussions about scoliosis gave way to the topic of gymnastic exercises, the promotion of which was headed by Roth and his followers.

In 1885, Roth released his groundbreaking article "Two Hundred Consecutive Cases of Lateral Curvature of the Spine Treated without Mechanical Supports." The report, as its title suggests, discussed Roth's results with two-hundred patients whom he treated solely with prescribed exercises. Part of what distinguished this publication from many of its predecessors was that in it, Roth publicly released his patients' records for other practitioners to see and evaluate. Three-and-a-half pages of tables accompanied the article—a rather rare sight in the *BMJ,* where publications tended to occupy only a handful of pages each. The tables contained a wealth of information, arranged in carefully-numbered, neat rows: the date, the patient's abbreviated name, sex, age,

[166] Bigg, *An Essay*, 169-71.

duration of deformity, causes of the deformity, detailed description of the curvature, pain levels, whether or not the patient had flat feet, any previous treatment sought out by the patient, the duration of Roth's treatment, the results of Roth's treatment, and the name of the physician who referred the patient to Roth. Although Roth's results were perhaps open to question, as every single reported case fell somewhere on the spectrum between "improved" and "very much improved," his method of recording cases did not go unnoticed by his peers for its impressive attention to detail.[167] Moreover, Roth had succeeded in what Sayre and his followers had often been criticized for failing to do: present organized, detailed, and well-defined records of his findings to the medical community. Accordingly, the *BMJ* was dominated by discussions of the constitutional treatment of scoliosis for the remainder of the century.

As far as Roth's program of treatment went, contemporaries noted that his practices were borrowed from treatments first promoted in the 1850s and 1860s, but had fallen mostly by the wayside due to the brace craze of the 1870s and early 1880s.[168] Indeed, Brodhurst had been an early promoter of exercise in treating scoliosis. Unlike Roth, Brodhurst was not wedded to the constitutional camp, and did support the use of braces and other spinal instruments in some cases. But he strongly emphasized that any use of instruments had to be supplemented by exercise, as he believed that instruments had the potentially to fatally weaken the body. Therefore, the body must be strengthened as the patient's spine was straightened. To this end, he recommended that, in addition to

[167] Bernard Roth, "Two Hundred Consecutive Cases of Lateral Curvature of the Spine Treated without Mechanical Supports," 820-4; and John Tisdall, "Treatment of Lateral Curvature of the Spine," *The British Medical Journal* 2, no. 1454 (10 November 1888): 1075.

[168] Bigg, *An Essay*, 175; and Tisdall, "Treatment of Lateral Curvature of the Spine," 1075.

prescribed exercises, patients should partake in plenty of sea-air and bathing, along with an iron-rich diet.[169]

This school of thought fell in line with the sanitarian movement of the earlier half of the nineteenth century. The industrial and civic pollution generated by the industrial revolution, coupled with miasma theory (which held that sickness was rooted in foul odors), culminated in a perceived link between clean air and health. Sea air in particular was viewed as being especially healthy, thanks to the prominent English Quaker physician John Lettsom, who observed in the 1790s that fishermen rarely contracted scrofula (tuberculosis). As a result, generations of British invalids made pilgrimages to warm coastal regions, away from the unclean air of the cities. In 1854, the famous German physician Hermann Brehmer added exercise, in conjunction with fresh air, to the program for consumptive patients.[170]

In the case of tuberculosis, professional opinion shifted back and forth on the benefits of rest versus exercise, but such recommendations nonetheless had a clear impact on how orthopedists within the constitutional and integrative camps chose to treat scoliosis. Tuberculosis—which killed more people in the nineteenth century than any other epidemic disease—and tuberculosis sanatoriums were such pervasive aspects of Victorian life and culture, that it comes as no surprise that aspects of tuberculosis treatment would be adopted towards the treatment of scoliosis.[171] As with tuberculosis,

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[169] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (5 March 1864): 253.

[170] J.N. Hays, *The Burdens of Disease: Epidemics and Human Response in Western History* (New Brunswick: Rutgers University Press, 1998): 167-9.

[171] Hays, *The Burdens of Disease,* 154.

scoliosis was a chronic condition that had a slow, insidious, "wasting" effect on the body. Likewise, many, if not the majority of, scoliosis specialists believed that the bodies of patients with scoliosis were inherently weak in some way, regardless of the initial cause of the curvature.[172] Therefore, orthopedists in the constitutional and integrative camps concluded that scoliosis, like tuberculosis, became deadly in cases where the patient's body was allowed to weaken and degrade too severely. Especially for those who chose the integrative approach, which necessitated the use of mechanical instruments that could further contribute to weakness, exercise was absolutely imperative for the cure of a scoliotic patient. In reference to the use of spinal instruments, Brodhurst stated in no uncertain terms that "it is of small advantage to remove disease if you kill your patient in the process."[173] Strengthening the patient's body in addition to straightening the spine was, in his mind, a matter of life and death.

Roth avoided the possibility of spinal instruments leading to the death of a patient by forgoing their use altogether, and instead advocating a treatment program that depended solely on exercise. By 1888 in the *BMJ*, Edward Freer strongly supported the efforts of Roth and expressed relief that "surgeons are at last beginning to discard the old system of relegating their cases to the tender mercies of the instrument maker."[174] Only four years prior, Freer had been one of the most ardent supporters of Sayre and the practice of bracing, which speaks to the rapidity and forcefulness with which Sayre's

[172] This was also linked to contemporary views on the supposed weakness of the female body, further discussed below.

[173] Brodhurst, "Lectures on Orthopaedic Surgery (Continued)," (5 March 1864): 253.

[174] Edward L. Freer, "The Ergostat and Lateral Curvature," *The British Medical Journal* 1, no. 1412 (21 January 1888): 160.

program of treatment gave way to Roth's.[175] Again, in 1889, Freer reconfirmed his total conversion to Roth's ideology, writing that scoliosis was best corrected with "continuous and systematic exercises … as suggested by Mr. Roth."[176] Four years later in another article, Freer again extolled the virtues of Roth's treatments, suggesting that his newly adopted convictions had not been swayed in the interval. In the same article, two other practitioners, W. J. Walsham and Lewis Marshall, fully backed Freer's support of exercise.[177] Finally, in 1897, at the sixty-fifth annual meeting of the British Medical Association, Roth presented an update to his research: an analysis of one-thousand cases of scoliosis, which had been "treated by 'posture and exercise' exclusively (without mechanical supports)."[178] By that point, Roth's influence was such that the president of the British Medical Association, Christopher Heath, declared at the same meeting that he was "convinced of the uselessness of instrumental treatment in scoliosis."[179]

How does one account for the profession's dramatic shift in opinion? In prior decades, there existed a great deal of dissent between the different camps of surgeons, even when Sayre's brace had reached its zenith in popularity. With the rise of Roth's gymnastic treatments, however, debates about bracing and other mechanical instruments largely grew quiet, especially in comparison to the fervor with which they had previously been discussed. Bigg, reflecting back on the time, believed that the shift could be

[175] Freer, "Poroplastic Felt in the Treatment of Spinal Curvature," 1043.

[176] Edward L. Freer, "Spinal Curvature," *The British Medical Journal* 1, no. 1468 (16 February 1889): 386.

[177] Edward L. Freer, W. J. Walsham, and Lewis Marshall, "The Treatment of Scoliosis," *The British Medical Journal* 1, no. 1677 (18 February 1893): 343.

[178] Bernard Roth, "Analysis of 1,000 Cases of Lateral Curvature of the Spine: Treated by 'Posture and Exercise' Exclusively (Without Mechanical Supports)," 958.

[179] Christopher Heath, "Commentary on 'Accurate Measurement of Spinal Curvatures, with Description of a New Instrument for the Purpose,'" *The British Medical Journal* 2, no. 1919 (9 October 1897): 961.

attributed to "the void left vacant by the failure of Sayre" and "the natural swing of the pendulum towards anything that was the very opposite of such antecedent failure." Furthermore, "the principles of the gymnastic treatment became diplomatically interwoven with certain popular fads," in reference to increasing female participation in sports, "which were quite irrespective of matters surgical."[180] As mentioned earlier, Bigg's appraisal of Sayre's fall from grace must be taken with a grain of salt, as he was a major detractor of Sayre, and tended at times to have a somewhat dismal view towards the American surgeon's period of fame. His latter claim about contemporary fads, on the other hand, merits attention.

Bigg explained that over the course of the nineteenth century, gymnastics gained in popularity as a means to offset the negative effects of the upper class's largely sedentary lifestyle. By the middle of the century—coinciding with the period when gymnastics were first applied to scoliosis—milder versions of the exercises taught to boys were extended to girls. This "physical education," originally only enjoyed by the well-to-do, began to be disseminated amongst the middle class following the passage of the Education Act in 1870.[181] Bigg believed that by 1880, "the children of the masses were enjoying to a greater or less degree the benefits of physical education." Parallel to these developments, "medical men conceived the idea that the exercises which appeared of such benefit … of the straight and normal body could also be utilised to remedy its deformities, and more particularly to correct curvature of the spine."[182] Susie Steinbach, a

[180] Bigg, *An Essay*, 179.

[181] This was one of many Education Acts passed in Britain during the nineteenth century, and should not be confused with the introduction of compulsory education in 1880, as discussed earlier in Chapter I.

[182] Bigg, An Essay, 184-7.

historian who has written extensively on the Victorian period, also attests to the importance of athletic pursuits in the Victorian era, particularly after 1870. In the late Victorian era, sports were a central aspect of British life—and while they were predominantly a part of male culture, upper- and middle-class women nonetheless "were also able to make inroads into sports culture."[183] The pro-exercise zeitgeist had a strong impact on orthopedists. The significance which both Bigg and Steinbach ascribed to the year 1870 is also supported by contemporary medical literature. Only four months after the passage of the Education Act, *The Lancet* discussed a performance put on for the medical profession by female students, demonstrating various gymnastic exercises. Attending physicians noted how the girls' "lithe figures were models of symmetry," and the author of the article went so far as to suggest that medical professionals wishing to treat lateral curvature should familiarize themselves with the school's exercise program.[184] While there is no indication that the exercises from the school in this example were particularly influential, it nevertheless speaks to the connection made between physical education for girls and the treatment of scoliosis.

Evolutionary Theory and Scoliosis Treatment

One final item for consideration in the Victorian debate about scoliosis treatment is the influence of evolutionary theory. During this period, upright posture became linked with the very notion of what it meant to be human. Adherents to this school of thought reasoned that what made human beings "special," as compared to other animals, was mankind's bipedalism. Subsequently, an entire sub-specialty emerged within the pro-

[183] Steinbach, *Understanding the Victorians*, 156-7, 178.

[184] [No Author Identified], "Gymnastic Exercises for Girls," *The Lancet* 1 (1870): 815-6.

eugenics camp of the medical profession that "defined the healthy body and treated the ill body based on notions of acceptable posture."[185] Orthopedists were likewise affected by this mode of thinking, as evidenced by Bigg in his assessment of the profession from 1870 to the end of the century.

Bigg proved himself to be a lifelong critic of Sayre's plaster-of-Paris brace. However, as a fellow supporter of braces, what he resented even more was the rise of Roth and his wholesale discarding of spinal instruments. One aspect of Sayre's methodology that Bigg *had* embraced was that scoliotic patients benefitted from braces modeled after corsets. This served as one of his main pillars in his critique against the constitutional camp, and he used evolutionary theory to support his claims. Bigg held the belief that "women of all dominant and civilised races" wore and "always will wear" some form of corsetry, the main purpose of which was to support the body in its upright position and natural shape. Such was necessary, as humans were built "on the quadrupled [sic] pattern," and were thus meant to spent most of their lives in the horizontal rather than the upright position. Men, according to Bigg, had adapted well enough to the change in position where they required only a loin-band for extraneous support. Women, on the other hand, with their "frailer build, the development of their breasts, and their pectoral mode of respiration," needed corsets in order to maintain a healthy posture and figure. The proof of how a lack of corsetry adversely affected women could be observed, he wrote, in "primitive and aboriginal races in which women do not wear them." Such women became, "as a rule, hideous objects of disfigurement" after puberty, and especially after childbirth. To Bigg's mind, women as a whole needed corsetry to protect

[185] Sander L. Gilman, "'Stand Up Straight': Notes Toward a History of Posture," *Journal of Medical Humanities* 35 (2014): 66.

their frail bodies from deformity, and scoliotic women above all depended upon mechanical support. However, Bigg did *not* support corsets which altered a woman's waistline or other aspects of her figure, as was typical with corsetry of his time. In this sense, his ideas did not contradict the contemporary view of the medical profession that tightly-laced stays were harmful. The corsets which Bigg believed women ought to wear were ones which merely provided support to the back, holding it upright.[186]

Bigg expressly attributed the basis of his arguments to "Darwinian" principles, and although he was writing in favor of the mechanical camp, echoes of his ideas are detectable in the other camps, as well.[187] Sayre and Roth, despite championing the integrative and constitutional camps respectively, both promoted the idea that, regardless of what the initial cause of lateral curvature was, it had a link to muscular weakness. Indeed, Victorian orthopedists in general maintained the notion that scoliotic patients were inherently weak. As I have demonstrated up to this point, orthopedists viewed scoliosis as being gendered in nature. Roth concluded from his own research, combined with data from other studies, that 84.5 to 87.8 percent of all scoliosis patients were female.[188] So while the majority of reported patients were not male, neither were they exclusively female. Nevertheless, when surgeons wrote about scoliosis, they frequently overlooked male patients, choosing instead to construct lateral curvature as an overwhelmingly female condition. Subsequently, surgeons believed that the weakness of scoliosis patients was an indication of the weakness of the female body. The fact that

[186] Bigg, *An Essay*, 194-200.

[187] Bigg, *An Essay*, 197.

[188] Roth, "Analysis of 1,000 Cases of Lateral Curvature of the Spine," 958.

Bigg substantiated this concept with evolutionary theory points to how scoliosis had become entangled in a larger, late-nineteenth century tendency to use science and Darwinism to reinforce cultural beliefs about female inferiority. The perceived link between female weakness and the mechanism of evolution provided scientific reasoning for "Victorian strictures that maintained women in a subservient state," which could be justified based on theories about conditions like scoliosis.[189]

[189] Patricia Murphy, "Reevaluating Female 'Inferiority': Sarah Grand versus Charles Darwin," *Victorian Literature and Culture* 26, no. 2 (1998): 221-2.

IV. CONCLUSION

Although Victorian technology and medical practice lacked the capacity to pinpoint the exact cause of scoliosis, the discourse they developed about the matter demonstrates how societal attitudes towards non-able bodies were constructed. Additionally, because Victorians noted that scoliosis primarily affected females, the discourses found in publications concerned with scoliosis, female health, and the female body intertwined with larger trends in Victorian society. Women were increasingly encouraged to engage in activities which promoted physical fitness, and the societal obsession with *corpore sano* ("the healthy body") contributed to the view that a lack of exercise caused spinal degeneracy in adolescent girls. Other writers blamed women's fashion choices, occupations which were predominantly female, poor posture while standing, and other lifestyle choices as causing scoliosis. In all cases, until the end of the century when heredity began to gain credence as a major cause of lateral curvature, publications in the *BMJ* and other British periodicals reveal an implicit assumption on the part of writers that scoliosis patients were in some way responsible for their own condition. The concurrent popular belief that "humanness" was defined by proper posture indicates that, though scoliosis had become a major topic for discussion and debate within (and in some cases, without) the medical community, patients with spinal deformities were nevertheless subject to prejudicial attitudes and dehumanization.

The evolution of Victorian views towards scoliosis over the course of the latter half of the nineteenth century likewise reveals how strongly linked the condition was to societal views concerning women. Surgeons interpreted scoliosis as a deformity which was essentially "female" in nature, and their prestige as medical professionals cemented

this notion with the weight of scientific authority. As a result, scoliosis became a tool in the hands of those who promoted the oppressive and patriarchal concept of the "naturally" weak female body. This weakness was explained using notions borrowed from evolutionary theory, which meant that cultural beliefs about female inferiority could be reinforced using "scientific" theories of biological determinism. Additionally, theories on the causes of scoliosis were affected by contemporary concerns over the increasing participation of women in spheres that had formerly been the domains of men.

Treatments of scoliosis were also strongly affected by gendered societal issues. The belief of medical practitioners that stays were harmful to women's health, when pitted against female consumers preferring braces which adhered to their fashion choices, presented a serious challenge to brace designers. The fierce defense which women mounted against medical practitioners who disparaged their clothing choices demonstrates their refusal to submit uncritically to medical authority. Ultimately, consumer demand dictated the direction of brace design, as the most popular braces began mimicking corsetry during the 1870s and 1880s. Along with fashion preferences, increased female participation in sports also affected trends in scoliosis treatment. During the late 1880s and the 1890s, surgeons began favoring constitutional, exercise-based methodologies for treating scoliosis, which coincided directly with the rise of physical education for girls. Surgeons may have constructed scoliosis as a gendered condition, but as a result of their doing so, the three camps of treatment were subject to the influence of women's choices.

This study demonstrates how an in-depth investigation into a condition such as scoliosis benefits the methodology used in writing the history of medicine. The nature of

my sources unfortunately left me having to defer to the viewpoint of male authority figures in the medical profession—a "great man" tendency which often haunts histories of medicine. However, I have attempted to avoid the "triumphalism" that also tends to color narratives about the history of medicine, especially concerning the nineteenth century. The story of scoliosis was not a story of Western medicine triumphing over a previously misunderstood ailment. Even in the present day, much about scoliosis remains a mystery, and so the discovery of a "cure" for it was never the significance of this study. Rather, I have focused on the ways in which medicine and society interact with one another. In doing so, I have analyzed the connections between scoliosis and important societal issues affecting women, thus demonstrating the contributions that histories of medicine can make to other fields of history.

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