



The use of corsetry to treat Pott's disease of the spine from 19th century Wolverhampton, England



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ABSTRACT

Corsets have been used both to create a fashionable silhouette and as an orthopaedic treatment for spinal conditions, but skeletal changes associated with the use of corsetry are rarely reported on in the palaeopathological literature. Here, we report on a 19th-century adult male with Pott's disease of the vertebral column and related vertebral compression deformities. Wolverhampton HB40 presented destruction of the vertebral bodies of T6 to L4, ankylosis of the apophyseal joints of L1 and L2 and an angular kyphosis of the lumbar region, the result of tuberculosis. The presence of flattened spinous processes and bilateral acute angulation of multiple ribs in the lower thoracic region is indicative of plastic deformation caused by the use of the corset. The presence of both of these changes in an adult male, at a time when the use of cosmetic corsets by men was in decline, suggests that the compression trauma was the result of an orthopaedic corset used to correct the defective posture resulting from tubercular kyphosis, although corset use to obtain a fashionable silhouette cannot be ruled out.

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1. Introduction

Tuberculosis (TB) is a chronic infectious disease caused in humans by members of the Mycobacterium Tuberculosis Complex (MTC). It was a significant cause of morbidity and mortality across England from the early medieval period through to the late-19th century (Aufderheide and Rodriguez-Martín, 1998). Skeletal TB is always secondary to a primary infection in the lung, gastrointestinal tract or lymph nodes that spreads to bone via the lymphatic system or blood stream (Ebnezar, 2005). Once within bone the tubercle bacilli tend to exhibit a predilection for the axial skeleton, particularly the haemopoietic centres, due to their high metabolic and circulatory rates, with the lower spine being the most common location for skeletal lesions (Ortner, 2003). Spinal TB predominantly affects the vertebral bodies, most notably the anterior portions with involvement of the neural arches being an extremely rare occurrence. The destructive nature of the disease commonly results in the collapse of the vertebral bodies creating an angular kyphosis known as a gibbus or Pott's disease of the spine (Ortner, 2008).

Almost 3% of all cases of TB develop a severe spinal kyphosis (Tuli, 1995), for which traction via corsetry and braces has been a common treatment since the late medieval period (Ponseti, 1991).

Corsetry refers to garments of clothing that provide a rigid frame that can be tightened to manipulate and hold the wearer's torso in a desired shape for either fashionable or medical purposes. Historically, one of the most common uses of corsets was to slim the body and enable the wearer to conform to the fashionable silhouette of the period. For women this usually meant attaining a 'wasp-waisted' figure by emphasising the hips and bust while reducing the waist (Steele, 2001; Stone, 2012; see Fig. 1). For men the dominant fashion was a lean figure boasting broad shoulders and a narrow waist, which was also often achieved using corsetry. Although notoriously associated with the 'Dandies'¹ of the 18th and early 19th centuries, male corsets were openly advertised by tailors, and men from every social stratum were known to have worn them (Cole, 2010; Schwarz, 1979). Despite the overwhelming association of corsets with fashion, these restrictive garments have a more extensive history within the field of orthopaedic medicine, especially with regard to the treatment of spinal deformities (Wiener, 1896). Orthopaedic corsets have been produced in multiple forms for centuries; of these, frame corsets and braces have been regu-

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¹ A man unduly concerned with looking stylish and fashionable.

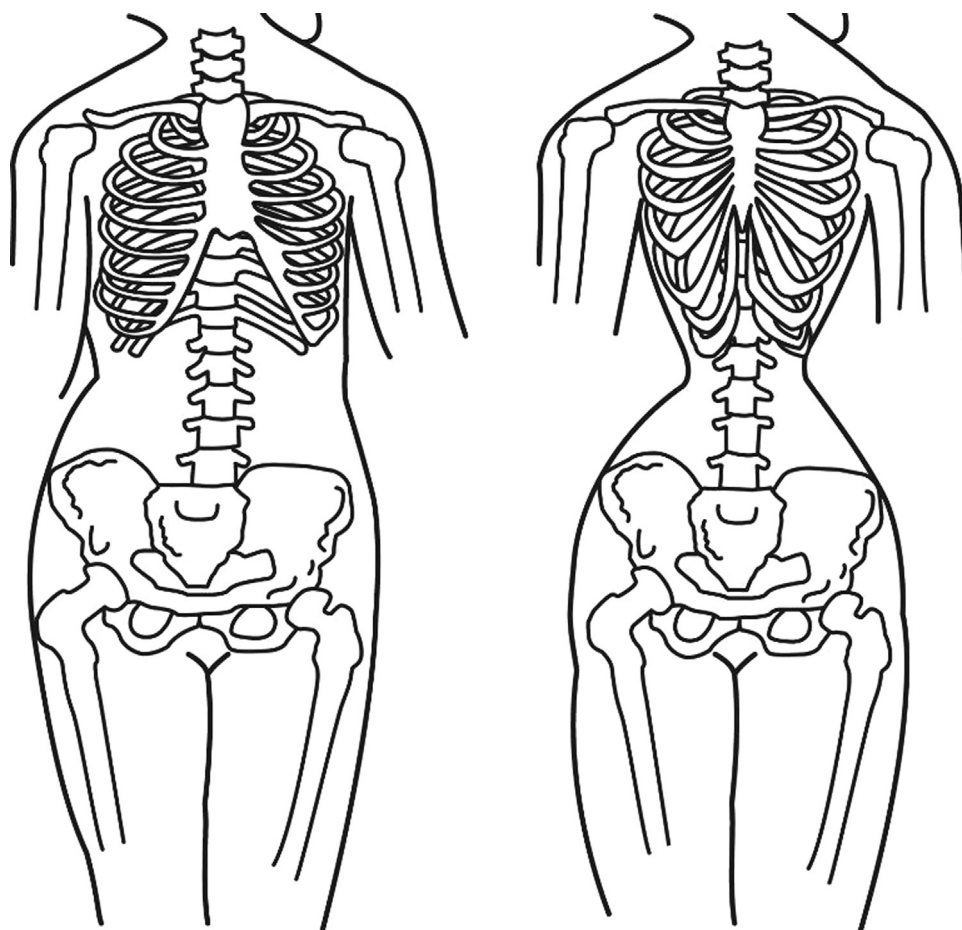


Fig. 1. Effects of corsetry on the thoracic cage: normal (left) and with regular corset use (right). Redrawn after Banfield (2012).

larly prescribed to treat spinal diseases such as lumbar disc lesions, spondylosis, spondylolisthesis, TB, ankylosing spondylitis and scoliosis (Ueyoshi and Shima, 1985). Indeed, throughout the 19th century the primary treatment for Pott's disease involved the prolonged use of corsets and braces in an attempt to correct defective posture caused by the spinal deformity (Turner, 1913). Due to the compressive nature of these garments, long-term use could lead to skeletal changes in the thoracic region, which can be detected during osteological analysis of the remains (Groves et al., 2003; Miles et al., 2008; Wescott et al., 2010). The compressive forces imposed on the thoracic cavity by these corsets create an anterior displacement of the ribs and antero-lateral deviation of the spinous processes of the vertebrae. The impact of these external stressors is minimised by plastic deformation of the skeletal elements, facilitated by the high collagen content of bone, which eventually results in an abnormal remodelling of the thoracic cavity (Fig. 1) (Cross, 2006).

2. Wolverhampton HB40

St. Peter's Collegiate Church overflow cemetery in Wolverhampton was excavated between October 2001 and January 2002 (Adams and Colls, 2007). The overflow cemetery was in use between 1819 and 1853; a total of 150 human burials were recovered (Arabaolaza et al., 2007). Wolverhampton burial HB40 was recovered from an earth-cut stacked grave above the interred remains of a previously published individual, HB39, who suffered from metastatic multicentric osteosarcoma (Ortner et al., 2010; Adams and Colls, 2007).

Burial HB40 consists of the incomplete remains of an adult human skeleton. The burial had been partially destroyed due to clearance and construction work prior to excavation, which is responsible for the incomplete nature of the remains (Fig. 2); the lack of the *ossa coxae*, specifically, dictated the restricted number of age estimation and sex assessment techniques employed during analysis. Sex assessment was conducted using skull morphology (Walker, 2008) and metrical analysis of the glenoid fossa, epicondylar breadths and vertical head diameter of the humerus (Bass, 2005). Closure of the cranial vault sutures and lateral-anterior cranial sutures (Meindl and Lovejoy, 1985), alongside transition analysis (Boldsen et al., 2002), were used to estimate the age of the individual. Osteological analysis of Wolverhampton HB40 assessed the individual to be a probable male aged between c.20–35 years (young middle adult).

3. Palaeopathology

Pathological alterations include severe destruction of the anterior portions of the vertebral bodies of L1 and L2, which led to extensive cavitation of both bodies and the eventual collapse of L1 onto L2 creating an extreme wedge shape (Fig. 3). These two vertebrae had preserved neural arches with complete fusion through their apophyseal joints creating an angular kyphosis (Fig. 4). In addition to this, there were large lytic lesions on the anterior surfaces of the lower thoracic vertebrae (T6–T12) and all the lumbar vertebrae present (L1–L4), exposing the trabecular bone. Significantly, these lesions did not skip any vertebrae and there was no bone proliferation associated with them. The differential diagnoses

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