



# Effects of Long Term Corseting on the Female Skeleton: A Preliminary Morphological Examination

**Rebecca Gibson**  
American University

*This study examines corset dimensions and skeletal rib deformation in female remains from three time periods and two locations to understand the relationship between the practice of corset wearing and longevity. The corsets are held in the Victoria and Albert Museum, and range in date from 1750-1908, while the skeletal remains are the result of the author's examination of collections held in the Musée de l'Homme in Paris, France, and the Centre for Human Bioarchaeology at the Museum of London Archaeology (MoL) in London, England. An anachronistic view of corseted women posits that they lived short and painful lives. These skeletal remains were examined with an eye toward establishing that rich or poor, young or old, corseted women lived comparatively long lives, and that the corset was not, in itself, a death sentence. The findings indicate that although women experienced skeletal deformation because of corseting, they also lived longer than the average age for their times.*

## Introduction

Within each cultural system, the way a woman chooses to clothe herself makes a statement regarding not only her social standing, but also the way she sees herself and the way she wishes to be seen. Styles of dress vary distinctly based on fabric availability, fashion, manner of employment, and socioeconomic class. The practice of corseting crossed many demographic boundaries during its 400-year tenure, following the whims of fashion. This study examines one collection of corsets and two collections of skeletal remains dated to 1700-1900 CE to examine what may be known about the physical impact of corseting during this time. This research will question some modern assumptions made about women who corseted by using artifact and skeletal evidence to discuss which demographics practiced corseting and what effect that practice had on their physical remains.

## Theory and background

### *Fashion Theory*

In order to discuss the physical impact of corseting, one must first look at what defines the body, where the body begins, and where borders are formed with the outside world. It is logical to start with the assumption that the body begins at the skin and the outside world exists external to this. However, the skin has the property of being semi-permeable—things pass through it, by diffusion or force—and thus the body cannot be seen as a unique entity with no interference from the outside world (Comaroff, 1985; Douglas, 1966; Simmel, 1957; Turner, 1993). Clothing, then, though produced by the outside world, may function as an intermediary between the world and the body. Clothing can form a less permeable barrier than the skin, what Turner (1993) describes as the social skin. It can protect the body from penetration by external forces and it can show, symbolically or actually, that there are boundaries between an individual and their society.

---

Author correspondence should be directed to [rg2440a@student.american.edu](mailto:rg2440a@student.american.edu) (Department of Anthropology, American University, Washington D.C. 20016)

Nexus is an annual graduate student publication of the McMaster University Department of Anthropology, Hamilton, Ontario, Canada. <http://www.journals.mcmaster.ca/nexus>.

Clothing defines the body by giving it firm edges and by showing that those edges are not to be questioned, pushed against, or penetrated (Entwistle, 2000, p. 4-16). Clothing also defines the body socioculturally, showing where the wearer stands in society. It is well established that many things—the type of clothing one can afford, the state of repair and fineness of material, cut, color, and the fashion one adopts—demonstrate richness or poorness, fashionability or lack of social knowledge. Clothes make not only the (wo)man, but reify the position of the person as well. It is easy enough, therefore, to use clothing, fashion, style, and fabric to read the past for information about agentive decisions made during the course of history (Entwistle, 2000).

### Corsets and their History

Whether curved front or straight front, made of leather or satin, or meant as an undergarment or as the centerpiece of an outfit, the corset provided the fashionable profile of the day. Beginning in the 1600s as a set of stays—stiffened material that formed the front of a dress—corsets were used to shape clothing, and by extension the body, in desirable ways (Bendall, 2014). Stays or busks were worn in specially formed pockets that stretched from collar to pelvis and were attached by ribbons to the woman's dress at one end (Bendall, 2014). Women from all sociocultural groups could wear these, as they could be made from many easily available materials including stiffened leather, wood, or thick paper (Bendall, 2014). As fashion evolved, stays became the frontispiece of the corset, which could be worn as an undergarment or over the chemise to hold an entire outfit together, or built into a dress so that the dress itself acted as its own support (Bendall, 2014; Lauder, 2010; Seleshanko, 2012; Steele, 2001; Fontanel, 1992).

Even during the early 1800s when the neo-classical look was fashionable in both England and France, (Lord, 1868; Perrot, 1994), women wore corsets to help shape their bodies away from nature and toward a more “civilized” ideal form (Lord, 1868). Because of this ideal, corseting

crossed demographic lines and was expected of anyone who wished to be received in civilized society, regardless of their socioeconomic status (Bendall, 2014; Lord, 1868; Steele, 2001). Corsets could be fashioned in such a way that they did not require inserted boning, rendering them available to any woman with a needle and thread (Bendall, 2014; Lord, 1868; Steele, 2001). Some corsets held by the Victoria and Albert museum show evidence of having been bought second-hand and given after-market alterations, such as lace to cover especially worn areas.

Not even pregnant women escaped the need to be within the corset; special corsets were made to be worn by women who were pregnant or nursing, with side gussets or special snaps over the breasts to accommodate their changing form while still allowing them to follow the fashion of the time (Victoria & Albert, 2013) (Figure 1).



*Figure 1.* Pregnancy and nursing corset from the Victoria and Albert Collection

Corsets worn during the two hundred years under consideration in this article consisted of stays, boning, and gussets contained in a garment of various shapes, uniformly more slender at the waist than at the breasts or hips (Victoria & Albert, 2013) (Figure 2). Variations on this basic pattern included shoulder straps, stocking hooks or clips, panels that could be inserted or removed to accommodate pregnancy, the bustier, which did not cover the abdomen or hips, and the waist

cincher, which fitted around the waist but did not cover the breasts or abdomen (Figure 3).



*Figure 2.* T.90&A-1984: Overbust corset from the Victoria and Albert Collection, cotton twill, CB 71 cm, CW 48 cm, CH 71 cm



*Figure 3.* T.95-1949: Underbust corset from the Victoria and Albert Collection, blue silk, metal hooks, metal lacing holes, CW 54cm.

A woman would wear her corset for almost her entire life. From a very young age female children were placed inside corsets and defined by them (Kunzle, 2004; O'Followell, 1908; Steele, 1985, 2001; Summers, 2001). One advertisement in O'Followell's (1908) textbook states that "corsets pour Enfants & Fillettes" (corsets for small children and young girls) were for sale at a store in Paris (Fontanel, 1992). By the age at which many women married, in their early- to mid-twenties in both England and France during much

of the 19th century (Davidoff & Hall, 1987/2002; Weber, 1976), deformation of the body by the corset was well underway. However, this garment could also be prescribed to function as a corrective medical device.

### Women's Bodies: (De) and (Re)formed

During the 200-year period under consideration, France and England underwent considerable social upheaval. Both saw expansion of their empires, consolidation of their immediate territories, multiple wars and revolutions, industrialization, the creation of germ theory and race theory, and, of course, the writings of Karl Marx and Sigmund Freud. France moved from a feudal system to a system of limited suffrage where women were considered citizens—not full citizens, as they were unable to vote, but rather limited or "silent" citizens—who had human rights which needed to be considered. England also saw limited suffrage for landowners, which toward the end of the 19th century included some women. What did not change was the desire to shape and form women's bodies through the use of the corset.

However, what remains in dispute is who owned that desire, who instigated control over women's bodies, and for what purpose. While French and English societies during this time period are considered patriarchal, one must be careful not to completely strip women of autonomy, agency in their clothing choices, and an active and participatory subjectivity. In the words of D. O. Teasley (1904), a woman writing for and to other women, "For my part I can not [sic] see why tight lacing was ever invented. Men, as a rule, especially men of good judgment, do not admire slender waists" (p. 101). The importance of this implication cannot be overlooked when discussing corsets; women, Teasley (1904) implies, were choosing to control their own bodies, even to the point of self-harm.

Teasley (1904) goes on to compare the perfect woman to the classic lines of Greek and Roman statuary, remarking, "Neither nature nor art would

suggest the ill-shaped forms of fashionable women. The Venus dei [sic] Medici, an ancient statue, is considered the most perfect model of the female form and has been the admiration [sic] of the world for many ages” (p. 102). She is not alone in this. O’Followell (1908) discusses a similar idea:

*We see the Venus de Milo, and find her fair and beautiful, but if she were wearing the current styles, surely you would see her as ugly, for the clothing of today would not fit her size. You admire the Venus de Milo, and you admire the small woman of today, yet if the small woman were without her clothing you would be obliged to conclude that she must be ugly because she would not resemble the Venus<sup>1</sup> (p. 239).*

Here, O’Followell (1908) is a man speaking ostensibly to other men, but also to and in some ways for women. By closely analyzing his introductory chapter, one sees an erasure of the female voice and a shifting of blame, regarding both their health problems and their unnatural shape, to the woman for wearing a badly made or badly fitted corset (O’Followell, 1908, p. 1-16). The corset is given all agentive actions, as it atrophies, constricts, degenerates, envelopes, cuts, reforms, molds, presses, renders, and causes (O’Followell, 1908, pp. 1-16).<sup>2</sup> However, writing 40 years earlier, Lord (1868) provides letters written by women defending fashion and decrying the practice of comparing modern dress with the ancients.

These letters are also mentioned by modern theorists, and are often dismissed as fantasy, fiction, or fabrication meant to increase readership, despite the fact that they clearly and concisely foreshadow the sentiments of both women and their doctors (Kunzle, 2004; Steele, 2001). Regarding one letter, excerpted in his book, Lord (1868) writes:

*[I]t has been much the fashion amongst those who have written in condemnation of the use of the corset to contrast the figure of the Venus de Medici with that of a fashionably-dressed lady of the present day....No fallacy can be greater than to apply the rules of ancient art to modern costume (p. 180).*

As one can see from the above examples, women themselves used, championed, and criticized corseting, and men often interpreted and disseminated the literature regarding the practice. What this view lacked, and this study seeks to rectify, is two-fold. Firstly, impoverished women’s voices are missing, both from the modern studies and from the written accounts. Secondly, the extant evidence that corseting was inherently harmful comes completely from hyperbolic and unreliable doctors’ accounts (Kunzle, 2004; O’Followell, 1908; Steele, 1985, 1996, 2001; Summers, 2001), and as such it cannot be verified using the literature alone.

In order to construct a more complete picture of the life of a corseted woman, the researcher looked at both skeletal remains and corsets. While a great deal of literature has been amassed on women’s lives in England and France from 1700-1900 CE, documenting both their own words and the words of others (Berlanstein, 1984; Davidoff & Hall, 1987/2002; Hunt, 1984; Kunzle, 2004; Lord, 1868; Matthew, 2000; O’Followell, 1908; Perrot, 1994; Steele, 1985, 1996, 2001; Stone, 1977; Summers, 2001; Teasely, 1904; Weber, 1976; Woloch, 1994), no modern work examines the physical effects of corsetry on the ribs and vertebrae, nor correlates those effects with mean age at death. This indicates the need for a synthetic and nuanced discussion of how corseting affected women’s bodies, incorporating ideas about skeletal morphology and lifespan.

## Materials and Methods

### *Corsets*

The corsets examined herein are held in the Victoria and Albert museum's textile collection in London. This collection was chosen because of the comprehensive nature of the online database and the relatively large amount of material available from the relevant time period. Much previous research on corsets focuses on the exaggerated form of the woman who tight laced (Dickinson, 1887; Kunzle, 2004; O'Followell, 1908; Steele, 2001, 1996, 1985; Summers, 2001; Teasely, 1904). However, corseting, like many body modifications, comes in different forms. The styles of corset held in the Victoria and Albert museum exemplify the full range of popular corsetry, as they were collected separately over the timespan of the museum. There are 44 corsets dating to the 200-year time period in the Victoria and Albert Museum online database. Examination made use of the text of the records themselves and of the pictures with which they corresponded, combining this with measurements taken by the researcher and by Victoria and Albert staff (Victoria & Albert, 2013). Corsets were measured with a paper tape along their waist, bust, and hip circumferences, and front, side, and rear lengths. Notation was made of any wear, particular wear patterns, and signs of repair or mending.

The two skeletal collections chosen for this research are housed at the Musée de l'Homme in the Museum National d'Histoire Naturelle, in Paris, (Figures 2 & 3) and the Centre for Human Bioarchaeology at the Museum of London (MoL), in London (Figures 4-7). The researcher was primarily interested in observing deformation of the ribs and vertebrae, as these elements are most likely to show long-term damage from the pressure of corsets, which can be up to 80 pounds per square inch (Summers, 2001, p. 50).

The researcher examined remains that had been articulated shortly after death in the collection at the Musée de l'Homme in Paris, and remains that had been excavated from burial plots in the Parish

of St. Brides Lower in London (FA090) at the Museum of London. These collections were chosen for accessibility and availability; they are both open to researchers and contain skeletons from the appropriate time period. The skeletons at the Musée de l'Homme were relatively complete, having never been exposed to the elements, but the disarticulated remains at the Museum of London were in considerably worse condition, showing, in most cases, lack of completeness and surface wear from their exposure.

Knowledge of an anatomically "normal" human skeletal ribcage is essential in order to examine deformation. Typically, the ribcage is ovoid, with the coronal dimension (measured from one side of the body to the other) exceeding the sagittal dimension (measured from the front of the body to the back). Human ribs generally conform to a relatively standard curvature, as illustrated by White, Black, and Folkens (2011). Deviation from this curvature can occur during fetal development (congenital deformity), can be influenced by diseases (vitamin D deficiency rickets and osteomalacia, ankylosing spondylitis, or osteogenesis imperfecta), or can be acquired by concerted and sustained pressure on the bones, particularly during the adolescent growth phase, as would result from long confinement in a corset. This deviation can then be observed and measured.

### *France*

Of the mounted and articulated skeletons at the Musée de l'Homme, the researcher requested access to the skeletal remains of women who lived between 1700 and 1900 CE, with the understanding that this collection was assembled piecemeal and that the skeletons have no relation to one another temporally or spatially (Table 1). First, the diameters of each thoracic cage along the coronal and sagittal planes were measured. Additionally, angles of incidence between the heads of individual ribs and their vertebral articular facets were measured and photographed, as were the internal curvatures of rib surfaces, and the angle of incidence of the spinous processes of

the vertebrae. Age indicators such as cranial suture fusion, osteoarthritis, ankylosing spondylitis, and mandibular corpus height (marking specifically incidents of alveolar resorption) and overall tooth wear were photographed as well. As the skeletons are completely articulated with both rib and pelvic cartilage fully intact, rib end and pelvic age markers could not be observed.

### *England*

At the Museum of London, 18 sets of remains were requested for this study on the basis of their completeness and the presence of extant ribs. These remains are from the cemetery designated FAO90, St. Brides Lower Churchyard 75–82 Farringdon Street, City of London. Excavated in 1991, this cemetery contained 606 individual skeletons, all of which were to some extent disarticulated. St. Brides Lower

Churchyard was known to be a resting place for the poor, residents in the parish, prostitutes, the incarcerated, or workhouse inmates. In their unpublished work on the excavation, Miles and Conheeny (2010) write, “in the lower churchyard there was no differential [sic.] by wealth and status, leading to it being the poorer members of the parish, lodgers and those who had not contributed to the poor rate who were mainly buried there” (p. 10).

Based on initial observations conducted by the Museum of London, only two sets of remains were previously identified as having corset damage (Walker, 2012). The damage that was observed in this research, specifically the curvature of the ribs and deformation of the spine, was not noted in the report on pathology of the vertebrae (Museum of London, 2005). Accession data concentrated on individual bones rather than sets of bones. Therefore, the researcher looked at

*Table 1.* Skeletal remains from the Musée de L’Homme

<b>Accession Number</b>	<b>Description</b>	<b>Origin</b>	<b>Date</b>	<b>Country</b>
<b>DF4-1 3571</b>	Mounted skeleton of a woman who died in Paris	Coll. Serres		Africa
<b>DC5-1 3636</b>	Mounted skeleton with cranium, with mandible intact, of Française			France
<b>DB8-1 3786</b>	Mounted skeleton with cranium, with mandible intact, of the woman Houte, killed on Vaugirard Street	Coll. Dumoutier, acquired by M. Barbier	1879	France
<b>DC9-1 5825</b>	Mounted skeleton with cranium, with mandible intact, of Alsace	Purchased by Vasseur, naturalist and merchant, on the Medical School Street	1869	France
<b>DC4-1 771</b>	Mounted skeleton with cranium, with mandible intact, of a Piemontaise woman of 30 years			Italy
<b>DJ9-1 781</b>	Mounted skeleton of a woman of the Isle of Bourbon, died in Paris, in November of 1850 at the age of 38 years			La Reunion
<b>DH12-1 28216</b>	Mounted skeleton of a Polish woman, missing the mandible	From the Society of Polish Anthropology to the Society of Parisian Anthropology, 1878		Poland

both individual rib and vertebra pairings and sets of vertebrae.

Standard age and sex markers, including cranial suture fusion and tooth wear, were photographed and evaluated. To evaluate deformation, ribs were sided and matched, and each vertebral facet was fitted to its corresponding vertebra. After as many as possible were matched, pairs of mid- to lower-ribs (between T4 and T11, depending on the level of preservation on each skeleton) were selected for measurement. In photographing pairs of ribs, a sand tray provided by the curators was used to stabilize the vertebrae and hold the ribs upright. Prior to photography, the ribs were confirmed to fully articulate with all evident facets and to be in complete anatomical alignment.

## Results

### *Corsets*

In the Victoria and Albert collection, 25 corsets were constructed from silk, 29 from cotton, two of leather, four of wool, and six of linen. For the boning structures, 24 are listed as being made of whalebone, and eight of steel. The waist sizes of these corsets, when fully laced closed, ranges between 34 and 80 cm (Table 2).

Thirty-two of the 44 corsets held in the collection could be examined. Of these, 15 were designed to be worn laced closed, and 13 showed evidence of having been mended. The mean waist circumference of the 15 that were laced closed is

56.33 cm.

### *France*

Of the seven mounted skeletons examined at the Musée de l'Homme, all exhibited rib and spinous process deformation consistent with long-term pressure on growing ribs and vertebrae and inconsistent with other types of documented damage, such as rickets/osteomalacia, ankylosing spondylitis, osteogenesis imperfecta, and congenital deformities (Brickley & Ives, 2008; Byers, 2002; Ortner & Putschchar, 1981; White et al., 2011). This is supported by Ortner and Putschchar's (1981) work on skeletal pathology, which details the thoracic changes associated with rickets as "...flattening of their curves, secondary to bending of rib cartilages at the osteocartilaginous junction...forward bending of the sternum, giving the pigeon breast deformity...in severely malacic rickets, lateral depression of the rib contour may occur, secondary to the pressure of the arms..." (p. 278). It is further supported by Brickley and Ives' (2008) more recent work on metabolic bone disease.

Observed rib damage at the Musée de l'Homme shows not a flattening of the curves, but rather an accentuation of them, with ribs sometimes pushed into an 's' shape so that their sternal ends point downward. This damage was located posterior to the midpoint of the ribs, which would eliminate the possibility of interference by pressure from the arms, which occurs during osteomalacic rickets

Table 2. Skeletal remains from the Victoria and Albert Museum

	<b>Circ. Waist</b>	<b>Circ. Bust</b>	<b>Circ. Hips</b>	<b>Front Length</b>	<b>Side Length</b>	<b>Rear Length</b>
Mean	56.78	62.66	58.15	37.18	30.42	36.58
Median	55.75	61.5	58	35	26.5	33
Mode	52	68	68	36	30	33
Max	80	90	84	143	143	143
Min	34	36	32.5	17	10	14

(Brickley & Ives, 2008; Byers, 2002; Ortner & Putshcar, 1981; White et al., 2011). All seven thoracic cages appear to be uniformly deformed between the fourth and tenth pair of ribs. The eleventh and twelfth pairs were occasionally considerably more deformed being pressed until they sat almost vertically.

Additionally, the spinous processes of the third to the twelfth thoracic vertebrae, on each set of remains, overlapped each other and were deformed laterally away from the sagittal plane. The thoracic cages were uniformly circular, with the coronal and sagittal dimensions being equal or nearly so (Table 3, Figures 4 and 5).

Table 3. Dimensions of the thoracic cage

	Coronal dimension	Sagittal dimension	Circumference
DF4-1 3571	20cm	18cm	59.8cm
DC5-1 3636	20cm	20cm	62.8cm
DB8-1 3786	17cm	17cm	53.4cm
DC9-1 5825	18cm	19cm	58.1cm
DC4-1 771	19cm	17cm	56.6cm
DJ9-1 781	18.4cm	18cm	57.2cm
DH12-1 28216	18.5cm	18cm	57.3cm

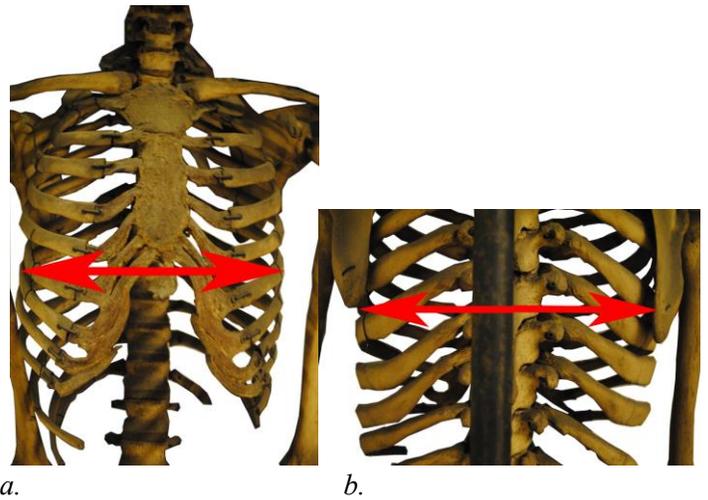


Figure 4 a. and b.: DC9-1 5825: Anterior and posterior views of the thoracic cage. Thoracic cage dimensions: coronal = 18, sagittal = 19. Articulated and preserved at time of dissection, approximately late 1860s. Arrow indicates location of measured diameter.

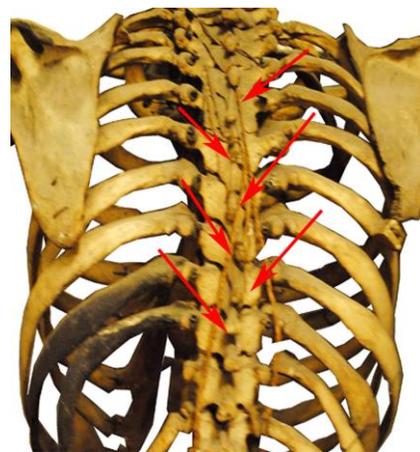


Figure 5: DH 12-1 28216: Spinous process deformation, with observable overlapping and deviation from the sagittal plane. Arrows indicate deviated and/or overlapping spinous processes.

Their circumference was then calculated by using either  $C=2\pi r$  to find the circumference if the dimensions were equal, or using a programmed circumference of an ellipse generator (csgnetwork.com), which uses the equation  $C=\pi\sqrt{2*(1/2(\text{longer dimension})^2 + (1/2(\text{shorter dimension})^2)}$ . The circumference generator was used due to the somewhat complicated nature of determining the circumference by equation, and was used if the dimensions were more than .1cm different from each other.

In the French skeletal collection, some ages at death were known, and others were estimated following techniques in Byers (2002) and White et al. (2011). While the accuracy of all aging techniques is disputed, cranial suture fusion using multiple fusion points—midlambdoid, lambda, obelion, anterior-sagittal, bregma, midcoronal, and where available pterion (Byers, 2002, p. 238-239; White et al., 2011, p. 390-392)—combined with analysis of attrition and secondary dentin deposition in tooth wear (Byers, 2002, p. 244-246; White et al., 2011, p. 388-392), will give a relatively stable range for age at death. All other suture sites, cartilaginous rib ends, and pubic symphyses were unavailable, as the articulation of the skeleton rendered these completely inaccessible. The ages estimated are conservative since they encompass the widest possible range, taking into account potential early suture fusion and the advanced tooth wear in younger individuals (Byers, 2002; White et al., 2011) (Table 4).

### England

Within the 17 sets of skeletal remains examined from the London FAO90 collection, four were determined by the curators to be between 36 and 45 years of age at death, with the remaining 13 above the age of 46 (Table 5).

Table 4: Age estimation for the Musée de L'Homme samples

	Age given	Age estimated
DF4-1 3571		35-50
DC5-1 3636		28-40
DB8-1 3786		50-60+
DC9-1 5825		30-45
DC4-1 771	30	
DJ9-1 781	38	
DH12-1 28216		30-55

Table 5: Age estimation for the London FAO90 samples

FAO90	Age Estimated	FAO90	Age Estimated
2245.1	>46	1547	>46
1954	>46	1940	>46
2158	>46	1127	>46
2116	>46	1119	>46
1123	>46	1326	>46
2284	>46	1151	>46
2283	36-45	2255	36-45
2216	36-45	1903	36-45
1741	>46	1343	>46

For three sets of remains measurements could be taken of the coronal diameter of the thoracic cage (Figures 6 & 7). Sagittal dimensions were not measured due to the inability to assemble the entire disarticulated thoracic cage. However, various sagittal dimensions were not visually observed to exceed the coronal dimensions, confirming that the thoracic cages would have

been, if not perfectly, at least approximately circular. This appeared to the researcher to be the same circular deformation as seen in the Paris collection. Circumference was then calculated using the formula  $C=2\pi r$  (Table 6), given visual confirmation of approximate circularity against the set-angle and based on the one measured dimension.

Table 6. Calculation of circumference of the thoracic cage

	Coronal dimension	Calculated circumference based on visual confirmation of circularity
FAO90 1151—T6 and ribs	14.64 cm	46 cm
FAO90 1547—T10 and ribs	10.27 cm	31 cm
FAO90 1547—T8 and ribs	12 cm	37 cm

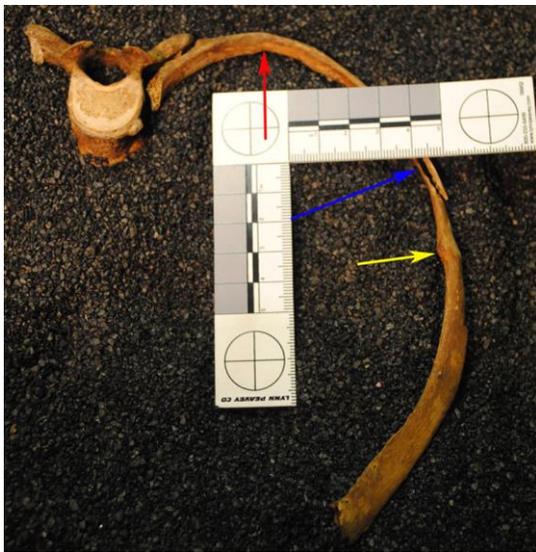
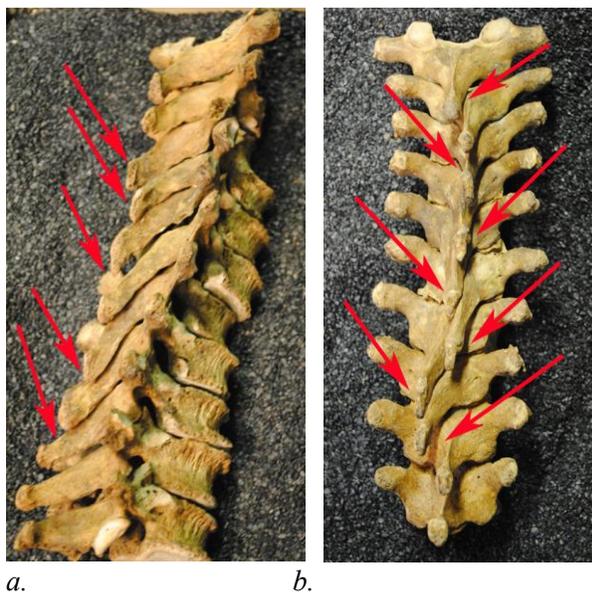


Figure 6. FAO90 2115—Fifth thoracic vertebra and left articulating rib. Red arrow indicates observable plastic deformation of the curvature of the rib neck. Blue arrow indicates postmortem breakage. Yellow arrow indicates antemortem breakage.



Figure 7. FAO90 2383—Third thoracic vertebra and articulating ribs. Red arrows indicate observable accentuation of the curvature of the ribs. Yellow arrows indicate traumatic breakage of the ribs. 21 cm diameter.

While interesting changes to the vertebrae were evident at the Musée de l'Homme, alterations were especially noticeable in the London collection because the vertebrae could be held and moved to evaluate how they overlapped when reassembled. Findings in London coincided precisely with the findings from Paris, in that the spinous processes deformed downward and laterally, presenting as flattened and overlapping each other, and producing a distinct, highly angled appearance consistent with the effects of long term pressure (Figures 8 a. and b.).



*Figure 8 a. and b.:* a. FAO90 1123—First to 11th thoracic vertebrae: observable deformation of the spinous processes downward and laterally from the sagittal plane. Arrows indicating deformations. b. FAO90 2216—First to 10th thoracic vertebrae: observable deformation of the spinous processes downward and laterally from the sagittal plane. Arrows indicate plastic deformation.

## Discussion

The Victoria and Albert corsets are in various stages of wear and show multiple levels of fineness (Victoria & Albert, 2013). One can extrapolate that at least two different socioeconomic levels are represented here, if not more, as there are both very finely made corsets meant for special occasions and utilitarian corsets that have had aftermarket additions made to cover wear patterns. As can be done today, one could purchase relatively fine garments second hand fairly inexpensively, so it is important to acknowledge that silk does not denote wealth and that utility does not denote poverty. Fine fabric was more likely to originate as a garment for a wealthy woman, however, it did not necessarily end its useful life in the same hands in which it began.

It is not possible to confirm exactly how long the corsets in the Victoria and Albert collection were in use, however, some of them show extensive patterns of wear and repair. Some show the addition of lace decoration after long use, a few show darning around the armholes and waist gussets, and others have lacing holes that have been repaired. Many show water staining, rust marks from the steel boning, or holes where the boning has poked through the fabric. The main outer fabric of many corsets is damaged, with silk that has faded or laddered, or cotton, which is not prone to laddering, taking on a napped or snagged appearance. The overall presentation of the collection is that of clothing that has been used and re-used, and that has been, colloquially, “well loved.”

Apart from one piece designated as belonging to a set of baby clothes, the fashions represented are all designed for adults. The collection includes overbust and underbust corsets, bustiers with shoulder straps, a riding habit, and several ball gowns. From this, it is evident that many demographics are represented. Upper-class women would be able to afford a ball gown made of silk, most other women would be able to buy strong, cotton, utilitarian corsets, and poor women

would be able to buy corsets second hand and make their own decorations for them. This collection represents a cross section of London's female population during the two hundred years of interest to this study.

The collection also shows that adult women's average waist size—based on the 15 corsets that had to be worn laced completely closed—was 56.33 cm, considerably smaller than the current average. A 2001 SizeUK survey (n=11,000, aged between 16 and 95 years) showed an average female waist size of 86 cm, this value having increased from their 1951 survey, which showed an average of 70 cm (SizeUK, 2015). In combination with the above skeletal data regarding the circumference of the thoracic cages (Tables 3 & 6), what one can see is a changing morphology, a sort of decompression, represented and influenced by a shift in the fashion of undergarments from corsets to brassieres. Brassieres put far less pressure on the rib cage and spinal column, and tend to be introduced into a woman's life at or slightly after the onset of puberty rather than before (Pedersen, 2004).

Additionally, the impact of culture and fashion on the female body related to issues surrounding skeletal morphology cannot be ignored. Toward the beginning of the 20th century, women were more socially able to move about in public, they were able to show increasing amounts of bare skin, and, as corsets changed, so did women's overall ability to take an active part in society and in the workforce. All of these changes contributed to lowering the incidence of vitamin D deficiency, or osteomalacia.

White et al. (2011) state that the effects of rickets are seen most often in the limbs, specifically a bowing of the femur, and the skeleton as a whole retains a certain plasticity. Brickley and Ives (2008) note that childhood rickets usually affects the long bones, and occasionally the bodies of the vertebrae, but it has yet to be shown to affect the spinous processes. Such deformation of the thoracic spinous processes as was observed is not characteristic of rickets or osteomalacia, or of any

other known metabolic or traumatic skeletal process (Brickley & Ives, 2008; Byers, 2002; Ortner & Putshcar, 1981; White et al., 2011).

These two skeletal collections are composed of women who lived comparatively long lives while undergoing this skeletal transformation. In France between 1745 and 1905 life expectancy at birth lay between 25 and 49 years, with data not separated for age (Roser, 2015). Likewise, for England between 1706 and 1901, life expectancy at birth was between 35 and 50 (Roser, 2015), whereas age at death averaged between 48 and 60 (Office for National Statistics, 2010).

As shown by the data in Tables 4 and 5, particularly the London data in Table 5, the women analyzed here either reached or exceeded their life expectancy at birth, and a few may have exceeded the average age at death, adjusted for infant/childhood mortality, despite the morphological changes brought about by corseting. While nothing can be said about the quality of life of these particular women, these results confound the very popular notion that corseting was inherently overtly harmful and a violence done to women, as well as the longstanding medical belief that corseting was responsible for early death, this being defined as death before or within a few years of marital age (Kunzle, 2004; O'Followell, 1908; Steele, 2001, 1996, 1985; Stone, 2012; Summers, 2001).

Contributing to the idea that women in corsets lived short and painful lives, O'Followell (1908) lists 42 unique symptoms related to corseting:

*...with those who wear bad corsets: slices near the armpits, difficulty with the venous circulation of the upper limbs, accidents resulting in the compression of the brachial plexus, flattening, crumpling of the breasts and diverse maladies of the lymph nodes or the mammary glands, extreme difficulty of certain movements, weakening and atrophy of compromised or inactive muscles,*

*pressing down and permanent overlapping of the lower ribs, restriction of the lower part of the thorax, reduction of the cavities of the chest and the abdomen, repression of the diaphragm, compression of the lungs, the heart, the stomach, the liver, and the other abdominal viscera, above all after a meal, more or less difficulty with breathing and speech, and at the very least aggravation of the lungs, disposed to coughing up blood, palpitations of the heart, syncope, circulatory difficulty returning the blood to the veins of the heart, embarrassment in the circulation of the head and the neck, frequent congestion in the upper genitals, difficulty using the muscles which have become languorous, digestive lesions (ulcers), indigestion, nausea, vomiting, slowness and easy interruption of the matter in the shrunken intestine, deformation, displacement of the liver and swelling in the vertical dimension abutting the iliac fossa, reduction of the other senses and depression moreover in substance, difficulty in abdominal circulation, prolapse of the uterus, troubles menstruating and, in the enlarged state (pregnancy), disposition towards abortion (miscarriage), with uterine hemorrhage, etc., etc.*<sup>3</sup>(p. 12).

Indeed, it is safe to assume that the women who came to O'Followell with these symptoms were also corseting; as demonstrated through the literature, the various types of corsetry found in the Victoria and Albert, and the skeletal collections, all demographics of women did this. Corseting, for a woman during this 200-year period, was the default position. From a modern perspective, while the corset certainly could not have been beneficial to many of these medical problems, such as atrophied muscles, increased

chance of miscarriage, and of course skeletal deformity, it was in no way shown conclusively to have been the primary cause of others, such as missed periods, heart palpitations, indigestion, and coughing up blood, a symptom which can be attributed to the high prevalence of tuberculosis.

Women themselves were far more concerned specifically with tight lacing than with other, perhaps more moderate, forms of corseting (Alderson, 1887; Steele, 2001; Teasley, 1904). As modern researchers differ on what constitutes tight lacing, (Steele, 2001; Summers, 2001), and as it was never clearly defined in either the words of women (Alderson, 1887; Teasley, 1904) or their doctors (Kunzle, 2004; O'Followell, 1908), what one sees in the literature does not necessarily represent what women experienced on a daily basis. There have been reports of broken laces (Teasley, 1904), and hyperbolic drawings of maids with their feet upon the backsides of their mistresses as they struggle with recalcitrant lacing (Colmer, 1980; Steele, 2001). Yet the corsets themselves tell a different story: a story of being often and well worn, but handled with care and used for years, something that would be less than likely were they pulled tighter than their frames allowed.

What this research shows, in aggregate, is the need for continued study integrating women's lived experiences into the bioanthropological record, and the need for a truly nuanced discussion about women's lives in relation to the cultural practices they embodied. Rather than making such practices fit the mold of terms such as patriarchal or violent, one must look at how women agentively chose to corset, and at the actual physical repercussions of their choices. To return to the idea of a social skin (Turner, 1993), one needs to look at corseting as something as integral to a woman's life as her own skin. We need to piece together what it meant to live in and be changed by a corset, something women did on a daily basis and which impacted every part of their lives, using a multi-disciplinary approach. This approach must use history and anthropology, as well as women's own words, to draw a clear

picture of this important era that so greatly influences the way we speak, act, and think today. The 21<sup>st</sup> century sees itself as the child of modernity, as the product of this 200-year time period, and this type of research therefore has lasting implications for how women are treated now and going forward.

### Notes

<sup>1</sup> Nous trouvons la Vénus de Milo belle comme elle est, mais, habillée à la mode actuelle, elle nous semblerait affreuse, car les vêtements qu'on porte aujourd'hui lui épaissiraient encore la taille. Vous admirez la Vénus de Milo et vous admirez une taille fine, mais une fois la femme mince déshabillée, vous serez obligés de conclure qu'elle doit être laide puisqu'elle ne ressemblera pas à la Vénus.

<sup>2</sup> atrophier, constricter, dégénérer, déterminer, envelopper, excoriater, reformer, moule, presser, rendre, à cause de.

<sup>3</sup> ...qu'au port de mauvais corsets: excoriations au voisinage des aisselles, gêne de la circulation veineuse des membres supérieurs, accidents résultant de la compression du plexus brachial, aplatissement, froissement de seins et maladies diverses de ganglions lymphatiques ou des glandes mammaires, affaissement, déformations ou excoriations des mamelons, difficulté extrême de certain mouvements, affaiblissement et atrophie des muscles comprimés ou inactifs, abaissement et rapprochement permanent des côtes inférieures, rétrécissement de la base du thorax, réduction des cavités de la poitrine et de l'abdomen, refoulement du diaphragme, compression des poumons, du cœur, de l'estomac, du foie et des autres visères abdominaux, surtout après les repas, d'où la gêne plus ou moins grande de la respiration et de la parole, aggravation des moindres affections pulmonaires, disposition à l'hémoptysie, palpitations de cœur, syncopes, difficulté du retour du sang veineux au cœur, embarras dans la circulation de la tête et du cou, congestion fréquent aux parties supérieures, efforts

musculaires difficiles ou langoureux, lésions des fonctions digestives, gastralgie, nausées, vomissements, lenteur et interruption facile du cours des matières dans l'intestin rétréci, déformation, déplacement du foie augmenté dans son diamètre vertical et repoussé vers la fosse iliaque, réduit dans les autres sens et déprimé en outre dans la substance, gêne de la circulation abdominale, abaissement de l'utérus, troubles de la menstruation et, dans l'état de grossesse, disposition à l'avortement, aux hémorragies utérines, etc., etc.

### Acknowledgements

E. Schattschneider, Brandeis; J. VanderVeen, Indiana University; R. Redfern and J. Bekvalac, Centre for Human Bioarchaeology-Photos Courtesy of the Museum of London; P. Menciaer and A. Fort, Photos-Collection d'Anthropologie, Musée de l'Homme (MNHN, Paris)

## References

- Alderson, M. (1887). *How she felt in her first corset and other poems*. Butte, MT: Self published.
- Bendall, S. (2014). To write a distick upon it: Busks and the language of courtship and sexual desire in sixteenth-and seventeenth-century England. *Gender and History*, 26(2), 199–222.
- Berlanstein, L. (1984). *The working people of Paris*. Baltimore, MD: The Johns Hopkins University Press.
- Brickley, M., & Ives, R. (2008). *The bioarchaeology of metabolic bone disease*. Oxford: Elsevier Press.
- Byers, S. (2008). *Introduction to forensic anthropology* (3<sup>rd</sup> ed.). Boston, MA: Pearson Education, Inc.
- Colmer, M. (1980). *Whalebone to see-through: A history of body packaging*. Cranbury, NJ: A. S. Barnes & Co., Inc.
- Comaroff, J. (1985). Bodily reform as historical practice: The semantics of resistance in modern South Africa. *The International Journal of Psychology*, 20, 541-567.
- CSG Network. (2015). Retrieved from <http://www.csgnetwork.com/circumellipse.html>.
- Davidoff, L., & Hall, C. (2002). *Family fortunes: men and women of the English middle class 1780-1850, revised edition*. London: Routledge Press. (Original work published 1987).
- Dickinson, R. (1887). *The corset: Questions of pressure and displacement*. London: Dodo Press.
- Douglas, M. (1966). *Purity and danger*. New York, NY: Routledge Press.
- Entwistle, J. (2000). *The fashioned body*. Cambridge: Polity Press.
- Fontanel, B. (1997). *Support and seduction: A history of corsets and bras*. New York, NY: Abrams Books.
- Hunt, L. (1984). *Politics, culture, and class in the French revolution*. Berkeley, CA: University of California Press.
- Kunzle, D. (2004). *Fashion & fetishism: Corsets, tight-lacing & other forms of body-sculpture*. Sutton: Stroud.
- Lauder, V. (2010). *Corsets: A modern guide*. New York, NY: Chartwell Books.
- Lord, W. (1868). *Freaks of fashion: The corset and the crinoline*. London: Dover.
- Matthew, C. (2000). *Short Oxford history of the British Isles, the nineteenth century*. Oxford: Oxford University Press.
- Miles, A., & Conheaney, J. (2010). *A Post-medieval population from London: Excavations in the St Bride's Lower Churchyard 75–82 Farringdon Street, City of London, EC4*. London: MOLA.
- Museum of London Database. (2005). *Collections Research Database*. Retrieved from <http://www.museumoflondon.org.uk/Collections-Research/LAARC/Centre-for-Human-Bioarchaeology/Database/Post-medieval+cemeteries/St+Brides+lower.htm>
- Office for National Statistics. (2010). *Mortality in England and Wales: Average life span*. Retrieved from <http://www.ons.gov.uk/ons/rel/mortality-ageing/mortality-in-england-and-wales/average-life-span/rpt-average-life-span.html#tab-Trends-in-Average-Life-Span>
- O'Followell, L. (1908). *Le corset: Histoire, médecine, hygiène*. Paris: A. Maloine.
- Ortner, D., & Putschar, W. (1981). *Human skeletal remains, Smithsonian contributions to anthropology* 28. City of Washington: Smithsonian Institution Press.
- Pedersen, S. (2004). *Bra: A thousand years of style, support, and seduction*. London: David and Charles Press.

- Perrot, P. (1994). *Fashioning the bourgeoisie: A history of clothing in the nineteenth century*. Princeton, NJ: Princeton University Press.
- Roser, M. (2015). *Life expectancy*. Retrieved from <http://ourworldindata.org/data/population-growth-vital-statistics/life-expectancy/>
- Seleshanko, K. (2012). *Bound and determined: A visual history of corsets, 1850-1960*. New York, NY: Dover Publications.
- Simmel, G. (1957). Fashion. *The American Journal of Sociology*, 62(6), 541-558.
- Steele, V. (1985). *Fashion and eroticism: The ideals of feminine beauty from the Victorian era to the jazz age*. New York, NY: Oxford University Press.
- Steele, V. (1996). *Fetish: Fashion, sex and power*. New York, NY: Oxford University Press.
- Steele, V. (2001). *The corset: A cultural history*. New Haven, CT: Yale University Press.
- Stone, L. (1977). *The family, sex, and marriage in England 1500-1800*. New York, NY: Harper Colophon.
- Stone, P. (2012). Binding women: Ethnology, skeletal deformations, and violence against women. *International Journal of Paleopathology*, 2(2-3), 53-60.
- Summers, L. (2001). *Bound to please: A history of the Victorian corset*. Oxford: Berg.
- Teasley, D. (1904). *Private lectures to mothers and daughters on sexual purity: Including love, courtship, marriage, sexual physiology, and the evil effects of tight lacing*. Moundsville, WV: Gospel Trumpet Company.
- Turner, T. (1993). The social skin. In C. Burroughs & J. Ehrenreich (Eds.), (pp. 15-39). Ames, IA: University of Iowa Press.
- Walker, D. (2012). *Disease in London, 1<sup>st</sup>-19<sup>th</sup> centuries: An illustrated guide to diagnosis. Monograph Series 56*. London: MOLA.
- Weber, E. (1976). *Peasants into Frenchmen: The modernization of rural France, 1870-1914*. Stanford, CA: Stanford University Press.
- White, T., Black, M., & Folkens, A. (2011). *Human osteology*, (3<sup>rd</sup> ed.). Burlington, MA: Elsevier Press.
- Woloch, I. (1994). *The new regime: Transformations of the French civic order, 1789-1820s*. New York, NY: W.W. Norton and Company, Inc.