Historic medical perspectives of corseting and two physiologic studies with reenactors

Colleen Ruby Gau

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Historic medical perspectives of corseting and two physiologic studies with reenactors

by

Colleen Ruby Gau

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

Major: Textiles and Clothing
Major Professor: Jane Farrell-Beck

Iowa State University
Ames, Iowa
1998

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This is to certify that the Doctoral dissertation of

Colleen Ruby Gau

has met the requirements of Iowa State University

Signature was redacted for privacy.

Major Professor

Signature was redacted for privacy.

For the Major Program

Signature was redacted for privacy.

For the Graduate College
This dissertation is dedicated with grateful thanks and love to

my husband Gerald

who supported and encouraged me to this beginning
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Historic interpreters from Living History Farms in Urbandale, Iowa who served as subjects for these experiments were pioneers in their own right; they gave their time, their torsos and their enthusiasm to this project over almost two years. Their patience and professionalism serves as a ‘gold-standard’ for studies involving safety of reenactors. I am in awe of their cooperation, their unending cheerfulness, and their dedication to history.

No project of this complication can come to fruition without the extensive use of multiple libraries. The staff of the Iowa State University’s Parks Library Interlibrary Loan department provided me with a high percentage of my requests, which were frequently nineteenth century, obscure, and found in far-flung places. The curators and librarians at the New York Academy of Medicine assisted me in my search for Robert Latou Dickinson’s archives and provided invaluable guidance from their unique collections. My visits to the
National History of Medicine Library in Bethesda, Maryland, Library of Congress, New York City and Brooklyn Public Libraries, University of Minnesota, University of Wisconsin (Madison), and the Mayo Medical Library were outstanding in their abundant resources. In every case, the assistance received was courteous and helpful.

Support and encouragement has come from my family and friends. When I left my nursing career and entered university after age fifty, I had people who believed I could succeed. Thomas, my elder son and Rebecca, my sweet daughter-in-law not only produced the world’s cutest grandchild, but consistently bolstered me. My youngest son, Nicholas, provided cheers and neck massages after my long commutes. The loyalty and sheer enduranc of my husband has sustained me through the lonely stretches, his unerring calmness and conviction in my ability sustained my courage to complete this project. I always felt the humor and the love of my middle son Matthew, helping me when I needed an angel. I want to thank the members of my book club, my Toastmaster’s group, former work-mates, old neighbors, hairdressers, sisters-in-law, brothers, nieces. and so many dear people who never failed to pray for and encourage me, despite infrequent contact and long-neglected responsibilities. Mary Peterson, my husband’s unflappable secretary, has provided cheer and able assistance via phone and e-mail during this long-distance arrangement; without her I would have faltered.

This journey has been a spiritual as well as an academic undertaking. When I began I was a different person than I am today. I have grown in ways which I did not anticipate and I feel confident I am better for the experience. Many of my friends have talked of courage when they speak of my accomplishing this goal; I do not think of it as an act of bravery, but of fulfillment. The action of returning to school, receiving degrees and preparing for a new career has been the most fun-filled accomplishment of my lifetime. I hope that in a small way I have been a model to the young women and men I have met along the way; to follow their dream and do what they love during their lifetimes.
Safety of historic reenactors was the primary reason for this research. No studies of corseted subjects have been done since the late nineteenth century. Clinical observations about the effects of corsets were numerous in the medical literature; but dress reform efforts by doctors were not effective in changing fashion. Arguments by Dress Reformers did not concentrate on the medical aspects of corseting.

Two historic physiologic studies were reproduced using modern equipment. Sixteen subjects took part in lung capacity and comfort assessments, and eight of the subjects had torso pressures measured. When tight-laced three inches less than their natural waist measurement, subjects lost an average of 9% of their tidal volume as measured by spirometer, with the range from 2%-29%. Shortness of breath was reported in varying degrees by all subjects, but was relieved easily with rest. No serious physiologic effects were seen with one day of corseting. Comfort was greater when tight-lacing was 10% or less of natural waist measurement; subjects with waist measurements greater than 32.5 inches [median of group] were more comfortable than those with waists less than 32.5 inches. Both small and large waisted subjects were able to carry on their routine reenactment duties with some adjustments. Torso pressure measurements were greatest at the rib position, with 56 cm. of H_2O (±35), compared to waist front pressure of 48 cm. of H_2O (±33), and waist back pressure of 48 cm. of H_2O (±14). The pressures were proportionately similar to the findings of the historic study.

Recommendations for reenactors were: 1) tight-lace no more than 10% of her waist measurement; 2) exercise regularly to maintain abdominal and spinal musculature and prevent serious muscle atrophy with resultant dependence on corset.
CHAPTER 1: INTRODUCTION

Justification

Throughout the time I have been at Iowa State University I have been interested in the broad subject of clothing and health. This is based, in part, on my knowledge of anatomy and physiology from my previous career as a Registered Nurse. Many references to the 'health corset' which piqued my interest and caused the question, "What did the designation 'health' mean?" Why did nineteenth century physicians use the term? I looked for studies which used scientific methodology in medical literature which supported the health designation. This interest proceeded from my focus on the safety and health of historical interpreters and reenactors who wear corsets to create a silhouette consistent with the clothing of the nineteenth and early twentieth centuries.

In a preceding study I examined the effect of two styles of corsets on the exercise capacity of female reenactors using treadmill testing.¹ The 'hourglass' corset style of 1865 was compared with the 'straight-front' corset of 1900 using ten subjects. The straight-front corset was designed by a doctor, and called the 'health' corset. Physiologic parameters of oxygen uptake, carbon dioxide output, tidal volume of the lungs, blood pressure, pulse, and respiratory rates were recorded with and without corsets. I used standardized protocols for maximum exercise without corsets and 85% of the individual's maximum work load when corsets were worn. Despite the claims of efficacy by straight-front corset inventors and historians' reiterations of those claims, I found the straight-front corset to be more deleterious to the physiological performance and capacity for exercise than the hourglass style when tight-laced to the same degree. In addition to the poor physiologic performance when wearing the straight-front corset, subjects complained of balance difficulties, increased back pain, and problems with gait adjustments.
My first focus in this study was to examine the historic medical literature for corset-related information. I discovered a small amount of scientific evidence related to corset topics and a large amount of clinical observation evidence. The second focus for this project centered on reproducing, as closely as possible, elements of two small studies done in the nineteenth century and never repeated since. A study completed in 1890 by Dr. William Wilberforce-Smith in London, England examined a size-matched series of males and females [corseted and never-corseted] using spirometry measurements. The spirometer had been designed about forty years previously by Dr. John Hutchinson and was used to show vital capacity. Although the equipment I used was technology of the late twentieth century, it was based directly on the earlier (1880s) model, and information gathered could be directly compared.

The second experiment I attempted to replicate was done in 1887 by Dr. Robert Latou Dickinson, a gynecologist. He fashioned a small rubber bladder attached to a sphygmomanometer [blood pressure measuring device] and slipped it between the tight-laced corsets and torsos of his patients to obtain pressure readings (Figure 1). He attempted to convince his patients of the dangers associated with external pressure applied to the soft tissues and organs of the abdomen from the tightly-laced corsets worn at the time. My experiment used slightly more sophisticated pressure measuring devices, and the amount of tight-lacing was predetermined at three inches less than the natural waist measurement of the subjects.

In addition to re-examining these two nineteenth century experiments, I asked the subjects to keep dairies of their comfort levels in corsets during their normal work day. These studies took place at the Living History Farms, in Urbandale, Iowa during the summer of 1997. I wanted to understand the feelings and physical capacity of subjects wearing corsets. This was not a contest to see who could do the most work while corseted, but was meant to assess the relative comfort and safety of wearing a corset during reenactment duties.
During the time I was doing the experiments, I became aware of 1990s fashion designers' use of corsets and heard from several present-day corset wearers who were not historical interpreters or reenactors. Several correspondents answered a short series of questions about their corseting habits and this led me to some real concern about the advocacy and use of corsets in today's fashion milieu. In addition to being shod in very high heeled shoes which have again become popular with young fashion-conscious women, will women also choose corsets? Because this information was outside my primary focus, I elected to place this information about present-day corseters in an epilogue.

Purpose

The overarching purpose of this project was to assess the health-safety aspects of wearing tight-laced corsets during reenactment duties. The first part of this study used a spirometer to measure the pulmonary capacity of female reenactors with and without corsets prior to and at the conclusion of their day's work as historic interpreters. The second part measured pressure exerted by their corsets on the torsos of subjects tight-laced three inches less than their natural waist measurement. The third part of this project used a written scale to assess comfort levels of reenactors while wearing corsets; this was juxtaposed to their written activities diaries.
The aforementioned project was supported by a thorough examination of the historical medical literature as it pertained to corseting.

Research Questions

1. Did the late nineteenth and early twentieth centuries' medical literature condone or condemn tight-lacing? Did medical opinion on corseting affect the fashion industry?

2. Is there evidence that dress reform advocates used medical literature or controlled scientific experimental methods to support their cause?

3. Will the pulmonary capacity of subjects tight-laced three inches less than natural waist measurement change? Will these data corroborate those of Wilberforce-Smith?

4. Can the torso pressures, as recorded by Dickinson, be corroborated using sophisticated balloon-tipped catheter measuring devices?

5. What comfort level is assessed by corset-wearing reenactors during their work day?

Hypotheses

Anyone reading this dissertation will realize the use of hypotheses is not 'de rigeur' for historical topic research, however, I felt the interdisciplinary nature of this study warranted the use of the following statements.

1. Subjects wearing corsets tight-laced three inches less than natural waist measurement will have diminished lung capacity.

2. Subjects wearing corsets tight-laced three inches less than natural waist measurement will be capable of doing their usual reenactment duties.

Objectives

1. To assess medical opinions of and research on tight-lacing by late nineteenth and early twentieth century doctors.

2. To discover whether medical opinions about corseting affected dress reform.

3. To determine if spirometry results reported by Wilberforce-Smith, which assessed pulmonary capacity in corseted and uncorseted individuals, could be replicated.

4. To determine if torso pressures, as measured by Dickinson, could be duplicated using modern measuring devices.
5. To assess the safety of wearing corsets tight-laced three inches less than natural waist measurement during historic reenactment work.

6. To assess individual comfort levels of reenactors during their usual work day as historic interpreters.

Definitions

This report encompassed several fields: medical history, history of clothing, dress reform, and exercise physiology. For this reason, I have placed all definitions in a glossary at the end of the manuscript to help specialists in each area understand the nomenclature.

Assumptions

1. Opinions expressed in historic medical and fashion journals and books are honest and accurate within the context of the period.

2. The volunteers answered the questions honestly.

3. Each volunteer’s corset fit correctly according to the 1870 silhouette and was tight-laced to three inches less than their natural waist measurement.

4. All testing equipment operated within correct parameters.

5. Corsets made by the researcher were consistent within the fabric’s limits.

Limitations

1. Each volunteer was self-assessed only in relationship to her individual work routine. No special preparatory routine or pre-testing was done with the subjects. Each reenactor chose the day for testing and carried out duties within her sphere of historic interpretation for one eight-hour day.

2. There was not an averaging effect through the use of multiple testing.

3. The number of experimental subjects was limited by cost and the effort of producing custom-made corsets.

4. The number of individuals responding to the modern corseters’ questionnaire was limited by small exposure and time.

5. The subjects’ personal dedication to the researcher and their eagerness to take part in the study may have skewed their responses and prevented them from releasing the tight-lacing when they felt discomfort.
Notes

5 The decision to use three inches of tight-lacing was based on my two earlier studies with eighteen subjects. Previously uncorseted subjects were able to tolerate three inches of tight-lacing with some degree of comfort over three to eight hour periods, but tighter lacings were not well tolerated.
6 All images are used with permission throughout this manuscript.
7 ‘Safety’ is a relative term which in the context of this research means within acceptable limits of physiologic capacities. Although some breathing changes may occur, no acute symptoms would be noted during short-term corset use.
CHAPTER 2: LITERATURE REVIEW

Introduction

This literature review will include the work of historians who have chronicled aspects of the social, political, industrial, and economic changes which took place between 1870-1915. It will be divided into sections to assist the reader in understanding the time during which tight-lacing was preeminent. The fashion section will contain a selection of writers who typified opinions of the time. The Dress Reform Movement and its influences, which would normally be a part of this topic, will be discussed in chapter four. The medical section will encompass a truncated explanation of medical education in the nineteenth century and a brief synopsis of the 'state' of medical practice in the years specified. A definition of historic reenactment and interpretation as carried out at Living History Farms in Urbandale, Iowa, will be included in this portion of the report.

The primary focus of this research is tight-lacing. Tight-lacing is a process of reducing the waist measurement from three to fifteen inches smaller than the natural waist measurement, using a boned corset of two or more sections (Figure 2). In the time under study, moderate lacing was described as one-to-three inches less than the unlaced waist. Cinching was achieved by degrees, beginning before puberty with lightly-boned stays, and advancing to tighter garments as the girls aged (Figure 3). Boarding school pupils were supervised to assure stays were removed only for bathing and loosened slightly for sleep. Tight lacing had a resurgence after the tubular silhouette of the Napoleonic Era faded; the waistline of garments gradually returned to a

Figure 2. Corset with busk closure, made with eight pieces on each side, bones in seams. (Shep, p. 44)
natural position. From the mid-century onwards, corsets were increasingly tightened as fashion focused on the diminutive waist. Newspapers and magazines devoted to fashion declared the bride's ideal waist could be encompassed by the hands of her groom.⁴

The Late Nineteenth Century Social Milieu

In his excellent history of Victoria's reign, W. J. Reader gives readers a lucid image of many changes which occurred in the late nineteenth century.⁵ Many of the changes in Britain were mirrored or slightly anticipated in American society: class consciousness was rife, technological changes with the industrial revolution were creating wealth as well as havoc in the 'Puritan work-ethic' populations, child labor was slowly outlawed, education and agricultural reforms were begun, railways were built, photography was invented, communication between great distances was faster with trans-Atlantic cables and telegraph
lines, leisure travel and sports were taken up by the middle class, and improvements in housing and sanitation gradually changed the urban and rural landscapes.

During this time attention was placed on beauty, the artistic, or what was sometimes described as 'aesthetic'. The artist Hogarth was quoted as saying, "line before beauty," which corseters took to mean that the corseted form, by creating a smooth line, 'created beauty' (Figure 4). Several present-day authors have mentioned the changing definitions of beauty. When we examine cultures around the world, we may find customs and practices which seem extreme by our standards, but which are completely accepted and even admired in their homelands. Examples of skull-flattening, tattooing, scarification, and other body-modifications have been cited by many authors. In recent times, National Geographic featured an article about the extreme definitions of beauty held by some Burmese tribeswomen, who wore neck rings to elongate their necks (Figure 5). As customs changed and neck rings were discouraged, these women were unable to support their heads with atrophied muscles. Spinal injuries resulted in women who attempted to remove the rings without a protracted period of muscle strengthening and rehabilitation. Precisely the same type of muscle atrophy occurred in those women as had happened to their nineteenth century sisters.

Figure 4. Hogarth's 'line of beauty' c. 1875. (Newton, p. 20)
Figure 5. Burma tribal 'line of beauty' c. 1975; created atrophy of muscle. (Kreshnihan, p. 799)
The advent of *haute couture* took place in the middle of the nineteenth century, as Englishman Charles Worth (Figure 6) established his business in Paris. He catered to the moneyed classes, members of the French court, and particularly the Empress Eugenie. In the 1870s he employed 1200 seamstresses and was almost single-handedly responsible for reviving the Lyon silk textile mills.\(^{10}\) His influence on the fashion scene was world-wide by the time of his death. Worth put emphasis on the corseted waist, swept the bell-shaped skirt back into a bustled form, and designed the "princess-line" which smoothed the figure firmly-shaped by the underlying long-line corset. There were others who followed in his footsteps, with varying degrees of influence. One who bridged the century change was Poiret; he traveled extensively in the United States and was widely admired for his flowing, 'waistless' designs. One author named him "The Man Who Banned the Corset."\(^{11}\)

Among present day writers who focused on aspects of the feminine experience in the nineteenth century: Jill Conway\(^{12}\) discussed dress reform briefly, without mentioning corset-wearing specifically; Quentin Crewe\(^{13}\) used illustrations from *The Queen*, a contemporary magazine about Victorian court life, to show fashions of the day; Alison Gemsheim\(^{14}\) presented a survey of Victorian and Edwardian fashions; Pamela Horn\(^{15}\) examined the Victorian servant's relationship to their employers and other members of their class; Lois Banner\(^{16}\) recorded the focus on female beauty in America; Anne Hollander\(^{17}\) discussed the meanings and messages of the clothing worn by Victorians; and Janet Murray\(^{18}\) gave insights about feminist leaders and others who kept diaries in the nineteenth century. These authors stirred my imagination to better understand the thinking and the actions of the nineteenth century women, as well as the milieu in which they found themselves. As the reader realizes, it can be detrimental to research if one makes judgments based on present-day...
social mores, computer-age knowledge, 1990s political enlightenment, or modern religious
tolerance.

Corsets and Class

Several present-day historians have commented on clothing in the class structure within
the nineteenth century and how it impacted the social milieu. Although Peter and Ann
Mactaggart principally discussed fashions earlier in history, I felt their comments about
working class women using corsets were appropriate for the nineteenth century female labor
force as well. I do not agree with Smithsonian curator Della Rios, who said, “the practice of
tight-lacing [American] women was not common at all.” A French reporter who traveled and
wrote in America during the late nineteenth century wrote extensively on her impressions of the
fashions worn by American women of all classes. She said, [American women are] “always
finding some ways to adapt themselves to fashion at any
cost.” One only has to examine garments found in rural
museums and small historical societies, or look at
photographs taken in the period to refute her opinion
(Figure 7). It is certainly within the realm of possibility that
these women did not tight-lace everyday, or even wear a
corset every day, but they certainly owned and wore corsets
on ‘dress-up’ occasions.

The middle class burgeoned as industrial power and
money created the “conspicuous consumption” which
marked the differences between old money and new rich;
upper, middle, and low classes; owners and workers; and
urban and rural inhabitants (Figure 8). The middle class
greatly increased in numbers over the entire period of the

Figure 7. American midwestern woman c.1885, wearing a fashionable dress
with a corset underneath. (Author’s collection)
Industrial Revolution, in both America and Europe, and with that upsurge came a greater upsurge of display, most especially done by the wife of the wealthy merchant, banker, or rich industrialist.

Corsets were part of the display of wealth by these women; they connoted respectability and exemption from manual work, as Green and Perry put it, corsets and petticoats which have survived from the period make it clear that movement was difficult for women who dressed in fashion. But the cinched waist was more than uncomfortable, it was loaded with cultural meaning and information. In a society that valued display, a restriction of movement was a signal that a woman did not have to endure the demanding physical labor of housework because her husband had enough money to pay for domestic help. Moreover, the restricted movement imposed by tightly laced corsets, metal stays, heavy petticoats, and high-heeled shoes was a kind of control over women. 

Economic Changes

Many changes which occurred in the late nineteenth and early twentieth centuries influenced fashion for women of that time. Understanding this helps us avoid judging our forebears with today's rules and knowledge. Change was world-wide, but like politics, it began locally with its basis in economics, education, communications, and population movement.

In the years following the American Civil War, industrialization created opportunities and workers flocked to factories. Immigrants flowed into the country in enormous waves, willing to work and expecting to prosper. Enrollment in advanced education was more accessible for women as the century ended. According to the United States Census, in 1875 out of a population of 45,073,000 only 2027 women received baccalaureate degrees [compared
to 9900 men]; by 1900, with a population of 76,094,000 the college graduation level for women increased to 5237 [12,700 men].

Changes took place in the homes of America. Technological advancement meant labor-saving devices were available to many. The home sewing machine (Figure 9) was a time-saver and brought with it demands for patterns, increased the use of frills and trims, and set a variety of economic changes in place, not the least of which was the installment payment. Initially resisted by tailors and dressmakers, sewing machines quickly became a great labor-saving resource. Employment of women outside the home increased as telephones, typewriters, and retail merchandising beckoned them into wage-earning. Adherence to strict religious codes gradually relaxed, time was available for sports and recreation, suffragettes campaigned for the vote, and men felt their dominant position in the hierarchy tremble.

The attitudes of Victorians about children were mixed. The upper classes pampered their children and dressed them as little adults after the age of about five (Figure 10). The lower class children worked in factories and were often dressed in rags. Middle class parents sought out boarding schools for their children. Treatment in the boarding schools was often harsh and included strictly enforced dress regulations for girls and boys. Writers who discussed children in the Victorian age and their clothing were: Dion Calthrop, Alison Gernsheim, Deborah Gorham, Helene Roberts, Iris Brooke, Barbara Greenleaf, Harvey Green and Mary Ellen Perry, Mabel Donnelly, and Phillipe Perrot. Although these authors unanimously reported corsets worn by children, they demurred from judging society’s or parents’ purpose in dressing children that way.
Mothers of those Victorian children were the concern of contemporary social Darwinists who warned of the dangers to the population’s survival wrought by wearing corsets. This trend of thinking continued in both lay and medical literature after the turn of the twentieth century. These arguments were intended to instill fear of sterility, miscarriage, deformed fetuses, invalidism, and even death resulting from tight-lacing. Fear has not shown itself to be a motivating factor in the fashion-conscious; despite dire warnings and predictions of dreaded results, women have continued to wear too-tight shoes and gloves, squeezed their torsos beyond the capacity for health, painted their complexions with poisons, and generally ignored comfort and common sense. But, it must be remembered, personal comfort was not an issue considered by preachers, doctors, educators, or even fashion designers of the last century. Propriety took precedence over comfort, and indeed, health in many cases; and propriety demanded a corseted waist. The phrase ‘loose woman’ found its origins in reference to the prostitutes of the early nineteenth century who wore their undergarments loose or open to accommodate their customers’ time constraints (Figure 11). Actresses were often unfairly categorized as ‘loose women,’ and for that reason they frequently took the appellation “Mrs.” to protect their reputation. The upright figure of the tight-laced female presented a direct contrast to the ‘loose woman’ (Figure 12). It was the tight-laced silhouette which preachers lauded and fashion magazines and the popular press persuaded women to assume.
Figure 11. ‘Loose woman’ actress Nell Gwynn. (Binder, p. 224)

Figure 12. The tightly-laced Victorian matron’s image above contrasts with that of the ‘loose woman’ to the left.
(Author’s collection)

Fashion Historian’s Views

Fashion historians of the present era who have not commented on corseting effects are probably non-existent. Almost every author after 1930 discussed corseting negatively: some held the corseters up to ridicule, questioned their mental capacity, commented on their status as “slaves,” or called them social parasites. I discovered only three who looked at corseting in a positive light: according to Lois Skinner, “corsets guarded virtue;” Gerhart Schwarz defended doctors who promoted corsets and blamed the German spas for bad publicity against corsets; and Edward Shorter wrote, “corsets are innocuous.”

Jane Richardson and A. L. Kroeber were anthropologists in the 1940s who looked at three hundred years of fashion silhouette changes; they identified cycles of change for shape, waist position, skirt length, and other features. Two other 1940s historians who contributed to the data bank of fashion history were Morris Crawford, who provided excellent
illustrations, and Quentin Bell. Bell stated, "We are [such]...creatures of fashion that we tend to accept its influence almost as a law of nature." I found four 1950s authors with opinions on corseting: Morris Crawford, James Laver, Nora Waugh, and Madge Garland. Laver spoke about the 'inevitability' of tight-waisted corsets without examining the reasons beyond the explanation that ladies who wore corsets didn’t have to work. He stated, “tight lacing went out just before the First World War." Waugh traced original patterns for corsets and placed them in the context of advertising and fashion silhouette changes. Garland reminded us of the corseted “New Look” of Christian Dior in 1947, which was, "a conscious expression of a newly liberated world in which women could look like women and not like imitation soldiers, sailors, or factory hands" (Figure 13).

The 1960s had an upsurge in costume history authors. Robert Reigel discussed the dress reform movement in England, he observed that “conservatives” looked upon corseted women as mysterious as well as beautiful. Benedict Zillacus chronicled the nineteenth century corset industry in Europe and stated, “for the first time in history, the corset has become a democratic everywoman's item of wear.” The same year, Ingrid Brenninkmeyer reiterated Veblen’s argument of conspicuous consumption, she stated, “clothes express...a hierarchy of values which is responsible for the relative position of culture elements in the total culture.” She also commented that sports clothing tended to be the "forerunner of practical clothing." Arthur Pearce edited the history of an American corset firm, the Warnaco Company; he gave a decidedly positive spin to corseting. Cecil Saint Laurent updated Crawford with wonderful photographs, while Agnes Young reexamined

Figure 13. Dior's 1947 "New Look" with wasp waists. (Ribeiro, p. 162)
fashion cycles. James Laver’s *The Age of Optimism and Victorianna* helped put perspective on the manners, social mores and customs as well as the clothes of the period. Brian Harrison looked at the sexuality of Victorians and particularly their pornography and how it related to undergarments, including corsets. Leonee Ormond wrote about the anti-corset "crusading" Aesthetic movement of the 1870s and 1880s. She commented, “Though some aesthetic women later espoused the movement for rational dress, aesthetic costume was generally escapist” (Figure 14). Phillis Cunnington and Alan Mansfield examined sports clothing of the Victorians; their questions about the possibilities of combining sports with corsets were very pointed.

I found more than twenty historians who published in the 1970s, most with ‘corset’ in their indexes, and an additional twenty who wrote in the 1980s about corsets. Interest appears to have waned, because I only found eleven historians who talked about corsets in the 1990s. In 1970, Gregory Stone and Henry Faberman classified the responses elicited by dress. They said dress, “establishes identity, value, mood, and attitude.” Elizabeth Ewing published four books in the 1970s, all related to corseting. In her introduction to *Dress and Undress*, she credits the Greeks with “introducing the prototype of the corset” (Figure 15). Rudolph Broby-Johansen attempted to explain female emancipation of dress, particularly from the tight-laced corset. He said, “Women wished to express their equal rights with men by an increased freedom of bodily movement.” Lois Banner wrote about “the steel-engraving lady” and mentioned the only documentation I found of the oft-mentioned rib-removal to enhance the
hourglass figure. She stated that a prominent singer, Anna Held, who married Florenz Ziegfeld, had this procedure done in 1895. Mel Davis discussed the decline in birth rates evidenced by the demographic trends of world population groups, which he suggested was caused by the tight-laced fashions of the late nineteenth century.

Eroticism and Corsets

Corsets have figured heavily in erotic dress discussions by historians, however I found only a few authors prior to 1930 who commented on this issue. M. F. and Mme. Lacroix discussed eroticism in a publication for lay-persons interested in medical problems associated with corseting. Social commentator Havelock Ellis published two works in which he suggested the corset as erotic. Psychologist J. C. Flugel discussed the fetishist aspect of wearing corsets for some people. Cecil Saint Laurent photographed underwear as art, but found a wider audience for the underlying eroticism. Brian Harrison examined Victorian attitudes about pornography and sexuality. Some authors wrote specifically to the audience looking for eroticism; Clifford Allen was one. Sociologist, Helene Roberts wrote about the corset and its role in the bondage of women, not only in sexual activity, but in every activity. Michael Colmer was slightly tongue-in-cheek in his treatment of eroticism and corsets. A thoughtful scholar, Prudence Glynn was completely serious in her work about sexuality and clothing. Valerie Steele has written scholarly works on dress, including the aspects of eroticism and fetishism. A New York Times article by Michael Gross pointed out changes toward eroticism in lingerie catalogs. Casey Finch compared the undressed, corseted, Victorian female body with renaissance figures; he juxtaposed the philosophies of John Donne and Thomas Hardy to exemplify the differences between the “pre-modern” and
"modern" eroticism of Victorian times. Sara Mower reported to British Vogue about corseting and eroticism in today's fashion world. Colin McDowell focused on the lethal aspects of corsetry and fetishist practices associated with it. Mistress Angel Stern is a pen-name, but her information was up-front about corsetry, fetishist dress, and bondage in today's transvestite communities. Aileen Ribeiro mentions the erotic aspect of corsetry in passing, but does not focus on it in either of her books. Cathy Horyn, reporter for Mirabella, saw corsets as the gear of the dominatrix. She asked, "what if the mouthy Murphy Brown [a television character] were to ...don a corset...would we recognize [her as] a dominatrix?" It seems strange to me that corsets could have changed from a garment of 'submission' to one of 'dominance' in the past 100 years. Alison Carter provided considerable detail in her historical view of corsetry.

Trying to look like what one is not has been the focus of transvestites and others. Cross-dressing has featured corsets in many cultures; the subject of male corseters was mentioned occasionally by twentieth century fashion authors. Among the authors are: James Laver, David Kunzle, Prudence Glynn, Nigel Arch and Joanna Marschner, and Vern and Bonnie Bullough. Pat Blashill reported in Details, a magazine for the 'erotic fringe' about individuals who corseted to obtain the shape of Barbie™ dolls (Figure 16), to achieve ecstasy states, and to otherwise manipulate body shape. Irving Penn featured the South African Pearl, corsetiere for Christian Lacroix, in an article for Vogue. Jon Stratton looked at eroticism and corsetry from a viewpoint of business with international connections.

Status of Medicine: 1800-1910s

A few historians have examined the connections of fashion, dress reform, and medicine. Many of them repeated the generally held
beliefs about the efficacy of the straight-front corsets, and failed to closely examine the use of corsetry. I examined literature written by physicians which dealt specifically with corset issues and published outside of the 'professional' publications, that is, books, magazine articles, pamphlets and other writings directed toward the lay audience. In this search I found several interesting works which, had they been widely publicized and/or believed at the time, might have made a significant difference in women's fashion. I also found medical authors with misconceptions about fashion which could have led them away from seeking change for their patients. Strictly medical articles will be discussed in Chapter 8.

In the period considered for this research, doctors did not generally enjoy the prestige accorded physicians today. There were reasons for this: first, their education was often very limited; second, certification and professional associations were in their infancy; third, and most important, the efficacy of most treatments were extremely limited. The majority trained as apprentices for only two years, many had no college degree or were graduates of questionable programs; accreditation of medical education was yet to be instituted. Germ theory was unknown until Pasteur in 1857, and took several decades to be widely accepted; vaccines were in their early stages. Anesthesia was first discovered in 1846, but was not widely used until the 1860s, which limited surgery and contributed to surgeons being known as "sawbones." X-rays were not discovered until 1895, after which they helped with diagnosis of fractures and lung diseases like pneumonia and tuberculosis. Diagnosis was only part of the problem faced by practitioners. Prepared drugs were rare, dosages were unregulated, and most often the doctor prepared his or her own pills and potions. Some doctors made a comfortable living visiting 'invalid' women and for those practitioners the fashion of tight-lacing assured a steady clientele.

Medical journals were in their early stages. The research and practical information in them certainly reflected the contemporary state of the art and science of medicine; however, their circulation was very limited. For example, the Boston Medical and Surgical Journal,
which published Dr. Robert L. Dickinson's first article on corset pressure, only reached about 3000 subscribers. Reports of medical studies to the lay press may have been sparse, compared to present day. I have not studied newspapers thoroughly, but in a survey of three Minnesota newspapers published over six months in 1890, the only references I found about doctors were either of a social note, or mentioned their names in commenting about public health issues like sewage and sanitation, and their assistance in disasters. During 1890 medical men in the state were reporting important strides in surgery, diagnosis and treatment of disease in professional journals, but the news did not make the lay press.

*The New York Journal of Medicine* had a circulation of about 4000 in 1911, when Dr. Robert L. Dickinson published his final article on the pressure effects of corsets. Apparently, this information was essentially ignored by both doctors and fashion designers, because he abandoned his twenty-four year quest to rid women of corsets and concentrated his talents in the area of public sanitation and birth control. Ironically, a few years later during WW I, corsets were discarded as women took up war work and donated their 'steels' to build tanks. At the same time designers were featuring a more tubular silhouette which de-emphasized the waist (Figure 17).

Elizabeth Blackwell was the first woman admitted to American medical schools in 1848. A small number of determined women followed her, but they remained a small minority for more than a century. A few female practitioners took up feminist causes of dress reform and suffrage, but many did not. This might have been attributed to the difficulties they had in being accepted at all, let alone if they 'created a disturbance' in the status quo. One might sympathize with the doctor who kept herself tight-laced in order to thwart accusers who charged her with masculinity and worse. Setting up a practice, or even getting a reference was difficult enough for the few
pioneers in the field; to add a label of suffragette or 'Bloomer' to one's reputation might have been too much to manage.

**Reenactment**

Webster defines reenactment as "repetition of an earlier event or incident." Many people who do this either as a hobby or as their job, immerse themselves into the character they are 'playing', often learning details of their background from diaries and records from the time the character lived. This can involve learning new [old] skills, like baking on a hearth, hand-milking, farming without machinery, and dressing in appropriate clothing (Figure 18). Theatrical and fashion designers have produced patterns and instructions for making clothing which can be evocative of the period desired.¹⁰⁹

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Figure 18: Historic interpreters at Living History Farms, Cynthia (left) and Dawn (right) wearing corsets under their usual costumes. (Author's Collection)
Historic interpreters and reenactors are a growing group in the history business in America at the present time. The number of reenactors or interpreters who wear corsets is low, according to Laura Poresky. She interviewed costumers at historic interpretation sites across America and found a minority of the females wore corsets of any kind. The trend toward a more 'authentic silhouette' in dressing reenactors is becoming stronger, perhaps influenced by period movie costuming which has recently been improved in accuracy. Actresses are now often required to wear appropriate corsets for the silhouette depicting an era (Figure 19). Interviews of actresses confirm practices evident in films. 

No reenactors, actresses, or historic interpreters of the present era have been corseted since adolescence and this precludes the severe tight-lacing which was de rigeur in Victorian times. A few modern corseters may have decreased their waist measurements over months or years for erotic or other reasons, but reenactors have resisted this activity. A small project I carried out to determine a general comfort level in wearing a corset indicated that any tight-lacing greater than three inches was not well tolerated in subjects who had not previously worn a corset. I did not find references to tight-lacing in theatrical or stage information which led me to believe no one has examined that area of costume in detail. Anecdotal reports generally followed opinions of observers of the costumed rather than experiential evidence with measurable scales.

Figure 19. Susan Neve in tight-laced costume for Portrait of a Lady. (BBC Video Cover)
Notes


11 Feldcamp, Phyllis. “The Man Who Banned the Corset.” *Horizon* 14, no. 3 (1972): 30-35. This designation was not strictly correct, since corsets were worn, but their shape was elongated and slimmer in silhouette.


20 MacTaggart, Peter, and Ann MacTaggart. “Some Aspects of the Use of Non-Fashionable Stays.” *Strata of Society* [Norwich] (1973): “To consider stays...merely as aids to a fashionable figure, is to miss much of their importance. Stay wearing does not cease when we reach the social limits of maid servants and farmer’s wives. Stays were worn by the poorest class of all - those on parish relief.” p. 20.

21 Rios, Della M. “Exhibit Peeks Into Clothing Myths and Mysteries.” *Minneapolis Star Tribune*. July 9, 1998: E8X. No evidence is mentioned in the article about which Ms. Rios used to support her assertion.

"I have examined many hundreds of women's garments in urban and rural museums and have measured waists; I found a typical "small waist to be about 22", but about 20% were smaller. From lingerie dresses to farmwives housedresses, almost all showed evidence that a corset was worn beneath."


Following the publication of Darwin's essays in 1842 and 1844 on "The Foundation of the Origins of the Species" and his books *The Origin of Species* in 1859, *The Descent of Man: and Selection in Relation to Sex,* and *Evolution by Natural Selection* in the 1870s, many social commentators attempted to apply his principles of natural selection to a wide variety of topics.


'True woman' was a phrase used since approximately 1860, according to Partridge. Eric. *Dictionary of Slang and Unconventional English.* New York: Macmillan, 1961. "On the loose" was defined as "earning a living by prostitution."


Ormond, Leonene. "Female Costume in the Aesthetic Movement of the 1870s and 1880s." *Costume: The Journal of the Costume Society* 2 (1968): 33-38, p. 34. Ormond did not define "escapist" but the definition I would use is from Webster's: one who uses "habitual diversion of the mind to purely imaginative activity or entertainment."


Rib removal was frequently mentioned in lay press articles and occasionally by historians. I found no medical journal articles about this procedure. Given the questionable medical practices of some doctors of the time, it is possible that it was done. However, because chest surgery was often a high risk procedure and the quality of anesthesia was questionable, it would surprise me if many women would have taken the chance. If a woman had corseted while in adolescence, the need would have been moot.


Horyn, Cathy. "Of Women's Bondage." *Mirabella* 1993, 116-118. The television character Murphy Brown, portrayed by Canance Bergen, was a strong feminist, assertive, acerbic, and often antagonistic toward both males and females.


Bix, Amy S. *Personal Communication*. November 1998: "Barbie’s form was derived from that of a German sex doll, and has recently been re-molded to fit more ‘normal’ proportions.”


Ibid.

*Encyclopedia Britannica* 1970, s.v. “Pasteur.”


*Encyclopedia Britannica* 1970, s.v. “X-rays.”


Julie Wilson, archivist/secretary for New England Journal of Medicine, telephone interview with author. She explained that The Boston Medical and Surgical Journal [former name of NEJM] was subscribed most heavily in the northeastern states, during Dickinson's era.

The newspapers I reviewed were: St. Paul Pioneer, St. Paul, Minnesota; Rochester, Minnesota's Post, and The Waseca Independent, Waseca Minnesota. I know that there were many breakthroughs in the medical world during the six months I surveyed, but none was reported in these papers.


Among the female doctors who publicly lectured, wrote or agitated for dress reform were; Anna Galbraith, Charlotte Perkins Gillman (in her later practice), Clelia Duel Mosher, and Anna Gove Nichols. Their writings are listed in references.


Poresky, Laura Marie. Correct Clothing for Historical Interpreters in Living History Museums. Master's Thesis. Iowa State University, 1997. In a personal interview, Laura estimated her sample had fewer than 10% who wore corsets of any type while reenacting. Laura has done reenacting herself for several years and in her travels to Civil War groups and reenactments she has noted only a small number of women who have worn corsets to complete their costumed silhouette. In Laura's opinion, that number is slowly growing.


I listened to Jane Campion, director of The Piano and Portrait of a Lady, being interviewed on National Public Radio by Terry Gross in 1997. She stated that she had demanded the star of Portrait of a Lady, Nicole Kidman, reduce her waist to nineteen inches with corseting. Kathy Bates, who was recently featured as Molly Brown in Titanic declared her dislike of being corseted for movie roles while being interviewed by Oprah Winfrey, which I heard in the spring of 1998.


As part of my senior design project at the University of Minnesota Clothing Design class, I made corsets for a series of eight costumed reenactors in 1994 and 1995; who portrayed portrait replica clothing at the Minneapolis Institute of Art in Tableau Vivant depictions. I asked each subject to wear their corsets laced at 1", 2", 3", and 4" on successive occasions lasting from two to eight hours. Not all the corsets were the same style, and strict regulation of the lacing was not employed, however the results overall indicated 3" of lacing smaller than the natural waist measurement was relatively tolerated by all subjects for periods of 2 - 8 hours.
CHAPTER 3: REVIEW OF ANATOMY AND PHYSIOLOGY

Introduction

This section will provide a basic explanation of the structures and the actions within the human body which are responsible for life systems. Although the reader may not have a full grasp of the clinical aspects of anatomy and physiology, the information here will serve as a refresher to what is likely understood. Much of this information was not well understood by the doctors of the nineteenth century, referred to in the previous chapter. I have included a selected group of historians and present-day medical authors in this chapter, but have placed all the primary sources which dealt with the effects of corseting in a later chapter. A small number of clothing historians have mentioned the physiological aspects of corseting on the anatomy and physiology.¹ None of these historians approached this subject from the angle which I have attempted in this research.

Respiratory System

The whole system comprises the nose, bronchial tubes, the lungs (Figure 20)² and their accessory muscles of the neck and chest, contained within the ribcage (Figure 21).³ From the first breaths taken after birth, until the final moments of life, the rate of respiration is determined by the capacity of the lungs, the exercise or work-load which demands oxygen, the general health of the individual, atmospheric parameters like humidity, barometric pressure, and temperature, and the inter-related body systems of heart and blood vessels.⁴ All of the blood in the body is circulated through the lungs every ninety seconds in a healthy human.⁵ The gaseous exchange of carbon dioxide and oxygen across the walls of the air sacs [alveoli] occurs with the continuous circulation of blood. Oxygen is used in the metabolism of the body and carbon dioxide is a waste product.
Figure 20. Heart and lungs. (Netter, Plate 194)

Figure 21. Ribcage, bony thorax. (King & Showers, p. 176)

Figure 22. Diaphragm positions during inspiration and expiration. (King & Showers, p. 246)
The structures surrounding the lungs are the spine, ribs, sternum and collarbones. The muscular components of the respiratory system are both external and internal; some are striated, like the intercostal muscles of the chest wall, and some are smooth, such as those found in the tubing system within the lungs. The primary muscle involved with breathing is the dome-shaped diaphragm which divides the chest from the abdomen (Figure 22). As the diaphragm rises, the gaseous contents are forced out to the atmosphere, and as it contracts downward to a flattened configuration, fresh air is drawn into the lungs to provide oxygen.

The abdominal muscles act as accessories to this breathing process by allowing and assisting the diaphragm to work as a piston in the center of the body.

Several recent research projects which are related in some degree to corseting and the respiratory system will be reported in Chapter 6.

Circulatory System

The heart and blood vessels along with the blood itself make up the circulatory system (Figure 23). The heart is the central pump which moves the blood through the body. Blood carries not only the gases which are exchanged regularly by the lungs, but also the nutrition and waste products to and from the body’s tissues. As the blood absorbs nutrients from the intestine it carries needed elements to every cell. At the finest capillary level of circulation, gases, nutrients, and waste materials are exchanged. Wastes formed within each system are carried to the appropriate excretory system. The
circulatory system is responsible for continuous tissue maintenance, growth, and development of the human body.

If the circulatory system is compromised due to disease or external factors, the entire body is at risk. Each system of the body is so finely interconnected and responsive that when disruption occurs in one place it will be felt in many other areas. The capacity of the circulatory system to withstand physiologic distress is great, particularly over the short term. However, with chronic disease or conditions of compromise the circulation will gradually diminish. Hardening of the arteries and high blood pressure are two manifestations of disease within the circulatory system.

**Musculo-Skeletal System**

The bony structures which hold the human body upright in conjunction with the muscles covering them make up the musculo-skeletal system (Figure 24). The bones not only compose the frame of the body, but provide the blood manufacturing sites for the circulatory system. The muscles both move the body through space and metabolize nutrients into energy and heat.

In childhood the bones are likened to ‘greensticks’ which are pliable, growing and tender. As the body matures, bones gradually absorb calcium and other minerals until they are rigid. If for one reason or another, an immature body is subjected to stresses which cause malformation, this problem may be corrected with palliative efforts; but if the malformation is neglected it will become permanent.

The abdominal muscles are responsible for maintaining the continuity of the contents of the abdomen (Figures 25, 26). The regular movements and stretching done by a person continually exercises and maintains their strength; but because they are relatively thin, they can be overstretched easily, leading to a protuberant or flaccid belly. These are the muscles that assist with ‘abdominal breathing’ by expansion and contraction. As insipration occurs, the
muscles tighten; and when expiration occurs, they relax. With the expanding muscle action, a slight negative change in atmospheric pressure is achieved within the pleural space, and this assists in the full expansion of the alveolar sacs.

Muscle fibers create the heat generated from the foods we eat; they produce important substances (like good cholesterol) when regular exercise occurs, and they use fats for fuel when exercise is prolonged for more than a few minutes. This is the primary way humans reduce fat stores and lose excess or maintain ideal weight.

Within the bones themselves, blood cells are produced in the marrow. Health of the musculo skeletal systems is very dependent on nutrition, exercise, and blood circulation; without these, bone density is diminished, creating an increase risk for fractures. Osteoporosis, a condition caused by depletion of calcium in bone, causes spinal curvature and other complications which can lead to life-threatening problems, like diminished lung capacity and hip fractures.
Figure 25. Transverse and rectus abdominal muscles. (King & Showers, p. 217)

Figure 26. Abdominal oblique muscles. (King & Showers, p. 217)

Figure 27. Saggital view of the female torso, showing vertebral structures and primary organs of the digestive and reproductive systems. Note the relative space taken by the spinal column in the area of the waist. (King & Showers, p. 340)
**Digestive System**

The digestive system is positioned within the abdomen below the diaphragm (Figure 28). Digestion takes place in a continuous tract which begins in the oral cavity and ends at the anal sphincter. Within the system are a group of related organs which perform the tasks of digestion of the food into the nutrients needed for health in the body tissues. Several separate fluids are excreted within the system, including saliva, gastric acids, bile, insulin, and enzymes which assist the process either within the digestive tract or at the cellular level. The organs involved are the esophagus, stomach, the liver and gall bladder, the pancreas, and the small and large intestines. These are contained in the abdomen below the diaphragm and are supplied with nutrients via the mesenteric arteries which branch off the descending aorta (Figure 27). If circulation is prejudiced or impaired by constriction of any type, the health of these organs and their consequent functions may be seriously jeopardized. Peristaltic action of the intestines which moves food through the digestive system allowing for nutrient absorption is dependent upon the autonomic nervous system, which is easily interfered with by outside pressures.

**Urinary System**

The kidneys, ureters, bladder and urethra make up the urinary tract (Figure 29). The two kidneys are located in the abdomen, behind the intestines to the right and left sides of the spinal column.
Kidney function depends on blood circulation to maintain the filtration of wastes from the system. The kidneys are each connected with a single narrow tube to the bladder which holds collected urine. The bladder is a muscular organ which empties urine via the short urethra on a voluntary neuro-command.

The kidneys and ureters operate automatically, but may be damaged by high blood pressure or outside force. Their position is relative to the organs around them and they can be displaced fairly easily. The bladder and urethral walls have special muscles and sphincters which regulate the flow and back-flow of urine within the system. The lower segments of the urinary tract of females are particularly susceptible to infections and stretching during pregnancy and childbirth.

Reproductive System

Because the primary focus of this research is with corseted females, I will restrict my explanation to the female reproductive system. This is another system which is located totally within the abdominal space, that is, below the navel level, and essentially between the intestines and the urinary system. It comprises two ovaries, two Fallopian tubes, uterus, and vagina (Figure 30). The ovaries are semi-anchored in the space by ligaments which are made of connective tissue. The Fallopian tubes, which propel the eggs emitted by the ovaries with flagellation of hair-like structures in their canals, are attached to the top of the pear-shaped uterus. This is a strongly muscular hollow structure which opens at the lower end of the
cervical os to the vagina. The vagina is a stretchable muscular tube which connects the uterus to the atmosphere. All the structures of the reproductive system are susceptible to crowding, are easily displaced and, because they operate involuntarily, they cannot be totally controlled by their 'owners.' In effect, the uterus is the only organ in the female body which has 'an escape hatch' through which it may prolapse. When either internal or external pressures are exerted on the reproductive organs, they are susceptible to moving aside, since the ligaments which hold them in suspension are easily stretched. An atonic colon or bladder may create a chronic state of pressure which will influence the uterus to antivert or retrovert, which in turn can cause infertility, pain, and even spontaneous abortion.

Figure 30. Female reproductive system. Note the uterus is flexed slightly forward, in normal position. (King & Showers, p. 390)
Summary

A basic knowledge of these anatomic systems will enable the reader to comprehend the medical references more completely. I have omitted the neurological system which is definitely integral to the entire body, but was not well understood in the nineteenth century and tended to be ignored in the literature. My purpose in this chapter was to assist the reader in remembering the systems of the body and their interconnectedness.

The procedure of tight-lacing affected every system in many ways. The pressure restricted not only lung capacity and blood circulation, but through this the general tissue health and function of the organs themselves. Closely examining Figure 27 may clarify the impact which corsets had, by reducing the waist 25% or more; they infringed on the narrow space between the vertebral column and the muscular abdominal wall. Intestinal motility was greatly reduced, which caused constipation, fecal impaction, and worse. These same problems would be seen in the modern corseter.

Notes


16 Ibid.
CHAPTER 4: DRESS REFORM REVIEW

Historians' Views

I do not intend a complete review of dress historians' views on dress reform. Rather, I plan to highlight a select number, particularly if they expressed opinions on corsets while discussing dress reform. I have also been interested in the interaction between the Dress Reform Movement and physicians; I was looking for historians who spoke about that issue.

Quentin Bell and James Laver were post-WW II writers who carefully examined the nineteenth-century British and American fashion scenes, and the context of the times. Their comments were not heavily laden with Marxist, feminist, or other political agendas, and because of this, I found their information more 'trustworthy' than some historians who came later. Neither author emphasized the politics or the leaders of the dress reform movements, mentioning them as a 'sidebar' to the social milieu of the mid-century. Both focused on the 'Bloomer' costume (Figure 31) worn by some Reform proponents, and the Aesthetic movement garments worn by a small group of adherents of the 'Bloomsbury Group' in England (Figure 14).

During the 1960s, Robert Riegel turned the table and spoke about the dress and politics of women's rights in the nineteenth century which, in his opinion, sprang from "a feminist line of attack." Brian Harrison looked at dress reform from a 'scientific'
viewpoint; he also examined the attitudes about sexuality prevalent in the mid-century and later with regard to clothing. Harrison viewed the proponents of dress reform as antagonists of the medical profession ("science") and religion ("morality"). In his later work, he maintained that both male and female doctors acquiesced to corsets in the nineteenth century, despite knowing the dangers to health caused by constricting garments. Charles Snyder wrote about a female Civil War era physician who dressed in a tailored 'pant suit' based on the military uniform.

Laurel Wilson provided the example of Anna Gove, "social non-conformist and clothing conservative" who was a physician and daughter of a physician. The Dress Reform Movement was already four decades old when she entered medical school; yet, in spite of her education, she consistently wore a corset. Anna Gove tight-laced almost 6 inches smaller than her normal corseted size when she wore evening dress, according to Dr. Wilson's measurements of her garments. This evidence is consistent with other information I have found about women in many different walks of life, that while Dress Reform was happening in the society, not everyone was influenced by it. The reasons may be as diverse as the people in every class, education level, and political group.

An example of the far-reaching effects brought by Dress Reform was told about Charlotte Perkins Gilman, another woman who went to medical school and later studied in Paris where she was influenced to dress fashionably. Her biographer stated,

Details of the divorce proceedings of Charlotte’s parents quoted from the San Francisco Examiner: December 19, 1892
...told of G. Walter Stetson’s efforts to secure a divorce from Charlotte Perkins Stetson, a writer of renown....the husband accused his wife of not wearing a corset or even waistbelts...of devoting her time to the doctrines of Bellamy, and of running after fads in social and dress reform....

It appeared the corset (or lack thereof) was even to blame for divorce! Moral turpitude was a concern in a case such as this, according to the editor of the San Francisco paper. Details of Charlotte's medical school in America and her experience in Paris as a surgical resident may be clues to why she felt compelled to wear a corset while simultaneously pioneering in a male bastion. When she returned to America she worked for freedom for women.
An unexpected, but valuable source of dress reform information were the writings on the history of the bicycle. I have included this information in Chapter 6, which deals with exercise. The invention of the bicycle was responsible for many changes in society, not the least of which was demand for appropriate and comfortable clothing. Dress Reform began two decades prior to the advent of the two-wheeler, but there was a mutuality among their protagonists.

Stella Newton's accounts of dress reformers, the context in which they lived, and their connections to each other and to society illuminated the press, activists, and physicians - those who supported and those who objected to Dress Reform. Her statement that, "The Rational Dress Society was anxious to deny the suggestion that it was out to persuade women to dress like men" indicated that she really understood the Dress Reform Movement as it functioned in the nineteenth century. This may seem an obvious statement to make, yet it reminds us when viewed from the point of society in the 1860s, that the wearing of trousers of any type was fraught with implications of sexuality, morality, and social distinction. Jill Conway's discussion of women's movements did not focus on Dress Reform.

The liveliest, if not the most bombastic debate, by historians of the nineteenth century, about the role of corset and Dress Reform took place between Helene Roberts and David Kunzle in the 1970s. It began when Helene Roberts published a feminist viewpoint of Victorian corseting and the movement for dress reform, with her ideas of the underlying reasons for the phenomena. She described the Victorian woman as an "exquisite slave", in a submissive, inactive role dominated by husband, religious imperatives, and physical dependency on the supportive corset. These words and ideas she had obviously gleaned in her review of literature, which I have also perused. She outlined the sources of change in dress as the Dress Reform Movement, the Aesthetic dress proponents, increasing roles and activities outside the home, and the role of sports for women. In these, she saw a combined effect which helped bring about the emancipation of women. Two years later, David Kunzle attacked
this premise in a scathing and scantily documented response. In what may have been a publicity-seeking effort to pump sales of a book he had forthcoming, Mr. Kunzle made sweeping statements based on very slim evidence; he relegated feminists to "hysteria," claimed tight-lacing was practiced only by a minority of middle-class women and servants; and denounced the corset as "an obsession of small minds." In Mr. Kunzle's opinion, corsets were no more than a "voluntary" and "cult" practice which arose out of an erotic need of women for "pain." In my opinion, Mr. Kunzle has ignored the massive amounts of evidence which supports Ms. Roberts premises, and with which I heartily agree.

In the opinion of Deborah Warner, Dress Reform had made significant progress by the opening of the 1876 Centennial Exhibition in Philadelphia. Her brief article on 'rational undergarments' makes several sweeping statements about the politics of dress reform and the condition of women in late nineteenth century society. She seemed convinced that the Dress Reform Movement had clearly defined goals and objectives.

Jeanette and Robert Lauer provided the most detailed account of the conception, advocacy, and final rejection of the Bloomer outfit. While writing with a twentieth century perspective on "power", they uncovered a good deal about the American historic fashion scene. Their answer to the question, "Can you be both fashionable and healthy?" was a bit brief in my view, but they were focused on power, and not health. I think they summed up very well when they said,

"Fashion is a form of normative behavior, for there are...expectations about proper and improper dress. Those who have derided women for their failure to be non-conformists even before it appeared that fashions they accepted "uglified" them or created health problems, have ignored the fact that conformity is the essence of society."  

Janet Murray provided some 'up-close and personal' vignettes from nineteenth century England. Although the author did not address Dress Reform directly, she included many anecdotes and first-person accounts which throw light on the context of that complex time. In "Girl of the Period" and "Suffering for Beauty" sections I found six essays which gave real
balance to the topic. Mabel Donnelly discussed Dress Reform in America from a feminist, political point of view, and attempted to dispel what she labeled "myth" from "reality". She was dismissive of the women who worked sincerely for change. She referred to corseting, commenting succinctly that it prevented young girls from exercising. Her limited understanding of dress prevented her from comprehending the situation as clearly as she might. A much more perceptive statement made by Anne Scott in *Natural Allies* got at the heart of the situation. She said,

> Understanding the history of women’s associations would be easier if the women had moved in lockstep through stages of development: from religious society to self-improvement clubs, to civic improvement, to suffrage, and so on. But no such tidy order emerges from the record. Groups with different purposes emerged at the same time, and what is more confusing, their boundaries were anything but fixed.

In her senior thesis from Harvard, Paige Hamilton declared, as a result of medical reports [about effects of corsets], the public finally announced their concern to create a widespread movement to rid the corset from fashion. She continued, "medical professionals started the Dress Reform Society [with] the small percentage of women who discarded the corset long before." Although some of her other information is very well documented and well thought-out, I cannot agree with her overall analysis.

A stronger and more valid, in my opinion, explanation was expressed by Karen Brown-Larrimore in her two-volume thesis from Wisconsin. She illustrated the changes in corset design from 1820 - 1915 and drew succinct conclusions based on evidence which, though mute, argued clearly for fashion’s influence despite the remonstrations of church, common sense, or any medical practitioner.

*Contemporary Opinions about Dress Reform*

The efforts of Susan B. Anthony and other prominent members of the Women’s Reform Movement were discussed by Gertrude Haines, from Fairmont, Minnesota. Haines examined the movement with respect to women’s safety, in addition to the financial burdens placed by fashion changes and accepted by all but a minority of women. She called for a
crusade similar to that of the Temperance Movement. Another author and Dress Reform lecturer from that state was Frances Russell. Russell said women’s dress was dehumanizing, and equality of women was thwarted in education, jobs, and votes due to her “appearance...which seems to vitiate her claim.” Grace Greenwood discussed her personal effort toward changing women’s costume. Although she admitted to longing to begin wearing “the fatal garment” when she was a young girl, her mother resisted until a fashionable relative prompted Grace to stitch her own corset. She wore corsets to the detriment of her health, succumbing to “fainting fits, anemia, bronchial inflammation, and pneumonia” before discarding them in favor of garments designed by Mabel Jenness Miller.

The Union Signal, published as the voice of the Women’s Christian Temperance Movement, contributed to the efforts toward Dress Reform. “Rational dress” was the topic of many articles and a catalog with that title was produced for one of the symposia held in Boston. A column signed “Undine” called the adherents of Dress Reform to rally against the “tyranny of fashion.” At least one writer accused the Dress Reformers of “not sufficient moral and intellectual independence” to accomplish the goal of discarding the corset. Three writers from the early twentieth century discussed the strong German influence on Dress Reform. The Saturday Evening Post published a retrospective of the Dress Reform movement in 1922.

The prominent American author, Louisa May Alcott, added her voice and prestige to the cause of Dress Reform. In her 1874 novel Eight Cousins, she devoted an entire chapter, titled “Fashion and Physiology,” to descriptions of the heroine being “fitted out” with fashionable gown and its attendant underpinnings, and another “hygienic model” dress. This latter is condemned as “lacking style” by an older female, but promoted by the heroine’s uncle, a doctor. In her descriptions and original illustrations Alcott, clearly outlined the problems of balance, muscle atrophy, and shortness of breath caused by tight-lacing. A later volume, A Garland for Girls, contains a series of short stories in which there are several statements
regarding the efficacy of sensible dress and avoidance of corsets and other tight garments. Exercise and activity were promoted in each of Alcott's stories of girls.

**Contemporary Doctors for Dress Reform**

In reviewing the medical literature, I was looking for hints of actions taken by physicians in the field of Dress Reform. I attempted to discover not only their opinions but information about their activities in this realm. The percentage of doctors who publicly called for some type of women's dress reform in the nineteenth century is somewhat difficult to gauge. Publishing in medical journals was attempted by fewer than .01% of doctors throughout history. Journals were not numerous, their circulation was limited, and their influence small; the effort to write and submit articles added a burden on the practicing physician or surgeon. Clinical research [done with real patient observations, not in a laboratory] was often considered suspect and not taken seriously. As is the case today, a patient's clothing was not taken into much account in the doctor's office, and in the nineteenth century it may have been considered inappropriate for any mention of clothing to be made. Yet many doctors risked their professional and public reputations to take up the cry against the use of tight-lacing, in addition to calls for comfortable shoes, shorter skirts, reducing the weight of clothing, use of shoulder supports, and many more issues in the cause of Dress Reform.

A letter, written in 1851 by a doctor's wife, to Dr. Mary Gove Nichols, who was setting up a school to teach water-cure principles with her husband Thomas, was the first direct reference that I found to Dress Reform made by a physician. To a question of her “views of the new style of dress which has been adopted by a few truly American Women”, Dr. Nichols responded,

[The new costume] gives a new freedom to women. We can get but small achievement from women when it is the labor of their lives to carry about clothes. Our present style of dress is endangering and expensive. It is not adapted to the world as God made it, nor any form of work. It drags on stairs and streets and crossings, is dusty and muddy, and when held up to avoid the mud as we must, leads to indecent exposure. It is liable to be stepped upon and caught in machinery. It gives us much weight and little warmth in winter, yet heat and weariness in summer.
The new style is opposed by bad men and weak women, and by those who wish women to be weak, inactive, and dependent — the pretty slave of man. We shall now see whether women are a nation of cowards or whether they are true daughters of the men of '76.\textsuperscript{30}

Mary Gove Nichols went on to deliver a lecture in 1851, which is printed in its entirety in a following issue of \textit{The Water-Cure Journal}. In it she reckons “men are almost universally friendly to the emancipation of women from their weary bondage of clothes....”\textsuperscript{30} In the same issue, the ‘Bloomer’ costume with a comparison to a French fashion illustration was printed; this was reprinted in \textit{The Water-Cure Journal} later. A follow-up told about the “New Costume in California” which experienced the ‘Bloomer’ and the gold rush together.\textsuperscript{31} \textit{The Water Cure Journal} stated on its banner it was a “herald of reforms, devoted to physiology, hydropathy, and the laws of life;” it was edited by Dr. Thomas Nichols\textsuperscript{32} to make the case for “allopathy.” This method promoted moderation in exercise, appetites, and sleep; it avoided alcohol, stress, and used sparingly medicines found in nature. Water was used to bathe daily, to drink in regular quantities, and to soothe by sound and sight. Spas served meals and gave instructional classes; exercise was done in groups, and they served much the same purpose as spas do today.\textsuperscript{33}

\textit{The Hydropathic Encyclopedia} published in 1852, contained a chapter devoted to “Air” in which Dr. R. T. Trall not only pointed out the evils of tight-lacing, but made specific suggestions and included illustrations (Figure 32). He said, “It is perfectly certain that, just to the extent that any female diminishes the circumference of the body around the lungs, just in that ratio will she lessen the number of her days....”\textsuperscript{34}

Dr. Sara Devoli summed up an address to an audience of doctors in Portland, Maine in 1876, with these words on Dress Reform,

[\textit{it is}not less worthy of your serious attention than any department of hygiene, education, co-education, temperance reform or the social evil \textit{[venereal disease]}. The question is a large one; it has its moral and mental aspects, as well as physical; it has its history; its philosophy; its literature; it touches upon many social problems. It is the “last ditch of women, for the coming women will no more be a slave to dress than the coming man is to prejudice.}
Figure 32. Dr. Trall's fashion reform ideas: left, the "unnatural waist"; middle, the "natural waist"; and right, the "Venus DeMedici's waist." (Trall, pp. 298 & 299)

We present this subject in that spirit of endeavor and deep seriousness, in which we palliate suffering, or watch by the bedside of the sick, regardless of comfort and convenience, that we may save life.³⁵

Dr. Lena Ingraham asked the Alumnae Association of the Women's Medical College of Pennsylvania for money to build a gymnasium and laboratory and to endow a professorship for the study of women's physiology and preventative medicine. She commented that, "as women physicians a great responsibility rests upon us, regarding the effect of dress upon the growth and health of women."³⁶ She went on to explain her habit of discussing dress with her patients, to convince them of the necessity for healthful choice in clothing.

Dr. William Flower, father of several activists in the Dress Reform Movement, discussed fashion reform from a Darwinian standpoint. He attempted to educate women away from habits which caused them to decrease the health and welfare of the human race.³⁷ Dr. William Wilberforce-Smith discussed the "difficulties of reform" in an article published two years after his initial foray into the world of women's fashion.

In seeking present reform, broadly viewed, it is a large measure that must be looked for. Women, even more than men, naturally conform with but little resistance to the
environment of customs. The majority have had no vestige of physiology included in their education. They have been born to an encumbered inheritance in the matter of the corset. A practice of tradesmen shows the widespread evil taste for a constricted form. Extensively published pictorial advertisements are set off, not alone with portraits of favorite beauties, but with the representations of waists constricted to the utmost degree of 'elegance.' In the current number lying before me of a weekly paper for ladies, I find actually eighty-two illustrations representing such waists in the advertising pages, besides twenty-nine in the body of the paper.®

Dr. Wilberforce-Smith put himself in an unusual position, for a practicing physician in England, by authoring an article for the Dress Reform journal Algaia. This was the official magazine of the "Healthy and Artistic Dress Union" and circulated to several thousand subscribers. At the time, publishing outside of the professional medical journals was considered bordering on blatant advertising, or at least, 'bad form.'

The career of Dr. John Harvey Kellogg of Michigan was devoted to reform of one sort or another. This included dress reform, about which he frequently wrote and lectured. His concern was preventative medicine, and he saw much in the dress of women to be improved. Illustrations for 'health waists,' suspenders for skirts, and knickers for bicycling are found in his papers. The Battle Creek Sanitarium Dress System, devised under his supervision, was read into the Congressional Record in an effort to get the word out to the American public on this issue. This was a collection of "healthful clothing" ideas gathered by the group of physicians working with Dr. Kellogg who wrote that the essential qualifications for healthful clothing were:

1) It must allow unrestrained action of every organ of the body.
2) It must secure equable temperature of all portions of the body.
3) Its weight must be as light as possible without sacrificing other necessary qualities.
4) It must be so adjusted on the body as to be carried with the slightest effort.
5) It must conform to the principles of art and good taste. [italics theirs]

Construction tips and illustrations of garments and anatomical details were included. Patterns and copies of the instructions could be ordered by mail.®

Dr. Charles Jessop, physician to St. Pancras Hospital, London, called on "ladies who do not have to work for their livelihood" to teach their neighbors and servants the basics of physiology and dress reform. He recommended the "Turkish smock" with linen breeches or
stockings held from the shoulders. Dr. Frank Wells chaired a committee of the Michigan Medical Society for the Hygiene of Dress. Clearly, the existence of this committee shows efforts were being made by the medical community to address the problem of dress. The group's purpose was preventing "universal injury to women" as a result of wearing corsets, and urging her to modify her garments toward healthful goals. Dr. Wells lamented, "Spasmodic attempts to induce women to adopt some modification of the trousers to her attire, like the bloomer effort, have always failed and probably will continue to fail for many generations at least."

Dr. Bayard Holmes, a surgery professor at the University of Chicago, told his students they must distrust the adage "ignorance, prejudice, and fashion yield to no argument." He saw hypocrisy when "women declare they do not wear their corsets tight." But he said, "it is better to pretend to do right than to be ignorant of rectitude." He saw in the "struggle for reform, and the evolution of modern dress" a hope for change; and in the examples of a few, a promise for the future "emancipation which long study and training will give."

One of the most long-suffering and consistent supporters of American dress reform was Dr. Robert Dickinson. His campaign to educate his fellow physicians and his patients continued unabated for over twenty years. He published in professional journals, spoke in public, and taught his office patients about the hazards of dress and urged them to adopt healthful styles. Because he recognized this was not going to happen quickly, he ultimately compromised by recommending the straight-front corset, which he sincerely believed to be a better choice.

As late as 1928, calls for dress reform were made by Dr. S. Aldophus Knopf of New York. He chronicled the continued rise in cases of tuberculosis among young women across America. He said, "mortality from tuberculosis among young women could be cut down if dress reform were encouraged." He described, "the tightly laced brassiere or wide elastic band," used by the fashion-conscious young women of the 1920s to compress their breasts, as
contributing factors to the incidence of tuberculosis. He credited the 1920s mode of dress as an improvement over past styles, but urged family physicians, teachers, ministers, directors of girls' groups, and mothers to pay attention to dress as a component of good health.

*Dress Reform and the 'Beauty Factor'*

Many adherents and supporters of Dress Reform attempted to convince women to change an ideal of beauty. Amelia Bloomer was outspoken in her efforts along those lines in her newspaper *The Lily.* Long before the Aesthetic Dress supporters' embracing of the fluid garments of the 'renaissance' in the 1870s and 1880s, Dress Reformers were rallying support for beauty of line. A Bloomer contemporary, Mrs. Swisshelm was the subject of an article by the publisher, and herself an author on the topic of beauty and dress. The 'Bloomer' costume was compared with another design, both were found to possess aspects of 'beauty.' Mrs. Rebecca Mills addressed the problems as she saw them in a very popular book which sold through at least five printings. Mrs. Roxey Caplin's corset design (Figure 33) was not solely based on health; she too had ideas about beauty of form. When the meeting with Elizabeth Cady Stanton and others to discuss reform in women's rights took place in upstate New York in 1851, Elizabeth Miller presented her design for what was later to be labeled the 'Bloomer.' Amelia Bloomer published illustrations of Miller's costume that year in *The Lily,* a newspaper devoted to emancipation of women, and because of this she was mistakenly given credit for it. Mrs. Bloomer *did* wear the costume, during the eight years in which she published *The Lily,* and stated she found it "very comfortable and convenient."
Cady Stanton and others wore the costume for various lengths of time, but ultimately found it distracted their audiences so much that, despite its practicality, it became a nuisance. During the mid-Victorian era there were influences on dress design from artists and ‘Bohemians’ primarily living in London who fostered the ‘aesthetic’ lines of the Renaissance and Middle Ages, even of ancient Greek dress. The journal *Algaia* fostered this movement and encouraged women to avoid the constricting corset and choose softly draped and flowing lines in their garments (Figure 14). They advocated reform of women’s dress not from a health standpoint, but from their opinion of classical idealism. Although the ‘Aesthetics movement’ began in the late 1860s, it continued through the first decades of the twentieth century, as the Art Noveau influence burgeoned.

Abba Gould Woolson was a stalwart in the fight for women’s rights and dress reform. Mrs. Woolson traveled, lectured and campaigned tirelessly for the cause. She focused on the Greek ideal of beauty, recommending exercise and the ‘Empire’ line of Josephine and Madame Recamier (Figure 34).

Many books were published with ‘Beauty’ as the focus, covering everything from household hints to dress advice. Weekly and monthly publications contained articles about beauty in fashion and reform in almost every issue; one had only to peruse *Demorest’s Family Magazine, Peterson’s Magazine, Harpers Bazar, The Ladies Home Journal*, and others to find advice.

Figure 34. Madame Recamier by David (detail). The high-waist gown made of softly draped muslin created a tubular silhouette. (Handy, p. 115)
Individual authors, lecturers, and advocates of reform spoke for the cause. Hester Poole was looking for "simplicity, symmetry, and fit" when she spoke to young women in *The Union Signal.* The author of *Beauty in Dress*, Miss Marian DeWing, identified the problem: "the failure of the 'dress reformers' to find acceptance .... arises from two causes. First, that object has no beauty; and secondly, because they defeat their own purpose by a superficial knowledge of the true formation of the body." Posture was the key according to Mrs. Mary Frances Steele and Elizabeth Livingston Steele Adams. Mrs. Steele lectured the Boston Symposium on Dress Reform in 1892 on this subject; she rejected any garment which forced the shape into unnatural contours. May Wright Sewall was President of the Council for the Symposium on Women's Dress of 1892. When she addressed their Boston meeting, she read the resolution which was to be voted on which called for clothing that was practical, comfortable, "and in good taste," suitable for business and home activities. The Symposium had worked for thirty-six years by that time; this was the first time the business woman was singled out. Several speakers called for grace, beauty, and virtue to be the keys to dress reform: not everyone called for abolition of the corset.

A few doctors joined the chorus for greater 'beauty' in women's dress, among them were Dr. Diocletian Lewis, Dr. Josephine Ines Gaches-Sauuaute, and Dr. Arabella Kenealy. As the end of the century neared, the straight-front corset was producing the famous S-bend silhouette (Figure 35); advocates for beauty took on a new urgency. The S-bend posture
resulted from the straight-front corset pushing the pelvis down and back, thus thrusting the buttocks out at the back. The center of gravity was changed by this ungainly posture, resulting in untold complications for the orthopedist and podiatrist. The style continued into the early part of the twentieth century, and gradually faded after WW I, but women continued to wear corsets into the 1930s and beyond. I personally knew many women who continued to wear corsets until their deaths in the 1950s, 60s and even 70s.

Notes


Thomas Nichols was known to support his wife in the campaign to reform women's' dress. He wrote an article which has some interesting points. Nichols, Thomas L. "A Few Words on Clothing." *The Water-Cure Journal* 11, no. 2 (1851): 1-2; "Familiar Talk with Our Friends." *The Water-Cure Journal* 12, no. 4 (1851): 89; and "the New costume in California." *The Water-Cure Journal* 12, no. 4 (1851): 89.


Bloomer, Amelia. “Mrs. Swisshelm.” *The Lily* 1-6, no. 10 (1851): 70; Swisshelm, Mrs. “Ladies’ Waists.”


Hawes, Mary Eliza. *The Art of Beauty.* London: Chatoo & Windus, 1878; Clark, Sir James. *The Ladies Guide to Beauty: Containing Practical Advice on Improving the Complexion, the Hair, the Hands, the Form, the Teeth, the Eyes, the Feet, the Features; so as to Insure the Highest Degree of Perfection of Which They are Susceptive.* New York: Dick & Fitzgerald, c.1880; Finck, Henry Theophilus. *Romantic Love and Personal Beauty.* New York: Macmillan, 1887; Dean, Teresa H. *How to Be Beautiful: Nature Unmasked.* Chicago: People’s, 1889; Sanborn, Frederic. *A Delsartean Scrapbook: Health, Personality, Beauty, House-Decoration, Dress, Etc.* New York: John W Lovell, 1891.


CHAPTER 5: CORSETS AND CHILDREN

Introduction

Young girls wore unboned or lightly-boned 'waists' before puberty (Figure 36), and during the early teenage years tight-lacing was begun in earnest. This assured the narrow ribcage and small-waisted silhouette that we associate with corset-wearing, by preventing normal growth and development of the torso and by causing muscle atrophy (Figure 37).

Historians’ Views

The medical, dress, and social historians who have commented on the effects of corsets on children during the nineteenth century are not numerous. A concise review was published in Popular Science Monthly in 1907, which pointed out the continued lack of appropriate clothes for girls to that date. Dr. Janet Lane-Claypon failed to mention corseting of children in her book Hygiene of Women and Children. Dr. Stephen Engel did note in his medical textbook that corsets worn by nineteenth century children were injurious to lung development. Dr. Morris DeCamp Crawford mentioned and illustrated children’s corsets without commenting on their effect on children. Deborah Gorham commented:

In the Victorian period, a change in style of dress was the most obvious physical sign of a girl’s transition from childhood to 'young ladyhood’. At some point in her early or mid-teens, a girl assumed adult female dress....and the limitations such clothing placed upon vigorous physical activity....while 'tight-lacing' was condemned,
the use of some sort of constraining corset...was considered both necessary from the point of view of fashion, and *healthful*. [italics mine].

Barbara Greenleaf stated “the most important cultural concern for mother and daughter was physical appearance” and illustrated corsets worn by children.

Iris Brooke showed us the changing silhouettes of children’s dress, with corseted postures. Green and Perry said, “In spite of warnings and good advice, the child’s corset was a commonly used part of female children’s dress” in the nineteenth century. In her commentary on the American woman in the Victorian era, Mabel Donnelly recognized Catherine Beecher once again, whom she said argued against corseting of young girls. Phillipe Perrot discussed the corseting of children from several sources. In condemning corsets, he quoted Dr. Debay’s *Hygiene and Physiology in Marriage*,

> a very grave misconception held by mothers sees the corset as an excellent means of correcting defects in the figure and posture of their daughters. They eagerly apply this straight-jacket to these frail creatures whose torso soon deviates from its normal erectness, leaning forward, backward, to the right or left. This error greatly augments the very defect or deformity mothers are trying to correct.
Perrot also quoted the opposite opinions held by several prominent physicians and the fashion mavens of the time. Parisian, Dr. Henri-Victor Bouvier said,

"...when young girls are not given corsets until they approach puberty, it is impossible to attribute to their influence deformations that almost always begin before then. I have sometimes seen lateral curvatures of the spine develop more rapidly because corsets were not used in time; on the other hand, I have never observed that their use contributed to this deformity."

The reader can easily understand the confusion of mothers in deciding to corset their daughters.

**Medical Opinions**

Corseting of children was a topic about which medical writers disagreed, as noted in the historians' findings. I found 23 specific references about corsets for children in my literature review. The earliest American physician to publish on the subject I found was Nathan Smith, who reported on his 1827 autopsy of a fifteen year-old prostitute whose death had been caused by corseting, "the injuries which result to the constitution from long confined compression of the thorax are manifold." He remarked, "that the corset, when first worn, causes much uneasiness, and young girls are often very refractory in regard to this part of their physical education." Smith continued

The degree of injury inflicted by the corset upon the female form, undoubtedly, in some degree, depends upon the period of life it is assumed. Before the figure is fully developed, its contour may be influenced by the slightest restraint. This was undoubtedly the case in the instance with which I introduced this subject [aforementioned death].

Almost forty years later in England, at a time when tight-lacing fashion was more extreme. Dr. William Acton discussed childhood health and prostitution without mentioning corsets or their effects. Dr. Mary Walker wrote about conditions affecting public health of children, "The wretched manner in which little children are dressed before they have a personal control of their clothes, is figured up by the sextons to the tune of many thousands per year." She continued, "The snug fit of the waist of the dress or corsets, prevents freedom of motion, of respiration, digestion, assimilative circulation of the blood, and of the nervo-vital fluid. It
prevents freedom of the muscles of the lower part of the chest, and the upper part of the legs...."\(^{17}\)"

Dr. George Buchanan\(^ {18} \) lectured in London about the treatment of tuberculosis in children. He recommended a diet with plenty of fruits and vegetables, fresh milk and light meats; he proposed children be moved to dry climates; and he forbade the use of constrictive dress of any kind. During the mid nineteenth century, child mortality in urban centers of

Figure 38. Circles of 19" and 13" illustrate the waist sizes which were considered 'normal' and 'severe' by the Victorians. 19" is the circumference of a standard saucer. Not only was the lacing constricting, it also forced the normally ellipse-shaped waist into a circle-shape. When one considers the vertebral column of an adult is from 2.5-3" or more on the transverse plane, it would take up a large portion of the diameter of either circle, as it does in this superior view (Vertebrae adapted from Netter, plate 172; used with permission)
America and Europe were very high, some estimates put it as high as 50% prior to age seven\textsuperscript{19}; I did not discover public health figures for childhood TB deaths alone\textsuperscript{20}. Childhood mortality was accepted as a fact of parenthood in the nineteenth century; it was a rare family which did not have one or more children succumb to infection, injury or accident before the age of five. Focus on children’s health did not really take hold in the medical community until after WW I, when the specialty of Pediatrics was separated from Obstetrics and Gynecology.

It was not only English and European doctors who were interested in the topic of corsets and children. Homeopathic medical practitioner Dr. Diocletian Lewis\textsuperscript{21} lectured and practiced in Boston. He joined Elizabeth Cady Stanton and James Chadwick in dress reform efforts. Their report on the changes made in school girls’ physical strength and ability to exercise after removing corsets emphasized the frivolousness of fashion-conscious mothers in dressing their daughters without regard to their health. Lewis reported on students entering Lexington School, from every area of the United States, the West Indies, and Central America; he described them as “delicate girls, unable to bear the artificial life in fashionable seminaries.” He explained that many arrived at the school, “with injunctions from mothers not to climb stairs, and with letters from family physicians urging moderation in gymnastics.” After discarding long skirts and corsets often with waists of 19” and smaller (Figure 38), students were given a vigorous program of exercise including walking, dancing, stair-climbing, and gymnastics. The school’s doctor reported “in four years not only was no harm done...but in no instance did a pupil fail to improve in health.” All this happened, according to Dr. Lewis, as a result of, “abandonment of corsets, the adoption of a simple physiological dress, and exercise.” Professor V. Taliaferro\textsuperscript{22} of Atlanta’s Medical College in Albany, Georgia commented on the effects of corsets on young women in his gynecological practice. He reported,

Very many young ladies of our highly civilized and fashionable age, of but sixteen or eighteen summers, have protuberant, flabby and pendulous abdomens, which nature rarely encumbers and disfigures the healthy matron of a dozen successful pregnancies. And are we surprised, when the child of eight or ten must needs don the corset. Shame
upon the *fashions* when they distort and disease the bodies which God has given...”  

In a lecture given to the California State Teacher's College, Dr. Henry Gibbons remonstrated his primarily female audience to refrain from setting a tight-laced example to their students. “The fault is universal. Before our girls enter their teens the work of restraint commences, and the immature and plastic bones of the thorax receive the first impression and so the bad work goes on, it may be unconsciously to the victim.”

Those words were echoed by Dr. Walter Cowpl, Assistant Gynecologist to the New York Homeopathic Medical College. He noted a higher rate of tight-lacing among city girls, than among “their country cousins” within the same families, with subsequently higher disease and death rates for those who were corseted. He stated,

> While we cannot, of course, attribute *all* this difference to tight-lacing on the part of *city mothers*, nor simply on the other hand, to more constant tight-lacing on the part of *city daughters*, we can, however, say with truth, that the denizens of towns, subject to a variety of constant health-lowering causes, cannot well withstand another serious bar to health as may their relatives under more natural surroundings.  

Dr. T. Frederick Pearse published a volume of health information written in plain language for the general public. In it he said,

> Tight-lacing is especially injurious in young girls. In them, unfortunately, the pliant bones so readily enable a small waist to be produced that a so-called elegant waist is obtained without much discomfort. Mothers incite as well as sanction young girls in this practice, in order, as they term it, that the figure should not be spoiled. This is an unfortunate fallacy, for nothing is so likely to spoil the figure of a woman as the custom of having worn stays as a child.

Gynecological surgeon Dr. Thomas Emmet from New York recognized the pressures brought by fashion when he wrote in his medical textbook,

> ...society is so constituted that the most conscientious parent must yield to the force of fashion, and today almost every young girl in the land suffers more or less from a pernicious system of physical and mental training.  

A girl scarcely enters her teens before custom requires a change in her mode of dress; her shoulder straps and buttons are given up for a number of strings about her waist, and the additional length of skirt is added....Her waist is drawn into a shape little adapted to accommodate the organs placed there, and, as the abdominal and spinal muscles are seldom brought into play, they become atrophied....
The spirit of emulation which is encouraged in all schools has a deleterious influence .......

Dr. Emmet was in the minority of medical doctors who paid attention to the clothing of their young patients. One who did pay attention was Dr. Sarah Devoli of Portland Maine. She discussed children's health and discarding corsets from what she called a "manifest destiny" standpoint. She said, "interference with nature's laws by modifying the conditions or methods of action [corseting children] must inevitably result in unnaturally stimulating and dwarfing both body and mind; for this overdress with its attendant errors, follows our girls from childhood to womanhood..."

Battle Creek, Michigan homeopath, Dr. John Kellogg measured respiratory process and capacity of boys and girls of matched stature, perhaps in conjunction with Dr. Thomas Mays of Philadelphia. Kellogg reported these findings in 1879 and in 1888 wrote again to emphasize his point that,

1. In childhood, and until about the age of puberty, respiration in the boy and girl are exactly the same.
2. Although there is a change in the mode of respiration in most females, usually soon after the period of puberty, marked by a increased costal respiration and diminished abdominal or deep respiration, this change can be accounted for on other than physiological grounds.
3. I believe the cause of this modification of respiration is the change in dress which is usually made about the time of puberty. The young girl is now becoming a woman, and must acquire the art of lacing, wearing corsets, 'stays', and sundry other contrivances which aid in producing a 'fine form.'

Dr. Thomas Mays measured boys and girls respiratory movements and capacities to find they were equal in all ways when matched for stature and size of the children. He stated categorically, "the original type of breathing in both male and female sex is abdominal...."

When either boys or girls were forced to wear constricting clothes, their breathing mechanisms changed to a costal [rib-muscle] pattern, in Dr. Mays' studies. The topic of constriction continued to fascinate scientists after the century changed.

Not many women physicians worked publicly for dress reform. Dr. Anna Galbraith was an activist, promoting the 'straight-front' corset as more healthful than the 'wasp-waist'
style. She wrote, "the greatest dangers come from putting corsets on young girls who are still growing and are very imperfectly developed, and later by an undue constriction of the lower parts of the thorax and the waist...."\textsuperscript{37}

Dr. Thomas Manley of New York promoted corset-wearing, although he abjured tight-lacing. He called for corsets "constructed on physiological principles" and said that corsets were a prophylaxis [preventative] for spinal distortions, and a variety of maladies. He wrote, "Physicians should not so much concern themselves about abolishing this highly useful garment.... In the young, growing girl, presenting signs of rachidian [spinal column muscle] weakening, the corset should be applied early, that the strain should be removed..."\textsuperscript{38} Dr. Manley felt that, "the profession should regard the dress and wearing apparel of women as within the domain of sanitation."\textsuperscript{39}

In his 1900 presidential address to the American Gynecological Society, Dr. George Engleman\textsuperscript{40} spoke about the health of women and children. He suggested good nutrition, exercise, and careful sanitation but did not mention children’s corsets specifically. He did recommend against tight-lacing for women before, during, and after pregnancy because he saw it as a hazard for fetal health. He echoed Dr. Alice B. Stockham who said, "The corset should not be worn for two hundred years before pregnancy takes place."\textsuperscript{41} [Italics hers]

Germany was known throughout the world as a bastion against tight-lacing. This was likely influenced by Dr. Thomas von Sommering,\textsuperscript{42} one of the earliest medical denouncers of tight-lacing. A German medical textbook took a very pragmatic view. The authors stated,

Young girls should postpone the use of the corset as long as possible, not employing them until the osseous [bony] skeleton is completely developed. This will prevent a great majority of the bad effects produced by this article of apparel, and particularly the malformation of the lower thorax.

...the tendency to constipation...would be greatly diminished if inappropriate corsets were forbidden.\textsuperscript{43}

Another author who wrote with the American public in mind was Dr. Meyer Solis-Cohen\textsuperscript{44} who worked as a pediatrician in Philadelphia. He discussed "the improprieties of dress" as he saw them: "undergarments made of unsuitable materials" [he preferred unboned, lightweight
woolen 'waists' and "constriction of the modern female dress, as typified by the corset..." which lead to restricted lung volume in children and thus to disease, in his opinion.

Califomian Dr. Clelia Mosher\textsuperscript{45} took a series of measurements of girls entering college; she reported on the increasing physical stature and capacity of young American women. Her review of both eastern and western college entrants indicated there was an emphasis on the compressed waist prior to 1905, and that the degree of compression lessened after that date. As has been stated, corseting must have begun early in adolescence to create the deformities seen by Dr. Mosher. She described narrowed ribcage, spinal curvatures, trunk muscle wasting, and several other signs associated with tight-lacing in the young women she examined. She noted that the attitudes about wearing corsets gradually changed as education for girls improved. Dr. Mosher had strong desires to promote education for women which may have influenced her findings.

Authors for Non Medical Publications

Non-physicians wrote in dress reform publications and fashion literature. One of the first to call publicly for moderation for the tight-lacing of girls was Madame de la Sante\textsuperscript{1} in 1865.\textsuperscript{46} She outlined a plan for the gradual introduction of stays and warned mothers against temptations "to take an empress's [Eugenie of France] waist as a model."\textsuperscript{47} Her plan, which she says "will be found worthy of adoption by everyone who cares for the health and personal appearance of her daughters" included the following.

At the age of seven or eight years they should be carefully measured and fitted with stays, made so as to meet from top to bottom when laced on. When so laced, there should be no tightness whatever round the chest or below the waist, and they should be little more than close-fitting, even at the waist itself. These Corsets [sic] should be fitted with shoulder straps and held in their proper position.\textsuperscript{48}

The reader may surmise as to the frequency of changes needed in these garments for growing children, creating inordinate costs and making the likelihood of well-fitting, non-compressing stays almost nil.
Mrs. Gardner reminded England's readers of *The Ladies Repository* about the dangers inherent in tight-lacing young girls in 1867. She said, "Youth does not, of its own accord, take to tight-lacing." She described an interaction between a daughter pleading to be removed from the stays placed by her mother, which she then concludes with, "It is four years since, but the frail lovely creature has for three years been wearing the dress which requires no lacing to make it fit. A white marble cross in the burial place shows where she rests." 

An article in the 1871 New York publication *Metropolitan* warned, "Those mothers who are desirous of their daughters slender waists should be careful in the application of the corset." The author went on to describe a snug, but not tight-laced corset, and recommended that "after the age of fourteen, the full corset should be worn." This commentator praises corsets and credits France with their revival.

An article which appeared in *Harper's Bazar*, 1875, asked the question, "How are tight waists to be made compatible with any kind of serious effort [exercise]?" The author went on, "Without insisting, at this time, upon any radical reform of woman's dress, we would urge upon parents not to fetter their daughters prematurely with its [fashion's] oppressive finery and entanglements. The costume of the girl is too often modeled after that of the full-grown woman, but even in its most faulty styles is better adapted to the necessary freedom of childhood than the fashionable attire of modern lady.

That opinion was reiterated by Mrs. Oliphant in her introductory remarks on dress and beauty for 1878. She stated, "One cannot but smile to see the unconscious folly with which a fresh young girl with flowing locks and elastic form painfully fits to her young figure the expedients invented for the benefit of people who are, according to the expressive idiom of the French *passe*es" [italics hers; an old spelling for *passé*]. Mrs. Oliphant went on to describe her recommendations for color, style and line without referring to the corseting of young girls again.

Sir James Clark, physician to Queen Victoria from 1870-1885, wrote a warning to England's mothers against "all descriptions of machines [corsets] or braces which are so applied as to restrain the shoulders or to press heavily on any one part of the female form."
This plainly written guide was revised and reprinted in America; he wrote, "We caution mothers most strongly not to be deceived by the apparent improvement when first put on; for this is the snare that has allured so many tortured children into deformity." This was a straightforward attempt by a member of the Royal Household to influence the population at large.

An anonymous author wrote in response to letters from Dress Reform advocates published in England in 1882. The writer reminded the editors of historic examples of all classes and ages wearing corsets, yet "living long and healthy lives." He quoted one eighty year old correspondent who stated she had "contracted into fifteen inches when she was young."

Maria DeWing included comments about corseting in her advice about beauty in dress. She said,

...five and twenty is the age set by anatomists for the complete formation [body development]; from the age of 15 or 16, the pliant, tender bones and muscles are often compressed and flattened, till, instead of growing and making room for the wonderful system of organs which only their full development can give us a worthy race, the beautiful skeleton is contracted and deformed, the young muscle weakened, and the doctor's offices filled with nervous patients. Tight-lacing is not only a hideous stupidity, it is a crime [italics hers] - a crime that casts a heavy burden upon the next generation....

In the course of my correspondence with modern corseters via e-mail, I received a copy of a diary purported to have been written in 1883-1884 by a young French girl living in the United Kingdom. I have some reservations about the authenticity of this manuscript, however many of the entries 'ring true' with regard to the anatomical details and feelings of discomfort felt by the thirteen year old author, who was undergoing her first experiences of tight-lacing. Along with descriptions of the three corsets her mother supplied, the descriptions of gradually increasing degrees of lacing, night-corsets, and physical symptomatology have an air of genuineness. Apparently the young diarist never thought to rebel or attempt to thwart the fashion imposed on her.
An opposite personal experience of corset wearing was related by an Australian woman who wrote in response to a series of articles to the mid-1880s Dress Reform journal Knowledge. She wrote that she was “encased in stays” at the age of fifteen, but the “infliction those wretched instruments of torture entailed upon my young, supple body” caused her to remove corset bones, gradually loosen, and ultimately remove her corset completely, while continuing a vigorous exercise regime. She attributed her good health and strength to the avoidance of corsets and maintenance of regular exercise, in which she was encouraged by her reading.

Editors of 1880s publication The Family Doctor asked about the existence of tight-lacing in boarding schools. A reply from a writer verified in the affirmative, and gave detailed descriptions of tight-lacing being used as a punishment in some schools. One student told the writer that she had started lacing at age twelve, and a survey of six corseted girls, ages 12 to 17, found that five wore their corsets day and night. The author hoped to influence mothers and teachers into “deposing the corset and adopting a more rational and healthful form of dress.” This presented a different point of view. For many young ladies at school a tiny waist was a desirable outcome, and might have been considered a reward.

A gentleman corset-proponent wrote to the editor of The Family Doctor which had published the above-mentioned articles comparing tight-lacing practices in boarding schools. He mentioned the waist measurements were competitive among his wife and daughters and their friends, with the smallest waist measured at 12 inches [apparently on a very small-framed girl]. The “figure-training” associated with boarding schools depended upon the directors and the parents’ wishes for their daughters. He did not mention health as a concern.

One who wrote with the message that encouraged 1890s Christians “to care for the body as a temple of God’s work” was Lydia Newcombe. She stated,

It is a generally accepted fact that the use of the cigarette ruins boys physically and unfit them for school work. What tobacco does for the boy, improper dressing does for the girl. ...the girl sees the picture of the beautiful Venus de Milo side by
side with the distorted, deformed waist, looks about her and sees the latter among her older friends and concludes - to follow the fashion.®

"Practical information for wives and mothers" was the subtitle of Mrs. E. B. Duffey's 1898 book.® On the "evils of stays" she stated emphatically, "There must be no corsets worn [italics hers]...stays are in every way injurious. The bones which stiffen them press against the tender tissues of the growing bust, not only preventing its full development, but building the foundation for future troubles when the girl becomes a woman and a mother."® Of the culpability of the mothers, she says, "A woman who has these facts [health hazards] before her, and who still, for fashion's sake, persists in putting her daughter into stays is unworthy to be a mother."®

Two years later in 1900, Mary Howarth opened her article in Women's Dress with the statement, "There has never been any doubt as to the importance the corset occupies in dress."®® She explained when the 'grown-up corset' should first be worn. She said the age of fifteen is the time for most girls, but stated that some girls [notably "those of Italy, Greece, Spain, and the tropics"] would require an adult-style corset earlier. She used the analogy of a sapling, allowed to grow without pruning and restraint, to compare to the uncorseted, young girl.

Dr. John Girdner had an opposing opinion to corseting, when he wrote an article directed at the lay public in 1902. He said.

The mother of our western civilization puts a corset round her daughter's waist as soon as she enters her teens, and its pressure not only disarranges her anatomy, but interferes with the functions of some of the most vital organs of the body. Some idea of this pressure is seen when a necropsy is made on a tight-lacer.®

Summary

The writers I have cited above are a cross section of medical and non-medical people who were either supporters or opponents of corsets for children. Arguments for and against children's corsets were, no doubt, confusing to well-meaning parents. In spite of the best efforts of medical practitioners to educate the public, most opinions reached a limited audience.
This was true with health issues like corseting as well as more immediate issues like clean water and public sanitation. A very limited percentage of writers in the medical literature and an even smaller number in the non-medical publications mentioned children's corsets or clothing at all. Those who did mention clothing generally deplored tight-lacing without actually calling for total rejection of the corset. The majority of non-medical writers wrote for fashion and other popular markets and relied on the fashion trade for their livelihood, making them less likely to deplore a commercial garment. In the final analysis, only the gradual change in fashion released children from their bondage in tight-laced corsets.

Notes

2 Lane-Claypon, Janet E. *Hygiene of Women and Children*. London: Henry Frowde & Hodder & Stoughton, 1921. She did comment on dress reform and fashion trends for women in both nineteenth and twentieth centuries, but concentrated her remarks about children to growth, nutrition, and activity without discussing their clothing.
14 Ibid., p. 6.
16 Walker, Mary E. HIT. New York: *The American News*, 1871. p. 67. She refers to the funeral expenses which were paid to the sexton (bookkeeper/secretary/sacristan) of the churches. They were in charge of cemetery placements and organization of ceremonial events at church; often their records were the only documentation of death prior to laws requiring births and deaths to be registered with the state.
17 Ibid. p. 74.


Galbraith, Anna. *Hygiene and Physical Training for Women.* New York: Dodd, Mead, 1895. This work was also published with the title "Hygiene and Physical Culture for Women." p. 270.


47 Ibid. p. 28. The Empress Eugenie of France was said to tight-lace to a waist size of seventeen or fewer inches; reports were never specific, but nineteen inches is the largest number I found in this regard. Nineteen inches is the circumference of the average teacup saucer. [See Figure 46]

48 Ibid., p. 30.


50 Ibid. p. 262


54 Clark, Sir James. The Ladies Guide to Beauty: Containing Practical Advice on Improving the Complexion, the Hair, the Hands, the Form, the Teeth, the Eyes, the Feet, the Features; so as to Insure the Highest Degree of Perfection of Which They are Susceptive. New York: Dick & Fitzgerald, c.1880.


62 Ibid. np.


64 Ibid., p. 40.

65 Ibid., p. 41.


CHAPTER 6: CORSETS AND EXERCISE

Historians' Writings

In this section I shall discuss a limited number of authors who specifically mention corsets in relation to exercise during the late nineteenth and early twentieth centuries. To assist the reader with visualizing the size of tight-laced waists, refer to the diagram with 19 inch and 13 inch circles (Figure 38). Wilfred Webb discussed the effects of corsets upon the individual by quoting extensively [and exclusively] from two English medical articles which promoted the wearing of corsets by women. He also mentions, “the wearing of belts by navvies [unskilled workers] when they are doing heavy work is possibly a precaution against strain.” Although much of his other material appears broad-based and accurate, it is puzzling that, as a historian, he limited his studies to only one viewpoint when speaking of corseting.

Carrie Hall wrote about changes in women's garments paralleling the changes in attitudes about life, travel, entry into the professions, and increasing travel opportunities which brought about “new ideas toward physical education for girls.” Phillis Cunnington and Alan Mansfield's comprehensive survey of English sports clothing has a wealth of information, including references to special corsets worn for riding in the nineteenth century. They provided illustrations of sports costumes from the period 1860-1910 which would lead the discerning viewer to speculate that corsets were worn as foundations for the silhouette depicted.

The article by Helene Roberts created a controversy in the years following its publication in 1975. Her opinion was adamant: corsets were not only harmful, but were foisted on women by chauvinistic, masochistic, and domineering males in order to keep them in submission. She credited the Dress Reformers with some protestation against the corset, and stated “the influence of sports in the 1890s was near revolutionary.”

In response to Roberts, David Kunzle asserted “tight-lacers claimed to enjoy superior health and to take more than the usual amount of exercise.” He argued that only a small
percentage of "largely lower middle-class" women tight-laced. I believe his opinions are misleading and dismissive of the prodigious amount of evidence from the medical and lay press to the contrary. Stella Blum referred to the corseted riding habits worn by female members of the Hapsburg dynasty. Jeanette Lauer wrote,

In 1910, the woman's amateur tennis champion of the United States addressed the debated question of whether women should wear corsets while playing golf or tennis. She asserted she wore them herself and felt they were "desirable for many reasons" including the fact that most players looked better in them.

In her thesis for the University of North Carolina, Judith Leslie asserted corsets were generally worn for sports by women, except for a few "daring Dress-Reformers who braved the derision of their peers and spectators." Paula Welch concurred with Leslie, although she stated, "Dress reformers were more disturbed over the effects of cumbersome attire than the lack of physical exercise." Welch credited Catherine Beecher with contributing to the acceptance of dress reform, along with physical and general education for young girls in early nineteenth century America.

Aileen Ribeiro quoted Roxey Caplin as one of the first authors to advocate exercise for posture correction while wearing her 'health corset' (italics mine) (Figure 33). Mabel Donnelly had several references about corseting, particularly that they prevented exercise by young girls during the Victorian era. Patricia Vertinsky blamed the medical profession for lack of leadership in women's exercise and dress reform, chauvinism toward females generally, and sundry other peccadilloes regarding women and their clothing, particularly their attitude toward corseting. She regarded corseting as tantamount to imprisonment, because of its construction inhibiting healthful exercise.

My thesis work provided some basic physiologic information about the effect of corseting on the exercising female wearing a corset. The straight-front corset was called the 'health, hygienic, rational, reform, or sanitary' corset by its inventors and manufacturers and many Victorian physicians recommended it for use during exercise. I found no evidence that any experiments were conducted to support those recommendations.
One straight-front corset designer was Doctor Josephine Ines Gaches-Sarraute; she made many assertions in French medical journals\textsuperscript{16} about the efficacy of her corsets which were repeated with full conviction by physicians around the world. Unfortunately, I believe she was completely wrong; the studies I performed indicated her corset did not allow enhanced physical performance, rather it restricted the subjects more severely. In every category of testing, the straight-front corset actually created more troubles for the wearers than did the hourglass corset style when laced to the same degree. The pelvis was pushed down in front, creating a severe lumbar curvature [sway-back] and this posture changed the center of gravity which caused stress to be placed differently on joints and muscles (Figure 35).

\textit{The Bicycle and Its Influence}

In this section I have grouped historians and contemporary authors who specifically mention cycling for women as a newfound exercise mode (Figure 39). A stir was created in the mid-1860s, after the invention of the bicycle, involving clothing in general and corsets in particular. Bicycling was regarded by some as a salvation, by others as a danger to feminine morality! Paula Welch\textsuperscript{17} stated, “the bicycle was the emancipator for women, a justification for donning functional clothing” (Figure 40). According to historian Maryanne Dolan “the biggest revolution in clothing was caused by the wheel -- or two wheels -- the bicycle.”\textsuperscript{18} Anyone who has ridden a bicycle can imagine the hindrance long skirts and corsets might create for the rider.
From the 1860s to 1900, English and American women had adopted first the tricycle and then the bicycle. Robert Smith related that “a New York medical man told an audience that cycling had come along just in time to rehabilitate the American woman.” He also told of more than two dozen physicians from Chicago who promoted cycling for their female patients in 1895 because it encouraged them to remove “their murderous corsets.”

![Figure 40. Sports clothing designs which reflected the beginnings of rational garments for exercise. (Left: Garland p. 12; Center: Garland, p. 12; Right: Laver, 1995, p. 224)](image)

Apparently, this action was quickly rebuked by corset business owners who fought to maintain the fashion. Certainly, contemporary advertising illustrations abound for ‘bicycle corsets’ (Figure 41). A section in a pediatric journal of 1897 recognized this trend.

The glad news has come from Paris, whence are issued the decrees of woman’s world of fashion, that it has been decided, after mature deliberation, to increase the size of the waist of a society woman by three or four inches. The bicycle is responsible for this wonderful innovation.

Julius Price credited the women of Paris with championing the change in fashion; both bourgeoisie and elite spun through the lanes wearing, “a costume which put the sportsmanlike character of the Parisienne to the test.”
A variety of fashion mavens, social advisors, and society writers, not to mention cartoonists, informed women on the subject of bicycle fashions. Advice ranged from presenting the trim back of a smoothly corseted riding habit, "fitting the figure perfectly and cunningly stretched and shrunk" by Mrs. Harcourt Williamson, to Dr. Dickinson's recommendation of a union suit, tights, and a choice of trousers or bloomers.

Parsons preached against bicycling as an amoral fad; they had several reasons for this opinion. They thought the virtue of females would be affected through the influence of loosened corsets; they abhorred "the urge to emancipation" as typified by the free-wheeling feminists; and they gravely objected to the possibility of "sexual excitement" caused by the saddle against the pubic ramus. This last concern they felt to be exacerbated by the removal of the corset, which then allowed the rider to lean forward at an angle which would "strongly suggest the indulgence we are considering."

Some medical practitioners recommended the bicycle for exercise, while others denounced it as injurious. A German gynecologist reported increased incidence of urinary tract infections as a result of cycling without mentioning the concurrent corseting in his patients. Perhaps the most definitive article was written by Dr. Robert L. Dickinson, who heartily recommended the bicycle as preferable to horseback riding [because cycling did not create as much bouncing], or to pressing the treadle of a sewing machine, which created extra abdominal pressure when sewers leaned forward. This was the first instance I found which...
referred to sewing as exercise, but I believe it to be serious, and the vigorous treadling of a sewing machine certainly could be defined as ‘leg-work.’

An American reporter wrote a popular article in 1892 on women’s cycling without once mentioning corsets. Haute couture designers largely ignored the bicycle; Rational Dress enthusiasts grasped it whole-heartedly; princesses and commoners took to ‘the wheel.’ According to Frederick Alderson, near the end of Queen Victoria’s reign “the bicycle [and with it, a change in fashion] had become an established part of national life.” Doctor Eugene Crutchfield, quoted anatomy Professor Howard A. Kelly when recommending exercise for his patients. Kelly said, “one of the most important results from bicycling for women ... is that it will require them [women] to do away with the corset.” The editor of Pediatric News suggested bicycle riding as a TB preventative. Photographs and illustrations from the period, suggest that most sportswomen were wearing corsets (Figures 42, 43). There were a few who dared to be comfortable and to show their athletic prowess (Figure 44).
Figure 44. Members of the first women's professional cricket team in England. The uniform was a breakthrough in sports dress in the 1890s. (Crewe, p. 18)

Publications and lectures given both at spas and during publicity tours focused on dress reform, exercise, healthy diet, and freedom from corset restraints.

Contemporary Opinions about Corsets and Exercise

Corset wearing during exercise was argued in the medical and the lay press during the late nineteenth and early twentieth centuries. In this section I have omitted those authors mentioned in the prior section who discussed cycling specifically. I found twenty-four medical authors who wrote opinions about exercise in general: one was in favor of corseting, nineteen were definitely against it, and four encouraged exercise for women without ever mentioning clothing or corsets at all! In the lay press articles I found, opinions were almost reversed: eleven authors favored corseting during exercise, three wrote in opposition, and two failed to
mention corseting as either a boon or hindrance to the exercises they recommended. Overall, the ‘anti-corseters’ seemed most vociferous and missionary-like in their statements.

**Medical Authors Who Were Anti-Corset**

There were many medical authors who wrote about the effect of corsets or stays in the early years of the nineteenth century, but I have chosen to report on those who used actual scientific evidence, either from autopsy reports, research studies done by the author, or peer-reviewed papers presented at professional meetings. It must be noted that very few actual experiments were done on corseted subjects; I could find only one contemporary report involving exercise directly. The researchers extrapolated their opinions regarding exercise.

Dr. Nottingham⁴ of Edinburgh recommended a fifteen-year old patient in his care “throw aside the stays” and commence a program of rehabilitory exercises in 1841. He based this recommendation on discoveries he made while autopsying another young woman who tight-laced. If we examine the recorded silhouettes of the 1840s, we might not think of the tight-lacing as severe, yet it was apparently sufficient to cause death even then. His advice was echoed by Dr. Goldthwaite, who took the athlete as an example.⁴¹

Dr. Robert Dickinson⁴² practiced gynecology in Boston when he first wrote instructions which doctors could use to instruct patients how to gradually stop their use of corsets. Later, when he lived and worked in New York, he replied to the concerns of local clergy who preached against women riding bicycles. Dickinson attempted over a series of several years to influence women against corsets and to encourage exercise. He also argued for all patients to remove their clothing [including corsets] during physical examination, which was not a common practice at the time. The editor of *Pediatric News* hailed the bicycle as a TB preventative.⁴³

Published in England, Dr. Joseph Farrar⁴⁴ was another physician with a clear message: “first, lay aside the pinching corset; ...next, do everything to assist the chest in this work of reestablishing ...respiration.” He recommended “plenty of outdoor exercise, particularly
walking...,” and exercises “where the arms are brought into action.” An article written by Dr. Diocletian Lewis for the North American Review was copied by the editors of *Knowledge*; it detailed a study done with students of the Boston Normal School for Physical Education. The health of the female schoolteachers, who made up about half of the student body, was described as “broken.” Dr. Lewis wrote, “But with the removal of the corset, the long, heavy skirts, and the use of those exercises which a short and very loose dress renders easy, a remarkable change ensued. In every one of the ten classes of graduates, the best gymnast was a woman.”

In a textbook chapter devoted to social conditions and development of women, gynecologist Dr. Thomas Addis Emmet discussed the “education of girls in connection with growth and physical development,” recommended against tight clothing, particularly corsets, and said, “in no part of female education is there so much need for reform as in that of physical culture.” Dr. Lena Ingraham agreed, when she campaigned for gymnasiums for girls' schools and colleges. She chided her fellow physicians to promote exercise as a palliative for many of the complaints female patients presented. In her advice book for women, author Dr. Alice Stockham recommended a “princess waist or combination garment” in place of the rigid corset, but emphasized “a perfect fit” as essential when exercising.

Dr. Edwin Checkly outlined suggestions for women’s physical training. In his opinion, females were nearly capable of doing the same training as males. He cautioned, “At the very threshold of healthful development is the obstacle of the corset.” Seventh-Day-Adventist, Dr. John Harvey Kellogg, advocated a vegetarian diet, a strenuous program of daily exercise, and removal of the corset for health’s sake. His sanitarium at Battle Creek Michigan was a Mecca for health reformers and patients seeking vigorous exercise and Spartan diet. Although he wrote vociferously against the wearing of corsets by his patients in medical articles, when he published a series of health books for the lay press with another author, the corset was never mentioned. Another homeopathic practitioner, Dr. E. H. Ruddock
published several encyclopedic manuals for home health care. These included dietary, exercise, and moral guidelines for all occasions. He advised against corsets for the post-maternity patient specifically, recommending a series of exercises to regain vigor.\textsuperscript{52}

*Scribners Magazine* published Dr. D. A. Sargent’s article on the physical development of women in 1889, in which he reported a study of women running. He stated,

In order to ascertain the influence of tight clothing upon the action of the heart during exercise a dozen young women consented this summer to run 540 yards [1/3 of a mile] in their loose gymnasium garments, and then to run the same distance with corsets on. The running time was two minutes and thirty seconds for each person at each trial, and in order that there should be no cardiac excitement or depression following the first test, the second trial was made the following day. Before beginning the running the average heart impulse was 84 beats to the minute; after running the above-named distance, the heart impulse was 152 beats to the minute; the average natural waist girth being 25 inches. The next day corsets were worn during the exercise, and the average girth of waist was reduced to 24 inches. The same distance was run in the same time by all, and immediately afterward the average heart impulse was found to be 168 beats per minute. ...one can form some idea of the wear and tear on this important organ [the heart], and the physiological loss entailed upon the system in women who force it to labor for over half their lives under such a disadvantage as the tight corset imposes.\textsuperscript{53}

Sargent took this evidence seriously and attempted to have his patients remove their corsets, although his instructions were not specific on method. When one considers the average amount of tight-lacing reported in the 1890s was 7 inches, it may be possible to imagine the severity of limitations women endured in the name of fashion. As far as I was able to discern, this is the only study of this nature ever done during the period. Dr. Sargent’s information was presented to the public in a *Delsartean Scrap-Book* by Frederick Sanburn.\textsuperscript{54}

F. B. were initials used by a now-anonymous medical writer who spoke directly of figure training and form. This author stated,

Women should learn that the only way to keep their bodies in good trim is to use their muscles sufficiently, and that they should find out what amount of use is required to produce exactly the right kind of development...Gymnastics...running, jumping, quick walking, and even games like cricket...To play these games with safety and advantage however, stays and tight boots must be altogether discarded.\textsuperscript{55}

F. B. did not give instructions about the procedures which would be used to “discard” the corset, only that it should be done.
A physician in Mount Carmel, Illinois, Dr. J. Schneck presented a paper to the Illinois Medical Society on the physical training, education, and dress of girls. He compared "wealthy and fashionable girls ... with their sisters from the country" or with immigrant girls who had never corseted. His recommendation was that "exercise should be taken in the open air...not too violent [sic]. The apparel should not interfere with the free action of any of the vital organs of the body."

Another prominent American physician who wrote recommending moderate diet, fresh air, and exercise for men and women was Dr. Henry Taylor. Dr. Taylor was cited by Dr. George Engleman, in his presidential speech to the American Gynecological Society, when he outlined specific schedules for exercise for girls and women. Engleman presented data regarding girls entering physical training courses at the high school. Whereas 47% wore corsets when they were freshmen, only 30% continued as seniors; Engleman concluded the exercise program helped rebuild their musculature and allowed them to stop wearing corsets. Even though this seems a modest decline in corset wearing in a specific group, it points out that fashion-conscious young women could and did make changes when given instructions and encouragement.

In a section in a book written specifically to the lay audience, Dr. Meyer Solis-Cohen included exercise as one of the "hygienic rules" for women and girls at every stage of life. In the same section, he points out that "faulty methods of dressing are responsible for many diseased conditions." Professor Howard Kelly, MD, who was mentioned previously, stated in his textbook chapter devoted to constipation, headache, insomnia, and obesity, "If a young woman will discard the rigid tight-fitting corset when she begins to take exercise adapted to making her breathe deeper and strengthen her loins, she will have taken one of the most important steps toward regulating this function [abdominal muscle weakness following childbirth]."
In 1912 Dr. Eliza Mosher published a series of letters to young girls deploring corsets and encouraging exercise. Her relative Dr. Clelia Duel Mosher, mentioned in Chapter 5, was the first woman to graduate from Stanford Medical School in California. She published a series of papers dealing with the relative increases in height of college women over the first two decades of the twentieth century. She attributed this finding to two factors:

a) the change in fashion making possible the wearing of clothing which interferes less with the hygiene of the woman; b) the increased physical activity which has been brought about (1) by the change in dress, (2) by the development of physical training and sports in secondary schools, (3) by the change in conventional attitude toward these activities for women.

Mosher also credited the bicycle with "forcing fashion to adapt" to exercise by women.

Generally, nineteenth century British and American physicians held similar views advocating exercise for women, although, in my opinion, the Americans were the leaders. My survey of medical literature found similar proportions for and against corsets in each group, with the majority repudiating them.

Anti-Corset Writers in the Lay Press

Although I did not survey women’s fashion magazines thoroughly, I did find some articles which bore directly on the subject of exercise with an anti-corset stance. An editor of Harper’s Bazar wrote a scathing essay on the subject of long skirts and corsets for young girls, decrying the urgency of taking girls away from their freedom of movement and putting them into clothes which limited exercise. The question was asked, “how are tight-waists to be made compatible with any kind of serious [physical] effort?” At the same time, corset advertisements continued throughout the publication, just as they did in other magazines for women.

The weekly publication Knowledge gave serious consideration to the topic of women’s dress. In a reference from Mrs. E. M. King, secretary of the English Ladies’ Dress Society, they quoted, “We are ready to accept, appreciate, and profit by the greater generosity of those men who encourage and help us to obtain a like advantage with themselves in education; and to
join them in their sports and healthy pleasures." Another journal article about clothing and exercise was written by James King. He stated, "from childhood to old age, women take much less exercise than men." In his opinion, "the first and chief cause of this is the corset."

Octavia Bates addressed the 1892 Symposium on Women's Dress in Boston on the subject of college women's dress. She emphasized the difficulties of wearing the heavy, corseted fashions when attempting to maintain a rigorous study and exercise regimen. She recommended "helping college girls out of their bondage to clothes."

At least one contemporary ladies' magazines advocated "exercise as a beautifier." Despite the fact that the article was illustrated by a tiny-waisted and fully-dressed 'Gibson girl' using a rope and pulley, the advice was exercise "should be done...when free of dress." The author does not specify her intent, but the reader may assume how to interpret the statement.

The director of women's gymnastics at Stanford University in the early twentieth century, Frances Bolton, wrote a thorough and well-illustrated book about exercise for women, in which the second chapter was titled, "Clothes an Important Factor." Bolton abhorred corseting and did her utmost to discourage the use of restrictive dress of all types. Elizabeth Chesser also included a chapter titled, "Clothing and Health" in her book outlining changes in females from girls to women. She wrote, "the girl whose muscles are properly developed does not require artificial support, and when you wear badly fitting corsets you directly encourage round shoulders and spinal curvature."

**Corset Advocates**

The reader is aware that a primary function of most magazines for women was to emphasize the fashionable mode, which included corsets. Although I have not done a formal survey, I found corsets were routinely advertised in ladies' magazines (See Appendix D). This may have caused editors to have been reticent to speak against corseting. There were several authors and editors who defended and endorsed corseting as an imperative wardrobe element.
Although Catherine Beecher advocated education reform, physical exercise for her pupils, and dress reform, she did not go as far as promoting corsetless figures. There were ‘alternate corset’ designers who promoted their designs as appropriate for exercise; among these was Roxey Caplin, mentioned previously. Caplin claimed to be able to exercise vigorously in her “hygienic design.”

Mrs. Oliphant wrote in the introductory remarks to her book that “although a fresh young girl with...elastic form painfully fits to her young figure the expedients [corsets] invented for...the expressive idiom of the French [fashionable mode]...since it is fashion, it must be accepted. According to Mrs. Oliphant, if exercise must be foregone, then young ladies must acquiesce.

Mrs. Teresa Dean was another proponent of the corseted figure. She equated exercise with “graceful movement” which could not be accomplished “in wearing clothes loose enough to hitch out of place.” Dean emphasized decorum and maintenance of social position as paramount to a lady’s style. A sedate stroll was likely the only exercise any tight-laced female could manage with comfort.

Discovering physicians who promoted physical exercise in combination with corset-wearing was not easy, however Dr. Alice Cutler provided one example. She is quoted as recommending “the corset as a necessary garment for working women.” A separate pamphlet was printed based on her contribution to The Nurse, in which Cutler emphasized the corset must be properly fitted, and laced with care. She stated,

Corsets and shoes are the two most important articles of dress, but to a nurse, corsets are of greater moment than ill-fitting shoes. In her work, she is expected to get into all kinds of positions, and if she has on an ill-fitting corset it causes a displacement of the internal organs which in time produces a train of bad feelings ultimately resulting in a fagged-out appearance and cause her to do work in a half-hearted manner...All physicians know that corsets have been the cause of much of the trouble that women suffer from; but if a woman wears a corset that fits her anatomically, it gives her the greatest comfort and support....

Cutler chided her fellow physicians for not being understanding “of the comfort we women have when we are properly corseted.”
Lydia Becker wrote about the usefulness of stays which were "well-modeled and not too tightly laced" for women who did housework. She said, "The kind of corset chosen should be adapted to the habits of the wearer. The rule should be simply to take that kind of stays in which she can best do her work, and feels most comfortable while doing it." The advertisements beckoned buyers with enticements of beauty, health and comfort (Figure 45).

In addition to those who promoted corsets, there were several authors who proposed exercise as a remedy for many maladies without discussing corsets or clothing at all. Redfold recommended "every kind of exercise, and the habits most conducive to the expansion of the thorax" and especially singing! He published in *The Water Cure Journal* which was generally thought to be against corseting, but no mention of the garment was made. More than sixty years later, a series of articles appeared in *Musician* regarding the efficacy and problems of corset-wearing by singers.

Albert Hayes of the Peabody Medical Institute in Boston, outlined a series of gymnastic and other vigorous exercise programs for young women in Massachusetts without once mentioning dress. Dr. Flint presented a paper to the Medical Society of the County of New York on the subject "Physiological Effects of Muscular Exercise" in which he recommended exercise for both sexes, young and old. Dr. Flint not only failed to mention corsets, but did not advise his fellow-physicians to recommend a gradual beginning to the vigorous programs he proposed. The procedure of giving patients advice without instructions on how to follow through was a typical one in my experience as a nurse and health educator with several decades experience. Very few medical schools teach doctors in training how to teach patients, techniques for evaluation of patient's understanding of instructions, or basic methods of presenting material in verbal, visual, or combination forms.
Figure 45. Three examples of corset advertisements from the late nineteenth century which alluded to 'health' as an enticement for the buyer. Top Right: Dr. Lucien Warner’s 1875 Sanitary Corset advertisement showed a soft bodice and shoulder straps. (Shep, p. 24) Middle Left: The Ferris Good Sense Corset with firmer boning and shape. (Shep, p. 71) Lower Right: Madam Clark’s Hygeian model with a distinctly tight-laced waist and a spoonbill busk. (Shep, p. 43).
Discussion

These opponents and proponents of wearing corsets while exercising offered diametrically opposite viewpoints with very little hard evidence to illustrate their reasoning. The closest to scientific evidence was reported by Dr. Sargent with his experiment of girls running, but it may not have been widely publicized. There is little doubt that information from the medical community was confusing to the women in the late nineteenth and early twentieth centuries. I believe it was difficult to form an independent opinion in the face of social, moral, and fashion pressure that kept many women in their corsets despite their discomfort and even against their common sense.

Notes

1 Webb, Wilfred Mark. The Heritage of Dress. London: Times Book Club, 1912, p. 239-251. This chapter quotes Heather Bigg and studies done by Adami and Roy which are discussed in my chapter on medical writings. Bigg attempted to convince calisthenics instructors to wear corsets, but there is no report that they followed this advice. Adami and Roy claimed the corset assisted the pumping action of the heart.


7 Blum, Stella, ed. The Imperial Style: Fashions of the Hapsburg Era. New York: Rizzoli: Metropolitan Museum of Art, 1980. The riding habits were smoothly fitted over a tight-laced corset worn with a thin chemise next to the skin, in order to present ‘a trim back.’


40 Nottingham, J. "Compression of the Female Waist by Stays." Provincial Medical and Surgical Journal 3 (1841): 111.


51 Kellogg, John Harvey, and M. V. O'Shea. The Everyday Health Series: Book Two, Keeping the Body in Health. New York: Macmillan, 1921: The Everyday Health Series: Book One, Building Health Habits. New York: Macmillan, 1925. Although the titles describe differently, Book One was published after Book Two; no reason was given to explain this by publisher or authors.


54 Sanborn, Frederic. A Delsartean Scrapbook: Health, Personality, Beauty, House-Decoration, Dress, Etc. New York: John W Lovell, 1891. According to Sanborn, Delsarte was a French philosopher and social moralist who promoted dance, exercise, and hygienic principles particularly to the upper classes, holding up the Greek figures as ideals to emulate. It should be noted that Sanborn did not credit Sargent as his source for the running experiment.

55 B. F. How To Train the Figure and Attain Perfection of Form. London: Lawrence Simon, 1893.


Mosher, Clelia Duel. “Concerning the Size of Women, Preliminary Note.” California State Journal of Medicine 19, no. February (1921): 53. Clelia and Eliza were either sisters-in-law or cousins-in-law, both lived in California; Eliza was the younger.


“Exercise as a Beautifier.” Conkey's Home Journal 9, no. 2 (1901): 5.


Chesser, Elizabeth Sloan. From Girlhood to Womanhood. New York, London, Melbourne: Cassell & Company, 1913. See the section on muscle atrophy for explanation of these phenomena.


Caplin, Roxey A. Health and Beauty: or, Corsets and Clothing Constructed in Accordance with the Physiological Laws of the Human Body. London: Darton, 1856


Ibid. p. 73.


Ibid., p. 151


Hayes, Albert. Physiology of Women. Boston: Peabody Medical Institute, 1869.

Flint, Dr. “Physiological Effects of Muscular Exercise.” Proceedings of the New York County Medical Societies, no. April 4 (1870): 546-552.
CHAPTER 7: RELATED MODERN PHYSIOLOGICAL EXPERIMENTS

Introduction

The reader may have some doubts as to the implications of present-day physiologic experiments relating to tight-laced corseting, but I hope to show analogies which I think may convince you otherwise. Although my studies are apparently the first in over one hundred years using tight-laced corseted females, several studies have been done with individuals [mostly males] who wear other types of restrictive clothing, like divers' suits and firemen's gear; there are also experiments designed using elastic bandages and other 'pressure loading' devices. Respiratory restriction, hemodynamic effects, muscle atrophy, digestive disorders, and other aspects of physiologic effects have been studied in animals [primarily dogs, but occasionally primates] and humans. The studies mentioned below are representative, but are not meant to be a comprehensive review of these types of experiments. I have placed a synopsis table of these studies at the end of this chapter to assist the reader.

Dr. Bruce Johnson is one of the exercise physiologists at Mayo Clinic's Cardiovascular Health Clinic; his research examines diaphragmatic function, fatigue, and exercise. He frequently publishes excellent peer-reviewed articles about 'elastic loading' of the chest and other physiologic problems akin to corseting. He adapted the esophageal balloon pressure catheters for my use with corsets.

Chest Wall Restriction

Researchers in Sydney, Australia studied the oxygen cost of inspiratory loading in healthy humans and found fatigue of chest-wall muscles contributed to more shallow inspirations over time. They used elastic bandages to restrict chest wall movement without attempting to restrict any abdominal movement; but results showed a decrease in inspiratory capacity of the subjects. Capacity to inspire was compromised increasingly over time, resulting in loss of ability to exchange air of up to 20% in subjects. Whereas this temporary
reduction of chest capacity did not cause immediate or threatening symptoms in the tested subjects, it may be argued that consistent restriction would restrict valuable air exchange chronically.

Changes in Breathing Pattern

Researchers in Liverpool, England investigated individuals' perception of and their responses to resistance when inspiring. They also used elastic bandages to restrict the chest wall of their human subjects; this action reduced the ventilatory response to CO₂ resulting in an increased sensation of effort to breathe, as reported by the subjects and from data recorded mechanically. This was corroborated by the increased rate of respiration noted. They found even small changes in the level of CO₂ could change subjects' breathing pattern by shortening the inspiration phase, which subsequently reduces tidal volume. With steel-boned garments restricting both chest and abdomen, the corseted subject might have consequent feelings of shortness of breath, greater effort needed to breathe, and possibly sensations related to fainting.

Another study examined the effect of slowly increasing the elastic load on the chest wall of humans. When subjects' breathing was very gradually inhibited, their consciousness of, and therefore their response to, the inhibition was reduced to the point that they did not alter their respiratory rates at all! This may explain why women denied feeling short of breath (or even that their corsets were tight) when they were subjected to tight-lacing gradually over an extended time.

Diaphragmatic Function

Inspiratory function with regard to diaphragmatic action was measured when the chest wall was restricted during exercise of male athletes. When the abdominal wall alone was restricted, the diaphragm's action was "well-defended" but when the chest wall and the abdomen were restricted simultaneously, endurance was reduced. Subjects breathed more
often per minute, and their ability to respond to greater work loads [faster pace or increased grade on treadmill] was impaired. This response was similar to that which I noted for the corseted subjects who exercised on the treadmill during my earlier study. Their respiratory rate increased as their work load and their ability to respond to increased work was greatly hampered when they were corseted compared to exercising without corset restriction. Again, since the corset restricts both abdomen and chest wall, the experience of Hussain and Pardy appears appropriate to compare.

*Shortness of Breath*

The sensation of dyspnea [shortness of breath] has been studied extensively in Japan. Researchers produced a decrease in functional residual capacity during inspiration by seating human subjects in a rigid unit, clamped to restrict their chest wall muscle movement. Subjects were instructed to attempt to curtail their sensation of dyspnea by using behavioral control. Since subjects were seated quietly during the test, several were able to maintain a mental feeling of comfort despite the inability to breathe freely. One may guess how the feeling of shortness of breath might be heightened if they had been asked to exercise during the restriction of the chest. The rigidity of restriction might well correspond to steel-boned corsets.

Another study by one member of the previous team examined how the ventilatory command signal, initiated in the brain, is closely related to the sensation of dyspnea. He determined that functional lung capacity was reduced when subjects had a sensation or feeling of shortness of breath resulting from chest wall restriction. As dyspnea became apparent to the subjects, they increased their breathing rate and attempted to compensate. This could have a direct relationship to corseted subjects.

A collaborate study on feelings of dyspnea with chest wall restriction was done in Ireland. Constriction of the rib cage was achieved using an inexpandable corset (designed to provide support for the thoracic vertebrae); this both reduced resting lung volume and restricted
rib cage expansion." I believe the use of a thoracic back brace, as described here, acted in a very similar way to the corsets of old.

**Sensation of Tight Clothing**

An experiment at Kutztown University, Pennsylvania, studied effects of clothing on inhalation volume. They were examining diaphragmatic breathing in athlete’s relaxation protocols. They showed tight clothing interfered with diaphragmatic breathing, during a period of time when athletes were recumbent, wearing commercially available elasticized exercise clothing in their usual size. Lung capacity was significantly reduced with resulting changes in breathing patterns. Respiration rates and sensations of dyspnea increased. The entire response reversed when clothing was loosened to allow for free diaphragmatic movement. The article described the degree to which the athletes had been subjected as “only slightly restrict[ing] the abdominal wall.” This study showed similarity to the symptoms and sensations experienced by tight-lacers, who also experienced symptom reversal when the corset was loosened to allow freer diaphragmatic motion.

**Blood Flow in the Chest**

A European study to examine effects of interthoracic pressure on blood flow was done by restricting the chest wall with elastic binding. Their conclusion asserted that external resistance on inspiration increased the work of the heart and resulted in a rise in blood pressure. As most people know, high blood pressure is a state to be avoided, since this can bring about serious changes in kidneys, liver, eyes, brain, and essentially every organ system in the body. The effect of tight lacing could produce effects which would be similar to those of this experiment.
Increased Vascular Response to Exercise

An experiment in Germany evaluated the coronary [heart] and vascular [blood vessels] response to chest wall resistance in dogs. Dogs are used for many experiments because their hearts and circulation are similar to humans. Oxygen levels in the circumflex artery [one of the main vessels supplying the heart muscle] were measured and found to be elevated. Heart rate and cardiac output were increased as a result of chest wall resistance. This showed a correlation between the heart muscle’s demand for oxygen and the chest wall binding. One may extrapolate that the corseted female would have similar effects.

Increased Intra-Abdominal Pressure

In my search for studies which might be relative to corseted subjects, I looked for muscle testing and found an outstanding example from Sweden. Pressure loading was applied specifically to the lumbar spine [mid-low back], and electro-activity of the spinal muscles was measured simultaneously with intra-abdominal pressure; the correlation was directly proportional and statistically significant. What this could mean in corseted individuals relates to the intense pressure applied to the lumbar region by the tight-laced corset, which created additional pressure within the abdomen. Since the Swedish study did not use universal pressure around the abdomen, as would a corset, the reader may realize pressure might be even more intense than spinal pressure alone. The consequences of this pressure will be discussed in other sections.

Abdominal Muscle and Movement

Two physio-therapists from Chicago published results from a longitudinal study on female subjects, who were observed in over 3000 instances during precise exercise procedures, with and without resistance. Essentially this study showed the trunk muscles are necessary in both sitting and standing postures, in addition to hip movements, and they act
as accessories to the chest muscles. If the trunk muscles were allowed to deteriorate in strength from any cause [casting was given as an example] the consequences were marked. Participants could not perform as well when muscles were weak. This result would corroborate reports of weakness of trunk muscles due to corseting, which acts very much like a cast. Although the reader might assume that corsets were removed particularly during sleep, this was not always the case. References are made in both medical and lay literature corroborating night-time corset usage, generally with slightly looser lacing.

Another muscle study provided findings which showed lack of trunk flexion increased lumbar-spinal muscle pressure. One can readily understand that steel-boned corsets did not allow much, if any, trunk flexion; this would translate into added spinal pressure, which, as mentioned above, would increase intra-abdominal pressure. It was a vicious cycle.

Orthopedic Bracing

Attention has consistently focused on the aspect of orthopedic bracing for a number of causes. These results have been reported in medical and surgical journals for more than a hundred years, but during that time bracing has not really changed very much. The brace is essentially a corset. Jane Farrell-Beck described this eloquently in her article for medical historians. Spinal mobility and its consequences are paramount in the aspect of bracing, but little attention was historically paid to the long-term effect of corseting by doctors; that is a topic about which I will deal separately.

Muscles and Osteoporosis

Strength of muscle of the back directly relates to spinal fractures from osteoporosis, according to researchers at Mayo Clinic, in Rochester, Minnesota. If we admit that muscle strength decreases with lack of exercise, as would happen under the corset, we may then see a connection to osteoporosis in the corseted person.
Tidal Volume

An investigation of breath control with the chest wall restricted was conducted at the Massachusetts Institute of Technology. The report specified the abdominal area "was not impinged." Tidal volume decreased and blood gas measurements [concentration of oxygen and carbon dioxide] showed aberrant results when the chest wall was restricted. These symptoms led to further impairment due to dyspnea and subsequent attempts by subjects to compensate by increased breathing rates. The reader may easily recognize similar patterns in the corseted subjects, as a result of tight-lacing around the chest.

Another study showed reduction in lung volumes when subjects were immersed in water. The pressure of water against the chest wall has not been correlated directly to corseting, however it might make an interesting topic for further research.

Tight Girdles

Dr. Paul Dudley White turned his attention to women's clothing in the 1970s. He described hiatus hernia, gastric reflux, and esophagitis, as well as colonic infarction [loss of blood circulation to the colon wall] causing death as results of wearing tight girdles which were then fashionable. He mentioned dyspnea, fainting, and cardiovascular problems including thrombosis [blood clots], varicose veins, and circulatory disease causing skin and leg ulcers. All of these he attributed to the increased pressure resulting from girdles. Many of these specific problems were common with corset wearers.

Synopsis

The ways that the human anatomy is restricted can affect many of the physiologic activities of the body. In each study only particular symptoms were discussed, but it is logical to think that the interaction of the body systems would create many effects. Information from the studies mentioned has been placed in Table 1.
Table 1: Synopsis of Present-day Physiology Studies

<table>
<thead>
<tr>
<th>Researchers</th>
<th>Anatomy Restricted</th>
<th>What Happened</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cala, et. al.</td>
<td>Chest Wall (elastic)</td>
<td>Inspiration 20% less, Short of breath (dyspnea)</td>
</tr>
<tr>
<td>Clague, et. al.</td>
<td>Chest Wall (elastic)</td>
<td>Reduced tidal volume, Short of breath</td>
</tr>
<tr>
<td>Puddy, et. al.</td>
<td>Chest Wall (gradual)</td>
<td>Reduced tidal volume, but no change in respiratory rate</td>
</tr>
<tr>
<td>Hussain, et. al.</td>
<td>Abdomen + Chest Wall</td>
<td>Short of breath, Work load impaired</td>
</tr>
<tr>
<td>Kikuchi, et. al.</td>
<td>Chest Wall (rigid seat)</td>
<td>Inspiration restricted, Mental control of dyspnea</td>
</tr>
<tr>
<td>Kikuchi</td>
<td>Chest Wall (elastic)</td>
<td>Increased resp. rate</td>
</tr>
<tr>
<td>MacHose</td>
<td>Chest Wall + Abdomen (tight clothing)</td>
<td>Short of breath, Reduced tidal volume</td>
</tr>
<tr>
<td>Oligati, et. al.</td>
<td>Chest Wall (elastic)</td>
<td>Blood pressure rise</td>
</tr>
<tr>
<td>Peters, et. al.</td>
<td>Chest Wall (dogs)</td>
<td>Heart rate increase, Cardiac output increase</td>
</tr>
<tr>
<td>Ortengren, et. al.</td>
<td>Lumbar Spine (pressure)</td>
<td>Increased intra-abdominal pressure</td>
</tr>
<tr>
<td>Partridge, et. al.</td>
<td>Weakened trunk muscles</td>
<td>Reduced tidal volume</td>
</tr>
<tr>
<td>Potvin, et. al.</td>
<td>Lumbar Spine (pressure)</td>
<td>Decreased trunk flexion, Increased intra-abdominal pressure</td>
</tr>
<tr>
<td>Sinaki, et. al.</td>
<td>Back Muscles Weakened (osteoporosis)</td>
<td>Spinal fractures, Reduced tidal volume</td>
</tr>
<tr>
<td>Sidney, et. al.</td>
<td>Chest Wall (elastic)</td>
<td>Reduced tidal volume, Blood gases aberrant</td>
</tr>
<tr>
<td>White</td>
<td>Abdomen (tight clothing)</td>
<td>Hiatus hernia, Circulation changes, Short of breath, fainting</td>
</tr>
</tbody>
</table>
Notes


5 Ibid. p. 2032.


7 Harty, Helen R., Douglas R. Cornfield, Richard M. Schwartzstein, and Lewis Adams. *External Thoracic Restriction, Respiratory Sensation and Ventilation during Exercise in Man*. Working Paper. 1998. I have been privileged to receive a copy of this paper prior to publication through a reviewer Dr. Bruce Johnson, who has mentored me throughout my post graduate work in physiologic topics. I contacted Dr. Harty in Ireland [July 1997] and received permission to quote her work.

8 Ibid. p. 7.


10 Ibid. p. 264.

11 Ibid. p. 263.


16 Gurney, S. “Tight-Lacing in Brighton and Parisian Schools.” *The Family Doctor*, (December 24, 1887): 266;


23 Ibid. p. 557.
CHAPTER 8: FINDINGS: MEDICAL LITERATURE 1836-1920

Introduction

As I began a search in medical literature for my Master's thesis, I was looking for reports of scientific studies on subjects related to corseting and women's health. By 'scientific' I meant vigorously standardized methodologies underlying the experimental work and reporting. I found little evidence of this type, but found a relatively large body of generalized, anecdotal reports, written primarily by men and seldom accompanied by any empirical data. This was not as surprising as it may seem, given the state of medical education and professionalism prior to World War I.

The medical literature review is divided into sections corresponding to the body systems with a preliminary section dealing with more general topics. A list of patents for the 'health corsets' which were widely promoted by the medical profession is included (See Appendix A). I found some experimental animal studies, which are reported. I have named influential doctors who did not mention corsets, or clothing in reference to health of women or children. It should not be surprising that not everyone took fashion into account when discussing health.

General Review

From the early decades of the nineteenth century, a number of physicians attempted to alert the public to their growing concern that fashion was interfering with health. At the time professional journals were few and their circulation was limited, as has been mentioned; peer review was not yet formalized. Despite this, concern was expressed particularly when death was attributed to fashion. The earliest mention of death from corseting in America which I found was in 1827.¹ Some authors published books addressed to the lay public on the subject,² and the British Lancet ran a series of reports in the 1860s of deaths due to tight-lacing which sparked comments.³ Reports in medical journals of deaths reached their peak in the
1870s and 1880s and gradually diminished through the next decades. One case of a male corseter's death was reported. There were lay writers who cautioned about tight-lacing deaths, as they had been reported by doctors; they were the 'exceptions' who proved the rule.

Although the majority of doctors who wrote about corseting opposed it, there were a considerable number who embraced the practice in some respect, if not wholeheartedly.

Medical support for the corset continued through WW I for a variety of reasons, including an argument that the high-heeled shoes worn by women forced them to wear a corset. Several doctors had a vested interest because they were corset designers; they will be discussed in a later section of this chapter.

A well-respected surgeon, Dr. William J. Mayo said, "Animal experimentation has resulted in gifts of inestimable value to humanity." I found four reports of animal research related to corseting mentioned in the nineteenth century. In 1887, Dr. Robert Dickinson noted that when he compared the respiratory movements of male and female mammals, he found they matched. He was convinced this should also follow for humans, which was the conclusion of Dr. William Wilberforce-Smith in 1888 [about whom I will write later]. Dr. Robert Tait spoke against animal vivisection, yet promoted corseting for humans. Dr. Ralph Stockman performed experiments on dogs in his research into chlorosis; he restricted their diets and encased them in specially constructed tight-laced corsets which he found caused the dogs to develop the same symptoms seen in the young women he treated. An article by Dr. Arabella Kenealy provided some surprising, though sketchy information about a study done with monkeys, by an unidentified investigator, in an unnamed place, sometime before 1904:

Some years since, a series of experiments for the purpose of showing the effects of tight-lacing were made upon monkeys by an enterprising scientist. A number of miniature corsets, exactly similar to those worn by women, were fashioned to size, and a number of poor little creatures encased in them.

Their distress at the constriction and discomfort, their unceasing efforts to release themselves, did credit to their intellectual perception and sagacity. The physical results were as disastrous as they were instructive. For it was found that those which were corseted and laced at once to the regulation V-shape of fashionable women died in the space of a few days, as though stricken by some mortal malady. Those in whose cases a more gradual process was adopted lived some weeks in sickness and
suffering. Whilst others, the 'improvement' of whose figures extended over a still more lengthy period, did not succumb at all, showing that tolerance became established. But the tolerance was established obviously at the expense of health and happiness. These rudimental martyrs to a civilized vice fell off grievously in appetite and spirits. They were attacked by gastric and other internal disorders. They moped and lost flesh, alternating between extreme languor and marked nerve-irritability. Their tempers rendered them unapproachable, and although they did not die actually of stays, they died within a few months of some disorder of which stays with the health deterioration consequent on their use were the undoubted cause.

Table 2 shows the results of the study described by Dr. Kenealy above.

Table 2: Study with Corseted Monkeys

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Symptoms</th>
<th>Resultant Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Immediate V-shape</td>
<td>Acute respiratory distress</td>
<td>Within days</td>
</tr>
<tr>
<td>Second</td>
<td>Gradual V-shape</td>
<td>Pain, sickness</td>
<td>Within weeks</td>
</tr>
<tr>
<td>Third</td>
<td>Extended period to V-shape</td>
<td>loss of appetite, extreme languor, irritability</td>
<td>Few months</td>
</tr>
</tbody>
</table>

Source: Kenealy, 1904, p. 131.

Health Corsets

The term ‘health’ in the nineteenth century was used synonymously with ‘rational’, ‘sanitary’, ‘hygienic’, and sometimes ‘reform’, in medical and lay publications to indicate a positive position or category for whatever the writer was promoting. The earliest corset design which claimed this title was made and promoted in 1856 by Mrs. Roxey Caplin, the wife of a physician in England. She claimed her husband had assisted in the design by teaching her anatomy and physiology, after which, “having analyzed the wants and noted the structures of all the internal organs, and then adapted the clothing that envelopes them in such a manner as not only to preserve the health but to impart the greatest benefit to the wearer” (Figure 33). Her opinion on beauty and the requirement for corsets to maintain the female form were based
Lucien Warner's Sanitary Corset
With Skirt-Supporter and Self-Adjusting Pads

Figure 46. Lucien Warner's Sanitary Corset. This design launched the Warner Company, but later more fashionable designs made their fortunes. (Shep, p. 24.)

MADAM FOY'S
COMBINED
Corset, Skirt Supporter, and BUSTLE
Is just the article needed by every lady who consults
HEALTH, COMFORT, and STYLE.
Testimonials in its favor are constantly being received from all parts of the country.
Lady Agents wanted in every county of the United States.
HARMON, BALDWIN, & FOY,
Sole Manufacturers, New Haven, Conn.

Figure 47. Mrs. Foy's corset design, which she successfully claimed was copied by Dr. Warner. (Shep, p. 21)

on classic Greek figures and definitely did not promote tight-lacing. This corset style was promoted by dress reformers on both sides of the Atlantic. Lucien Warner and his brother, I. DeVer, were both trained as physicians. I. DeVer established a medical practice, but after four years of college and two years of apprenticeship, Lucien had difficulty getting a foothold. To make his living, he gave lectures and promoted vitamin and other products for sale on a circuit, until he decided to design a corset. Lucien wrote, "An entire revolution in women's dress is needed, a permanent fault is compression of the waist."

He initially designed and patented a garment with shoulder straps and a non-constricting waist which sold well (Figure 46; see Appendix A). His patents were challenged by Mrs. Lavinia Foy, who
claimed he took her ideas (Figure 47; see Appendix A). Lucien was so successful, his brother joined the thriving business and they were millionaires within four years. Their biographer wrote, "the altruistic principles upon which the business was founded (such as suspending weight from the shoulders and not compressing the waist) were sacrificed by the good doctors on the altar of fashion and financial exigency."19

Sir James Clark was an English physician whose book was revised by an unnamed American physician and chemist.20 In it, he advised young women to avoid tight lacing to a "spider's waist"21 rather, to emulate the Venus de Milo's shape (Figure 48) using "a rational garment."22 Dr. I. N. Reed published two books aimed at educating the public about the latest medical knowledge and discouraging the corset.23 A Parisian, Dr. Tylicka was reported to have spoken against the corset.24 When asked to recommend garments for ladies to wear and give her opinion on health or reform corsets, Dr. Alice Stockham wrote,

If women had common sense instead of fashion sense, the corset would not exist. There are not words in the English language to express my convictions upon this subject. The corset, more than any other is responsible for woman's being the victim of disease and doctors. [italics hers].

Dr. John Kellogg did not design a corset, but he did his utmost to prevent their use on children and urged his patients to avoid them. This advice was delivered by Kellogg at the

Figure 48. Aphrodite (Venus de Milo) compared to the fashion mode of 1880. (Lewis, 1886, P. 236)
annual meeting of the Michigan Obstetrics and Gynecology Society:

Health corsets are a device of the devil to keep women in bondage who are seeking for deliverance from the weakness and misery from which a really healthful mode of dress might emancipate her. Shoulder braces and harnesses of every description are, on the whole, a snare and a delusion. The only correct principle is to suspend everything from the shoulders by means of a waist which will equally distribute the weight upon natural bearings, and at the same time give latitude for the greatest freedom of waist movement.25

Dr. Robert Dickinson campaigned publicly for more than half his practicing life to banish the corsets from his patients' wardrobes, but ultimately prescribed what he believed to be a lesser evil, a "health corset" with a straight-front steel busk.26 This garment forced the pelvis to tilt down and back, and ostensibly allowed the diaphragm to move more freely. As I reported in Chapter 1, my own studies seemed to refute this claim.

A French physician, who also claimed to be a corsetiere, Dr. Josephine Ines Gaches-Sarraute designed corsets for her patients in Paris.27 Unfortunately, her claims for improved health and function in her patients were limited to anecdotal evidence, not on reliable measurements; but she was believed by many and prospered as a result. One American who believed her and encouraged readers to adopt the Gaches-Sarraute corset was Mrs. E. B. Duffey, in her book of beauty and health hints.28 Another who was convinced, Dr. W. Fothergill said, "The modern article with its straight, stiff front is certainly much better than its predecessor which had a pronounced curve in the midriff, and lessened the waist by pushing out the abdomen."29 Dr. Anna Galbraith promoted the straight-fronted corset as her choice for the American woman, as she published and lectured for sensible dress.30

An orthopedist and a gynecologist, Drs. Edward Reynolds and Robert Lovett, cooperated to do a study on corseted women with backache; they devised a method of determining the center of gravity in the body and were convinced that the straight-front corset was an appropriate device for their patients.31 San Francisco, Dr. George Somers came to a similar conclusion, based on anecdotal evidence from his tight-laced patients.32 He lectured at the Cooper Medical College, but resisted giving the straight-front corset the "health"
designation. His five-points of good and bad corsets were an attempt to educate his audience in the lay public as well as his medical students (Figure 49). As the fashion mode gradually changed after the turn of the century, tight-lacing lost its emphasis and this was hailed by medical and non-medical writers alike. The term 'health' or 'hygienic corset' continued to be used for two decades. Corset manufacturers had an interest in maintaining the designation as the mode for tight-lacing waned.

![Diagram of a Bad Corset](image1)

![Diagram of a Good Corset](image2)

Figure 49. Dr. George Somers instructed medical students using these diagrams in 1911. Any medical school teaching about clothing was rare. (Somers, p. 1444).

No Mention of Corsets

In my review of topics connected with corseting, I found several articles and other publications which surprised me by not discussing effects of corsets. I searched indexes and tables of contents using the keywords: chlorosis, corset, clothing, diaphragm, dress, gastroptosis, pressure, prolapse, reform, sanitary, splanknopsis, stay(s), tuberculosis, uterus,
and many more. Usually I found directly related information, but quite often it was not where I expected to find it.

Dr. Erasmus Wilson disregarded corsets as an instrument of pressure against skin.35 His article described the effect of changed circulation causing pressure sores as a result of degradation of the fat layers under the skin, but he failed to consider the effects of the tight garments on the patient's physique. Dr. Orson Squire Fowler omitted mention of corsets in at least one of his publications, although he had stated his strong objections on previous occasions.36 Dr. Graily Hewitt did not include corsets in writings about uterine flexion and pain, either as a cause or part of the remedy.37 Medical lectures and textbooks in medical schools did cite tight-lacing as a cause for this condition of the uterus, so what Hewitt's reasons were for omitting such a clear causal factor is unknown. In an article addressing women's health in North American Review, Dr. James Chadwick neglected the commonly recognized cause of many female problems.38 Textbooks for medical schools seemed to me to be a primary place to look for references to clothing and corsets, yet I found several which ignored the subject of women's dress, including one co-authored by none other than Dr. Robert Dickinson.39 Dr. George Kozmak did not mention corsets in his 1915 article on backache.40 Perhaps not too astonishing was Dr. Lucien H. Warner's omission of corsets as a cause when he wrote about chlorosis,41 since his father's corset manufacturing company had succeeded in establishing the family fortune. Maybe he believed their advertising. When Dr. Arabella Kenealy discussed the historic plight of women, she left out any talk of clothing as a cause of disease, perhaps not too surprisingly, because by 1920 styles had radically changed.42 Dr. Kenealy was the same author who told about the corseted monkeys in an earlier publication. Perhaps she changed her opinion regarding corseting for some reason, because she never wrote on the subject again. 'Politics' entered the picture in more places than we can imagine when the subject of corsets was raised.
Corset Patents and Advertising

An edited list of corset patent information has been placed in the Appendices (see Appendix A). These examples from the patents from 1863 to 1900 have a variety of health claims in their descriptions or titles. Many doctors advocated reducing garment pressure and the weight which was supported only at the waist during the era of voluminous skirts, by recommending shoulder support as an adjunct to the corset. There were a number of doctors who designed and promoted corsets of their own: in America, the Warner brothers; in France, Dr. Gaches-Sarraute; and in England, Drs. Adami and Roy to name a few. The number of doctors who promoted corsets cannot be effectively counted since records are not available with that information. Medical associations and professional groups did not have strict ethical codes preventing advertising of medical practices or promotions by their members.

Advertising of corsets was very common. Examples can be found in every contemporary women's magazine, following text in books, store advertising, newspapers, and handbills. A series of selected advertisements has been included (See Appendix D). All of the examples include some claim to health effects; words like 'sanitary', 'hygienic', 'good sense', and 'health' were used in the copy to attribute positive effects to the garments purveyed. Some took advantage of new technology, like electricity, to make claims of efficacy related to corsets. Charlatans were not uncommon in the corset advertising and manufacture business.

Doctors for Fashion Sense

Dr. Orson Squire Fowler, mentioned above, wrote in opposition to tight-lacing for more than twenty years, attempting to influence his readers to oppose the fashion industry. Dr. William Edward Coale wrote a book of instructions on health maintenance in which he cautioned against following fashion. He wrote, “With women's dress we have much to find fault....we have but little hope of achieving any impression single-handed...No autocracy has ever been so powerful as Fashion.” Dr. Diocletian “Dio” Lewis wrote in both medical and lay publications over several years in attempts to convince women to discard their corsets. He
appealed to mothers to avoid corseting their daughters, to emancipate them from fashion’s grip or advised them “never to marry”. Presumably Dr. Lewis had seen the ravages wrought upon the organs of reproduction by tight-lacing. Drs. Donald Brinton and George Napheys co-wrote their advice on the cultivation of beauty within the laws of health, in which they ridiculed tight-lacing as “an absurd and ugly fashion”. Dr. Charles Jessop was another physician who attempted to reach women through the lay press; he wrote, “the object of all clothing is self-preservation...” and the wearing of stays goes against that principle entirely.

Respiratory System

Tight-lacing of corsets had been recognized as a hazard to women’s health by some, and written about before the last half of the nineteenth century. Prior to the invention of reliable instruments to measure lung volume, doctors used balloons, bellows, and other primitive tools. Despite the lack of diagnostic equipment, physicians realized the problem. The scientist who provided the device, which has remained in use until today, for accurately measuring the capacity of lungs was an Englishman, Dr. John Hutchinson. The spirometer was an elegantly simple device which precisely measured the vital capacity of the lungs. It was essentially a portable bellows with a collection-measuring chamber and a hose connected with a series of stop-valves which the patient expelled their inspired breath. The critical parts were the valves which closed after the expiration thus trapping the air and allowing it to be measured. When he died, ten years after his invention, the spirometer was used worldwide to assist with diagnosis and treatment of respiratory disease.

Authors implicating corsets with respiratory disease include Dr. Martha Williams, Dr. M. Fothergill, Dr. Benjamin Richardson, Dr. Dyce Duckworth, Dr. Joseph Farrar, Dr. Walter Cowl, Dr. Sara Steveson, Dr. Diocletian Lewis, Sir Frederick Treves, Dr. Robert Dickinson, and Dr. Sebastian Wimmer. However, none of these reported controlled or scientifically-based studies; rather they reported clinical findings, results of observations made in the course of practice.
A pathfinder in this field, Dr. William Wilberforce-Smith was one who used scientific methods to demonstrate clearly to his fellows that the spirometer made accurate judgments of lung capacity. Before this series of studies, the spirometer had been used primarily in the examination of tubercular patients. Wilberforce-Smith was a general practitioner who gradually specialized in the area of gynecology. He described himself as "naturally curious" and noted the discrepancies in health between his higher class patients who wore corsets and their lower class servants and farm women he treated. He determined to examine the phenomenon and published data which showed real discrepancies in lung volumes of corseted and uncorseted women. He was also attempting to prove to his fellow physicians as well as the public at large that the published data about males breathing "abdominally" and females breathing "costally" [with their chest muscles only] was false. Spirometry studies done by Dr. Wilberforce-Smith dispelled the myth that breathing mechanisms were different between males and females, just as Dr. Dickinson had surmised in his observations with other mammals. The carefully planned study examined six groups: each with one man [whom we assume was uncorseted], one woman who never corseted or had avoided corsets for a long time, and one woman who wore corsets up to and during the study. The groups were clustered according to stature [height in inches] and age. Information about the avoidance of stays in two cases was not recorded specifically, but reported as "lengthy." The study showed the women not wearing corsets had vastly superior breathing capacity to their tight-laced sisters, and some had lung capacities equal to the men of their stature. The diminution of vital capacity between corseted and uncorseted is striking and averages approximately 20%. Table 3 shows the evidence he reported. His report was met with some skepticism by the lay press and in the medical profession. It took several years before his information was generally believed.

Subsequent to this study, several authors reported studies based on Wilberforce-Smith's experiment. Some used information supplied by Wilberforce-Smith without
Table 3: A Comparison of Lung Capacities

<table>
<thead>
<tr>
<th></th>
<th>Stature Inches</th>
<th>Lung Capacity Cubic Inches</th>
<th>Age Years</th>
<th>Total avoidance of stays Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average man</td>
<td>59.7</td>
<td>138</td>
<td>40-40</td>
<td></td>
</tr>
<tr>
<td>Stayless woman (case 1)</td>
<td>&quot;</td>
<td>135</td>
<td>47</td>
<td>9</td>
</tr>
<tr>
<td>Average woman</td>
<td>&quot;</td>
<td>87</td>
<td>40-50</td>
<td></td>
</tr>
<tr>
<td>Average man</td>
<td>60.9</td>
<td>185</td>
<td>23-26</td>
<td></td>
</tr>
<tr>
<td>Stayless woman (case 2)</td>
<td>&quot;</td>
<td>158</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Average woman</td>
<td>&quot;</td>
<td>115</td>
<td>23-26</td>
<td></td>
</tr>
<tr>
<td>Average man</td>
<td>62.6</td>
<td>210</td>
<td>23-26</td>
<td></td>
</tr>
<tr>
<td>Stayless woman (case 3)</td>
<td>&quot;</td>
<td>150</td>
<td>30</td>
<td>14</td>
</tr>
<tr>
<td>Average woman</td>
<td>&quot;</td>
<td>130</td>
<td>23-26</td>
<td></td>
</tr>
<tr>
<td>Average man</td>
<td>62.7</td>
<td>215</td>
<td>23-26</td>
<td></td>
</tr>
<tr>
<td>Stayless woman (case 4)</td>
<td>&quot;</td>
<td>200</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Average woman</td>
<td>&quot;</td>
<td>130</td>
<td>23-26</td>
<td></td>
</tr>
<tr>
<td>Average man</td>
<td>65.2</td>
<td>245</td>
<td>23-26</td>
<td>Lifelong</td>
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<tr>
<td>Stayless woman (case 5)</td>
<td>&quot;</td>
<td>195</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Average woman</td>
<td>&quot;</td>
<td>162</td>
<td>23-26</td>
<td></td>
</tr>
<tr>
<td>Average man</td>
<td>65.8</td>
<td>212</td>
<td>40-50</td>
<td></td>
</tr>
<tr>
<td>Stayless woman (case 6)</td>
<td>&quot;</td>
<td>160</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Average woman</td>
<td>&quot;</td>
<td>147</td>
<td>40-50</td>
<td></td>
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</table>


crediting its source. After the turn of the century many authors accepted the findings of Wilberforce-Smith and used the information in attempts to steer women, and even fashion away from the dangerous practice of tight-lacing, and from corsetry altogether.

In the age before reliable drug therapy, infectious diseases took a toll on all parts of the population. Prevention was recognized as the bulwark of physicians, and in the case of tuberculosis, many theories for prevention were floated. In all the references I found about TB treatment, comments were made about corsets, either as a predisposition to TB, a detriment to
treatment, or an outright cause of the disease. Prior to the 1860s, germ theory was unknown, doctors often based their treatments on Galen’s principles of the body humors. Little could be done to increase lung function, once TB had been contracted, except for removal of corsets; this action was argued for and against, or ignored by others. Some doctors maintained the straight-front corset improved the breathing enough to warrant its use in the face of TB. Dr. Clelia Mosher and others wrote about the factor of proper dress in TB prevention for college women.

Imposition of corsets affected singers’ breathing in a very direct way. This was addressed by several authors within the medical and musical domains. Opinions diverged as to whether a female singer should wear a corset. Some were adamantly against corsets for singers, others promoted their use, including the aforementioned Dr. Gaches-Sarraute. She stated that female singers could demonstrate completely normal breathing capacities wearing her corset design. She also claimed women removed their corsets at night, and consequently returned to normal breathing capacity, thus refreshing their bodies for the coming day. There is no evidence presented by Dr. Gaches-Sarraute or anyone else to substantiate this allegation. Apparently no arguments were put forward for or against corsets for male singers.

*Circulatory System*

The circulation of the blood in the body was correctly described first by William Harvey in 1627. He recognized the differentiation of colors between the venous and arterial blood and correctly surmised the arterial blood flow distributed some ‘Living Force’ to the body parts. This was taught in medical schools, but cadaver dissection was frowned upon in the Victorian era which resulted in confusion and faulty thinking by many ‘trained’ doctors when the heart and blood vessels were considered. Physical examination by physicians in the nineteenth century included assessment of the pulse rate and volume. The stethoscope, invented in 1816 by Laennec, was not generally used until its 1850s adaptation to the binaural
tubular device with which we are familiar. Blood pressure measurement was not common until the sphygmomanometer was marketed in 1891.\textsuperscript{68}

Some clinicians remarked on the effects corsets played on circulation. They noted decreased peripheral pulse volumes,\textsuperscript{69} rapid heart rates,\textsuperscript{70} and fainting\textsuperscript{71} in the tight-laced patient. Other signs which demonstrated circulatory deficiency were the presence of varicosities of esophagus, abdomen,\textsuperscript{72} and lower extremities.\textsuperscript{73} Poor circulation contributed to skin breakdown and ulceration, to faulty digestion, to decreased kidney function, and other maladies.\textsuperscript{74}

\textit{Musculo-Skeletal System}

When we think about corseting and the musculo-skeletal system, almost the first picture which comes to mind is of a deformed ribcage; this was originally described in 1788 by Dr. Samuel Thomas von Soemerring.\textsuperscript{75} He was a professor of medicine in Germany and an ardent opponent of corseting and proponent of spa treatment in the late eighteenth century. His diagrams of autopsied females with narrowed chests caused by corsets were compared to those of uncorseted females (Figure 50). Those diagrams were widely copied, and rarely attributed to their originator. Dr. William Williams described the deformities attributable to tight-lacing.\textsuperscript{76} Variations on the theme were published in every country where corseting was used, with little apparent effect (Figure 51).\textsuperscript{77}

Areas of concern regarding corsets which fall under the category of the musculo-skeletal system are generally classified in three groups: muscle atrophy and the resultant sequelae, postural problems including scoliosis and a disturbed center of gravity, and exercise limitations. The latter was discussed in Chapter 6. Because systems of muscles and bones are closely interrelated and were treated together by many authors, I shall divide this discussion mainly by the date of publication.
Muscle built mass with use, specifically regular stretching and contraction, which increased strength and encouraged blood flow. Atrophy occurred if the muscle did not contract and stretch with exercise. Muscles encased by a tight-laced corset were unable to function normally and atrophy resulted. As the individual wearing a corset gradually lost muscle strength, reliance upon the ‘exoskeleton’ of the corset for posture control became addictive. The reader may scoff at this description, however more than one author and many corseted persons have used the appellation to describe the condition they found themselves in. Only a few reports of muscle atrophy were found in the medical literature prior to 1860. This makes some sense, since tight-lacing was not as severe in the early decades of the century.
Englishman, Dr. Hugh Smith cautioned his readers to avoid the practice, "an inert, dormant state of the muscles of the spine, must necessarily produce debility in those parts... to rob them of their energy... easily account[ing] for an inclination of the spine to one side or the other [scoliosis]." He warned against even moderate lacing, which he rightly said, "ladies

Figure 51. Variations of von Soemerring's diagrams. (Newton, p. 211 [left]; Kunzle, 1982, p. 104 [right])

might call very loose," but which would cause gradual loss of tone in the muscles.

This brings up the topic of 'denial' as it was described by several doctors regarding their patients' statements about tight-lacing. The *Lancet* published correspondence from a young woman who declared her "delight to be laced so tight as to be almost unable to breathe." Dr. V. Taliaferro questioned the pressure assessment by corseted females, who he said, "never admit to tight-lacing." He reckoned, "with the combined pulley power of the lacing cords, fifty or seventy pounds could easily be drawn." In an article written in *The*
one tight-laced woman is quoted as saying, "actual pain is always, in a sense, entertaining!" Dr. Walter Cowl from New York wrote,

When viewed attentively, from both physiological and a clinical standpoint, it is believed that we may look upon tight lacing, or what by the subjects themselves would probably be called very moderate constriction, as one of the most important predisposing causes of disease among women in civilized life.

Dr. T. Frederick Pearse agreed; he recommended a procedure for checking the degree of tight-lacing during a patient’s visit. He said,

A lady will never own she laces too tightly, and if told of it she will endeavor to refute the assertion by a practical remark, saying she can put her “whole hand inside.” This is quite true, for by drawing in a deep breath and inclining the body forwards the size of the waist is still further diminished. To find out whether the stays and other garments around the waist are too tight, have the stays opened and all other garments loosened; then let the patient, after breathing quietly for a minute or two, take in a deep breath and stand perfectly upright. Let her now try to and bring her stays and dress together. She cannot do so.

Dr. Eugene Crutchfield, of Baltimore, concurred with this when he wrote, “Although you can never find a woman who will acknowledge that her stays are tight, it is safe to say that not one in a thousand breathes correctly.” The recommendation to have patients disrobe during clinical visits was startling to nineteenth century doctors and patients, but was prescribed by Dr. Wilberforce-Smith.

Dr. William Purple saw the effects of corset pressure, “over the ensiform cartilage, and around the floating ribs, so diminishing the size of the body as to prevent the descent of the diaphragm in the act of respiration.” Dr. J. Redfeld stated, “with stooping shoulders, a constrained body, and a corseted waist, not only are the ribs prevented from moving freely, but the diaphragm and other muscles being compressed and uninvigorated, cannot act with their natural freedom and strength.” Dr. Taliaferro of Atlanta, described the normal thorax,
Dr. Sara Devoli reported about the severity of muscle weakness with a majestic example, "Czar Nicholas was said to fall into a state of collapse on removal of his corsets." (Figure 52). Bostonian, Dr. Diocletian Lewis, as mentioned in Chapter 5, devoted much of his career to education of young women, and described many similar situations as his pupils entered his school. This was repeated by several school doctors. Sir James Clark attempted to persuade his readers against causing "injury to the figure" with tight-lacing. Several of the correspondents to the Englishwoman's Domestic Magazine admitted to "weakness of the back" when corsets were removed.

The recommended remedy for muscle weakness was exercise. Every doctor I reviewed prescribed exercise as a deterrent to muscle weakness. The fashionable corset shape began to evolve after 1880 to a longer, straighter garment which impeded exercise even more than the wasp-waisted model of previous years. As the bony pelvis was gradually thrust down and the spinal column was forced into lordosis, the female figure underwent some drastic changes in posture control and problems with the center of gravity. While not trained as physicians, Annie Jenness-Miller and her sister, Mabel Jenness did understand the physiology of exercise and published articles about posture and exercise which were welcomed by doctors of their era. The sisters were active in the Dress Reform Movement and on the lecture circuit where they promoted their exercise philosophy and encouraged women to abandon corsets.
Dr. Robert Dickinson's on-going studies of pressure exerted by the corset provided useful knowledge for the physician of the late nineteenth and early twentieth centuries. He devised a measuring device using a small rubber bladder attached to a sphygmomanometer [blood-pressure machine] which he placed between the corset and the body of his patients and which demonstrated the degree of tight-lacing used (Figure 1). He noted that his upper-class patients were generally discouraged from exercising, except for riding side-saddle (Figure 53), which put additional strain on already weak back muscles, while providing a minimum of strengthening exercise.

There were a few physicians who recommended wearing a corset as a support for feminine muscles, thought by some to be of an inferior grade compared to men's muscles. A reporter for The San Francisco Argonaut, Elizabeth Miller, who was apparently related to the Jenness-Millers mentioned above, opposed their opinion about corsets by telling of a German physician who recommended the garment for support of the back, and stated, "it is to the corset that woman owes her actual straight back."

Digestive System

Many of the same medical writers who discussed the effects of tight-lacing on the muscles of the abdomen also commented on the effects on the organs of digestion. With a few exceptions, most doctors opposed the excessive compression of the waist. Alexander Schmitt of New York joined the corset proponents, basing his advice on the theory that the abdominal wall muscles of women were weaker than those of men and required support to
prevent "disturbances of circulation and secretion in the abdomen." In his opinion, bowel function would be improved by the use of the corset.

The majority did not agree, citing loss of appetite, constipation, reduced bile secretion, gall stones, liver engorgement, colic, ulcers and most particularly hiatus [diaphragmatic] hernia as problems caused by corsets. Before the middle of the nineteenth century these problems were not seen in the severity noted during the last fifty years. It might be noted too, the primary medicinal treatment in those years was the purgative, and if the corsets were not too tight-laced, the treatment may have alleviated many problems. As the century progressed, tight-lacing was exaggerated and with it the associated digestive problems. The tight-laced corset encased and compressed the entire digestive system (Figure 28).

In 1789, the German Dr. Von Soemmering gave the first description of hiatus hernia, a displacement of the stomach, and sometimes the bowel, through a weakened diaphragm into the pleural [lung] space. Hiatus hernia caused symptoms of indigestion, regurgitation of food, and acid reflux which could lead to ulceration and pain, in addition to further constriction of the lung capacity of the tight-laced individual.

The gall-bladder and the liver were singled out by some writers as being the most injured organs of digestion in the corseted female. One of the first photographs used to illustrate a medical lecture was made by Dr. Norman Moore of St. Bartholomew's Hospital, London in 1878 when he showed the liver of a tight-laced woman he had autopsied. His comment was:

Every form of disease engendered by tight-lacing is common among women. It aggravates every attack of bronchitis, and is the chief factor in indigestion. The accompanying drawing has been made from the photograph of the liver of a tight-laced woman. ...the lower part of the liver was separated from the upper by a narrow band of atrophic tissue in which there can have been little functional activity.

In an autopsy report from Glasgow in 1880, Professor Cleland reported:

the liver had on the right a sulcus [fissure] caused by a fold in the diaphragm, and on the surface a constriction about two inches broad, of a paler color than the rest, in which a number of vessels belonging to the substance of the organ could be seen.
enlarging as they passed backwards. Plainly the patient had indulged the bad habit of tight-lacing to a destructive extent.\textsuperscript{107}

Dr. Mary Bissell also discussed the digestive problems of tight-lacing associated with the liver; she wrote,

The liver is probably the first organ to suffer from corset pressure. Normally, this organ does not reach below the border of the rib; but under corset constriction it is pushed inward and downward, - sometimes so compressed that the markings of the ribs are found upon its surface, -- and displaced from one to three inches below its normal position.\textsuperscript{108}

Dr. Robert Dickinson wrote extensively on the effect of corseting on the liver, "The liver suffers more direct pressure and is more frequently displaced than any other organ."\textsuperscript{109}

The diagrams published by Dickinson illustrated his ideas of pressure on the liver (Figure 54).

Experiments on bile secretion were done by Dr. W. J. Collins, a Public Health physician in London in 1888. He found that diaphragmatic movement affected the passage of bile and that flow was reduced when tight-lacing was applied to the abdomen. He said:

The free and unfettered action of the diaphragm, then, is essential to normal bilary secretion....what must be the effect of chronic restraint in those whose waists are forever cabined, cribbed, confined by corsets with clasped steels and constricting laces?\textsuperscript{110}

In an erudite presentation of the subject of digestive distress in the female, Dr. Boardman Reed of Philadelphia discussed his clinical findings on the effects of corsets. He named weakened abdominal muscle support, pressure upon the organs of digestion, and the resulting constipation, dyspepsia and displacement as the primary causes of patient’s visits to his office. All of these could be caused by the "unhygienic dress" and lack of exercise.\textsuperscript{111} He reported
examinations of 710 women with those signs and symptoms in just three years, and he noted
the problems were "very much more frequent" in women than in men.

Loss of appetite was one of the symptoms described in the diagnosis of the green
sickness or chlorosis. This affected primarily young women, occasionally leading to death. Readers may recognize in several of the symptoms -- extreme thinness, anemia, lack of
appetite, lassitude, and amenorrhea -- what is presently termed anorexia. Chlorosis was first
described by Dr. Samuel Fox in 1839, but became much more common after 1870 when Dr.
Lucien Warner and Dr. Napheys discussed the increased incidence. Diagnosis was difficult
and treatment in the nineteenth century often included bleeding, purgatives, and rest, but
seldom prescribed exercise, good nutrition, or abandonment of the corset. Dr. Lloyd Jones
presented a paper to the British Medical Society about the etiology of chlorosis and followed it
up with a book written for the general public about his concerns. Dr. Ralph Stockman of
Edinburgh described the first useful treatment for chlorosis in 1893, which included removal of
his patients' tight-laced corsets. Chlorosis was common in young American women as well
as Britons and Europeans, and public health campaigns were mounted to prevent it.

The stomach and intestines are soft, pliable organs, which may be easily displaced with
pressure. Constipation was a real threat when the entire intestinal anatomy was compressed
into an unnatural shape and size. Dosing with castor oil and other purgatives was common
throughout this era, dependence upon which compounded the problems. Dietary advice was
not generally thought to be in the sphere of medical authorities until Dr. John Kellogg and
others began to publish results of their experiments to determine cause and effect of intestinal
difficulties. "Auto-intoxication" was the term coined by Kellogg to describe a poisoning of the
system by the contents of a constipated bowel. He recommended loosening corsets,
exercise, plenty of water, and a meatless diet with fresh fruits, vegetables, and grains in a
measured and regular plan to correct the problem. Surgical intervention for bowel problems
was a last resort in the nineteenth century, but occasionally it succeeded, as in a case reported
by Drs. Stengel and Beyea.\textsuperscript{120} They were forced to use a supportive corset after surgery, which they gradually loosened and as exercise improved, the patient was ultimately free of the garment which brought her grief.

Thinning of the abdominal wall created increased possibilities for umbilical and inguinal hernias to develop, with strangulation of the bowel as a life-threatening complication. These effects were reviewed by Dr. Howard Kelly who reported results of studies on 500 patients.\textsuperscript{121} As the new century commenced, gastrointestinal problems from corseting lessened, but did not disappear.\textsuperscript{122} Incidence of rectal prolapse, (often associated with uterine prolapse) was several times greater than is reported today. These were the same symptoms reported by Dr. Paul Dudley White a half century later.\textsuperscript{123}

\textit{Urinary System}

The kidneys, ureters and bladder were seldom singled out for special mention in the overall admonitions against tight lacing, with one exception. Dr. Howard Kelly devoted an entire chapter to the effects of tight-lacing on the position, function and health of the kidneys.\textsuperscript{124} Kelly's diagram showing the displacement of the kidney illustrates the degree of stress and constriction of drainage tubes (Figure 55). This could result in trapping urine within the kidney's filtration mechanism which in turn can affect blood pressure regulation. The tissue of the kidneys is dense and cannot collapse as does the bowel, thereby inducing hypertension within the filtering tubules, resulting in high blood pressure.\textsuperscript{125}

The bladder and urethra were frequently impinged by the changing position of the uterus, in either retroversion or anteversion. The ligaments and muscles involved with voiding were described by clinicians as lacking in the tone required to maintain continence. Incontinence led to urinary tract infections and subsequent problems. Without today's antibiotics, women who suffered from urinary infections were forced to put up with frequency, pain, and complications of infection which often led to death.
The complications associated with the kidneys, ureters and bladder were described in many of the gynecological articles which will be discussed in the following section.

Reproductive System

Considering the Victorian emphasis on the 'Cult of Womanhood,' femininity, and motherhood, it is surprising that the fashion of tight-lacing with its inherent compromise of the reproductive system was tolerated at all, let alone embraced with such fervor. Infertility was blamed on corsets, even before tight-lacing became widespread. Prior to 1875, only a few articles appeared which spoke directly to the gynecological problems associated with tight-lacing. Dr. J. Godman recognized the practice was spreading and enjoined his fellow physicians in 1836 to participate in a campaign against corsets:

The injuries produced on many delicate females by tight-lacing, before and after marriage, have been sufficiently great, in numerous instances, to destroy all the joyous hopes and anticipation which are incident to maternity, and reduced the conjugal condition to one of unceasing disappointment and gloomy solitude.

Surgery Professor Arthur Cleland of Glasgow reported on autopsied cases in which he found numerous females with atrophied ovaries. According to Dr. Cleland, this was an uncommon finding among the women who were considered rough working class, but was found to have a significantly increased incidence among those women of the upper class, shop assistants, and household servants. Presumably these latter, wishing to emulate their tight-laced mistresses, were succumbing to the same maladies. Within the tradition of dress reform, reproductive health was generally viewed as paramount, and tight-lacing was seen as a barrier to motherhood and even to marriage by some.
Varicosities in the pelvic veins have been mentioned; this congestion within the pelvis contributed to the general malposition of the organs of reproduction induced by the pressure of the corset. Dr. Robert Dickinson’s measuring techniques had reported pressures as high as eighty pounds per square inch on the torso. Since Dr. Dickinson published in the *Boston Medical and Surgical Journal* (later *The New England Journal of Medicine*) which, according to the NEJM archivist, had a circulation in 1892 of 4,400 and dropped to 3,750 by 1912, and the *New York Obstetrical Journal* which had an even smaller audience, his information was probably unknown by the majority of doctors, let alone the general public.

Congestion of the pelvis was by no means the most serious of the gynecological problems facing the tight-corseted female. Prolapse of the uterus was the most common affliction reported in this area. Dr. William Coale wrote an article warning women about uterine prolapse, citing corsets as the direct cause. Prolapse usually did not occur until after
childbirth, but always resulted in sterility, pain and constant drainage of the affected part (Figures 56, 57). In his discussion of the treatment options of prolapse of the uterus, Dr. W. Burrage stated that in addition to manual replacement, packing, cautery and surgical amputation: "Tight-lacing must be forbidden."

Drawings used by Dickinson to illustrate pressure effects on tight-laced females (Figure 58), are very clear evidence of the displacement of the organs of reproduction, particularly the ovaries and uterus. He stated:

![Figure 58. Pressure of corset pushed uterus in retroverted position. (Dickinson, 1895, p. 30)](image)

Treatment included medical and surgical procedures developed to care for this serious malady, such as pessaries (Figure 59), and assuming the knee-chest position while attempts were made to reinstate the organ manually. Prolapse was the final aftermath of a process which often began with retroversion of the uterus caused by compression. Variations on the pessary were given many patents throughout the period when uterine prolapse was treated medically, and continued to be used even after surgical repair techniques, which relieved the displacement, but not the sterility.

Tight lacing was practiced by women of fashion during pregnancy and was blamed for abortion, premature delivery, and even fetal malformation. An apocryphal story was told by tour guides at Blenheim Palace of the precipitous, premature birth of Winston Churchill,
which took place in a cloakroom adjacent to the ballroom at Blenheim Palace where his American-heiress mother Jennie Jerome was tight-laced to conceal her 'condition.' The effect of tight-lacing on the abdominal wall has already been mentioned, but its consequence in childbirth was serious. Even the use of so-called maternity corsets would not remove the problem completely. During the process of parturition the abdominal muscles were called upon to augment the 'pushing'; if this could not be effected, the need for forceps delivery was increased. It was reported that forceps-assisted delivery was the norm during the decades most associated with tight-lacing. Dr. Howard Kelly recommended exercises as a prime defense:

When the abdominal muscles are lax, especially after confinement, they can be strengthened by lying flat on the back and rising to a sitting posture by the abdominal muscles alone, without any aid from hands or arms. If a young woman will discard the rigid tight-fitting corset when she begins to take exercise adapted to make her breathe deeper and strengthen her loins, she will have taken one most important step towards regulating this function.
In a reference to the equipment necessary for a lady’s maid to have in her possession at all times was a sharp scissors or penknife, “to be used in emergencies for cutting the stay lace.” Apparently these situations arose with some frequency.

Malposition of the uterus was discussed by railroad surgeon Dr. Frank Eskridge, in response to suits brought against the railroad companies in 1916, alleging that uterine problems were attributable to railway journeying. He reported on several cases examined by himself and Dr. Howard Kelly and concluded the railways were blameless and the fault could be placed on the injuries received during labor and delivery and that “a most important cause of pelvic diseases and mechanical disturbances is the improper dress of women.”

The final reference on the reproductive system involves the accusation that corsets caused cancer of the breast. This was published by a public health nurse and quotes an author I was unable to locate,

Lucas calls attention to a mode of onset of cancer of the breast which he calls “corset cancer.” The site where this carcinoma attacks the skin and cellular tissue is over an upper and outer radiant from the nipple corresponding exactly the point where the upper edge of a corset crosses the pectoralis muscle. It occurred on the right side in the three cases seen by the author, probably due to an undue use of the right arm, the friction of the corset at this spot being the cause of the cancerous process.

Summary

Studying the medical literature to discover and assess the profession’s interest, intent to reform dress, inventiveness, and implementation of scientific investigation, I found a great deal more than I expected, and because many sources were repetitive, I reported only about one-third of the findings. I realized that the methodology demanded of serious scientists today was not expected in the late nineteenth century. Medical clinicians did the best they could in the circumstances, but they were not in a position to really influence the fashion industry, nor were they particularly interested in doing so. Their social and professional influences were restricted by limited education, scope of scientific ability, financial constraints, bureaucratic concerns, the mores of the day, and their individual interests and talents within the field of medicine.
Notes


7. Brend, William G. “An Alleged Death of a Male from Tight-Lacing: A Curious Medico-Legal Case.” Practitioner 99, (1917): 339-346. The man was discovered in his locked bedroom the morning after he had dressed in women’s clothing, including a corset laced so tightly that the autopsy report stated he had obstructed blood flow in the descending aorta, which is the main artery supplying circulation to the trunk and lower limbs. Apparently the resulting circulation problem resulted in his fainting and subsequent death.


Stockman, Ralph. “Observation on the Causes and Treatment of Chlorosis.” *British Medical Journal* 2, no. December 14 (1895);

Caplin, Roxey A. *Health and Beauty; or, Corsets and Clothing Constructed in Accordance with the Physiological Laws of the Human Body.* London: Darton, 1856.


Clark, Sir James. *The Ladies Guide to Beauty; Containing Practical Advice on Improving the Complexion, the Hair, the Hands, the Form, the Teeth, the Eyes, the Feet, the Features; so as to Insure the Highest Degree of Perfection of Which They are Susceptive.* New York: Dick & Fitzgerald, c.1880.

Ibid., p. 16.

Ibid., p. 24.


43 Pearce, Arthur W., ed. *The Future Out of the Past: An Illustrated History of the Warner Brothers Company on its Ninetieth Anniversary.* Bridgeport, CN: Warner Brothers, 1964; Field, John W., and Bernard Smith. *Fig Leaves and Fortunes: A Fashion Company Named Warnaco.* West Kennebunk, MA: Phoenix, 1990. Lucien followed his brother into medicine, but without his success as practitioner. Lucien gave lectures and eventually took up dress reform as a cause, promoting his corset designs which prospered. Ultimately his brother joined him in the corset manufacturing business which expanded to include brassieres and underwear and succeeds to the present.

44 Gaches-Sarraute, Josephine Ines. “L’Hygiene du Corset; Etude Clinique et Prophylactique, Deductions, Pratiques, d’Application, Relatives au Corset le Mieux Approprie’ [The Hygiene of the Corset; Practical Deductions of Application Relative to the Most Appropriate Corset].” *Tribune Medicine Paris* 2, no. 28 (1896): 406-412. The claims made by Dr. Gaches-Sarraute’ are not substantiated by scientific research methods, but were anecdotal.


Kellogg refers to doing some experiments with various groups of children in Philadelphia with Thomas Mays, but I could locate only one article published by Mays alone. Kellogg indicated they did spirometry measurements on several boys and girls, in diverse groups: American Indian children (never before corseted) who had been brought to be educated in Eastern boarding schools; children of immigrant groups arriving in America (never corseted); and daughters of "second-generation" Americans who insisted on the upper-middle class dress distinction of corseting from an early age. Kellogg reported that he and Mays found similarities in the first two groups and across genders, but a distinct diminution of lung capacity in the corseted girls. Fitz, G. W. "A Study of Types of Respiratory Movements." Journal of Experimental Medicine 1 (1896): 677-692. Fitz enlarged Wilberforce-Smith's study and found corroborating results.


Gaches-Sarraute, Josephine Ines. “L’Hygiene du Corset; Etude Clinique et Prophylactique, Deductions, Pratiques, d’Application, Relatives au Corset le Mieux Approprié” [The Hygiene of the Corset; Practical Deductions of Application Relative to the Most Appropriate Corset]. *Tribune Medicine Paris* 2, no. 28 (1896): 406-412. These articles were translated by Larkin Murphy.


Shirk, J. K. *Female Hygiene and Female Disease.* Lancaster, PA: Lancaster, 1884, p. 74.


“Addiction” as a descriptor was used by several authors when referring to the behavior of women who used corsets. Essentially, as the muscles became reliant on the rigid corset for support, the wearer became psychologically dependent as well. Corset wearers’ letters quoted in *Englishwoman’s Domestic Magazine,* [reference below] and some from the modern corset wearers who answered my questionnaire declared, “I can’t take the corset off, except to bathe,” “I need it,” “I rely on it.”


Ibid.


Clark, Sir James. *The Ladies Guide to Beauty; Containing Practical Advice on Improving the Complexion, the Hair, the Hands, the Form, the Teeth, the Eyes, the Feet, the Features; so as to Insure the Highest Degree of Perfection of Which They are Susceptible.* New York: Dick & Fitzgerald, c.1880, p. 16.


Miller, Elizabeth. "Rehabilitation of the Corset." *San Francisco Argonaut,* no. 168 (c1892).

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Haire, Alphonsus P. “Medical Corsetry.” *Medical Review of Reviews* (1918): 209-211.

Kellogg, John Harvey. *Autointoxication; or Intestinal Toxemia.* Battle Creek, MI: Modern Medical, 1918.


CHAPTER 9: NON-MEDICAL FINDINGS 1850-1920

Contemporary Opinions

Contemporary writers remarked about dress. Before tight-lacing was repopularized in the 1850s, reformers, preachers, and concerned editors joined doctors in voicing their outrage and concern over the practice. Charles Butler wrote a chapter on dress in his book *American Lady*, in which he lamented fashion was “irrepressible.” Just as Victoria ascended the throne in 1847, Matthew Carey published a startling philosophical treatise on domestic happiness, which included remarks on dress. He said, “Fashion is a most arbitrary, inexorable and capricious tyrant. She rarely consults comfort, convenience or common sense in her high behest....” In 1868, William Lord published a collection of scathing caricatures of corseted men and women with dire warnings of the evil effects of tight-lacing. William Johnson warned women they were responsible for the health and well-being of themselves and the future leaders of the nation, and should therefore “responsibly avoid” such practices as tight-lacing. John Leighton characterized tight-lacing as akin to devil-worship; he feared diabolical plots on the part of fashion designers to reduce the human species to “deformed creatures who declined to use their God-given brains to throw off the accursed garments.”

*The Englishwoman’s Domestic Magazine* scandalized the Empire when it published a series of articles, editorials, and letters specifically about tight-lacing over a period of several years. No attempt was made to authenticate the published letters, nor was a critical stance taken. Both sides of the argument were represented, although the majority favored the wasp-waist.

Five years later in 1882, French historian Augustin Challamel discussed fashion ‘rules and regulations’ for every occasion, and he granted women the decision to wear “steels” as they were dictated by “fashion leaders, like Lady Betina Rothchild.” Benjamin Richardson called fashion designers “the ally of the undertakers” and called for the British parliament to pass laws against tight-lacing.
Frederic Sanborn authored *A Delsartean Scrapbook* with advice to homemakers on a variety of topics from health to decorating. In it he reminded his readers that stays had been warned against since the days of Galen, that they were nothing but trouble, and to use them showed a lack of artistic understanding on the part of corset wearers. An 1895 historian of the American fashion scene, Frenchwoman Theresa Bentzon, traveled eastern America as a reporter and wrote under the *nom de plume* Madame Blanc. She voiced her criticism, for all classes of American women in rural and urban areas, about the degree of their tight-lacing. Minnesotan Thorstein Veblen wrote of class and women's dress in 1899. His opinion that "women's dress sets forth the wealth of the household to which she belongs" set off a maelstrom of debate. Social rank, according to Veblen, was made visible by the garments worn; in addition he pointed to the excessively tight corset as an indicator that the wearer did not do hard work.

Veblen's opinion was celebrated by a contemporary encyclopedia devoted to fashion merchandisers. *Coles Encyclopedia of Dry Goods* declared that between 1865 and 1875 the United States moved "to the front ranks as a [corset] manufacturing nation" after a period of "great obstacles." Wholesale and retail merchants throughout the country carried a large inventory of corsets made with whalebone and steel, laces, and accessory garments which they advertised as the 'status symbols' Veblen indicated they were. John Bray, who wrote from the dressmaker/corsetiere viewpoint said, "the corset today is pliable and beautiful, and the former quality does away with much that busy doctors have to say against it; but doctors must always have a fad." Corsets were offered as prizes and inducements to purchase other goods.

A group of historians from the early decades of the twentieth century have looked at corseting and fashion changes from a variety of angles: sociologic, and otherwise. Since many of their opinions are repetitive of those already cited in this section, I have listed them together in the footnotes.
Silhouettes changed with regularity through the nineteenth century (Figure 60, 61, 62, 63). After mid-century, the haute couture was always at the leading edge, copied and adapted by lesser designers and dressmakers to suit their clients. Paper patterns, developed by Mrs. Ellen Demorest in the 1860s, and sewing machines made “every woman her own designer,” according to a Mid-western advertisement for a popular correspondence course for home-

Figure 60 (Above Left). 1800 Silhouettes. This style was very dependent upon the lightweight fabrics with which it was made, to create the flowing lines desired by the fashion. (Handy, p. 148)

Figure 61 (Above Center). 1825 Dress. Interest was drawn to the elaborate lower skirt; the waist remained high until later in the decade. (Hall, p. 46)

Figure 62 (Above Right). 1850s Mode. The waist was in natural position, crinoline created the bell-shape. (Gorshine, p. 190)

Figure 63 (Below Left). 1875 Style. Emphasis was swept to the back with the bustle created by Worth. (Gorshine, p. 192)
Design was dictated in part by the firm religious strictures on every facet of life, mores of the community, and economic factors, including the desire by the rapidly rising middle-class towards “conspicuous consumption.” The underpinning of every design throughout the century was the corset, in various degrees of tight-lacing. Patterns were available for home sewn corsets but most purchased ready made garments.

Male Corseting in the Nineteenth Century

Czar Nicholas of Russia was not the only man to wear corsets in the nineteenth century (Figure 52). Heir to the Austrian throne, Franz Joseph and his wife Elisabeth of Hungary were portrayed at the time of their wedding in 1847; both appeared to be tightly corseted (Figure 64). Military dress uniforms were worn notoriously tight (Figure 65); to maintain smoothness many were worn with a corset, which heightened the straight military bearing. I was unable to find any mention or discussion of the apparent dichotomy of soldiers wearing corsets and their obvious need for strong muscles. I assumed they wore corsets only for short periods with dress uniforms, but I have no precise knowledge of this. Benjamin Richardson, who called fashion “the ally of the undertaker” wrote in The Gentlemen’s Quarterly that “boys boarding schools and colleges ...[used] to employ a strap or other form of belt for holding up their trousers” which led to “tight lines of pressure marked round the bodies of these youths.” Dr. F. Parke Weber concurred with that observation, with autopsy results.
The weekly publication *Knowledge* frequently published articles and opinions about corseting. Richard Proctor entitled his 1882 article “Stays and Strength.” In it he tells of his personal experience wearing a corset, in an attempt to reduce weight, and “to take interest in scientific experiment.” After wearing the stays a short time, he found himself reliant upon them. “But for one month of folly, I had to endure three months of discomfort. At the end of about that time I was my own man again.” The experience was typical of the effect of muscle atrophy. D. A. Sargent, writing in *Scribner’s Magazine*, stated, “If you put a tight bandage around the waist of a man, the physiologic functions of the abdominal and thoracic organs are for the time impaired, and the man is unable to make more than two-thirds of the mental and physical exertions of which he is capable.”

Edwin Balch, a member of the Franklin Institute of Pennsylvania, reported on a New Guinea tribal custom “for men, not women, constricting their waists so tightly with a stiff bark belt, that in one case the waist measured only 53 centimeters [20 inches] the flesh above and below it bulged out to about 70 centimeters [27.3 inches].” [italics his]. Dr. Arbuthnot Lane countered this when he advocated the use of “the straight-front French corsets” for men and women.22

A “crusade” to convince readers to forego their corsets on moral grounds was embarked upon by the publishers of *The Gentlewoman* in 1892. A series of twelve articles were scheduled, nine were published, and these were followed by a considerable number of letters, both pro and con, received over the course of publication.23 While publishing the anti-
fashion opinion, the same paper carried news of the Parisian fashions, and corset advertisements.24

*Waist Size Comments*

Although many authors commented on the waist measurements using anecdotal evidence, I was able to find some ‘hard’ data. Anthropomorphic measurements of various groups of women of the late nineteenth century were done by Dr. John Kellogg; these data are shown in Table 4. He included data gathered by Dr. M. Anna Wood of Wellesley College who measured 1100 female students 19 - 21 years of age, and measurements made by Dr. Seaver of Yale who averaged results of 2000 male students. Dr. Kellogg was prompted to take these measurements and publish the results because of his concern over the deterioration of health in the American women he saw as patients at his spa in Battle Creek, Michigan. He not only encouraged women to reform their dress, but advocated changes in education of all females to include vigorous exercise daily.

If comparing the Table 4 with data published by A. L. Kroeber in *American Anthropologist* in 1919 (Table 5), the reader may find some curious incongruencies.25 Mr. Kroeber carefully measured ten figures randomly chosen from fashion prints of each year from 1844 to 1919. He commented that “stylistic idealized pictures” depicted the waist smaller than those found in photographic images. In spite of the difficulties, he discerned a definite increase in the size of women’s waists, as illustrated in fashion magazines. I have deleted his complicated numerical data for simplicity and show only his word descriptions. In his description of method, Kroeber does not precisely specify how he measured the pictures he found of fashion illustrations. Since he was not able to make absolutely accurate measurements using live subjects, the reader may object to these conclusions, as I suspect Dr. Kellogg might have done.
Table 4: Kellogg's Data on Proportion of Waist to Height

<table>
<thead>
<tr>
<th></th>
<th>Height [inches]</th>
<th>Waist [inches]</th>
<th>% waist /height</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Women</td>
<td>61.64</td>
<td>24.44</td>
<td>39.6</td>
</tr>
<tr>
<td>English Women</td>
<td>60.4</td>
<td>25</td>
<td>41.3</td>
</tr>
<tr>
<td>French Women</td>
<td>61.6</td>
<td>28</td>
<td>45.4</td>
</tr>
<tr>
<td>Telugu Women</td>
<td>60.49</td>
<td>24.675</td>
<td>40.6</td>
</tr>
<tr>
<td>Chinese Women</td>
<td>57.85</td>
<td>26.27</td>
<td>45.4</td>
</tr>
<tr>
<td>Yuma Women</td>
<td>66.56</td>
<td>36.84</td>
<td>55.2</td>
</tr>
<tr>
<td>American Men</td>
<td>67.96</td>
<td>29.46</td>
<td>42.3</td>
</tr>
<tr>
<td>Mrs. Langtry</td>
<td>67.00</td>
<td>26</td>
<td>38.8</td>
</tr>
<tr>
<td>Venus DeMilo</td>
<td></td>
<td></td>
<td>47.6</td>
</tr>
<tr>
<td>43 women [18-25 yr.]</td>
<td>60.7</td>
<td>27.1</td>
<td>44.64</td>
</tr>
<tr>
<td>25 women [18-30 yr.]</td>
<td>62.5</td>
<td>23.3</td>
<td>37.3</td>
</tr>
<tr>
<td>with corsets on</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same 25 women after 3 months of no corsets</td>
<td>62.5</td>
<td>27.15</td>
<td>43.4</td>
</tr>
<tr>
<td>1100 college girls</td>
<td>63</td>
<td>24.6</td>
<td>39.0</td>
</tr>
<tr>
<td>2000 college men</td>
<td>68.6</td>
<td>29.3</td>
<td>42.7</td>
</tr>
</tbody>
</table>


a. These figures were published in more than one place by Dr. Kellogg, despite the absence of his name on the second manuscript.

b. Brickmakers who wore heavy skirts

c. Measured by Dr. M. Anna Wood

d. Measured by Dr. Seaver
If we believe Mr. Kroeber's analysis that fashions were shown in magazines with gradually increasing waist sizes throughout the nineteenth century, we might think Dr. Kellogg was in error in his judgment that tight lacing was creating falsely small waists in proportion to height. The American census of 1890 confirms Dr. Kellogg's assertions of declining birthrates, which he attributes partly to tight-lacing and its subsequent physical deterioration of women. Neither author mentions social class as a 'variable' when discussing corseting or waist size, but many others regarded it as an important factor, as has been mentioned.

Table 5: Kroeber's Diameter of Waist

<table>
<thead>
<tr>
<th>Period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1844-1857</td>
<td>Average</td>
</tr>
<tr>
<td>1858-1862</td>
<td>Slender</td>
</tr>
<tr>
<td>1863-1871</td>
<td>Average</td>
</tr>
<tr>
<td>1872-1876</td>
<td>Full</td>
</tr>
<tr>
<td>1877-1877</td>
<td>Average</td>
</tr>
<tr>
<td>1888-1900</td>
<td>Above Average</td>
</tr>
<tr>
<td>1901-1907</td>
<td>Full</td>
</tr>
<tr>
<td>1908-1919</td>
<td>Very Full</td>
</tr>
</tbody>
</table>


Comments

Tight-lacing controversies came and went in the fashion literature of Europe and America. There was no specific definition of the term, so comparisons are not easily made regarding any claims or protests. In many articles the waist measurement was given without any anatomic or size description of the individual [age, height, weight, general frame size, or
anthropomorphic classification]. This type of information was thought by many Victorians to be inappropriate for 'ladylike' conversation or reading. Many who spoke out, either praised the corset for supporting the 'weaker' female, or saw it as a symbol of Christian moral rectitude. The series of letters and editorial comments published by Samuel Beeton in *The Englishwoman's Domestic Magazine* really opened the topic to the general public, and created a good deal of controversy. Because my interest lay in the field of health and clothing, I did not review fashion magazines per se, however I found some pro-corset writings in my examination of publications thought to be 'educational,' 'scientific,' or directed to 'the public health.' It was my impression that writers for the non-medical press paid scant heed to the information which might have influenced them to promote 'rational dress.'

**Notes**

2 Carey, Matthew. "Philosophy of Common Sense: Practical Rules for the Promotion of Domestic Happiness; Containing rules for the Married; Essay on Relations of Masters, Mistresses, and Domestics; Rules for Moral Education; Essay on Fashions, and on the Pernicious Effect of the Use of Corsets; with Various Other Fugitive Articles." In *History of Women,* 170. New Haven, CN: Research Publications, 1838, p. 54.
Rood, William C. "Dressmaker's Magic Scale." In Supplement No. Two to Advanced Studies: Quincy, IL, 1890. This was a measurement device offered to dressmakers and home-seamstresses. The offer of a free corset was made to anyone naming a referral who then became a customer. The cost of the measurement scale was $5.00, and the corset was of a quality which was said to cost $2.00. Sears and Montgomery Wards offered corsets of "good quality" at that price range in 1890.


Kansas School of Design." advertised in Ladies Home Journal and other magazines c 1890. Lessons included use of fur, feathers, making trims, and complete tailoring instructions. Students were assigned projects which they sent to the School for adjudication, after which they received the next installment.


Ibid., p. 474.


CHAPTER 10: METHODS

Introduction

This research was based on my earlier studies with corseted subjects, described in Chapter 1. I had already tested their ability to exercise on a treadmill while corseted. With the first section of the present physiologic testing I wanted to determine if their lung capacity would change while corseted. I planned to carry out the experiment at the site of their daily work as interpreters at Living History Farms in Urbandale, near Des Moines, Iowa. I asked subjects to keep activity diaries as well as “comfort” assessments every half-hour during their corseted day. In a second phase, I took seven of the subjects to a special physiologic testing laboratory at St. Mary’s Hospital in Rochester, Minnesota to have torso pressure measurements taken while wearing their corsets.

Just as I had been stunned with surprise at the enthusiasm of reenactors to take part in my earlier study, I was almost overcome with volunteers eager to act as subjects for these projects. My only form of recruitment was a letter to the staff and volunteers of the Living History Farms in Urbandale, Iowa where I found the subjects for my initial study. I chose sixteen female reenactors, several of whom had volunteered for my earlier studies. These intrepid pioneers were eager to add to the small body of information we had previously discovered. The administration and staff permitted me to do the studies over several weeks in the summer of 1997.

Recruitment, Selection and Orientation of Volunteers

The Living History Farms in Urbandale, Iowa employed more than 225 reenactors during 1997 to interpret the historical settling of Iowa from the time of native Indian peoples, and on representations of an early 1850s homestead farm, an 1870s village, and a farm of 1919. The subjects for this study played roles in each of the farm and village settings; some acted as farm wives, others worked in stores and shops in the village, while still others were in
roles of higher class ladies of society who were ‘at home’ for entertaining, supervising
servants, and visiting. Tasks ranged from sitting at a tea party to heavy farm work, gardening,
pottery making, and canning tomatoes.

All female reenactors from Living History Farms were invited by letter to participate in
the study; an orientation meeting was attended by twenty women. I had originally planned to
ask ten volunteers to take part, but was cajoled into taking additional subjects. Essentially, I
was attempting to limit my costs and sewing time for corset production. I gave precedence to
six volunteers who had participated in my earlier study, and the others were chosen because
they were available for the fittings and dates for study which I had predetermined. Selection of
the individuals was limited to non-smoking females in good general health; body size was not a
determinant for selection. Those over forty years of age were requested to provide a doctor’s
letter of acknowledgment of their participation (see Appendix B). After I had named my
subjects, one dropped out for personal reasons and one could not schedule a study day after
her corset was complete. Since all of the female historic interpreters at Living History farms
were of Northern European descent, I was unable to test an ethnically mixed group. Subjects
ranged from 5’0” to 5’10” in height; from 110 to 205 pounds in weight; and frame sizes were
small, medium, and heavy. Normal waist measurement ranged from 26” to 44”; six subjects
had waist measurements less than 32.5” (the median waist measurement).

Historic Studies to be Reproduced

One nineteenth century English researcher, Dr. William Wilberforce-Smith¹, provided a
small, but elegant, study of the spirometry [lung volume] of corseted females and compared
them to males and never-corseted females of the same stature. An American, Dr. Robert Latou
Dickinson² measured pressure on the torso. I could not locate any other scientifically-based
information on these topics; anecdotal evidence reported in medical and lay publications tended
to give opposing opinions in about equal proportions. I determined to repeat those studies
using modern equipment and to challenge the body of ‘knowledge’ and present day opinions
about corsets with real evidence. I especially intended to illustrate, for those who might wear corsets as interpreters of historic times, any safe practices I might discover.

Orientation and Research Tools

An orientation meeting was held to explain procedures that would be used. A demonstration of the spirometry was carried out. Assessment surveys were discussed and subjects’ input provided useful suggestions for measuring activity and comfort. A presentation about torso pressure testing was done using overhead projections. The pressure testing required a 350-mile round-trip which limited the participation to those able to spare their off-duty time. Both prior volunteers and new recruits were assured that they could stop at any step of the testing, without prejudicing the study in any way. I assured them from the beginning that, since this would be the first testing of this type in over one hundred years, I could not predict what we would find, and therefore I wanted to be especially cautious not to make this a “contest” to see who could endure the most discomfort or do the most work. Each subject was asked to go about her normal daily reenactment duties and keep the diaries; she was also encouraged to loosen or remove the corset at any time she wanted. I had determined in an earlier study that three inches of tight-lacing was a reasonably comfortable amount to tolerate\(^3\) and that amount of tight-lacing was used for all subjects in this study.

Development of Survey Tools

Several of the survey tools used in this study were developed with the help of the reenactors who took part. The Physician’s Awareness Form was used routinely by the Human Performance Laboratory personnel at Iowa State University (see Appendix B). Informed Consent and Photography Consent forms were developed from guidelines of Iowa State University and submitted to and approved by the Human Subjects Committee (see Appendix B). Recording forms for physical parameters were developed specifically for the spirometry testing (see Appendix B); comfort assessment forms, which I designed myself based on
several numerical scales in the *Mental Measurements Yearbook,*\(^4\) (see Appendix B); a special pressure testing form used at Mayo Clinic was adapted by the assistant\(^5\) to the physiologist for this project (see Appendix B).

**Corset Construction**

Each subject was measured for a custom-fitted corset. I used a pattern which I adapted from an illustration for a corset popular in France in the late 1860s; this was illustrated by Nora Waugh\(^6\) (Figure 66). My goal was to produce corsets which were similar to those worn in the American mid-west around 1870 since that was the period reenacted in the village section of the Living History Farms. Each corset was made to allow three inches of tight-lacing. Photographs of the production process show the pattern pieces, and finished corsets (Figures 67,68). I produced all corsets using 100% cotton drill [jean] or 100% cotton pillow-ticking; both were a twill weave. Although these fabrics had similar thread counts per inch.

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\(^{4}\) *Mental Measurements Yearbook*.

\(^{5}\) Assistant.

\(^{6}\) Nora Waugh.
and weight, I realised they were not precisely equal. Yet to accommodate the extra subjects with the fabric I had available which matched historic corsets, this was a reasonable choice. The steel busks were purchased from a corset supplier; half-inch wide steels (Figure 68), which required custom sizing, were purchased from an orthopedic brace supplier; polyester laces were used. Hot-water pre-washing and drying were repeated twice to shrink fabrics; fabrics shrunk the same amount by measurement. Seams were machine-sewn using polyester thread. During the testing no laundering was done to assure sizing would remain as stable as possible. Fitting sessions paid special attention to placement of steel boning to maintain symmetry of each corset section on the subject's body. Finishing was done by hand with placement of nickel-plated or brass eyelets at one inch intervals at back openings.
Equipment Used in Physiologic Testing

Spirometry testing was done using a portable spirometer, disposable mouthpiece, plastic tubing, and nose pincher. Blood pressure was measured using an aneroid sphygmomanometer and stethoscope. Weight was measured on a step-on bathroom scale; height was measured using a standard steel measuring-tape attached to a door frame in the fitting room of the Living History Farms. A retractable steel measuring-tape was used to measure waist measurements before and during tight-lacing. Climatological data were received from the Des Moines, Iowa office of the National Weather Service (see Table 6). I believed the temperature and humidity data might be critical factors in the spirometry testing, as well as with comfort assessments. Timing was kept according to the fitting room clock. Comfort data were gathered using a measured scale instrument (see Appendix B) and individual diary comments as well as activity information were collated separately.

Pressure on the torso was measured with seven subjects in a Cardiovascular Fitness Laboratory at St. Mary's Hospital in Rochester, Minnesota with the assistance of Dr. Bruce Johnson and his assistant Kathy O'Malley (Figure 69). Special catheters were devised, based on Hyatt type esophageal balloon-tipped catheters used in previous experiments for determining diaphragmatic movement by Dr. Johnson. These catheters were placed between the corset and the T-shirt-covered torsos of the subjects: one at the left front waist, next to the steel busk; the second below the right arm, against a rib; and the third at right mid-back (Figure 70). Care was taken to place the balloons under the cotton fabric and not under a steel bone.
The catheters were then attached to a strain gauge with a three way stop-cock; five cubic centimeters of air was used to inflate the balloons. Subjects used a closed breathing apparatus and were asked to stand quietly and breathe in series of normal and deep breaths to determine their standard capacity.

**Testing Procedures**

Tight-lacing for this study was three inches less than natural waist measurement. Each subject had a custom-made corset which was designed to allow this amount of tight-lacing. Corsets were worn over a T-shirt, and some subjects also wore a brassiere because the corsets did not fully cover the breasts.

Tight-lacing was done by the researcher by pulling the laces from top and bottom toward the mid-back (Figure 71); laces were then tied tightly at the back, but did not encircle the waist outside the corset. The laces were surreptitiously marked to ascertain if stretching of the laces or loosening by the subjects changed the waist measurements.

The first spirometry measurements were done before the subject began her interpretive day. The office of the costume department was set up as a private screening site for the testing procedures. Blood pressure, height, weight, and waist measurement were recorded for each subject before
the initial morning test. Ambient temperature and humidity were noted using local radio reports; these were checked with the Climatological Data reports. Each subject was given a demonstration of the spirometer procedure prior to doing the test herself. A script was used to ensure that standardized information was given to each subject concerning the procedure as well as to reconfirm her understanding of the entire study’s point: that every bit of data would be useful, and that it did not comprise a contest between subjects. A Pneumoscan 340 portable spirometer was employed during the testing; procedures were in accordance with AARC Clinical Practice Guidelines. The first test was done without the corset in place; the second test was completed when the corset was tight-laced as described above. A nose pincher was placed to close the airway; three deep breaths were drawn and exhaled through a disposable mouthpiece. Readings were recorded manually on Spirometry forms (see Appendix B). These data were later assessed using a computer statistical program. The spirometry tests were repeated at the end of the subjects’ work day with the corset still in place and then immediately after removal. Repeated instructions were given, without the demonstration for the end-of-day tests.

Comfort scales were recorded by subjects at half-hour intervals, along with a record of their activities (see Appendix B). Subjects were encouraged to add comments and additional information to their diaries and many provided detailed chronologies of their work day. Each subject had been repeatedly told that they were encouraged to remove or loosen the corsets at any time during the day if their comfort was infringed; despite this, no one removed or loosened her corset.

*Torso Pressure Testing*

Pressure testing required very special equipment and because it was not portable, the subjects were transported to St. Mary’s Hospital Cardiovascular Exercise Research Laboratory in Rochester, Minnesota. Equipment included a Hans Rudolph Pneumotachograph flow
sensor, which measures pressure change between two screens and integrates the data proportional to flow, to a collection software program custom designed by Dr. Johnson. The flow sensor was calibrated using a Collins 3-liter calibration device. Pressure transducers used were made by the Validyne Company with a ± 200 cm H₂ O range; these were connected to the balloon-tipped catheters. Another custom-designed calibration device was employed to test the balloons.

The group was oriented to the laboratory setting and each individual was tested privately while the others waited in a reception area. In an effort to cause as little extra 'distress' as possible, each was requested to empty her bladder before the test. None had eaten within four hours of the test. Subjects wore their own clothing and were fully covered; the corsets were placed over their T-shirts. Waist measurements were recorded using a steel tape. Three balloons were placed as shown in Figure 70 above.

Prior to tightening the corset, a series of breathing measurements were done using a computerized system to ascertain balloon sensitivity and to familiarize them with the procedures. Subjects breathed into a standard spirometer system, which was connected to a computer. The nose was plugged and a “scuba gear” type mouthpiece with which the subjects were familiar was employed; a short series of (4 or 5) ‘normal’ breaths were followed by one deep inspiration followed by a subsequent series of ‘normal’ breaths. After balloon calibration, each balloon was appropriately inflated using 5 cc. of air, and the corset was tightened to three inches less than their natural waist size. With the corset tightened, each subject repeated the breathing exercises described above (Figure 72). The balloon-tipped catheters were attached to a three-way stop-cock connected to a strain gauge and thence to the computer programmed to produce graphs of the pressures. Subjects did not exercise during the procedure, which took only a few minutes to complete once the pressure balloons were correctly placed. These procedures were in accordance with the AARC Clinical Practice Guidelines for spirometry testing.¹⁰
Figure 72. Testing of respiratory capacity was measured in addition to external torso pressure from the corset. In this picture the lacing is loose in order to measure normal capacity. Dr. Johnson watched data on the computer monitor. (Author's collection)

**Statistical Analysis Methods**

The statistical software used to analyze data from the spirometry testing and the comfort assessment records kept by the subjects was **SPSS**. Variables measured for the spirometry included: ambient temperature, humidity, and barometric pressure; height, weight, blood pressure, and waist measurement of the subject; and duration corset was worn. Since this was the first experiment to examine these phenomena using corseted subjects, I could not be sure which variables would be important. T-tests were used to determine significance; an Alpha level of .05 was used in all statistical reports.

For the pressure testing section of the study, a different software program [Excel] was used. Variables in this part of the study included: height, weight, and waist measurements of subjects; respiratory rate and inspiratory depth; and pressure exerted on the subject's torso by her corset. Analysis included comparisons of corseted and uncorseted vital capacity from morning and evening tests; t-tests for determination of significance and identification of trends.
Notes

3 Gau, Colleen. How Much Tight-Lacing is Tolerable? Unpublished paper for Textiles and Clothing class February 1996. I made a series of corsets for five volunteers at the Minneapolis Institute of Art and for three college-student volunteers; each wore the corset for 4-8 hours over one day, with hourly or two-hourly changes in tight-lacing amounts ranging from one to four inches. Three inches of tight-lacing was found to be the highest tolerable degree of tightness.
5 Assistant to Dr. Bruce Johnson, Cathy O’Malley adapted forms and provided data entry and receptionist services to the volunteers during testing in addition to making the special balloon-tipped catheters.
10 Ibid.
CHAPTER 11: FINDINGS IN PHYSIOLOGIC AND COMFORT STUDIES

Introduction

This research involved subjects who had never worn corsets in their regular positions as historic reenactors (or in their personal life). For that reason, I requested each volunteer to wear her custom-made corset reducing her natural waist measurement one inch or less for one workday prior to the tight-lace testing. This was done to prepare them in practical work-day performance while corseted. According to their comments at day's end, posture and task performance were affected even without tight-lacing on the pre-trial day. Testing was done at Living History Farms in Urbandale, Iowa and St. Mary's Hospital, Rochester, Minnesota.

Climatologic Information

Spirometry tests and comfort assessments were done over several weeks in the summer of 1997. Temperature, humidity and barometric pressure readings were recorded and checked with data from the Iowa Climatological Service as shown in Table 6.

Table 6: Climatologic Data on Test Days

<table>
<thead>
<tr>
<th></th>
<th>Temperature</th>
<th>Humidity</th>
<th>Baro. Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>8-22-97</td>
<td>65</td>
<td>81</td>
<td>77</td>
</tr>
<tr>
<td>8-25-97</td>
<td>69</td>
<td>90</td>
<td>69</td>
</tr>
<tr>
<td>8-27-97</td>
<td>73</td>
<td>100</td>
<td>79</td>
</tr>
<tr>
<td>9-8-97</td>
<td>68</td>
<td>93</td>
<td>78</td>
</tr>
<tr>
<td>9-10-97</td>
<td>58</td>
<td>77</td>
<td>72</td>
</tr>
<tr>
<td>9-27-97</td>
<td>61</td>
<td>87</td>
<td>76</td>
</tr>
</tbody>
</table>

Source: National Weather Service, Des Moines, Iowa
Temperature, humidity, and barometric pressure did not seem to affect spirometry results or comfort assessments according to the t-testing. This data was collected in case effects were noticeable with climatic differences. The degree of compromise with three inches of tight-lacing would not be expected to severely restrict the subjects, which would have happened with six, eight or ten inches of tight-lacing. Because the test subjects had normal lung volumes and rib-cages, they were not in jeopardy. In more severe lacing situations, with or without rib-cage deformation, climate conditions may have been greater factors in producing distress.

Pilot Study

A pilot subject was tested in a laboratory setting prior to the main experiment. The spirometer was more sophisticated than that used in the field testing; however, the results are completely comparable. The pilot subject did not work with her corset in place for a day of reenacting, but demonstrations of testing routines were practiced with her to enable the researcher to smoothly carry out routines with the main group of subjects. Her spirometry testing proved her capable of higher than normal inspiratory capacity, with a 27% decrease when tight-laced. A follow-up spirometry measurement was not made to ascertain if her capacity was diminished at the conclusion of her testing. Because of this, her results were not included in the main data report.

Living History Farm Subjects' Spirometry Tests

I chose the mean of subjects' natural waist measurement of 32.5" to differentiate 'small waisted' from 'large waisted'. Both groups changed in vital [lung] capacity when corseted as seen in spirometry tests, but no pattern was evident. The 'small-waisted' subjects showed a more marked decrease in vital capacity than the 'large-waisted.' Table 7 presents these data.
Table 7: Percentage Changes in Vital Capacity in Small and Large Waisted Subjects when Corsets are On and Off

<table>
<thead>
<tr>
<th>WAIST SIZE* (inches)</th>
<th>% CHANGE (in size)</th>
<th>AM VC (Liters) OFF</th>
<th>AM VC (Liters) ON</th>
<th>% CHANGE in VC</th>
<th>PM VC (Liters) OFF</th>
<th>PM VC (Liters) ON</th>
<th>% CHANGE in VC</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.5</td>
<td>-10.5</td>
<td>3.97</td>
<td>3.40</td>
<td>-14</td>
<td>3.50</td>
<td>4.03</td>
<td>+13</td>
</tr>
<tr>
<td>27.5</td>
<td>-11.5</td>
<td>3.60</td>
<td>3.00</td>
<td>-17</td>
<td>2.80</td>
<td>3.50</td>
<td>+25</td>
</tr>
<tr>
<td>30.0</td>
<td>-10.0</td>
<td>4.30</td>
<td>4.17</td>
<td>-3</td>
<td>4.30</td>
<td>4.43</td>
<td>+3</td>
</tr>
<tr>
<td>26.5</td>
<td>-11.3</td>
<td>3.03</td>
<td>2.60</td>
<td>-14</td>
<td>2.80</td>
<td>3.00</td>
<td>+7</td>
</tr>
<tr>
<td>27.0</td>
<td>-11.0</td>
<td>3.47</td>
<td>3.33</td>
<td>-4</td>
<td>3.30</td>
<td>3.33</td>
<td>+1</td>
</tr>
<tr>
<td>31.0</td>
<td>-9.7</td>
<td>4.10</td>
<td>3.6</td>
<td>-12</td>
<td>3.27</td>
<td>3.8</td>
<td>+16</td>
</tr>
</tbody>
</table>

\( \bar{X} = 28.4 \), \( \bar{X} = 10.6 \), \( \bar{X} = 3.75 \), \( \bar{X} = 3.35 \), \( \bar{X} = 10.6 \), \( \bar{X} = 3.32 \), \( \bar{X} = 3.68 \), \( \bar{X} = 10.8 \)

<table>
<thead>
<tr>
<th>LARGE</th>
<th></th>
<th></th>
<th></th>
<th>Wired</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>37.0</td>
<td>-8.0</td>
<td>3.57</td>
<td>3.23</td>
<td>-9.5</td>
<td>3.13</td>
<td>3.43</td>
<td>+9.5</td>
</tr>
<tr>
<td>46.0</td>
<td>-6.5</td>
<td>3.13</td>
<td>3.27</td>
<td>+4</td>
<td>3.23</td>
<td>3.33</td>
<td>+3</td>
</tr>
<tr>
<td>35.5</td>
<td>-8.5</td>
<td>3.67</td>
<td>3.00</td>
<td>-18</td>
<td>3.37</td>
<td>3.53</td>
<td>+5</td>
</tr>
<tr>
<td>36.0</td>
<td>-8.3</td>
<td>3.27</td>
<td>3.47</td>
<td>-1</td>
<td>3.33</td>
<td>3.4</td>
<td>+2</td>
</tr>
<tr>
<td>39.0</td>
<td>-7.7</td>
<td>3.73</td>
<td>3.13</td>
<td>-16</td>
<td>2.87</td>
<td>3.43</td>
<td>+19</td>
</tr>
<tr>
<td>39.0</td>
<td>-7.7</td>
<td>4.47</td>
<td>4.20</td>
<td>-6</td>
<td>4.23</td>
<td>4.27</td>
<td>+1</td>
</tr>
<tr>
<td>33.5</td>
<td>-9.0</td>
<td>4.07</td>
<td>3.3</td>
<td>-2</td>
<td>4.00</td>
<td>4.00</td>
<td>+0</td>
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<tr>
<td>35.0</td>
<td>-8.5</td>
<td>3.50</td>
<td>3.37</td>
<td>-4</td>
<td>2.97</td>
<td>3.23</td>
<td>+9</td>
</tr>
<tr>
<td>34.5</td>
<td>-9.0</td>
<td>2.63</td>
<td>2.57</td>
<td>-2</td>
<td>2.53</td>
<td>2.57</td>
<td>+1.5</td>
</tr>
</tbody>
</table>

\( \bar{X} = 37.3 \), \( \bar{X} = 8.1 \), \( \bar{X} = 3.6 \), \( \bar{X} = 3.3 \), \( \bar{X} = 6 \), \( \bar{X} = 3.3 \), \( \bar{X} = 3.5 \), \( \bar{X} = 5.6 \)

*Waist measurement taken outside T-shirt and corset, before tight-lacing.
The average proportion of waist measurement lost when tight-laced was 10.6% for the 'small-waisted,' and 8.1% for the 'large-waisted.' The 'small-waisted' subjects averaged 3.75 liters lung capacity in the morning without the corsets, and lost an average of 10.6% in vital capacity when tight-laced. They returned to an average of 3.68 liters when the corset was removed at the end of the day [for no net loss]; one subject actually gained capacity as measured at day's end. It may be that her morning test was not a true valuation of her vital capacity, however it was accepted as such at the time. The 'large-waisted' subjects' average morning capacity was 3.56 liters, they dropped an average of 6% to 3.28 liters when their corsets were tightened. When the corsets were removed in the evening, the 'large-waisted' subjects regained an average of 5% to 3.46 liters [a net loss of 0.1 liter]. This demonstrated the majority of 'large-waisted' subjects were unable to completely recover to their first spirometry test result when the corset had been removed at the end of the work day. Table 8 shows the statistical analysis. The difference between AM and PM Vital Capacity for the total group was close to statistic significance: \( t = 2.02; (df 14) p = .063; \) 95% CI (.005, .169); SE .041.

The cause of the difference in vital capacity between morning and evening is unclear, but the findings may indicate muscle laxity as a result of the corset pressure from only one day of wearing. This may be a sign that continuous wearing of tight-laced corsets would

<table>
<thead>
<tr>
<th>Corset Off - Morning</th>
<th>Corset Off - Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>15</td>
</tr>
<tr>
<td>Mean VC (Liters)</td>
<td>3.634</td>
</tr>
<tr>
<td>SD</td>
<td>0.499</td>
</tr>
<tr>
<td>SE</td>
<td>0.129</td>
</tr>
<tr>
<td>Corr (AM &amp; PM)</td>
<td>0.950</td>
</tr>
</tbody>
</table>
gradually prevent complete recovery when corsets were removed. Testing at intervals after corset removal might have revealed total recovery time, but that was not done.

Differences in lung capacity, as measured by spirometer, were statistically significant when the corset was placed in the morning and removed in the evening when compared to the uncorseted state. Paired differences in Vital Capacity in the AM showed a $M = .3247$, $SD$ of the difference $= .298$, $SE = .077$; $t = 4.22$, ($df$ 14); and $p = .001$; $95\%$ C. I. (.159, .490). Paired differences in Vital Capacity in the PM showed a $M = .2433$, $SD$ of the difference $= .229$, $SE = .059$; $t = 4.11$, ($df$ 14); and $p = .001$; $95\%$ C. I. (.116, .370). (See Tables 9 and 10).

When grouped together, subjects lost from 1% to 18% of their total capacity as measured by spirometer when corseted in the morning, with an average loss of 9%. Because this type of testing has never been done precisely like this before, it is difficult to judge the impact of tight-lacing, except to say that in this group a loss of tidal volume was seen in all but one subject when the corset was put on. It is reasonable to assume that this group of subjects performed the spirometry tests as efficiently and correctly as any test group, which would affirm the results reported. The corsets appeared to be the causal factor for the change.

Table 9: Influence of Corseting in AM Vital Capacity in All Subjects

<table>
<thead>
<tr>
<th></th>
<th>Corset Off - Morning</th>
<th>Corset On - Morning</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Mean VC (Liters)</td>
<td>3.634</td>
<td>3.309</td>
</tr>
<tr>
<td>SD</td>
<td>0.499</td>
<td>0.458</td>
</tr>
<tr>
<td>SE</td>
<td>0.129</td>
<td>0.118</td>
</tr>
<tr>
<td>Corr (before/after)</td>
<td>0.809</td>
<td></td>
</tr>
</tbody>
</table>
Table 10: Influence of Corseting in PM Vital Capacity in All Subjects

<table>
<thead>
<tr>
<th></th>
<th>Corset On - Evening</th>
<th>Corset Off - Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Mean VC (Liters)</td>
<td>3.3089</td>
<td>3.552</td>
</tr>
<tr>
<td>SD</td>
<td>0.522</td>
<td>0.486</td>
</tr>
<tr>
<td>SE</td>
<td>0.135</td>
<td>0.125</td>
</tr>
<tr>
<td>Corr (AM &amp; PM)</td>
<td>0.899</td>
<td></td>
</tr>
</tbody>
</table>

We know that human beings can live with one lung removed, however their capacity for exercise is much reduced. If capacity is lost over an extended period, it stands to reason adaptation would take place. When corsets were removed at day’s end, recovery ranged from 92-100% of original capacity, with a mean recovery rate of 96.8%. I could not assess any long-term changes.

**Comfort Assessments**

Comfort assessments were recorded every half hour during their working day by all subjects, along with diaries of their work duties, using a research tool designed to assess comfort (See Appendix B). The 6 ‘small-waisted’ subjects indicated more discomfort than the 9 ‘large-waisted’ subjects. This is reported using illustrative figures and quotations from the oral and written comments from the diaries kept by each subject outlining her respective duties and chores as well as feelings which could not be easily assessed using the graduated scale. The corsets seemed to be best tolerated shortly after the subjects began their days, but declined during and immediately following the lunch period. There was a short recovery period for some of the ‘large waisted’ in mid-afternoon, then comfort dropped as the day’s end
approached. Each volunteer verbally expressed relief as their corset was released, although every one remained tight-laced throughout the day. Lace markings were essentially unchanged from morning indicating not one subject had loosened her laces. This was confirmed by the repeated waist measurement at day’s end.

I again separated the ‘small-waisted’ from the ‘large-waisted’ [mean of 32.5” was the point of separation] to determine if comfort records would relate to the physical findings (Figure 73). Table 11 shows the statistical data. The ‘small-waisted’ subjects demonstrated a 10.6% loss of vital capacity, and they indicated a greater degree of discomfort during their work day when corseted. The ‘large-waisted’ subjects had a relatively smaller percentage of waist reduction when tight-laced and indicated a generally positive comfort level throughout

![Figure 73: Comparison of comfort throughout the day [military time]. The Comfort Assessment tool used by subjects had values from -5 [Very Uncomfortable] to +5 [Very Comfortable]; this chart indicates the averages for both groups.](image-url)
Table 11: Comfort Levels During Corseted Day in Small and Large Waisted Subjects

<table>
<thead>
<tr>
<th></th>
<th>Small Waist</th>
<th>Large Waist</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>6</td>
<td>11*</td>
</tr>
<tr>
<td>Mean Comfort</td>
<td>-0.794</td>
<td>+1.0702</td>
</tr>
<tr>
<td>SD</td>
<td>0.442</td>
<td>0.401</td>
</tr>
<tr>
<td>SE</td>
<td>0.107</td>
<td>0.097</td>
</tr>
<tr>
<td>Corr (Small/Large)</td>
<td>0.508</td>
<td></td>
</tr>
</tbody>
</table>

*Larger number represents repeated test days for two subjects

the day; their vital capacity was reduced an average of 6%. The mean difference in comfort was -1.864, SD .420, SE =.102; t = 18.30, (df 16); p = .0001; 95% CI (-2.080, -1.648).

**General Comfort during Work**

As reported in their diaries, eight subjects mentioned that their pace was slowed, they performed tasks “more sedately” or “had to take it easy” with their usual chores; four specified bending and stretching were harder than usual. None of the subjects reported feelings of faintness or other alarming symptoms, despite the strenuous work done by some. Every subject reported a feeling of fullness with small food or liquid intake, and all indicated they had curtailed their usual diet at lunch while wearing the corset. Several subjects reported their experience wearing the corset on ‘the practice day’ had prompted them to reduce their liquid intake on the test-day to prevent frequent bathroom visits. A general complaint about the inconvenience of wearing modern panties with corsets was voiced.

Low back pain/pressure was noted by seven subjects. Pressure around the ribcage was noted by three subjects, while shortness of breath was reported by seven during exertion such as stair-climbing, or heavy chores like carrying pails of water. Eight subjects noted changed speech patterns, that they breathed in different places in their normal banter with visitors, and
took more shallow breaths; one was restricted when coughing or sneezing; and one felt skin irritation over her ribs which was seen as redness under her camisole when the corset was removed.

Generally, the 'large-waisted' subjects were more comfortable working than the 'small-waisted' subjects. A wide variety of tasks were done by the subjects, including weeding and gardening, picking and canning tomatoes, general housework, cooking over an open fire, baking, carrying buckets of slop for pigs, climbing stairs, churning butter, and sedentary tasks like knitting and entertaining at tea. The comfort reports did vary with the type of work done, with those subjects who did more strenuous tasks generally finding their work more difficult because of the corset. This was not uniform in its reporting, and no conclusions could be drawn from the anecdotal reports. A majority commented on a feeling of "awareness of the corset" which, no doubt, would likely fade if they wore it every day. Although most subjects found they were required to make certain adjustments in their routines, speaking patterns, and amounts they ate, the majority indicated they might be willing to wear the corsets at least some days. Comments such as, "feeling more in character," "I felt lady-like," "this presents a more correct figure" were typical at their test-day's end (Figure 74).

There appeared to be a "denial factor" present in the comfort-status logs when I compared the relative spirometry results on some subjects. Although the lung capacity of specific subjects had definitely been significantly reduced, their rating of comfort did not correspond to the diminution. Either their perception of shortness of breath, chest restriction, and overall physical limit was skewed, or they were able to ignore or otherwise rationalize their feelings of change in comfort. Some respondents used phrases like, "I just put it out of my mind" or "I wanted to make it through the day, like everyone else." This latter statement seemed similar to attitudes held by followers of fashion in the nineteenth century. Again, I remind the reader, my statement to every subject as she began her day: "this was not a contest," and "whether they kept the corset tight all day or not would give valid data."
They appeared not to heed my warning or advice, perhaps in the spirit of scientific research, or due to their loyalty to this researcher. The argument may be made that an independent ‘neutral’ observer might have obtained different results. No attempt was made by this researcher to assess the psychological or interpersonal relationships between the subjects and myself. I am not denying this might have impacted on the subjects’ cooperation, only that I did not consider it during this study.

**Trying the Fainting Couch**

Two subjects reported attempts to find relief from post-prandial discomfort by reclining on the fainting couch in the farmhouse in which they worked. Both stated they were made more uncomfortable in the semi-recumbent position and this feeling was worsened when they tried to lay flat on a bed; this supported the comfort-log assessments that most subjects found the upright position most tolerable, with sitting most uncomfortable. A subject wrote in her diary, “I never wear binding or tight clothes; I found the corset constricting and
uncomfortable." She identified a common thread among today’s reenactors: namely, women of today are used to easy-fitting garments.

The ‘supportive’ aspect of wearing the corset was noted by several subjects. One found it easier “to let the corset do the work” [holding the spine erect]. Bending was more difficult for six subjects, some chores had to be done differently, and one subject reported “Charley-horse in rib muscles after corset was removed.” One reenactor, who worked in a 1900 farmhouse setting, noticed the corset supported her efforts when carrying heavy pails.

**Pressure Data Explained**

Seven subjects were tested in a cardiovascular exercise research laboratory of St. Mary’s Hospital in Rochester, Minnesota. Testing was carried out by myself, with Dr. Bruce Johnson, and his assistant Mrs. Cathy O’Malley. Dr. Johnson had worked with pressure sensitive balloons which measured esophageal and diaphragmatic pressures. He reckoned the same type of balloons could be used between the corsets and subject’s torsos to determine corset pressures. My intent was to attempt to replicate the earlier measurements and to compare the present-day data with Dr. Robert Dickinson’s measurements of corset pressures over a century earlier.

Dr. Dickinson had used a modified blood pressure cuff bladder attached to a standard sphygmomanometer to determine the amount of pressure exerted on the trunk when the corsets were tight-laced (Figure 75). In his attempt to demonstrate their reliance on a garment he abhorred, he measured several hundred corseted females when they were visiting his office for a variety of reasons. At the time of his study, this instrument was newly invented, and his use was truly innovative. Dickinson took measurements from many different positions under the corset and recorded the pressures in cubic centimeters of water units [cm. of H₂O]. Although the instrument was simple, it was capable of measuring very exact pressures and in many ways was not less accurate than our more sophisticated machinery of the present-day.
The small bag was inflated after being placed against the patient's torso in various positions, measurements were noted for normal (quiescent) breathing and deep breathing. The details of statistical analysis were missing from his report. Dr. Dickinson's data are presented in Table 12. He could not predict from the waist measurement what pressure was exerted on any given subject. The amount of tight-lacing was only part of the equation, in his opinion: the relative or laxity of the subjects' abdominal muscles was a greater factor in the determination. When the muscles of the abdomen were strong, the pressure of the corset did not tend to displace the viscera [abdominal organs] to a great extent, but where the muscles of the abdomen were flabby, the viscera was considerably displaced and the discomfort greater. Although the viscera were not as disturbed in the subjects with strong abdominal muscles, Dickinson found their intrapelvic vascular pressure much increased, creating serious circulation changes and varicosities.

Table 12: Average Peak Corset Pressure [cm. of H₂O] with Quiescent and Deep Inspiration (Dickinson)

<table>
<thead>
<tr>
<th></th>
<th>Quiescent Breathing</th>
<th>Deep Inspiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ribs</td>
<td>42</td>
<td>89</td>
</tr>
<tr>
<td>Waist</td>
<td>44</td>
<td>50</td>
</tr>
<tr>
<td>Back</td>
<td>47</td>
<td>61</td>
</tr>
</tbody>
</table>

I determined to measure similar pressure sites on the outside of the torso, using catheters with special balloon adapters for assessing pressure units of cm. of H₂O. Three catheters were prepared, calibrated, and the balloons placed between the corset and the torso of the subjects (Figure 70). Since I assumed Dr. Dickinson's subjects wore a chemise or undergarment under their corsets, the present-day subjects wore a soft T-shirt for modesty during the testing.

**Pilot Study**

A pilot subject was tested to familiarize this researcher with new routines. The pilot subject was in the 'small-waisted' category; she was tall, thin, and physically active, which made her relatively well-muscled. The pressure measurements made during deep inspiration by the balloon-tipped catheters under her corset were: rib 45 cm. H₂O; front waist 31 cm. H₂O; and the mid-back/ilium 86 cm. H₂O. To put these numbers into perspective, during normal respiration intrathoracic pressure might be 5-8 cm. H₂O; pressure during deep breathing with heavy exercise might rise to 30 cm. H₂O. The values have been measured *intrathoracically* using resistive garments like elastic bandages. We do not actually know the intrathoracic pressure of the subjects in this study; but they wore an *inelastic* corset, which in theory might increase pressures.

**Group of Seven**

On a different day, the seven subjects were tested using the balloon-tipped catheters. The pressures were monitored through a series of strain-gauges, while subjects used a closed breathing system; all were monitored by computer. Data were collected on disk and computed using *Excel*: means, t-tests with .05 CI. Table 13 shows the results of this testing.

Two of these seven subjects were of the arbitrary 'small-waisted' category described above, while five were in the 'large-waisted' category. I expected to see very high pressure measurements from the back position for all subjects, because the pilot subject had a pressure
measurement of 86 cm. H₂O at her back during deep inspiration. The back pressure measurement on the seven subjects varied from 4.5 cm. H₂O to 75 cm. H₂O with deep inspiration. The discrepancy may be explained as follows: the catheter placed at the back position was not directly over the ilium, but closer to the spinal column, this could account for the wide differences in the values recorded, particularly for the 'large-waisted' subjects. I may have missed the area of highest pressure.

Table 13: Average Peak Corset Pressure [cm. of H₂O] with Quiescent and Deep Inspiration (1998)

<table>
<thead>
<tr>
<th>Measurement Site</th>
<th>N</th>
<th>Quiescent Breathing</th>
<th>Deep Breathing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ribs</td>
<td>7</td>
<td>35 ± 18</td>
<td>56 ± 35</td>
</tr>
<tr>
<td>Waist</td>
<td>7</td>
<td>37 ± 21</td>
<td>48 ± 31</td>
</tr>
<tr>
<td>Back</td>
<td>7</td>
<td>38 ± 21</td>
<td>48 ± 14</td>
</tr>
</tbody>
</table>

As the corset laces were drawn tight for the 'large-waisted,' the soft tissues over the back and spine tended to create a 'valley' with the bony spine as the floor; this may have averted some pressure which would not have been the case with the 'small-waisted' subjects. Comparing the pressure readings reported by Dr. Dickinson in 1887 with the seven subjects showed similar measurement relationships [ribs to waist front and back], whereas the pilot subject had the greatest pressure at her back. Neither Dr. Dickinson nor I were able to predict the pressure which we measured. Table 14 shows this.
Table 14  Corset Pressure Comparisons with Deep Inspirations (cm. H2O)

<table>
<thead>
<tr>
<th>Measurement Site</th>
<th>Dickinson [n = 100+]</th>
<th>Pilot Subject* [n = 1]</th>
<th>Group [n = 7]</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ribs</td>
<td>89</td>
<td>45</td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Waist</td>
<td>50</td>
<td>31</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Back</td>
<td>61</td>
<td>86</td>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>

* Pilot subject was very slender, back balloon placement was directly over the iliac crest.

Although the frequency of breathing was slightly more rapid than normal in the corseted subjects, this was within expectations for test subjects in an unfamiliar setting. The tidal volume was also slightly diminished during the short testing procedure. This does not rule out a gradual further increase in respiratory rate, or a gradual change in tidal volume over a longer period; it may be an explanation for the small decrease in recovery which was seen at the end of the day of wearing the corset during work at Living History Farms. Because the pressure testing took only about ten minutes for each subject, and since we were not looking for breathing changes specifically, these data were coincidental.

Comment

The information gathered in this experiment was a small beginning. It has whetted the appetite for deeper understanding of this topic. One of the areas of concern for the modern-day corseter might be measurement of muscle atrophy with various pressures. Another area of concern is determining the organ displacement which occurs with tight-lacing. A discussion with a physics professor at ISU who deals with ‘Virtual Reality’ using a cave built with computer imaging may lead to use of the Visible Woman® software to determine organ displacement in tight-lacers. There are many avenues which are yet to be explored.
I did not seek out corseters who were fetishists, but I am aware of that group. I do not propose my research either examines fetishists' practices or recommends for their safety, but I feel this would be an area for further study. The death of a Victorian male corseter described earlier points out dangers of using extreme tight-lacing as a fetishist practice.

Notes

2 One subject's lace marking was 1/4 inch different, all others were unchanged.
3 Forward bending was possible, but not comfortable; side-bending was much more difficult, according to verbal reports. The test corsets had six or seven 1/2 inch width steels per side, plus the steel busk in center front, compared to some more extreme models which advertised as many as thirty [narrower] steels per side.
6 The *Visible Woman* software is administered through the National Institutes of Health in Washington and contains the data from a 57 year old woman who donated her body to the project. After death her body was frozen and sliced in 1 mm. segments which were then computer-digitized. This data allows medical students and scientists to study female anatomy without cadaver dissection. The proposal which Dr. Carolina Cruz-Neira and I have discussed entails the attempt to apply 'virtual corset pressure' to the anatomy of the *Visible Woman* in order to observe organ displacement. At this time, the idea is in its infancy.
CHAPTER 12: DISCUSSION

Introduction

This research has covered a wide range of topics concerning corseting in the late nineteenth and early twentieth centuries. Questions which were partly based on my own earlier research into the efficacy of the 'health corset' lead me to a deeper search of the related medical literature and to compare the fashion-related writers' opinions on corseted figures with the medical opinions. I was curious about the relationship between the medical profession and the Dress Reform Movement. I attempted to find some connections or to understand the reasons why the two groups did not cooperate to gain a common goal.

In addition to these matters, I was interested primarily in the safety of corseted reenactors in the present day. I attempted to replicate, as closely as possible, two studies of corseted subjects: the first was carried out in 1887 by Dr. William Wilberforce-Smith; the second was reported in 1887 by Dr. Robert L. Dickinson. I felt I could best ascertain the safe parameters through direct study of corseted subjects. The process included: the production by this researcher of custom-made corsets for each subject; field tests carried out at the Living History Farms, Urbandale, Iowa with sixteen subjects; and a further testing of seven of the subjects in a physiology laboratory in Rochester, Minnesota. Using up-to-date equipment, I employed quantitative methods: lung volume testing, using spirometry measurements; assessment of comfort using a scaled device; and torso pressure measurements. In addition, I collected a qualitative component which had the subjects keep a day's diary of their reenacting activities and a record of their comments.

Coincidentally I was made aware of the present-day fashion designers' use of corsets and consequent wearing of corsets by persons not associated with theater or reenacting roles. I purposely avoided the transvestite and fetish corseters who may comprise another substantial group who have concerns with corsets.
Medical Opinion on Corsetting

The physicians of the last half of the nineteenth and the first decade of the twentieth century were not unanimous in their opinions or their attention to corsets worn by women (or men). Advice to remove the corset, voiced by crusaders, was diminished by the general acceptance of the garment as fashion, a wide difference in quality of professional acumen, and pressures brought by religious, social, political, and other factions. The status of the physician in the community was not what it is today; the communication between doctors was limited; and scientific methods were in their infancy. These factors lead to real limitations for the few who attempted serious research. For each voice raised in opposition to the corset, there seems to have been a voice of praise within the medical community.

There were advocates for Dress Reform within the medical profession, but they were either unfocused or in disagreement about the exact mode to propose. Some wanted to abolish the corset, others to modify it, and still others suggested the corset was not the culprit, but merely a pawn of fashion. The Aesthetic Movement worked in opposition to many in the Rational Dress Reform group on both sides of the Atlantic. The medical literature did not clearly take one side or the other. Nor did the fashion industry respond directly to the challenges made by medical professionals, despite repeated calls for change. Only a small number of female physicians took up the cause of Dress Reform, perhaps because they faced a grudging profession and a clientele who appreciated conformity. It appeared only the march of industrialization, education of women, and the introduction of sports forced the narrow-waisted fashions and ultimately the corset to fade into history.

Corroboration of Wilberforce-Smith and Dickinson

In my study when corseted reenactors were tight-laced three inches smaller than their natural waist measurements, they reduced their tidal volume, as measured by spirometer, by an average of 9%. This would seem to corroborate the evidence shown by Dr. William Wilberforce-Smith in 1890, when he demonstrated women with an average of seven inches of
tight-lacing lost an average of 20% tidal volume. An mean of 6% of tidal volume was regained [in my study] at the end of one day's corseting with three inches of tight-lacing.

The pressure measurements published by Dr. Robert L. Dickinson in 1887 were replicated using modern techniques, but with the identical units: cm. of H₂O. Similar pressure relationships appeared to exist in the modern group as were measured by Dr. Dickinson. The three inches of tight-lacing in the modern group was considerably less than the average of seven inches reported in 1887, which likely accounted for some of the differences in actual pressures. Because the modern subjects experienced tight-lacing for the first time as adults, they were not precisely matched to their sisters of the nineteenth century, who tight-laced from adolescence. Variables were not possible to control, such as height, weight, body size, time of menstrual cycle, or age as well as the myriad of differences in historic and present-day women.

There were torso pressure differences seen between inspiration and expiration in the corseted subjects: with averaged peak pressures of 56 cm. of H₂O over the ribs of the right side; 48 cm. of H₂O pressure at the right mid-front abdomen; and 48 cm. of H₂O pressure at the left ilium/back position. This was much higher than the 30 cm. of H₂O pressure, normal with the deep breathing of heavy exercise. The left ilium/back pressures may have skewed lower due to placement of the balloon transducer. Prediction by this researcher of pressure measurements for individuals was not found to be credible; in other words, I could not tell who would demonstrate more or less pressure when judging by body size or waist measurement.

Comfort Assessment

Sixteen volunteers assessed their comfort level every half hour during their normal work day of reenacting at Living History Farms, Urbandale, Iowa. A tool using a score from -5 to +5 was employed. All the subjects remained corseted with three inches of tight-lacing throughout a day which averaged 8.3 hours. Those with waists less than 32.5 inches were less comfortable on average than those with waists greater than 32.5 inches. Comfort levels averaged in the positive category until the noon meal was eaten; a decline in comfort was noted.
with the average -1 one hour after eating. This rose and fell several times during the afternoon.

By three o’clock, all subjects noted a more negative comfort level, which continued to decline as their workday ended. The average overall comfort was +1.5 for the day; when subjects were divided into ‘small’ and ‘large’ waisted, comfort was higher in the ‘large waisted’ group. All subjects were able to maintain their usual routines, with small adjustments. Shortness of breath with exertion was the main symptom noted, but this was of short duration and remedied with rest.

*Questions for Further Research*

As my research proceeded, I became aware of questions which piqued my interest, but were left to be answered another time. The first group are related to health/medicine.

1. What was the motivation behind Dr. Robert Dickinson’s attempt to influence Dress Reform and the fashion industry, and why did he eventually give up?
2. Why did so many physicians accept the recommendations for the straight-front corset as ‘healthier’ without scientific evidence?
3. How has the wardrobe of males and females influenced their health, and what attention to clothing has been paid by physicians?
4. What percentage of women wore corsets after WW I, WW II, the 1950s, and later? How was their health affected?
5. How many doctors ask questions about patient’s clothing when taking a history?
6. Are doctors taught about the effects of clothing on health during their medical education?

The second group of questions has to do with the experiments I carried out.

1. Could this study be repeated with larger numbers and show similar results?
2. If 10% of waist measurement was used to determine the amount of tight-lacing for an individual subject, would the results be uniform?
3. How long does the subject take to completely recover tidal volume as measured before corseting?

4. If work schedules were identical, what differences would be demonstrated in spirometry and comfort levels of corseted subjects?

5. Would tidal volume reduce over time if reenactors wore their corsets regularly?

6. Would balloon transducers register with greater accuracy at the ilium if a method could be found to fix them to the corset, maintaining position as tight-lacing is achieved?

7. Where are the ideal places on the torso to measure pressure?

8. Could pressure transducers be used during the work day to determine measurements with various tasks? Could tasks be replicated in a laboratory setting?

9. Could the organ displacement done by corsets be reproduced using a computer program like Visible Woman?

A final group includes questions regarding reenactors and others who corset.

1. How many people wear corsets on a regular basis in their line of work: Actors/actresses, historical interpreters/reenactors, Home Depot employees, and others?

2. Do these corseters follow a routine of torso-strengthening exercises?

3. Which fashion designers are designing for corseted figures, and how many are following these fashions?

4. Are the present-day corseters tight-lacing? If so, to what degree?

**Summary and Recommendations**

Both of the historic research studies were able to be replicated with modern techniques. The nineteenth century physicians who campaigned against fashion were essentially ignored by the majority of women; the primary influence for 'corset avoidance' was the gradual emancipation, introduction of active sports, and education of women.
It seemed that reenactors' tolerance for tight-lacing was higher if they had some adipose tissue to displace the pressure exerted by the corset. Three inches of tight-lacing was tolerated with a greater degree of comfort if the waist was greater than 32.5 inches. The amount of tight-lacing used should be in proportion to the waist size. I would recommend a general standard for reenactors: do not tight-lace more than 10% of your normal waist measurement. I base this recommendation on the experience of the studied subjects, who had an average level of comfort of +1.5 while wearing their corsets, did not experience any acute physical symptoms, and were able to carry out their usual duties with slight adjustments.

A recommendation for regular corseters to prevent atrophy of trunk muscles would be: maintain a routine of trunk strengthening exercises, not less than 30 minutes four days per week, *not wearing their corset*. For occasional corseters, four to six uncorseted days will renew the muscle weakness from a day of corseting. Reenactors should be alert to reliance on the corset, and the 'addictive factor.'

*Notes*

EPILOGUE: MODERN CORSETERS

Introduction

In the course of research for this study, I was contacted by several individuals who either corseted themselves or were concerned about present day corseting, but were outside the reenactor or historic interpreter groups. I believe that my research may be of some interest to those individuals, about whom I have several concerns regarding their corset practices. Again, I am avoiding the fetish corseters, and focusing on the ‘fashion’ corset wearers.

I had an inquiry from Dorothy Ko, a professor at Rutgers, who told me about some of her “very chic friends in Los Angeles and New York who routinely tight-lace because it is fashionable.”¹ I also had an e-mail from Sally Queen, who formerly managed the Colonial Williamsburg Costume Department; she returned from a trip to the University of Texas where she met with “many young designers [who] were anxious to show me their corseted [modern clothing] designs.”² I was told an article in the New York Times³ which discussed an exhibit of corsets at the Metropolitan Museum of Art prompted some of these corseters to experiment, although after contacting several I found that was not the case.⁴

A group in the panoply are those who wear corsets for individual reasons: I was contacted by a small group [twelve] of dedicated corseters, through the help of Shenlei Winkler⁵ in New York City, and asked them to answer a brief questionnaire about their practices (See Appendix E). As the reader may surmise, there are males who wear corsets in one degree or another; some of the respondents to my questionnaire were males. I appreciated their candor and their cooperation. I asked ten basic questions about corseting history with the following results. Information from the respondents follows a brief description of my query.

1. The styles of corset they wore were described as a “Victorian hourglass or 19th century” by five, “Elizabethan or 17th century” by five, “a surgical steel brace” by one, and style was not specified by one.
2. How they obtained their corsets: four made their own, two had garments made to measure, one purchased the corset in a surgical supply house, and mail order from the United Kingdom and the USA provided the remainder.

3. The frequency and length of time [hours daily] corsets were worn. Nine of twelve wore their corsets at least four days per week, with seven being daily wearers; all wore corsets at least ten hours. Two wore their corsets except while bathing. The three who wore corsets less frequently tended to use them for special occasions and for fewer hours; all specified four to six hours at a session.

4. The degree to which tight-lacing was employed by the corset wearers. Only one of the respondents failed to specify this and one reported minimal lacing of one inch less than the natural waist measurement. Three reported two-to-four inches, four claimed between four and seven inches, and two routinely laced seven-to-ten inches less than their natural waist. Several detailed the extended time period it took them [often amounting to months] to achieve their goal. One of the replies detailed a formula which figured the percentage of tight-lacing using physics to determine a 30% reduction of the waist for different weight and height subjects. This was of great interest to me and one in which I may attempt to determine accuracy in a future study.

5. Physician awareness: Only three respondents suggested their physicians were aware of their tight-lacing practices, while eight denied this awareness and one did not specify.

6. I asked what their physicians’ comments were regarding this practice, if they knew corsets were used. One doctor attempted to convince the corseter to desist using a corset as a back support, but apparently gave no alternative advice; one corseter who thought she may have cracked a rib reported her doctor did not recommend x-ray and attributed the discomfort to “growing pains;” a third patient was apprised of muscle atrophy by her physician, who is reported to have said, “That’s some figure you have there.” I resist commenting directly on the ethics of such a comment.
7. Remedial exercise was a topic in which I had a great deal of interest. I wanted to know if my respondents exercised and how often. Four reported doing no special exercise. One did only five minutes twice a day, two reported a once weekly session. Two-to-four times a week was usual for three responders, with only one corseter exercising daily. One did not answer this question.

8. The type and style of exercises varied from short flexibility and stretching routines, sit-ups, weight-training and walking the dog, to gymnasium based fitness work-outs. In no case did the corseter discuss his or her exercise routine with a physician, nor did they plan exercise to protect or fortify torso musculature. As one respondent stated, “I didn’t know it would help.”

9. I asked how many years the corseters had worn corsets. Six had worn the corset less than three years, with one using the corset only for a recent six-month period. Others replied with general terms like “many”, or “several” years; one reported wearing a corset for the past twenty-four years, with three admitting to between seven and fifteen years of use. It was impossible to obtain a correct average for the group, but omitting the generalized replies would give an average of more than seven years.

10. Why did they wear corsets? Only three of my respondents took part in historical reenactment or theatrical work while wearing their corsets. Six specified the corset was worn as a support garment, either for back or in two cases for breast support. “Enjoyment”, “comfort”, “pleasure”, “relaxation”, and “it makes me look good” were stated as reasons for corseting. Two replies used the word “addictive” in describing why they wore their corsets; one described a routine use of a corset to “relax the back muscles” following hours of waitressing work without wearing the garment.

Several of the replies added information on subjects I did not ask about; some of this seemed to corroborate historical data which has been reported in medical journals and other publications. One respondent described, in detail, how her eating habits were affected when
she wore her corset. This person tolerated only small amounts of food, limited her liquid intake, avoided gas-forming [specifically high-fiber] foods, and ate more slowly to ensure her comfort. Two others described using the corset as an “adjunct to weight-loss” and a “diet prompter.” A few mentioned constipation as a problem but the majority either denied health problems or dismissed symptoms lightly. Several mentioned shortness of breath with small amounts of exertion [climbing one flight of stairs]; this was similar to the findings in the reenactor’s comments reported in Chapter 11. One respondent replied to a question about removing the corset that, “I can’t anymore, I need it to hold me up.” She had worn her corset for seven years, the last two continuously. None reported anemia or severe anorexia, but I did not ask specific questions about those maladies.

_Modern Male Corset_

Vogue magazine featured a corseted male in a 1995 article\(^6\) (Figure 76). Pearl, a South African corsetiere for Christian Lacroix in Paris, wore a tight-laced corset twenty-three hours a day by his own admission. According to Pearl, his ideal waist measurement is eighteen inches;\(^7\) he states “without the haute couture, the corset ...would never have come about.”\(^8\) Upon inspection of his silhouette in photographs, I believe it is

Figure 76. Pearl, a male corseter who is reported by Valerie Steele to have a waist measurement of 19” (like the diagram in Figure 46). He has been corseting for several years. (Penn, p. 265)
apparent he began corseting after his ribcage was fully developed, since his ribs are not deformed into the typical inverted cone of the nineteenth century tight-lacers (Figure 77). The severe stricture of his abdomen must create gastro-intestinal problems similar to those described by the medical literature of the mid-to late nineteenth and early twentieth centuries. The fact that he wears the corset except while bathing indicates his trunk muscles are severely atrophied and he requires the corset in order to maintain his posture; this demonstrates the same difficulty described by corseters who could not maintain erect position without their ‘exoskeleton.’ Muscles lose about 2-5% of their strength each day of disuse, and require up to six days of exercise for every day of disuse to recapture their original vigor. This is demonstrated regularly by persons with casted limbs, who, when the cast is removed, must undergo a period of muscle rehabilitation.

Back Supporters

Several items which are described as supporters are now sold particularly in catalogs (Figure 78). These are garments which may be worn “discreetly under clothing, or comfortably over casual wear” and are advertised as being designed “exclusively for women, by a woman,” Christina Errescek, who is described as a “renown [sic] intimate apparel designer and sports authority.” It is designed to fit around the mid-torso, with shoulder straps; it is made of “high-density mesh” and is laced over the abdomen. The advertisements describe the item using phrases that defy medical logic, “The Cincher emphasizes spinal alignment and posture through compression to the abdomen and lower back.” This is one of several items of a similar nature I found for sale.
A study reported on Home Depot employees' use of supporters to prevent back injury during heavy lifting on the job was reported in the *Wall Street Journal*. Although Jess Kraus, the physician who originated this study, is no longer active in the investigation, the company has continued to use the supporters. The study reported a 30% reduction in injuries of the back when employees wore the supporter. The control within the study was unclear, particularly regarding the orientation received by the employee about wearing the tightened supporters *only when lifting*. Another difficult to measure variable was the amount of tension or pressure applied as the employee tightened the belt with each use; and the degree of looseness with which it was worn when other duties were pursued.

A telephone interview with a Home Depot executive in the personnel services department indicated that since the UCLA study there has not been a consistent effort to record or study the use or even the abuse of the supporters. Although I was assured the employee orientation included instruction for use of the belts, Home Depot was not willing to share this in written form. Home Depot employees wear these supporters; they are instructed in their use with lifting, and are told to “wear them loose” when not lifting. A “Loss Prevention Supervisor” in each store has the authority to reprimand any employee who is found to be wearing the belt tightly while not lifting, but at this time the stores do not keep records of these events.

I have informally observed employees of Home Depot, Lowes Home Center, Target and many other companies wearing these belts. I have noted that many [if not most] maintain a constant degree of pressure with the hook and loop closures, instead of loosening the belt when not engaged in heavy lifting procedures. When we understand the muscle atrophy

![Figure 78. Modern corset worn as a back supporter. (Inteli-Health Catalog, p. 31)](image)
typical of corseted individuals, we can easily relate this to the many clerks we see in the establishments who use these "supporters." I believe the extra support may be useful if worn only when special heavy-lifting procedures are required, otherwise the individuals may be placing themselves in greater danger of injury in the hours off-duty, caused by weakened muscles.

A related item advertised to "flatten that tummy" is an "Adjustable Panel Control Brief" (Figure 79). This garment, made with Spandex and nylon, and claimed to "smooth and slim all over" with a "crossover bulge-tamer" adjustable elastic section featuring six rows of hook and eye closures. The resistive pressure of this girdle would create problems previously described: increased abdominal pressure, cardiovascular changes, gastro-intestinal problems and multiple other physiologic distresses, primarily diminished muscle tone. Wearers would become dependent upon the device, like the corset wearers of yesteryear.

*Today's' Corseters*

It may be surprising to some readers to realize there are many people who 'corset' in the present age. The first group which comes to mind are those engaged in theater, costumed to create silhouettes of bygone eras. The number of reenactors and historical interpreters has increased over the past decade and is now estimated at approximately 50,000 in the United States, with a further 20,000 in the United Kingdom. Of course, not all reenactors wear corsets, but I am assured by those I know that greater pressure is brought by both the public and management to present a correctly dressed silhouette. Several authors provide guidelines for dressing in vintage styles, whether for presentation or individual situations.
I heard from social historian, Barbara Darlin, who provides audiences with a one-woman show about late Victorian culture and fashion. Ms. Darlin costumes herself in a 1900 straight-front corset, and in answer to my inquiries about her comfort she wrote,

I reduce my measurement by about three and a half inches. I have trouble just bending and breathing in that corset, so exercise would really be a struggle. The ribs are so compressed that breathing is very shallow, not to mention difficult. By the end of the hour, I also start to get a pain in my chest at the sternum [breastbone].

Articles written in recent years in a variety of fashion magazines have indicated the corset is being promoted by some of today's designers and worn by a few fashion-conscious women (Figure 80). This style may be prompted by movies dealing with period dress and featuring prominent actresses in corseted roles.

The recent production of "Titanic" and other movies of the ilk have brought corseting into the limelight. Jane Campion, director of "Portrait of a Lady" starring Nicole Kidman, was said to have demanded Ms. Kidman tight-lace to a nineteen-inch waist for the role. I remind the reader of the waist measurement circles illustrated in Figure 46. Although Ms. Kidman is a tall and slender woman, I would venture to guess that her natural waist measurement is at least six or seven inches greater than that alleged to have been desired by her director.

If actresses are regularly asked to tight-lace to that degree, I believe it could be deleterious to their health. At the least, special attention should be given to maintenance of their natural musculature; their tidal volume measurements could be monitored; and their abdominal and pelvic symptoms attended to promptly. Diet and exercise may aid in health maintenance and motility in the intestinal tract.

Figure 80. Model wearing corset in perfume advertisement. The bust closure of this corset is identical to those I used and of the nineteenth century styles. (W, April 1998, p. 12)
I found the autobiographical account of a corsetiere who had moved to South Africa in the 1950s fascinating. She found steady employment among the women attempting to ‘hold things in check.’ This was in the time after WWII when the “New Look” as designed by Christian Dior reintroduced the corset (Figure 81). Steel was no longer rationed and was therefore available to the fashion industry for corset boning.

Comment

The practice of corseting appears to be gaining popularity among the young fashion-conscious women of the late 1990s. Perhaps some anthropologist, social-psychologist, or historian will be able to help us understand this phenomena. I do not have an answer, but I have real concerns for their health.

Notes

2 Queen, Sally. Personal Communication. October 31, 1997. Over the past several years, Sally has frequently contacted me with encouraging bits of information about corset-wearers, designers and other helpful input. I have appreciated her interest in this project.
3 Cunningham, Bill. “What Once was Under is Now Over.” New York Times, July 31 1988, 44.
4 Although I had correspondence via e-mail with almost thirty individuals, I chose to report only those who answered at least eight of the ten questions I asked. The replies were remarkable in their candor, and in the interest they showed in the study I was attempting. I am genuinely grateful to all who responded.
7 Steele, Valerie Fahnestock. Fashion and Eroticism: Ideals of Feminine Beauty from the Victorian Era to the Jazz Age. New York: Oxford University Press, 1985, p. 61, “he used the term “magical” when referring to the eighteen inch measurement.
8 As my advisor, Costume Historian, Jane Farrell-Beck put it, this is “patently untrue, because couture dates from the 1860s and the corset from 300 years earlier.”

10 Studies done at the University of Texas placed healthy young athletes at complete bed rest; for every week at rest, they required six weeks to recover to their prior strength.


13 Kraus, Jess MD, Personal Communication. January 27, 1998. I asked Dr. Kraus if he measured muscle tone loss or atrophy, he said they did not.

14 Wilkes, Julie. Personal Communication. March 10, 1998. Home Depot representative stated that the company's policy is to have all employees wear the supporters unless they have a doctor's letter forbidding them. She told me that no further studies are being planned at this time.


Some of the definitions in this glossary have been copied from the Webster's New Universal Unabridged Dictionary; some have been quoted from Fairchild's Dictionary of Fashion; and some are compilations from multiple sources.

**allopathy**: that method of medical practice which seeks to cure disease by the production of a condition of the system either different from or opposite to the condition produced by the disease: distinguished from homeopathy

**aorta**: great trunk arterial vessel arising from the heart's left ventricle which carries oxygenated blood to the arterial vessels throughout the body

**atrophy**: decrease in size, or wasting away of a body part or tissue

**blood gas**: the measurement to determine concentration of oxygen and carbon dioxide in arterial blood

**boning**: a narrow strip of stiff material (steel, whalebone, feathers, wood, plastic) used to stiffen a corset or other garment

**busk**: strips of steel with connecting fasteners used to join corset fronts

**cardiac output**: the amount of blood pumped by the heart in a fixed time

**chlorosis**: nineteenth century medical term to describe “greenish hue of skin” of young females with loss of appetite, weight-loss, iron-deficiency anemia, and other symptoms

**corsetiere**: maker of corsets

**costal**: pertaining to the ribs; muscles connecting ribs are ‘intercostals’

**coutil**: a firm herring-bone weave cotton fabric used for foundation garments

**diaphragm**: dome-shaped muscle separating thorax (chest) from abdomen

**disuse atrophy**: changes in skeletal muscle in response to prolonged inactivity

**dyspnea**: shortness of breath [SOB]

**ECG [EKG]**: electrocardiogram tracing of the electric conduction mechanism of the heart

**electrodes**: a device of wire, connector, and gummed patch attached to skin used to conduct EKG data from patient to recording device
exercise treadmill test: A procedure to determine the exercise capacity of a subject walking on a moving belt while being monitored for physiologic responses such as heart rate, respiratory rate, muscle fatigue, and pain.

expiration: exhalation or breathing out air from lungs

eyelet: circular ring of metal pressed through fabric to make a hole for lacing to pass

gore: a tapered (sometimes triangular) piece of cloth

HR: heart rate: the number of impulses of heartbeat per minute

hemodynamic: concerning blood circulation

hiatus hernia: a hernia of the stomach into the opening of the diaphragm through which the esophagus passes (hiatal hernia)

homeopathy: a system of medical practice that treats a disease especially by the administration of minute doses of a remedy that would in healthy persons produce symptoms of the disease treated

hypertension: elevated blood pressure

illium: the posterior section of bone which is part of the pelvis

inspiration: intake of breath into lungs

inspiratory resistance/loading: any condition which causes inspiration volume to be diminished; can be external (binding) or internal (constriction of bronchial tree)

interthoracic: contained within the chest (thoracic) space

intrapleural: contained within the membranous lining space between lungs and ribs

jean: durable cotton fabric of twill weave

lordosis: abnormal curvature of the spine; “sway-back”

molock: a fictitious deity who fed upon the innocent [according to Stella Newton, p. 42]

naturopathy: a system of treatment of disease that avoids drugs and surgery, and emphasizes the use of natural agents (as air, water, sunshine) and physical means (as manipulation and electrical treatment)
**Peak Oxygen Consumption:** the maximum capacity of body’s ability to take in, transport, and utilize oxygen in response to exercise

**pessary:** device used to support the prolapsed uterus inside the body

**post-prandial:** time immediately after meals during which digestion takes place

**prolapsed uterus:** falling down or slipping of the organ from its usual position within the body; degrees range from mild to severe, from slight sagging into the vaginal canal to complete inversion with entire uterus extruded outside the labia from the vaginal canal

**rachidian:** referring to the spinal column, vertebral and muscle components

**RER:** Respiratory Exertion Ratio: Measured carbon dioxide production divided by oxygen consumption. \((\text{VCO}_2/\text{VO}_2)\)

**respiration:** the physical and chemical processes with breathing, by which an organism supplies cells with the oxygen needed for metabolism and relieves them of carbon dioxide formed in energy producing reactions

**restrictive respiration:** any interference of breathing, either intrinsic or extrinsic which causes air-exchange to be diminished

**retroversion:** a tipping or turning backward from normal position (as retroversion of the uterus)

**SOB:** shortness of breath [dyspnea]

**sphygmomanometer:** an instrument for measuring blood pressure

**spirometer:** an instrument for measuring the air entering and leaving the lungs

**spirometry:** a test which measures lung capacity or volume of air exchange

**splanchnoptosis:** (splanknoptosis): a Victorian term for a condition of partial or total collapse of the abdominal wall, caused by muscle weakness and allowing the intestines to fall forward; essentially a complete herniation of the abdominal contents (viscera)

**stays:** steel, whalebone, wood , or rigid plastic strips used to maintain shape in corsets; a nineteenth century term for corsets

**tidal volume:** the amount of air exchanged in one respiration, measured by spirometry.
tight-lacing: The diminution of the waist from its natural contour and measurement by means of a rigid or semi-rigid partitioned garment which is constricted by pulling laces. Laces could be positioned at one or more places, but are predominantly center front or center back.

umbilicus: the navel or ‘belly-button’ which is situated at the abdomen’s midpoint.

uterus: female organ of reproduction; womb

“vapors”: an archaic term meaning: a) exhalations of bodily organs (as the stomach) held to affect the physical or mental condition; b) a depressed or hysterical nervous condition.

varicosities: venous blood vessels which are damaged by pressure or constant constriction which weakens the vessel wall structure, causing a ballooning of the vessel and subsequent decrease in normal circulation; such veins are prime locations for clot formation.

vena cava: any of the large veins by which blood is returned to the right atrium of the heart.
APPENDIX A

LIST OF PATENTS WITH 'CORSET IMPROVEMENTS'
The following represents a sample of patents from 1863 until 1900 which had in their applications some claim to improve corsets from a health aspect. The patentees are male and female, some are medical doctors, others are seamstresses, inventors and business entrepreneurs. Not all corsets which claimed to aid health were patented and no claim had to show proof or efficacy. The single criterion for receiving a patent was originality. A comparison of patent claims with their respective advertising copy can be interesting.

<table>
<thead>
<tr>
<th>Date</th>
<th>Number</th>
<th>Patentee</th>
<th>Description on Patent Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1863</td>
<td>39910</td>
<td>L. H. Foy</td>
<td>“Skirt Supporter”</td>
</tr>
<tr>
<td>1863</td>
<td>39911</td>
<td>L. H. Foy</td>
<td>“Corset Skirt Supporter”</td>
</tr>
<tr>
<td>1866</td>
<td>56210</td>
<td>C. A. Griswold</td>
<td>“...greatly to the support and comfort of the person: also to support the clothes or skirts which usually are supported by the hips.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“...straps expand with each respiration, allowing perfect breathing, and on sudden exertion do not confine the heart and lungs. The muscles of the back are allowed free action and perfect development. By thus relieving the entire body of abnormal pressure healthy circulation is promoted, digestion not impeded and cold feet, backache, hysteria, palpitation of the heart, &amp;c, if not cured, are at least not induced.”</td>
</tr>
<tr>
<td>1875</td>
<td>163433</td>
<td>J. A. Ames</td>
<td>“Improvement in Corsets.”</td>
</tr>
<tr>
<td>1876</td>
<td>172, 214</td>
<td>L. C. Warner</td>
<td>“…for imparting a better carriage to the upper part of the body, and prevent by strengthening the back and bracing the shoulders, the inclination to stoop over and contract the chest.”</td>
</tr>
<tr>
<td>1876</td>
<td>181,330</td>
<td>C. A. Griswold</td>
<td>“sufficiently rigid to support the figure.”</td>
</tr>
<tr>
<td>1877</td>
<td>197,913</td>
<td>I. DeV. Warner</td>
<td>“Corset skirt supporter.”</td>
</tr>
<tr>
<td>1878</td>
<td>205,479</td>
<td>J. H. Foy</td>
<td>“...no inconvenient pressure can be caused.”</td>
</tr>
<tr>
<td>1878</td>
<td>212,411</td>
<td>W. Thomas</td>
<td>“...the corset is adjustable to support the womb, and to press the ovaries against it and keep it in place, and to press upward...”</td>
</tr>
<tr>
<td>1879</td>
<td>220,806</td>
<td>J. C. Cook</td>
<td>“...accurately fit under all changes of wearer’s position, without chafing or annoying...”</td>
</tr>
<tr>
<td>1879</td>
<td>222,082</td>
<td>G. Schilling</td>
<td>“...flexible, convenient to the wearer...”</td>
</tr>
<tr>
<td>1879</td>
<td></td>
<td>S. Florsheim</td>
<td>“…so as not to draw or press upon the bosom, thereby misshaping or deforming...”</td>
</tr>
<tr>
<td>1880</td>
<td>227,211</td>
<td>J. Bowers</td>
<td>“...improved spinal and shoulder brace corset...”</td>
</tr>
<tr>
<td>1882</td>
<td>266,008</td>
<td>J. D. Banfield</td>
<td>“...affords a direct support of the abdomen.”</td>
</tr>
<tr>
<td>1883</td>
<td>281,659</td>
<td>C. M. Barry</td>
<td>“S-shaped corset...”</td>
</tr>
<tr>
<td>1883</td>
<td>283,734</td>
<td>C. A. Worden</td>
<td>“...use of plaited material instead of metal bones.”</td>
</tr>
<tr>
<td>1885</td>
<td>322,251</td>
<td>S. Bryant</td>
<td>“My invention relates to health corsets...”</td>
</tr>
<tr>
<td>1885</td>
<td>327,781</td>
<td>S. B. Ferris</td>
<td>“…a corset which may be worn next to the person without the slightest inconvenience and with perfect comfort at all times...”</td>
</tr>
<tr>
<td>1886</td>
<td>334,359</td>
<td>K. Dunham</td>
<td>“…for the purpose of admitting a free circulation of air to the body...”</td>
</tr>
<tr>
<td>1886</td>
<td>341,869</td>
<td>B. Baldwin</td>
<td>“...for the purpose of admitting a free circulation of air to the body...”</td>
</tr>
<tr>
<td>1886</td>
<td>346,339</td>
<td>G. A. Ackerman</td>
<td>“...for the purpose of admitting a free circulation of air to the body...”</td>
</tr>
</tbody>
</table>
1886 336,768  A. H. Traver  "...leaves the lungs and adjacent parts free for the necessary movements of respiration."
1888 390,771  M. L. Geffs  "...serves as a shoulder-brace, abdominal supporter, and skirt-holder..."
1888 392,195  C. A. Griswold  "...gives entire freedom of movement..."
1889 397,801  C. W. Higby  "...do not interfere with the comfort of the wearer, nor do they impair the wearer's health."
1889 405,037  L. I. James  "...for invalid's use..."
1889 412,494  T. S. Gilbert  "...capable of being worn with a maximum degree of comfort."
1890 432,895  H. Philip  "...my hygienic corset."
1890 436,131  J. H. Odenbrett  "...to firmly support or hold the parts of the trunk of the body..."
1892 477,976  A. L. Weeks  "...useful where carefully regulated pressure is needed for the abdomen."
1892 481,294  W. P. Bigelow  "...advantages not only as to health, but also as an artistic form."
1895 537,523  I. W. Birdseye  "...durability as well as flexibility..."
1896 564,020  M. F. Linquist  "...designed to be used as a bicycle corset..."
1899 621,060  H. I. Gould  "abdominal supporter.
1900 644,930  M. W. Lawrence  "...to confine and properly shape certain portions of the human body as are defective or lacking in the natural qualities requisite to produce a standard or anatomical figure."
1900 646,180  C. Julien-Binard  "...thoroughly hygienic and will afford a support of the body, while permitting perfect freedom of movement and avoiding any injurious pressure."
1900 653,455  A. H. Morford  "...straight front corset."
1900 644,744  G. Marple  "...to hold the body in its natural form."
1900 656,913  A. H. Wade  "...permit freedom of motion without unduly compressing or confining the body."
1900 657,237  C. Guillot  "From a medical point of view this bodice possesses the advantage of supporting the abdomen and the intestinal organs..."
1900 659,013  M. L. Barclay  "...gives perfect freedom of movement."
1900 662,999  R. L. Young  "...to support and improve the outline of the figure by compressing the abdomen."
APPENDIX B

RESEARCH INSTRUMENTS
Last name of principal investigator: Gau

Consent Form for Corset Study

The study in which you are volunteering participation is part of the Textiles and Clothing 699 dissertation project of Colleen Gau. Persons who are pregnant or have any history of phlebitis or compromised venous return are excluded. There is a potential for symptoms like shortness of breath and light-headedness which should be reported immediately.

a) Purpose of the Study
The purpose of the study is to determine the lung capacity and the pressure on torsos of females when wearing a tight-laced corset [three inches less than normal waist measurement]. Volunteers will be asked to complete a series of spirometer [lung capacity] tests with and without corsets. Subjects will wear corsets with pressure transducers under their corsets on a different series of days. [A pressure transducer is a small electronic sensor attached to a thin wire which will be coiled under the clothing; the skin will not be pierced or irritated.]

b) Use of Identifier Codes
Each participant will be identified using a confidential wearer number code. The name and code identification will be kept separately from the data and this information will be destroyed after the study is presented (not later than December 31, 1998).

c) Estimate of Time Involved
Each participant will be asked to wear a corset on a series of days during their regular employment at the Living History Farms. The testing and measurements will be done in private by a Registered Nurse [the principal researcher]. Each test period will last approximately 5 minutes and will be repeated at two or three intervals during the day.

d) Location of Research Activity
This study will be done at the site of the Living History Farms, Urbandale, Iowa.

e) Confidentiality will be Ensured
All participants will be ensured privacy through the use of a number code which will be the method of reporting the data. The identification of number code and name of participant will be kept separately from the data and will be destroyed immediately after the data is presented (not later than December 31, 1998).

f) Follow-up Study
No follow-up study is planned at this time.

g) Statement of Participation
I, the undersigned, understand that my participation in this study is entirely voluntary. I have read the consent form and agree to take part in this study.

Signature_________________________________________ Date____________________
#8. Explanation of Informed Consent

1. This experiment will measure physiologic responses of female volunteers who wear corsets in the course of their work as historical interpreters. Each volunteer will be tested in two ways: 1) pressure of the corset will be monitored using electronic transducers under the corsets; 2) lung volume tests, using a Spirometer. The first purpose of the experiment is to discover the pressure exerted by the tight-laced corset on the torso. Transducers will be positioned against the skin using paper tape; no insertion into the dermal layers is necessary. The second purpose of the experiment is to examine the differences (if any) in exercise tolerance, lung volume and respiratory function during the course of the work day. Each volunteer will be measured on at least two different days, but not more than three different days. A baseline Spirometry test will be done without corset for each subject. A series of Spirometry tests will be done as the volunteer wears an 1865-style corset during the work day. The corsets will be tight-laced to 3 inches less than the volunteer's natural waist measurement.

2. The foreseeable discomforts will be the moderate discomfort of having a corset laced three inches less than the natural waist measurement, the possibility of shortness of breath and decreased ability to exercise. These are the expected results and all volunteers will understand this. The test will be discontinued without prejudice if the volunteer wishes, or if the physiologic indicators warrant.

3. Possible benefits from this study have to do with the future recommendations to reenactors and other costumed personnel wearing corsets. The results may show a range of safety for the tight-lacing of the garments and the ability to exercise while wearing them. It may show that tight-lacing of corsets can be dangerous if exercise is attempted.

4. No alternative procedures are suggested at this time.

5. It is the intent of the experimenter to answer any questions which may arise during the course of the experimental procedures. In the event that the volunteer wishes documentation or written answers, it shall be provided.

6. If at any time, the volunteer subject wishes to discontinue the test, it shall be done immediately. No prejudice will result from a discontinuance.

7. Confidentiality of data will be maintained in the following ways: Volunteers will be assigned a code to be used on all written documentation and forms. The original of this will not be copied and will be kept separately from all other documentation; only the primary investigator will know the identities of the individual volunteers. All identifiers will be destroyed no later than December 31, 1998.

8. The testing time required of each subject will be not less than two fifteen minute sessions of one working day and not more than two sessions of two working days. Corset production will require individuals to be measured and fitted prior to the on-site testing; this will take not less than one hour and not more than two hours.
Consent Form for Corset Study Photography

The study in which you are volunteering participation is part of the Textiles and Clothing 699 dissertation project of Colleen Gau.

a) Purpose of Photography of the Subjects
The purpose of the photographs will be to accurately document the procedures and equipment used in the different phases of this study.

b) Use of Identifier Codes
Each participant will be identified using a confidential wearer number code. The name and code identification will be kept separately from the data and this information will be destroyed after the study is presented (not later than December 31, 1998).

c) Estimate of Time Involved
Each participant will be asked to wear a corset on a day during their regular employment at the Living History Farms. The testing and measurements will be done in private by a Registered Nurse [the principal researcher]. Each test period will last approximately 15 minutes and will be repeated at two intervals during the day. Additional testing in the physiology laboratory will last 10-20 minutes.

d) Location of Research Activity
This study will be done at Living History Farms, Urbandale, Iowa and St. Mary’s Hospital, Rochester, Minnesota.

e) Confidentiality will be Ensured
First names only will identify participants if they are fully dressed; photographs depicting procedures will not depict participant’s facial features.

f) Follow-up Study
No follow-up study is planned at this time.

g) Statement of Participation
I, the undersigned, understand that my participation in this study is entirely voluntary. I have read the consent form and agree to take part in this study.

Signature ________________________________________ Date ____________________
PHYSICIAN’S AWARENESS FORM

A patient of yours, ________________________________, has expressed an interest in taking part in a research project that will entail wearing a corset tight-laced three inches less than her natural waist measurement while she performs her regular duties as an historical interpreter at Living History Farms, in Urbandale, Iowa. As you may be aware, the above individual wears a costume which depicts clothing of the historic period between 1850 and 1900. The purpose of this form is to make you aware that the above individual wishes to participate in this study and gain your input as to the suitability of this patient for this study.

This study will measure the tidal volume using a spirometer at four times during the day. Two measurements will be taken when the corset is in place and tight-laced three inches less than the patient’s natural waist measurement. The purpose of this study is to determine if lung capacity changes with this degree of tight-lacing. A second phase of this research will take place in a laboratory setting; the individual will again wear the corset tight-laced to three inches less than her natural waist measurement for a short period (less than fifteen minutes) while three balloons are placed under the corset to determine degrees of pressure exerted by the corset against the torso. A description of these procedures is attached. Please note that this study has been approved by the Human Subjects Committee of Iowa State University.

In order to allow this patient to participate in this study, please be kind enough to answer the following questions.

1. Does this individual have any physical limitations/conditions which you feel warrants the complete exclusion of exercise for your patient (yes/no)? ________________

2. Does the individual have any physical limitations/conditions which you feel warrants limiting or modifying their participation (yes/no)? ________________ If so, please explain.

3. Additional comments ____________________________________________________________________________

If you have any additional questions or concerns pertaining to this form and/or your patient’s participation in this study, please feel free to contact me at 515-296-0456. Thank you for your assistance.

Please mail the completed form to:  Colleen Gau, RN
246 N. Hyland, #104
Ames, IA 50014
### Living History Farms Volunteer Corset Study

**Volunteer:** ___________  **Code #:** _______  **Date:** ________________

**A.M. Temp:** ______  **Humidity:** _____  **BARO Pressure:** ______  **P.M. Temp:** ______

Please circle the number which best describes your level of comfort every 30 minutes during your day. Comments and descriptions are welcome.

<table>
<thead>
<tr>
<th>Time</th>
<th>Very Uncomfortable</th>
<th>Neutral</th>
<th>Very Comfortable</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>9:30</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>10:00</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>10:30</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>11:00</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>11:30</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>12:00</td>
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<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>12:30</td>
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<td>-4</td>
<td>-3</td>
</tr>
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<td>-3</td>
</tr>
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<td>-4</td>
<td>-3</td>
</tr>
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<td>-5</td>
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<td>-3</td>
</tr>
<tr>
<td>2:30</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>3:00</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>3:30</td>
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<td>-4</td>
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</tr>
<tr>
<td>4:00</td>
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<td>-4</td>
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</tr>
<tr>
<td>4:30</td>
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<td>-4</td>
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<tr>
<td>5:00</td>
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<td>-3</td>
</tr>
<tr>
<td>5:30</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
<tr>
<td>6:00</td>
<td>-5</td>
<td>-4</td>
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</tr>
<tr>
<td>8:30</td>
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<td>-4</td>
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</tr>
<tr>
<td>9:00</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
</tr>
</tbody>
</table>

**COMMENTS:** ________________________________________________________________
Last name of principal investigator: Gau

Spirometry Measurements  
Living History Farms Volunteers  
Corset Study

Volunteer: ____________  Code #: ____  Date: ________________

A.M. Temp: _____  Humidity: _____  BARO Pressure: ________

Time: _____ BP (AM) _______ Ht______ Wt______ Waist___/___

Before Corset:  1. _________  Corset On:  1. _________
                 [Laces Marked ___]
                 2. _________
                 3. _________

Time: __________  BP(PM) __________

P.M. Temp: _____  Humidity: ________ BARO Pressure: ________

Corset On:  1. _________  Corset Off:  1. _________
            2. _________
            3. _________

Total Time Corset worn: __________  Laces mark change? _________

Comments: __________________________________________________
          _________________________________________________________
          _________________________________________________________

Tasks Performed: ______________________________________________
                  ____________________________________________________
PRESSURE TEST RESULTS

Wearer Number Code: ____________

Date: ____________

Height: ________ cm
Weight: ________ Kg
Clothing Wt: ________ Kg

Natural Waist Measurement: ________
Corseted Waist: ________

These readings will be entered directly into the laptop computer which will be connected to the transducer wires which are being worn by the volunteer corset wearers. Each data set will be coded only with the date, time, and wearer code. The data will be printed in raw form and in computer analyzed form using a program developed by the bio-mechanical division of Mayo Clinic. The program and computer will be loaned for my use in this project because the aforementioned group are interested in pressure beneath body casts and the corsets may produce a similar physiologic torso pressure pattern. I will be sharing the pressure readings with them (without any wearer code information); I will also be sharing this pressure information with Dr. Carolina Cruz-Neira at Iowa State who will be attempting to program for a "Virtual Corset" which may ultimately be used with Visible Woman to determine soft tissue migration resulting from pressure.
APPENDIX C

ESTIMATED UNITED STATES POPULATION 1850-1920
<table>
<thead>
<tr>
<th>Year</th>
<th>Total Population</th>
<th>Rural</th>
<th>%</th>
<th>Urban</th>
<th>%</th>
<th>Foreign Born</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>23,086,000</td>
<td>19,648,000</td>
<td>85.1</td>
<td>3,544,000</td>
<td>14.9</td>
<td>2,241,000</td>
<td>9.7</td>
</tr>
<tr>
<td>1860</td>
<td>31,513,000</td>
<td>25,227,000</td>
<td>80.0</td>
<td>6,217,000</td>
<td>20.0</td>
<td>4,097,000</td>
<td>13.0</td>
</tr>
<tr>
<td>1870</td>
<td>39,905,000</td>
<td>28,656,000</td>
<td>71.8</td>
<td>9,902,000</td>
<td>28.2</td>
<td>5,494,000</td>
<td>13.8</td>
</tr>
<tr>
<td>1880</td>
<td>50,262,000</td>
<td>36,026,000</td>
<td>71.7</td>
<td>4,130,000</td>
<td>28.3</td>
<td>6,560,000</td>
<td>13.1</td>
</tr>
<tr>
<td>1890</td>
<td>63,056,000</td>
<td>40,841,000</td>
<td>64.8</td>
<td>22,106,000</td>
<td>35.2</td>
<td>9,122,000</td>
<td>14.5</td>
</tr>
<tr>
<td>1900</td>
<td>76,094,000</td>
<td>45,835,000</td>
<td>60.2</td>
<td>30,160,000</td>
<td>39.8</td>
<td>10,214,000</td>
<td>13.4</td>
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<tr>
<td>1910</td>
<td>92,407,000</td>
<td>49,973,000</td>
<td>54.1</td>
<td>41,999,000</td>
<td>45.9</td>
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<tr>
<td>1920</td>
<td>106,466,000</td>
<td>51,552,000</td>
<td>48.4</td>
<td>54,158,000</td>
<td>51.6</td>
<td>13,713,000</td>
<td>12.8</td>
</tr>
</tbody>
</table>


This information has been included to assist the reader in understanding the population growth of the United States, primarily resulting from immigration in the nineteenth century. It also helps the reader to understand the limited effect small publications like medical journals would have on the total population.
APPENDIX D

SELECTED CORSET ADVERTISEMENTS
Figure 82. Two ‘dress reform’ corset designs.
(Right: Unknown source. Left: Shep. p. 23)

Figure 83. Advertisement which cast doubt on the serious side of dress reform.
(Shep. p. 12)
Figure 84. Enticements of “health” and fashion.
(Shep, p. 64)

Figure 85. The lure of “French fashion” was frequently employed.
(Shep, p. 14)

Figure 86. This corset was lightly boned; flexibility was the by-word.
(Shep, p. 71)

Figure 87. Advertisement for “American Gentleman” corset, c. 1890.
(Author’s collection)
Over 14 Million Sold in this Country alone.
The Best Fitting and Best Wearing Corset Ever Made, SOLD EVERYWHERE.

Figure 88. The typical hourglass shape popular from 1850 through 1890. The busk may be a ‘spoonbill’ to push the abdomen in. (Shep, p. 55)

Figure 89. The straight-front silhouette. The pelvis was pushed down in front, causing lordosis and spinal instability, with consequent balance difficulty. (Crewe, p. 102)

Figure 90. Illustration of “Men’s Health Belt Corset” from 1908. (Shep, p. 153.)
Figure 91. 1950s advertisement with wasp-waist silhouettes. (Kunzle, p. 200)

Figure 92. Compare this 1950s silhouette to Figure 88 of 1850s silhouette. (Kunzle, p. 200)
APPENDIX E

QUESTIONS ASKED OF PRESENT-DAY CORSETERS
These questions were sent via e-mail to several contacts who volunteered through a mutual acquaintance to answer. I have not met any of them, and can only report their answers as received electronically.

1. What prompted you to wear a corset?
2. What style(s) of corset do you wear?
3. How or where did you get your corset?
4. How long (months, years) have you worn a corset?
5. How often do you wear your corset, and for what period (please be specific)?
6. Do you tight-lace less than your natural waist measurement? If so, how much?
7. Did you break yourself in gradually (to tight-lacing)?
8. Does your doctor know that you wear a corset? If yes, does the doctor comment? If no, is there any reason why this has not been mentioned?
9. Do you exercise to maintain muscle tone in your torso? If yes, would you please describe your exercise routine: frequency, time allotted, type? If no, why not?
10. Have you had any health-related problems associated with wearing the corset?
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