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ORTHOPEDIC BACK SUPPORT CORSET

Abstract

Orthopedic corsets with bonings in a back-support panel are described. One orthopedic corset includes a first panel, a second panel, and a fastener to fasten the first panel and the second panel at a front side of the orthopedic corset. The orthopedic corset also includes a third panel, a fourth panel, a lacing system, and a back-support panel. The lacing system is located at the back side of the orthopedic corset and adjusts a tightness of the orthopedic corset. The back-support panel is coupled between the third panel and the fourth panel, and is located behind the lacing system. The back-support panel includes one or more bonings.

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Background/Summary

BACKGROUND

[0001] A corset is a garment meticulously crafted to snugly encase the torso, sculpting it into an

aesthetically pleasing shape, often accentuating a cinched waist and enhanced hips and bust. This form-fitting piece is distinguished by its structured architecture, fortified with boning, and tightened with lacing, enabling it to dramatically transform the wearer's silhouette. Historically, corsets were central to fashion, serving primarily to mold the body into the prevailing idealized contours of each era. These garments have traversed an evolutionary journey through fashion history, continuously adapting in style to mirror the shifting trends and societal values of different periods.

[0002] In contemporary times, the corset's role extends beyond mere fashion; it is embraced for historical reenactments, body modification, theatrical costuming, and as a statement piece in modern wardrobes. The enduring allure of corsets is a testament to their versatility and the shifting perceptions of beauty and femininity. Their design and popularity have oscillated, mirroring the ever-evolving landscape of fashion and societal attitudes towards the female form.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] The present disclosure is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings.

[0004] FIG. **1**A is a front view of an orthopedic corset worn by a person according to at least one embodiment.

[0005] FIG. **1**B is a back view of the orthopedic corset of FIG. **1**A worn by the person according to at least one embodiment.

[0006] FIG. **2**A illustrates a front section of an orthopedic corset according to at least one embodiment.

[0007] FIG. **2**B illustrates a back section of the orthopedic corset of FIG. **2**A according to at least one embodiment.

[0008] FIG. **2**C illustrates a right-side section of the orthopedic corset of FIG. **2**A according to at least one embodiment.

[0009] FIG. **2**D illustrates a left-side section of the orthopedic corset of FIG. **2**A according to at least one embodiment.

[0010] FIG. **2**E illustrates a flexible panel according to at least one embodiment.

[0011] FIG. **3**A illustrates a boning according to at least one embodiment.

[0012] FIG. **3**B illustrates a casing in which the boning of FIG. **3**A is disposed according to at least one embodiment.

[0013] FIG. **3**C is a cross-sectional view of bonings located in a back-support panel of the back section of FIG. **2**A according to at least one embodiment.

[0014] FIG. **3**D is a cross-sectional view of additional bonings located in additional panels of the back section of FIG. **2**A according to at least one embodiment.

[0015] FIG. **3**E is a cross-sectional view of the right-side section coupling the front section and the back section of the orthopedic corset of FIG. **2**A according to at least one embodiment.

[0016] FIG. **3**F is a cross-sectional view of the left-side section coupling the front section and the back section of the orthopedic corset of FIG. **2**A according to at least one embodiment.

[0017] FIG. **3**G a cross-sectional view of the back-support panel of the back section of FIG. **2**A according to at least one embodiment.

[0018] FIG. **4**A is a cross-sectional view of a front section of an orthopedic corset with six panels and six bonings according to at least one embodiment.

[0019] FIG. **4**B illustrates a front view of the front section of the orthopedic corset of FIG. **4**A according to at least one embodiment.

[0020] FIG. **4**C illustrates a rear view of the front section of the orthopedic corset of FIG. **4**A

according to at least one embodiment.
[0021] FIG. **5**A-FIG. **5**B illustrate an orthopedic corset **500** with a lacing system **502** for adjusting a tightness of the orthopedic corset **500** from a front side of the orthopedic corset **500** according to at least one embodiment.
[0022] FIG. **6**A illustrates an aspect of the subject matter in accordance with one embodiment.
[0023] FIG. **6**B illustrates an aspect of the subject matter in accordance with one embodiment.
[0024] FIG. **7** illustrates a method of manufacturing an orthopedic corset according to at least one embodiment.

DETAILED DESCRIPTION

[0025] Orthopedic corsets with bonings in a back-support panel are described. Originally crafted to sculpt a fashionable silhouette, corsets have found utility beyond mere aesthetics, venturing into the realm of generic spine and torso support. Notably, they facilitate an upright posture; the interplay of rigid boning and snug lacing combats the tendency to slouch, thereby encouraging a straighter spine and a more dignified posture. Constructed from durable yet pliable materials such as cotton, satin, or leather, corsets are reinforced with boning-historically, made from whalebone but now commonly crafted from steel or plastic. This boning is the cornerstone of the corset's structure and its ability to shape the body. Corsets are engineered as a single, cohesive garment, assembled from multiple fabric panels meticulously stitched together. They envelop the wearer's torso, extending from the bust to the hips, and are secured with lacing at the back for customizable tightness. Many designs incorporate a busk, a front closure featuring two steel pieces that interlock, adding support and simplifying the process of donning and doffing the corset.
[0026] While corsets contribute to a more erect posture, it is important to note that they are not specifically tailored for orthopedic back support. Their primary design focus remains on body contouring and fashion, with health-related benefits being secondary considerations.
[0027] A corset is intricately composed of several fundamental components, such as panels, boning, a busk, lacing, eyelets or grommets, waist tape, binding, and, optionally, a modesty panel. While modern corsets might deviate in construction and materials, these elements remain hallmarks of traditional corsetry.
[0028] At the heart of the corset are the panels, individual fabric pieces meticulously sewn together to sculpt the corset's form. Providing its core structure and contouring ability is the boning, historically crafted from whalebone but now predominantly fashioned from steel or plastic in contemporary designs. The busk, a pivotal hardware element positioned at the corset's front, comprises two elongated steel pieces-one adorned with loops and the other with corresponding posts. This duo interlocks to securely fasten the corset's front.
[0029] The back of the corset features lacing-typically a robust cord or ribbon-threaded through strategically placed eyelets or grommets. This design not only reinforces the lacing holes but also allows for precise fit adjustments. Ensuring even tension distribution and maintaining the corset's silhouette, the waist tape is a sturdy fabric strip sewn internally around the waist. To refine and protect, the binding, often made from bias tape, elegantly covers the panel edges.
[0030] An optional yet functional element is the modesty panel, nestled beneath the lacing at the back. It serves dual purposes: protecting the skin from direct contact with the lacing and concealing any exposed skin.
[0031] It is crucial to note, however, that despite the corset's capability to offer general back support, its structure-particularly the lacing system and the optional modesty panel—is not engineered to provide orthopedic back support. The assemblage of these components achieves the corset's iconic shape and support but does not cater to specialized orthopedic needs.
[0032] An orthopedic back strap, also referred to as a back brace or lumbar support brace, serves as a vital medical device designed to reinforce the back, with a specific emphasis on the lumbar region. This brace is integral in managing back pain, enhancing stability, and correcting posture in individuals suffering from various back ailments, including herniated discs, sciatica, scoliosis, and

general lower back pain. The brace's support is key to alleviating discomfort and aiding in the recovery process post-injury or surgery. It also plays a preventive role in activities that pose a risk to the back, such as heavy lifting or strenuous physical labor.

[0033] Constructed from a spectrum of materials ranging from flexible to rigid, these braces often incorporate adjustable straps and Velcro closures to ensure a personalized and secure fit. Advanced designs might also feature lumbar pads, shoulder straps, or reinforcements made of metal or plastic for augmented support. This diversity in design enables the availability of various braces, from straightforward elastic belts to more sophisticated structures that cater to specific medical requirements.

[0034] Despite their functional importance, orthopedic back straps often face challenges regarding aesthetics. Generally, these braces lack attention to fashion, being made from non-garment materials and typically presented in stark, generic colors like black or white. This design approach leads to a distinctly medical appearance, which may not be visually appealing or discreet under clothing. The practical yet conspicuous appearance of these straps, marked by their Velcro closures and belt-like structure, provides little in terms of style or concealment, potentially drawing unwanted attention to the wearer. This lack of cosmetic consideration can be a drawback for individuals who are conscious about the visual impact of wearing such a medical device in public or social settings.

[0035] Aspects and embodiments of the present disclosure overcome the deficiencies described above and others by providing an orthopedic corset (also referred to as an “orthopedic back support corset”) with structural features to provide orthopedic back support to a person wearing it. One orthopedic corset includes a first panel, a second panel, and a fastener to fasten the first panel and the second panel at a front side of the orthopedic corset. The orthopedic corset also includes a third panel, a fourth panel, a lacing system, and a back-support panel. The lacing system is located at the back side of the orthopedic corset and adjusts a tightness of the orthopedic corset. The back-support panel is coupled between the third panel and the fourth panel, and is located behind the lacing system. The back-support panel includes one or more bonings (also referred to herein as boning members). The boning can be a steel boning that flexes in only two directions. The boning can be a spiral steel boning that flexes in two or more directions. The boning can be a plastic boning.

[0036] The boning can be used to provide structure and shape to the orthopedic corset, as well as provide orthopedic support to the spine and torso of the wearer. In particular, the boning members of the back-support panel, and their relative placement at the back of the orthopedic corset provide the orthopedic support to the wearer in a similar manner as orthopedic back straps, but as an aesthetically appealing garment. The boning members can be made of rigid or semirigid materials, such as steel, plastic, metal, animal bone material, or the like. In at least one embodiment, the boning is an elongated boning of metal or plastic that is sewn in a casing that is secured to outer fabric of a panel, such as the back-support panel **104**. A casing in sewing is a tunnel or enclosed space created in the fabric, often used for inserting elastic, drawstrings, or other elements. In this case, the boning member can be inserted into the casing. In some cases, interface fabric can be bonded to a casing. This refers to the process of attaching interfacing to a specific part of a garment or fabric item to provide additional structure and support. In some cases, the back-support panel **104** can have material that is more flexible than the material of the two adjoining panels, so the elongated boning is sewn into a casing that is secured (e.g., sewn) to the flexible material of the back-support panel **104**. In other cases, the boning can be sewn into casings that are secured to the outer fabric of the panel. The outer fabric can also be referred to as shell fabric or facing for the exterior fabric.

[0037] In other cases, the boning can be disposed between the outer fabric and a liner of a panel. In some embodiments, a first thermoplastic material is disposed on a first end of the elongated boning, and a second thermoplastic material is disposed on a second end of the elongated boning. The thermoplastic material can be used to prevent rough or sharp edges of the elongated boning from

snagging or tearing the fabric of the casing and/or panel. In other embodiments, other types of bonded interfacing materials or coatings can be applied to the elongated boning before being disposed in fabric of the orthopedic corset **100**. The bonings are described in more detail below with respect to FIG. **3**A to FIG. **4**A. The bonings of the back-support panel **104** provide orthopedic support to the spine and torso of the wearer.

[0038] Another orthopedic corset includes a back-support panel located at the back of the orthopedic corset. The back-support panel spans across a gap between two segments (e.g., panels) of the orthopedic corset that accommodate the lacing. At the back of the orthopedic corset, the lacing, which is usually a strong cord or ribbon, is threaded through eyelets or grommets on these two segments. The lacing, when strung throw the eyelets or grommets, allows the orthopedic corset to be tightened and adjusted for fit. The eyelets or grommets are metal or plastic rings that are inserted into holes in these two segments of fabric at the back of the orthopedic corset. The lacing allows the two segments of the orthopedic corset to be closed together and tightened or loosened to adjust for fit. The back-support panel is located behind the lacing and two segments. That is, the back-support panel is located closer to the wearer's back than the two segments and lacing. The back-support panel includes one or more bonings as described herein.

[0039] FIG. **1**A is a front view of an orthopedic corset **100** worn by a person **102** according to at least one embodiment. FIG. **1**B is a back view of the orthopedic corset **100** of FIG. **1**A worn by the person **102** according to at least one embodiment. The orthopedic corset **100** has a back section with multiple panels, a front section with multiple panels, and two side sections with panels. The back section of the orthopedic corset **100** includes at least the back-support panel **104** located behind a lacing system. The lacing system can be coupled to adjacent panels of the back section. In general, such as illustrated in FIG. **1**A and FIG. **1**B, the back section has two segments, such as two separate panels, adjusted by the lacing system, and the front section has two segments, such as two separate panels that are joined using a fastener. The fastener is a mechanical device that is used to join two edges of fabric of these two segments together. In at least one embodiment, the fastener is a zipper. In some embodiments, the fastener is a busk or a busk closure. The busk is a piece of hardware at the front of the corset. It includes two long pieces of metal (e.g., steel), one with loops and the other with posts, which fasten together to close the front of the orthopedic corset. The busk can also provide additional support and can add to the ease of putting on and taking off the garment. Alternatively, other fasteners can be used to join the two segments at the front section of the orthopedic corset **100**.

[0040] The lacing system can include reinforcement rings, such as eyelets, grommets, or lace hooks, and lacing (one or two laces). As illustrated in FIG. **1**A and FIG. **1**B, the lacing can be long enough to be threaded through eyelets or grommets in the back section, and be reachable by a wearer to bring the lacing to the front section. The wearer can pull the lacing at the front section to the desired tightness and tie the lacing in a bow or other knot against the front section of the orthopedic corset **100**, as illustrated in FIG. **1**A. In other embodiments, instead of a lacing system, the two segments of the back section can be joined using a fastener, such as a zipper. Although the fastener can be used for ease of putting on and taking off the orthopedic corset **100**, a fastener at the back section can be hard for a wearer to fasten by themselves. Furthermore, depending on the type of fastener used at the back section, the capability to adjust the tightness of the orthopedic corset may be lost or reduced, as compared to a lacing system. Alternatively, other fasteners can be used to join the two segments at the back section of the orthopedic corset.

[0041] As described in more detail below, the back-support panel **104** can include multiple bonings. The bonings can be animal bone material, metal, plastic, or the like. For example, the back section can have the back-support panel **104** underneath a first lacing panel and a second lacing panel, each of which is coupled to adjacent panels in the back section, as illustrated in FIG. **1**B. The back-support panel **104** can have straight panel with bonings to provide support at a central area of the backside of the orthopedic corset **100**, whereas the adjacent panels can have curved shapes with or

without boning members to contour the shape of the orthopedic corset **100** in areas of the corset that are closer to the hips than the spine of the wearer.
[0042] The number of panels used in the orthopedic corset **100** can vary. For example, the orthopedic corset **100** can have eleven different panels and the two lacing panels. The back section can include five panels, including the back-support panel **104**, and the front section can include four panels. The two side sections can each include a flexible panel that joins the back section and the front section. In other embodiments, the side sections can be panels like the panels of the front and back sections described above. The side sections may also have bonings to provide additional support on the sides of the wearer's torso. The orthopedic corset **100** can have more or less panels than eleven. In addition to the bonings in the back-support panel **104**, the orthopedic corset **100** can have additional bonings in other panels of the orthopedic corset **100**. The different panels of the orthopedic corset **100** are described in more detail below with respect to FIG. **2**A to FIG. **2**E.
[0043] FIG. **2**A-FIG. **2**D illustrates different views of an orthopedic corset **200** according to at least one embodiment. The orthopedic corset **200** can be similar to the orthopedic corset **100** as described above, except as otherwise noted in the description.
[0044] FIG. **2**A illustrates a front section **202** of an orthopedic corset **200** according to at least one embodiment. The front section **202** includes a first right panel **204**, a first left panel **206**, a second right panel **208**, a second left panel **210**, a zipper **216**, and a zipper shield **218**. The first right panel **204** and the second right panel **208** are coupled together, for example, by sewing edges of the panels together at a seam. Similarly, the first left panel **206** and the second right panel **208** are coupled together, for example, by sewing edges of the panels together at a seam. A tape of the zipper **216** can be sewn into a right edge of the first right panel **204** and a right edge of the first left panel **206** to permit the zipper **216** to fasten the first right panel **204** and the first left panel **206** at a front side of the orthopedic corset **200**. The first right panel **204** and first left panel **206** can be joined by closing the zipper **216**. Alternatively, other fasteners can be used to join first right panel **204** and first left panel **206** at the front section **202**. For example, the orthopedic corset **200** can include a busk or a busk closure on the front section **202**. The zipper shield **218** (also referred to as “fly shield” or “zipper flap”) can be coupled to one of the first right panel **204** or the first left panel **206**. For example, the zipper shield **218** can be sewn at a left edge of the first right panel **204** or a left edge of the first left panel **206**. Alternatively, the zipper shield **218** can be sewn at other locations of the front section **202**. The zipper shield **218** is located behind the zipper **216** when the zipper **216** is closed. The zipper shield **218** can be used to prevent direct contact between skin or undergarments and the zipper **216**. The zipper shield **218** lies under the zipper **216** to protect the skin or undergarment from getting stuck or pinched in the zipper **216** when fastening or unfastening the zipper **216** since the zipper **216** rests tight against the front abdomen. It is also possible to cover the outside surface of the orthopedic corset **200**, such as to hide the zipper **216** from view when closed.
[0045] The front section **202** is coupled to two side sections, each having a one panel. In particular, the second right panel **208** is coupled to a third right panel **212** on a right-side section **246** of the orthopedic corset **200** (see FIG. **2**C), and the second left panel **210** is coupled to a third left panel **214** of a left-side section **248** (see FIG. **2**D). The third right panel **212** and third left panel **214** can be flexible panels. In at least one embodiment, the panels of the front section **202** (e.g., first right panel **204**, first left panel **206**, second right panel **208**, and second left panel **210**) include outer fabric of a first material. The panels of right-side section (i.e., third right panel **212**) and the left-side section (i.e., third left panel **214**) each includes a fabric of a second material that is more flexible than the first material. The second material can be elastic fabric, stretch fabric, or the like. The first material can be a fabric or cotton that is more rigid than the stretch or elastic fabric.
[0046] FIG. **2**B illustrates a back section **220** of the orthopedic corset **200** of FIG. **2**A according to at least one embodiment. The back section **220** includes a back-support panel **222**. The back-support panel **222** is similar to the back-support panel **104** of FIG. **1**B as described above, except as

otherwise noted in the description. The back section **220** includes a fourth right panel **224**, a fourth left panel **226**, a fifth right panel **228**, a fifth left panel **230**, a right lacing panel **232**, a left lacing panel **234**, and a lacing system **236**.

[0047] The fourth right panel **224** and the fifth right panel **228** are coupled together, for example, by sewing edges of the panels together at a seam. Similarly, the fourth left panel **226** and the fifth left panel **230** are coupled together, for example, by sewing edges of the panels together at a seam.

[0048] The back section **220** is coupled to two side sections. In particular, the fourth right panel **224** is coupled to the third right panel **212** on the right-side section **246** (see FIG. **2**C), and the fourth left panel **226** is coupled to the third left panel **214** of the left-side section **248** (see FIG. **2**D). As described above, the third right panel **212** and third left panel **214** can be flexible panels. In at least one embodiment, the panels of the back section **220** (e.g., fourth right panel **224**, fourth left panel **226**, fifth right panel **228**, and fifth left panel **230**) include outer fabric of a first material, whereas the third right panel **212** and third left panel **214** each includes a fabric of a second material that is more flexible than the first material. The second material can be elastic fabric, stretch fabric, or the like. The first material can be a fabric or cotton that is more rigid than the stretch or elastic fabric.

[0049] The back-support panel **222** is coupled between the fifth right panel **228** and the fifth left panel **230**. A right edge **242** of the back-support panel **222** can be sewn to a right edge of the fifth right panel **228**, forming a first seam. A left edge **244** of the back-support panel **222** can be sewn to a right edge of the fifth left panel **230**, forming a second seam. The right lacing panel **232** can be sewn to the back-support panel **222** and the fifth right panel **228** at the first seam. The left lacing panel **234** can be sewn to the back-support panel **222** and the fifth left panel **230** at the second seam. In other embodiments, the right lacing panel **232** and left lacing panel **234** can be sewn at different locations than the seams between the back-support panel **222** and the fifth right and left panels.

[0050] As illustrated in FIG. **2**B, the back-support panel **222** is located underneath the right lacing panel **232** and left lacing panel **234**. That is, the back-support panel **222** is located closer to the wearer of the orthopedic corset **200** when the orthopedic corset **200** is being worn. The back-support panel **222** can operate as a modesty panel, covering the skin or undergarment of the wearer. More importantly, the back-support panel **222** can provide orthopedic support to the wearer of the orthopedic corset **200**.

[0051] FIG. **2**C illustrates the right-side section **246** of the orthopedic corset **200** of FIG. **2**A according to at least one embodiment. As described above, the right-side section **246** includes the third right panel **212**, which is coupled to the second right panel **208** of the front section **202** and the fourth right panel **224** of the back section **220**. As described above, the third right panel **212** can be a flexible panel with flexible material, such as illustrated in FIG. **2**E.

[0052] FIG. **2**D illustrates the left-side section **248** of the orthopedic corset **200** of FIG. **2**A according to at least one embodiment. As described above, the left-side section **248** includes the third left panel **214**, which is coupled to the second left panel **210** of the front section **202** and the fourth left panel **226** of the back section **220**. As described above, the third left panel **214** can be a flexible panel with flexible material, such as illustrated in FIG. **2**E.

[0053] FIG. **2**E illustrates a flexible panel **250** according to at least one embodiment. The flexible panel **250** includes stretch fabric **252**. The flexible panel **250** can join two adjacent panels that have outer fabric that is more rigid than the stretch fabric **252**. The stretch fabric **252** can stretch at least in lateral directions to provide some flexibility in the fit of the orthopedic corset **200**.

[0054] As described herein, one or more panels of the orthopedic corset **200** can include one or more bonings. The bonings can be used to provide structure and shape to the orthopedic corset **200**, as well as provide orthopedic support to the spine and torso of the wearer. In particular, the bonings of the back-support panel **222**, and their relative placement at the back of the orthopedic corset **200** provide the orthopedic support to the wearer in a similar manner as orthopedic back straps, but as

an aesthetically appealing garment.
[0055] FIG. **3**A-FIG. **4**A illustrates bonings, casings, and cross-sectional views of the panels with the bonings of the orthopedic corset **200** according to at least one embodiment.
[0056] FIG. **3**A illustrates a boning **300** according to at least one embodiment. The boning **300** is an elongated boning that can be made of rigid or semirigid materials, such as steel, plastic, metal, animal bone material, or the like. In at least one embodiment, the boning **300** is an elongated boning of metal or plastic that is sewn in a casing that is secured to outer fabric of a panel, as illustrated in FIG. **3**B. Before being sewn into a casing, a first thermoplastic material **302** is applied to a first end of the boning **300**, and a second thermoplastic material **304** is applied to a second end of the boning **300**. The first thermoplastic material **302** and second thermoplastic material **304** can act as barriers to prevent fabric punctures from the boning **300**. In other embodiments, other bonded interfacing material can be used as the barrier. For example, the ends of the boning **300** can be coated with a coating of material that acts as the barrier.
[0057] FIG. **3**B illustrates a casing **306** in which the boning **300** of FIG. **3**A is disposed according to at least one embodiment. As illustrated, the boning **300** can be disposed in a casing **306**. As described above, the casing **306** is a tunnel or enclosed space created in fabric for inserting the boning **300**. In some cases, interfacing fabric (also referred to as “interfacing” can be bonded to an interior of the casing **306**. As illustrated in the interior casing view, first interfacing **334** can be bonded at a top end of the casing **306** and second interfacing **336** can be bonded at a bottom end of the casing **306**. The first interfacing **334** and second interfacing **336** can correspond to the first thermoplastic material **302** and second thermoplastic material **304**, respectively. Bonding interface material to the fabric refers to the process of attaching interfacing to a specific part of a garment or fabric item to provide additional structure and support. When bonding interface fabric to the casing **306**, an appropriate interfacing can be selected that matches the weight and type of fabric being used for the casing **306**. If the casing **306** requires flexibility (like for elastic or drawstrings), a lightweight or knit interfacing may be suitable. The interfacing can be cut to the required size and shape, usually slightly smaller than the fabric piece to avoid bulk in the seam allowances. If using fusible interfacing, the adhesive side is placed against the wrong side (the non-visible side) of the fabric. It is then bonded to the fabric using an iron. The heat and pressure from the iron activate the adhesive, causing it to melt and adhere to the fabric. For sew-in interfacing, it is basted or sewn directly to the fabric. After the interfacing is attached, the fabric is then folded and sewn to create the casing **306**. The first and second interfacings **334** and **336** add structure to the casing **306**, making it more durable and maintaining its shape, especially important if the casing **306** will be under tension. Bonding interfacing to a casing is often done in garments where casings are used. The interfacing ensures that the casing remains stable and does not stretch out or become misshapen with use. This technique is particularly useful in garment construction to achieve a professional finish and prolong the life of the garment.
[0058] The casing **306** can be further stitched to secure the boning **300** within the fabric of the casing **306**. The casing **306** can have two pieces of fabric that are sewn at the edges to create a pouch in which the boning **300** can be disposed and secured within the casing **306**. The first thermoplastic material **302** and second thermoplastic material **304** disposed at the ends of the boning **300** can act as barriers to prevent the boning **300** from puncturing the fabric of the casing **306** or the fabric of the panel to which the casing **306** is secured. The first thermoplastic material **302** and second thermoplastic material **304** can also prevent the boning **300** from snagging on skin or the undergarment of the wearer. In general, the first thermoplastic material **302** and second thermoplastic material **304** can be used to prevent rough or sharp edges of the boning **300** from snagging or tearing the fabric of the casing **306**, the fabric of the panel, or skin or garments of the wearer of the orthopedic corset.
[0059] As illustrated in FIG. **3**C to FIG. **4**A, the boning **300** can be secured to one or more panels of the orthopedic corset **200**.

[0060] FIG. **3**C is a cross-sectional view of bonings located in a back-support panel **222** of the back section **220** of FIG. **2**A according to at least one embodiment. In this embodiment, the back-support panel **222** includes a first boning **308**, a second boning **310**, and a third boning **312**. The first boning **308**, second boning **310**, and third boning **312** are similar to the boning **300** of FIG. **3**A and can include the thermoplastic material at their respective ends. Each of the first boning **308**, second boning **310**, and third boning **312** can be sewn into a casing, similar to casing **306** of FIG. **3**A. The casing of each of the first boning **308**, second boning **310**, and third boning **312** can be sewn between an outer fabric and a liner of the back-support panel **222**. In some embodiments, the first boning **308**, second boning **310**, and third boning **312** can be sewn into pouches created between the outer fabric and the liner of the back-support panel **222**. For example, the three bonings can be stitched into separate channels of the back-support panel **222**, one boning per channel. Although FIG. **3**C illustrates three bonings in the back-support panel **222**, in another embodiment, the back-support panel **222** includes four bonings. For example, the four bonings can be stitched into separate channels of the back-support panel **222**, one boning per channel. In another embodiment, the back-support panel **222** includes one or more bonings.

[0061] In other embodiments, additional bonings can be added to other panels, such as the additional panels of the back section **220**, such as illustrated in FIG. **3**D, additional panels of the front section **202**, such as illustrated in FIG. **3**E, FIG. **3**F, and FIG. **4**A.

[0062] FIG. **3**D is a cross-sectional view of additional bonings located in additional panels of the back section **220** of FIG. **2**A according to at least one embodiment. As described above with respect to FIG. **3**A, the back-support panel **222** includes the first boning **308**, second boning **310**, and third boning **312**. The back-support panel **222** is coupled to the fifth right panel **228** at the right edge **242** and the fifth left panel **230** at the left edge **244**. The fifth right panel **228** can include a fourth boning **314**, and the fifth left panel **230** can include a fifth boning **316**. The fifth right panel **228** is coupled to the fourth right panel **224** at an opposing edge of the fifth right panel **228**. The fifth left panel **230** is coupled to the fourth left panel **226** at an opposing edge of the fifth left panel **230**. The fourth right panel **224** can include a sixth boning **318**, and the fourth left panel **226** can include a seventh boning **320**. The fourth right panel **224** can be coupled to the third right panel **212** of the right-side section **246**, and the fourth left panel **226** can be coupled to the third left panel **214** of the left-side section **248**. Although the back section **220** is shown as having seven bonings, in other embodiments, the back section **220** can include more or less bonings than seven. In addition to the bonings in the back section **220**, the orthopedic corset **200** can have additional bonings in one or more panels of the front section **202**, as illustrated in FIG. **3**E to FIG. **4**A.

[0063] FIG. **3**E is a cross-sectional view of the right-side section **246** coupling the front section **202** and the back section **220** of the orthopedic corset **200** of FIG. **2**A according to at least one embodiment. The first right panel **204** of the front section **202** includes two bonings, including an eighth boning **322** and a ninth boning **324**. In at least one embodiment, the eighth boning **322** can be stitched to the first right panel **204** alongside the zipper **216** to provide rigid support to the zipper **216**. The second right panel **208** of the front section **202** includes one boning, including a tenth boning **326**.

[0064] FIG. **3**F is a cross-sectional view of the left-side section **248** coupling the front section **202** and the back section **220** of the orthopedic corset **200** of FIG. **2**A according to at least one embodiment. The first left panel **206** of the front section **202** includes two bonings, including an eleventh boning **328** and a twelfth boning **330**. In at least one embodiment, the twelfth boning **330** can be stitched to the first left panel **206** alongside the zipper **216** to provide rigid support to the zipper **216**. The second left panel **210** of the front section **202** includes one boning, including a thirteenth boning **332**.

[0065] As described herein, different number of panels and bonings can be used in the orthopedic corset. For example, instead of four panels in the front section of orthopedic corset **200**, as illustrated in FIG. **2**A, a front section can include six panels, each having a respective boning, such

as illustrated in a front section **402** of an orthopedic corset **400** in FIG. **4**A.
[0066] FIG. **3**G a cross-sectional view of the back-support panel **222** of the back section **220** of FIG. **2**A according to at least one embodiment. The cross-sectional view can be a bottom view of a portion of the back section **220**. As described above, the back-support panel **222** includes the first boning **308**, second boning **310**, and third boning **312**. The right lacing panel **232** and the fifth right panel **228** are sewn to the back-support panel **222** at the right edge **242** of the back-support panel **222**. The left lacing panel **234** and the fifth left panel **230** are sewn to the back-support panel **222** at the left edge **244** of the back-support panel **222**. For additional support, the right lacing panel **232** can include a fourteenth boning **338**, and the left lacing panel **234** can include a fifteenth boning **340**. The fourteenth boning **338** and fifteenth boning **340** can be located between reinforcement rings and the opposing edges of the right lacing panel **232** and left lacing panel **234**.
[0067] FIG. **4**A is a cross-sectional view of a front section **402** of an orthopedic corset **400** with six panels and six bonings according to at least one embodiment. The orthopedic corset **400** includes six panels, three panels on the right and three panels on the left. The orthopedic corset **400** includes six bonings, including first boning **404**, second boning **406**, third boning **408**, fourth boning **410**, fifth boning **412**, sixth boning **414**. As illustrated in FIG. **4**A, there is one boning per panel. In other embodiments, each panel can include zero or more bonings.
[0068] FIG. **4**B illustrates a front view of the front section **402** of the orthopedic corset **400** according to at least one embodiment. As illustrated in the front view (or exterior view) of the front section **402**, the orthopedic corset **400** includes a zipper **416** and a zipper shield **418** located behind the zipper **416**.
[0069] FIG. **4**C illustrates a rear view of the front section of the orthopedic corset of FIG. **4**A according to at least one embodiment. As illustrated in the rear view (or interior view) of the front section **402**, the zipper shield **418** can be stitched to a panel **420** of the orthopedic corset **400** at a seam **422**. It should be noted that the zipper shield **418** can be stitched to an opposing panel **424** in other embodiments.
[0070] FIG. **5**A-FIG. **5**B illustrate an orthopedic corset **500** with a lacing system **502** for adjusting a tightness of the orthopedic corset **500** from a front side of the orthopedic corset **500** according to at least one embodiment. The lacing system **502** includes a first lace **504** (i.e., a first cord) and a second lace **506** (i.e., a second cord). The first lace **504** and second lace **506** can be equal in length. There are a first set of reinforcement rings **514** located on the first lacing panel **508** and a second set of reinforcement rings **514** located on the second lacing panel **510**. The first lace **504** is laced through alternating ones of the first set and the second set of reinforcement rings, and a second lace **506** is laced through alternating ones of the first set and the second set of reinforcement rings **514**. Each pair of opposing reinforcement rings **514** of the first set and the second set of reinforcement rings **514** provides a point of adjustment for tightening or loosening the orthopedic corset **500**. The first lace **504** and the second lace **506** each has a length to extend from the back section to the front section to permit a person wearing the orthopedic corset **500** to secure the first lace **504** and the second lace **506** at a front side of the orthopedic corset **500**.
[0071] In at least one embodiment, a first end of each of the first lace **504** and second lace **506** is sewn to a top end of a lacing panel (e.g., lacing panels **508** and **510**, respectively). The first lace **504** and second lace **506** are laced diagonally through opposing reinforcement rings **514** in the lacing panels **508** and **510** into a center of the orthopedic corset **500**. The first lace **504** and second lace **506** are extended on opposing sides to reach around to the front side of the orthopedic corset **500**. The first lace **504** and second lace **506** can be continued to be laced diagonally to a bottom end of the lacing panels **508** and **510**. A second end of each of the first lace **504** and second lace **506** is sewn to a bottom end of the respective lacing panel (e.g., lacing panels **508** and **510**, respectively).
[0072] In another embodiment, the lacing system **502** uses a single cord. The single cord can be laced by sewing a first end at a top end of the lacing panel **508**, lacing diagonal downwards through opposing rings to the two center reinforcement rings **514**. On the lacing panel **510**, the single cord

can be extended to reach around to the front side of the orthopedic corset **500**. The single cord can be continued to be laced diagonally to the bottom reinforcement ring **514**, and then laced diagonal upwards to two center rings on the lacing panel **508** where cord is extended to reach around to corset front, continue to lace diagonal upwards to top of second lacing panel; and then sew a second end of the cord to a top end of the lacing panel **510**.

[0073] In another embodiment, the lacing system **502** can be implemented with a dual-level tightening system with one lace that starts at the top and one lace that starts at the bottom and meet in the middle and then extend to the front side for tightening by the wearer. The lacing system **502** allows a wearer to apply the orthopedic corset **500** without the assistance of another person by the inclusion of rear cinching that allows the wearer to tighten the **500** around the lower torso from the front of the **500**. The wearer can adjust the lacing system **502** to a suitable level of comfort level determined by the wearer, providing lower torso support and a slenderizing effect while not restricting general lumbar movement and flexibility.

[0074] The lacing system **502** can be implemented in other manners than those described above.

[0075] FIG. **6**A illustrates a cross-sectional view of a back side **602** of an orthopedic corset **600** according to at least one embodiment. The back side **602** includes a first panel **606** (right), a second panel **608** (right) coupled to the first panel **606**, a third stretch panel **610** (right) coupled to the second panel **608**, a fourth panel **612** (right) coupled to the third stretch panel **610**, a fifth panel **614** (right) coupled to the fourth panel **612**, a back-support panel **616** coupled to the fifth panel **614**. The back side **602** also includes a first panel **618** (left), a second panel **620** (left) coupled to the first panel **618**, a third panel **622** (left) coupled to the second panel **620**, a fourth panel **624** (left) coupled to the third panel **622**, a fifth panel **626** (left) coupled to the fourth panel **624** and the back-support panel **616**. The orthopedic corset **600** can include a zipper **628** and a zipper shield **630**, similar to the zipper shield **218** and zipper shield **418** described above. The back-support panel **616** can include three bonings. The fifth panel **614** and fifth panel **626** can each include a boning. The fourth panel **612** and fourth panel **624** can each include a boning. The second panel **608** and second panel **620** can each include a boning. The first panel **606** and first panel **618** can each include a boning. The boning of the first panel **618** and the portion of the zipper **628** are obscured by the zipper shield **630** in FIG. **6**A. The panels and bonings of FIG. **6**A are similar to the panels and bonings described above.

[0076] FIG. **6**B illustrates a front view of a front side **604** of the orthopedic corset **600** of FIG. **6**A according to at least one embodiment. The front view shows the first panel **606** (right), second panel **608** (right), third stretch panel **610** (right), fourth panel **612** (right), fifth panel **614** (right), back-support panel **616**, first panel **618** (left), second panel **620** (left), third panel **622** (left), fourth panel **624** (left), fifth panel **626** (left), zipper **628**, and zipper shield **630**. The front view also illustrates a lacing system **632**. The lacing system **632** can be similar to the lacing system **502** described above.

[0077] FIG. **7** illustrates a method of manufacturing an orthopedic corset according to at least one embodiment. At block **702**, method **700** sews tape of a zipper into a right edge of a first right panel and a right edge of a first left panel to permit the zipper to fasten the first right panel and the first left panel at a front side of the orthopedic corset. At block **704**, method **700** disposes a first thermoplastic material on a first end of an elongated boning. At block **706**, method **700** disposes a second thermoplastic material on a second end of the elongated boning. At block **708**, method **700** sews a casing comprising the elongated boning. At block **710**, method **700** sews the casing in a back-support panel. At block **712**, method **700** sews a right edge of the back-support panel, a right edge of a first lacing panel, and a right edge of a second right panel at a first seam at a back side of the orthopedic corset. At block **714**, method **700** sews a left edge of the back-support panel, a right edge of a second lacing panel, and a right edge of a second left panel at a second seam at the back side of the orthopedic corset.

[0078] Various operations of method **700** may be performed differently than the order shown in

FIG. **7**. Some operations of the methods may be performed concurrently with other operations. In at least one embodiment, one or more operations shown in FIG. **7** may not always be performed. In at least one embodiment, additional operations than those shown in FIG. **7** may also be performed.

[0079] Other variations are within the spirit of the present disclosure. Thus, while disclosed techniques are susceptible to various modifications and alternative constructions, certain illustrated embodiments thereof are shown in drawings and have been described above in detail. It should be understood, however, that there is no intention to limit the disclosure to a specific form or forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the disclosure, as defined in appended claims.

[0080] Use of terms "a" and "an" and "the" and similar referents in the context of describing disclosed embodiments (especially in the context of following claims) are to be construed to cover both singular and plural, unless otherwise indicated herein or clearly contradicted by context, and not as a definition of a term. Terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms (meaning "including, but not limited to,") unless otherwise noted. The term "connected," when unmodified and referring to physical connections, is to be construed as partly or wholly contained within, attached to, or joined together, even if there is something intervening. Recitations of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within range unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. Use of the term "set" (e.g., "a set of items") or "subset," unless otherwise noted or contradicted by context, is to be construed as a nonempty collection comprising one or more members. Further, unless otherwise noted or contradicted by context, the term "subset" of a corresponding set does not necessarily denote a proper subset of the corresponding set, but subset and corresponding set may be equal.

[0081] Conjunctive language, such as phrases of the form "at least one of A, B, and C," or "at least one of A, B, and C," unless specifically stated otherwise or otherwise clearly contradicted by context, is otherwise understood with the context as used in general to present that an item, term, etc., may be either A or B or C, or any nonempty subset of a set of A and B and C. For instance, in the illustrative example of a set having three members, conjunctive phrases "at least one of A, B, and C" and "at least one of A, B, and C" refers to any of the following sets: {A}, {B}, {C}, {A, B}, {A, C}, {B, C}, {A, B, C}. Thus, such conjunctive language is not generally intended to imply that certain embodiments require at least one of A, at least one of B, and at least one of C each to be present. In addition, unless otherwise noted or contradicted by context, the term "plurality" indicates a state of being plural (e.g., "a plurality of items" indicates multiple items). A plurality is at least two items but can be more when so indicated either explicitly or by context. Further, unless stated otherwise or otherwise clear from context, the phrase "based on" means "based at least in part on" and not "based solely on."

[0082] Use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illuminate embodiments of the disclosure and does not pose a limitation on the scope of the disclosure unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the disclosure.

[0083] The terms "coupled" and "connected," along with their derivatives, may be used in the description and claims. It should be understood that these terms may not be intended as synonyms for each other. Rather, in particular examples, "connected" or "coupled" may be used to indicate that two or more elements are in direct or indirect physical contact with each other. "Coupled" may also mean that two or more elements are not in direct contact with each other but yet still co-operate or interact with each other.

[0084] Although the discussion above sets forth example implementations of described techniques, other architectures may be used to implement the described functionality and are intended to be within the scope of this disclosure. Furthermore, although specific distributions of responsibilities

are defined above for purposes of discussion, various functions and responsibilities might be distributed and divided in different ways, depending on circumstances.
[0085] Furthermore, although the subject matter has been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter claimed in appended claims is not necessarily limited to specific features or acts described. Rather, specific features and acts are disclosed as exemplary forms of implementing the claims.

Claims

1. An orthopedic corset comprising: a front section having a first right panel and a first left panel; a fastener to fasten the first right panel and the first left panel; a back section; a right-side section coupled between the front section and the back section on a right side of the orthopedic corset; a left-side section coupled between the front section and the back section on a left side of the orthopedic corset, wherein the back section comprises: a back-support panel; a first lacing panel coupled to a second right panel; a second lacing panel coupled to a second left panel, wherein the back-support panel is coupled between the second right panel and the second left panel, wherein the back-support panel is located behind the first lacing panel and the second lacing panel, and wherein the back-support panel comprises one or more bonings; and at least one lace to adjust a tightness between the first lacing panel and the second lacing panel.
2. The orthopedic corset of claim 1, wherein: the first lacing panel and the second right panel are coupled to the back-support panel at a right edge of the back-support panel; and the second lacing panel and the second left panel are coupled to the back-support panel at a left edge of the back-support panel.
3. The orthopedic corset of claim 1, wherein at least one of the one or more bonings comprises a spiral steel boning that flexes in two or more directions.
4. The orthopedic corset of claim 1, wherein at least one of the one or more bonings comprises a steel boning that flexes in only two directions.
5. The orthopedic corset of claim 1, wherein at least one of the one or more bonings comprises a plastic boning.
6. The orthopedic corset of claim 1, wherein the one or more bonings comprises: an elongated boning, wherein the elongated boning is steel or plastic; a first thermoplastic material disposed on a first end of the elongated boning; and a second thermoplastic material disposed on a second end of the elongated boning.
7. The orthopedic corset of claim 1, wherein the back-support panel comprises an outer fabric and a liner, wherein each of the one or more bonings is disposed in a casing that is disposed between the outer fabric and the liner.
8. The orthopedic corset of claim 7, wherein the casing comprises interfacing bonded to the casing.
9. The orthopedic corset of claim 1, wherein panels of the front section and the back section comprises outer fabric of a first material, wherein the right-side section and the left-side section each comprises a fabric of a second material that is more flexible than the first material.
10. The orthopedic corset of claim 1, wherein the back-support panel comprises three or four bonings.
11. The orthopedic corset of claim 1, further comprising two or more additional bonings disposed in at least two of the first right panel, the first left panel, the second right panel, or the second left panel.
12. The orthopedic corset of claim 1, wherein: the back-support panel comprises a first outer fabric; and the first lacing panel and the second lacing panel each comprises a second outer fabric, wherein the first outer fabric is more flexible than the second outer fabric.
13. The orthopedic corset of claim 1, wherein: the fastener is a zipper; and the front section further comprises a zipper shield coupled to one of the first right panel or the first left panel, wherein the

zipper shield is located behind the zipper when the zipper is closed, wherein the zipper shield is to prevent direct contact between skin or undergarments and the zipper.

14. The orthopedic corset of claim 1, further comprising: a first set of reinforcement rings located on the first lacing panel; a second set of reinforcement rings located on the second lacing panel, wherein the at least one lace further comprises: a first lace laced through alternating ones of the first set and the second set of reinforcement rings; and a second lace laced through alternating ones of the first set and the second set of reinforcement rings.

15. The orthopedic corset of claim 14, wherein: each pair of opposing reinforcement rings of the first set and the second set of reinforcement rings provide a point of adjustment for tightening or loosening the orthopedic corset; and the first lace and the second lace each has a length to extend from the back section to the front section to permit a person wearing the orthopedic corset to secure the first lace and the second lace at a front side of the orthopedic corset.

16. An orthopedic corset comprising: a first panel; a second panel; a fastener to fasten the first panel and the second panel at a front side of the orthopedic corset; a third panel; a fourth panel; a lacing system at a back side of the orthopedic corset, the lacing system to adjust a tightness of the orthopedic corset; and a back-support panel coupled between the third panel and the fourth panel, the back-support panel being located behind the lacing system, and the back-support panel comprising one or more bonings.

17. The orthopedic corset of claim 16, wherein the fastener is a zipper.

18. The orthopedic corset of claim 16, further comprising one or more additional bonings disposed in at least one of the first panel, the second panel, the third panel, or the fourth panel.

19. A method of manufacturing an orthopedic corset, the method comprising: sewing tape of a zipper into a first edge of a first right panel and a first edge of a first left panel to permit the zipper to fasten the first right panel and the first left panel at a front side of the orthopedic corset; disposing a first thermoplastic material on a first end of an elongated boning; disposing a second thermoplastic material on a second end of the elongated boning; sewing a casing comprising the elongated boning; sewing the casing in a back-support panel; sewing a first edge of the back-support panel, a first edge of a first lacing panel, and a first edge of a second right panel at a first seam at a back side of the orthopedic corset; and sewing a second edge of the back-support panel, a first edge of a second lacing panel, and a first edge of a second left panel at a second seam at the back side of the orthopedic corset.

20. The method of claim 19, further comprising bonding interfacing fabric to an interior of the casing, wherein: the back-support panel comprises a first outer fabric; and the first lacing panel and the second lacing panel each comprises a second outer fabric, wherein the first outer fabric is more flexible than the second outer fabric.