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Apparel Design Process: Shifting the Basic Pattern Block into a New Framework to Fit the Demands of Post Double Mastectomy Women

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Apparel Design Process: Shifting the Basic Pattern Block into a New Framework to Fit the Demands of Post Double Mastectomy Women

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Abstract

Breast cancer is a leading cancer among women today. Mastectomy is one of the most common paths for breast cancer prevention and treatment. However, this treatment path can cause noticeable body changes around the woman's bust area. Recently more and more post mastectomy women are deciding to live without breast reconstruction surgery. This decision referred to as "going flat" or "living flat." Due to the changed bodies and a lack of information on functional and aesthetic concerns related to clothing, clothing selection becomes difficult for post mastectomy women who choose to "live flat."

The purpose of this study was to create two new fitting (no dart and one waist dart) blocks for post mastectomy women after exploring the clothing preferences, demands, and clothing expenses of post double mastectomy female participants in a social media organization. An online survey was created and applied to collect information such as their geographic location, post-surgery clothing and body sizes, clothing and fabric preferences, and clothing expenses statistics. A total of 95 post double mastectomy women who choose to "live flat" participated in the survey. There were 89 participants who had double mastectomy surgery, and six participants who had single mastectomy.

Based on the findings, most mastectomy survivors changed their clothing style after mastectomy surgery. There are many types of clothing they could not wear any more since their body shape changed. In order to meet their clothing fitting and aesthetic demands, two new blocks have been made. The researcher also provides the steps of making the no dart and one waist dart blocks. Although there are different types of breast cancer survivors, the new blocks were only focused on post double mastectomy women in this study. It leaves a creative space for

researchers and designers to innovate new blocks for women who had different types of mastectomy surgeries and without having a breast reconstruction surgery.

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I would especially like to acknowledge Windy Gay. She is a breast cancer survivor who is living "flat." Her desire to create a fashion line for women who have chosen to live "flat" after undergoing a double mastectomy is inspiring. After finding that standard apparel no longer fit properly post-surgery, Ms. Gay sought direction from the Apparel Merchandising and Product Development program to produce prototype garments for her design ideas. Ms. Gay was body scanned and her measurements were used to create a custom block for her body. She gave invaluable time and insight into preparing the survey for distribution through a social media sight in which she is a member. Thank you for motivating me to think outside the typical fashion template and dive into a specialty market demand.

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Last but not least, I would love to express my thanks to my family for the understanding, love, valuable encouragement, and spiritual support that they have provided throughout my education.

Dedication

I dedicate this thesis to my parents and husband, who always fully understand and support me. I could never truly express how much I love you all. I appreciate everything you have done for me. Thank you for your wisdom and love.

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CHAPTER I

Introduction

Breast cancer is the most common cancer in women worldwide second to skin cancer. In 2015, an estimated 231,840 new cases were diagnosed, and there were approximately 3.1 million breast cancer survivors in the United States (Kuhn, 2015). Between January and May, 2016, an estimated 246,660 new breast cancer cases were diagnosed (What Are the Key Statistics about Breast Cancer?, 2016). One of the most common treatments for breast cancer is mastectomy, which is the removal of the diseased breast, leaving scars as well as altering the tenderness, breast size, and upper body shape of women (Breast Cancer Facts & Figures 2011-2012, n.d.). The surgery and radiation usually results in serious psychological and physical consequences. After a mastectomy, there are three options for breast cancer survivors: 1) have breast reconstruction surgery, 2) wear a prosthesis, or 3) accept and adapt to uneven breast size or flat upper body shape (Fallbjork, Karlsson, Salander, & Samussen, 2010).

Breast reconstruction surgery provides an opportunity to rebuild the appearance of post mastectomy women's bodies. Because appearance is a major concern for women with breast amputation (Feather, Wainstock, & Pitts, 1989), they commonly choose to rebuild their breast(s). The breast reconstruction can be done immediately after mastectomy or as a later step (Fallbjork, Karlsson, Salander, & Samussen, 2010). However, for different reasons, not all breast cancer survivors decide to restore their breast(s). Some choose to wear a prosthesis after mastectomy, while recently more and more women choose not to use special bras, magnets or prosthesis, or rebuild their uneven flat breast area. They call this decision "going flat" or "living flat" (Going flat: choosing no reconstruction, 2015).

The psychological effects of a mastectomy can be just as taxing as the physical effects. Hoffman indicates "Clothing helps create and project a positive self-image at a time when physical changes and limitations may cause distress and feeling of loss" (as cited in Chiweshe, Boll, Lambert, Cardinale, & Wong, 2011, p.2). However, after surgery, the treatment teams may provide only cursory information about clothing that is comfortable for post mastectomy women. There is also little substantial information or development in clothing for breast cancer survivors beyond being merely functional (Jackson, 2004). Due to issues of bodies changing, as well as fit, comfort, and aesthetics, clothing selection becomes difficult for female breast cancer survivors.

Purpose of the Study

Considering the changed bodies of post mastectomy women, and a lack of information on functional and aesthetic concerns related to clothing, "post mastectomy women face difficulties in finding appropriate and fashionable clothing" (Chiweshe, Boll, Lambert, Cardinale, & Wong, 2011). Currently, there are limited choices for post mastectomy women in the ready to wear apparel industry. They must rely on limited clothing that utilizes fabrics that stretch or have clothing altered to fit their new body. The purpose of this study was to gather the clothing and styling data of the double (bilateral) mastectomy women's preferences and demands on a flat garment. Based on the analysis of the surveys' results, and using a post double mastectomy woman's body measurements, new basic bodice blocks were developed. These unique women's body blocks can be used to create suitable and comfortable clothing for post mastectomy patients. The clothing would meet the demands of fit, enhancing both the body image and self-esteem post mastectomy.

Research Questions

1. Are post double mastectomy women willing to purchase clothing that fits a flat chest?
2. Have post double mastectomy women changed their clothing style preferences?
3. Are post double mastectomy women spending more or less money on their clothing?

Hypotheses

Hypothesis 1 (H1): More post double mastectomy women are willing to wear clothes designed to fit their flat chest, if available.

Hypothesis 2 (H2): More post double mastectomy women changed clothing styles since their body shape change.

Hypothesis 2-a (H2-a): More post double mastectomy women prefer to wear altered clothing.

Hypothesis 2-b (H2-b): More post double mastectomy women wear casual rather than professional or dressy clothing.

Hypothesis 2-c (H2-c): More post double mastectomy women like solid fabrics over patterned fabrics.

Hypothesis 3a (H3a): More post double mastectomy women spend more money on clothing.

Hypothesis 3b (H3b): More post double mastectomy women are willing to spend more money on clothing designed to fit their flat upper body.

Key Terms

1. Breast Cancer: “A malignant tumor that starts in the cells of the breast. A malignant tumor is a group of cancer cells that can grow into (invade) surrounding tissues or spread

(metastasize) to distant areas of the body. The disease occurs almost entirely in women, but men can get it, too" (What is breast cancer, n.d.).

2. Mastectomy: A surgery to remove the entire or partial breast for the treatment or prevention of breast cancer (Breast Cancer, n.d.).
3. Double Mastectomy: A surgery to remove both of the entire breasts (Breast Cancer, n.d.).
4. Breast Reconstruction: A type of surgery rebuilds the breast for women who have removed both or part of their breasts. This surgery attempt to help post mastectomy women to restore the appearance, feeling, size, and shape of their removed breast. The nipple and areola, the darker area around the nipple, can also be added (Breast Cancer, n.d.).
5. Prosthesis: An artificial substitute for a missing body part. Breast prosthesis is an artificial breast that is worn following a mastectomy. It can be used to help a person look as though the body parts had never been changed (Breast Cancer, n.d.).
6. "Living Flat"/ "Going Flat": A group of women who have had double mastectomy surgery, and then live without breast reconstruction surgery or the use of any bra form/prosthesis (Going flat: choosing no reconstruction, 2015).
7. Bodice Block: The most primitive form of a garment created based on body measurements, and is a basis for pattern design and manipulation. It can be adapted to make different design garments (MacDonald, 2010).
8. Dart: A V-shaped tuck that is a sewn fold in the construction of a garment, which shapes fabric to fit the curved body. Usually darts can be found at the bust, shoulder, waistline and hipline area (Fashion Dictionary, n.d.).

9. Ease: The fullness that is incorporated into a pattern to fit the body comfortably and allow for movements (Fashion Dictionary, n.d.).

Limitations

The limitation of this study was the use of the online survey, which limited the population and sample to those who are members of a social media group created for women living flat. It may also limit the population of older generations who are less familiar with social media or the Internet. Moreover, because most of the members in the social media organization are from western countries, the participants were limited by geographical convenience. Additionally, the limitation of body block development was based on the measurements of only women who have undergone double mastectomy surgery. As a result, the prototype body blocks may only fit double mastectomy women. It leaves a gap for women who have undergone single or other types of mastectomy operations.

Chapter II

Literature Review

Breast cancer has become one of the most common malignancies in the world of women. It has increased since World War II, especially in developed and developing countries. The rate of breast cancer diagnosis has become very high in recent years. In 2016, from January until May, there were more than 2.8 million women undergoing breast cancer treatment (What Are the Key Statistics about Breast Cancer?, 2016). Jackson (2004) illustrated that "All medical treatments for breast cancer revolve around some form of surgery, radiotherapy treatment, chemotherapy, and/or hormone therapy. Treatments such as surgery, lymph node dissection, and radiation that ensure long term survival are sometimes the most invasive and debilitating."

Mastectomy

Mastectomy is a type of surgery that removes the entire breast of the person who has breast cancer. William Stewart Halsted performed the first mastectomy in 1894. There are different types of mastectomies such as a total mastectomy, partial mastectomy, radical mastectomy, modified radical mastectomy (MRM), and Subcutaneous ("nipple-sparing") mastectomy (What is Mastectomy, 2013). Surgical treatments are also divided into two surgical procedures: breast conserving and non-breast conserving modalities. Breast conserving treatment removes the tumor and all or a small part of the surrounding tissue (Breast Cancer Health Center, 2014).

The most common types of mastectomies are: total (simple) mastectomy and modified radical mastectomy. In the total mastectomy, the surgeon removes the entire breast and the lining of the chest muscle without other tissue. The modified radical mastectomy is a procedure that removes the entire breast, including skin, areola, nipple and most lymph nodes in the underarm

area; however, this surgery does not remove the underlying chest wall muscles (Mastectomy, n.d.; Breast Cancer Facts & Figures 2011-2012, n.d.). The aim of a mastectomy is to prevent any possibility of breast cancer reoccurring and spreading.

The various types of surgeries determine the remaining breast tissue for patients; thus, garment-fitting problems will vary due to the incision position and subsequent surgeries for post mastectomy women (Wilkerson, 1977). Additionally, the various options for recovery can cause inconsistencies in clothing solutions. Some post mastectomy women decide to have reconstruction surgery immediately following mastectomy while others opt to wait. Some patients decide not to have the reconstruction at all. Furthermore, some women opt for deconstruction, which is a decision to have the reconstructed area reversed/removed.

Physical Concerns

Mastectomy treatments help women survive breast cancer, but most patients are emotionally afflicted due to the amputation of their breast and surrounding tissues, underarm lymph nodes, and chest muscles (Chowdhary & Ryan, 2003). Baron et al. (2007) argued, post mastectomy patients will also suffer from numbness, tenderness, pulling, soreness, and tightness of their amputated area. These effects are also coupled with muscle atrophy, weakness, decreased range of motion, and different levels and types of pain after surgery. Forty-three percent of women suffer from post mastectomy pain syndrome (PMPS), which could be defined as neuropathic pain and includes numbness, "pins and needles" feeling, burning or stabbing sensations in the amputated area, such as in the axilla, arm, shoulder, or chest wall (Smith, Bourne, Squair, Phillips, & Chambers, 1999). Smith et al. (1999) indicated that sudden movements, tiredness, rubbing of clothing, cold weather, and coughing could cause pain symptoms. Additionally, clothing friction serves as one of the biggest catalysts of pain. However,

appropriate fabric and style selection of clothing can reduce the physical experiences of pain and distress for the post mastectomy women.

Furthermore, many post mastectomy patients experience Lymphedema (swelling of the arm and hand). After the lymph nodes have been removed or altered by radiation, patients' arms, hands, and breasts can be swollen and painful. This is the most common complication after surgery and can be either intermittent or permanent. Beard (2011) indicated that lymphedema leads to discomfort, limited movement, as well as a maximized risk of infection. It can be extreme enough to cause serious disfigurement, pain, or loss of functionality, resulting in psychological and social issues. Since this swelling can cause intense discomfort and size variation near the affected arm(s), the fitting of sleeves and the armscye area becomes another difficult clothing issue. All these difficulties, along with pain and loss of motion, can create emotional anguish, emotional distress, and social barriers (as cited in Beard, 2011, p.6).

According to a study by Jackson (2004), after a mastectomy, patients may undergo radiotherapy treatment, chemotherapy, and hormone therapy. The side effects of chemotherapy can cause nausea and vomiting, appetite loss, menopause and infertility, as well as partial/total hair loss, fatigue, weight gain, bone loss, and heart disease. This could also be accompanied by mouth sores, headaches, skin burning, and sensitive skin. Radiation is also known to increase the symptoms of lymphedema and skin discoloration. Side effects of hormone therapy, include hot flashes as well as blood clots, pulmonary emboli, vision problems, depression, nausea and vomiting, vaginal discharge, and even uterine cancer in women who are both overweight and undergo hormone therapy (Jackson, 2004).

Clothing can serve as a mental and physical barrier to the side effects of post mastectomy surgeries and other operations such as chemotherapy and radiation. Jackson (2004) pointed out

that Slater and Hatch indicated clothing offers a protective layer against pain and discomfort on the skin and surrounding areas, and it also "maintain[s] a neutral state, a term defined as a pleasant state of physiological, psychological, and physical harmony between a human being and the environment" (as cited in Jackson, 2004, p.27). Smith et al. (1999) noted the appropriate clothing style, fabric, and seam style selection can enhance the post mastectomy women's physical comfort by minimizing physical discomfort caused by pressure on the skin, particularly on the scar area by inappropriate styles, non-resilient fabrics, and firm and rough seams. Suitable clothing and fabrics can alleviate the pain arising from both skin tenderness and friction.

Psychological Concerns

Women diagnosed with breast cancer report being concerned with the pain associated with post treatment, the threat of future health concerns, the fears of physical defects, lack of feminine attractiveness, powerlessness, and ultimately the threat of losing life. Women may also feel breast cancer will change their normal life, and will make them feel different and isolated (Gao & Liu, 2007).

These mental activities and image dissatisfactions will make pre and post mastectomy patients experience anxiety, depression, negatively altered body images, and low quality of life (Tullio-Pow, Zhu, Schaefer, Kolenchenko, & Nyhof-Young, 2011). They are afraid to let other people know of their disease and are concerned that other people will notice their body changes (especially younger patients). According to Robert, et.al, (2003) young patients seem more anxious and depressed about their physical changes after a mastectomy. Overall, post mastectomy patients will experience different levels of negative feelings and deprecation about their body image because of their diminished attractiveness and femininity (Koutz, 2000).

Specialized clothing with particular fabric colors and patterns may alleviate the psychological concerns associated with the physical discomforts of breast amputation, lymphedema issues, skin burning, and skin discoloration because carefully selected colors and prints may cause a distraction. Furthermore, "General principles of design would dictate that heavy or short figures would look best in solid colors, vertical lines, curving lines, and random design motifs. Larger prints, plaids, or horizontal type designs work better on the slender well-proportioned figure. Indefinite outlines can break up space and direct where the eye goes" (as cited in Beard, 2011, p13).

According to Cash and Pruzinsky (1990), "Body image is a multifaceted construct encompassing one's perceptions, thoughts, feelings, and actions regarding one's body, particularly its appearance." A positive body image will develop and enhance a healthy and strong self-esteem. Meanwhile, fashion psychology is one way to increase the positive relationship between self-esteem, looking good, and feeling better (Chowdhary & Ryan, 2003). According to Paek (2000):

> Body image is gradually organized by means of all the influences affecting an individual which include constitutional factors, inner psychic experiences, sensory impressions, and environmental attitudes, together with the individual's interpretation of these influences and their integration into the total personality. The presence of disease or deformity in some part of the body can alter this body image or influence its subsequent organization, as can excessive attention by persons in the individual's environment to the body or some specific part of it. Body image is an orderly, maturational process and is constantly changing, undergoing reorganization and elaboration depending on the individual's present total life experience. (p. 2)

Based upon literature, breasts are the significant symbol and root of femininity and sense of attractiveness. If breast cancer patients consider themselves highly feminine and attractive largely because of the presence of their breasts before the surgery and treatment, they will have dissatisfaction with their alternate new body image after mastectomy (Carver, et al. 1998; Kraus,

1999). As Jackson (2004) specified, breast cancer survivors have "lowered self-esteem after diagnosis and treatment for cancer and that lowered self-esteem is linked to depression and insecurity."

Today's culture heavily idealizes the female figure, placing great emphasis on a woman's breasts. This results in post mastectomy patients feeling immense pressure to conform to societal notions of female attractiveness. In order to avoid the stigma of deviating from a socially perfect body and blemish-free appearance, many women opt to wear prostheses and/or alter their clothing choices accordingly (e.g., wearing high necklines to cover cleavage) in order to model a traditional female aesthetic, while others may use apparel to "camouflage less desirable characteristics and enhance attractive attributes" (Tullio-Pow et al, 2011). Conversely, for those with low self-esteem, clothing will serve as an adaptive function to bolster one's self-esteem. There is a very intimate relationship between bodies and their clothing. Clothing is a necessity of human life and one's social environment. People exploit clothing to cover their body, present a manner of dress, and to express their personal image of themselves. It plays a significant role in developing human self-identity, self-image, self-esteem, and self-respect (Kaiser, 1997; Eicher, 1981, Jackson, 2004).

Clothing

Clothing has been described in several studies as not only covering the body, but also as a comprehensive term to include body modifications and supplements. It can generate social approval and psychological satisfaction (Chowdhary, 2008). Jackson (2004) noted that "Clothing is a silent communicator and an outward symbol that expresses meaning and gives others information about us. The appearance or outer image that develops through this expression of

meaning is an interpretation of the psychological components of who we are." It plays a major role in appearance and social construction of identity.

In a study by Feather et al. (1989), most post mastectomy women consider appearance to be significant for both social events and informal situations. However, Jackson (2004) stated, "Changes due to treatment for breast cancer cause alteration in human system processes and therefore may change the process used to evaluate clothing. Physical comfort issues may increase as clothes interact differently with a changed body. Psychological and social comfort may be affected when a woman has an altered outer image, as well as an altered internal feeling about her body." Furthermore, a mastectomy robs women of versatility of clothing and dressing. It takes away their freedom of expression and personality through clothing. It appears, based upon literature that post mastectomy women choose to wear loose blouses, tops, or dresses without darts or princess lines in order to avoid extra space or gaps between breast area and clothing. They may choose high necklines or long sleeves to cover their scars. Because of the limited clothing selection, patients must change their entire style for their future life.

However, the challenge exists in providing clothing to a mass audience of women in need. Since there are multiple variations of body changes that can occur based on which type of breast cancer treatment and surgery must be performed, the determination of clothing fit, comfort, selection, and general aesthetics may vary by patient. Chowdhary (2000, 2002) argued that if the post mastectomy patient could have appropriate clothing that allowed her to enjoy the freedom, expression, and personality that comes with dressing again, in addition to comfort and function, it would positively affect the women's attitudes and would enhance their self-esteem (as cited in Chowdhary & Ryan, 2003, p.37).

Gupta (2011) stated “All clothing is known to perform multiple functions- from aesthetic to basic protection from the elements. ‘Functional clothing’ can therefore be defined as a generic term that includes all such types of clothing or assemblies that are specifically engineered to deliver a pre-defined performance or functionality to the user, over and above its normal functions.” The clothing designed for post mastectomy women requires clothing that performs a purely aesthetic function to enhance their altered body shape. It is also ergonomically designed to have a minimum inhibitory effect on fit and movement while providing maximum physical and psychological comfort to the clients.

Design Process

Bodice Sloper or Block. “Every piece of clothing requires a process to convert rectangular fabric into a form useful for human needs. Flat patternmaking is one of the ways to achieve this conversion” and involves turning a 2D outline pattern into a 3D garment (Kim & Kim, 2014). There are several ways to create a pattern, “but the conventional way is to use a set of slopers or blocks of a specific size to represent fundamental shapes and sections of the body (such as the bodice, sleeve, skirt and trouser) and use these as the basic pattern piece outlines” (Parish, 2013). The basic pattern sloper or block includes five pieces: front bodice, back bodice, front skirt, back skirt, and a long sleeve.

A sloper or block is a basic pattern that follows the natural lines of the body and is developed from the body measurements of a live model or a dress form mannequin, which will fit and represent its basic dimensions. Usually, the sloper or block has no seam allowances, style lines, or design features. It is also referred to as a basic pattern, sloper pattern, block pattern, or foundation pattern (MacDonald, 2010). Herein, this basic pattern will be called a block. Because the block is created based on body measurements to provide a basis for pattern design, it can be

used to generate patterns for drafting a garment to fit the human torso. Thus, it is a significant component for creating and modifying the pattern. Joseph-Armstrong (2010) indicated that:

> Creating basic patterns begins with a two-dimensional piece of paper (for drafting) or muslin (for draping). The dimensions of the form or model takes up the necessary space within the paper or muslin, giving shape to the basic patterns. The remaining paper or cloth is cut away.
>
> Patterns confine the dimensions of the figure by a series of straight lines (shoulder, side seams, skirt- below hip) and curved lines (necklines, armholes, skirt—above hip). Wedges that appear at the pattern's edge are directed to the apex of the bust, shoulder blade, abdomen, and buttock. Wedges are called darts.
>
> Darts retain form or model measurements by confining unneeded fullness at the pattern's edge and gradually releases fullness and terminates at or near the apex of the bust, shoulder blades, buttocks, and abdomen…It is the dart that converts a two-dimensional pattern into a three-dimensional garment. (p. 39)

Thus, darts are an important component to converting a flat fabric from a 2D into a 3D version. However, since the bodies of post double mastectomy women change, their clothing bodice block would be different from standard women's bodice blocks. Because of the breast area alteration, post double mastectomy women's upper body shapes are similar to men's upper body shapes. Thus, a women's bodice block was adapted utilizing principles of drafting a men's bodice block. Together, the two drafting processes combined to create a new bodice block for post double mastectomy women without a bust dart or shoulder dart. This bodice block would fit a flat chest, but provide a more purely aesthetic function to enhance their altered body shape.

Design Process of Bodice Block. The design process is used in many fields such as education, psychology, and philosophy, because of its benefit of developing creative thinking. It is also used in architecture and engineering design, as well as theories and practices relating to industrial product design and fashion design (LaBat & Sokolowski, 1999). LaBat and Sokolowski (1999) pointed out design processes used in fields that focus on the design of three-dimensional structures and spaces were reviewed. There are three major stages: problem

definition and research, creative exploration, and implementation. The three stage design process can be utilized in all applied design fields. Many design researchers have revised/refined this processes to fit their needs. As Bye and Hakala (2005) illustrated:

> The complex task of identifying and translating needs into garment attributes is accomplished through the design process. Several researchers have presented similar steps in their description of the design process (LaBat & Sokolowski, 1999; Lamb & Kallal 1992; Orlando, 1979; and Tan, Crown, & Capjack, 1998). A general summary of the design process proposed by Watkins (1995) uses terms adapted from Koberg and Bagnall (1981). The steps include accept, analyze, define, ideate, select, implement, and evaluate. (p. 46)

The design process aids designers to construct their design inspirations and visualize the design concepts, which the creator wants to express, but it is not a linear task. Rather, it involves multiple cognitive functions including internal and external ideation searches, application of aesthetic needs and desires, and an intentional effort to evaluate and repeat the process of ideation until a good design is achieved (as cited in Au, Taylor, & Newton, 2016).

The purpose of this study was to gather clothing and styling data from women who have undergone a double mastectomy concerning their preferences and demands on a flat garment. New bodice blocks were developed based on a post double mastectomy woman's body measurements.

Chapter III

Methodology

The primary goal of this study was to test the research questions regarding clothing preference and clothing expenses of women who experienced double mastectomy. The research questions are as follows:

1. Are post double mastectomy women willing to purchase clothing that fits a flat chest?
2. Have post double mastectomy women changed their clothing style preferences?
3. Are post double mastectomy women spending more or less money on their clothing?

The hypotheses are as follows:

H1: More post double mastectomy women are willing to wear clothes designed to fit their flat chest, if available.

H2: More post double mastectomy women changed clothing styles since their body shape change.

H2-a: More post double mastectomy women prefer to wear altered clothing.

H2-b: More post mastectomy women wear casual rather than professional or dressy clothing.

H2-c: More post mastectomy women like solid fabrics over patterned fabrics.

H3a: More post double mastectomy women spend more money on clothing.

H3b: More post double mastectomy women are willing to spend more money on clothing, designed to fit their flat upper body.

Instrumentation

Fit & Style Survey. The purpose of this research was to determine clothing preferences for women who have undergone double mastectomy surgery without reconstruction or have had deconstruction. A survey was developed to explore how to solve for, or satisfy, the problems and

demands associated with the post mastectomy flat chest. The survey was administered to an online social media group whose members have chosen to live "flat" after a double mastectomy. The results were analyzed and used to create a basic block that removed the extra room traditionally included for breasts. The block was then utilized to create a test garment for fit on a flat-chested subject. The survey contained 42 questions sorted into four sections: (1) demographic information, (2) clothing sizes, (3) clothing and fabric preferences, and (4) clothing expenditures (Appendix A). The survey was posted on a social media page and completed by a growing non-profit organization, which is a female post mastectomy cancer survivor group. The survey was approved by the Institutional Review Board for the University of Arkansas (Appendix B).

Demographic Information. The first section of the survey, questions 1-5, asked the participants to provide demographic information that included age, country of residence, ethnicity, occupation, and type of mastectomy. Since this survey was sent to a female social media group, the gender was not included in the survey. All questions of demographics were multiple choice, single-answer questions. For instance, participants were asked to select their age range from among the following: A: 20-29, B: 30-39, C: 40-49, D: 50-59, E: 60-69, F: 70-79, and G: 80+. Nationality was listed as A: The United States, B: Canada, C: South America, D: Europe, E: Middle East, F: Asia/Pacific Islands, G: Africa, H: Australia, I: Other. Types of mastectomy surgeries were listed as A: A Bilateral (double) Mastectomy, B: A Single Mastectomy, C: A Partial Mastectomy, D: Other.

Clothing Size. In the second section of the survey, questions 6-13, participants were asked to provide their current height, weight, body size and clothing size information. This section started with two tables, one containing standard sizes based on height and weight, the

other containing standard sizes based on nationality. Participants could refer to these two tables while responding to questions about apparel sizes.

Questions 6-7 required participants to report their height and weight. Questions 8-12 asked participants to select their correct top, dress, jeans, pant, and skirt sizes, with two size options: XS-XXL and 0-20. Question 13 was a drop-down menu that required participants to characterize their proportions (Narrow, Average, or Wide/Short, Average, or Long) in shoulder, arms, torso, hips, and legs.

Clothing and Fabric Preferences. In section three, questions 14-35, participants were asked to select their favorite clothing styles and fabrics. Questions 14-15, 16-17, 19-20, and 29-30 asked participants to select shopping area preferences, fitting preferences, style preferences, and pre and post mastectomy fabric/fiber preferences. Questions 18 and 35 were Yes/No questions; participants were asked to say whether they changed their style after mastectomy and whether they would wear prostheses if they had suitable clothing options. Questions 21-23 and 25-27 were multiple-choice questions that allowed for multiple answers about clothing style issues and fabric color preferences. For question 32, participants were required to rate on a Six-Point-Likert-type scale, the importance of each characteristic of clothing: A: style, B: texture/fabric, C: price, D: comfort, E: branding, F: quality, and G: other. The scale was rated from 1-6, with 1 representing "Least important" and 6 representing "Most important."

Clothing Expenditures. Question 36-42 were designed to explore the participants' clothing costs. These were all multiple-choice, single-answer questions except for 41 and 42, which were Yes/No questions. Question 36 asked participants to indicate how often they purchase new clothes. Questions 36-40 asked participants to provide their monthly clothing expenditures and recent expenditures on tops, dresses, and bottoms. Questions 41 and 42 asked

participants that if they would spend more money on clothing that is designed to fit their flat chest.

Measure. The independent variables in this study comprised the mastectomy survey type and demographic variables. Part one of the questionnaire required participants to answer the aforementioned demographic variables of age, residence, ethnicity, occupation, and mastectomy surgery type. Since this study was focused on female post mastectomy survivors, gender was not included in the survey demographics.

The dependent variables of the study were clothing selection preferences such as participants' size, shopping area, style, fabric (texture, color, and pattern), and expense of clothing.

Population and Sample

The target population of this study was women who were members of a social media group, and have undergone a double mastectomy without reconstruction or using prostheses. This league of members seeks to support and empower females who have received a double mastectomy and choose to live without breast reconstruction or wear a breast form/prosthesis following surgery. Their mission is to envision a society in which beauty is not defined by "one size fits all."

Data Collection Procedure

After receiving approval from the University of Arkansas Institutional Review Board (IRB) (Appendix C), the survey was posted as a link on a social media group page platform for ten days from June 23, 2016 to July 3, 2016. All female members between ages 20 to 80 and over who have previously had a mastectomy were eligible to participate in this research study. Participants were informed of the purpose of this study, as well as participants' rights,

researcher's contact information, and the survey link on a social media site. Qualtrics, an online based website software, was utilized to create the online survey.

Data Analysis

Data was collected though the online survey and was analyzed by using Statistical Package for the Social Science, IBM SPSS Statistics, version 23. The descriptive analysis was applied to summarize frequencies of independent and dependent variables as well as identify any associations and relationships. The frequency and percentage distributions were applied to the data using means, percentages, standard deviation and standard error for questions. Three questions were addressed in this study, and data analysis was conducted for each research question.

Research questions:

1. Are post double mastectomy women willing to purchase clothing that fits a flat chest?
2. Have post double mastectomy women changed their clothing style preferences?
3. Are post double mastectomy women spending more or less money on their clothing?

Chapter IV

Results

This study intended to investigate post double mastectomy women's clothing and fabric preferences, and clothing expenses before and after mastectomy surgery. The purpose of this study was to gather and analyze the data of post double mastectomy women regarding their clothing preferences and demands to create a no dart and a one waist dart bodice blocks.

All data from the instruments were analyzed by using the IBM SPSS Statistics data analysis software for testing hypotheses. Descriptive statistics were employed to analyze and summarize all research questions and hypotheses in conjunction with chi-square to test hypotheses.

The hypotheses were:

H1: More post double mastectomy women are willing to wear clothes designed to fit their flat chest, if available.

H2: More post double mastectomy women changed clothing styles since their body shape change.

H2-a: More post mastectomy women prefer to wear revealing clothing.

H2-b: More post mastectomy women wear casual rather than professional or dressy clothing.

H2-c: More post mastectomy women like solid fabrics over patterned fabrics.

H3a: More post double mastectomy women spend more money on clothing.

H3b: More post double mastectomy women are willing to spend more money on clothing, designed to fit their flat upper body.

Sample Characteristics

The survey was posted on the social media group page for ten days. A total of 95 voluntary participants (100% female) responded to the online survey. Although several of the surveys had missing responses, all surveys were used to analyze the data. The age range of the participants was from 20 to 80 and over. In question number one, the age had been divided into seven groups (e.g. 20-29, 30-39… 80+). Forty percent (n = 38) of the females were in an age range from 50 to 59 years old, followed by 30.53% (n = 29) between 40 to 49 years old (Table 1). The majority of the participants (95.8%, n = 91) reported their ethnicity as white (Table 2).

Table 1: Age Range of Participants (N = 95)

	%	Frequency (n =)
20-29	1.1	1
30-39	7.4	7
40-49	30.5	29
50-59	40	38
60-69	17.9	17
70-79	2.1	2
80 +	1.1	1

Table 2: Ethnicity of Participants (N = 95)

	%	Frequency (n =)
White	95.8	91
Hispanic or Latino	2.1	2
Black or African American	0	0
Native American	1.1	1
Asian/Pacific Islander	0	0
Other	1.1	1

Due to a missing response for question number two, there were only 94 responses. Nonetheless, a majority of participants (87.4%, n = 83) were from the United States (Table 3).

There were 22 (23.2%) participants whose occupation was engaged in education, followed by 15 retired (15.8%), 14 homemaker (14.7%), and 12 finance/management/business (12.6%) with total participants of N = 93 (Table 4).

Table 3: Country of Residence of Participants (N = 94)

	%	Frequency (n =)
The United States	87.4	83
Canada	5.3	5
Australia	3.2	3
Other	3.2	3

Table 4: Occupation of Participants (N = 93)

	%	Frequency (n =)
Art/Design	4.2	4
Education	23.2	22
Finance/management/Business	12.6	12
Homemaker	14.7	14
Law	1.1	1
Medicine	6.3	6
Military	0	0
Retail	1.1	1
Self-employed	6.3	6
Student	0	0
Technology	2.1	2
Retired	15.8	15
Other	10.5	10

Of the total sample size, 93.68% (n = 89) of participants experienced a double mastectomy and 6.32% (n = 6) had a single mastectomy as illustrated in Table 5. A majority of participants indicated their height within the range of 5’0”to 5’11” (94.7%, n = 95), and the majority weight range was 140-160 pounds (27.4%, n = 6), followed by 22.1% (n = 22) of

participants within the range of 120-140 pounds (Table 6 & 7). The largest percentage of participants reported that they wear a medium top size (34.7%, n = 33), medium dress size (31.6%, n = 30) and medium skirt size (33.7%, n = 32). Most participants purchase size 32-33 for jeans, size 10-11 and 12-13 for pants (both pant sizes sharing the same frequency of n = 14).

Table 5: Types of Mastectomy Participants (N = 95)

	%	Frequency (n =)
Bilateral (double) Mastectomy	93.7	89
Single Mastectomy	6.3	6
Partial Mastectomy	0	0
Other	0	0

Table 6: Height Range of Participants (N = 95)

	%	Frequency (n =)
4'0"- 4'11"	2.1	2
5'0"-5'11"	94.7	90
6'0"-6'11"	3.2	3

Table 7: Weight Range of Participants (N = 95)

	%	Frequency (n =)
Less than 100lbs	0	0
100-120lbs	5.3	5
120-140lbs	22.1	21
140-160lbs	27.4	26
160-180lbs	20	19
180-200lbs	7.4	7
200+	17.9	17

Hypotheses Testing

Based on the study, three research questions were addressed. Descriptive statistics and Chi-square tests were used to analyze all hypotheses.

Research Question One: Are post double mastectomy women willing to purchase clothing that fits a flat chest?

Hypothesis 1: More post double mastectomy women are willing to wear clothes designed to fit their flat chest, if available.

Research question 35 was created to measure post double mastectomy participants' aspirations of purchasing newly designed clothing that will fit their new upper body shape. Participants were asked whether they are willing to wear a prosthesis if they have the option to wear clothes that will fit their flat chest. Participants that indicated they wear a prosthesis were coded as 1 = "Yes," while the participants who chose to not wear a prosthesis were coded as 2 = "No." A third option of 3 = "Depends" was given for participants who could not decide whether or not to wear a prosthesis. Descriptive statistics were used to analyze the result of their inclinations in conjunction with Chi-square(χ^2) to test hypothesis 1. H_0: the frequencies of all selections are distributed evenly.

A total of 93 participants responded to question 35. A strong majority of the participants (82.1%, n = 78) chose not to wear a prosthesis if there was suitable clothing designed to fit their flat chest (Table 8). According to the Chi-square goodness-of-fit test ($\chi^2(2) = 107.290$, $p < 0.001$), H_0 is rejected. There were statistically significant differences in the frequency of three selections of post double mastectomy women's inclinations of willing or not willing to purchase clothing that fits their flat chests. Thus, alternative H1 was supported, which indicates that more participants are willing to wear clothes designed to fit their alternate body shape.

Table 8: Preference to Wear a Prosthesis if Clothing Fit Flat Chest (N = 93)

	%	Frequency (n =)
Yes	5.3	5
No	82.1	78
Depends, please explain	10.5	10

Research Question Two: Have post double mastectomy women changed their clothing style preferences?

Questions 16 through 34 explored the participants' clothing preferences before and after double mastectomy. The questions referred to shopping preferences, style preferences, fabric color and texture preferences, and style changes after mastectomy. The outcomes showed that before mastectomy surgery, 43.2% (n = 41) participants wore mostly loose clothing, while after surgery the percentage increased to 56.8% (n = 54) (Table 9). Also, 83.2% of participants who used to wear casual wear increased to 88.4%.

Table 9: Fitting Preference Before and After Mastectomy (N = 95)

		%	Frequency (n =)
Before	Mostly Tight	20	19
	Straight	23.2	22
	Mostly Loose	43.2	41
	Oversized	8.4	8
	Others	5.3	5
After	Mostly Tight	9.5	9
	Straight	15.8	15
	Mostly Loose	56.8	54
	Oversized	12.6	12
	Others	5.3	5

The majority of participants in this study (58.9%, n = 56) chose to never wear a prosthesis after a double mastectomy. Because of their changed body shape and no supporting garments, participants considered clothing with darts around the bust area (84.2%, n = 80), clothing with a plunging neck line/low cut (75.8%, n = 72), clothing with large armholes (55.8%, n = 53), and strapless clothing (53.7%, n = 51) to be more difficult to wear, however, these styles were still desired (Table 10). The casual chic (35.8%, n = 34) and bohemian chic (25.3%, n = 24) were the top two styles followed by the classic style (20%, n = 19) that participants would like to incorporate into their wardrobe. Comfort was ranked as the most important characteristic when they select and purchase clothes.

Table 10: Top and Dress Difficulty of Fit for a Flat Chest (N = 95)

	%	Frequency (n =)
Tank Top	31.6	30
Low Back	6.3	6
Clothing with Darts around Bust Area	84.2	80
Plunging Neckline/Low Cut	75.8	72
Sleeveless	14.7	14
Large Armholes	55.8	53
Strapless	53.7	51
Other	11.6	11

For the fabric selection, 81.1% (n = 77) of participants preferred natural fiber fabrics such as cotton, silk, linen, and wool. More than 40% of participants indicated they were not sensitive to any fabrics/fibers, but 29.5% would avoid wearing synthetic fiber fabrics after mastectomy due to sensitivity. The top five most preferred colors were: black, blue, purple, teal, and pink. The top three colored and patterned fabrics they preferred to avoid were: yellow, orange, gold, critter prints, animal prints, and polka dots.

Hypothesis 2: More post double mastectomy women changed clothing style since their body shape changed.

Survey question 18, "Has your style changed as a result of your mastectomy surgery?" was created for alternative H2. The selections for this question were coded as 1 = "Yes," 2 = "No." H_0: the frequencies of all selections are distributed equally. Based on the results, a strong majority of participants (77.9%, n = 74) selected "Yes," which indicated their style had been changed due to a change in their bust area. Moreover, from the result of Chi-square, a significant difference ($\chi^2(1) = 29.456$, $p < 0.001$) was found for women whose clothing style changed post double mastectomy. Thus, it can be concluded that more double mastectomy women changed their clothing style after surgery.

Hypothesis 2-a: More post double mastectomy women prefer to wear altered clothing.

Survey question 34: "Do you alter clothes to fit your new flat and fabulous body?" was designed to test the H2-a. The selections were coded as 1 = "Often," 2 = "Occasionally," 3 = "Rarely," 4 = "Never," 5 = "I would if I knew how to sew." According to the data, only 28.4% (n = 27) of participants never altered their clothes. There were 21.1% (n = 20) of participants who altered their clothes to fit their flat body, and 29.5% (n = 28) would alter clothes if they knew how to sew (Table 11). Forty-nine point five percent (n = 47) of participants reported they never/rarely alter their clothes. Although the Chi-square result ($\chi^2(4) = 18.842$, $p = 0.001$) indicated a significant difference for all selections, more post double mastectomy women did not wear altered clothing. Thus, H2-was not supported.

Table 11: Frequency of Clothing Alterations Post Mastectomy (N = 95)

	%	Frequency (n =)
Q34: Do you alter clothes to fit your new flat and fabulous body		
Often	5.3	5
Occasionally	15.8	15
Rarely	21.1	20
Never	28.4	27
I would if I knew how to sew	29.5	28

Hypothesis 2-b: More post double mastectomy women wear casual rather than professional or dressy clothing.

Question 20 was designed to test H2-b and to explore the clothing style preferences of double mastectomy women before surgery. The four selections were 1 = "Business"; 2 = "Casually"; 3 = "Date Night/Night Out"; and 4 = "Cocktail/Wedding/Special Event." H_0: the frequencies of all selections are distributed evenly. The frequencies and percentages of clothing styling preferences are shown below (Table 12).

Table 12: Frequency of Clothing Style Preferences After Mastectomy (N = 95)

	%	Frequency (n =)
Business	11.6	11
Casually	88.4	84
Date Night/Night out	0	0
Cocktail/Wedding/Special Event	0	0

From the data of question 19-20, there were no substantial changes of style preferences before and after surgery. Most mastectomy women continue to choose to wear casual clothing rather other clothing styles. Moreover, based on Chi-square test of survey question 20, there was a significant difference ($\chi^2(1) = 56.095$, $p < 0.001$) between all selections. Thus, H_0 is rejected and H2-b was supported by Chi-square result.

Hypothesis 2-c: More post double mastectomy women like solid fabrics over patterned fabrics.

The selections for question 24 (Do you prefer patterns or solid colored fabric?) were coded as 1 = “Patterns”; 2 = “Solids”; 3 = “Both”; and 4 = “No preference.” The findings indicated that 55.8% (n = 53) of participants preferred both patterns and solids colors (Table 13). Although Chi-square result showed significant differences in color and pattern fabric preferences, ($\chi^2(3) = 52.298$, $p < 0.001$), the selection 3 = “Both” was not a variable in alternative H2-c. Therefore, H2-c was not supported.

Table 13: Overall Fabric Color and Pattern Preferences (N = 94)

	%	Frequency (n =)
Patterns	18.9	18
Solids	16.8	16
Both	55.8	53
No preference	7.4	7

Based on all the results, the researcher concluded that post mastectomy women had changed their style and were not satisfied with their current style and clothing after experiencing a double mastectomy surgery. H2 and H2-b were supported while H2-a and H2-c were not supported.

Research Question Three: Are post double mastectomy women spending more or less money on their clothing?

Questions 36-42 were designed to analyze how much money post double mastectomy women spend on their clothing. Based on the questions, participants needed to select the expenses on tops, dresses, and bottoms. The majority of participants (41.1%, n = 39) purchased new clothing a few times a year, and 41.1% (n = 39) spend $50-$100/month (Table 14).

Table 14: Clothing Expenses Post Mastectomy (N = 95)

	%	Frequency (n =)
How Often to Purchase New Clothes		
Few Times a Year	41.1	39
Once a Month	32.6	31
Couple Times a Month	23.2	22
Every Week or More	2.1	2
Miss Value	1.1	1
Clothing Expenses- A Month		
Less than $50	38.9	37
50- $100	41.1	39
$100-$150	6.3	6
$150- $200	7.4	7
$200- $300	4.2	4
Over $300	2.1	2
Current Expenses		
Tops		
Less than $25	41.1	39
$25- $50	40.0	38
$50-$75	12.6	12
$75- $100	2.1	2
Over $100	3.2	3
Missing Value	1.1	1
Dresses		
Less than $50	49.5	47
$50-$75	25.3	24
$75- $100	13.7	13
$100- $150	4.2	4
Over $150	4.2	4
Missing Value	3.2	3
Bottoms		
Less than $50	55.8	53
$50-$75	29.5	28
$75- $100	7.4	7
$100- $150	5.3	5
Over $150	1.1	1
Missing Value	1.1	1

Hypothesis 3a: More post double mastectomy women spend more money on clothing.

Participants were asked to respond to the choice of whether they spend more/less on their clothing after mastectomy (Question 41). H_0: the frequency of all selections distributed evenly. According to the frequency and percentage results, 23.8% (n = 22) of participants chose "Yes, I spend more"; 21.1% (n = 20) of participants chose "No, I spend less"; and 15.8% (n = 15) of participants chose "I am not sure." The most common response of participants, 40% (n = 38), chose "Did not change." Based on Chi-square result, $\chi^2(3) = 12.495$, $p = 0.006$, the four selections were not equally distributed. H_0 is rejected. Since more participants chose "Did not change," the alternative H3a was not supported.

Hypothesis 3b: More post double mastectomy women are willing to spend more money on designer clothing, designed to fit their flat upper body.

The descriptive analysis was also applied to illustrate the percentage and frequencies of participants who selected "will or will not spend more money" on designer clothes that will fit their flat chest. If respondent chose yes, it was coded as 1 = "Yes," the respondents who chose no were coded as 2 = "No," and "Maybe" was coded as 3. The H_0 of H3b: the frequency of all selection distributed evenly. Based on the 95 participants, more than half 56.8% (n = 54) of participants selected "Yes," while 12.6% (n = 12) participants chose "No," and 30.5% (n = 29) of participants reported it would depend on the clothing cost, style, material, and fit to decide as to whether they would spend more money on clothing designed for a flat upper body. In addition, the significant differences in frequencies of the three selections, χ^2 (2) = 28.189, $p < 0.001$, were found to exist between willing and not willing to spend more money on suitable clothes. H_0 was rejected, and H3b was supported by testing results.

Block Design Process

There are more and more post double mastectomy women who chose to live flat, without having reconstruction surgery or using prostheses. Although the desire for appealing clothing for post mastectomy women is present, currently there is limited ready-to-wear clothing for this special group (Beard, 2011).

In this study, a survey was developed to explore post double mastectomy women's clothing preferences and expenses. Based on the research results, most participants had changed their clothing style post mastectomy. More than 45% of participants had experienced having to adjust the clothes to fit their body, while over 25% of participants would alter their clothing if they knew how. They also indicated that they would spend more money if there were clothes designed for them. Based on the results, it appears that the current available clothing styles do not meet most post double mastectomy women's clothing demands.

Based on basic bodice block-creating processes in the book *Principals of Flat Pattern Design* (MacDonald, 2010) and a video— "Lesson 1- Basic Bodice" from the Studio LOT13 website (Studio LOT13, 2014), the bodice block pattern with bust and waist darts for the creative process was utilized. It was revised to develop two new bodice blocks, one with no darts and one with only a small waist dart. These two blocks have the potential to meet the post double mastectomy women's altered body fitting needs. As previously mentioned, darts play a significant role in converting a 2D fabric into 3D curve shaped garments. However, the function of the waist darts in a new developed block only serves to reduce the extra fabric or ease to help fit post double mastectomy women's waist area, and to provide the design function and diversified style selection for post double mastectomy women.

Generally, because of the breast structure of most females, one or more wider or deeper darts are required on the women's bodice block to reduce the fullness at the waist. Typically, the

same block process principles apply to girls' and boys' body blocks since there are no bust darts required on the basic block. However, as young girls' bodies mature, the most significant area of physical development is the breast area. LiEr (2010) indicated that since the body shape changes, their front body block structure will be significantly different, but their back shape will not change with the exception that the measurements will be bigger and wider. The back block for women is drafted in a similar manner as girls, and boys. The primary difference found on the women's bodice front block requires more sloping side seams and waist darts. Occasionally, waist darts are drafted onto the women's back block as well to help support the structure of the garment over the curves of her breast area (LiEr, 2010).

In the typical front block design, there are two darts, one originating from the waist and one originating from the side seam. The dart is a significant element that converts a 2D pattern into a 3D garment. "Darts retain form or model measurements by confining unneeded fullness at the pattern's edge and gradually releases fullness and terminates at or near the apex of the bust, shoulder blades, buttocks, and abdomen" (Joseph-Armstrong, 2010). Besides the waist dart, there are other common positions of the front bodice bust-enhancing dart: 1) French dart, 2) straight (side) dart, 3) mid-armhole dart, 4) t-shoulder tip dart, 5) mid-shoulder dart, 6) mid-neck dart, 7) center front neck dart, 8) center front bust level dart, 9) center front waist dart (Joseph-Armstrong, 2010). However, after a double mastectomy surgery, the women's upper body changes from curvy to flat, which is making their bodies more similar to young girl's bodies. Thus, aspects of the young girl's body block principles should apply to post double mastectomy women's body blocks. The difference between women's, young girl's, and children's body blocks are darts and measurements of added ease. Generally, there are no darts on the children's body block. Ease is very important for comfort and fit of the garment, since the body expands

and contracts during movements. Ease amount will depend on gender, garment type, fabric type, and overall shape (Studio LOT13, 2014). In order to make the block fit post double mastectomy women two prototypes were developed, one with no bodice darts, and one with a small waist dart.

Before creating the bodice block, measurements were extracted from a volunteer who had undergone a double mastectomy without reconstruction. Usually, when creating a basic dart block, the required measurements are: chest width, upper bust circumference, bust area, and under bust circumference. All of these measurements are used in conjunction to calculate the dart measurement amount. The volunteer's body measurements are shown in Table 15.

Table 15: Volunteer's Body Measurements

Bodice Front Measurement	
1	Center Front (Front Collarbone To Waist) = 14"
2	Bust/Chest Circumference (CF to CF) = 32" plus 2" ease divided by 2 = 17" (CF to CB)
3	Waist Circumference = 30"
4	Front Waist (Side Seam to CF) = 7 ½"
5	Neck Width = 5 ½" divided by 2 = 2 ¾"
6	Shoulder Length (Neck to Should/Armhole point) = 4 ½"
7	½ Front Width (Armhole to Center Front) = 6 ½"
8	Bust Span (Right Apex to Center Front) = 8" (standard) divided by 2 = 4"
9	Front Dart Placement = 4"
10	Armscye Depth = 8 ¾" with 1" ease
11	Bust Depth (Shoulder/ Neck to Apex) = 9 ½ to 10"
12	Front Shoulder Width (Shoulder Point to Shoulder Point) = 17" divided by 2 = 8 ½" plus ½" = 9"

Table 15 (Continued)

Bodice Back Measurement	
1	Center Back (Nape Point to Waist) = 15”
2	½ Back Width (Center Back to Armhole Plate) = 6 ¼“ plus ¼” ease = 6 ½”
3	Armhole Depth (1" Below Armhole Plate at Side Seam) = 8 ¾”
4	Back Full Length (Shoulder to Waist) = 17 ¾”
5	Back Dart Placement (Center Back to Princess line) = 4 ¼”
6	Back Neck Width (Calculated from Front Neck Width) = 5 ½”
7	Back Shoulder Width = 17” divided by 2 = 8 ½” plus ½” = 9”

An Adaptation of Creating Block Process

No Dart Block. Based on the Video, “Lesson 1- Basic Bodice” (Studio Lot13, 2014) and the book *Principals of Flat Pattern* (McDonald, 2010) the no dart block steps 1 through 3 were designed by the researcher to create a rectangle as a base for the block development processes. Step 4 was followed by the book *Principals of Flat Pattern Design* (McDonald, 2010), which divided the rectangle into two equal parts in order to draw the front and back block at once. Then steps 5 and 6 created the neckline and shoulder line. These steps were edited from the steps of Studio Lot13 (2014). Step 7 of adding armscye ease was based on McDonald (2010). Step 8 was revised front neckline creating steps of “Lesson 1- Basic Bodice.” In the “Lesson 1- Basic Bodice” video (2014), Studio Lot13 created a shoulder side dart on the basic block. Since post double mastectomy women do not have a curved bust area, the shoulder point dart was not necessary. Instead of adding a dart from the shoulder point in step 9, the shoulder line was drawn directly from shoulder point “l” with the volunteer’s shoulder measurement. Steps 10 through 15 show the creation of the armscye line, as shown in the video (Studio Lot13, 2014). Since there are no bodice darts, step 16 was to design and finish the waist measurement.

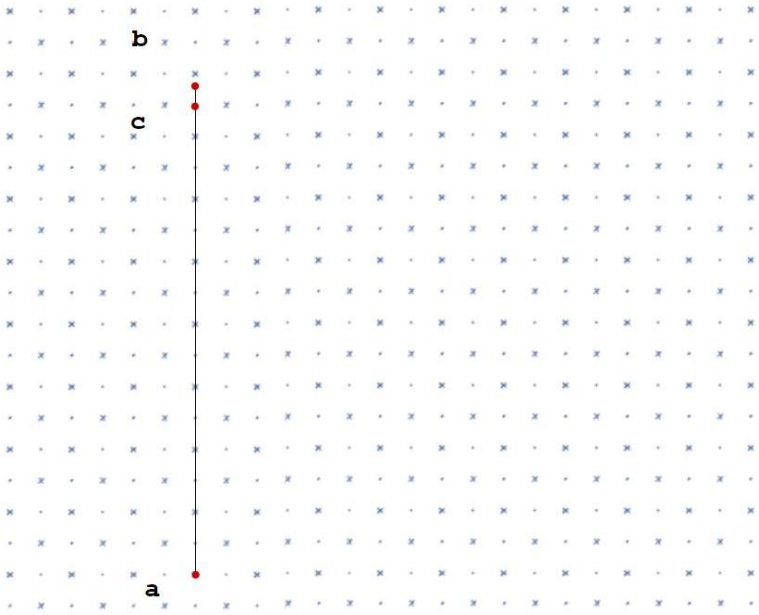
One Waist Dart Block. Steps 1 through 15 were repeated for the no dart block creating process. Since this is a one-waist dart block, step 16 was to locate the back block waist dart position. This step was revised from the waist dart creation process of "Lesson 1-Basic Bodice" video. In the video, the basic front block contains a shoulder point dart. However, due to post double mastectomy women's altered body shape, the shoulder point dart was deducted from the newly developed block (see step 9). Thus, in step 17, instead of following Studio Lot13 to use shoulder dart bust point as a pivot point to draw the waist dart, the half standard apex measurement was used to locate the pivot point to determinate front waist dart positions. Step 18, according to dart point rule, the apex point was lowered one inch down as a repositioned bust point. In addition, according to the waist dart measurement formulas provided in "Lesson 1-Basic Bodice" video, the new waist dart measurement formulas were designed for post double mastectomy women.

All steps displayed below were created on a CAD program: Lectra Kaledo Designer software.

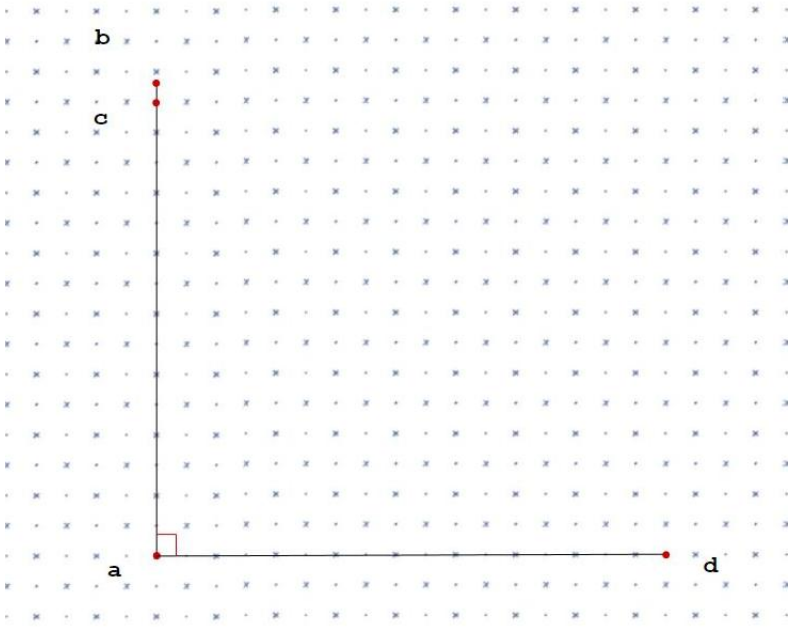
No Dart Block Creating Process

1. Starting from point **a**, vertically draw a line to point **b** with the Center Back measurement of 15" + ¾'' + 1" ease = 16 ¾". This line will be called line **ab**. Starting from point **b**, locate a new point ¾" from point **b** and label as point **c**. The line **ac** will represent the Center Back. Point **c** represents the neckline point, which is also called nape point.

**All body measurements of this creation process are based on Table 15

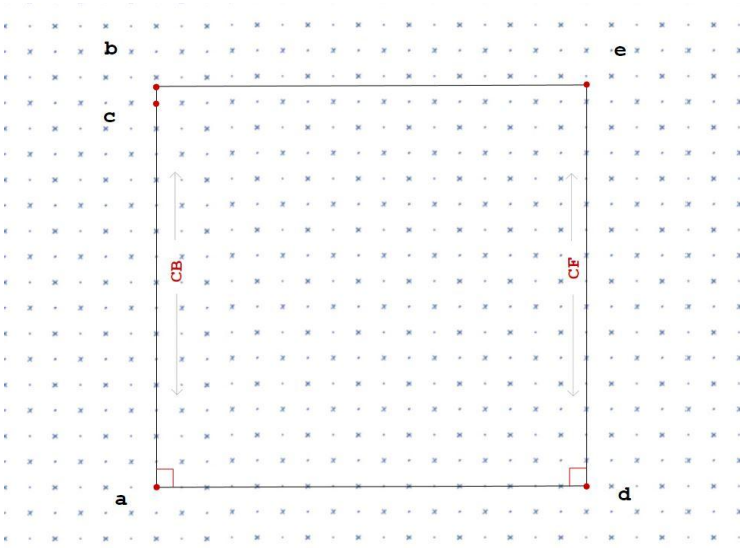


2. From point **a**, horizontally draw line **ad** (at a 90° angle) with half of the bust/chest circumference measurement + 1” ease (for this example, half circumference = 16” + 1” = 17”).

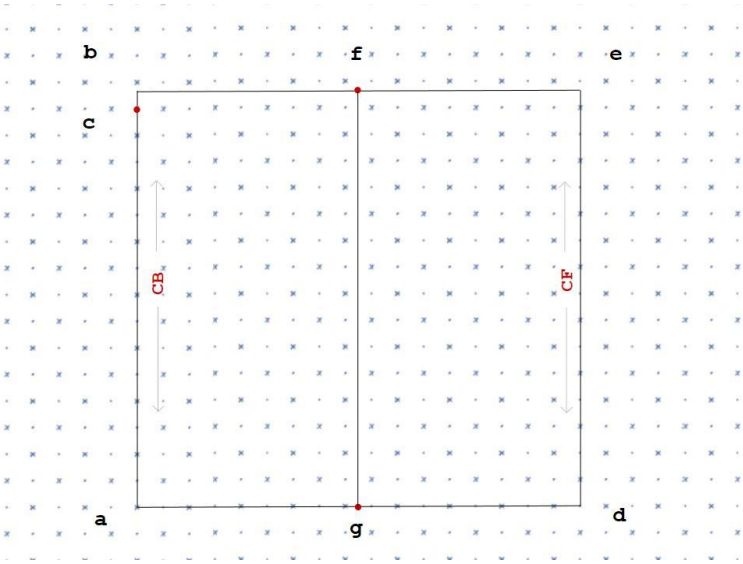


3. At a 90° angle, draw a line from point **d** upwards with the same measurement of line **ab** (16 ¾”). This new point will be labeled **e**; the line will be labeled **de**. Connect point **b** to point **e**, as line **be.** Label line **ab** Center Back (CB) and line **de** Center Front (CF).

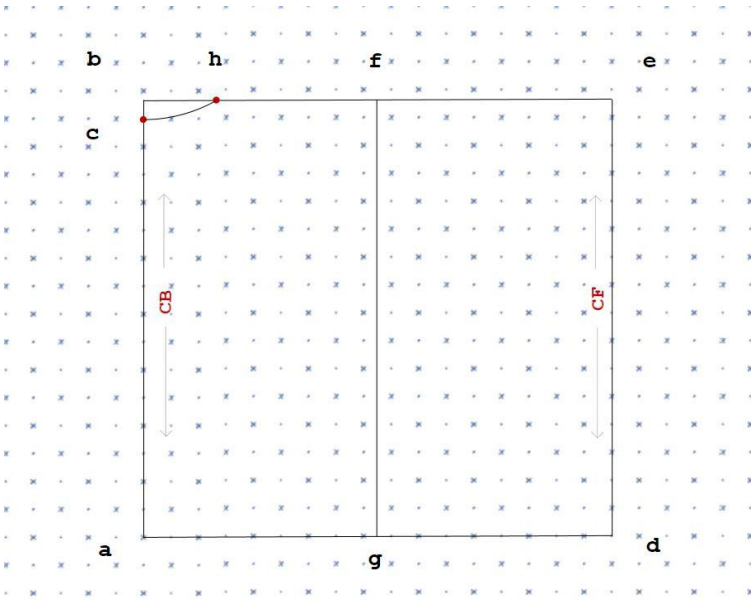
****** Line **ad** represents the waistline. Line **ad** and **be** represent half of the bust circumference + 1” ease.



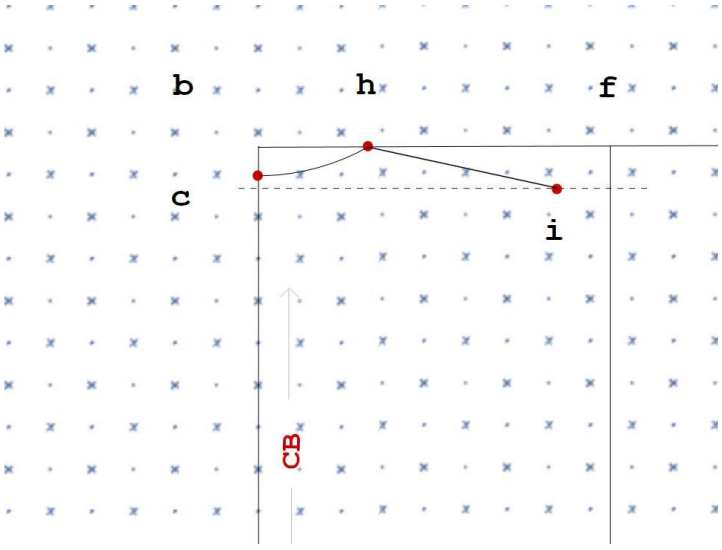
4. Divide the rectangle in half vertically, labeling this new line as **fg.** One half of the rectangle is to be used as the front block, another as the back block.



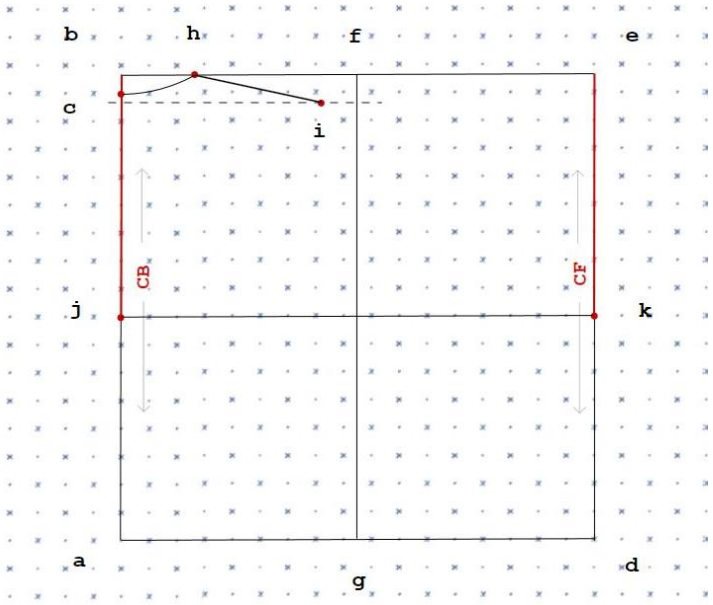
5. Starting from the corner point **b,** measure 2 ¾” toward point **f** label point **h,** and connect **c** to **h** using neck curve tool. This line presents the back neckline.



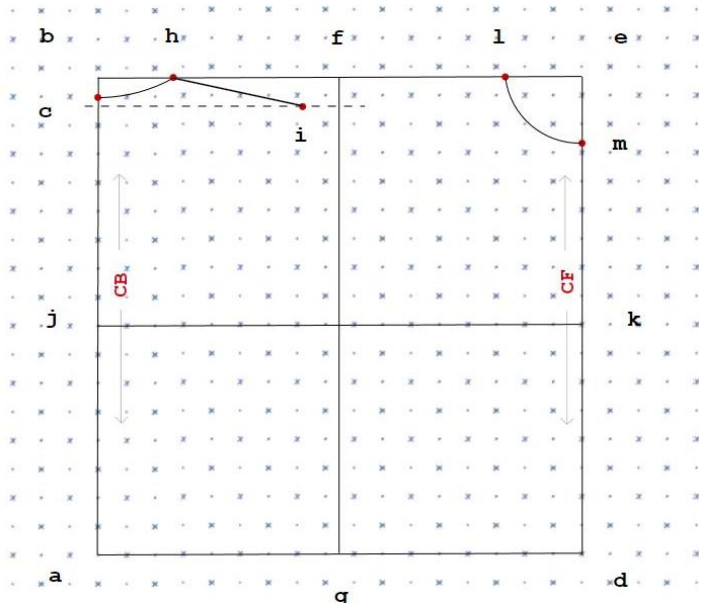
6. Draw a dotted line 1” below line **bf,** placing the end of the ruler on point **h,** and angle it until the shoulder line measurement = 4 ½” and touches the dotted line. Label this point as **i.**



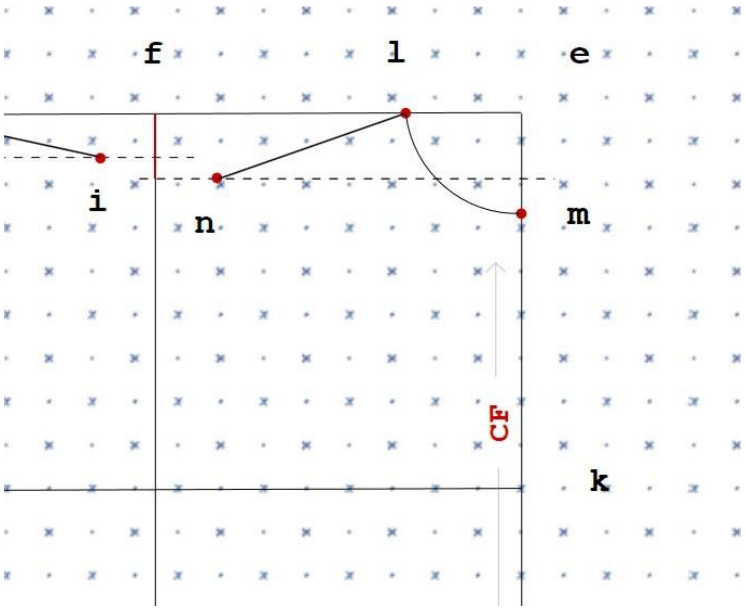
7. To indicate the chest line, start at corner points **b** and **e**, measure 7 ¾” (armscye depth) +1” (ease) draft the horizontal chest line **jk.**



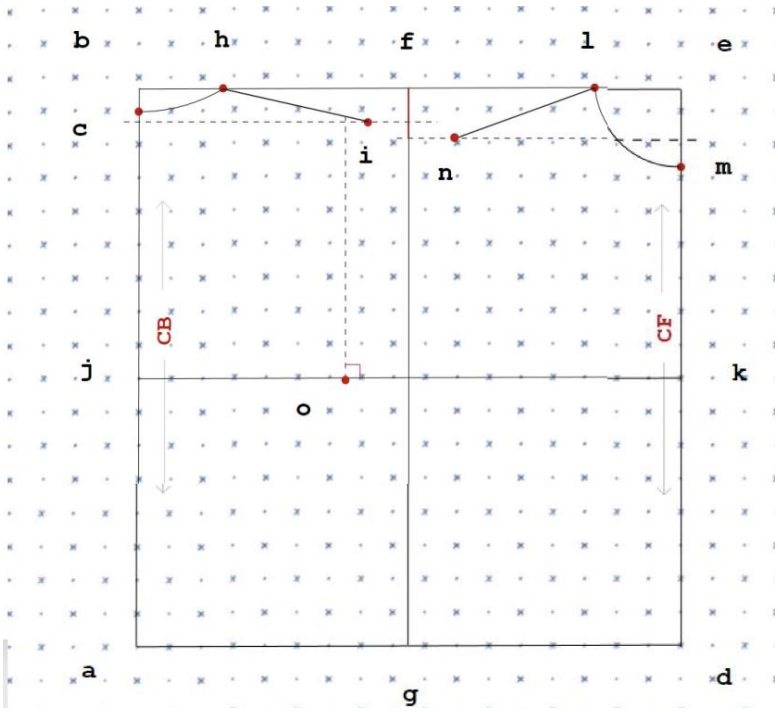
8. From the corner point **e,** draft one half of the neckline width 2 ¾” toward point **f** and 2 ¾” toward point **k**. Mark the new points as **l** and **m**. Draw a curved line from **l** to **m** using neck curve tool**.** This is the front neckline.



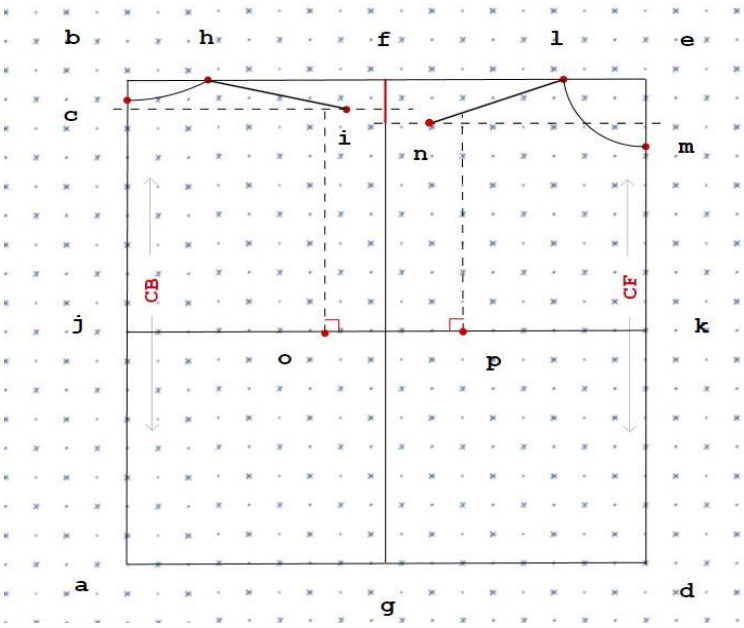
9. Draw a parallel dotted line 1 ¾” below line **fe**. Placing the end of the ruler on point **l** angle it until the shoulder line measurement 4 ½” touches the dotted line. Label point as **n.**



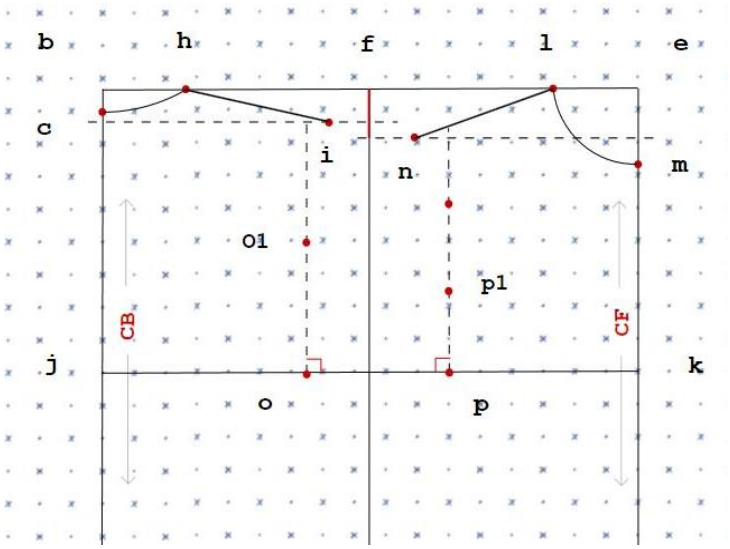
10. Starting from **j** toward point **k**, use the half back width 6 ¼” + ¼” ease mark point **o.** Draw a dotted line perpendicular to line **jk** from point **o** to shoulder line **hi**.



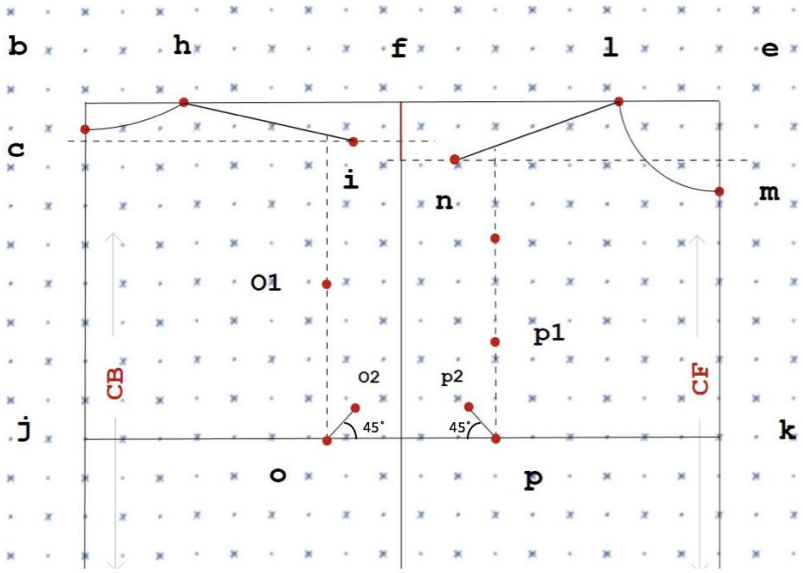
11. Measure from point **k** toward point **j**, use the half front width 6 ¼” + ¼” ease mark point **p**. Draw a dotted line perpendicular to line **jk** from point **p** to shoulder lines **ln**.



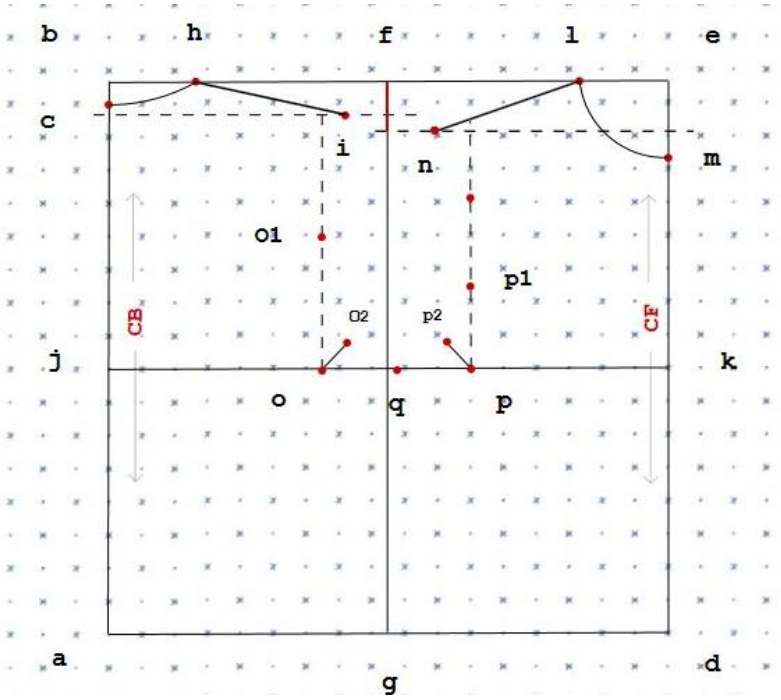
12. Divide the back dotted line from **o** to shoulder line **hi** into half; mark the middle point as **o1**. Divide the front dotted line from **p** to shoulder line **nl** into thirds; mark the lower point as **p1**.



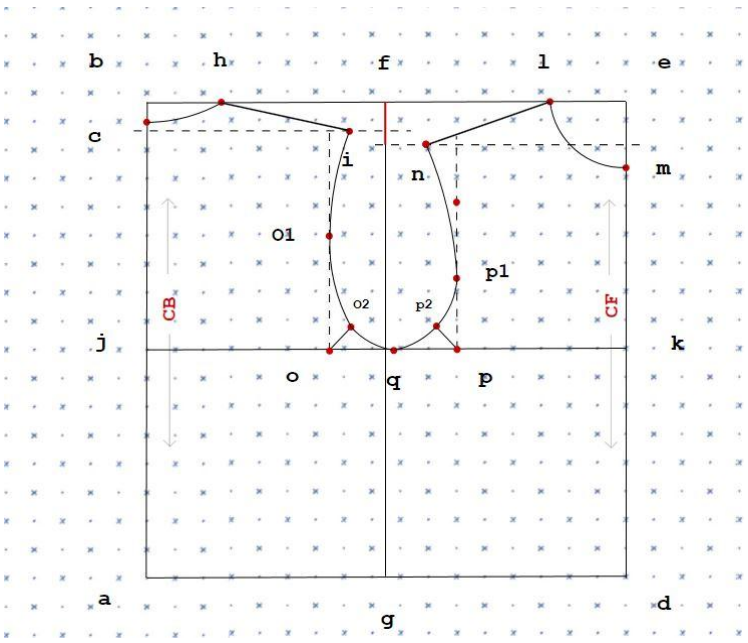
13. Add a new guide point 1” above point **o** at a +45˚ angle. Label new point as **o2** (guide line **oo2** = 1”). Add a new guide point 1” above point **p** at a -45˚angle. Label new point as **p2** (guide line **pp2** = 1”).



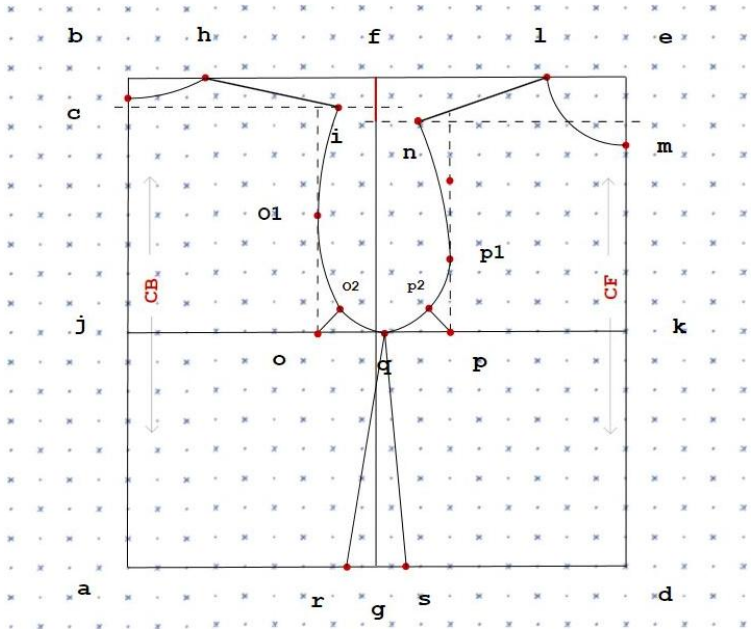
14. Divide the segment between **o** and **p** in half; mark middle point as **q.**



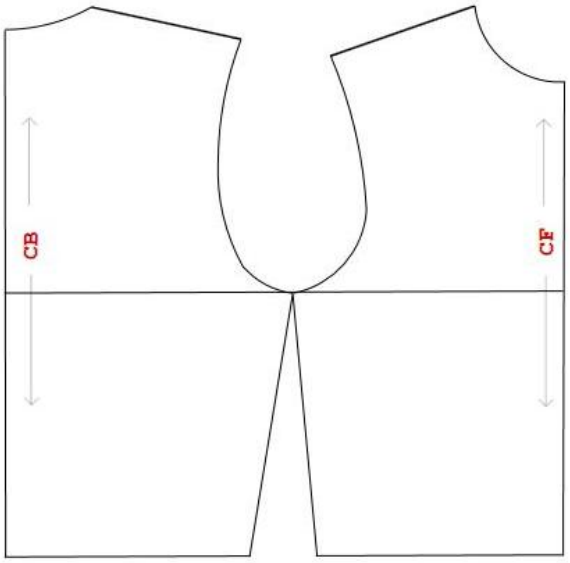
15. Connect the points **i-o1-o2-q**, and **n- p1-p2-q** using a curve tool. The two curves represent your back and front armseyes.



16. Create point **r** along on line **ag** using ¼ of the waistline measurement, mark point **r.** Creating point **s** along on line **dg** using ¼ of the waistline measurement, mark point **s**. Then connect **r** to **q** and **s** to **q.**

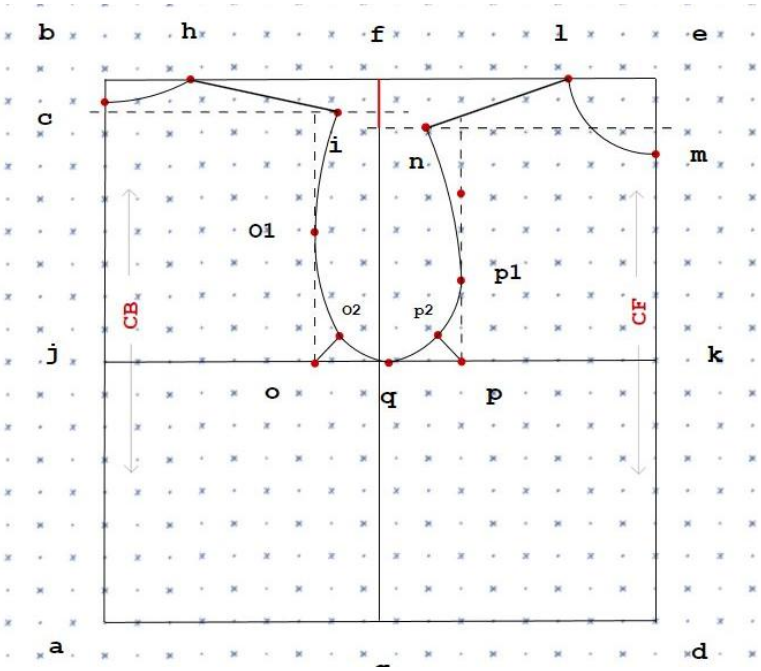


Final No Dart Block:

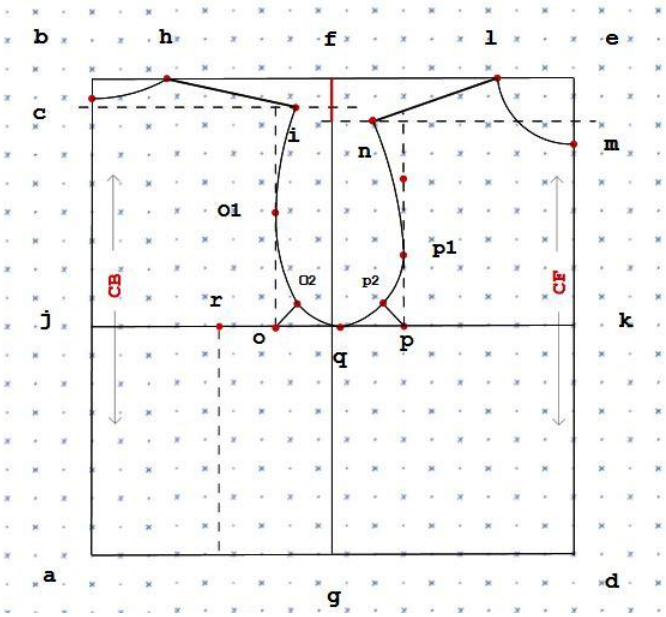


One Waist Dart Block Creating Process

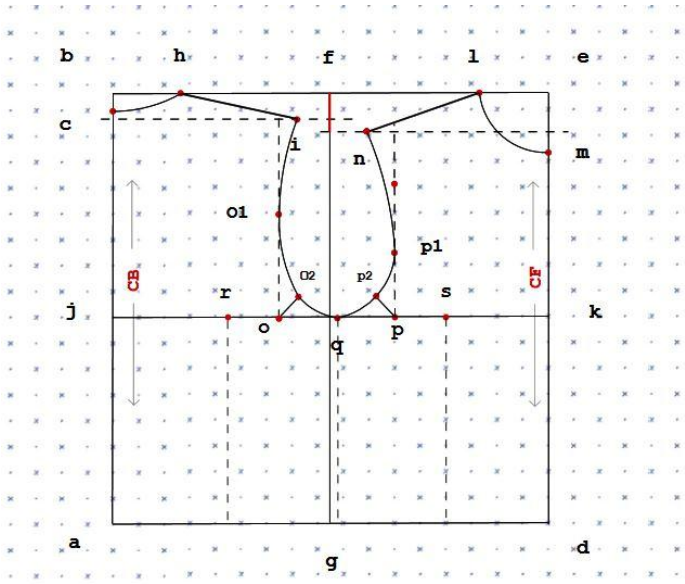
Repeat step1 to 15 as shown above.



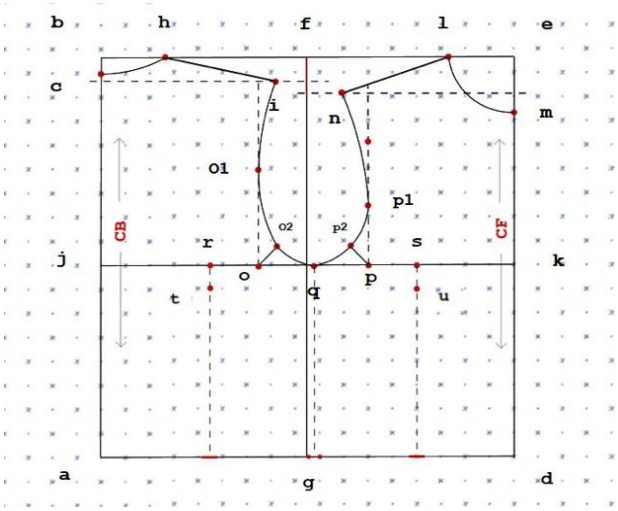
16. Determine the waist dart apex position on chest line **jk**. Divide half back waist measurement (7 ½" divided by 2 = 3 ¾"), and add ½" ease (4 ¼"), label new point as **r**. Connect the point **r** perpendicularly to line **ag** with a dotted line.



17. From point **k**, using the half standard apex measurement 4" (MacDonald, 2010) mark point **s**. This point represents the front waist dart apex point. Connect point **s** perpendicularly to the waist line **dg** with a dotted line**.** Connect point **q** perpendicularly to the waist line **dg with a dotted line.**



18. Measure 1” from point **s** along dotted line, mark as point **u.** Measure 1” from point **r** along dotted line, mark as point **t.**

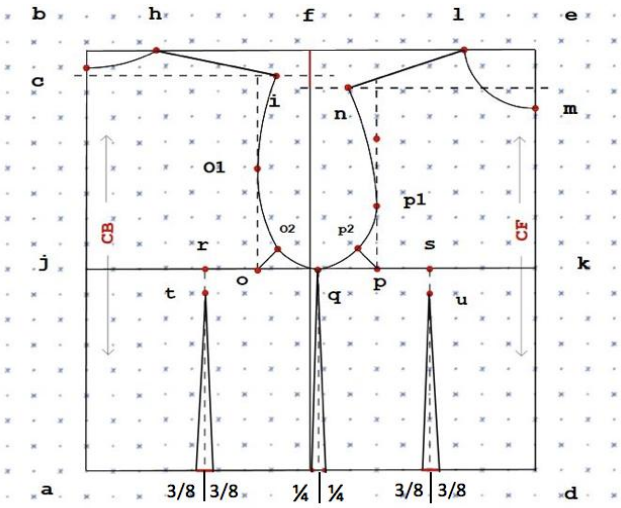


** Darts Measurement Formulas:

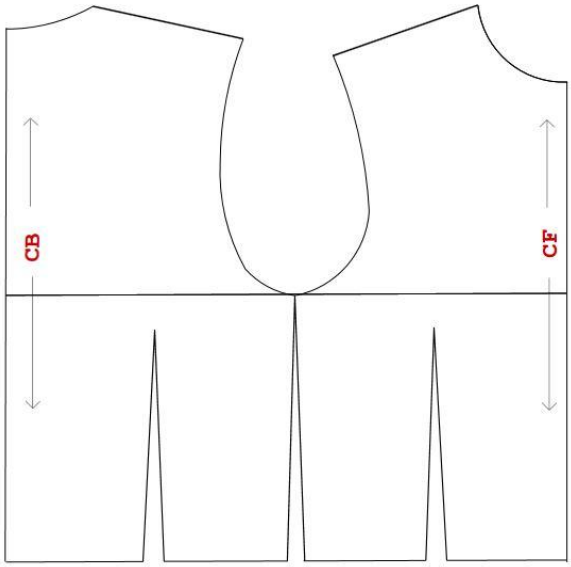
- Half bust/chest circumference (17”) – half waist circumference (15”) = X” = 2”,
- Side seam measurement = X” ÷ 4 = 2” ÷ 4 = ½
- Waist dart= (X” – side seam measurement) ÷ 2 = (2” – ½) ÷ 2= ¾”

** Darts measurement formulas revised from video Lesson 1-Basic Bodice (Studio Lot13, 2014)

19. To draw the legs of the dart, use dotted lines as dart central line, start from the bust point dotted lines measure to the left to the right 3/8”. To draw the side seam, start from side seam dotted line measure to the left to the right ¼”



Final One Waist Dart Block



Block Prototype Fittings

Results of the survey data revealed that post mastectomy women have problems with the fitting of clothing currently on the market. The bodice block was designed to accommodate the needs of this special female group. No dart and one waist dart bodice block patterns were developed to fit the post mastectomy woman's physical characteristics. Each of the completed block patterns were cut out and used to make the basic prototype garment, which was made of muslin. These two prototypes were customized on the volunteer post mastectomy model. The garments were evaluated in both static and dynamic positions, and the volunteer was asked to provide feedback on the fit and comfort. Since the garment must accommodate the human body in many different positions, testing it as it is worn is the best way to get the most detailed information.

The two prototype garments were made by using the two specific blocks. After examining the two garments on the volunteer live model, the final prototypes met the design criteria, which fit well on the model as shown:

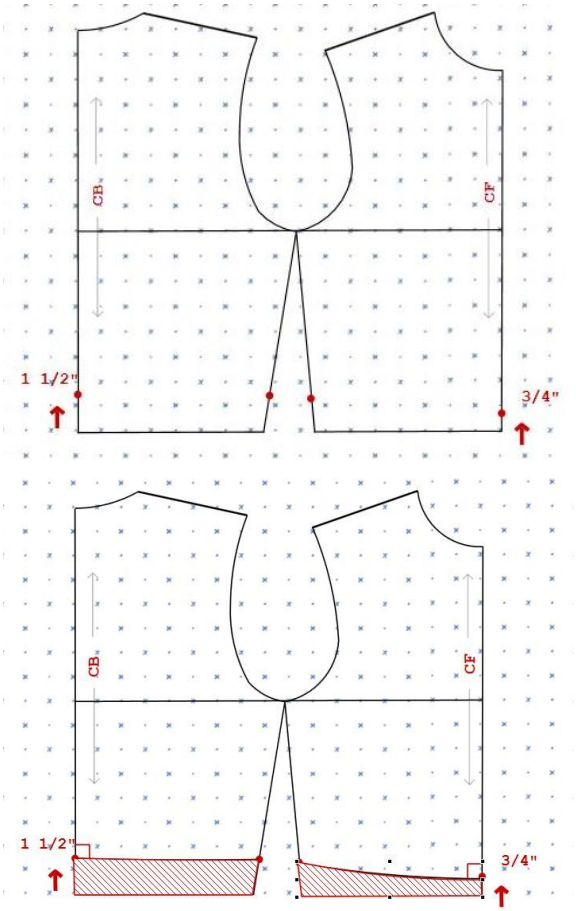
Prototype 1- No Dart Slope/ Block

Prototype 2- One Waist Dart Block

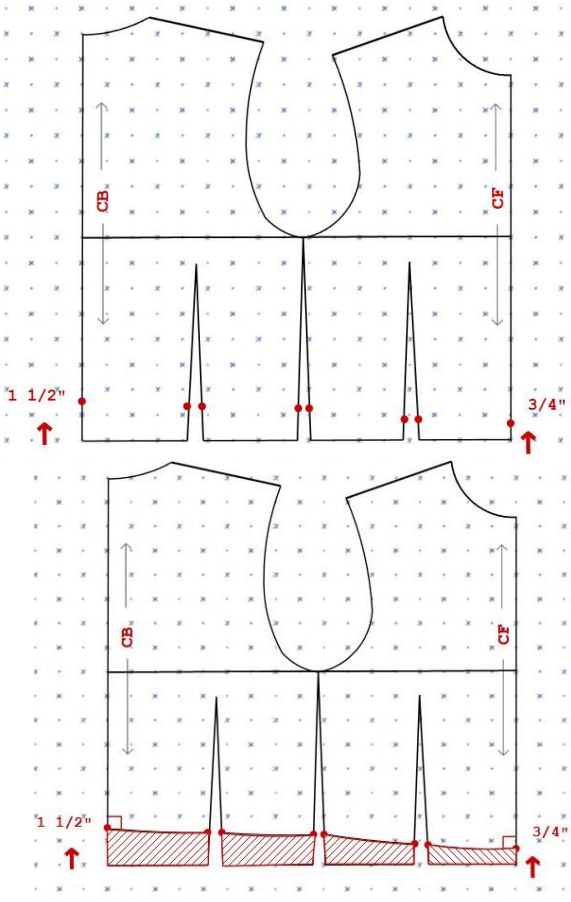
(Photographs taken by author)

The only issue with these two prototypes was the waist length. Since the researcher added a 1" ease on the center front and center back measurements of both blocks, there was unexpected extra length in the prototypes' front and back waist. Moreover, the length of the extra ease was not symmetrical; the front waist length ease (= ¾") was smaller than the back waist length ease (= 1 ½"). In order to make the prototypes fit better on the model, the researcher decided to redraw the straight waistline with a curved line to take out the extra length in the waist. The revised blocks were as shown.

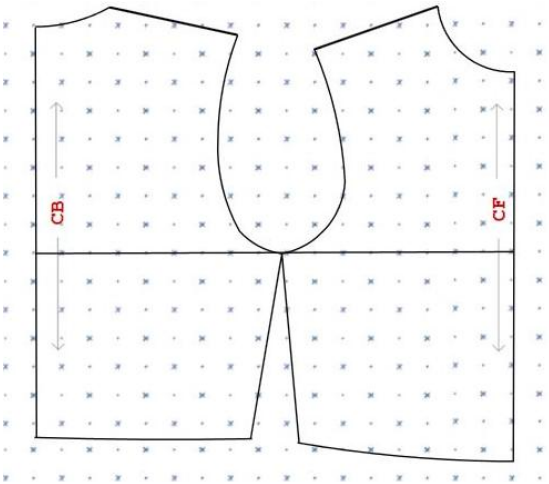
No Dart

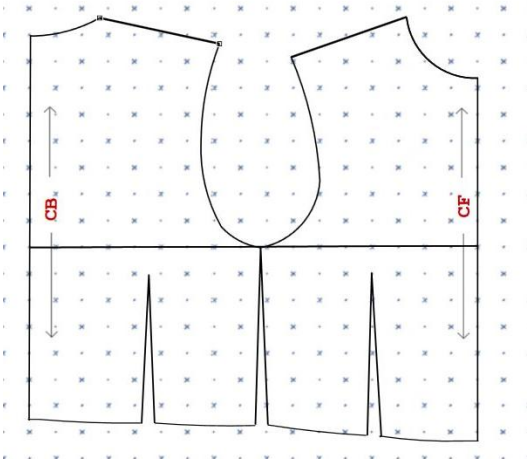


One Waist Dart



Final Block





Comparing the no dart block with the one waist dart block, the one waist dart block had a better fit on the model. It also provided an illusion that the double mastectomy volunteer had a curvy bust area. Based on the one waist dart block, future designers can utilize this block to provide more creative design solutions for post double mastectomy women. This has the potential to meet their clothing fitting and aesthetic demands, in the same way as the functions and creativities that a basic body block provides.

Chapter V

Conclusions

There are currently 3.1 million women who have experienced breast cancer, making it one of the most common cancers among women in the United States (Kuhn, 2015). Since there are multiple treatment paths, breast cancer survivors have to undergo various physical and psychological side effects from the different surgeries and treatments while living with noticeable body changes that result in a day to day struggle with clothing fit, comfort, and aesthetic difficulties (Beard, 2011; Jackson, 2004; Wassner, 1982). However, previous researchers (Beard, 2011; Jackson, 2004) pointed out that there were limited literature reviews and studies to explore and unravel the clothing desires of female breast cancer survivors.

The purpose of this study was to collect and analyze the research data to find out post double mastectomy women's clothing preferences in order to create new upper bodice blocks that would fit a flat chest. The study consisted of three research questions:

1. Are post double mastectomy women willing to purchase clothing that fits a flat chest?
2. Have post double mastectomy women changed their clothing style preferences?
3. Are post double mastectomy women spending more or less money on their clothing after surgery?

The tested hypotheses were:

H1: More post double mastectomy women are willing to wear clothes designed to fit their flat chest, if available.

H2: More post double mastectomy women changed clothing styles since their body shape change.

H2-a: More post double mastectomy women prefer to wear altered clothing.

H2-b: More post double women wear casual rather than professional or dressy clothing.

H2-c: More post double women like solid fabrics over patterned fabrics.

H3a: More post double mastectomy women spend more money on clothing.

H3b: More post double mastectomy women willing to spend more money on designer clothing, designed to fit their flat upper body.

In order to investigate post double mastectomy women's body size, clothing preferences, and clothing cost, an online survey was created, analyzed, and tested. The online survey was essential to the study due to limited previous research statistics of apparel demands of post mastectomy women. A total 95 completed surveys were collected and analyzed. The participants were 100% female post mastectomy survivors: 93% (n = 89) of participants had double mastectomy surgery, 6.3% (n = 6) had single mastectomy. Most participants were age 50-59 years old (40%, n = 38) and 40-49 years old (30.5%, n = 29). The majority of participants were white women living in the U.S.

Data analysis, descriptive analysis and Chi-square tests were applied to summarize the collected statistics and test the hypothesis. Based on the results, all hypotheses were statistically supported, except Hypotheses 2-a, 2-c, and 3a. However, this result of H3a was expected because it illustrated the lack of clothing choices/selections for post mastectomy women. This would be an opportunity for the apparel industry to create and expand a market to meet post mastectomy women's clothing demands.

The block was based on the basic process for creating children's blocks. The block was modified using the women's basic block, which involved bust and waist darts. After double mastectomy surgery, female survivors' upper body shapes are close to children's bodies. The

adjusted steps displayed above were created by utilizing a CAD program, Lectra Kaledo Designer.

Discussion and Findings

Research Question One: Are post double mastectomy women willing to purchase clothing that fits a flat chest?

Yes, post double mastectomy women are willing to purchase clothing that fits a flat chest. A majority of respondents would purchase clothes that fit their post-operative body shape. Thus, post double mastectomy women have positive intentions to purchase clothes that fit their new body. The findings supported by Beard (2011) pointed out "minor changes to selected styles have the potential to be cost-effective and meet the needs of a large target market of women."

Research Question Two: Have post double mastectomy women changed their clothing style preferences post mastectomy?

Based on the findings, most participants' clothing styles had not changed since double mastectomy surgery. Most participants chose to live flat, and continue to wear loose and casual clothes as they did pre mastectomy surgery. Because of the side effects of the surgery and subsequent therapies, most participants indicated clothes with darts around bust area (84.2%, n = 80), plunging neck line/low cut (75.8%, n = 72), large armholes (55.8%, n = 53), and strapless clothing (53.7%, n = 51) were difficult to wear. Although only 29.5% of participants sought clothes altered to fit their new body shape, 29.5% of participants said they would alter their clothes if they knew how to sew. From the results, the researcher can assume that participants are not satisfied with clothing that is available currently. Additionally, the majority of post double mastectomy women (55.8%, n = 53) indicated they like both solid and patterned fabrics.

Research Question Three: Are post double mastectomy women spending more or less money on their clothing?

Hypothesis 3a: "More post double mastectomy women spend more money on clothing" was rejected. Forty percent of participants indicated they did not change their expenses on clothing after surgery. On the other hand, based on the result of hypothesis 3b, "More post double mastectomy women are willing to spend more money on clothing, which fits their flat upper body." Participants consider spending more money on clothing that will fit their body. This result was expected because it illustrates the limitation of the clothing choices/selection for post mastectomy women. This finding supported Beard's (2011) point that "There has been a lack of understanding for what this target market desires and the amount of modification needed that could be easily addressed with same styling with minor, cost-effective modifications." This area of research would be an opportunity for the industry to bridge the gap between post mastectomy women and their apparel choices. Thus, findings pointed out post double mastectomy women are not satisfied with current trendy clothing.

Implications

Breast cancer is one of the most common cancers, and there are a growing number of female survivors considering and choosing to live flat. However, there is little clothing information and style selection provided for post mastectomy women. "Breast cancer survivors are a large target market and should not be ignored by industry. There has been a lack of understanding for what this target market desires and the amount of modification needed that could be easily addressed with same styling with minor, cost-effective modifications" (Beard, 2011). As aforementioned, this could be a great opportunity for the industry and its designers to increase their target market. The practical implications of this study include disseminating the

results of post double mastectomy women's shopping preferences, clothing preferences such as style, fabric color and texture, and clothing expenses to industries, businesses, designers, and future researchers. From this study, the two different no dart and one waist dart blocks were created. The creation of these two new bodice blocks could be the beginning of a change in industry's and designers' clothing design and production processes.

Limitations and Recommendations

This study was limited to a specific post double mastectomy group in which membership was voluntary. In 2012, there were estimated 1.7 million breast cancer new cases diagnosed among women worldwide (Breast Cancer Statistics, 2016). Therefore, there is an opportunity to gain additional insight into the fit issue of women who have undergone double mastectomies, whether they choose to live flat or not. Recommendation for future researchers is to broaden the representative population and sample size. Additionally, since the questionnaire was posted online, the elder generation and people who are not familiar with the computer, Internet, and social media may not have participated. Future studies should consider applying multiple instruments to acquire a larger group of participants and collect more data.

Moreover, the bodice blocks were made using a specific volunteer's body measurements. It was a made-to-measure (MTM) product. Additional research could utilize the standard size measurement of post double mastectomy women to create a standard bodice block in order to fit more post double mastectomy survivors. In addition, this study only focused on post double mastectomy women. It leaves a creative space for researchers and designers to innovate new suitable blocks and garments for women who have undergone different types of mastectomy surgeries.

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APPENDICES

APPENDIX A: INFORMED CONSENT & SURVEY INSTRUMENT

Title: Apparel Design Process: Shifting the Basic Pattern Block into a New Framework to Fit the Demands of Post Double Mastectomy Women

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Fit & Style Survey

1. Please indicate age range.
   A. 20-29
   B. 30-39
   C. 40-49
   D. 50-59
   E. 60-69
   F. 70-79
   G. 80 +

2. Please indicate your current country of residence.
   A. The United States
   B. Canada
   C. South America
   D. Europe
   E. Middle East
   F. Asia / Pacific Islands
   G. Africa
   H. Australia
   I. Other

3. Please indicate your ethnicity.
   A. White
   B. Hispanic or Latino
   C. Black or African American
   D. Native American
   E. Asian/ Pacific Islander
   F. Other

4. Please indicate your occupation.
    A. Art/ Design
    B. Education
    C. Finance/management /business
    D. Homemaker
    E. Law
    F. Medicine
    G. Military
    H. Retail
    I. Self-employed
    J. Student
    K. Technology
    L. Retired
    M. Other

5. What types of mastectomy have you been though?
    A. A Bilateral (double) Mastectomy
    B. A Single Mastectomy
    C. A Partial Mastectomy
    D. Other

Size: Please use provided charts for the following questions

	XS	S	M	L	XL	XXL
USA	0-2	4-6	8-10	12-14	14-16	16-18
UK	2-4	6-8	10-12	14-16	16-18	18-20
FRANCE	30-32	34-36	38-40	42-44	44-46	46-50
DENMARK	28-30	32-34	36-38	40-42	42-44	44-46
ITALY	34-36	38-40	42-44	46-48	48-50	50-52
AUSTRALIA	4-6	8-10	12-14	16-18	18-20	20-22
JAPAN	3-5	7-9	11-13	15-17	17-19	19-21

Weight (Lbs.)

	<100	110	120	130	140	150	160	170	180	190	200	200+
<5'	XS	S	S	M	M	L	L	XL				
5'0"	XS	S	S	S	M	L	L	L	XL			
5'1"	XS	S	S	S	M	M	L	L	XL			
5'2"	XS	XS	S	S	M	M	L	L	XL			
5'3"	XS	XS	S	S	M	M	L	L	L	XL		
5'4"	XS	XS	S	S	M	M	L	L	L	XL		
5'5"	XS	XS	S	S	M	M	L	L	L	XL		
5'6"	XS	S	S	S	M	M	L	L	L	XL		
5'7"		S	S	S	M	M	L	L	L	XL		

5'8"			S	S	M	M	L	L	L	XL		
5'9"			S	S	M	M	L	L	L	XL		
5'10"			S	S	M	M	M	L	L	L	XL	
5'11"			M	M	M	M	M	L	L	L	XL	
6'0"			M	M	M	M	M	L	L	L	XL	XXL
>6'				M	M	M	M	L	L	L	XL	XXL

6. Please indicate your height. (Dropdown menu)
   Feet: 4-5 Inches: 1-11

7. Please indicate your weight. (Dropdown menu)
   A. Less than 100lbs
   B. 100-120lbs
   C. 120-140lbs
   D. 140-160lbs
   E. 160-180
   F. 180-200
   G. 200+

8. Please indicate your typical top size. (Dropdown menu)
   XS- XXL or 0- 20

9. Please indicate your typical dress size. (Dropdown menu)
   XS- XXL or 0- 20

10. Please indicate your typical Jeans size. (Dropdown menu)
    Jean waist: 25- 40

11. Please indicate your typical pant size. (Dropdown menu)
    Pants: 0- 20

12. Please indicate your typical skirt size. (Dropdown menu)
    Skirts: XS- XXL

13. How would you characterize your proportions for each of the following? (Dropdown menu)
    A. Shoulders (Narrow, average, wide)
    B. Arms (Short, average, long)
    C. Torso (Short, average, long)
    D. Hips (Narrow, average, wide)
    E. Legs (short, average, long)

Preference:

14. Which is your favorite shopping preference **before** you had a mastectomy? (Please select one)
    A. Luxury brands
    B. Online
    C. Independent/ small clothing companies
    D. Catalog
    E. Other- Please indicate_____

15. Where do you typically purchase clothing most **after** the mastectomy? (please select one)
    A. Luxury brands
    B. Online
    C. Independent/ small clothing companies
    D. Catalog
    E. Other- Please indicate_____

16. How did you like your tops to fit **before** mastectomy surgery?
    A. Mostly Tight
    B. Straight
    C. Mostly loose
    D. Oversized
    E. Others- Please indicate_____

17. How do you like your tops to fit **post** mastectomy surgery?
    A. Mostly Tight
    B. Straight
    C. Mostly loose
    D. Oversized

18. Has your style changed as a result of your mastectomy surgery?
    A. YES.
    B. NO.
    If your answer is YES, please indicate_____
    If NO, please explain_____

19. Which type of clothing did you wear most often **before** mastectomy surgery?
    A. Business
    B. Casually
    C. Date night/ night out
    D. Cocktail/ wedding/ special event

20. Which type of clothing do you wear most often **after** mastectomy surgery?
    A. Business
    B. Casually
    C. Date night/ night out
    D. Cocktail/ wedding/ special event

21. Think about the shape of your new flat and fabulous body. What tops and dress details are most difficult to pull off with a flat chest? (Check all that apply)
    A. Tank top
    B. Low back
    C. Clothing with darts around bust area
    D. Plunging neck line/ low cut
    E. Sleeveless
    F. Large armholes
    G. Strapless
    H. Other, please specify_____

22. From the list below. Which characteristic of clothing do you want to wear, but have a difficult time making work without prosthesis?
    A. Low back
    B. Clothing with darts around bust area
    C. Plunging neck line/ low cut
    D. Sleeveless
    E. Large armholes
    F. Other, please specify_____

23. From the list below. Which clothes do you want to wear, but have a difficult time making work without prosthesis?
    A. Bras
    B. Tank top
    C. Swim suits
    D. Sundresses
    E. Tailored clothing
    F. Sports wear
    G. Strapless
    H. Other, please specify_____

24. Do you prefer patterns or solid colors fabric?
    A. Patterns
    B. Solids
    C. Both
    D. No preference

25. Please choose the top **five** colors you like most.

A. Beige
B. Black
C. Blue
D. Brown
E. Burgundy
F. Gold
G. Green
H. Gray
I. Navy
J. Orange
K. Pink
L. Purple
M. Red
N. Silver
O. Teal
P. White
Q. Yellow

26. Please indicated what **three** colors you avoid?

A. Beige
B. Black
C. Blue
D. Brown
E. Burgundy
F. Gold
G. Green
H. Gray
I. Navy
J. Orange
K. Pink
L. Purple
M. Red
N. Silver
O. Teal
P. White
Q. Yellow
R. N/A

27. What prints do you prefer to avoid? (you can choose more than one answer)

A. Animal Prints
B. Critter Prints
C. Floral
D. Paisley
E. Plaid
F. Polka Dots
G. Stripes
H. N/A

28. Please select any styles that you like and/or would like to incorporate more of in your wardrobe?

A. Bohemian Chic
B. Classic
C. Edgy
D. Casual chic
E. Glamorous
F. Preppy

29. Which fabrics/fibers are your favorite? (Please select one)
    A. Natural fiber fabrics: cotton, silk, linen, wool
    B. Synthetic fiber fabrics: Nylon, Rayon, Polyester, Acrylic Spandex, Microfibers, Lyocell
    C. Leather
    D. Furs
    E. Other, please indicate_____
    F. None above

30. Which fabrics/fibers are you sensitive to or avoid wearing after your mastectomy surgery?
    A. Natural fiber fabrics: cotton, silk, linen, wool
    B. Synthetic fiber fabrics: Nylon, Rayon, Polyester, Acrylic Spandex, Microfibers, Lyocell
    C. Leather
    D. Furs
    E. Other, please indicate_____
    F. None above, I'm not sensitive to any fabrics/fibers.

31. Thinking of your body, please indicated where you prefer to cover or expose. (Dropdown menu)

Arms	Back
A. I love to show it off	A. I love to show it off
B. Some time I like to flaunt	B. Some time I like to flaunt
C. Only for special occasions	C. Only for special occasions
D. I am rather to keep it covered	D. I am rather to keep it covered

Legs	Midsection
A. I love to show it off	A. I love to show it off
B. Some time I like to flaunt	B. Some time I like to flaunt
C. Only for special occasions	C. Only for special occasions
D. I am rather to keep it covered	D. I am rather to keep it covered

Shoulders	Upper part of body
A. I love to show it off	A. I love to show it off
B. Some time I like to flaunt	B. Some time I like to flaunt
C. Only for special occasions	C. Only for special occasions
I am rather to keep it covered	D. I am rather to keep it covered

32. Please rank the most import characteristic when you choose clothing.
6=most important, 1= least important
    A. Style
    B. Texture/ Fabric
    C. Price
    D. Comfort
    E. Branding
    F. Quality
    G. Other, please specify

33. Please select the statement below that summarizes your current use of breast prosthesis.
    A. I only wear prosthesis to help with the fit of clothes
    B. I wear prosthesis every day at home and out
    C. I only wear prosthesis when I am out
    D. I rarely wear prosthesis
    E. I never wear prosthesis

34. Do you alter clothes to fit your new flat and fabulous body?
    A. Often
    B. Occasionally
    C. Rarely
    D. Never
    E. I would if I knew how to sew

35. If you had the option to wear clothes that are designed to fit your flat chest, would you still prefer to wear prosthesis?
    A. Yes
    B. No
    C. Depends, please explain_____

36. How often do you purchase new clothing?
    A. Few times a year
    B. Once a month
    C. Couple times a month
    D. Every week or more

37. How much do you spend on clothing a month?
    A. Less than $50
    B. $50- $100
    C. $100-$150
    D. $150- $200
    E. $200- $300
    F. Over $300

38. How much do you currently spend on tops?
    A. Less than $25
    B. $25- $50
    C. $50-$75
    D. $75- $100
    E. Over $100

39. How much do you currently spend on a dresses?
    A. Less than $50
    B. $50-$75
    C. $75- $100
    D. $100- $150
    E. Over $150

40. How much do you currently spend on bottoms?
    A. Less than $50
    B. $50-$75
    C. $75- $100
    D. $100- $150
    E. Over $150

41. Do you spend more/less on clothing after mastectomy?
    A. Yes, I spend more than what I use to be
    B. No, I spend less
    C. I am not sure
    D. Did not change.

42. Would you be willing to spend more money if the clothing was tailored to fit a flat chest?
    A. Yes
    B. No
    C. Maybe, explain_____

APPENDIX B: IRB APPROVAL

DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

School of
Human Environmental Sciences

UNIVERSITY OF ARKANSAS
DALE BUMPERS COLLEGE OF AGRICULTURAL, FOOD & LIFE SCIENCES

118 Home Economics Building, University of Arkansas, Fayetteville, AR 72701-1201
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Hello Flat and Fabulous Members,

My name is Shan Gao. I am an Apparel Merchandising and Product Development graduate student at the University of Arkansas.

I am currently working on my thesis with my advisor Dr. Laurie Apple and Flat and Fabulous member Ms. Windy Gay. I am researching clothing preferences of women who have undergone a double mastectomy without reconstruction to help determine if clothing designed for a flat chest is desirable and marketable. Based on the results and preferences, a new body sloper/block will be created that will fit double post-mastectomy women who have decided not to choose reconstruction. A prototype garment will be created using the new flat body sloper/block to assess for fit and be aesthetically pleasing compared to clothing currently available in retail stores. The completion of the survey is critical to understanding what post-mastectomy women who choose to live flat desire for incorporation into new garments.

This survey is anonymous and it contains 42 questions. All questions are developed to explore how to solve for, or satisfy, the issues and demands associated with the post double mastectomy women, who decide to live flat. Your help is appreciated in taking a few minutes to complete the survey. Understanding fitting problems will better enable a creation of a suitable block/sloper and prototype garment and give designer Windy Gay the opportunity to create garments specifically for women who choose to live flat.

Completion of the survey is voluntary and all records will be kept confidential and will only be used for study purpose. Refusing to participate will not adversely affect any other relationship with the University or the researchers.

Thank you so much for taking the time to complete this survey.

LINK TO SURVEY:
https://qtrial2014az1.az1.qualtrics.com/SE/?SID=SV_1S5DWgDszS2O6jP

If you have questions or concerns about this study, you may contact Shan Gao at 479-575-5225 or by e-mail at sgao@uark.edu, or Dr. Laurie Apple 479-575-4576 or by email lapple@uark.edu. For questions or concerns about your rights as a research participant, please contact Ro Windwalker, the University's IRB Coordinator, at (479) 575-2208 or by e-mail at irb@uark.edu.

Best regards,

Shan Gao
Graduate Student

Laurie M. Apple, Ph.D.
Associate Professor

APPENDIX C: INTRODUCTORY LETTER

UNIVERSITY OF ARKANSAS

June 20. 2016
Office of Research Compliance
Institutional Review Board

TO: Shan Gao
Laurie Apple
Kathy Smith
Stephanie Hubert

FROM: Ro Windwalker
IRB Coordinator

RE: PROJECT MODIFICATION

IRB Protocol #: 16-03-670

Protocol Title: *Apparel Design Process: Shifting the Basic Pattern Block into a New Framework to Fit the Demands of Post Double Mastectomy Women*

Review Type: EXEMPT EXPEDITED FULL IRB

Approved Project Period: Start Date: 06/20/2016 Expiration Date: 04/14/2017

Your request to modify the referenced protocol has been approved by the IRB. **This protocol is currently approved for 2,000 total participants.** If you wish to make any further modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

Please note that this approval does not extend the Approved Project Period. Should you wish to extend your project beyond the current expiration date, you must submit a request for continuation using the UAF IRB form "Continuing Review for IRB Approved Projects." The request should be sent to the IRB Coordinator, 109 MLKG Building.

For protocols requiring FULL IRB review, please submit your request at least one month prior to the current expiration date. (High-risk protocols may require even more time for approval.) For protocols requiring an EXPEDITED or EXEMPT review, submit your request at least two weeks prior to the current expiration date. Failure to obtain approval for a continuation *on or prior to* the currently approved expiration date will result in termination of the protocol and you will be required to submit a new protocol to the IRB before continuing the project. Data collected past the protocol expiration date may need to be eliminated from the dataset should you wish to publish. Only data collected under a currently approved protocol can be certified by the IRB for any purpose.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.