

Concealment Women's Body Defects to Mastectomy cases by Optical Illusion Using Different Techniques

Reem M. Nofal

Textile and Clothing, Women's College for Arts, Science, and Education, Ain Shams University, Cairo, Egypt.

Corresponding Author: reem.nofal@women.asu.edu.eg

Abstract

Breast cancer patients are the most sensitive people to deal with because they believe that they are losing part of their femininity as a result of treatment. Some women resort to cosmetic surgeries, but the vast majority, due to economic circumstances, may not resort to cosmetic and breast prosthetic surgeries. The physical and psychological state of the breast cancer survivors are very important as social support for them is often inadequate. One of the most helpful supports is to improve their appearance by functional clothes, to be in line with the new body form after surgery and during recovery stage by using fashion designing and techniques. Four techniques are proved to be effective in concealment body defects to mastectomy women such as embroidery, clothing complementary accessories, draping, folding and printing techniques, that are used as optical illusion procedures that can adjust breast form variations resulted from mastectomy. A number of designs (12) are executed by using 2D and virtual 3D software of fashion design, another clothing accessories (20 proposed ideas from internet) are supposed to help in concealment body and breast defects after mastectomy. A questionnaire was practiced and statistically analysis to females with one or both breasts removed due to breast cancer (32 years, minimum and 55 years, maximum). Fashion experts also, gathered their opinions about designs.

Keywords:

Breast cancer, mastectomy, optical illusion, embroidery, draping, printing, clothing accessories.

إخفاء عيوب جسم المرأة في حالات استئصال الثدي عن طريق الخداع البصري باستخدام تقنيات مختلفة

المستخلص:

تعتبر مريضات سرطان الثدي من أكثر الناس حساسية في التعامل معهن لأنهن يعتقدن أنهن يفقدن جزءاً من أنوثتهن نتيجة للعلاج. تلجأ بعض النساء إلى جراحات التجميل، ولكن الغالبية العظمى، بسبب الظروف الاقتصادية، قد لا تلجأ إلى الجراحات التجميلية والتعويضية. تعتبر الحالة الجسدية والنفسية لمريضات سرطان الثدي مهمة للغاية حيث أن الدعم الاجتماعي لهن غالباً ما يكون غير كافٍ. أحد أكثر أشكال الدعم فائدة هو تحسين مظهرهن من خلال الملابس الوظيفية، لتتماشى مع شكل الجسم الجديد بعد الجراحة وأثناء مرحلة التعافي باستخدام تصميم الأزياء والتقنيات المختلفة. ثبتت فعالية أربع تقنيات في إخفاء عيوب الجسم لدى النساء اللاتي خضعن لاستئصال الثدي بعد الإصابة بسرطان الثدي، حيث تم استخدام التطريز، والإكسسوارات المكملة للملابس، وتقنية التشكيل على المانيكان، والطي والطباعة كإجراءات للخداع البصري حيث يمكنها تعديل الاختلافات الشكلية الناتجة عن استئصال الثدي. تم تنفيذ عدد من التصاميم (١٢ تصميم) باستخدام برامج تصميم الأزياء ثنائية الأبعاد وثلاثية الأبعاد الافتراضية، واقتراح إكسسوارات الملابس المنفصلة (٢٠ تصميم مقترح) في إخفاء عيوب الجسم والثدي بعد استئصال الثدي. تم تطبيق استبيان وتحليله إحصائياً على الإناث اللاتي تم استئصال أحد الثديين أو كليهما بسبب سرطان الثدي (٣٢ عامًا كحد أدنى و ٥٥ عامًا كحد أقصى). كما جمع خبراء الموضة آراءهم حول التصميمات.

الكلمات المفتاحية:

سرطان الثدي، استئصال الثدي، الخداع البصري، التطريز، التشكيل على المانيكان، الطباعة، إكسسوارات الملابس.

1. Introduction

Breast cancer is the second most common form of cancer and the leading cause of death by cancer in women. One of the treatments is mastectomy, which brings negative physical and psychological consequences to the lives of these women, significantly reducing their quality of life [1].

According to the World Health Organization (WHO), about 40% of deaths could be prevented by eliminating or minimizing exposure to carcinogens. Primary prevention consists in promoting health and avoiding external risk factors. Secondary prevention involves actions aimed at early diagnosis of the disease. The main objectives of treatments are to cure, prolong survival and improve the quality of life (QoL) of patients [2].

Older breast cancer survivors experience many ongoing needs—for emotional and tangible support from family and friends, for access to professional counselors, and for new coping strategies to manage fears of recurrence and day-to-day stress [3]. Older women with breast cancer who lack sufficient emotional support have been shown to have poorer self-perceived quality of health and greater difficulty with psychosocial adjustment to cancer[4,5].

Breast cancer:

The breast lies between the second and sixth ribs, from the sternal edge to the edge of the axilla, and against the pectoralis muscle on the chest wall. Breast tissue also projects into the axilla as the tail of Spence [6].

Breast cancer is a group of diseases in which cells in breast tissue change and divide uncontrolled, typically resulting in a lump or mass. Most breast cancers

begin in the lobules (milk glands) or in the ducts that connect the lobules to the nipple.

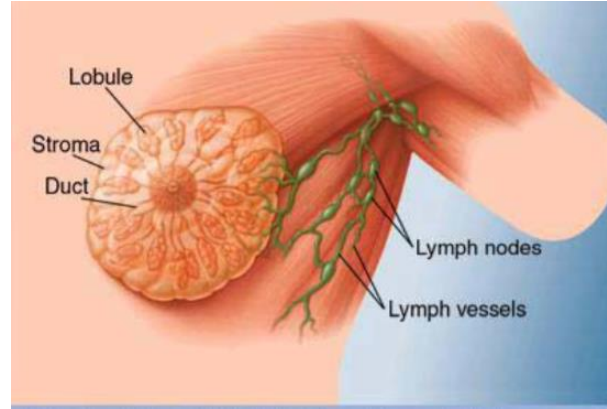


Figure (1): breast morphological structure.

According to World Health Organization (WHO), Breast cancer is the most frequent cancer among women, impacting 2.1 million women each year, and also causes the greatest number of cancer-related deaths among women. In 2018, it is estimated that 627,000 women died from breast cancer – that is approximately 15% of all cancer deaths among women. While breast cancer rates are higher among women in more developed regions, rates are increasing in nearly every region globally [7].

Breast cancer survival rates vary greatly worldwide, ranging from 80% or over in North America, Sweden and Japan to around 60% in middle-income countries and below 40% in low-income countries (Coleman et al., 2008). The low survival rates in less developed countries can be explained mainly by the lack of early detection programs, resulting in a high proportion of women presenting with late-stage disease, as well as by the lack of adequate diagnosis and treatment facilities [8].

Early diagnosis of breast cancer reduces breast removal surgery opportunities.

Mastectomy

Breast removal surgery or mastectomy (fig. 2) is a way to cancer recovery. It has a big impact on women life both emotionally and physically. It is normal to feel some pain and restriction after breast surgery, and some feel anxious or self-conscious about the changes to their body. All of the bad feeling of how patients can adjust their appearance, as after the surgery the breast form is changed, and the using of push-up is uncomfortable to the most.

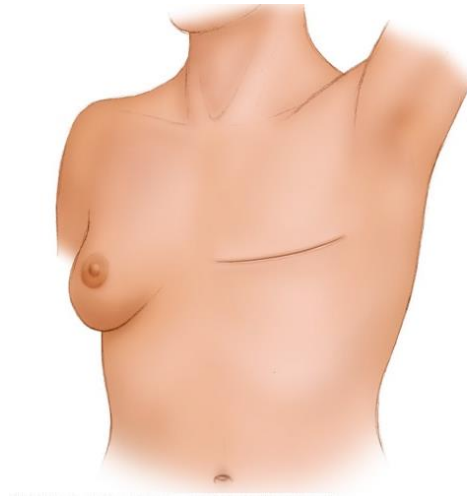


Figure (2): mastectomy surgery appearance [9].

If mastectomy women haven't had breast reconstruction, many breast forms are available in a range of different sizes, weights, shapes and colors. They can either be attached directly to the skin (a 'contact prosthesis') or inserted into the pocket of a mastectomy bra [10].

Using inters silicon or sponge pads inside bra (as shown in figure3, and 4) can causing uncomfortable feelings and unbalanced appearance, as it can irritate the surgical site. So, the need to use ways and techniques to make visual illusion and concealment of breast form unusual defects are very important.

Secondary diseases that occur during the rehabilitation of breast cancer survivors are factors that can negatively change the physical and psychological state of the patient. The rehabilitation after treatment of breast cancer survivors is an important process to prevent cancer recurrence and increase the survival rate because a negative psychological state significantly impacts the long-term survival rate [11].



Figure (3): breast cancer survivor with partial (left breast) mastectomy [12]



Figure (4): pads that are used inside bra to adjust external breast form [13].

Mastectomy poses significant challenges to a woman's body image and psychological well-being, and breast reconstruction plays a pivotal role in post operative quality of life. Following breast reconstruction, many patients choose to have subsequent aesthetic procedures. Data on the prevalence of such subsequent aesthetic interventions are lacking in the literature [14].

So, the need to concealment mastectomy women body defects -that suffers from breast cancer- by clothing techniques is emerged as important procedure to help improving patients' appearance.

Optical illusion effects created by fashion design and techniques

Occasionally, the blind spot in human eye may cause the brain to gather the signals coming from the optic nerves in a wrong way. Therefore, while the eye and the brain are trying to see the reality, they may also cause illusions. This causes the visual object to be interpreted inaccurately. These inaccurate perceptual interpretations are so abundant that these are called in psychology as the “Perceptual Illusion or “Optical Illusion“ [15,16].

Proposed Clothing techniques to concealment breast form changes:

After surgery it will take time to adapt body to the new surgery shape. It is an anxious feeling to mastectomy women to think about what to wear after the surgery. The ability to maintain breast form after mastectomy surgery while wearing stylish and fashionable.

There is a great necessity to wear natural and breathable fabrics to achieve comfortable feeling, and to avoid irritating sensitive skin. The mastectomy clothes should also be soft, stretchy, and naturally moisture-absorbent to reduce the effect of hot flushes following cancer treatment. The easiness of wearing and taking-off is also very important requirement.

2. Experimental work:

-Methodology

This research is following descriptive, analytical methodology. In addition to the theoretical study which is discuss mastectomy in women who suffer from cancer, and their clothing needs after surgery, recovery and during therapy.

-Aim of research

Enriching clothing design with various methods of embroidery, printing and outfit accessories.

-Significance

After surgery woman may experience a more limited range of arm and upper body movement, which can make dressing more challenging. holding in place a breast form (or prosthesis), which some women use to help restore their shape following surgery. Helping mastectomy women in improving their appearance, by different fashion techniques, will improve their lives.

- Research tools:

A. Evaluation questionnaire form of the proposed designs and techniques for post mastectomy women suffers from breast cancer in Baheya hospital (Hospital in Sheikh Zayed City -Egypt) . Baheya is a leading non-profit organization based on sustainability and community partnership, providing innovative programs specialized in awareness, early detection, treatment of breast cancer, and psychological support for women using the latest technologies and scientific research.

Twenty cases of women suffer from mastectomy surgery, is reported to different questions about different techniques of clothing as embroidery, printing, crochet, knitting, leather separated accessories, and mannequin draping techniques. These techniques aim to aid in concealment breast defects, unbalanced appearance due to mastectomy cases especially partial breast removal for outerwear clothes (day wear, and evening wear).

Table 1. Mastectomy cases and their personal information and status.

NO.	Name	Age	Breast removal status	Marital status
1.	Eman E.	32	partial	Married
2.	Fatma B.	30	partial	Single
3.	Magda M.	50	partial	Single
4.	Hadeer S.	38	partial	Married
5.	Sara A.	55	whole	Divorced
6.	Heba H.	48	partial	Divorced
7.	Aya A.	42	partial	Single
8.	Sherin E.	33	whole	Single
9.	Shimaa A.	38	whole	Single
10.	Ahlam E.	44	partial	Divorced
11.	Radwa S.	50	partial	Divorced
12.	Maha M.	46	partial	Married
13.	Aya M.	45	partial	Single
14.	Reham S.	38	partial	Divorced
15.	Sahar S.	35	partial	Single
16.	Hayam B.	38	partial	Married
17.	Mona A.	39	partial	Married
18.	Amal O.	46	partial	Married
19.	Rania S.	42	partial	Married
20.	Mona N.	43	partial	Married

B. Questionnaire form:

The researcher prepared a questionnaire aimed at mastectomy cases suffer from breast cancer, to arbitrate the proposed designs, and included the questionnaire on the evaluation of (12) designs and 20 ideas of techniques proposed from internet. The questionnaire is a three-levels rating scale that was used to give the answer “agree” (three degrees), “somewhat agree” (two degrees), and “disagree” (1 degree).

Table 2. Questionnaire form topics.

Questionnaire Items	agree	somewhat agree	disagree	any remarks
1- The proposed designs are succussed in hiding breast defects and size difference.				
2- Designs colors suits mastectomy women's.				
3- The proposed designs helping mastectomy cases to feel confident.				
4- It is preferable to use 2d printing techniques to hide body defects of breast partial or total removal.				
5- 3d printing technique succeed in hide body defects of breast partial or total removal.				
6- It is preferable to use embroidery techniques to hide body defects of breast partial or total removal.				
7- Using mannequin draping techniques to hide body defects of breast partial or total removal is preferable.				
8- It is preferable to use woven fabrics accessories to hide body defects of breast partial or total removal.				
9- It is preferable to use knitting and crochet accessories to hide body defects of breast partial or total removal.				
10- leather accessories succussed in hiding body defects of breast and fashionable.				
11- The designs in total provides or support for total comfort (easy wearing, and take off).				
12- The proposed designs are fashionable.				
13- The designs combines both functionality and style.				
14- The techniques proposed to be used will hide any weight loss, the patient will suffer after undergoing the past therapy treatment.				
15- supposed designs are superior in promoting aesthetic appearance to mastectomy women's wear.				
16- The proposed clothing can be used wearied after cancer recovery.				
17- Designs can improve mastectomy women appearance.				
18- It recommended those designs to help mastectomy women's.				

C. Computer Aided Design (CAD) programs

- ✓ Adobe Photoshop CC 2023 (24.6.0).
- ✓ Virtual 3D software, CLO version 5.1, 2019.

The proposed designs

Fifteen designs are produced carrying the spirit of Egypt Biomimicry. The proposed designs are evening wears for females (32-55) years old.

3. Results and Discussion:

Some of the supposed techniques in fashion field- virtual 3D designs and, that help cancer survivors to improve their appearance after mastectomy surgery that are: Embroidery, printing (2D, 3D), Clothing accessories (knitting, crochet, leather, and woven accessories), and Draping techniques.

3.1. Embroidery Technique:

Embroidery is one of the ancient arts of textile decoration, which gives a three-dimensional aesthetic effect. This art in which decorative details and designs are added to fabrics using needle and thread. Different tools are used to achieve different embroidery techniques, whether traditional or modern.

Embroidery dates back thousands of years, and has been used to decorate clothing, fabrics, furnishings, curtains, religious garments, and traditional clothing. Embroidery is also a form of artistic and craft expression, allowing artists and craftsmen to showcase their skills and creativity in creating unique and beautiful designs.

In designs from 1-6, hand embroidery involves the use of a variety of needles, threads and decorative materials to add color and aesthetic detail to designs. Designs for evening wear and embroidery with a combination of silver and gold threads with the integration of ribbon embroidery and pieces of fabric in the

form of roses, and beads of different colors and shapes. Use cords, flowers, and motifs made of thread or ribbon to add extra details and decorative motifs to the embroidery. These motifs can be applied by hand, by needle stitching, or by techniques such as quilting and inlay. For an added touch of glamour, which has satin detailing around the cups and shoulders, which contains pretty lace detailing. Areas of prominent embroidery are concentrated in the chest area to hide body defects.

Design (1):**Design (2):**

**Design description:**

Slate color top and Champagne color lower part, maxi length dress. With asymmetrical neckline. The idea of mastectomy optical illusion in chest is based on 3D embroidery with different beads and fabric florals.

**Design description:**

A sleeveless silver dress, floor length with jewel neckline. The idea of mastectomy optical illusion is based on 3D embroidery with beads and fabric florals.

Design (3):



Design description:

Ball- gown dress with azure color satin fabric, maxi length, with scoop neckline. The idea of mastectomy optical illusion is based on 3D embroidery with fabric

Design (4):



Design description:

Taupe color, A-line satin evening length dress, with boat neckline. The idea of mastectomy optical illusion in breast area is based on 3D embroidery with different

different shapes and florals.

beads and fabric florals.

Design (5):



Design (6):



Design description:

Aqua color, floor length dress, with illusion neckline. The idea of

Design description:

Above calf dress with scoop neckline. tan gold, on top and plum color satin lower part. The idea of mastectomy

mastectomy optical illusion is based on fabric bulks with different shapes. illusion is based on 3D fabric and protruding lace and flowers.

3.2. Printing Technique:

Textile printing is an old technique of coloring textiles. Textile printing is defined as a regulated technique of coloring cloth in specific patterns or motifs by employing specialized printing techniques and machinery.

Generally, a difference is observed between printing processes and printing styles. Traditional textile printing processes can be classified into two categories: direct printing and indirect printing [17, 18].

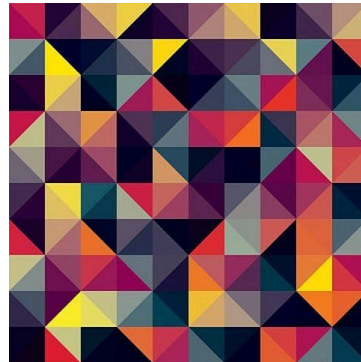
3.2.1. Achieving optical illusion using two Dimensions Printing technique (2D)

Design (7):



Design description:

White creamy color, A-line dress, midi length with gradual length edges, boat neckline. The idea of mastectomy illusion is based on 2D printing with colored triangles shapes.



Design (8):



Design description:

Turtle neckline, evening length dress with different colors printing, the effect of colors is achieved a great illusion and camouflage to breast imbalance.

Design (9):



Design description:

Dark eggplant color dress, with rosewood color scarf which achieves bulk and optical illusion to breast area. maxi length dress, with boat neckline.

Design (10):**Design description:**

Sky blue dress, with cardigan open top, maxi length, poet sleeve, with halter neckline. The two layers of clothes, and small prints in cardigan is achieved optical illusion to mastectomy cases.

Evening and nightwear clothes (design 7-10) are designed to be comfortable, adaptable and easy to put on and take off – helping mastectomy wearer to feel more secure and confident in their body shape. The designs are stylish and comfortable and have the added benefit of including pockets

for breast forms. The 2D printing is made up of different colors and patterns. The breast area is focused on the application of the printed forms to camouflage and hide imperfections and differences in breast size.

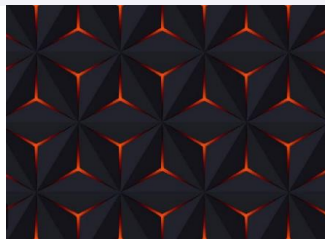
3.2.2. Achieving optical illusion using three Dimensions Printing (3D)

Nowadays, 3D Printing is widely used in the world. Digital fabrication technology, also referred to as 3D printing or additive manufacturing, creates physical objects from a geometrical representation by successive addition of materials. 3D printing technology is a fast-emerging technology [19].

3D printing can also contribute to waste-free production processes. In the method of 3D printing on textiles, the material is applied directly to the textile substrate to create 3D objects, patterns or designs on the surface. The fused deposition modelling (FDM) technology, where thermoplastic filaments are extruded and deposited in thin layers based on a 3D model, is widely used for this purpose [20].

In designs 11 and 12, obtaining artistic and creative values through innovative clothing by presenting designs implemented using the capabilities and technologies of the 3D printer.

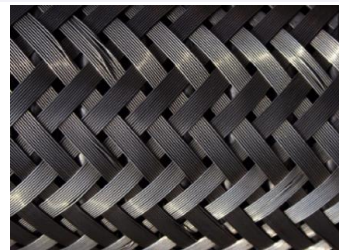
Design (11):



Design description:

Square neckline top with three-dimensional printing Strapless blouse, dark maroon velvet mid-calf length skirt. The idea of optical illusion is achieved by 3D protruding prints with color grades.

Design (12):



Design description:

Midi length, sage color dress. With V- neckline and 3/4 length sleeve. The idea of optical illusion to mastectomy cases, is achieved by 3D protruding weaves.

3.3. Using clothing accessories and complementary items:

Accessories are the final touch to clothes, without which the external appearance is not complete in decorating, beautifying and clarifying the lines of the outfit. Clothing accessories play an important and major role in making it attractive if used elegantly. Therefore, the proper and appropriate use of clothing accessories has a psychological and social impact that deserves attention. If accessories are chosen well, they work to express the individuality and distinction of women. This is not by purchasing a large number of accessories. Elegance and good appearance can be achieved, but by choosing fewer pieces that are of high quality and taste. If a woman can achieve this, she will certainly achieve what she aspires to through distinction, uniqueness and self-confidence. Clothing accessories are classified into two main categories:

First: Trims (connected to clothes)

It is everything that is added to clothes for a functional purpose or for decoration and leads to raising the value of the model such as: (ribbons – perforations – hand and machine embroidery – added parts of all kinds such as knitting, crochet, pressed pleats, fur, buttons of all kinds, zippers, ram, gallon, lace, applique, feathers, etc.)

Second: Separated accessories

They are accessories used with more than one outfit, as they are independent (separated), and not an imitation of the outfit. They are made of different materials that can be added to or removed from clothes, such as (handbags, shoes, socks, belts, gloves, scarves, head coverings, hats, shawls, vests, caps, etc.)

draw attention away from the areas that are less confident with (breast areas), by creating a focal point elsewhere. Using knitting, crochet, leather, and woven accessories.

3.3.1. Knitting and crochet techniques:

It is one of the arts of needlework consisting of loops executed manually and intertwined with each other using a crochet hook. It consists of stitches and decorative shapes based on the chain stitch. Loops are made by making a new loop from this loop and by varying the method of wrapping the thread around the needle and the number of loops, different shaped stitches are produced.



Figure (5): knitting and crochet accessories of different shapes, patterns and colors to mastectomy cases (partial and total removal).

3.3.2. Leather accessories

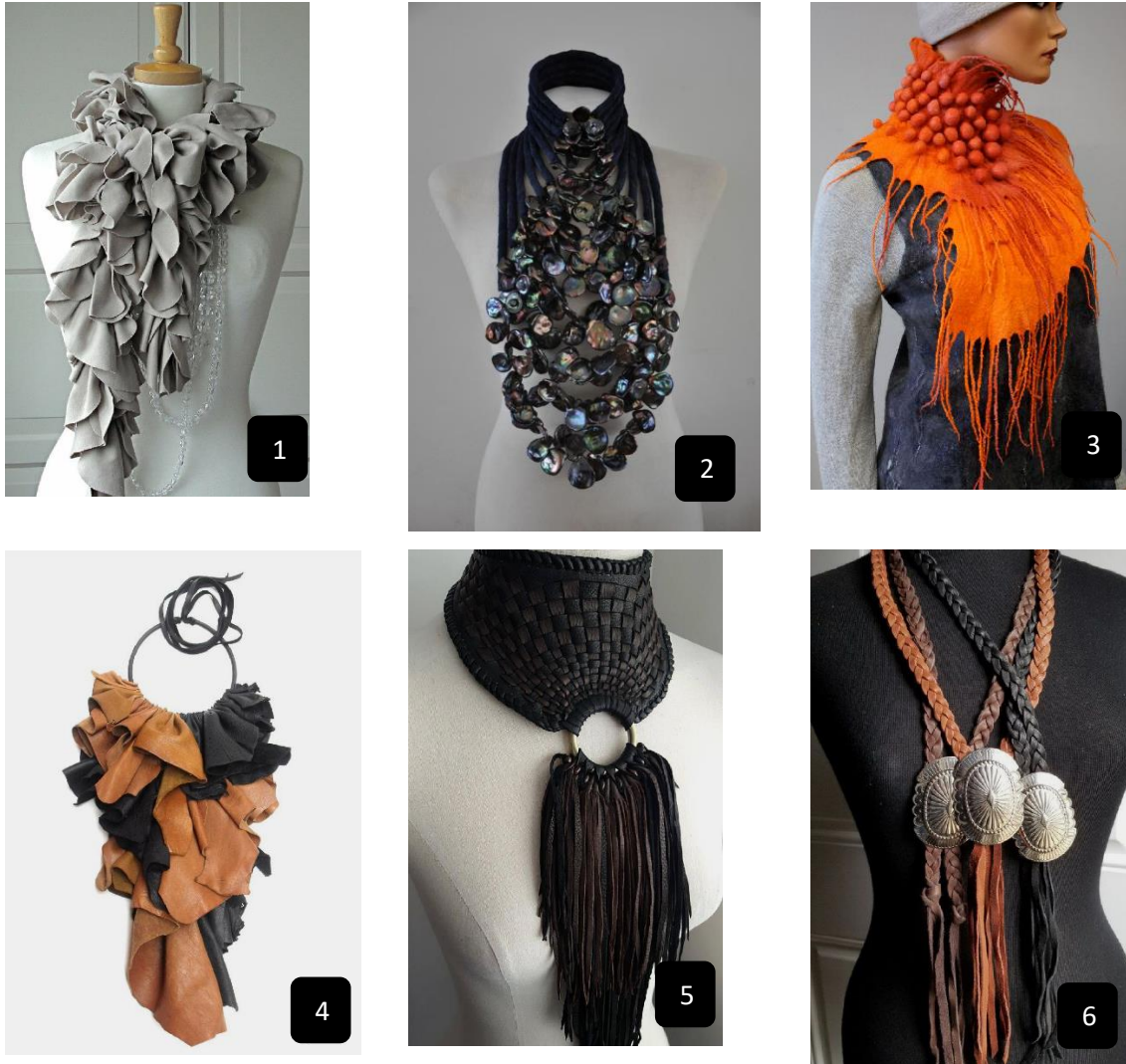


Figure (6): leather accessories of different shapes, patterns and colors

to mastectomy cases (partial and total removal).

Using distinctive pieces of accessories made of natural colored leather, which adds elegant shades to clothes and transforms them in the blink of an eye into elegant pieces of clothing. Leather accessories with different shapes and colors used as neck laces and complementary accessories to clothes, can aid in concealment of breast unbalanced size and appearance after mastectomy surgery to women suffer from breast cancer. As aesthetic and functional aspect to women personal appearance.

3.3.3. Woven shawls and lace:

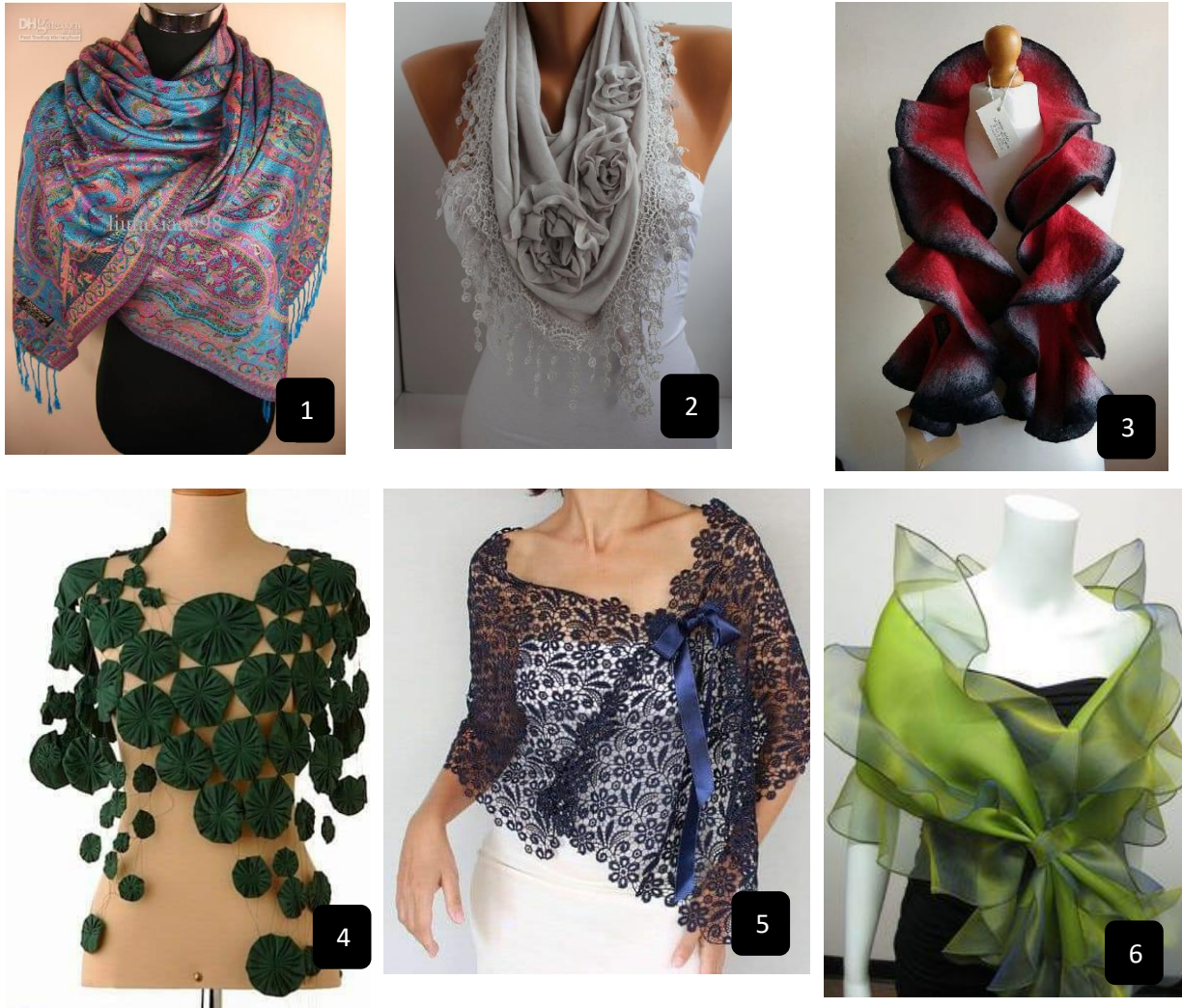


Figure (7): Separated accessories (Woven and knitted) of different shapes, patterns and colors to mastectomy cases (partial and total removal).

3.4. Draping Techniques:

Mannequin shaping and draping is one of the methods of designing and preparing three-dimensional patterns for clothing. This method is used to implement clothes with distinctive designs that are difficult to implement using paper patterns and requires special experience and skill. From here, the use of mannequin shaping began in a general and broad way for the purpose

of design, and this method is used in designing clothing, especially Haut Couture.



Figure (8): Fabrics draping and folding techniques to mastectomy cases (partial and total removal).

Folds of fabric in some areas, such as the breast parts, create an attractive effect and at the same time hide some of the defects of the size differences between the breasts, due to mastectomy surgery.

Questionnaire reliability (specialist's reliability) of fashion experts:

In order to verify the validity of the questionnaire, it was offered in its preliminary form to a group of experts in the fields of clothing and textiles in the faculties of Women, home Economics and Specific Education. The number

of specialists was 15 to judge the suitability of each phrase for its topic, As well as the formulation of phrases and the identification and addition of any proposed phrases, and finally the questionnaire has been improved on the basis of the opinions of some specialists to add some new phrases and modify the general form of the questionnaire.

Honesty using internal consistency between the total degree of the main topic and the overall degree of the questionnaire: The honesty was calculated using internal consistency by calculating the “Pearson correlation” coefficient between the total degree for each phrase in topic (A. The proposed designs achieved the main goal of concealment breast defects after mastectomy surgery and wearing. B. The virtual 3D designs achieve standards of proportionality in the distribution of lines, spaces and colors. C. The proposed designs achieve color harmony) and the overall degree of the questionnaire.

Table 3. Correlation coefficient values between the degree of each topic and the degree of the questionnaire.

Topic	Correlation coefficient
The proposed designs achieved the main goal of concealment breast defects	**0.842
designs achieve standards of proportionality in the distribution of lines, spaces and colors	**0.853
The proposed designs achieve color harmony The proposed designs achieve color harmony	**0.858
Achieving Aesthetic and Functional	**0.830

** Significant at 0.01

It is clear from the above table that correlation coefficients are all significance at the level of (0.01). Thus, it is possible to say that there is an internal consistency between the topics of the questionnaire. It is also true

measurement, indicating the sincerity and homogeneity of the questionnaire topics.

Stability of the questionnaire:

Stability is the accuracy of the test in the measurement and observation, and not inconsistency with itself. The stability was calculated by: Alpha Cronbach method.

Table.4 Stability coefficient values for the questionnaire.

Axis	Alpha coefficient
The proposed designs achieved the main goal of concealment breast defects	0.881**
designs achieve standards of proportionality in the distribution of lines, spaces and colors	0.911**
The proposed designs achieve color harmony The proposed designs achieve color harmony	0.878**
Total questionnaire stability	0.872**

** Significant at 0.01

It is clear from the previous table that all values of stability coefficients, alpha coefficient, significant at level (0.01) indicating the stability of the questionnaire.

Questionnaire analysis of mastectomy cases:

Data revealed in (figure 9), shows that, opinions of mastectomy surgery cases about clothing techniques success rate in hiding and concealment breast form defects resulted from partial or total breast removal surgery. About questionnaire, the proposed designs succeeded in hiding breast size variation and defects to a great extent that 37% percent of cases agree that, draping and folds, especially in

breast area, then the embroidery technique especially 3D embroidery by using beads and satin tapes are very successful in percent 33%, followed by accessories (17%), and printing (13%). In case of 3D printing techniques, cancer survivors suppose this is a successful technique in hiding breast shape defects in size and appearance.

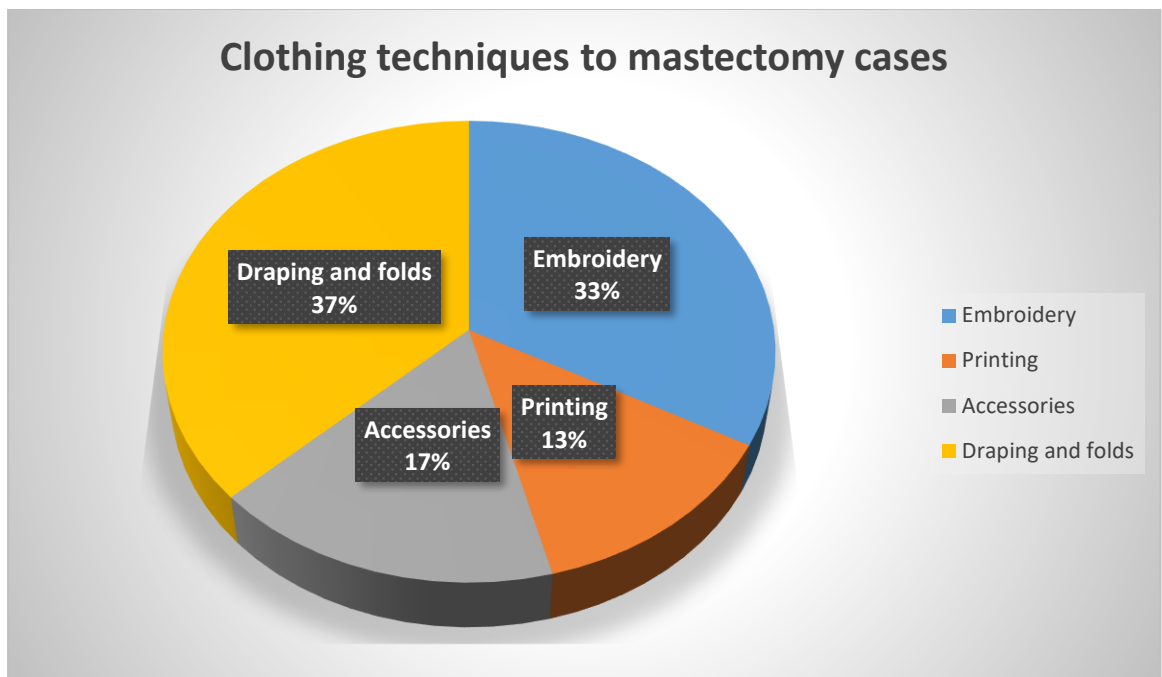


Figure (9): Clothing techniques to mastectomy cases and questionnaire responses percentage.

In questionnaire responses, 89% of women agree that, Designs colors suit them and fashionable, 10% somewhat agree and 1% disagree. Also 92% of respondents agree that the proposed designs helping mastectomy cases to feel confident and 8% of respondents somewhat agree this is an indication to the comfort feelings about proposed designs and techniques. Answers of question no. 4 shows that, 85% agree that using proposed techniques to hide body defects of breast form are very helpful, and 15% somewhat agree. 96% of cases agree that designs in total provides or support total comfort and 4 % somewhat agree. In question no.6, 88% agree that, the clothing doesn't need using extra – push –up or

an enhancer to breast forms, as the protruding yarns, beads and satin tapes act as visual illusion that gives bulk which catches eyes and prevent the observation of breast size variations. In question no.7 about 95% of cancer survivors cases, agree that, proposed designs are fashionable and 5% somewhat agree. 100% agree that, the designs combines both functionality and style. In question no. 9 about 94% agree that the draping and then embroidery techniques are helpful to hide any weight loss, the patient will suffer after undergoing the past treatment and 5% somewhat agree and 1% disagree. 80% of mastectomy cases, agree that designs are superior in promoting aesthetic appearance to mastectomy women's wear. 96% also agree to use the proposed clothing after cancer recovery and 4% somewhat agree. In question no.12, 89% agree that, they feel easy to wear and take off the proposed clothes, 7% somewhat agree and 4% disagree. 90% recommended those designs to help mastectomy women's enhancing their appearance.

Table.3 shows the descriptive statistics of using different clothing technique in hiding breast defects that describe the extent of correlation between the responses of women who have a full or partial breast removal surgery after breast cancer. about proposed clothing designs in this research, and we find that the responses averages are high, reaching $M = 2.9$ as in question 8, 13, $std=0.307$ this a small number proved a strong relation between women's responses, also Q 4,7,3, 11 gave high means values as follows: $m=2.85$, 2.8, as for std deviation were, $std=0.36635$, 0.52315. Q6 gave the lowest mean value, $m= 2.35$, $std=0.87509$ this means that there are differences in women responses for this question, where 88% agree that the clothing need using extra – push –up or an enhancer to breast forms 15% somewhat agree and 25% disagree.

Fashion expert's opinions about designs

There are differences of statistical significance between the proposed designs in achieving both aesthetical and functional value according to the views of fashion experts”.

Main Topic:

A. The proposed designs achieved the main goal of concealment breast defects after mastectomy surgery and wearing.

B. The virtual 3D designs achieve standards of proportionality in the distribution of lines, spaces and colors.

C. The proposed designs achieve color harmony.

Table (5). The averages of the specialist's evaluations of the aesthetic and functional aspect of the proposed designs.

Topic	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12
A	2.93	2.93	2.67	2.73	2.93	2.87	2.47	2.47	2.80	2.47	2.87	2.87
B	2.73	2.60	2.20	2.73	2.80	2.40	2.47	2.40	2.27	2.47	2.33	2.40
C	2.93	2.87	2.60	2.67	2.93	2.87	2.40	2.53	2.40	2.33	2.67	2.87

In order to verify this hypothesis, analysis of the variance averages of proposed designs was calculated in order to achieve the aesthetic and functional values to women suffer from breast cancer and undergoing mastectomy surgery according to the opinions of fashion experts.

Table (6). Analysis of the variance average for the proposed designs in achieving the aesthetic and functional aspects to mastectomy cases according to the opinions of fashion experts.

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.86	14	1.205	13.772**	.000
Within Groups	18.366	210	0.87		
Total	35.236	223			

** Significant at 0.01

The results of the previous table indicate that the value of (F) was (13.772), which is a statistical value significant at (0.01). This indicates that there are differences between the proposed designs in achieving the aesthetic and functional values to women suffer from breast cancer and undergoing mastectomy surgery according to the opinions of fashion experts.

Table (7). Mean, standard deviations and quality coefficients of the proposed designs in order to achieve the aesthetic and functional aspects to mastectomy cases according to the opinions of specialists.

Design No.	Mean	Std. Deviation	Quality Factor (%)	Design Sorting
Design (1)	2.85	0.374	95.11	3
Design (2)	2.76	0.203	92.00	4
Design (3)	2.45	0.400	81.78	8
Design (4)	2.66	0.192	88.67	5
Design (5)	2.87	0.195	95.56	2
Design (6)	3.00	0.000	100.00	1
Design (7)	2.41	0.410	80.22	11
Design (8)	2.43	0.415	81.11	10
Design (9)	2.45	0.309	81.56	9
Design (10)	2.39	0.353	79.78	12
Design (11)	2.58	0.281	86.00	7
Design (12)	2.65	0.141	88.44	6



Figure (10): Quality factors of the proposed designs in order to achieve the aesthetic and functional aspects to mastectomy cases according to the opinions of specialists.

Table (7) and Figure (10) shows that: The best proposed design in achieving the aesthetic and functional values to women suffer from breast cancer and undergoing mastectomy surgery according to the opinions of fashion experts is design Number (6), this is due to the breast area of dress is combines both 3D embroidery and adding lace with lustrous fabrics with thick texture of fabric beside its high aesthetic value, and the least design is the design Number (10), this is according to experts opinions. In light of the above results can accept the hypothesis of research, which states: There are differences of statistical significance among the designs proposed in achieving the aesthetic and functional values to women suffer from breast cancer and undergoing mastectomy surgery according to the opinions of fashion experts.

Conclusion:

- For women suffering from breast cancer, mastectomy is performed. The removal may be total or partial of both breasts. Some women resort to cosmetic surgeries, but the vast majority, due to economic circumstances, may not resort to cosmetic and breast prosthetic surgeries. In order to maintain the psychological state of women after cancer and mastectomy, they must take care of their appearance. Women wear bras with padding, which often shows a difference in the size of the breasts, which causes embarrassment to women who have survived cancer. Various techniques have been researched to hide body defects and differences in breast size through optical illusion.
- Four techniques are proved to be effective in concealment body defects to mastectomy women. Embroidery, clothing complementary accessories, draping, folding and printing techniques are used as techniques that can adjust breast form variations resulted from mastectomy.

- A number of designs (12) are executed by using 2D and virtual 3D fashion design programs, another clothing accessories (20 proposed ideas) are supposed to help in concealment body and breast defects after mastectomy.
- A questionnaire for mastectomy women in Baheya hospital was practiced and statistically analysis to survivors with one or both breasts removed due to breast cancer.
- In mastectomy cases questionnaire, the proposed designs succeeded in hiding breast size variation and defects to a great extent that is, draping and folds, especially in breast area, then the embroidery technique especially 3D embroidery, followed by accessories and printing.
- In fashion expert's questionnaire the best proposed design in achieving the aesthetic and functional values to women suffer from breast cancer and undergoing mastectomy surgery according to the opinions of fashion experts is design Number (6), and the least design is the design Number (10), this is according to experts' opinions.

Recommendations

- ✓ Paying attention to the clothing of cancer patients and choosing designs that are as comfortable as possible.
- ✓ Directing scientific research in the clothing and textile sector to choose textiles that are resistant to bacteria and have high comfort and air permeability properties.
- ✓ Pay attention to design functional bra to be suitable after mastectomy surgery.

ORCID

<https://orcid.org/0000-0001-5066-6685>

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ملحق (١) قائمة بأسماء السادة المحكمين من الأساتذة المتخصصين

م	الاسم	الدرجة العلمية
١	إ.د/ عادل جمال الدين الهنداوي	أستاذ النسيج والملابس بقسم الاقتصاد المنزلي – كلية التربية النوعية- جامعة طنطا
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٣	إ.د/ عبد الرحيم عبد الغنى	أستاذ بقسم الملابس الجاهزة- كلية الفنون التطبيقية- جامعة حلوان
٤	إ.د/فيروز أبو الفتوح الجمل	أستاذ بقسم الغزل والنسيج والتريكو - كلية الفنون التطبيقية- جامعة دمياط
٥	إ.د/طارق عبد الرحمن احمد	أستاذ بقسم الغزل والنسيج والتريكو - كلية الفنون التطبيقية- جامعة حلوان
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٨	إ.د/ نورا حسن العدوى	أستاذ النسيج والملابس- كلية التربية النوعية- جامعة المنصورة
٩	إ.م.د/نسرين عوض النقيب	أستاذ النسيج والملابس المساعد- كلية البنات – جامعة عين شمس
١٠	إ.م.د/إيناس عبد القادر العقدة	أستاذ النسيج والملابس المساعد- كلية البنات – جامعة عين شمس
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١٢	إ.م.د/ كريمة الحسيني	أستاذ النسيج والملابس المساعد - كلية التربية النوعية- جامعة جنوب الوادي
١٣	د/ مروة الخضري	مدرس النسيج والملابس- كلية البنات – جامعة عين شمس
١٤	د/ رانيا صادق سيف الدين	مدرس النسيج والملابس- كلية البنات – جامعة عين شمس
١٥	د/ منى محمد على	مدرس النسيج والملابس- كلية البنات – جامعة عين شمس