

A Study on the Development of Mastectomy Bras and Breast Prostheses*(II)

-Focused on the designs of mastectomy bras and breast prostheses-

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I . Introduction

Breast cancer is the most common cancer to affect women. In Korea, it is the second most common cancer(14.7%) next to stomach cancer(16.2%)(Ministry of Health and Social Affairs, 1999). In the United States, about 192,200 women will be diagnosed with breast cancer in 2001 and about 40,600 women will die from the disease. It is also the second leading cause of cancer death in women after lung cancer (www.cancer.org).

For women, breast cancer can be a devastating experience both physically and emotionally. Almost every form of breast cancer involves some surgery and most women get total mastectomies as the initial therapy. The loss of a breast, however, is very painful to a woman's self-image and sense of femininity(Love, 1995).

After undergoing a mastectomy, of paramount concern is how to recreate the appearance of a breast. Most women prefer to appear to the outside world as if they have both breast, so they tend to be uncomfortable wearing revealing clothes such as T-shirts, pullovers, and swimsuits(Kyungmi Lee, 1999).

There are two ways to create the illusion of a breast. The first entails wearing a prosthesis along with a specially constructed mastectomy brassiere. The brassiere contains a pocket that the prosthesis can be placed in to reduce its movement when worn and to prevent causing any kind of skin irritation and the possibility of dislocation when bending over. The other is the reconstruction of an artificial breast that will have the natural appearance of a breast, but it has its limitations depending on the type of surgery undergone - a mastectomy or a partial mastectomy (lumpectomy).

We propose to develop our own developments of mastectomy brassieres and prostheses, specially designed to aid the patient to easily select the right size and achieve a better comfort and fit.

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II. Functions of prosthesis

Generally, it is suggested that a patient be fitted with a prosthesis right after the surgery. In most cases, a prosthesis can be worn within two to eight weeks after the surgery, when there is no longer any swelling and the surgeon says the patient would no longer need care. A properly fitted breast prosthesis helps replace the weight lost after breast surgery. This replacement is not merely for cosmetic or psychological reasons but for physical reasons as well. When a natural breast is removed, the body is no longer in balance and will compensate with slight curving of the spine and drooping of the shoulders. Both conditions may lead to lower back and neck pain(www.yvettelingerie.com). Additional benefits from wearing a prosthesis include keeping bras from riding up, protecting the chest and enabling the patient to wear the same type of clothes as prior to surgery.

If a woman does not wear a breast prosthesis or wears one that is too heavy or light for her breast type, physical problems may arise : spinal curvature, shoulder droop, muscle contraction with accompanying discomfort, and difficulties with balance (www.intimateimage.com). In the case of small-breasted patients, the problem can usually be alleviated with the use of some light padding. However, if the patient is very heavy-breasted, the weight will have to be evenly balanced so that a brassiere doesn't ride up and cause back and shoulder strain.

III. Types of prosthesis(www.bfi-ia.com)

A prosthesis is a breast form, either worn inside a bra or attached to the body by a special adhesive system. It closely simulates the weight and contours of the natural breast and is made from silicone, foam or fiberfill. There are also some useful accessories for comfort and convenience such as bra extenders which give a bra extra inches in its size, attachable nipples and shoulder cushion to eliminate the irritation and indentation caused by shoulder straps.

1. symmetrical shape

It is a form that can be worn on either side of the body.

- triangle - the most general type and offering the most complete and natural brassiere fit for most users
- teardrop - the name implies its shape and it gives a better fit either under the arm or on the upper part of the chest.
- heart shape - it has double extensions both for under the arm and the upper chest wall.

2. asymmetrical shape

It is a form designed for left or right side specific.

- curved teardrop - regular teardrop type with one rounded portion of the teardrop, which has a slight extension for the upper chest wall.
- extended triangle - a modification of the symmetric style. A corner of the triangle has an extension which goes under the arm for better fitting.

3. attachable breast form

Velcro on one side and an adhesive on the other side are used. This type of breast form allows the wearer to move freely and do a wide range of activities including sports.

4. for swimming and leisure

There are also prostheses made for swimming. These forms come in either non-weighted silicone, non-weighted foam, or fiber-fill. They are comfortable to wear to bed, or right after surgery. They are tucked into the breast pocket of the swimsuit.

IV. Developments of mastectomy brassieres and prostheses

In the United States, the most hospitals arrange for qualified fitters to visit the patients while they're still in the hospital to talk to them about prostheses (Love, 1995). Prostheses can also be found in fancy lingerie shops and mail order catalogues are also offered. In Korea, however, patients are supplied with little information about mastectomy brassieres and prostheses, and purchase locations are limited. They can buy such products only in medical supply stores that offer imported products. They don't stock a variety of form or brassieres. There is no store or company that custom-makes such products. Therefore, it is impossible to achieve a totally precise match, even though patients need to be specially fitted.

In the case of the mastectomy brassieres, they are available only in beige, white, and black lace or white cotton knit. They are also available only in A cup for the each bra size and accordingly fitting problems were reported : the band digs in, the bra slides up, the straps dig into the shoulders, the sides are too tight.

Moreover, imported prostheses are mostly made of silicone, which creates the feel of a natural breast can be given. However, they are very expensive and since only one type is imported for each size, fitting problems are frequently reported : the

prosthesis is too heavy prosthesis, limited air circulation and sweating(Kyungmi Lee, 1999). The prosthesis should be a proper weight for the wearer, breathable, soft. In addition, the brassiere cup should fit perfectly and stay in place during all daily activities.

1. Developments of mastectomy brassiere

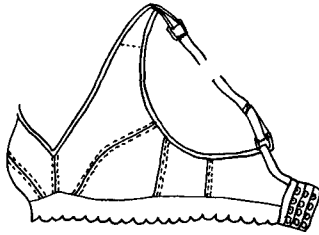
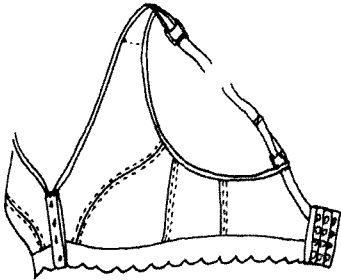
1) Designs of mastectomy brassiere

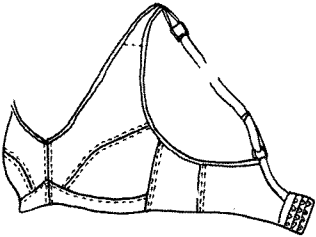
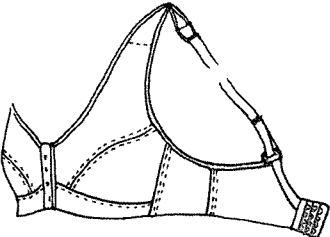
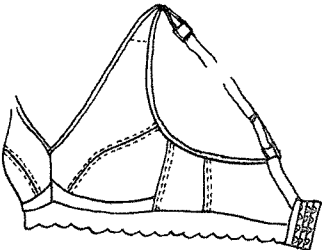
The mastectomy brassiere does not differ from an ordinary brassiere except it contains a pocket to hold a prosthesis. Most importantly, a prosthesis is only as effective as the bra that carries it.

The most patients who undergo mastectomy surgeries are in middle-aged over 40-year-olds(Kyungmi Lee, 1999), so that they generally have heavy breasts requiring specialized mastectomy brassieres.

In our designs for mastectomy brassieres, we focused on the better fitness and wearing comfort and the wide brassiere straps, full coverage brassiere cups and front closures(Tab.1). In addition to those features, we designed a side pocket to hold a sponge pad which goes under the arm for the patients who underwent the radical mastectomy surgery.

<Tab. 1> designs of mastectomy brassiere

style#	brassiere design	Features	size
101		<ul style="list-style-type: none"> • 40mm wide under band to prevent ride-up • adjustable 18mm wide shoulder strap used 	<ul style="list-style-type: none"> • under chest circumference (underneath the bust) - 85cm • cup size -A • under band - 40mm
102		<ul style="list-style-type: none"> • same features as # 101 • convenient front closure 	<ul style="list-style-type: none"> • under chest circumference (underneath the bust) - 85cm • cup size -A • under band - 40mm

style#	brassiere design	Features	size
201		<ul style="list-style-type: none"> ▪ 20mm wide under band similar to ordinary bra ▪ non-wire type 	<ul style="list-style-type: none"> ▪ under chest circumference (underneath the bust) - 85cm ▪ cup size -A ▪ under band - 20mm
202		<ul style="list-style-type: none"> ▪ same features as # 201 ▪ convenient front closure 	<ul style="list-style-type: none"> ▪ under chest circumference (underneath the bust) - 85cm ▪ cup size -A ▪ under band - 20mm
301		<ul style="list-style-type: none"> ▪ separated center panel from cups for better fit ▪ 40mm wide under band to prevent ride-up 	<ul style="list-style-type: none"> ▪ under chest circumference (underneath the bust) - 85cm ▪ cup size -A ▪ under band - 20mm

2. Developments of a prosthesis

The predominant material in the commercial prosthesis is silicone gel inside a very thin plastic shell with tapered edges. However, it is very expensive and because of the changing international currency rate, the prices of imported products are constantly fluctuating. Korea does not create its own products and since a full range of prostheses size are not imported, there are fitting problems, too.

The first step in developing our own prosthesis was to find the cheaper alternative to silicone prosthesis and the second problem entailed adjusting the weight of the device to fit individual patients whose cup sizes may vary even though their bra size may be the same. Patently, a larger bra size is not consistent with an increase in breast volume. The same results were presented in the previous journal of

measuring the volume of human female breasts(Kyungmi Lee, 2000).

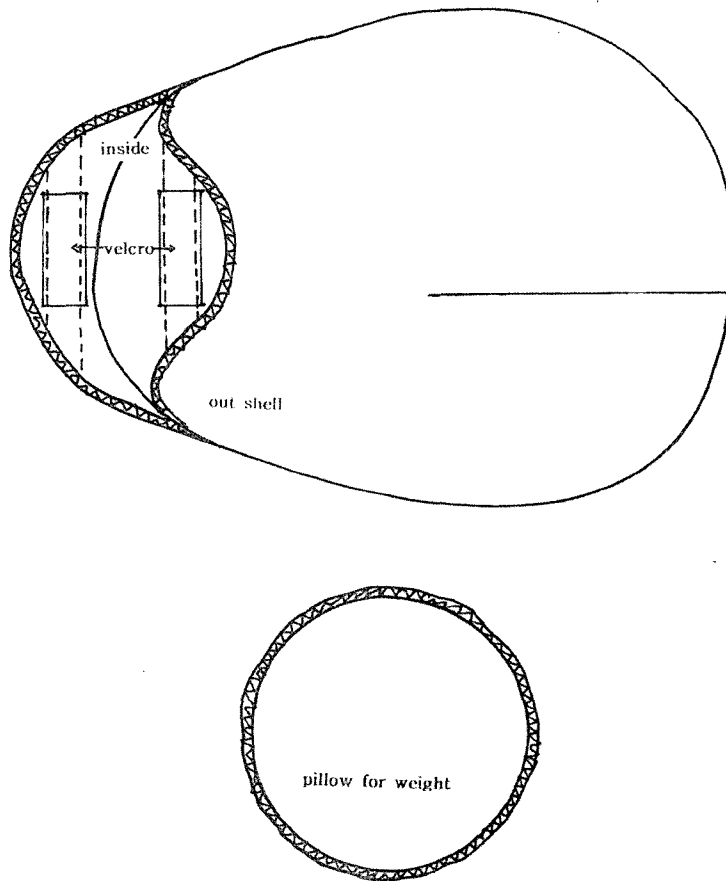
To develop our own prosthesis, based on the results of our survey(Kyungmi Lee, 1999), we selected a brassiere size 85 with A cup as the sample size. In the near future, we plan to develop other sizes based on the results of the wearing tests.

Our prosthesis differs from others. No silicone is used, rather it is composed of nylon and cotton cushioned with fiberfill. To give weight and balance with a natural breast, we chose jade powder in cushioned fiberfill pillows. Although not scientifically proven, it is believed that jade exerts a positive influence on one's health and patients themselves recommended it based on their own experiences. Moreover, the jade paste allows air circulation and flow as the body movement.

The weight of the silicone prosthesis for brassiere size 85 varies from 200g to 400g depending on the manufacturer. To allow a better fitness to patients, our prosthesis offers four pillow weight forms ; one of 200g, one of 100g and two of 50g. The wearer's breast volume will determine the number of pillows used. These four pillows are put into the outside envelope of the teardrop shape, which can be worn either horizontally or vertically(Tab. 1, Fig. 1).

<Tab. 2> size specs of the developed prostheses

	length(cm)	width(cm)	height(cm)
envelope	10.0	14.0	5.0
	diameter(cm)	weight(g)	height(cm)
pillow 1	8.0	50	1.7
pillow 2	8.5	100	2.5
pillow 3	11.0	200	3.0



<Fig. 1> design of weight-changeable prosthesis

V. Further prospects

All the after-effects of breast cancer are not only physical but also emotional. In particular, the loss of a breast affects one's self-esteem or self-respect as a woman. Women may well feel ashamed of not having both breasts, and become reluctant to be involved in any kind of social activities, either.

By providing women with the optimum, most natural, and most comfortable breast replacements, we can help rebuild their self-confidence and aid them cope with their feelings. Women need to feel comfortable with their appearance and we must provide them with more choices. In addition, a special lingerie shop should be opened to offer mastectomy products in a private atmosphere for the patients' convenience. Also, there should be a qualified fitter trained to measure and select the proper

prostheses and brassiere for each individual woman.

Because of the limitations of time and expense, we were able to develop a mastectomy brassiere and prosthesis for brassiere size 85 only. However, after the wearing test, and after noting any shortcomings of our product and altering the design accordingly, we plan to develop a full size range of brassieres and prostheses. We will continue with further study to develop the best products providing optimum fit and comfort.

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