

Technology Frontier

News Bite on PolyU's Innovation

Thermal and moisture comfort mastectomy bra and prosthesis

Restoring self-image without sacrificing comfort

Breast cancer is a common cancer worldwide and surgical removal of part or whole of the breast seems unavoidable in almost all courses of treatment. Post-mastectomy patients have to deal with psychological and physical issues. Prostheses and mastectomy bras on the market are just adding to their physical discomfort as they trap sweat and heat. Researchers from the Institute of Textiles and Clothing thus developed a series of accessories for mastectomized women that prioritize wearing comfort.



Dr Kristina Shin



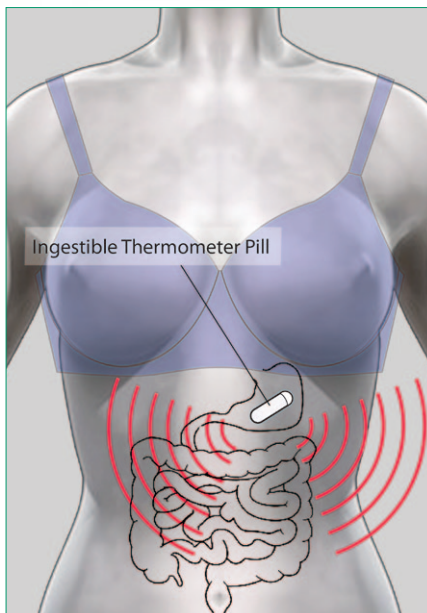
Our newly designed mastectomy bra, prosthesis and garment clip

Breast cancer is the most common cancer in women worldwide, with nearly 1.7 million new cases diagnosed in 2012¹. Despite advancements in medical science, surgical removal of parts or whole of the breast remains the best option to treat the cancer. Yet, the aftermath of mastectomy imposes tremendous psychological effects on patients. "Research shows that many women who have undergone mastectomy experience lower self-esteem because they feel incomplete, unattractive, embarrassed and self-conscious. Some of them even avoid social interaction as a result. Breast reconstruction or wearing prosthesis would be one way to cope," said Dr Kristina Shin,

Assistant Professor, the Institute of Textiles and Clothing, who has been studying the wearing comfort of bras and breast forms for mastectomized women.

Physical and psychological functions

"Wearing prosthesis isn't just about the look and their self-esteem. There are also physical needs for it as it helps balance body weight and prevents unnecessary pressure on the spine and shoulders. They also protect the scar tissues which can be sensitive." However, existing options on the market are either not comfortable or not fitting the Asian figure. That's why Dr Shin and her team developed the new mastectomy bra and breast form that were designed to maximize



Ingestible thermometer pill for core temperature measurement



The thermal and moisture-comfort mastectomy bra and prosthesis won a gold prize and a special merit award in Seoul International Invention Fair 2015.

wearing comfort. “The current prostheses and mastectomy bras on the market are not comfortable because they trap sweat and body heat. Thus, our key objective is to make them sweat-wicking and breathable, while restoring the self-image of mastectomized women,” said Dr Shin. In this project, Dr Shin and her team worked on three items, namely a prosthesis, a garment clip that secures the prosthesis on any bra strap, and a mastectomy bra.

Where comfort and self-image meet

Their new prosthesis is made with medical-grade silicone moulded with a wavy textural surface on the inside. This helps minimize the contact surface on the skin and promote air circulation, essentially reducing sweat and discomfort. There are ventilation holes on the surface and a hollow inner core that maximizes air flow. The new mastectomy bra also includes ventilation holes and windows that reduce heat and moisture build-up. It can be adopted to almost any undergarments such as girdles, sleepwear or sports bras. Finally, mastectomized women may not have enough choices of mastectomy bras on the market to fit their every wardrobe need. Dr Shin and her team came up with one invention that makes all bras with straps in their closet wearable

again. “Generally, you must make some alterations to a regular bra to secure a prosthesis. You either create a pocket in the bra cup to accommodate it, or make a loop on the bra strap to hang the breast form with a regular strap hook. That’s just too much work. With our new garment clip, it just clicks right on any bra strap securely, essentially turning every bra into a mastectomy bra right away.” Simply open the clip, insert the bra strap, close it till the metal teeth grab the strap firmly and then it’s done.

The research team conducted an objective test to compare the skin temperature, humidity and body core temperature under the new and regular prostheses and bras. Within the 70-minute experiment where the subjects were asked to sit, walk, run, walk and sit again, the new prosthesis and new mastectomy bra consistently showed better performance than conventional products, recording 0.2 - 1.1 °C lower skin temperatures, 0.3 - 0.5 °C lower core body temperatures, and 3 - 12% lower humidity.

In November 2015, the thermal and moisture-comfort mastectomy bra and prosthesis won a gold prize and a special merit award in Seoul International Invention Fair 2015.

¹ World Cancer Research Fund International. Breast Cancer statistics. Retrieved from <http://www.wcrf.org/int/cancer-facts-figures/data-specific-cancers/breast-cancer-statistics> on 8 Apr 2016.