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Breastlight: A breast self-examination device

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Abstract

Breast disorders are very common amongst women. Among the breast disorders, breast cancer is the second leading cause of death among women. Breastlight is a valuable tool to a women's breast awareness particularly during the period from one mammogram to the next. This is a handheld device helps in finding an abnormalities in breast and women can assess any unusual changes in their breasts frequently at home itself. It is not a diagnostic device but it can triggers the users to consult health care facility sooner than later and enhances the possibility of successful treatment thereby expected to reduces the mortality due to breast cancer.

Keywords: Breast disorders, breast cancer, breastlight, diagnostic device, early detection

Introduction

Breast health is every woman's own responsibility. Breast gives unique shape and sexual pleasure for women as well as delivers life sustaining milk to the babies. Hence, every women needs to keep an eye over the breast to maintain their breast health. Breast disorders such as breast lumps, breast pain or tenderness, nipple discharge or inversion and changes in the skin of the breast are very common amongst women of all ages from adolescent to older women. Although most breast lumps in women age 20 to 50 years are not cancerous. Some of the breast problems are known to be associated with increased risk of breast cancer. Breast cancer is the second leading cause of cancer death, affecting 2.5 million women each year. As per WHO, breast cancer accounts for 2.09 million cases and 6,27,000 deaths globally. In India, it accounts for 14% of all cancers in women. It can occur at any age but the incidence rates in India begin to rise in early thirties and peak at ages 50-60 years.

Since 2007 breast cancer death rates have been steady in women younger than 50 years, but have continued to decrease in older women. From 2013 – 2017, the death rate decreased by 1.3% per year. These decreases are believed to be the result of finding breast cancer earlier through screening and increased awareness as well as better treatment. Decline in breast cancer mortality could be accelerated by expanding access to high quality prevention, early detection and therapeutic services to all women. There are three common methods of early detection are mammography, clinical breast examination and breast self-examination. The American Cancer Society recommends women ages 40-44 should have a choice to start yearly. Women ages 45-54 years should have a mammogram each year and those 55 years and over should continue getting mammograms every 1 to 2 years.

In order to improve breast cancer outcomes and survival, early detection is crucial as it is associated with an increased number of available treatment options, increased survival, and improved quality of life.

In 1929, Cutler has identified that use of transillumination can be an aid in the diagnosis of breast lesion followed by Aungquist and colleagues in 1981. In 1982, Watmough had conducted another study showed that of due to associated angiogenesis that supplies oxygen and nutrients to cancer cells, visual images of breast cancer can be seen when red blood cells absorbs light at about 615nm. Now the recent advances in LED technology have enabled PWB health to develop the breast light an affordable, compact handheld device for use by women at home itself.

Breastlight

Breast Light is a non-diagnostic breast self-examination tool which assist a women to keep an eye on breast and helps in early detection of any breast abnormalities, monitor blood vessels and spot potential tumours/lesions. It gives a new lens on women's own breasts by shining a bright light through the breast tissue.

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The light which is used in breast light is perfectly harmless, highlights the blood vessels which optimally show up as dark lines.

Breast light is not a replacement for mammograms but rather a device to assist in early detection of breast abnormalities that may or may not be cancerous during the period from one mammogram to the next. Most lumps are not serious and can be easily treated where necessary. If it is diagnosed as cancer, early treatment offers the best chance of cure. The best hope of cure is early detection and this also reduces the number of mastectomies.

The women who is using breast light as breast self-examination device should keep in mind that every

women's breast is different in its size, shape and consistency and it can vary based on the time of the month as part of their menstrual cycle. Some women would have heavy, tender and lumpy breasts predominantly in the armpit mostly around their menstruation period. Menopause would also cause its own changes too with normal breast feeling softer, less firm and not as lumpy. So the women who noticed changes through the breast light should have been clarified with General physician without having any reluctance.

Parts of Breast Light Device

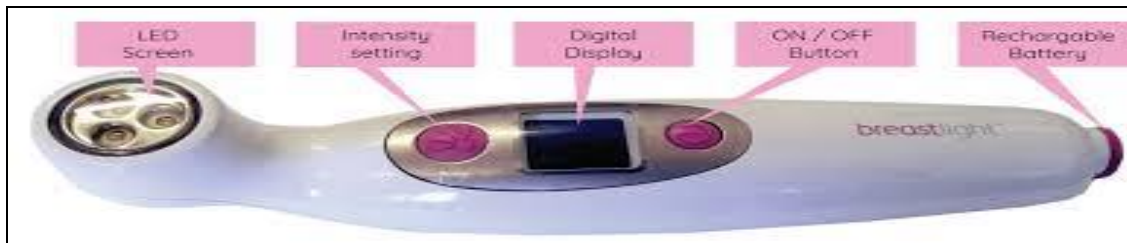


Fig 1.

1. Display Panel

There are four indicators on the display as follows:

- The brightness setting indicators shows the level of brightness which has to be selected. There are four intensity levels of adjustable brightness settings to choose from.
- The battery charge indicator shows the left over battery life and flashes when the battery needs charging.
- The high temperature indicator comes only when the product has overheated. When it gets overheated the unit will cut off, the indicator will flashes till the device has cooled down sufficiently and become ready for the next use.
- The days since the last use indicator shows how many days it has been since last used this device. It will be a best remainder for breast examination.

2. The Light

Breast light uses touch sensor technology to make sure that the light is only glow at full power when the lens has a full contact with the skin. Also the touch sensor needs time to reset itself when we switch on breast light. So wait for a couple of seconds before placing it against the breast.

3. The Battery and Power

Breastlight has rechargeable battery. When we are not using the breastlight automatically turn off after 1 minute to conserve the battery. If this happens, simply press the on/off button to continue the assessment.

Mechanism of Breastlight

Breastlight works by emitting high intense red light which penetrates through the breast tissue and illuminates the breasts. The hemoglobin in the red blood cells absorbs the red light and reveals shadow lines which are veins and blood vessels carrying blood normally throughout the breast itself. The degree of light absorption determined by the number of blood cells per unit volume of blood tissue, cysts appears translucent rather the blood filled cysts, hematomas and neoplastic tumors appears opaque.

The normal breast will appears red with uniform brightness accompanied by a well-defined black vein structure. There will be circle of small dots around the nipple which is a part of completely normal mammary gland.

Breast Self-Examination with Breastlight Preparation

The breastlight need to be charged before use. Plug the power lead into the socket on the end of the handle. When the battery is completely charged, the battery symbol on the display will stop moving and all the bars will be lit.

Procedure

Step-1

- Prefer dark room where the lights can be turn off and make it dark as much as possible.
- It is good to stand or sit in front of the mirror.

Step-2

Most women prefer lubricant which allows the lens to slide across the skin more easily. Only the water based lubricant is better whereas oil based lubricant may cause damage to the lens. Apply the lubricant liberally around the entire breast.

Step-3

- Turn off the room light and wait for a few minutes to allow the eyes to get practice to the dark.
- Next turn on the breast light. Usually it switch on at low intensity light level. The light will gradually increase to full power when it is in full contact with skin.
- Keep the breast light underneath one of the breast and push it firmly against the skin without any significant escape of light from under the breast and the breast itself will suddenly appear brighten.

Step-4

Generally larger or firmer breast will require high brightness settings. There are 4 different brightness settings. So adjust the brightness until you find the setting that is right for you.

Step-5

- Use the other hand to hold the breast and slowly move the breastlight around the breast until you have seen as much as you can.
- The breast tissue goes right around the arms and high up on the chest towards the shoulder. Make sure to look here as well.
- By either looking down on the breast as well as at the reflection in the mirror, a woman can get a full view of all areas of breast.
- Take enough time to assess all the areas of breast including the area just behind the nipple.
- After the complete assessment of one breast, a woman can move to the other breast.

Care of Breastlight

- Breastlight may be cleaned using a dry tissue or slightly damp clean cloth.
- Power socket cover should be in place during cleaning
- It is not a water-proof device.
- Do not use breast light in the shower or in the bath.
- Do not immerse it nor rinse under the tap.

Important pearls in use of Breastlight

- Make the room as dark as possible before using breastlight.
- Use a mirror so you can see more.
- Check all areas including under the arms and high on the chest.
- Check both the breast.
- If in any doubt whatsoever about what you find contact your general physician.
- The woman who had a lumpectomy also can see the rest of the breast normally with breastlight but there may be a congealing area over the scar tissue.
- In case of partial removal of breast, a woman can still use breastlight on the remaining tissue. But the woman who had undergone removal or reconstruction of breast will not be able to use breastlight, as it only works on breast tissue.
- Pregnant and lactating mothers have enriched blood supply to the breast tissue and have enlarged breasts. So it may give a false reading with breastlight.
- The breastlight should not be used during pregnancy and she has to wait for at least 6 months after giving birth before using the device again.

Conclusion

Breastlight is a most powerful device to assist a woman to detect any changes in the breast as well as allows a woman to acquire confidence in breast awareness routine. Besides, it can be of great assistance to women for whom palpation is not an effective way to identify suspicious masses. The research studies show that there will be 6 cancers missed by breast self examination, 2 cancers missed by breastlight examination and 1 cancer missed by mammography. Hence breastlight examination is not a replacement for a mammography screening but it can be expected to perform substantially better than breast self examination which leads to fewer missed cancers and reduced mortality.

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