

## Digital Infrared Thermal Imaging (DITI) used for adjunctive Breast Disease Screening Can Enhance Early Detection :

### “Early detection saves lives”

DITI's role in breast cancer and other breast disorders is one of early detection and monitoring of abnormal physiology and the establishment of risk factors for the development or existence of cancer.

When used adjunctively with other laboratory and outcome assessment tools, the best possible evaluation of breast health is made.

This fifteen-minute non invasive test, is a valuable adjunctive tool for alerting gynecologists and primary care physicians to the possibility of underlying breast disease. This test is designed to improve chances for detection of fast-growing, active tumors in the intervals between mammographic screenings or when mammography is not indicated by screening guidelines for women under 50 years of age.

DITI may be especially appropriate for younger women under 50 whose denser breast tissue makes it more difficult for mammography to pick up suspicious lesions. This test can provide a 'clinical marker' to the physician just before clinical breast examination as well as to the mammographer before the mammogram is performed, that a specific area of the breast needs particularly close examination."

#### Breast cancers tend to grow significantly faster in younger women under age 50:

AGE	AVERAGE TUMOR DOUBLING TIME
Under 50	80 Days
Age 50 - 70	157 Days
Over Age 70	188 days

Source:

Cancer 71:3547-3551, 1993

The faster a malignant tumor grows, the more heat it generates. For younger women in particular, results from DITI screening can lead to earlier detection and ultimately, longer life.

More than 90 percent of women diagnosed with early stage, localized cancer are alive five years later, yet only 58% of cancers are diagnosed at this stage according to the American Cancer Society.

During a clinical breast examination, a physician must rely on fingers (or palpation) and eyesight to detect tumors in the breast, which for women under age 50 may often occur when cancer is no longer localized or confined to the breast. DITI screening can provide an alert before clinical breast exam or referral to mammography, Sonography, or MRI so as to enhance early detection by the physician.

DITI is indicated for women of all ages, particularly in the age group 30 - 50 and women of any age in a high risk group.

Examination recall is dependant on Thermogram result, age, previous history and risk group and can be 3 monthly, 6 monthly, or 12 monthly.

## **Digital Infrared Thermal Imaging (D.I.T.I.) — as a Breast Exam**

**DITI** of the breast offers the opportunity of earlier detection of breast disease than has been possible with breast self examination, physician palpation, or mammography alone.

**DITI** is a non invasive test. This means that there is no contact with the body of any kind, no radiation and the procedure is painless.

**DITI** is performed using sophisticated medical infra-red cameras, a clinician simply captures infra-red images, or “thermograms” of the breasts. The digitized images are stored on a computer and can be sent electronically to a central data-base where a physician, such as a Radiologist or Thermologist (thermal imaging specialist), can perform statistical analysis. Significant asymmetries of the breast can indicate a physiological abnormality. This may be pathological (a disease) or it might indicate an anatomical variant. When a Thermogram is positive, the job of differential diagnosis begins. Reports are colour printed and sent to the patients physician / specialist.

**DITI** detects the subtle physiologic changes that accompany breast pathology, whether it is cancer, fibrocystic disease, an infection or a vascular disease, then the physician can plan accordingly and lay out a careful clinical program to further diagnose and or MONITOR the patient until other standard testing becomes positive, thus allowing for the earliest possible treatment.

If a suspicious (positive) **DITI** breast examination is performed, the appropriate follow-up diagnostic and clinical testing can be ordered. This would include mammography and other imaging tests, clinical laboratory procedures, and nutritional and lifestyle evaluation.

All patients thermograms (breast images) are kept on record and form a baseline for all future routine evaluations.

**DITI** is a very sensitive and objective physiological test of abnormalities in the breast and as such is an extremely valuable and important adjunctive test with regard to early detection of breast disease.

## **Digital Infrared Thermal Imaging (D.I.T.I.) as a Breast Exam**

**Breast cancer** is the most common form of cancer among Australian women between the ages of 30 and 60. The average woman has 1 chance in 9 (or about 11 percent) of developing breast cancer during her lifetime. Two-thirds of these women will be over 50 years old, but breast cancer can and does occur in younger women (about 1% of breast cancer cases occur in men).

**It takes** years for a tumor to grow, and the earliest possible indication of abnormality is needed to allow for the earliest possible treatment and intervention. Evidence of disease must be detected long before the intervention stage has passed.

**Doctors** do not yet know how to prevent breast cancer. But you can increase your chances of detecting breast cancer in its earliest stages by understanding the need for, and participating in an early detection programme that will help you increase your chances of detecting breast cancer in its earliest stages. Only about 20 percent of biopsied breast lumps are cancerous. And, if cancer is found early, there are choices for treatment. With prompt treatment, the outlook is good. In fact, most women treated for early breast cancer will be free from breast cancer for the rest of their lives.

### **Risk factors**

Women who delay having children until their 30's or who don't have children at all are at higher risk of developing breast cancer. If you have a mother, sister or relative who has had breast cancer this increases the risk for you as does a personal history of non-malignant cystic breast disease. Women whose periods started before the age of 12 or finished after the age of 50 also incur a greater risk of breast cancer. The link between the contraceptive pill and/or Hormone Replacement Therapy after menopause and breast cancer has not been satisfactorily confirmed or disproved at this stage of scientific research. Finally, if you have suffered from cancer of the womb there appears to be an increased risk of cancer of the breast.

### **Current Early Detection Guidelines**

One day there may be a single method for the early detection of breast cancer. Until then, using a combination of methods will increase your chances of detecting cancer in an early stage.

- Mammography for all women who are age 40 or older.
- Regular DITI screening for women of all ages.
- A regular breast exam by a health professional.
- Monthly breast self-examination.
- Personal alertness for changes in the breasts.
- Readiness to discuss quickly any such changes with a doctor.

**These guidelines should be considered along with your background and medical history.**

These guidelines may change as new scientific information becomes available. The final decision regarding all tests, of course, should be made on an individual basis.

**MAMMOGRAPHY** is essential to detecting breast cancer at its earliest stage

Beginning at age 40, all women should be encouraged to have a mammogram every 1 to 2 years until age 50. After 50, mammography should be done annually.

A mammogram is an x-ray of the breast. It can reveal tumors too small to be felt and can show other changes in the breast that doctors believe may suggest cancer.

In mammography, the breast is pressed between two plates; some pressure is applied to get a clear picture. Usually, two x-rays are taken of each breast, one from the top and one from the side. Although some women are concerned about radiation exposure, the risk is very small.

A doctor also may suggest a mammogram if a symptom of breast cancer is found, whether through Thermography, BSE, the annual exam, or by chance. If you have a symptom of breast cancer, you should not hesitate to have a mammogram if your doctor recommends it.

### **Other Methods Used For Early Detection**

#### **Needle biopsies**

Needle biopsies are less physically traumatic than surgical biopsy and leave little or no scarring on the breast. They cost much less than surgical biopsies and can be evaluated faster. Two types of procedures are currently employed. Fine-needle aspiration biopsy (FNA), requires no anesthesia and offers fast results, sometimes in less than 15 minutes. But FNA requires that a specially trained pathologist be on hand to evaluate the cells removed, and since the technique harvests few cells, it may produce ambiguous results. For those reasons, FNA is most effective for larger lesions that can be felt.

The other procedure, core needle biopsy, requires a local anesthetic and takes up to an hour to perform. A spring-loaded "gun" is used to insert the needle into the breast. The physician guides the needle to its target using either mammography or ultrasound. This type of biopsy removes a larger amount of tissue, and results are available in two or three days.

**Ultrasound** detects breast changes by sending high-frequency sound waves into the breast. The pattern of echoes from these sound waves is converted into an image of the breast's interior. Ultrasound may be helpful in distinguishing between solid masses and cysts (fluid-filled sacs). Unlike mammography, ultrasound cannot detect small calcium deposits that may be present in the breast and that sometimes indicate cancer, nor does it identify small tumors.

Recent technical improvements with ultrasound can often make us more confident in diagnosing benign conditions and can reduce the need for an immediate biopsy.

#### **Magnetic Resonance Imaging (MRI)**

An MRI machine can take cross-sectional images through different parts of the body, and may be a very sensitive imaging tool for finding breast cancers. MRI might prove to be better than either mammography or ultrasound in determining the extent of cancer in the breast and where it's located. Breast implants can interfere with conventional mammography. MRI is the best tool we have for looking at women with silicone implants. While most diagnostic imaging centers have MRI units, relatively few of them have used the technology for detecting breast cancers. Studies now under way, are evaluating whether MRI should join mammography, thermography and ultrasound as part of a standard regimen.

#### **Digital Mammography**

Instead of the image appearing on film, a digital mammogram is stored on a computer disk or tape. This allows manipulation of the image to increase the contrast. A digital mammogram lends itself to computer-aided diagnosis. Studies are under way at several medical centers. If those trials are successful, digital mammograms may be widely available in about five years.

**Diaphanography**, or transillumination, shines a bright light through the breast. Transillumination can show the difference between a solid tumor and a cyst. Current studies indicate that this method does not identify the very small cancers that can be detected by mammography. The technique remains experimental.

# A Physical Breast Exam Is A Must

Women should have breast examinations during their routine checkups.

You may find it convenient to schedule this exam during your routine physical checkup. If a breast exam is not done during that checkup, you should ask for one. During the exam, the health professional feels the breast and underarm with the fingers, checking for lumps. This is called palpation. The breasts also are checked for other changes such as dimpling, scaling, or puckering of the skin or a discharge from the nipples.

Women 40 and older should have breast examinations annually.

## **Breast Self Exam (BSE)**

Women should do breast self-examination monthly.

Breasts come in all sizes and shapes, just as women do. Your own breasts will even change throughout your life. Your monthly menstrual cycle, menopause, childbirth, breast-feeding, age, weight changes, and birth control pills or other hormones may change the shape, size, and feel of your breasts.

It is important to learn what is normal for you. This can be done by using BSE. It is easy to do, and, as the name implies, you do it yourself. Women taking charge of their own health are doing BSE regularly. They are also eating healthy foods, exercising regularly, and avoiding tobacco use.

BSE is done once a month so that you become familiar with the usual appearance and feel of your own breasts. Familiarity makes it easier to notice any changes in your breasts from one month to another. In fact, some health professionals suggest that, at first, women do BSE every day for a month so that they really know the "geography" of their breasts. Early discovery of a change from what is normal is the whole idea behind BSE.

The best time to do BSE is 2 or 3 days after the end of your period, when your breasts are least likely to be tender or swollen. A woman who no longer has periods may find it helpful to pick a particular day, such as the first day of the month, to remind herself that it is time to do BSE.

If you discover anything unusual, such as a lump, a discharge from the nipple, or dimpling or puckering of the skin, you should see your doctor at once. Remember, 8 out of 10 biopsied breast lumps are not cancer.

Many women have irregular or "lumpy" breasts. The term "benign breast condition" refers to those changes in a woman's breasts that are not cancerous. Many doctors believe that nearly all women have some benign breast changes after age 30. But any change is best diagnosed by your doctor.

Discussing BSE with your doctor will help you understand the procedure better. Ask your doctor or other health professional to review with you the steps of BSE, as well as to explain what you are feeling in your breasts. This will assure you that you are doing your BSE correctly and thoroughly, and you will gain more confidence in examining your breasts.

Remember every part of the breast cancer detection plan:

- Regular Mammograms.
- Regular Digital infrared thermogram screening
- Routine breast examination by a health professional.
- Monthly breast self-examination.

## BREAST SELF-EXAMINATION ( BSE )

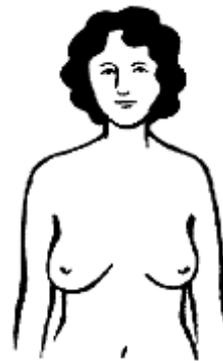
REMEMBER, BSE IS NOT A SUBSTITUTE FOR ROUTINE THERMOGRAMS, MAMMOGRAMS OR REGULAR BREAST EXAMS BY A DOCTOR.

Breast self-examination should be done once a month so you become familiar with the usual appearance and feel of your breasts. Familiarity makes it easier to notice any changes in the breast from one month to another. Early discovery of a change from what is "normal" is the main idea behind BSE. The outlook is much better if you detect cancer in an early stage.

If you menstruate, the best time to do BSE is 2 or 3 days after your period ends, when your breasts are least likely to be tender or swollen. If you no longer menstruate, pick a day such as the first day of the month, to remind yourself it is time to do BSE.

Here is one way to do BSE:

Stand before a mirror. Inspect both breasts for anything unusual such as any discharge from the nipples or puckering, dimpling, or scaling of the skin.

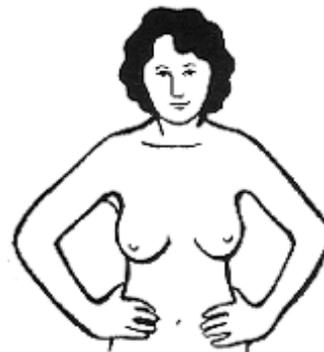


The next two steps are designed to emphasize any change in the shape or contour of your breasts. As you do them, you should be able to feel your chest muscles tighten.

Watching closely in the mirror, clasp your hands behind your head and press your hands forward.



Next, press your hands firmly on your hips and bow slightly toward your mirror as you pull your shoulders and elbows forward.



Some women do the next part of the exam in the shower because fingers glide over soapy skin, making it easy to concentrate on the texture underneath.

Raise your left arm. Use three or four fingers of your right hand to explore your left breast firmly, carefully, and thoroughly. Beginning at the outer edge, press the flat part of your fingers in small circles, moving the circles slowly around the breast. Gradually work toward the nipple. Be sure to cover the entire breast. Pay special attention to the area between the breast and the underarm, including the underarm itself. Feel for any unusual lump or mass under the skin.



Gently squeeze the nipple and look for a discharge. (If you have any discharge during the month - whether or not it is during BSE - see your doctor.) Repeat steps 4 and 5 on your right breast.



Steps 4 and 5 should be repeated lying down. Lie flat on your back with your left arm over your head and a pillow or folded towel under your left shoulder. This position flattens the breast and makes it easier to examine. Use the same circular motion described earlier. Repeat the exam on your right breast.



The earliest sign of breast cancer is a single painless firm to hard lump. The edges of the lump are not sharp and stretch out gradually into the surrounding tissue if felt between the fingers. Erosion of the nipple or discharge may indicate an early cancer. Late signs of cancer include an inability to move the lump which appears attached to the skin or to the deeper breast tissue. There may be puckering of the skin above the cancer or retraction of the nipple. Eventually there will be breast enlargement, hardness, inflammation and pain. Almost half of breast cancers begin in the nipple or outer and upper quarter of the breast. The earlier a cancer of the breast is discovered, the better the chances of a complete recovery.