

THERMOGRAPHY IN INFRARED THERMAL IMAGING TECHNIQUE

¹Mareshamani ,Roshini.B ²

¹Assistant Professor ²UG Students,
Department of Biomedical Engineering
BIHER, BIST, Bharath University
Chennai- 6000073.
mareshamani.bme@bharathuniv.ac.in

ABSTRACT

Thermography is a thermal imaging printing technique that measures the heat emissions in the various regions of the body and convert those into visual signals (Thermal Images) for diagnosing and treating abnormalities in the human beings and in vertinaries. Thermography is a non invasive and a no radiation method and a temperature measurer. The thermography is mainly used for screening Breast Cancer in the woman's using infrared waves .For many reasons thermography is suggested as a replacement for mammography.(i.e.) Thermography can assets breast cancer and used as a tool to monitor breast health.

KEYWORDS: Thermal imaging, Temperature measurement, Screening, Breast cancer.

INTRODUCTION

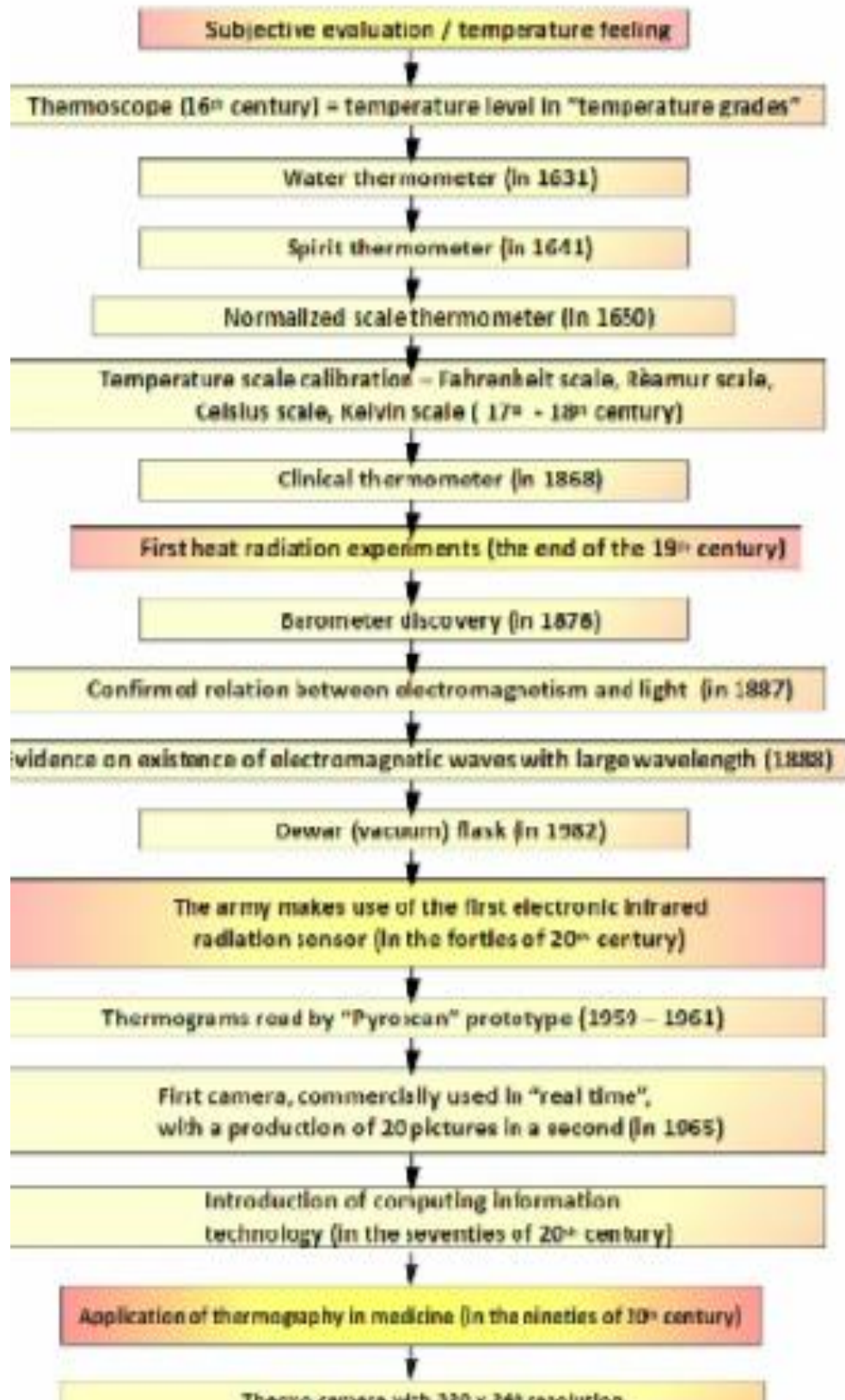
In longer days there was a association between the diseases and body temperature itself .Hippocrates defined the temperature differences in the body and suspected the tumor cells, And so development of temperature measurement gets begannd like thermometers in 1595.[1-5] The graphic of temperature measurement was made by the Carl Wunderlich in 1871. The invention of infrared radiation began in 1800 by Sir William Herschel who detected the heating rays beyond the visible red of spectrum.[5-9] In 1840 John

Herschel made first thermal imaging from sunlight using evaporograph technique, he was the one to use the term thermogram to describe images

In 1940s the early infrared imaging system was developed and become available to industries and medicine in 1959. A prototype Pyroscan used in bath in 1959 and was used to image the increased heat over arthritic joints. In 1963 with improvement of picture quality a early thermogram of RA knees were recorded with Mark Pyroscan. But each images took 3-4 minutes to acquire and was impossible to quantify.

During 1960 and 1970 new generation of thermal imaging was developed in Europe ,USA, Japan. Oscilloscopic displays and multiple colour photography was developed in the 1960's. 1970's made mini computers for storing images ,data's, image analysis etc., this marked the beginning of quantitative Thermography.

In 20th century the development of thermography was tremendous by giving high resolution 3D images from infrared cameras and possibility of video recording and dynamic diagnostics .Such development made the usage in the breast cancer screening than mammography which is contactless, safe, painless.[10-15][These advantages made its usage in medical, industries, building industries etc.,



METHODOLOGY

Breast cancer is the leading cause of death nowadays in the women throughout the world. Thermal imaging is used to record the thermal patterns using the infrared camera's to diagnose the tumor cells in the breast.[16-21]

Support Vector Machine

Support vector machine uses texture features extracted from co-occurrence matrix and run length matrix for classification of normal and malignant breast conditions. This proposed system gave an accuracy of 88.10%, sensitivity and specificity of 85.71% and 90.48% respectively.[22-27]

Liquid Crystal Thermography

The microencapsulated form of liquid crystal has developed for surface temperature mapping, while the un-encapsulated form is limited. This is more advantageous because it has high spatial resolution which is important for microgeometrics. It is mainly for measuring heat transfer coefficients in the microchannels.[

Role of Infraed imaging in detecting cancer

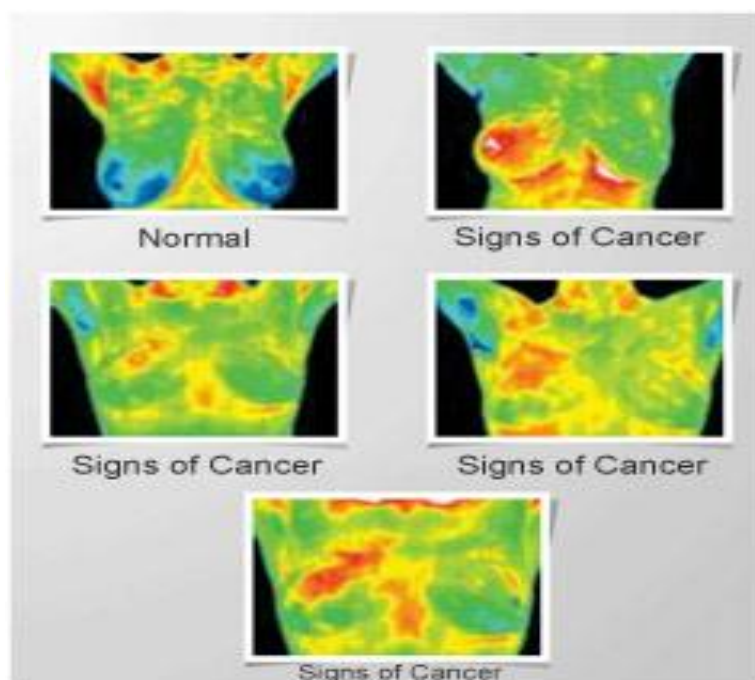
Thermography uses infrared camera to detect tumor cells in the breast. The infrared camera captures the image of the patient and visualizes the area of damage by thermal variations in the body, the region with tumors are easily detected by the thermography with out pain or compression. The image resolution is though high and make a clear visuality of the image.

Thus the tumor cells are detected by the thermal variations the treating of tumour cells is also made comfortable by without affecting the surrounding cells and without causing any radiation to the normal cells, so tissue damage is also avoided by use of thermography.[28-31]

How Thermography Performed?

The room where the imaging is gonna be taken is to be under the range of 18c to 25c and maintained within 1c during examination. Potential sources of additional heat generation permitting the sun shine to entering the

room ,heat generatinfg computers devices should be eliminated from the room to reduce the artifacts.Airconditioners must be placed away from the patient inorder to avoid the additional physiological stress that would negatively impact the procedure.The portion of screening is undressed and the surface is made to cooldown to the room temperature for 15 minutes.For scanning the patient is made to stand about 10 feet to the camera,the three view of the breast is taken(anterior and two lateral views).The next is patient is made to a cold challenge as patinet places hands in the cold water of 10c for 10 minutes,again the three images are taken.The breast exhibits the thermal patterns by the infrared camera.A Thermographer analysis the changes in the patients.[32-39]



DISCUSSION

As with anything thermography is the best choice of screening the breast. Instead of screening it also says about the health of the breast. Not only as a screening equipment it also undergoes healing process by quantifying inflammation and analysing the anti inflammatory medication.[40-45] Thermography is not a replacement for the mammography but it can assess breast cancer risk. Thermography can also detect lymphatic congestion and hormonal imbalances and monitor dietary changes. And woman's who don't want to undergo can have a great option of thermography.

CONCLUSION

Though technology development is the ultimate aim in all the sectors. Especially more new technologies are emerging in medical field to serve the society. In such case thermography play a prominent role by satisfying the some needs of people suffering of the breast cancer. However the specificity and sensitivity of thermography can be limited for many applications, and it is more valuable as a adjunct to the other modalities.

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