A Design for a Diffuse Optical Tomography Probe for Brest Cancer Imaging

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Technology description

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Summary

Problem or Unmet Need:
Breast cancer affects approximately 1 in 8 women in the United States and the incidence of breast cancer throughout the world is increasing. With more than 200 000 new cases every year, it accounts for 28% of all new cancers diagnosed in women. Because of growing awareness, more women today are undergoing breast cancer screening, such as x-ray mammography. However, there have been noted cases of poorly maintained mammography machines emitting excessive x-ray radiation that can lead to cancer and radiation sickness. Furthermore, more portable imaging methods are required for various surgical procedures, such as neoadjuvant chemotherapy (NACT). Due to safety issues and shortcomings of current x-ray imaging methods, other promising imaging modalities, such as diffuse optical tomography (DOT), have recently emerged to image breast tissue for the purpose of breast cancer screening. Unfortunately, the shape of the breast often makes it difficult to interface between the breast itself and the DOT apparatus. The result is incomplete coverage of the breast and an inability to image a range of breast sizes, as well as compression of the breast and other difficulties.
This technology encompasses a novel system to interface the optical system used for DOT with breast tissue and can be used to image all breast sizes. By providing adjustable DOT contact, the need for optical contact fluids can be mitigated and patient comfort can be maintained. This technology could be used to enhance diagnostic imaging systems, thereby leading to more effective screening tools, earlier detection and better treatment of breast cancer.

Application area

Front line and maintenance screening for breast cancer
Screening in regions with poor healthcare access
Alternative applications include neurological, orthopedic, cardiovascular screening

Advantages

Easily manufactured via rapid prototype printing (3D Printing Process)
Provides customizable coverage of breast
Limits need for optical contact fluids

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