nu:view Breast CT

Summary of relevant scientific publications on the nu:view breast CT system

IMAGE QUALITY / APPLICABILITY

"Spiral Breast CT: Going Further with Photon Counting"

Authors: M. Wetzl, S. Ohlmeyer, and E. Wenkel.
Published in: DI Europe Spring 2023 (2023).
Link: https://issuu.com/fido7777/docs/dieurope_spring_2023/24
Internal reference: Publication Wet23a

Summary:
This article from the Radiology Institute of the University Hospital Erlangen presents performance characteristics and initial user experiences of the nu:view breast CT. Results in breast diagnostics and clinical indications are also discussed. At a comparable dose to mammography, breast CT allows simultaneous visualization of lesions and microcalcifications. The system has the potential to become a screening modality, especially due to the high level of acceptance among patients.

"Dedicated breast computed-tomography in women with a personal history of breast cancer: A proof-of-concept study"

Authors: E. Formaz, C. Schmidt, N. Berger, A. L. Schönenberger, J. Wieler, T. Frauenfelder, A. Boss, and M. Marcon.
Published in: European Journal of Radiology 158 (2023), p. 110632. doi: 10.1016/j.ejrad.2022.110632
Link: https://www.ejradiology.com/article/S0720-048X(22)00482-X/fulltext
Internal reference: Publication For23

Summary:
In this study, the image quality of breast CT examinations of patients with personal history of breast cancer (PHBC) was evaluated. Confidence for the overall interpretation with breast CT was equal or superior to mammography in 98.4% of all cases for reader 1 and in 90.6% for reader 2 (p <.001). Confidence for scar evaluation with breast CT was equal or superior to mammography in all cases for reader 1 and in 91.9 % for readers 2 (p <.001). Breast CT provides images with a high image quality Breast CT in patients with PHBC offers a diagnostic certainty equal to or better than that of mammography.

"Clinical assessment of image quality, usability and patient comfort in dedicated spiral breast computed tomography"

Authors: C. S. Schmidt, C. Zellweger, J. Wieler, N. Berger, M. Marcon, T. Frauenfelder, and A. Boss.
Published in: Clinical Imaging 90 (2022), pp. 50–58. doi: 10.1016/j.clinimag.2022.07.001.
Link: https://linkinghub.elsevier.com/retrieve/pii/S0899707122001796
Internal reference: Publication Sch22

Summary:
This study examined image quality and patient comfort in 2418 breast CT scans from 1222 patients. Comfort, mobility and usability of the breast CT were rated each with either "no" or "negligible" complaints in >99%. Image quality was rated with "no" or "negligible complaints" in 96.7%. Lesion contrast and detectability of calcifications were rated either "optimal" or "good" in 92.6% and 98.4%. "Complete" and "almost complete" breast coverage were reported in 41.9%, while the pectoral muscle was found not to be covered in 56.0%. Major parts of the breast were covered in 97.9%. This demonstrated high image quality and high contrast of soft tissue lesions and calcifications. The system is also easy to use and offers a high level of patient comfort.

"Mehr Sicherheit"

Authors: G. Gebhardt and E. Wenkel.
Published in: Radiologie Magazin 2-2022 pp. 61-64
Link: https://ab-ct.de/wp-content/uploads/2023/11/ewenkel_mehr-sicherheit.pdf
Internal reference: Publication Geb22

Summary:
From clarifying unclear findings to ruling out multicentricity for surgery planning: Prof. Evelyn Wenkel gives an insight into her experiences with nu:view. The specialist in diagnostic radiology and chairwoman of the breast diagnostics group in the German X-ray Society (DRG) confirms that the high-resolution 3D method has great potential to further increase diagnostic reliability in the context of multimodal breast diagnostics: "In many cases, breast computed tomography could also be performed for breast cancer, as the procedure has a very high level of accuracy. The system is very sensitive, and it can be ruled out with a high degree of accuracy that there are further findings in the breast."

"Potential of spiral breast computed tomography to increase patient comfort compared to DM"

Authors: M. Wetzl, E. Wenkel, M. Dietzel, L. Siegler, J. Emons, E. Dethlefsen, F. Heindl, C. Kuhl, M. Uder, and S. Ohlmeyer.
Published in: European Journal of Radiology 145 (2021), p. 110038. doi: 10.1016/j.ejrad.2021.110038.
Link: https://linkinghub.elsevier.com/retrieve/pii/S0720048X21005192
Internal reference: Publication Wet21b

Summary:
This prospective study included 79 patients undergoing both spiral breast CT (SBCT) and DM for the assessment of BI-RADS 4 – 6 lesions. Following SBCT and DM patients answered a standardized

questionnaire regarding “Overall patient comfort” and “Pain” on a 5-point Likert Scale. On the same Likert Scale, experienced radiologic technicians rated the workflow of the SBCT regarding patients’ “Mobility”, ease of patient “Positioning”, patients’ adherence to the examination (“Compliance”) and expected image quality. Visibility of fibroglandular tissue in SBCT was independently rated by two breast radiologists on a 10-point Likert Scale. Patients reported significantly lower pain during SBCT (4.73 ± 0.57) compared to DM (4.09 ± 0.90; $P < 0.01$). This effect was independent from BMI. However, pain reduction by SBCT was most pronounced in premenopausal (SBCT vs. DM: 4.79 ± 0.50 vs. 3.89 ± 0.99) compared to postmenopausal patients (4.71 ± 0.77 vs. 4.20 ± 0.89). Overall patient comfort in premenopausal patients tended to be higher in SBCT compared to DM ($P = 0.08$) due to absence of compression-related pain in SBCT. Radiologic technicians rated the SBCT procedure generally as positive (average: 4.62 ± 0.56); patient mobility was good (4.44 ± 0.81), while ease of patient positioning (4.56 ± 0.71), patients’ compliance (4.75 ± 0.57) and expected image quality (4.62 ± 0.56) were rated very good. Coverage of fibroglandular tissue in SBCT was generally high (9.82 ± 0.43) The SBCT imaging can be easily integrated into the clinical workflow.

“Breast Computed Tomography: Diagnostic Performance of the Maximum Intensity Projection Reformations as a Stand-Alone Method for the Detection and Characterization of Breast Findings.”

Authors: C. Zellweger, N. Berger, J. Wieler, D. Cioni, E. Neri, A. Boss, T. Frauenfelder, and M. Marcon.
Published in: Investigative Radiology Publish Ahead of Print (2021). doi: 10.1097/rli.0000000000000829.
Link:https://journals.lww.com/investigativeradiology/abstract/2022/04000/breast_computed_tomography__diagnostic_performance.1.aspx
Internal reference: Publication Zel21

Summary:
The aim of this study was to evaluate the diagnostic performance of the MIP reformations of breast CT images as a stand-alone method for the detection and characterization of breast imaging findings. Of the 80 BI-RADS 1 examinations, reader 1 and 2 classified 91.3% and 92.5% correctly, respectively. Of the 71 benign lesions, 84.5% and 85.9% were correctly classified BI-RADS 2 or 3 by reader 1 and 2, respectively. Sensitivity for finding a malignant lesion (BI-RADS 4 or 5) was 88.9% for both readers and specificity for finding a malignant lesion was 99.3% for reader 1 and 100% for reader 2. The inter-reader agreement of the for finding a lesion (benign or malignant) versus detecting no lesion as well as of the BI-RADS classification was strong ($\kappa = 0.86$ and $\kappa = 0.82$, respectively). The inter-reader agreement for finding a malignant lesion was almost perfect ($\kappa = 0.94$). Overall, the readers were confident in their reading, as most of the examinations were rated “rather sure”. Interpretation time of MIP images for both readers was in average slightly more than 2 minutes. These results suggest that the use of MIP images could reduce the interpretation time without declining the diagnostic performance, potentially making BCT more suitable also for a screening setting.

"Breast CT - a ground-breaking innovation"

Authors: K. Ridder.
Published in: DI Europe 36.4 (Nov. 2020), pp. 18–21.
Link: https://ab-ct.com/wp-content/uploads/2023/10/DIEurope_nuview_BreastCT_UserInterview_2020-11-1.pdf
Internal reference: Publication Rid20

Summary:
Dr. K. Ridder reports on his first experiences with the nu:view Breast-CT and its use. Breast CT is an alternative to contrast-enhanced mammography and MRI when diagnosing dense breasts. In addition, the easy integration into the clinical workflow and the ease of operation as well as patient comfort are highlighted.

"Dedicated Spiral Breast Computed Tomography With a Single Photon-Counting Detector: Initial Results of the First 300 Women"

Authors: N. Berger, M. Marcon, T. Frauenfelder, and A. Boss.
Published in: Investigative Radiology 55.2 (Oct. 2019), pp. 68–72. doi: 10.1097/rli. 0000000000000609.
Link:https://journals.lww.com/investigativeradiology/abstract/2020/02000/dedicated_spiral_breast_computed_tomography_with_a.2.aspx
Internal reference: Publication Ber19b

Summary:
Similar to Ber19, the first clinical results are presented. This retrospective study evaluated 591 breast CT acquisitions in 300 women. Reference is made to the high image quality and patient comfort. As a quality criterion, the pectoralis muscle was included in 341 of 591 examinations. The main reason for preference of breast CT over mammography was the lack of breast compression (254 of 300, 84.7%), which was desired due to personal reasons or mastodynia, whereas 10 patients (0.3%) had implants hampering mammography. Therefore, breast CT represents an alternative for patients who refuse mammography.

"Dedicated Breast Computed Tomography With a Photon-Counting Detector: Initial Results of Clinical In Vivo Imaging"

Authors: N. Berger, M. Marcon, N. Saltybaeva, W. A. Kalender, H. Alkadhi, T. Frauenfelder, and A. Boss.
Published in: Investigative Radiology 54.7 (Mar. 2019), pp. 409–418. doi:10.1097/RLI.0000000000000552.
Link:https://journals.lww.com/investigativeradiology/abstract/2019/07000/dedicated_breast_computed_tomography_with_a.4.aspx
Internal reference: Publication Ber19

Summary:
This article presents the first clinical results of breast CT. In particular, the high image quality, the potential for screening modality and the high level of patient comfort are highlighted.

"Präzision und Komfort für eine bessere Diagnose"

Authors: G. Gebhardt and M. Wasser
Published in: Radiologie Magazin 3-2024, pp. 24-27.
Link: https://radiologiemagazin.de/epaper/epaper-RadMag_3-2024/index.html#24
Internal reference: Geb24

Summary:
Dr. Martin Wasser, radiologist at Leiden University Medical Centre, shares his perspective on the evolving field of breast cancer diagnostics. Emphasizing the transformative potential of breast CT, Dr. Wasser highlights its ability to deliver true 3D imaging without the need for breast compression—a feature that has significantly improved patient comfort and participation rates in screening programs.
"Breast CT combines the advantages of both mammography and MRI. It offers 3D imaging similar to MRI, provides high-resolution images that clearly show the morphology of the tumor, and can show calcifications, which are important indications of DCIS."
Ongoing research at LUMC and other centers aims to validate breast CT's role as a diagnostic and potentially primary modality in workflows. With further advancements like integrated biopsy capabilities, Dr. Wasser envisions breast CT becoming an indispensable tool in personalized breast cancer care.

DOSE

"Radiation dose estimates based on Monte Carlo simulation for spiral breast computed tomography imaging in a large cohort of patients"

Authors: S. Shim, D. Kolditz, C. Steiding, V. Ruth, A. M. Hoetker, J. Unkelbach, and A. Boss.
Published in: Medical Physics (2023). doi: 10.1002/mp.16211.
Link: https://aapm.onlinelibrary.wiley.com/doi/10.1002/mp.16211
Internal reference: Publication Shi23

Summary:
This study analysed 1,657 breast CT examinations and estimated patient-specific dose value. Overall estimated mean glandular dose values for the device nu:view were 7.3 ± 0.7, 6.5 ± 0.3, and 5.9 ± 0.3 mGy, and the calculated effective dose 0.88 ± 0.08, 0.78 ± 0.04, and 0.72 ± 0.04 mSv for the small, medium and large breast groups[1]. In summary for all breast sizes, the mean glandular dose was 6.6 mGy (SD 0.7 mGy, range 4,7–9.6 mGy). Radiation exposure was found to be lower when using spiral breast CT with a photon-counting (direct converting) detector [nu:view] compared to diagnostic mammography and cone-beam breast CT with conventional detector.

[1] The subcohort with small breasts exhibited a volume less than 400 cm^3, medium 400–760 cm^3, and large at least 760 cm^3.

CONTRAST AGENT

"Contrast Media–Enhanced Breast Computed Tomography With a Photon- Counting Detector"

Authors: N. Berger, M. Marcon, J. Wieler, D. Vorburger, K. J. Dedes, T. Frauenfelder, Z. Varga, and A. Boss.
Published in: Investigative Radiology 57.10 (2022), pp. 704–709. doi: 10.1097/rli.0000000000000863.
Link:https://journals.lww.com/investigativeradiology/abstract/2022/10000/contrast_media_enhanced_breast_computed_tomography.9.aspx
Internal reference: Publication Ber22

Summary:
This prospective study in 12 women with suspicious breast lesions addresses the applicability and image quality of breast CT after administration of iodinated contrast medium. Of the 12 patients, 15 suspicious lesions were found, 14 were malignant, and 1 benign lesion corresponded to a chronic inflammation. All lesions showed strong contrast media uptake with a signal-to-noise ratio of 119.7 ± 52.5 and a contrast-to-noise ratio between glandular tissue and breast cancer lesion of 12.6 ± 5.9. The correlation of the size of invasive tumours measured in B-CT compared with histological size was significant and strong R = 0.77 (P < 0.05) It is evaluated as a promising modality for breast cancer detection and staging, allowing lesions and microcalcifications to be visualized at the same time. In particular, the fully 3D visualization of microcalcification represents an advantage over MRI and DM/DBT.

"Detectability of Breast Cancer in Dedicated Breast CT Compared With Mammography Dependent on Breast Density"

Authors: M. Wetzl, T. Heilingbrunner, F. Heindl, E. Wenkel, M. Uder, S. Ohlmeyer.
Published in: Invest Radiol. 2024 Jul 5. doi: 10.1097/RLI.0000000000001105. Epub ahead of print. PMID: 38949016.
Link:
https://journals.lww.com/investigativeradiology/abstract/9900/detectability_of_breast_cancer_in_dedicated_breast.229.aspx
Internal reference: Publication Wet24

Summary:
This retrospective study evaluated the detectability of breast cancer in non-contrast-enhanced and contrast-enhanced (CE) spiral breast-CT (SBCT) in comparison with mammography. The evaluation was carried out by two independent radiologists. 90 women with 105 biopsy-proven malignant lesions were included. While with mammography only 83.8% and 80% of the lesions were detected by reader 1 and reader 2, respectively, CE-SBCT was able to detect 99.1% by both readers. The detectability was very high in CE-SBCT, regardless of breast density (density A/B/C/D: both readers 100%/100%/100%/87.5%) and compared with mammography (density A = 100%, B = 89.1% and 95.1%, C = 73.1%, D = 50.0% and 71.4%). CE-SBCT was found to have a very high diagnostic accuracy of 97.2% compared to 81.4% for mammography. In general, CE-SBCT performed better than non-CE-SBCT in terms of lesion detectability and diagnostic confidence.

BREAST DENSITY

"Potential of non-contrast spiral breast CT to exploit lesion density and favor breast cancer detection: A pilot study"

Authors: J. Weber, G. Zanetti, E. Nikolova, T. Frauenfelder, A. Boss, J. Wieler, M. Marcon
Published in: European Journal of Radiology, 2024, Volume 178, 111614. doi: 10.1016/j.ejrad.2024.111614.
Link: https://www.ejradiology.com/article/S0720-048X(24)00330-9/fulltext
Internal reference: Publication Web24

Summary:
The purpose of this prospective study was to assess the density values (HU) of breast lesions and breast tissue in non-contrast-enhanced spiral breast CT (non-CE-SBCT). Density values were evaluated from scans of 40 women (12 with malignant lesions, 7 with fibroadenoma, 12 with cysts and 9 with extremely dense breasts) by two readers. In non-CE-SBCT malignant lesions show significant higher density values compared to glandular tissue ($p<0.001$) and cysts ($p<0.001$) as well as fibroadenoma compared to glandular tissue ($p=0.003$). This difference in density, even in extremely dense breasts can offer a unique opportunity to detect lesions without contrast medium administration in women with extremely dense breasts.

"Fully automated breast segmentation on spiral breast computed tomography images"

Authors: S. Shim, D. Cester, C. Bluethgen, M. Marcon, N.Berger, J. Unkelbach, and A. Boss.
Published in: J Appl Clin Med Phys. 2022 Oct; 23(10):e13726. Epub 2022 Aug 9. doi: 10.1002/acm2.13726
Link: https://pubmed.ncbi.nlm.nih.gov/35946049/
Internal reference: Publication Shi22

Summary:
This study developed a seeded watershed and region growing algorithm specifically for breast CT images and optimized it using 68 breast images. The novel photon-counting breast computed tomography (CT) technology has the potential to quantify the amount of glandular tissue and breast density, which is important in assessing breast cancer risk. As a conclusion, a fully automated method for breast segmentation in breast CT images was proposed.

"Quantitative study on the breast density and the volume of the mammary gland according to the patient's age and breast quadrant"

Authors: S. Shim, J. Unkelbach, A. Landsmann, and A. Boss.
Published in: Diagnostics, 13 (21): 3343, October 2023. ISSN 2075-4418. doi: 10.3390/diagnostics13213343.
Link: https://www.mdpi.com/2075-4418/13/21/3343
Internal reference: Publication Shi23b

Summary:
This retrospective study of 1027 breast CT examinations aimed to quantitatively assess the percent breast density (PBD) and the mammary glands volume (MGV) according to the patient's age and breast quadrant since mammographic breast density is widely considered a strong risk factor for breast cancer that is not specific to the breast side. They successfully quantitatively analysed the breast composition from the 3D segmentation of BCT images by determining breast tissue volume (BTV), MGV, and PBD. The BTV increases, and MGV and PBD decrease with age, exhibiting a significant difference between the youngest and oldest patients' groups ($p < 0.05$). In the analysis in each quadrant, the largest shares of BTV and MGV were observed in the upper outer quadrant, about 34% of the breast, and the smallest shares in the lower inner quadrant, 18–19%. The strong inverse influence of age on breast density previously observed in the mammography studies based on the BI-RADS classification was systematically proved in their investigation. Their results demonstrated that breast density in women is substantially lower than the commonly accepted present mammographic density assumption.

"Breast density in dedicated breast computed tomography: Proposal of a classification system and interreader reliability"

Authors: J. Wieler, N. Berger, T. Frauenfelder, M. Marcon, and A. Boss.
Published in: Medicine 100.18 (2021), e25844. doi: 10.1097/MD.0000000000025844.
Link: https://journals.lww.com/md-journal/fulltext/2021/05070/breast_density_in_dedicated_breast_computed.86.aspx
Internal reference: Publication Wie21

Summary:
In this retrospective study of 1454 breast CT examinations, a classification system for breast density in breast CT was developed analogous to the BI-RADS breast density scale in mammography. For this purpose, the detectability of lesions was used to develop an atlas-based classification system for breast CT density with 4 categories. The designed classification system has high interrater agreement with an intraclass correlation coefficient (ICC) among 3 readers of 0.85 to 0.87.

MICROCALCIFICATION

"Dedicated Photon-Counting CT for Detection and Classification of Microcalcifications: An Intraindividual Comparison With Digital Breast Tomosynthesis"

Authors: LC. Huck, M. Bode, E. Zanderigo, C. Wilpert, V. Raaff , E. Dethlefsen, E. Wenkel, CK. Kuhl.
Published in: Invest Radiol. 2024 Jun 27. doi: 10.1097/RLI.0000000000001097. Epub ahead of print. PMID: 38923436.
Link:
https://journals.lww.com/investigativeradiology/abstract/9900/dedicated_photon_counting_ct_for_detection_and.226.aspx
Internal reference: Publication Huc24

Summary:
This prospective study compared the detection and classification of microcalcifications using the spiral breast CT (SBCT) device nu:view in comparison with digital breast tomosynthesis (DBT). The rating was done by two radiologists independently. 22 patients with DBT screening detected BI-RADS-4/5 microcalcifications (16 malignant, 6 benign) also underwent SBCT. SBCT allows depiction of in-breast microcalcifications similar to DBT, in particular also including microcalcifications associated with malignant changes. The conspicuity of microcalcifications was rated similar for SBCT (in high resolution mode) and DBT with high inter-rater agreement (SBCT: κ = 0.92, DBT: κ = 0.95). SBCT allows the assessment of the distribution of microcalcifications equivalent to DBT. The average glandular dose (AGD) was 7.04 mGy on average (range: 6.04–8.92 mGy) and comparable to DBT (average 6.88 mGy, range: 5.50–9.6 mGy).

IMPLANTS

"Breast CT in women with breast implants"

Authors: A. Boss.
Published in: DI Europe 37.2 (June 2021), pp. 16–18.
Link: https://ab-ct.com/wp-content/uploads/2023/10/BE_2021_06_DIEurope_Interview-Boss-Implants_BreastCT_EN.pdf
Internal reference: Publication Bos21

Summary:
In this article, Prof. Boss describes the benefits and use of breast CT in women with breast implants. The system displays the implants and the shell very clearly, making it easy to see wrinkles and defects/ruptures. Calcifications are also best visualized on a breast CT. The surrounding tissue can also be easily examined for lesions and microcalcifications.

"Diagnostic value of a spiral breast computed tomography system equipped with photon counting detector technology in patients with implants"

Authors: L. Ruby, S. Shim, N. Berger, M. Marcon, T. Frauenfelder, and A. Boss.
Published in: Medicine 99.30 (2020), e20797. doi: 10.1097/md.0000000000020797.
Link: https://journals.lww.com/md-journal/fulltext/2020/07240/diagnostic_value_of_a_spiral_breast_computed.15.aspx

Internal reference: Publication Rub20

Summary:
This is the first study on patients with implants using the device nu:view. In 3/21 (14%) women, a unilateral implant rupture was detected. The device nu:view revealed implant folds in the left breast and a positive Linguine sign in the right breast indicative of an intracapsular rupture. Extensive capsular fibrosis was detected in 3/21 (14%) women. A linguine sign, which represents the collapsed implant shell in the gel showing a high sensitivity and specificity for an intracapsular rupture, was identified with the breast CT. The results demonstrate the potential clinical value of the device nu:view in evaluating breast density, implant integrity, extensive capsular fibrosis, intramammary soft tissue lesions as well as micro- and macrocalcifications in women with breast implants without the need of contrast agent application or painful breast compression. It is the only modality providing both, excellent depiction of implants and microcalcifications in a single examination without overlay effects.

ARTIFICIAL INTELLIGENCE

"Detection of microcalcifications in photon-counting dedicated breast-CT using a deep convolutional neural network: Proof of principle"

Authors: A. Landsmann, C. Ruppert, K. Borkowski, P. Hejduk, A. Ciritsis, J. Wieler, C. Rossi, and A. Boss.
Published in: Clinical Imaging 95 (2023), pp. 28–36. doi: 10.1016/j.clinimag.2022.12.006.
Link: https://www.clinicalimaging.org/article/S0899-7071(22)00323-0/fulltext
Internal reference: Publication Lan23

Summary:
In this study, a dCNN (neural network) was trained with mammography data and its applicability to breast CT images for the detection of microcalcification was examined. The feasibility was confirmed.
Note: this is not part of the product. *Only breast CT images were used for this study.*

"Applied Machine Learning in Spiral Breast-CT: Can We Train a Deep Convolutional Neural Network for Automatic, Standardized and Observer Independent Classification of Breast Density?"

Authors: A. Landsmann, J. Wieler, P. Hejduk, A. Ciritsis, K. Borkowski, C. Rossi, and A. Boss.
Published in: Diagnostics 2022, 12(1), 181; https://doi.org/10.3390/diagnostics12010181
Link: https://www.mdpi.com/2075-4418/12/1/181
Internal reference: Publication Lan22

Summary:
This study shows that AI in form of deep learning can be used to classify breast density accurately and reliably in a Breast CT examination, allowing for standardized decision-making, improving the workflow and increasing its clinical applicability.
Note: this is not part of the product. Only breast CT images were used for this study.

"Radiomics in photon-counting dedicated breast CT: potential of texture analysis for breast density classification"

Authors: A. Landsmann, C. Ruppert, J. Wieler, P. Hejduk, A. Ciritsis, K. Borkowski, M.C. Wurnig, C. Rossi, and A. Boss.
Published in: European Radiology Experimental (2022) 6:30 doi: 10.1186/s41747-022-00285-x
Link: https://eurradiolexp.springeropen.com/articles/10.1186/s41747-022-00285-x
Internal reference: Publication Lan22a

Summary:
This study from is the first study to evaluate the potential of texture analysis in nu:view spiral breast CT for breast density classification in order to provide a more observer-independent classification system. The results of this evaluation show, that texture analyses can predict breast density with a high accuracy and can therefore be used to classify breast density in nu:view spiral breast CT.
Note: this is not part of the product. Only breast CT images were used for this study.

RADIOPAQUE BREAST MARKERS

"Feasibility of in vivo metal artifact reduction in contrast-enhanced dedicated spiral breast computed tomography"

Authors: M. Wetzl, E. Wenkel, C. Steiding, V. Ruth, J. Emons, M. Wasser, M. Uder, and S. Ohlmeyer
Published in: Diagnostics, (19), 2023,13. doi: 10.3390/diagnostics13193062.
Link: https://www.mdpi.com/2075-4418/13/19/3062
Internal reference: Publication Wet23b

Summary:
This study investigated the extent of artifacts in different breast marker types and the feasibility of reducing artifacts through a metal artifact reduction (MAR) algorithm. It was shown that the device nu:view can be used in the presence of metallic breast markers. MAR improved the detectability of lesions affected by artifacts in 5 out of 11 cases. MAR is feasible in SBCT and improves the image quality and detectability of lesions.
Note: This MAR algorithm is not part of the product. Only breast CT images were used for this study.

REVIEW ARTICLES

"Parametrische Bildgebung in der Mammadiagnostik"

Authors: R. Schulz-Wendtland, T. Wacker
Published in: Die Radiologie (2024). doi: org/10.1007/s00117-024-01392-z
Link: https://doi.org/10.1007/s00117-024-01392-z
Internal reference: Publication Sch24b

Summary:
This study examines the relevance of breast CT systems in comparison to the established MRI modality. It specifically compares two commercially available systems: the Koning Cone-Beam Breast Computed Tomography (CBBCT) and the AB-CT Spiral Breast Computed Tomography (SBCT).

The results show that SBCT provides superior image quality, higher resolution, reduced radiation dose, and improved detection of microcalcification compared to CBBCT.
SBCT opens therefore new perspectives in the detection and three-dimensional visualization of microcalcifications, which is not possible with MRI. Whether SBCT will complement or replace MRI in the evaluation and assessment of findings remains to be determined.

"Spiral breast computed tomography with a photon-counting detector (SBCT): The future of breast imaging?"

Authors: M. Wetzl, M. Dietzel, S. Ohlmeyer, M. Uder, and E. Wenkel.
Published in: European Journal of Radiology 157 (2022), p. 110605. doi: 10.1016/j.ejrad.2022.110605.
Link: https://www.ejradiology.com/article/S0720-048X(22)00455-7/fulltext
Internal reference: Publication Wet22

Summary:
This publication includes the results of various studies and the University Hospital Erlangen's own initial user experiences. Spiral breast CT (SBCT) promises multiple advantages: Unlike conventional mammography, contrast enhanced spectral mammography (CESM: both 2D), and digital breast tomosynthesis (DBT: pseudo 3D), SBCT enables 3D breast imaging without tissue overlap. SBCT achieves high isotropic spatial resolution of breast tissue enabling the assessment of both soft tissue and microcalcifications. Similar to CESM and MRI, SBCT supports contrast-enhanced imaging, enabling the assessment of breast neovascularization. Unlike mammography and its derived methods (CESM, DBT), SBCT does not require compression of the breast. Accordingly, women consistently report significantly increased patient comfort compared to mammography in a previous investigation.