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Case Study

# The Role of 3D Total Breast Ultrasound in Breast Imaging

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Answers for life.

# Epidemiology

## Diagnosis

Prediction

Diagnosis

Treatment

Summary

### Automated Breast Volume Scanning (ABVS) Has the Potential to Assist Physicians in the Detection of Occult Abnormalities in Dense Breasts

Women with dense tissue in 75% or more of the breast have a risk of breast cancer four to six times as great as the risk among women with little or no dense tissue.\*

Extensive mammographic density may also make breast cancer more difficult to detect by mammography and thus increases the risk of the development of breast disease between mammographic screening tests. Because density influences the detection of cancer, estimates of the risk of breast cancer associated with mammographic density may be distorted. Risk may be underestimated if it is based solely on cancers found during screening because cancers masked by dense tissue will be omitted.\*

### Risk Factors for Breast Cancer

Risk Factor	Relative Risk
BRCA1 or BRCA2 mutation	10.0–32.0
<b>Family history of cancer (no known mutation)</b>	
1 first-degree relative	1.5–2.0
2 first-degree relatives	3.0
3 or more first-degree relatives	4.0
1 second-degree relative	1.2–1.5
Therapeutic radiation to chest at <30 yr of age	7.0–17.0
<b>Hormonal factors</b>	
Late (age >30 yr) parity or nulliparity	1.2–1.7
Early (age <12 yr) menarche or late menopause (age >55 yr)	1.2–1.3
Combined hormone-replacement therapy (e.g., for 10 or more yr)	1.5
Postmenopausal obesity	1.2–1.9
Alcohol consumption (2 drinks/day vs. none)	1.2
Smoking before first live birth	1.2
Sedentary lifestyle	1.1–1.8
White race	1.1–1.5
Breast density (very dense vs. mainly fatty)	5.0
Atypical ductal or lobular hyperplasia or lobular carcinoma in situ on previous breast biopsy	4.0

\* Warner E., N Engl J Med 2011; 365(11):1025-32

\* N Engl J Med 2007; 356:227-236, January 18, 2007

# Patient History

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A 23-year-old female patient was referred for a mammogram following excision of a palpable retroareolar nodule in the left breast. The mammogram demonstrated extremely dense breast tissue with no evidence of masses or microcalcifications. An automated breast volume scan (ABVS) was performed which demonstrated a 2.7 cm seroma and multiple small lesions suspicious for multi-focal disease.

- An examination using the ACUSON S2000™ Automated Breast Volume Scanner (ABVS) indicated a suspicious area.
- An MRI examination confirmed the observation obtained using ABVS: identified similar lesions.
- A core biopsy confirmed secretory carcinoma – juvenile papillomatosis.



# Clinical Images

## Diagnosis

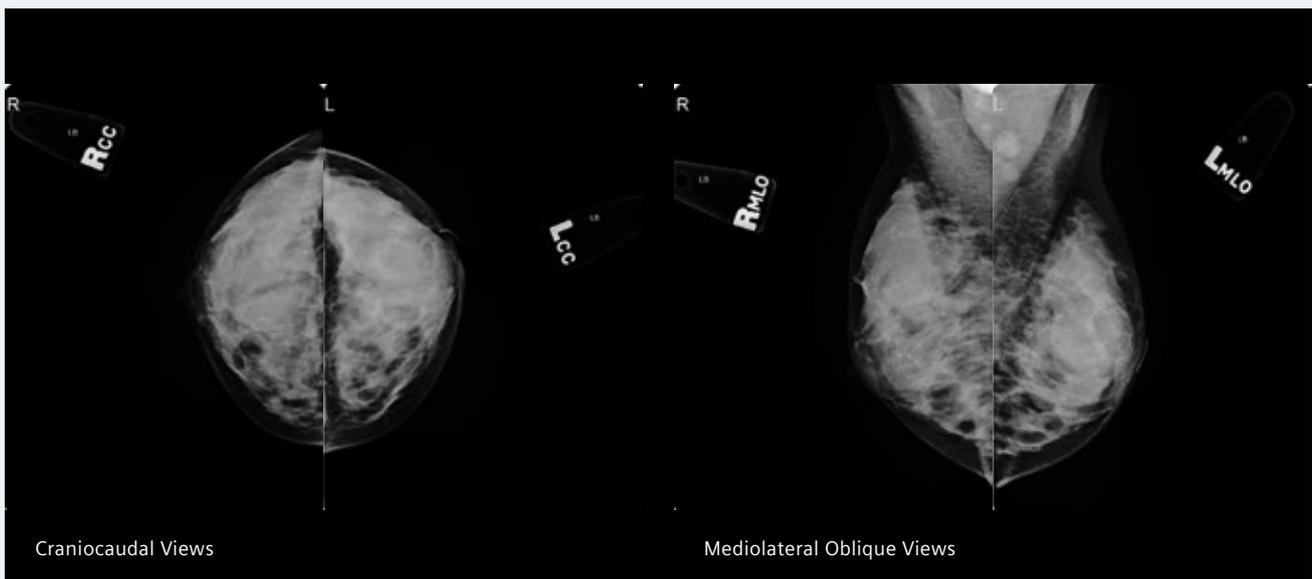
Prediction

Diagnosis

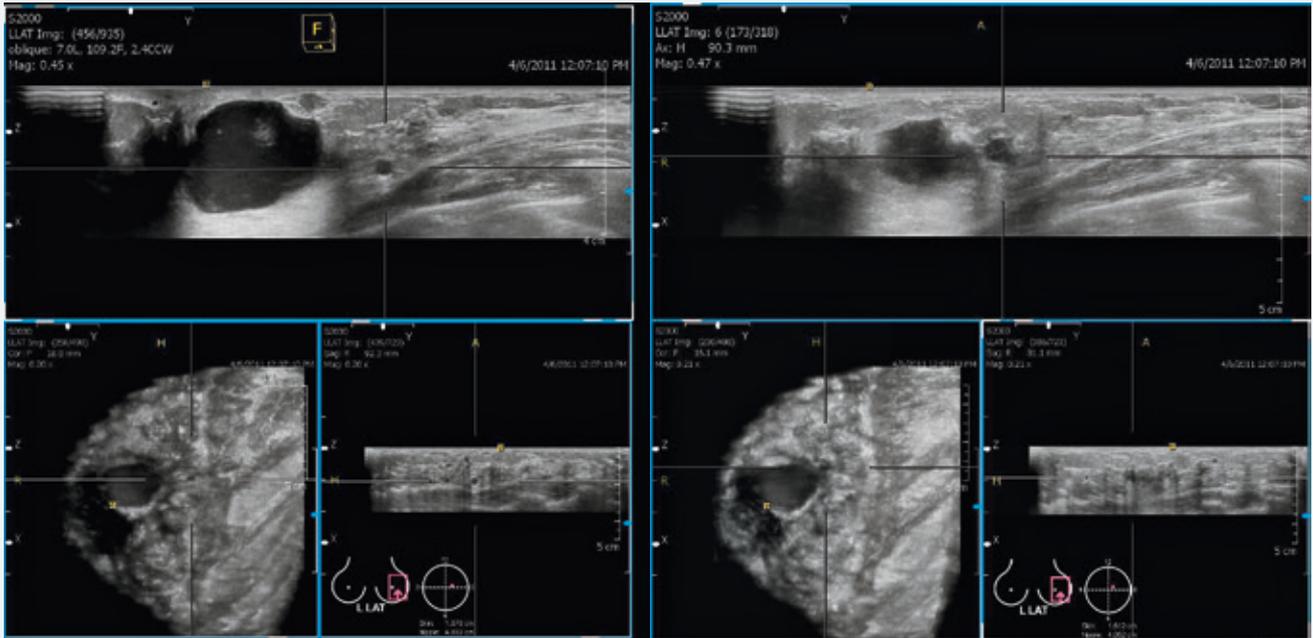
Treatment

Summary

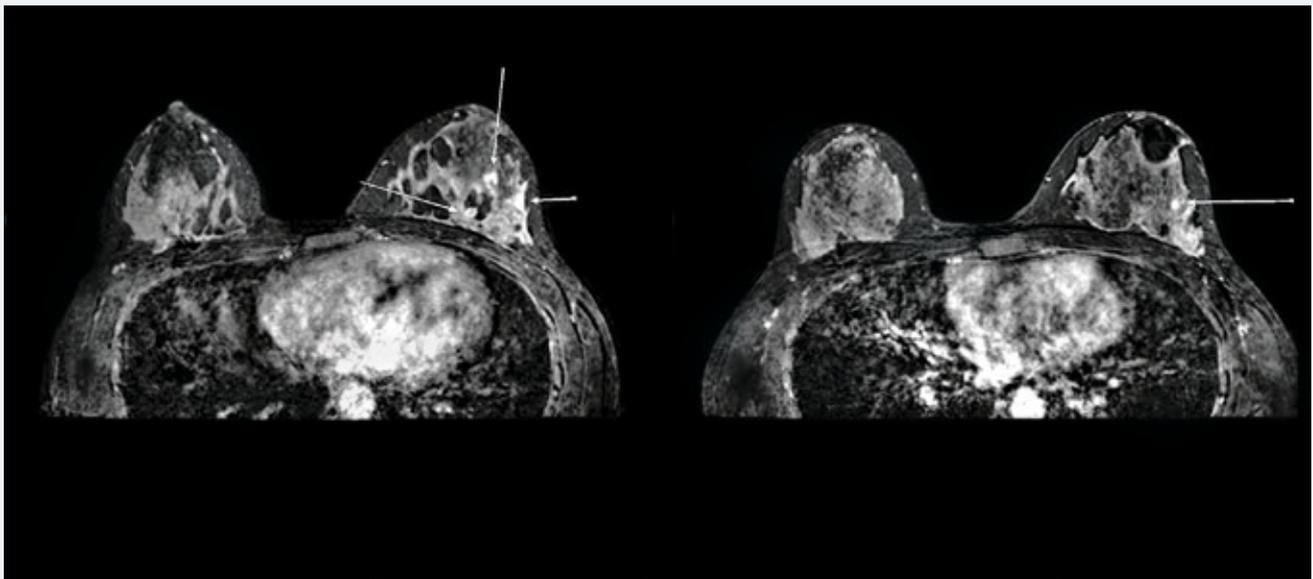
### Mammogram



### 3D Total Breast Ultrasound (ABVS)



### MRI



# Clinical Conclusion

## Treatment & Summary

Prediction

Diagnosis

Treatment

Summary



A mastectomy was performed which revealed 16 lesions; 15 of which were previously confirmed using ABVS images.

The patient's extremely dense breast tissue made the diagnosis difficult:

- The mammogram was inconclusive.
- The ACUSON S2000 ABVS ultrasound system showed multiple lesions.
- The MRI confirmed the lesions.

# Ultrasound Solution Benefits

## Summary & Conclusion

Prediction

Diagnosis

Treatment

Summary

### Benefits: Greater Diagnostic Confidence and Reduction of Exam Time

The ACUSON S2000 ABVS system provides:

- Greater diagnostic information providing full breast volume images and the unique coronal plane.
- Reproducible, standardized views of the breast reducing operator dependence.
- Improved efficiency of surgical planning as a result of the coronal plane view and patient's position.

A non-invasive automated breast volume ultrasound scan takes approximately 20 minutes, as compared to

- Hand-held 2D ultrasound, which is operator-dependent and can take as long as 45 minutes.
- MRI, during which patient compliance may be compromised, which is invasive in nature due to equipment design and injection, and can take up to 1 hour.

ABVS enables a disconnection of image acquisition and image assessment:

- Reproducible volumes can be rendered and reviewed conveniently at any time, resulting in time-shift advantages.

### Automated Breast Volume Scanning is a Valid Alternative for MRI

After mammography demonstrated dense breast tissue and pathology could not be found, an ABVS study showed multi-focal lesions, which were later confirmed on MRI. Patients with suspected multi-focal disease are usually referred to MRI.

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Please contact your local Siemens organization for further details.

Standalone clinical images may have been cropped to better visualize pathology.

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