

11:30 - 12:00

SomoVu - New Era of Automated Ultrasound for Breast Imaging

U Systems

Jiayu Chen, Ph.D.

Ultrasound for Breast Screening

- ACRIN 6666 (2007)
 - Cost Benefit analysis shows that the cost per year of life saved is comparable to that of screening mammography
 - 1-7 cancer per 1000 by US only
 - Shortage of trained personal to offer the service by using handheld US scan
- Kolb et al (Radiology, 2002, 225:165-175):
27,825 patient study; using manual "free-hand" method of scanning patients;
 - ultrasound breast screening increased the early detection
 - by 3 cancers/1000 dense breast screened;
 - by 1.2 cancers/1000 patients screened, regardless of breast density;
 - by 42% of nonpalpable invasive cancers missed by mammography
- Leconte et al (AJR, 2003, 180:1675-1679):
4,236 patients study; using manual "free-hand" method of scanning patients;
 - ultrasound detected 44% (11/25) of cancers in dense breasts not visible in mammograms
 - ultrasound detected 20% (5/25) of cancers in non-dense breasts not visible in mammograms

Limitations of Handheld Ultrasound

- Small field of view → average 4 cm²
- Acoustic speckle; coarse noisy image
- Inadequate spatial and contrast resolutions
- 2D image information
- No standard procedure for image acquisition
- No standard for lesion analysis and reporting

Operator dependence and repeatability are the major issues of Handheld Ultrasound for Breast Screening

Clinical Need for Ultrasound

Screening Mammography Misses ~½ of Cancers and Dense Tissue is a Major Cause.

- In the US, 40%, Europe 40-50%; Asia 60-70% of women have dense breast tissue.
- Ultrasound works in dense tissue. However, conventional, handheld (manual) ultrasound is:
 - Time consuming, 10 to 40 minutes
 - Physically demanding, repetitive motion injuries
 - Image quality dependent on skill of operator
 - Disruptive to effective workflow
 - ~2/3's of time physician participates in scanning process

U Systems solution addresses each of these issues

U-Systems, Inc.

The Innovative Leader in Ultrasound Breast Imaging



SomoVu Automated Breast Ultrasound

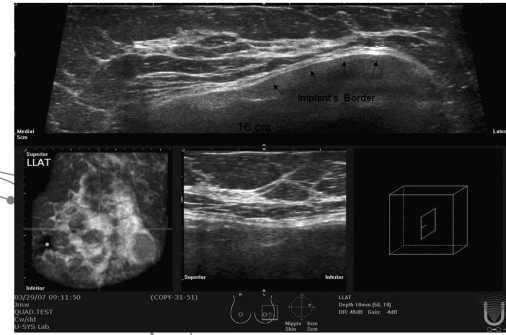
Image:

- Multiple angular scan without compromising resolution and exam time;
- Thin slices with lesion enhancements;
- Speckle and other artifact reduction algorithms;

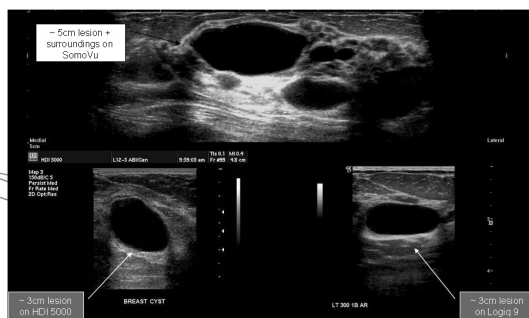
Technology:

- Large aperture and no silicon lens provide a consistent image cross the volume;
- Automatic image optimization reduces the operator dependence ;
- 3D voxel processing (SomoSynthesis) makes high quality images without sacrificing the scan time;

Large FOV



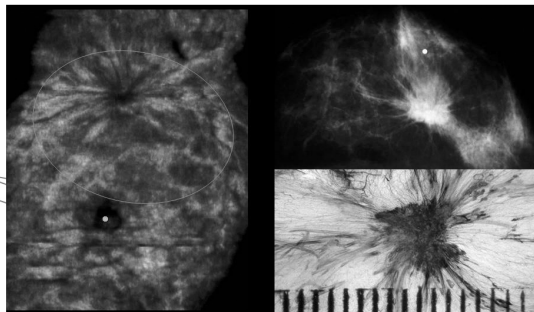
SomoSynthesis Advantages – Large FOV



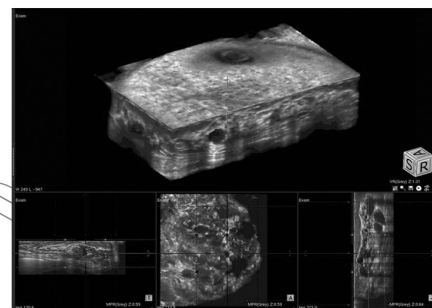
Correlation with other imaging techniques

- 3D volumetric data can be processed and viewed using similar post processes as other image modalities
- Coronal view provides an easy anatomic understanding of ultrasound images
- Display a global view of fibroglandular tissue and fat structures as other modalities
- Can be used as the second look for MRI and Mammogram images

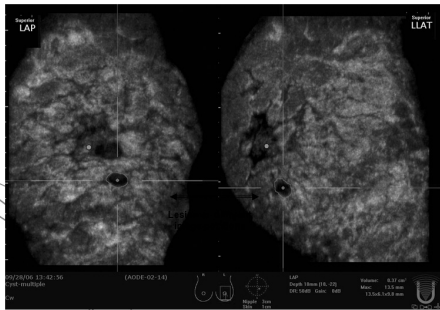
SomoVu™ Images – Correlation with Others



SomoVu™ Images – 3D Visualization



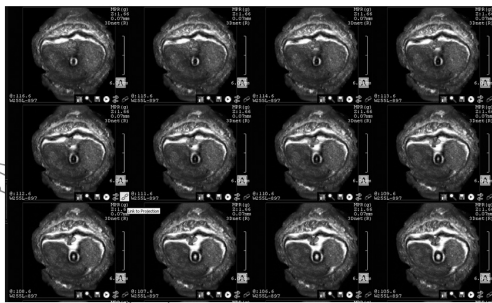
Coronal Views



Applications beyond Screening

- **Guidance of interventional procedures:**
 - Pre-surgical localization
 - Treatment planning and monitoring
 - Balloon catheter placement for partial irradiation
- **Special patient groups**
 - Young women (under 30 yrs)
 - Pregnant
 - Patient has issue with MRI or irradiation
 - Lactating patients
- **Evaluation problems with implants**
- **Evaluation of masses**
 - Palpable mass
 - Seen on Mammograms

Evaluation of Implants



Summary

- Ultrasound is an effective modality for breast imaging, especially for dense breast tissues
- Automated Ultrasound provides less operator dependence and repeatability