Purpose: The purpose of this paper is to present the experience of telemedicine and breast imaging in the Region of Scania in Southern Sweden.

Materials and methods: 1) Teleconsultations were performed by shared screen technology using Timbuktu Pro software. Thirty mammograms from 30 patients with suspicious findings were digitised at the Department of radiology at Ystad hospital 70 km from Lund University Hospital. The doctor at Lund University hospital was able to view the images and manipulate window and width with the help of the shared screen technology. 2) Ultrasound teleconsultations were performed with on-line TCP/IP based communication. Ultrasound images were transferred from Eslov hospital to the University hospital in Lund.

Result: 1) The diagnosis and management of the patient was clinically changed in five cases. In 25 cases the telemedicine consultation did not change the diagnosis. 2) It is possible to perform on-line ultrasound teleconsultation.

Conclusion: Telemedicine is a convenient way to help departments in remote hospitals with less experience in mammography.
SHEAR MODULUS IMAGING ON SUPERFICIAL TISSUES
- METHOD DEMONSTRATION ON IN VITRO PORK RIB

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Purpose: We present a suitable technique for shear modulus imaging on superficial tissues.
Materials and Methods: We previously developed the rf-echo phase matching method for
accurately measuring 2D strains generated in vivo in soft tissues during acquisition of two
successive rf-echo data frames. We also developed a stable method for reconstructing a
shear modulus distribution using only strain data. By combining and refining these methods,
we built up a suitable technique that is particularly effective for shear modulus imaging on
superficial tissues, where the tissues are compressed with ultrasonic transducer. The
suitability of the technique was demonstrated through experiments handling in vitro pork
rib.

Results: We obtained a stable shear modulus reconstruction in the rectangular region of
interest (ROI) of 15.6 mm (axial) by 72.8 mm (lateral) with the high spatial resolution of
1.1 mm by 6.0 mm and with the large dynamic range of 38.6 dB even though measured
strains were very small (e.g. the mean value of the axial strains in the ROI: -0.438 %). By
imaging the shear modulus reconstruction in a log gray scale, multi-layered structures of fat
and muscle could be favorably visualized.

Conclusion: The demonstrated ability of the technique indicated that it has high potential
to be applied as a diagnostic tool for superficial tissues.
3D-US DIAGNOSIS IN BREAST MASSES: MERITS AND LIMITATIONS

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Purpose: To assess the merits and the limitations in 3D-US diagnosis of breast masses.

Materials and Methods: 46 cases with breast masses (8 fibrocystic diseases, 1 postoperative fibrosis, 20 fibroadenomas, 9 breast cancers, 1 intraductal papillomas, 2 intracystic papillomas, 3 cysts, 2 abscesses) were examined 2D-US and 3D-US with sector transducer 7-10 MHz (Voluson 530, Kretz-Medison, Korea) and compared the results concerning about detectibility of the lesions according to the size, boundary echo pattern, internal echo pattern, contrast with surrounding parenchyma, accuracy in differential diagnosis between tumor and non-tumor lesions, accuracy in differential diagnosis between benign and malignant lesions.

Results: 3D-US imaging was superior to 2D-US contrast with surrounding parenchyma, esp. with cystic nature and interpretation of the internal echo pattern, inferior in differential diagnosis between benign and malignant lesions, and in detectibility of the lesions below 1cm in diameter and equal in differential diagnosis between tumor and non-tumor lesions. In boundary echo of the masses, so-called 'pseudospicule sign' on benign masses on 3D-US was the limitation in differential diagnosis from cancer.

Conclusion: 3D-US is valuable in diagnosis of breast lesions containing cystic portion (intracystic papilloma, cyst). The limitations were poor detectibility of the lesion below 1cm in size and differentiation between benign and malignant masses. The pseudospicule sign in benign masses on 3D-US is a pitfall in diagnosis of breast masses.
REAL-TIME AND THREE DIMENSIONAL SONOGRAPHIC EVALUATION OF THE SONOGRAPHIC SPICULATION SIGN ON BREAST CARCINOMA

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Purpose: To clarify the usefulness of the real-time evaluation and 3 dimensional demonstration of the sonographic spiculation sign on breast carcinoma.

Materials and Methods: Sonographic examinations were performed in 25 cases of breast carcinoma with stellate appearance on mammography. 3 dimensional reconstruction of serial B-mode images of 3 of the cases. Detectability and demonstrability of the sonographic spiculation sign were evaluated in all cases prospectively compared with identical static B mode images and mammography.

Results: In all cases, the sonographic spiculation sign were quite well demonstrated on real-time sonography rather than mammography, although the signs were not well demonstrated on static B-mode images in 8 of 25 cases. Real-time sonography also well demonstrated the spiculation within the fibroglandular tissue in 15 cases, on the contrary the spiculations within the tissue were not identified in static B mode images of all 15 cases. Sonographic spiculation sign was well demonstrated in 3 of 5 the 5 cases on 3D images.

Conclusion: Real-time sonography was thought to be the most sensitive modality for the evaluation of sonographic spiculation sign.
USEFULNESS OF CONCAVE ULTRASONIC TRANSDUCER (CUT) FOR EVALUATION OF THE BREAST LESIONS

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Purpose: The purpose of this study is to assess the usefulness of CUD for evaluation of breast lesions.

Materials and Methods: We compared the ultrasonic images of 30 breast lesions of the newly developed concave transducer of 5-9 MHz with those of linear array transducer of 5-9 MHz (GAIA, SONO-ACE 8800, Medison, Seoul, Korea). We analyzed the width of field of view, discriminative ability of interpretation of histologic location of the lesion and surrounding tissue, diagnostic accuracy, distortion of images according to location and degree of compression between two transducers.

Results: The conventional linear transducer showed morphologic change in movable mass under 2 cm diameter with strong compression, whereas the CUT did not. The concave transducer showed larger field of view. There were no differences between the two transducers in discriminative ability of interpretation of histologic location, diagnostic accuracy, and distance from skin to lesion.

Conclusion: The CUT is useful for the evaluation of breast lesions with higher contactability to convex breast surface and larger field of view without distortion of lesion and loss of image quality.
THE VALUE OF 3D VOLUME MODE ULTRASONOGRAM FOR EVALUATION OF THE BREAST DISEASES

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Purpose: To access the efficacy of 3D volume mode sonogram to evaluate the breast carcinoma and benign diseases.

Material and Methods: Since January 12, 1999, total of 109 patients (20-67 years) were examined using 3D volume mode Medison Voluson 530 D unit with 5 VNW 5-10 MHz Medison transducer. Patients were divided into three groups: Group I (n=12) for normal breast selected after mammogram and 2D sonogram, Group II for mammoplasty patients (silicone in 3 patients, saline in 2 patients) who underwent breast MRI, and Group III (n=53) for surgically confirmed patients with breast diseases. The methods of analysis were based on the 3D volume mode US findings regarding the shape of boundary echoes, internal echo patterns, detectability of multifocal lesions and extension of breast malignancy.

Results: The Group I normal patients showed relatively hyperechogenicity in breast and nipple skin. The 3D volume mode sonogram showed anatomic connection between the nipple, lactiferous duct, parenchyma, and nipple areolar-complex better than 2D sonogram. The Group II mammoplasty patients showed successful volumetric details and anatomic changes by 3D sonogram. Inspection into the deeper portion of the silicone bag and capsular details (capsular contracture: 1, extracapsular capsular rupture: 1 patient) were satisfactory with 3D volume mode postprocessing technique which were well correlated with breast MRI. Breast malignancy (infiltrating ductal carcinoma=21 patients, DCIS=2) showed thick irregular boundary echoes (88%) along with heterogeneous internal echoes (88%), and converging echogenic spicules toward mass (76%). 3D US showed the details of tumor extension (68%), and the detectability of multifocal tumors (40%) easily. Fibroadenomas (n=11) showed thin smooth boundary echoes (54.5%) and homogeneous internal echoes (63.6%) and 3D US detected multiple fibroadenomas (45.5%) well, but other findings were rarely seen in the mass. Fibrocystic diseases (n=8) showed thin lobulating (37.5%) or thick irregular boundary echoes (50%), convergent echogenic spicules (37.5%).

Conclusion: The 3D volume mode showed high quality resolution to detect the pathologic characteristics and anatomic relations of breast cancer with saving the scanning time and postprocessing imaging techniques even in the absence of patients. The effective detectability of thick irregular boundary echoes, converging echogenic spicules toward the tumor, realizing the extension of tumor, and detectability of the unknown multifocal lesions in breast cancer by 3D volume mode were presumed superior to 2D sonogram.