

Breakthrough Ultrasound Technology for the Early Diagnosis of Osteoporosis.

EchoS is the first non-invasive solution for the early diagnosis of Osteoporosis at **the Lumbar Vertebrae and Femoral Neck.**



About Echolight

Echolight is a high-tech biomed company, incorporated in Italy, for the development of innovative technologies in the medical device arena. Our mission is to provide the world medical community with the very first non-invasive and office-based solution for the Early Diagnosis of Osteoporosis. EchoLight will make the early detection of Osteoporosis more accurate and easily accessible to meet both clinician's and patient's needs everywhere.

Main Publications

"A novel ultrasound methodology for estimating spine mineral density".
Ultrasound in Medicine & Biology 2014.

"Diagnostic accuracy of a novel ultrasound methodology for spinal densitometry on a cohort of female patients". Osteoporosis International 2014, vol. 25.

"An innovative ultrasound-based method for the estimation of osteoporotic fracture risk". Annals of the Rheumatic Diseases 2014, vol. 73.

"Screening and early diagnosis of osteoporosis through X-ray and ultrasound based techniques". World Journal of Radiology 2013, vol. 5.

"Comparative assessment of a new ultrasound methodology for femoral neck densitometry and DXA". Osteoporosis International 2013, vol. 24.

"A new ultrasound method for osteoporosis diagnosis on main anatomical reference sites". Osteoporosis International 2013, vol. 24.

"High correlation between a new ultrasound-based methodology for spinal densitometry and DXA". Osteoporosis International 2013, vol. 24.

"Evaluation of bone mineral density on femoral neck: preliminary clinical validation of a new ultrasonic method". Annals of the Rheumatic Diseases 2013, vol. 72.

"A new ultrasonic method for diagnosis of osteoporosis on hip and spine". Bone Abstracts 2013, vol. 1.

In compliance with the standard:

UNI CEI EN ISO 13485:2012
ISO 13485:2003
Medical Device Class IIa
CE Mark

Ministry of Health Identification Codes
ECHOS: 001-0000
ECHOSTUDIO: 002-0000
ECHOSTATION: 003-0000



Legal Office

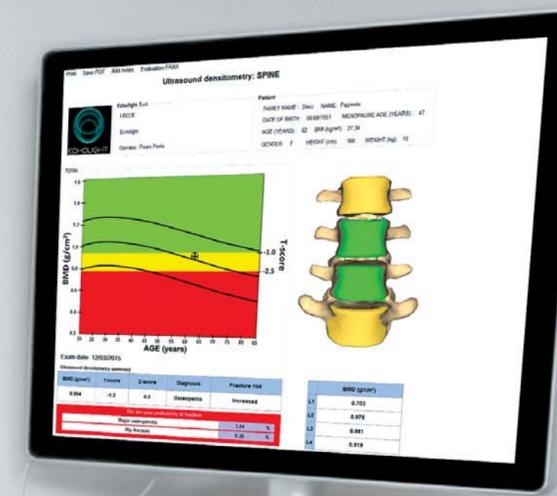
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ECHOS

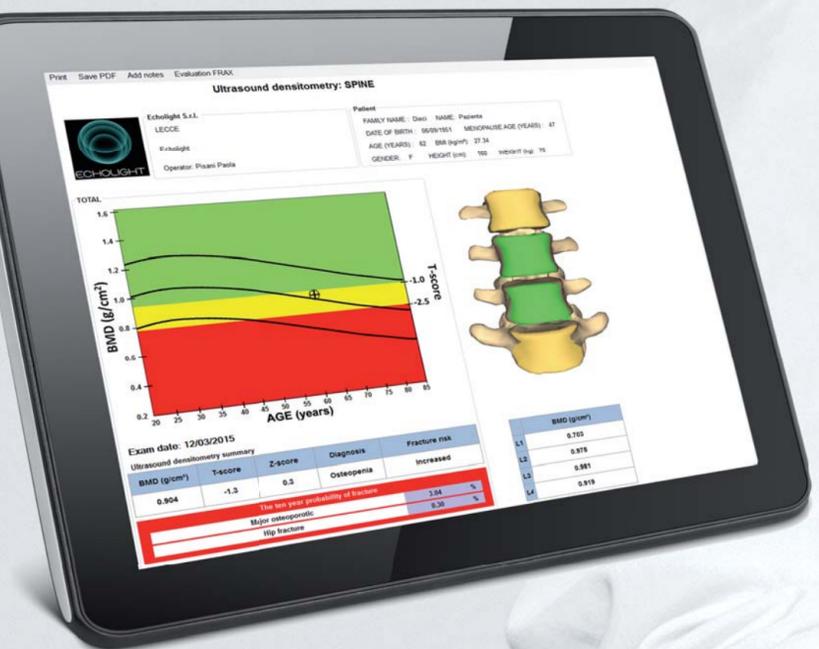
The next generation in the diagnosis of Osteoporosis.



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Novel Echographic Ultrasound Device For Bone Strength Assessment.

Non-invasive. Reliable. Portable. Easy to use. Fast.
Lumbar Vertebrae. Femoral Neck.



Medical Report

EchoS provides two numerical parameters: Osteoporosis Score O.S., which directly correlates with BMD measurements (in g/cm²) and Fragility Score F.S., which provides an independent estimate of bone fragility and fracture risk. EchoS medical report contains all the common parameters for Osteoporosis diagnosis: BMD (g/cm²), T-Score, Z-Score. In addition, F.S. evaluates the quality of internal bone micro-architecture and the 10-year risks of osteoporotic fractures (generic/hip) are calculated through the integrated FRAX® software.

Database

Database includes 7200 Caucasian subjects from 30 to 90 years, grouped into 5-y intervals and split into three subgroups based on BMI value. The subjects underwent the following diagnostic examinations: DXA scan of lumbar spine and/or proximal femur, TBS calculation where applicable, echographic scan with EchoS system and FRAX® questionnaire. Data were used to calculate the corresponding pairs reference spectral models for the following bone conditions: "osteoporotic/healthy" and "frail/non-frail". BMD values derived from O.S. calculation were compared with the results of DXA measurements, while F.S. values were evaluated against FRAX® predictions of 10-year probabilities of a generic osteoporotic fracture.



- 1 Axial Site Selection
- 2 Bone Target Visualization
- 3 Software-Assisted US Acquisition
- 4 Automatic Detection of the bone interfaces
- 5 ROIs Automatic Calculation
- 6 Automatic Signal and Spectral Analysis
- 7 Diagnostic Output
- 8 Medical Report

Protocol (2 minutes)

Technology

EchoS is an innovative ultrasound approach to the diagnosis of Osteoporosis, exploiting all the spectral features of the "raw" radiofrequency (RF) signals acquired during an echographic scan to determine the status of internal bone architecture through advanced comparisons with previously derived reference spectral models of the possible pathological or normal conditions. The method is natively integrated with US imaging, since, on one hand, the regions of interest (ROIs) for diagnostic calculations within the investigated bone are automatically identified exploiting both morphologic details and RF spectral features, and, on the other hand, the simultaneous acquisition of several RF scan lines for each image frame provides a solid and reliable statistical basis for subsequent spectral processing and the final diagnostic output.

QUANTITATIVE ASSESSMENT OF ECHOS PERFORMANCE	VERTEBRAE	FEMORAL NECK
SMALLEST DETECTABLE DIFFERENCE (SDD) [g/cm ²]	0.010	0.005
INTRA-OPERATOR REPEATABILITY (RMS-CV) [%]	0.35%	0.25%
INTER-OPERATOR REPEATABILITY (RMS-CV) [%]	0.54%	0.41%
DIAGNOSTIC AGREEMENT WITH DXA	93.1%	94.2%

Algorithm

The technology is full automatic to reduce the dependence on operator experience. The implemented algorithm automatically identifies the target bone interfaces within the sequence of echographic images acquired, discards "noisy" acquisitions, ensuring that diagnostic evaluations are performed only on US datasets reaching a specifically determined quality threshold.

Bone. Health. Life.