Breakthrough Ultrasound Technology for the Early Diagnosis of Osteoporosis.

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


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

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Novel Echographic Ultrasound Device For Bone Strenght Assessment.


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 10-year risks of osteoporotic fractures (generic/hip) are calculated through the integrated FRAX® software.

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

<table>
<thead>
<tr>
<th></th>
<th>Vertebral</th>
<th>Femoral Neck</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SMALLEST DETECTABLE DIFFERENCE (SDD) [g/cm²]</strong></td>
<td>0.002</td>
<td>0.005</td>
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<tr>
<td><strong>INTRA-OPERATOR REPRODUCIBILITY (BMD-CV) [%]</strong></td>
<td>0.35%</td>
<td>0.25%</td>
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<tr>
<td><strong>INTER-OPERATOR REPRODUCIBILITY (BMD-CV) [%]</strong></td>
<td>0.54%</td>
<td>0.41%</td>
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<tr>
<td><strong>DIAGNOSTIC AGREEMENT WITH DXA</strong></td>
<td>93.1%</td>
<td>94.2%</td>
</tr>
</tbody>
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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 of 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.