

Is CaviTAU® validated?

Two publications on the scientific validation of CaviTAU® in German abstracts and free PDF downloads.

1. Lechner J, Zimmermann B, Schmidt M, von Baehr V.

Clinical, Cosmetic and Investigational Dentistry: “*Ultrasound sonography to detect focal osteoporotic jawbone marrow defects - Clinical comparative study with corresponding Hounsfield Units and RANTES/CCL5 expression*”. Juni 2020; 12: 205-216. doi.org/10.2147/CCIDE.S247345

Free PDF download: https://www.dovepress.com/articles.php?article_id=54222.

Bis Juli 2021 über 4.413 Ansichten.

Link on PubMed: <https://pubmed.ncbi.nlm.nih.gov/32801922/>

Abstract

Background: The usual pulse-echo ultrasound examination is not suitable to provide relevant information about the jawbone, because ultrasound (US) is almost completely reflected by the solid cortical bone. At the same time, circumscribed "focal" bone defects in the jawbone ("focal osteoporotic marrow defects") (BMD) are the subject of scientific presentation and discussion.

Research question: Is a newly developed device for trans-alveolar ultrasonography (TAU-n) in the dental-jaw region suitable for reproducing focal bone marrow defects?

Material und Methoden: New TAU device: TAU-n consists of handpiece with extraoral US transmitter and enoral receiver unit. The display of TAU-n shows different physical densities in the dentoalveolar region with corresponding different coloration. The changes in bone density are also displayed numerically.

Validation of TAU-n readings: A conventional orthopantomogram (2D-OPG) is not suitable for determining bone density and is excluded. For validation, a 3D DVT including Hounsfield Units (HU) and TAU-n is performed in 82 patient cases for preoperative determination of a BMD. Postoperatively, histological findings and multiplex analysis of RANTES/CCL5 (R/C) expression from surgically cleared BMD areas are evaluated.

Results: In all 82 operated bone specimens, DVT-HU, TAU-n values, and R/C expressions consistently demonstrate the presence of BMD with a chronic inflammatory character. In only five cases histology shows no evidence of BMD.

Discussion: All four assessment criteria confirm the presence of BMD in each of the 82 samples. The TAU-n method to be validated here almost completely ranks with the diagnostic reliability of the other methods.

Conclusion: The newly developed TAU-n device is reliably available for radiation-free detection of a BMD.

2. Lechner J, Zimmermann B, Schmidt M.

Focal Bone-Marrow Defects in the Jawbone Determined by Ultrasonography—Validation of New Trans-Alveolar Ultrasound Technique for Measuring Jawbone Density in 210 Participants. *Ultrasound in Medicine & Biology.* Elsevier Published: August 12, 2021. <https://doi.org/10.1016/j.ultrasmedbio.2021.07.012>

Link to paper in Journal: [https://authors.elsevier.com/sd/article/S0301-5629\(21\)00309-4](https://authors.elsevier.com/sd/article/S0301-5629(21)00309-4)

Link in PubMed: in press

Abstract

Ultrasonography of the jawbone is not currently used in dentistry to determine bone density. Bone marrow defects in the human jaw bone (BMDJ/fatty degenerative osteolysis of the jaw bone

= FDOJ) are widely discussed in dentistry as they play a role in implant failure and cause inflammation in various immune diseases. The use of alveolar ultrasonography (TAU) to localize BMDJ/FDOJ was investigated using a new TAU device (TAU-n). The objective was to determine whether the readings displayed by the TAU-n device accurately indicated the clinical parameters for detecting BMDJ/FDOJ. Three parameters were compared with TAU-n measurements: 2D-OPG, Hounsfield units (HU) using digital volume tomography, and

RANTES/CCL5 (R/C) expression levels measured postoperatively in BMDJ/FDOJ-specimens. Based on the available clinical data, HU, R/C expression, and TAU-n color codes gave consistent results in terms of bone mineral density.

Thus, ultrasonography with TAU-n is a reliable and efficient diagnostic method for screening BMDJ/FDOJ in dentistry.