A NOVEL SCREENING APPROACH FOR OSTEOPOROSIS IN DENTAL PRACTICE USING QUANTITATIVE ULTRASOUND OF THE MANDIBLE

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Background: Screening for osteoporosis is paramount in the prevention of fragility fractures in older adults, with Quantitative Ultrasound (QUS) offering a portable, easy to use, relatively low cost, non-ionising alternative to Dual Energy X-ray Absorptiometry (DEXA) scans. QUS offers the potential for screening in non-traditional health care settings e.g. Dental practice. However there is limited literature on the effect of osteoporosis on the facial skeleton and its use as a screening site for osteoporosis. Here we aimed to investigate the suitability of QUS of the mandible as tool for screening for osteoporosis.

Methods: Female Caucasian participants (n = 127; age range 22 - 88 years) were assessed for osteoporotic status using DEXA and the FRAX® Osteoporosis assessment tool. Axial Transmission QUS (Omnisense) was employed to assess speed of sound (SOS) of the mandible. Measurement reliability was initially determined in n = 10 healthy pre-menopausal women. ANOVA was used to compare SOS between 3 groups (healthy pre-menopausal women; healthy post-menopausal women; women with osteoporosis). Logistic regression models were used to assess the predictive power of SOS in detecting osteoporosis.

Results: The parasymphysis of the mandible SOS measurements demonstrated the lowest root mean squared coefficient of variation of 0.74%. Both healthy groups had significantly higher mean SOS measurements than the osteoporotic subjects, with means of 3683 m/s (210), 3514 m/s (221), and 3312 m/s (264) respectively (p < 0.001). Increased mandible SOS was associated with a decreased odds (0.97; p < 0.01) of having osteoporosis after correction for other covariates. There was only a moderate correlation found between total hip BMD and mandible SOS (r = 0.35; p < 0.05).

Conclusion: This is the first study to employ axial transmission QUS to assess mandible bone strength, with mandible QUS a demonstrated screening approach for osteoporosis detection. Involvement of the dental profession in osteoporosis screening could enable detection of otherwise silent osteoporosis in the community.