

## Prediction of Postmenopausal Osteoporosis with Mandibular Bone Mineral Density Using Panoramic Radiographs

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**Purpose:** The purpose of this study was to determine the relative usefulness of mandibular bone mineral density (BMD) measurements on dental panoramic radiographs in the diagnosis of patients with postmenopausal osteoporosis among 52 postmenopausal women, aged from 62 to 78 years, attending for routine dental treatment. **Materials and Methods:** Skeletal BMD was measured for the lumbar spine and femoral neck using dual energy X-ray absorptiometry. The WHO criteria for Caucasian women were used for osteopenia (t-score between -1 and -2.5 standard deviations below the peak bone mass) and osteoporosis (t-score more than -2.5 standard deviations below that mean). Patients were classified as having postmenopausal osteoporosis if they had t-scores of  $> -2.5$  at either or both sites. The patients with osteopenia received calcium and vitamin D therapy, and the patients with postmenopausal osteoporosis received alendronate therapy (Fosamax, 70 mg/weekly) during 1 year. Each patient received a dental panoramic radiograph as a routine procedure prior to the dental treatment. Using the copper stepwedge, mandibular BMD was measured on the lower cortical border of the mandible: at 2 points below the mental foramen (BMD1, BMD2) at antegonion (BMD3) and gonion (BMD4). The mandibular BMD measurements were expressed as the equivalents of the actual stepwedge thicknesses. **Results:** When the logistic regression model included BMD measurements, all 4 variables were significant predictors of postmenopausal osteoporosis ( $P < .05$ ). ROC analysis showed that for BMD1 the area under the curve was 0.73 (SE = 0.08, CI = 0.56–0.88), for BMD2 it was 0.70 (SE=0.08, CI=0.53–0.87), for BMD3 it was 0.94 (SE = 0.03, CI = 0.88–1.00), and for BMD4 it was 0.78 (SE = 0.06, CI = 0.65–0.91). **Conclusion:** The mandibular BMD values measured on panoramic radiographs can be considered as significant factors in predicting postmenopausal osteoporosis.



**Dr Dubravka Knezović Zlatarić** was born in 1971. She is currently assistant professor at the Department of Prosthodontics, School of Dental Medicine, University of Zagreb, Croatia. As a student, she was rewarded twice for her scientific papers and received University and CEEPUS scholarships. She received her degree in dentistry in 1995 as the best student in her class. She obtained her MSD in 2000, defending a thesis on patients' satisfaction wearing removable partial dentures. In 2001, she received her PhD, with a thesis on residual ridge resorption in removable denture wearers. Dr Zlatarić specialized in prosthodontics in 2004. She earned the Dentsply Shield Award for the best orally presented scientific study and the Rowland Fereday Award for young investigators in the fields of prosthodontics at the European Prosthodontic Association Conferences. In 2004, she was the winner of the Croatian scientific award for young investigators in the fields of biomedicine.

### ***What was your rationale for choosing this research topic? Is the use of a panoramic film as an integral part of your methodology a scientifically viable method?***

Panoramic radiography is the most currently used tool in everyday dental clinical practice, and with the addition of copper stepwedge, is also useful as a screening tool for osteoporosis. This way, it helps clinicians who undertake dental panoramic radiography for treatment purposes to recognize patients with low BMD and to make a recommendation that such patients attend for BMD assessment using recognized techniques such as dual X-ray energy absorptiometry (DXA). The method is scientifically viable. (*Editor's note: Readers are encouraged to see the paper by Slagter et al for further discussion of this issue.*)

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