

Título: CAPACIDAD PREDICTIVA DE LA ESTABILIDAD PRIMARIA DE IMPLANTES DENTALES MEDIANTE ESTUDIO RADIOLÓGICO

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Resumen: Background: Primary implant stability (PIS) depends on surgical technique, implant design and recipient bone characteristics, among other factors. Bone density (BD) can be determined preoperatively in Hounsfield units (HUs) using cone beam computed tomography (CBCT). Reliable prediction of PIS could improve the assessment of implant prognosis, guide treatment decisions and improve success rates. We sought to assess whether PIS is associated with recipient bone characteristics, namely, BD and alveolar ridge width (ARW), measured preoperatively by CBCT and thereby investigate whether PIS could be predicted by this type of radiological analysis of the edentulous alveolar ridge prior to implant placement.

Methods: We studied 160 implants placed in 48 patients in 2016 and 2017. All patients underwent CBCT with a radiological/surgical guide. ARW and BD were calculated using a radiology viewer. PIS values were determined by resonance frequency analysis (implant stability quotient, ISQ) and insertion torque (IT). Contingency tables were constructed with appropriate statistical procedures: tests for differences in the mean, with estimation of effect sizes (R²), scatterplots, Pearson's χ^2 and Spearman's ρ correlation coefficients, and chi-square tests of

independence. P values < .05 were considered significant.

Results: IT was most influenced by the HU value at 0.5 mm outside the implant placement area, followed by the HU value within this area, these values explaining 39.8% and 35.3% of the variance respectively. The explanatory factors that most influenced ISQ were the HU value at 0.5 mm outside the implant placement area, followed by the anatomical implant placement site and apical ARW. ISQ values were significantly related to ARW in coronal ($p < .05$), middle ($p < .01$) and apical thirds ($p < .01$). ISQs were higher with 4.1-mm than 3.25- or 3.75-mm diameter implants ($p < .01$). ISQ and IT were strongly correlated ($p < .001$).

Conclusions: PIS assessed in terms of ISQ and IT is positively correlated with edentulous alveolar ridge BD measured by CBCT, implying that implant stability may be predicted preoperatively. Wide alveolar ridges favour lateral PIS, but have no effect on rotational PIS. The most significant predictor of lateral and rotational PIS identified was the HU value at 0.5 mm outside the implant placement area.