Effect of two designs of implant-supported overdentures on peri-implant and posterior mandibular bone resorptions: a 5-year prospective radiographic study

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Abstract
Objectives: The aim of this study was to evaluate and compare the effect of two designs of implant-supported overdentures on peri-implant and posterior mandibular bone resorptions after 5 years of follow-up.

Materials and methods: Twenty edentulous patients were randomly assigned into two equal groups: Group I (GI), patients received overdentures supported and retained by cantilevered bars on two canine implants and Group II (GII), patients received overdentures retained by straight bars on two canine implants and supported by two-first molar implants.

Peri-implant vertical (VBL) and horizontal (HBLO) bone losses were assessed on periapical radiographs at the time of overdenture insertion (T0), 6 months (T6 m), 1 year (T1), 3 years (T3), and 5 years (T5) after insertion. Posterior mandibular bone resorption was evaluated using proportional measurements (posterior area index, PAI) made on panoramic radiographs at T0 and T5.

Results: Group I recorded significant higher VBL than GII. VBL increased significantly with advance of time in both groups. Posterior implant recorded significant higher VBL than anterior implants in GII. HBLO did not differ significantly between groups or between observation times. Group I recorded significant higher PAI than GII at T5. Group, age, and initial height of the mandibular ridge were significantly correlated with PAI.

Conclusion: Within the limitations of this study, regarding the small sample size, it could be concluded that overdentures retained by straight bars on two canine implants and supported by two-first molar implants present a clinical advantage in terms of peri-implant and posterior mandibular bone preservation compared to overdentures supported and retained by cantilevered bars on two canine implants after 5 years.

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