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Occlusal Wear in Milled Dental Prostheses: a Clinical Pilot Study

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Objectives The study aims to evaluate occlusal changes in CAD/CAM milled complete removable dental prostheses (CRDP) at 6- and 12-months follow-up.
Methods Edentulous patients aged 60 years or more received either maxillary and mandibular conventional CRDPs or a maxillary conventional CRDP and a mandibular implant-overdenture (IOD). All protheses were CAD/CAM fabricated by subtractive milling. The prosthetic teeth were either milled from a monolithic two-colored shell-geometry PMMA disk (IM) or milled from a tooth-colored multi-layer disk (IO) prior to bonding to the denture base. The occlusal surfaces were scanned at 2 weeks post insertion (baseline) and compared to the scans at 6- and 12-months follow-up with a software using a best-fit algorithm (Geomagic Control®). Additional comparative analysis of multiple points on the buccal and lingual cusps of the posterior teeth was conducted. Outcome parameters were root mean square (RMS) accounting for all deviations and average negative deviations (AVG-). Non-parametric tests were conducted to compare different time points and type of prostheses with a significance level set at $P<0.05$.
Results Twelve patients were included (mean age: 74±11.5 years). Six patients received conventional CRDPs while another 6 had a maxillary conventional CRDP and a mandibular IOD. 8 patients had their CRDP fabricated from IM, the remaining 4 patients from IO disks. RMS increased at the 6- and 12-months follow-up (50.3±20.92 µm, and 69.6±25.25 µm; p=0.038). The AVG- increased in the maxilla from -36.6±15.55 µm at 6 months to -57.7±22.64 µm at 12-months (p=0.008), and in the mandible from -35.6±12.60 µm to -56.3±20.08 µm (p=0.017). The comparative analysis of the selected reference points revealed negative deviations. No significant variations were found between the two tooth materials or CRDP versus IOD prosthesis.
Conclusions The findings indicate a pattern of material loss consistent with wear, underscoring the importance of long-term monitoring of milled CRDPs for maintaining occlusal integrity and function.