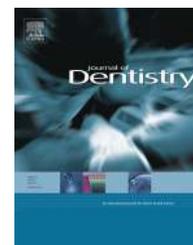


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Digital evaluation of the accuracy of impression techniques and materials in angulated implants

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ABSTRACT

Objectives: The aim of this study was to investigate the accuracy of 2 different impression techniques and 3 different impression materials in models simulating parallel and angulated implants.

Methods: Three master models simulating partial edentulous mandible with 2 implants at the sites of second premolars (parallel) and second molars with different angulations (parallel, 10° or 20° angulated) were fabricated. Two different impression techniques [splinted direct (D), indirect (I)] and 3 different monophase impression materials [polyether (PE), vinyl polysiloxane (VPS), vinyl polyether silicone (VPES)] were used for each master model and a total of 180 impressions were made ($n = 10$). Master model and casts were scanned by a modified laser scanner and data were transferred to VRMesh software. Master model and duplicate cast scans were digitally aligned observing the superposition of anatomic markers. Angular and coronal deviations between master and duplicated copings were calculated and data were statistically analyzed.

Results: Mean angular and coronal deviations were in a range of 0.205–0.359° and 22.56–33.33 μm , respectively. Statistical analysis revealed that the angulation of implant affected both coronal and angular deviations of the impression copings ($P < 0.05$). According to statistical analyses, for parallel implants, the accuracy of impression materials and techniques were ranging as VPS-D = PE-D > VPS-I = PE-I > VPES-D > VPES-I from most accurate to the least. For 10° and 20° angulated implants the most accurate material and technique was VPS-D whereas the least accurate combination was VPES-I ($P < 0.05$).

Conclusion: Angulation, impression technique and material were found to be effective on the accuracy of implant impressions.

Clinical significance: Clinicians may prefer VPS impression material and splinted direct technique for impressions of both parallel and up to 20° angulated implants.

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