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## In-vitro evaluation of the accuracy of conventional and digital methods of obtaining full-arch dental impressions.

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### Abstract

**OBJECTIVE:** To investigate the accuracy of conventional and digital impression methods used to obtain full-arch impressions by using an in-vitro reference model.

**METHOD AND MATERIALS:** Eight different conventional (polyether, POE; vinylsiloxanether, VSE; direct scannable vinylsiloxanether, VSES; and irreversible hydrocolloid, ALG) and digital (CEREC Bluecam, CER; CEREC Omnicam, OC; Cadent iTero, ITE; and Lava COS, LAV) full-arch impressions were obtained from a reference model with a known morphology, using a highly accurate reference scanner. The impressions obtained were then compared with the original geometry of the reference model and within each test group.

**RESULTS:** A point-to-point measurement of the surface of the model using the signed nearest neighbour method resulted in a mean (10%-90%)/2 percentile value for the difference between the impression and original model (trueness) as well as the difference between impressions within a test group (precision). Trueness values ranged from 11.5  $\mu\text{m}$  (VSE) to 60.2  $\mu\text{m}$  (POE), and precision ranged from 12.3  $\mu\text{m}$  (VSE) to 66.7  $\mu\text{m}$  (POE). Among the test groups, VSE, VSES, and CER showed the highest trueness and precision. The deviation pattern varied with the impression method. Conventional impressions showed high accuracy across the full dental arch in all groups, except POE and ALG.

**CONCLUSIONS:** Conventional and digital impression methods show differences regarding full-arch accuracy. Digital impression systems reveal higher local deviations of the full-arch model. Digital intraoral impression systems do not show superior accuracy compared to highly accurate conventional impression techniques. However, they provide excellent clinical results within their indications applying the correct scanning technique.

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