THE JOURNAL OF PROSTHETIC DENTISTRY

RESEARCH AND EDUCATION

Accuracy of different definitive impression techniques with the all-on-4 protocol

Oguz Ozan, DDS, PhD[a] and Oguz Hamis, DDS[b]

ABSTRACT

Statement of problem. A nonpassive fit of implant-supported restorations can jeopardize the biological and mechanical success of the treatment. Data regarding the fit of different impression techniques for the all-on-4 protocol are limited.

Purpose. The purpose of this in vitro study was to digitally evaluate 4 different impression techniques used with the all-on-4 protocol, with distal multiunit analogs positioned in 4 different angulations.

Material and methods. Four maxillary definitive cast models with 4 multiunit analogs (T0 32202; NucleOSS) were fabricated according to the all-on-4 treatment protocol. In the anterior region, the analogs were positioned in a parallel direction, whereas in the posterior region, they were positioned in different angulations (0, 10, 20, and 30 degrees). One hundred and sixty models were obtained by using 4 different impression techniques (closed tray without plastic cap, closed tray with plastic cap, splinted open tray, sectioned resplinted open tray) (n=10) and polyvinyl siloxane impression material. Definitive casts and definitive duplicate casts were scanned using a modified laser scanner (Activity 880; Smart Optics Sensortechnik GmbH), and data were transferred to a software program (VRMesh Studio; Virtual Grid Inc). The definitive casts and definitive duplicate cast scans were digitally aligned. Angular and linear deviations in all axes (x, y, and z) of the analogs between definitive and duplicate casts were calculated and subjected to statistical analyses (α=.05).

Results. Mean angular deviations were in the range of 0.03 to 0.16 degrees, and linear deviations were in the range of 0.10 to 0.75 mm. The increased angulation between impression copings caused higher linear and angular deviations when closed-tray impression techniques were used (P<.05).

Conclusions. Reduced linear and angular displacements were obtained from the open-tray impression techniques compared with the closed-tray impression techniques in the angulated groups. Angular and linear deviations increased with the increase in the angulation of the posterior analog. (J Prosthet Dent 2018;■:■-■)

Immediate loading of implants with prosthetic restorations is frequently preferred for completely edentulous patients.[1] The main problems encountered in dental implant treatment are high cost and treatment time because of the advanced surgical procedures needed for patients with insufficient bone.[2,3] The all-on-4 concept was introduced to address these problems for edentulous patients and those with failing dentition.[2,3] In this technique, 4 implants with straight and angulated abutments are immediately loaded, and a fixed interim restoration is delivered on the day of surgery.[4] However, passive fit of the prostheses with the all-on-4 technique is a key factor for success, and therefore, an accurate impression is essential. Implant-supported prostheses can be fabricated from conventional impressions or digital scans. Conventional impressions can be made either directly (open tray) or indirectly (closed tray).[5-12] The closed-tray technique is an impression method that is performed by using a closed impression tray and conical impression copings. The open-tray technique uses a custom tray with holes for the implant copings.[13] Because the copings are unscrewed after the

Supported by a grant (no.) from the Near East University, Scientific Research Projects Coordination Unit (no.: SAG-2016-2-011) and TFI Academy, Committee of Scientific Researches.
This study was presented in FDI World Dental Congress, Madrid, Spain, from August 29 to September 01, 2017, and awarded best poster presentation in the category of "Dental Treatment & Restorative Dentistry".
[a]Professor, Department of Prosthodontics, Faculty of Dentistry, Near East University, Nicosia, Mersin, Turkey.
[b]Research Assistant and Dentist, Faculty of Dentistry, Near East University, Nicosia, Mersin, Turkey.