



## WESTSIDEOMS ORAL SURGERY & DENTAL IMPLANT CENTER

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Spring 2018 ~ A Quarterly Update

Dear Colleague:

Each year we continue to see growth and development in our practice accompanied by an increase in treatment success. Through this quarterly newsletter, we wish to share with you some of the latest developments in oral surgery and implant dentistry, as well as open communication with your office.

If we can provide any additional information, or if you would like to see an article on a particular topic in our next issue, please do not hesitate to call. We appreciate the trust you place in us by allowing us to participate in the care of your patients.

Regards,

*Dr. Rupi Dhadli*

### Comparison of Stress and Strain Distribution Around Splinted and Non-splinted 6-mm Short Implants in Posterior Mandible

Meimandi M, Talebi A, et al.  
Implant Dent. 2018 Feb;27(1):74-80

**T**his study was designed to compare the biomechanical performance of splinted and non-splinted short implants, in the posterior mandible, using finite element analysis. Three-dimensional models of short implants with 2 different diameters (4 × 6 mm or 5 × 6 mm) were scanned, and CATIA (R21) was used to simulate the model of an edentulous lower jaw. Experimental groups were designed as follows: (1) D4L6-splinted (three 4 × 6-mm splinted implants), (2) D4L6-nonsplinted, (3) D5L6-splinted, and (4) D5L6-nonsplinted. A 100 N load was applied, and stress and strain values in surrounding bone were analyzed in specific nodes using ANSYS software (16.1).

The maximum stress values under axial load were found in D5L6-splinted model, and under oblique load, D5L6-nonsplinted model had the maximum stress values. Under axial load, D4L6-splinted model showed maximum strain values, but when oblique load was applied, D4L6-nonsplinted model had the maximum strain values. *Splinting adjacent short implants may*

*provide less bone strain and stress, especially at the presence of lateral forces. Increasing the implant diameter may be effective in strain reduction, but does not seem to reduce the bone stress, regardless of the direction of the load applied.*

### In Vitro Fit of CAD-CAM Complete Arch Screw-retained Titanium and Zirconia Implant Prostheses Fabricated on 4 Implants

Al-Meraikhi H, Yilmaz B, et al.  
J Prosthet Dent. 2018 Mar;119(3):409-416

**C**omputer-aided designed and computer-aided manufactured (CAD-CAM) titanium and zirconia implant-supported fixed implant prostheses on 4 implants have become popular. The precision and accuracy of their interface fit has not been widely researched. The purpose of this in vitro study was to compare the marginal fit of zirconia and titanium implant-supported screw-retained CAD-CAM complete fixed dental prostheses (CFDP) fit with a standardized cast simulating the all-on-4 implant distribution.

Representation of an edentulous maxilla with 4 multiunit replicas embedded in sites corresponding to the positions of the maxillary first molars and canines was chosen. Multiunit abutments were digitally scanned. CAD software was used to design screw-retained implant-fixed complete prostheses framework, and the file was sent to a milling machine for CAM. Titanium (n=5) and zirconia (n=5) frameworks were milled on 4 implants, and the frameworks were scanned with an industrial *continued on page 2*

Dr. Dhadli is dual degreed Oral and Maxillofacial Surgeons both a physician and dental surgeon. Dr. Dhadli attended Dental School and Medical School at Case Western Reserve University. She furthered her training and education through a 5 year intensive residency program in Oral and Maxillofacial Surgery and Anesthesia at University Hospitals of Cleveland, OH, Mt. Sinai Medical Center, Rainbow Babies and Children Hospital, and Metrohealth Medical Center in Cleveland, OH.



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## Vitro Fit of CAD-CAM...continued

computed tomography (CT) scanner while applying the 1-screw test. The direct CT scans were reconstructed to generate a standard tessellation language (STL) file from the voxel data set and transported to volume graphics analysis software from which measurements were extracted. The circular mating surfaces of the corresponding framework interfaces to their representative multiunit abutment replicas on the standard were measured for implant position left maxillary canine (LMC), implant position right maxillary canine (RMC) and implant position right maxillary first molar (RMFM). In addition, color maps were generated to show the marginal discrepancy between the mating surfaces using  $\pm 0.500$  mm color scale ranges.

The material type (zirconia or titanium) was not significant for 3D discrepancy measurements. However, 3D discrepancy measurement values were significantly different between RMC and RMFM within each group. The mean 3D discrepancy measurement for LMC for titanium was 48.2  $\mu$ m. The mean  $\pm 3$ D discrepancy measurement for RMC for titanium was 74  $\mu$ m and 84.4  $\mu$ m for zirconia. The mean 3D discrepancy measurement for RMFM for titanium was 102  $\mu$ m and 93.8  $\mu$ m for zirconia. All 3D discrepancy measurements showed values <135  $\mu$ m. *The authors concluded that implant-supported CAD-CAM fabricated titanium and zirconia complete fixed dental prosthesis frameworks showed comparable marginal fit. Three-dimensional microgap measurements of frameworks showed clinically acceptable misfit values. Absolute passive fit was not achieved.*

## Narrow- and Regular-diameter Implants in the Posterior Region of the Jaws to Support Single Crowns

de Souza AB, Sukekava F, et al.  
*Clin Oral Implants Res.* 2018 Jan;29(1):100-107

**T**he objective of this 3-year split-mouth controlled clinical study was to compare narrow-diameter implants (NDIs) to regular-diameter implants (RDIs) in the posterior region of the jaws (premolars and molars) in regards to (i) the marginal bone level (MBL) and (ii) implant and prosthesis survival and success rates. A total of 22 patients were included in the study. Each patient received at least one implant of each diameter ( $\varnothing 3.3$  and  $\varnothing 4.1$  mm), placed either in the maxilla or mandible to support single crowns. A total 44 implants (22 NDIs and 22 RDIs) were placed and included in the study. Twenty-one implants were placed in the premolar, whereas 23 were placed in molar areas. Radiographic evaluations to access the MBL were performed immediately after implant placement, 1 and 3 years after implant loading. Peri-implant clinical variables including probing pocket depth (PPD) and bleeding on probing (BoP) were obtained after crown delivery, 1 and 3 years after loading. Furthermore, the survival and success rates of the implants and prosthesis were also evaluated.

Twenty patients were able to complete the study. There was no statistically significant difference regarding MBL between groups at implant placement, 1-year and 3-year time intervals. The mean peri-implant bone loss at 3-year follow-up was -0.58 mm and -0.53 mm for NDIs and RDIs, respectively. BoP was present at 15% and 10% of NDIs

and RDIs, respectively, at 3-year follow-up. PPD >5 mm was observed in 5% and 0% of the implants of NDIs and RDIs, respectively, at 3-year follow-up. *At the 3-year examination, the implant success rates were in the NDIs and RDIs sites, respectively, 95% and 100%. The corresponding values for prosthesis success rates were 90% for NDIs and 95% for RDIs. The present study demonstrated that NDIs placed to support single crowns in the posterior region did not differ to RDIs in regards to MBL, implant survival, and success rates.*

## Prevalence of Interproximal Open Contacts Between Single-Implant Restorations and Adjacent Teeth

Int J Oral Maxillofac Implants. 2016 Sep-Oct;31(5):1089-92  
Varthi S, Randi A, et al.

**T**his study attempted to determine the prevalence of interproximal open contacts between single implant prostheses and adjacent teeth, as well as to provide guidelines to prevent interproximal contact loss (ICL). This was a retrospective, cross-sectional study. One hundred twenty-eight patients (174 single-implant restorations) from Columbia University College of Dental Medicine and a private faculty clinic with a single-implant restoration in the posterior or anterior region were selected to participate. Patients between the ages of 19 and 91, both male and female, were included in this pilot study. The period of evaluation after implant restoration insertion was between 3 months and 11 years. Participants were seen at random intervals to identify ICL. Interproximal contacts were evaluated with 0.07-mm-thickness dental floss and visual confirmation. Contact was considered open if floss passed without resistance from adjacent teeth.

The results revealed a significant percentage of ICL, 52.8%, between single-implant restorations and adjacent teeth; 78.2% were identified on the mesial surfaces and 21.8% on the distal surfaces. ICL was noted in 57.9% of the maxillary implant restorations and 49% of the mandibular implant restorations. Eight implant restorations in women demonstrated mesial and distal openings. Among the patients with ICL, a significant percentage, 40%, were aware of the presence of ICL and food impaction. Fifty-three percent of implant restorations demonstrated ICL. This result dictates that ICL should be included as a prosthetic implant complication. The high prevalence of ICL is justification for proper informed consent, and associated clinical problems need to be addressed. Possible causative factors were presented, but further research is necessary to identify the causative factors for ICL. *The authors suggest the use of an Essix retainer to prevent ICL between single-implant restorations and adjacent teeth. Evaluation of interproximal contact between implant restorations and the adjacent teeth should be periodically monitored.*



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