



# Scientific Studies

Selected Abstracts

VOL.2

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Adin's commitment to education today will reflect on the future of bettering and improving the world of Implantology. Adin highly values continuous education, offering customers new research opportunities, to explore and review new ideas in the field of Implantology.

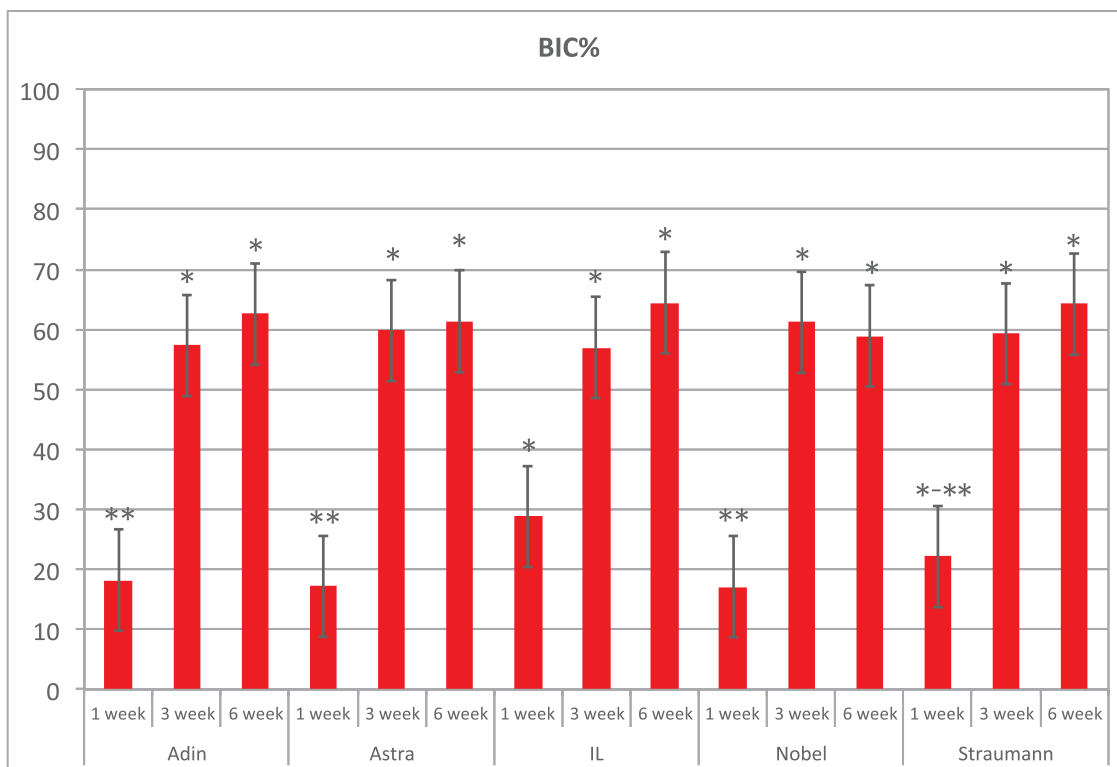
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## Histomorphometry and Bone Mechanical Property Evolution Around Different Implant Systems at Early Healing Stages

Ryo Jimbo, DDS, PhD; Rodolfo Anchieta, DDS, MS; Marta Baldassarri, PhD; Rodrigo Granato, DDS, MS, PhD; Charles Marin, DDS, MS; Hellen S. Teixeira, DDS; Nick Tovar, PhD; Stefan Vandeweghe, DDS, PhD; Malvin N. Janal, PhD; and Paulo G. Coelho, DDS, PhD.  
*Implant Dent.* 2013 Dec;22(6):596-603.

- **Purpose:** Commercial implants differ at macro-, micro-, and nanolevels, which makes it difficult to distinguish their effect on osseointegration. The aim of this study was to evaluate the early integration of 5 commercially available implants (Astra OsseoSpeed, Straumann SLA, Intra-Lock Blossom Ossean, Nobel Active, and OsseoFix) by histomorphometry and nanoindentation.
- **Materials and Methods:** Implants were installed in the tibiae of 18 beagle dogs. Samples were retrieved at 1, 3, and 6 weeks (n = 6 for each time point) and were histologically and nanomechanically evaluated.
- **Results:** The results presented that both time (P<0.01) and implant system and time interaction (P<0.02) significantly affected the bone-to-implant contact (BIC). At 1 week, the different groups presented statistically different outcomes. No significant changes in BIC were noted thereafter. There were no significant differences in rank elastic modulus (E) or in rank hardness (H) for time (E: P>0.80; H: P>0.75) or implant system (E: P>0.90; H: P>0.85).
- **Conclusions:** The effect of different implant designs on osseointegration was evident especially at early stages of bone healing.



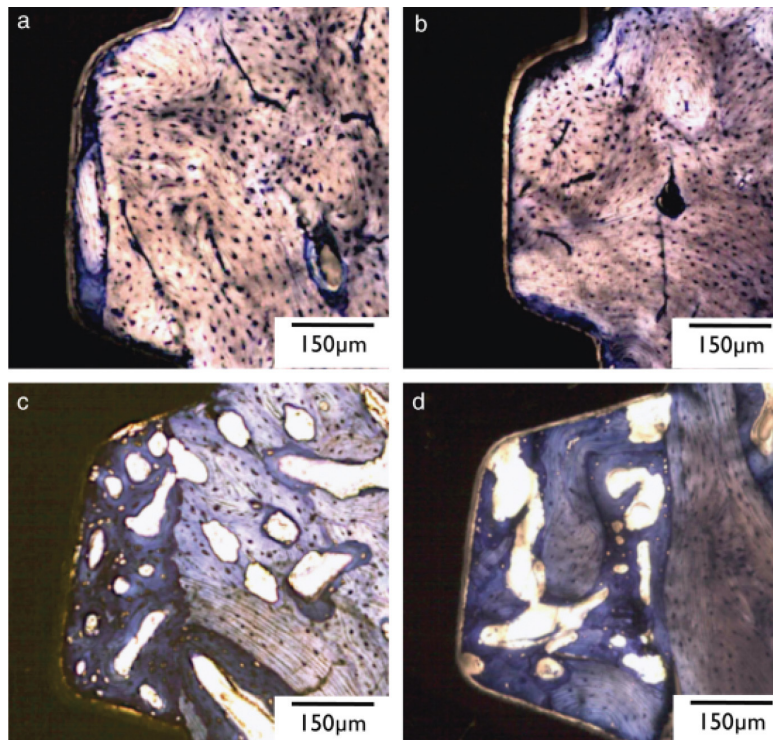
BIC as a function of implant system and time in vivo. Note that the number of asterisks represents statistically homogeneous groups for each individual time in vivo.

# Biomechanical and Histologic Evaluation of Non-Washed Resorbable Blasting Media and Alumina-Blasted/Acid-Etched Surfaces

Paulo G. Coelho, DDS, PhD; Charles Marin, DDS, MSc; Rodrigo Granato, DDS, MSc; Gabriela Giro, DDS, MSc; Marcelo Suzuki, DDS; Estevam A. Bonfante, DDS, PhD.

*Clin Oral Implants Res. 2012 Jan;23(1):132-5.*

- ▶ **Objectives:** To compare the biomechanical fixation and histomorphometric parameters between two implant surfaces: non-washed resorbable blasting media (NWRBM) and alumina-blasted/acid-etched (AB/AE), in a dog model.
- ▶ **Material and methods:** The surface topography was assessed by scanning electron microscopy, optical interferometry and chemistry by X-ray photoelectron spectroscopy (XPS). Six beagle dogs of ~1.5 years of age were utilized and each animal received one implant of each surface per limb (distal radii sites). After a healing period of 3 weeks, the animals were euthanized and half of the implants were biomechanically tested (removal torque) and the other half was referred to nondecalcified histology processing. Histomorphometric analysis considered bone-to-implant contact (BIC) and bone area fraction occupancy (BAFO). Following data normality check with the Kolmogorov-Smirnov test, statistical analysis was performed by paired t-tests at 95% level of significance.
- ▶ **Results:** Surface roughness parameters Sa (average surface roughness) and Sq (mean root square of the surface) were significantly lower for the NWRBM compared with AB/AE. The XPS spectra revealed the presence of Ca and P in the NWRBM. While no significant differences were observed for both BIC and BAFO parameters ( $P>0.35$  and  $P>0.11$ , respectively), a significantly higher level of torque was observed for the NWRBM group ( $P=0.01$ ). Bone morphology was similar between groups, which presented newly formed woven bone in proximity with the implant surfaces.
- ▶ **Conclusion:** A significant increase in early biomechanical fixation was observed for implants presenting the NWRBM surface.



Optical microscopy revealed similar bone to implant response for the NWRBM (a - cortical and c - trabecular) and AB/AE (b - cortical and d - trabecular) where newly formed woven bone is observed in proximity with both surfaces.

# Implant Diameter and Length Influence on Survival: Interim Results During the First 2 Years of Function of Implants by a Single Manufacturer

Eitan Mijiritsky, DMD; Ziv Mazor, DMD; Adi Lorean, DMD; and Liran Levin, DMD.  
*Implant Dent.* 2013 Aug;22(4):394-8.

- ▶ **Objectives:** The aim of the present study was to evaluate the influence of implant length and diameter on implant survival.
- ▶ **Methods:** A retrospective cohort of 787 consecutive patients from 2 private practices between the years 2008 and 2011 had been evaluated. Patient demographics, site and implant characteristics, and time of follow-up were recorded from the medical files.
- ▶ **Results:** Overall, 3043 implants were investigated. Overall survival rate was 98.7% with 39 implant failures recorded. Survival rates for narrow- (<3.75 mm), regular- (3.75-5 mm), and wide- (>5 mm) diameter implants were 98.2%, 98.7%, and 98.5%, respectively (P=0.89). Survival rates of short (<10 mm) and regular (10 mm and above) implants were 97% and 98.7%, respectively (P=0.22).
- ▶ **Conclusions:** Implant length and diameter were not found to be significant factors affecting implant survival during the first 2 years of function in the present investigation of this specific implant system by a single manufacturer. Further longterm follow-up studies are warranted because 2-years are only interim short-term results when dealing with dental implants.

**Table 1.** Implant Survival According to the Tested Variables

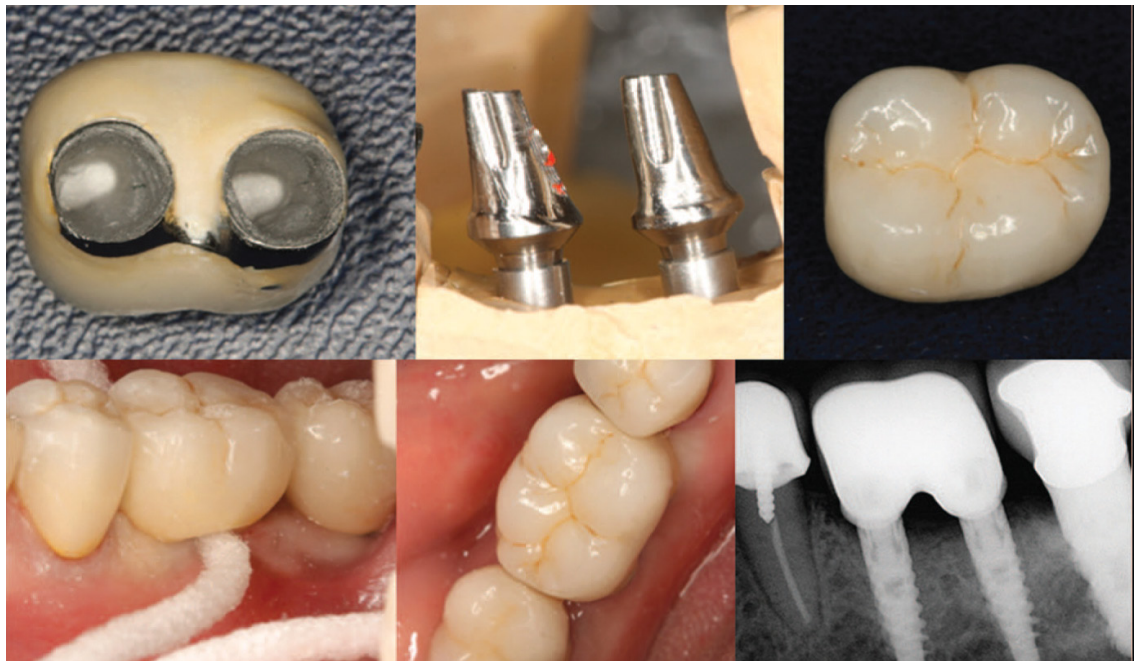
	Success		Failure		$\chi^2$	P
	N	%	N	%		
Smoking						
No	2182	98.8	27	1.2	0.274	0.601
Yes	808	98.5	12	1.5		
Diabetes						
No	2719	98.7	36	1.3	0.061	0.805
Yes	263	98.9	3	1.1		
Closed sinus						
No	2929	98.7	39	1.3	0.932	0.334
Yes	70	100	0	0		
Open sinus						
No	2650	98.6	38	1.4	3.123	0.077
Yes	350	99.7	1	0.3		
Immediate loading						
No	2250	98.4	36	1.6	6.605	0.037
Cemented	506	99.4	3	0.6		
Screwed	242	100	0	0		
Diameter						
(<3.75)	111	98.2	2	1.8	0.232	0.890
(3.75 < 5)	2758	98.7	36	1.3		
( $\geq$ 5)	131	98.5	2	1.5		
Length						
(<10)	64	97.0	2	3.0	1.530	0.216
(10+)	2937	98.7	38	1.3		

Closed sinus, transcrestal sinus augmentation approach; open sinus, lateral window sinus augmentation approach.

# Replacement of a Molar with 2 Narrow Diameter Dental Implants

Ziv Mazor, DMD; Adi Lorean, DMD; Eitan Mijiritsky, DMD; Liran Levin, DMD.  
*Implant Dent.* 2012 Feb;21(1):36-8.

- ▶ **Objectives:** The aim of the present study was to present results of single molar area rehabilitated by 2 narrow diameter dental implants.
- ▶ **Methods:** A retrospective cohort of 33 consecutive patients from 2 private practices between the years 2009 and 2011 had been evaluated. Patients who had a first molar single replaced by 2 narrow diameter implants (3 mm wide) were included in this case series. Patients' demographics, site and implant characteristics, and time of follow-up were recorded from the medical files.
- ▶ **Results:** Overall, 33 patients received 66 implants replacing 33 missing first molars. Patients' age ranged from 23 to 76 years with an average of  $49.2 \pm 12.7$  years. Most of the implants were used to replace a mandibular molar (76%) and 16 were used to replace 8 maxillary molars. In 2 patients, immediate implantation was performed. The mean distance between the adjacent teeth was  $12.1 \pm 1.0$  mm. Follow-up time ranged from 10 to 18 months (average,  $12.2 \pm 1.9$  months). All implants survived the follow-up time. One implant presented with 1 mm of bone loss at 12-month follow-up.
- ▶ **Conclusion:** Replacing a single missing molar with 2 narrow diameter dental implants might serve as a viable treatment option providing good and predictable long-term results.



The final rehabilitation consisted of a crown with an artificial intraradicular space (upper view-laboratory work). Note the final restoration in place where broad floss is inserted for cleaning the area in an intraradicular manner (lower view left). Final radiographic view is presented in the lower right view.

## Effect of Implant Diameter on Reliability and Failure Modes of Molar Crowns

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*Int J Prosthodont.* 2011 Nov-Dec;24(6):557-61.

► The reliability and failure modes of molar crowns supported by three different implantsupported designs were tested according to the following groups: group 1, one standard diameter implant (3.75 mm); group 2, one narrow-diameter implant (3 mm); and group 3, two narrow-diameter implants (3 mm). Loads were applied as mouth-motion cycles using a step-stress accelerated life-testing method.  $\beta$  values for groups 1 and 3 (1.57 and 2.48, respectively) indicated that fatigue accelerated the failure of both groups, but not for group 2 (0.39). Abutment screw failure was the chief failure mode. Strength and reliability were significantly higher for groups 1 and 3 compared to group 2.



Setup for mechanical tests

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