

Preliminary Observations Using an Aggressive Threaded Biospark™ Surface Dental Implant

Samuel Phillips, Columbia University College of Dental Medicine

Paul S. Rosen, DMD, MS, Rutgers University School of Dental Medicine, Private Practice: Yardley, Pennsylvania

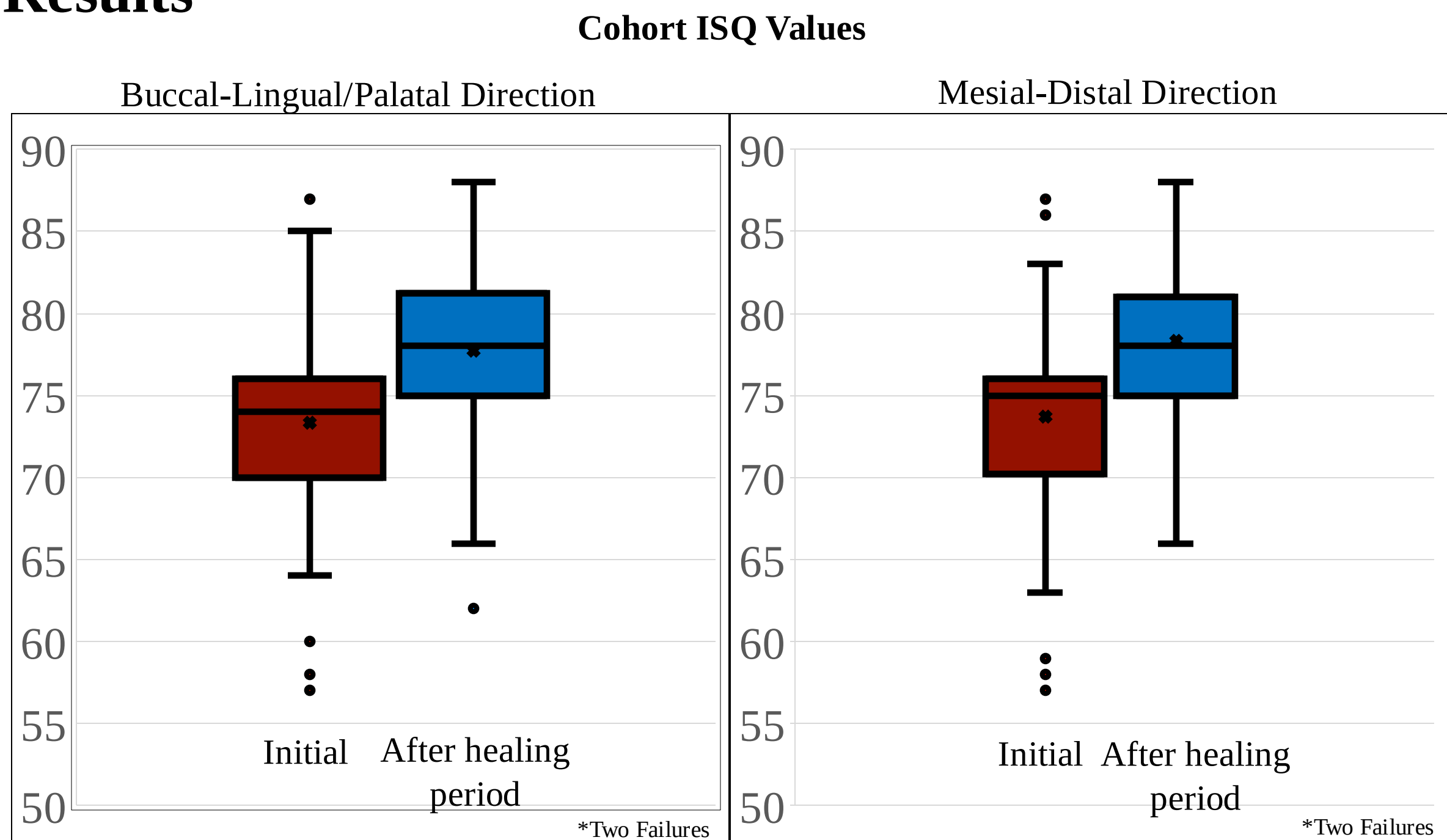
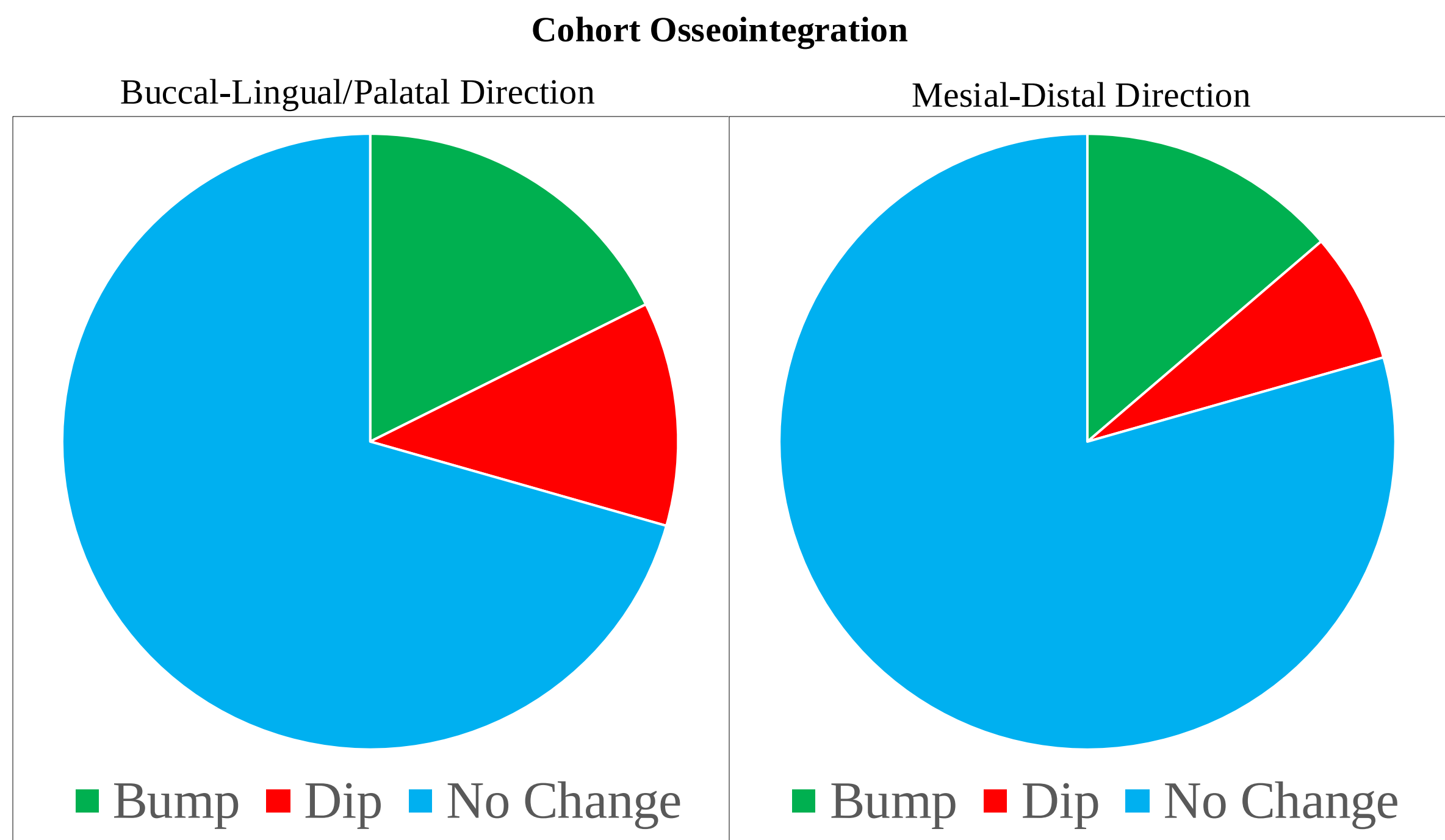
Introduction

Dental implants have been immensely successful in achieving osseointegration. Over time, implants have undergone modifications in their macro- and micro-geometries to achieve faster and more predictable osseointegration in a wide variety of circumstances. This retrospective analysis was performed in a clinical private practice to provide initial observations related to stability using an implant made from commercially pure titanium with an active designed macrostructure.

Materials and Methods

- This retrospective study comes as preliminary observations from a clinical private practice limited to periodontics, dental implants, and regenerative therapy.
- All implants were consecutively placed.
- The information collected at the time of surgery included:
 - Patient age and gender
 - Bone type
 - Whether the site was healed or an immediate implant was placed after extraction
 - The width and length of the commercially pure dental implant
 - Insertion torque
 - Resonance frequency values known as implant stability quotient (ISQ) measured using Osstell in both the buccal-lingual/palatal and mesial-distal directions
 - Duration of time for healing prior to proceeding with the restoration
- The ISQ values were repeated prior to restoration and the duration of time for healing was noted. At this second stage, ISQ was recorded in two directions as well as whether the implant had failed. Analysis was performed regarding these values.

Results



The baseline ISQ value for the entire group was 73.3 ± 5.7 in the buccal-lingual direction and 73.7 ± 5.9 in the mesial-distal direction. The ISQ values at this second visit overall were 77.7 ± 4.8 in the buccal-lingual direction and 78.3 ± 4.3 in the mesial-distal direction. The average duration of time before the second RFA value was taken was 15.5 ± 4.1 weeks with a range of 8 to 25 weeks.

A threshold of ± 2 units is used to consider whether a bump or dip occurred between the first and second readings. The threshold was determined based on RFA accuracy¹. Bumps and dips are representative of respective increases and decreases in implant stability, as healing progresses from primary mechanical stability to osseointegration².

Healing Protocol

Submerged		Non-Submerged	
Insert Torque		Insert Torque	
Average	31.6 N-cm	39.1 N-cm	
Std Dev	11.7 N-cm	10.6 N-cm	
Bone Type	Number of Implants	Bone Type	Number of Implants
1+2	25+1 Fail	1+2	33
3+4	29	3+4	13 + 1 Fail

Breaking this down by healing protocol, the single staged group had an RFA of 74.8 ± 5.3 in the buccal-lingual direction and 75.2 ± 4.7 in the mesial-distal direction. The submerged group's values were lower with the buccal-lingual being 71.9 ± 5.5 and 72.5 ± 4.7 mesial-distally. The single staged demonstrated increases for both the buccal-lingual to 78.6 ± 4.8 and 78.7 ± 4.8 for the mesial-distal direction. The submerged also saw increases where the buccal-lingual rose to 77.1 ± 4.6 and the mesial-distal was 78.0 ± 3.7 .

Conclusions

The results of this study suggest that this new active design for this Grade 4 titanium implant with a BioSpark™ surface achieves high success along with good stability at both the time of implant placement and at second stage as measured by insertion torque and ISQ. Further studies are needed to determine if a shorter period of healing may be employed to allow for these implants to be loaded.

References

- Nedir R, et al. Predicting osseointegration by means of implant primary stability. Clin Oral Implants Res 2004;15(5):520-8.
- Rosen PS, Meredith N, Reynolds MA. Case Reports Describing the “Bump”: A New Phenomenon in Implant Healing. J Implants Advanced Clin Dent 2010;2(9):27-37.