

INTRODUCTION

Vertical ridge augmentation has less long-term predictability than horizontal ridge augmentation due to common complications with vertical Guided Bone Regeneration (GBR), including early exposure of the barrier membrane and decreased bone stability (Gallo and Diaz, 2019).

OBJECTIVE

The purpose of this study was to evaluate the primary stability of short implants versus conventional implants, in vitro.

STUDY DESIGN



Figure 1: Ditron Dental® Implant System Used



Figure 2: Implant placement in Polyurethane resin block Type II Bone



Figure 3: Implant placement in Polyurethane resin block Type IV Bone

MATERIALS / METHODS

Two groups of implants (ULT, Ditron Dental, CA) were studied; short implants (Ø 6.0mm x 7mm) and conventional implants (Ø 3.75mm x 10mm). A total of 80 implants were placed by the same calibrated clinician (GR) at 800RPM, 40 short implants and 40 conventional implants. Each implant was placed in dense (type II) and soft (type IV) bone (Figs. 1-3). Implant primary stability was recorded using insertion torque (IT), Resonance Frequency Analysis (RFA), and Periotest values (Figs. 4-5). Statistical comparison with Analysis of Variance were completed to compare differences between groups.

RESULTS

The comparison of IT, RFA and Periotest of the two groups of implants showed statistical significance (P<0.0001) favoring the short implants (Ø 6.0mm x 7mm) in both the soft and dense bone qualities (Tables 1-3).

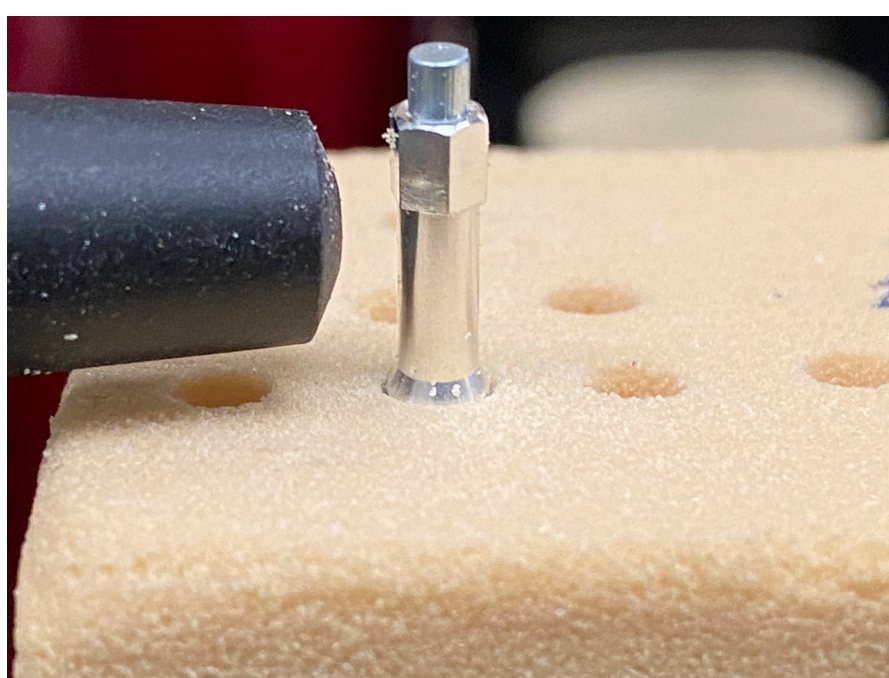


Figure 4: RFA performed on placed implants



Figure 5: Periotest performed on placed implants

3.75x10mm Implants vs. 6x7mm Implants in Type II and Type IV Bone												
(1) type II bone												
	Insertion torque (IT)				Average Osstell				Average Periotest			
	N	Mean	Std Err	P value	N	Mean	Std Err	P value	N	Mean	Std Err	P value
3.75x10mm implants	20	34	2.05	<.0001	20	60.1	1.64	<.0001	20	-2.6	0.77	<.0001
6x7mm implants	20	44.25	1.83		20	57.23	1.15		20	-0.58	0.51	
(2) type IV bone												
	Insertion torque (IT)				Average Osstell				Average Periotest			
	N	Mean	Std Err	P value	N	Mean	Std Err	P value	N	Mean	Std Err	P value
3.75x10mm implants	20	16.25	3.58	<.0001	20	50.74	5.13	0.0176	20	0.97	1.74	<.0001
6x7mm implants	20	28.5	3.66		20	47.33	3.3		20	3.03	0.66	

Primary Stability of Short vs. Conventional Ditron Implants in Different Bone Qualities

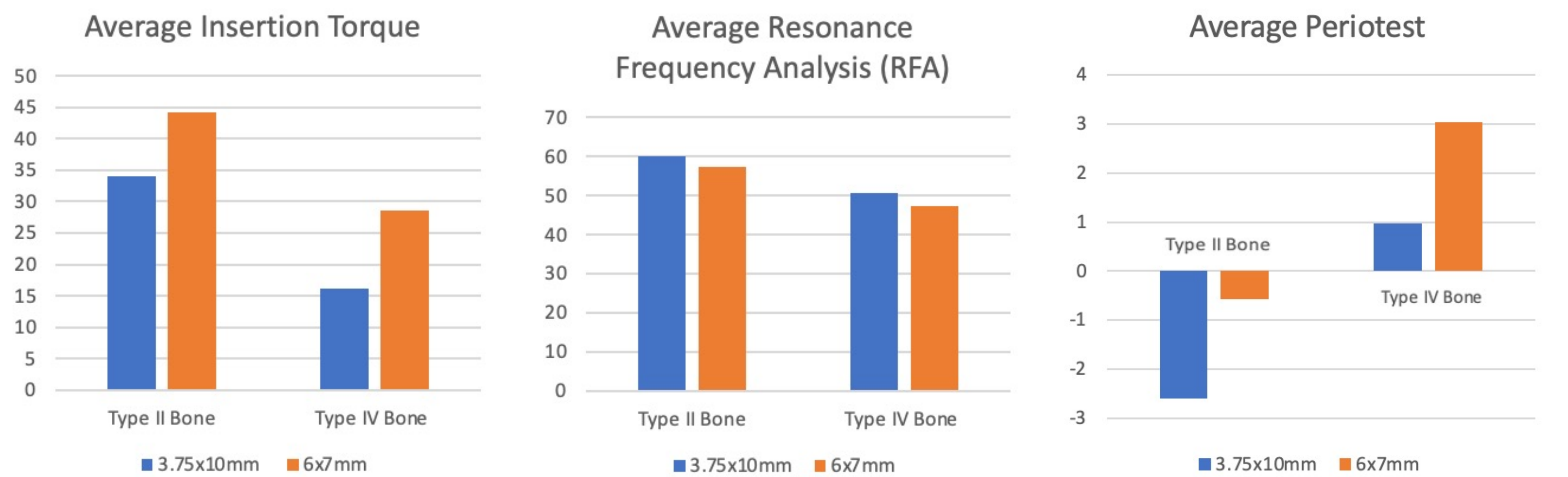


Table 1. Average Insertion Torque Values (Ncm)

Table 2. Average RFA Values via Osstell®

Table 3. Average Periotest Values (PTV)

CONCLUSION

Within the limitations of this study using the specific implant design, short implants with wide diameters seem to have a higher level of implant stability compared to narrow implants with conventional length.

The authors declare no conflict of interest