[1] DDS, Resident, High Specialization in Surgical and Prosthetic Oral Implantology, UNAM
[2] DDS, PhD, associated Professor, High Specialization in Surgical and Prosthetic Oral Implantology, UNAM
[3] DDS, Clinical associated Professor, High Specialization in Surgical and Prosthetic Oral Implantology, UNAM

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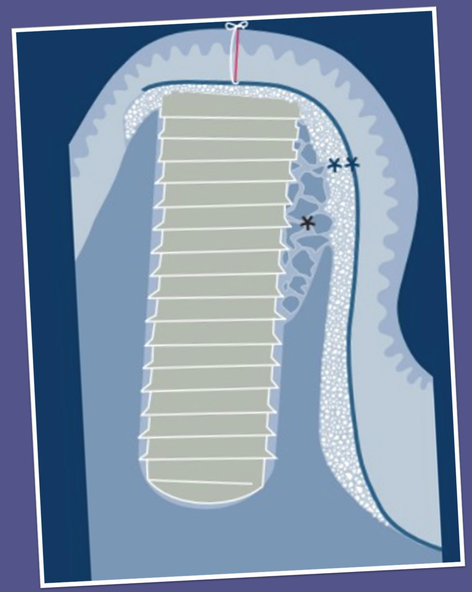
Volumetric Changes (CBCT and IOS) in Bone Regeneration Simultaneous to the Placement of Implants With Vestibular Dehiscence



National Autonomous University of México, UNAM
Faculty of Dentistry
Department of High Specialization in Surgical and Prosthetic Oral Implantology
G. Sifuentes[1], V. García-Lee[2], M. H. Rodríguez Tizcareño[3]

INTRODUCCTION

The different implant designs and the great variety of biomaterials allowed bone regeneration simultaneously to implant placement in sites with limited ridges, being more frequent protocols these days. Studies describing the use of CBCT to analyze the changes but there isn't enough literature that compares results also combining IOS measurements.

AIM

This work aims to carry out measurements protocols for volumetric changes using CBCT and IOS, in bone generation simultaneous to the placement of implants.

METHOD

Fig.1 Department of implantology patients for implant placement protocols. (A) Placement of implants at 37 and 36 for rehabilitation of single crowns. (B) Placement of implants at 16 and 14 for 3-unit fixed prosthesis. (C) Placement of implants at 13 and 23 for overdenture with locator attachments.

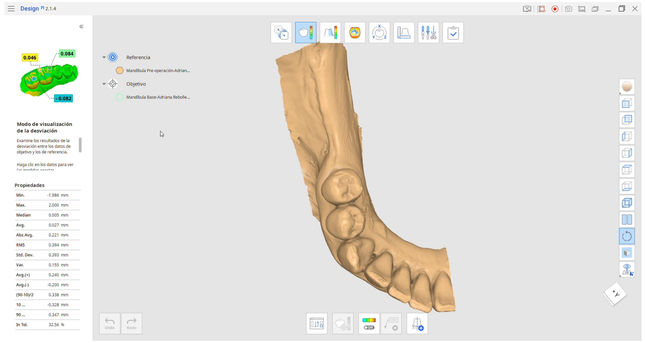


Fig. 2. The measurements in IOS were carried out using the Medit i500 software. The comparative measurements were obtained by the APP design before treatment and 3 months after surgery.

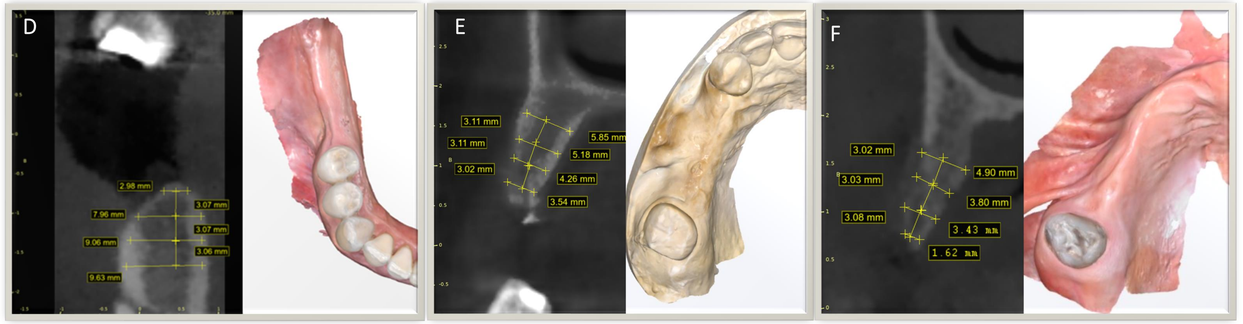


Fig. 3. Initial measurements obtained from CBCT and IOS evaluations, only sites with ridge characteristics ≤4mm are included. (D) Corresponds to implant site 46. (E) Corresponds to implant site 14. (F) Corresponds to implant site 13.

RESULTS

SURGERY

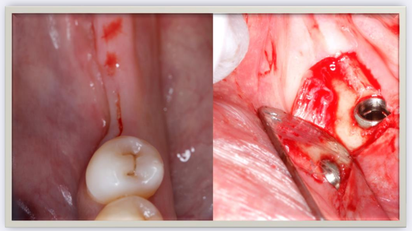


Fig. 4. Implant placement at bone level at 46, the exposure of the first thread is observed. No regeneration material was placed.

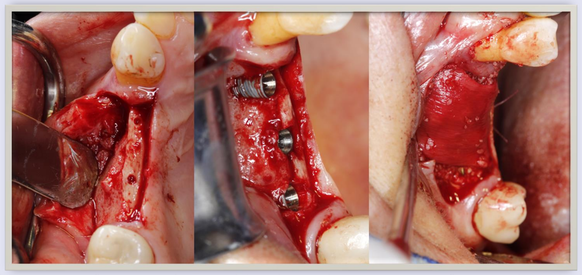


Fig. 5. Placement of 1mm subcrestal implant, the exposure of more than 3 threads in the vestibular area is observed, it is regenerated by bone and collagen membrane.

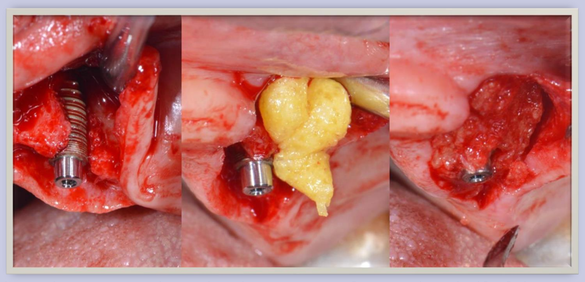
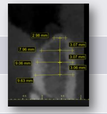
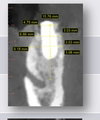
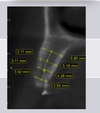
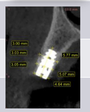
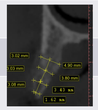
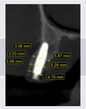
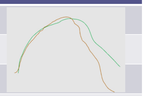
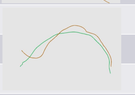
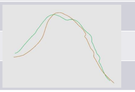


Fig. 6. Implant placement at bone level, exposure of more than half of the vestibular area of the implant is observed, it is regenerated with DBM loaded with collagen “sticky bone”.

Tab. 1. CBCT COMPARATIVE

	PRE-TREATMENT			3 MONTHS			
	Cervical	2.9mm		Cervical	4.75mm		1.85
	Middle	7.96mm		Middle	6.86mm		-1.1
	Apical	9.06mm		Apical	9.19mm		-0.41
	Apical	5.18mm		Apical	5.77mm		0.59
	Middle	4.26mm		Middle	5.07mm		0.81
	Cervical	3.54mm		Cervical	4.64mm		1.1
	Apical	3.80mm		Apical	5.78mm		**1.98**
	Middle	3.43mm		Middle	5.29mm		**1.86**
	Cervical	1.62mm		Cervical	4.70mm		**3.08**

Tab. 2. IOS COMPARATIVE

46	Cervical	**0.98mm**	
	Middle	**1.38mm**	
	Apical	1.50mm	
15	Cervical	0.18mm	
	Middle	0.77mm	
	Apical	1.28mm	
13	Cervical	0.40mm	
	Middle	1.03mm	
	Apical	**1.88mm**	

Tab. 1 CBCT parameters were collected prior to treatment and 3 months postoperative in cervical (C), middle (M) and apical (A) thirds.
Tab. 2. IOS parameters were collected prior to treatment and 3 months postoperative in cervical (C), middle (M) and apical (A) thirds.

IOS EVALUATION

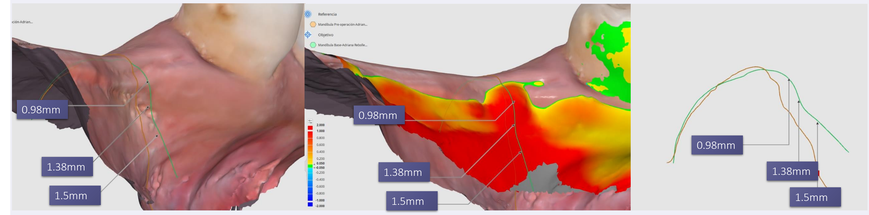


Fig. 7. The overlaying shows around 1mm volumen gain in the cervical, middle and apical zone.

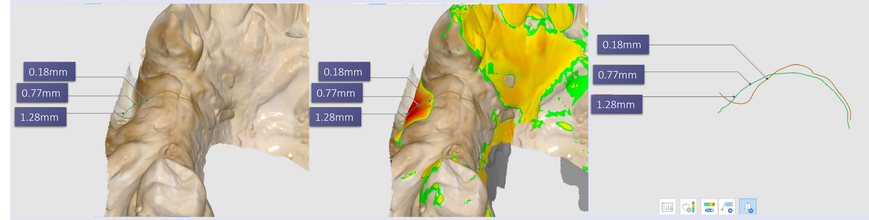


Fig. 8. Implant 14 overlay shows a volumen gain in the apical zone and a minimal gain in the cervalical zone.

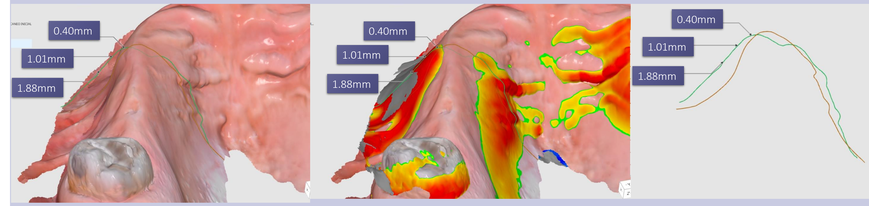


Fig. 9. The 13 implant overlay shows a 1mm gain in the middle and apicla zone.

RESULTS

Using biomaterials increases the presence of bone in sites with implant exposure in immediate implants with vestibular defects.

The Bone Volume (assessed by CBCT) gain was greater for the site where sticky bone was used, compared to the site where bone graft and membrane was used, and the site where no graft was placed.

The soft tissue volume gain (assessed by IOS) was greater in the site where no graft was placed at the middle and cervical level.

CONCLUSION

Many variables can influence this results, a segmentation of the sites should be described to be able to compare the results between them.

A greater number of samples is needed to allow us to better assess the results of the different protocols.