

Non-grafted One-stage Sinus Floor Elevation in the Severely Atrophic Maxilla

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Introduction

We presented a canine experiment of sinus floor elevation at the 2011 AO conference and discussed possibilities of clinical applications of non-grafted/one stage maxillary sinus floor elevation in severely atrophic maxillae. We modified this technique (**AntraNa method**) for clinical use on five patients. The clinical application of this technique will be discussed.

Findings in the previous experiment

In the experiment using canine frontal sinus lifting the sinus membrane and placing implant simultaneously without any grafting (Fig.1,2), new bone proliferated in the space where the sinus membrane was elevated (Fig.3) and the prominent osseointegration between the new bone and the implant was confirmed (Fig.4). It was seen that the HA coated implants osseointegrated better than non-HA coated implants. Furthermore, the osseointegrated new bone remained on the surface of the implant for a long period of time.

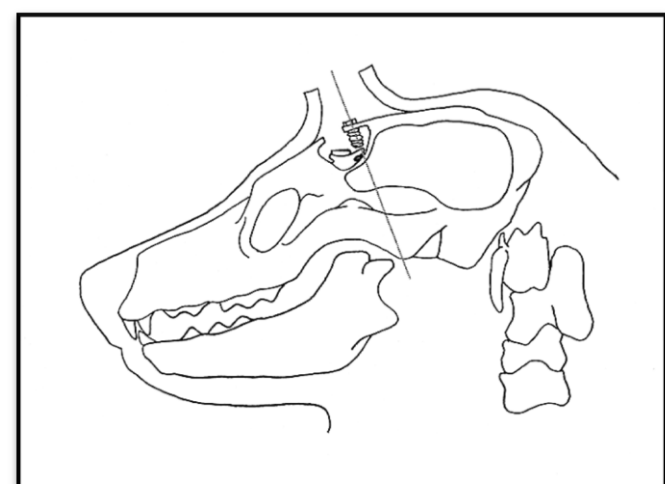


Fig.1: Canine frontal sinus

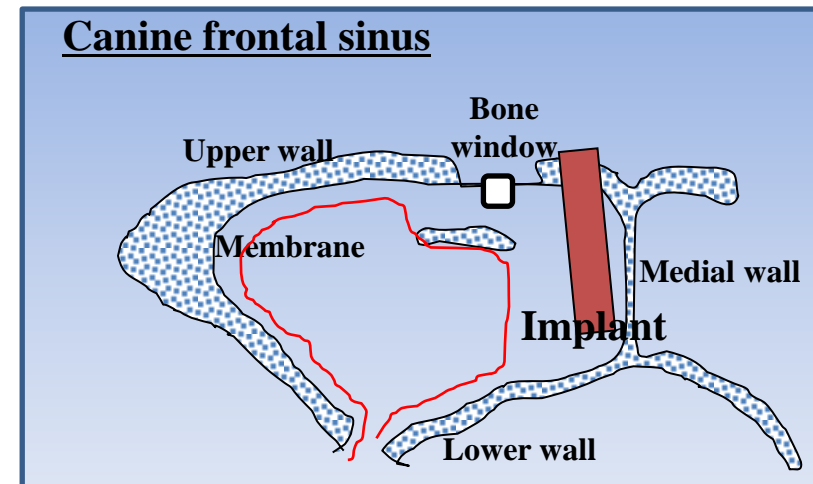


Fig.2: Coronal view of frontal sinus

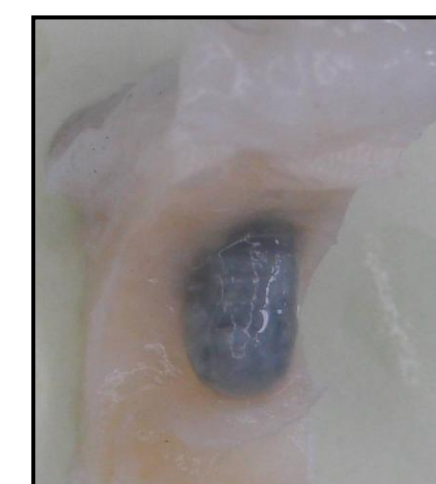


Fig.3: New bone engulfing the implant inside the sinus cavity

Rate of new bone surrounding implant surface after 6 months: 85.9%
Bone-implant contact rate: 76.7%

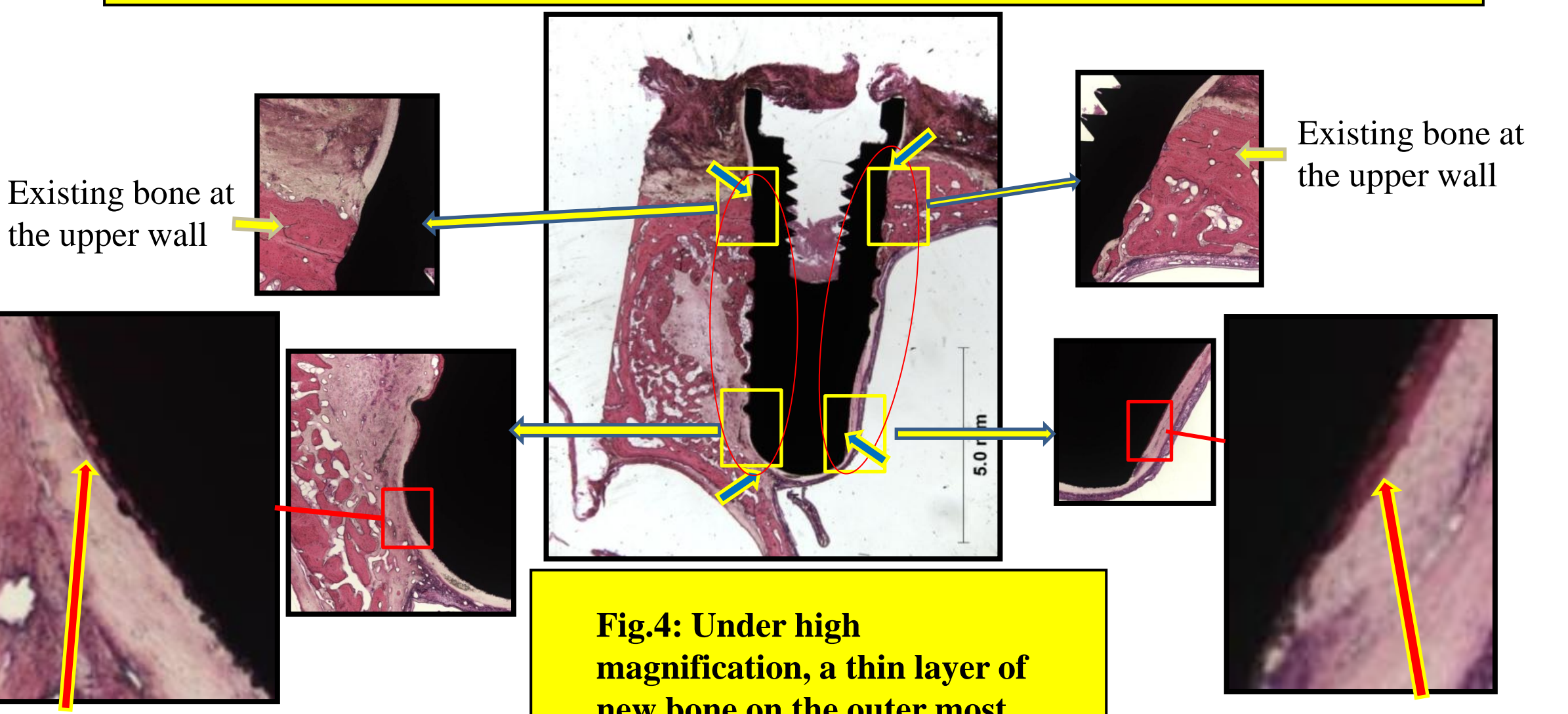


Fig.4: Under high magnification, a thin layer of new bone on the outer most surface of the implant (red circle) was visible in 6 months.

Procedure of AntraNa method

Lateral Approach

1. Incision and detachment of the oral membrane
2. Bone window made in the lateral wall of the maxilla
3. Lifting the sinus membrane away from the sinus wall
4. Preparing the implant bed to perforate into the sinus (Fig.5)
5. Inserting the HA implant beside the medial wall inside the sinus (Fig.6)
6. Placing the HA implant at the site within 4mm zone from the medial wall as possible
7. Setting the cover screw (Fig.7)

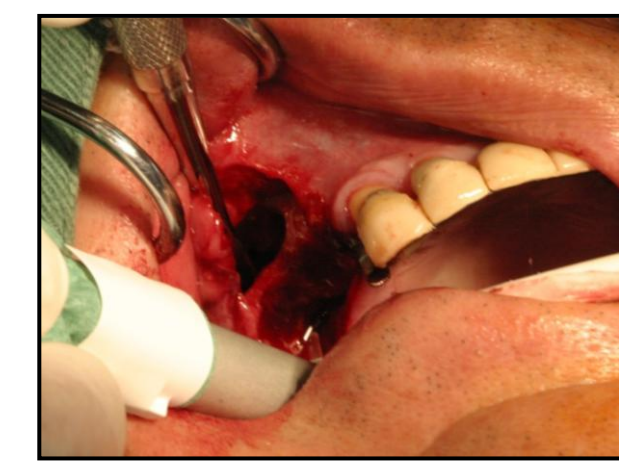


Fig.5: Preparation of implant bed

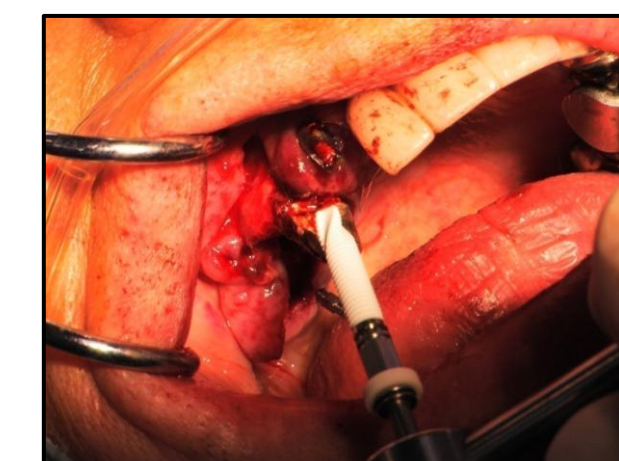


Fig.6: Implant insertion

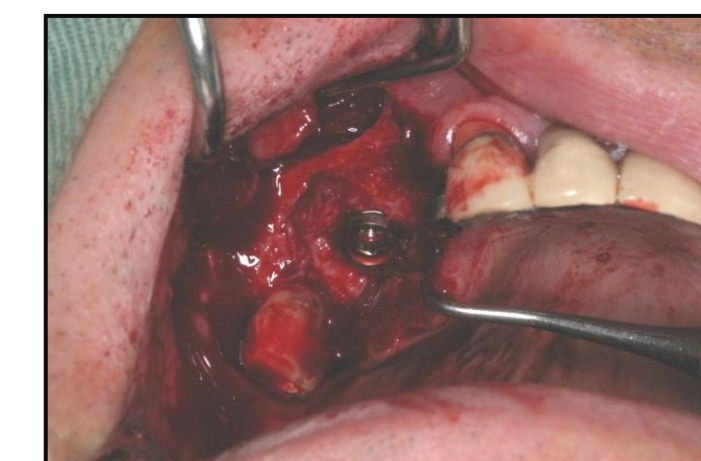
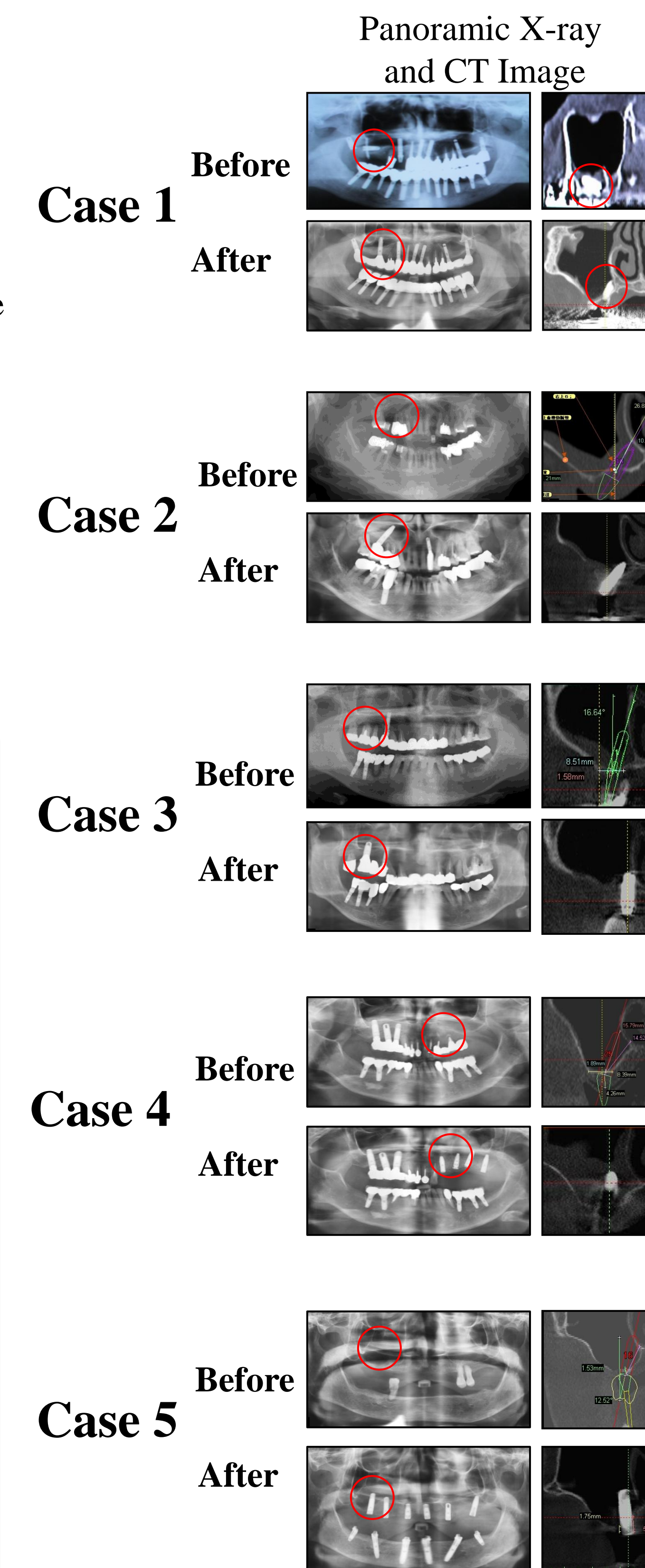


Fig.7: Implant placement at the site of the 4mm zone

Cases

Case	1	2	3	4	5	Ave.
Sex	M	F	M	F	F	
Age	66	56	60	57	68	61.4
Implant Site	16	16	16	26	16	
Medical History	No specific problem	No specific problem	No specific problem	No specific problem	No specific problem	
Sinus Membrane Findings	Slight Hyperplasia (lost implant)	Hyperplasia	Slight Hyperplasia	Normal	Normal	
Available Bone (mm)	1.8	1.2	1.6	1.9	1.5	1.6
Implant Type	HA coated titanium 4.7×16mm	HA coated titanium 4.2×14mm	HA coated titanium 4.7×13mm	HA coated titanium 4.7×16mm	HA coated titanium 4.7×16mm	
Date of Operation	Nov. 2005	June 2005	July 2007	Aug. 2007	Jan. 2008	
Post-Operation Results						
Non-loading Period (months)	6	6	7	7	9	7
Periotest	-1	-1	1	2	1	0.4
Movement on Palpation	None	None	None	None	None	
Periodontal Gingiva	Normal	Normal	Normal	Normal	Normal	
Sinus Membrane (CT findings)	Normal	Normal	Normal	Hyperplasia	Normal	
Peri-implant New Bone (CT findings)	Impermeable bone-like tissue around implant	Impermeable bone-like tissue around implant	Impermeable bone-like tissue around implant	Impermeable bone-like tissue around implant	Impermeable bone-like tissue around implant	



Results

A secondary surgery was carried out around 7 months after the first surgery. Periotest values at that time were on average 0.4±1.3. After provisional crowns were placed, the average follow-up time until the most recent checkup was 4 years and 5 months. All HA implants were stable. None of the cases have shown maxillary sinus infections up to the present time.

Discussion

In a non-grafted one-stage sinus floor elevation (**AntraNa method**) at the site of the severely atrophic maxilla;

1. New bone develops without grafting.
2. New bone osseointegrates with HA implants better than non-HA implants.
3. New bone forms up to 4 mm from the sinus wall (4mm zone), and remained over a long period of time (6months).
4. New bone engulfs the implant located at the 4mm zone.
5. New bone osseointegrates with HA implants at the site new bone was engulfed.
6. Existing bone needed for initial attachment is 1mm at least.
7. It is possible to engulf implants longer than 15mm.

Advantage of AntraNa method

1. Grafting is not necessary.
2. Surgery can be performed in one-stage.
3. It can be performed in a severely atrophic maxilla (at least 1mm).
4. Less invasive surgery.

Disadvantage of AntraNa method

1. Initial fixation is weak.
2. High risk of implants becoming lost in the maxillary sinus
3. Non-loading period is long (at least 6 months)
4. High risk of inclined implant placement

Conclusion

Clinical applications of sinus floor elevation with simultaneous implant placement without grafting in a severely atrophic maxilla was possible.

Contact

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