

TOPICS – Day 2

- Implant placement post extraction with simultaneous contour augmentation using GBR: When immediate, when early, when late?
- CAD-CAM technology and zirconia: new opportunities for esthetic single-tooth restorations
- **Complex GBR procedures**
- Prosthetic handling of compromised sites and extended edentulous spaces in the anterior maxilla
- Surgical handling of esthetic implant failures
- Pink ceramic to compensate post-implant soft tissue deficiencies

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Complex Cases in Implant Dentistry – Surgical Aspects

Implant sites with multiple missing teeth

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Sites with Multiple Missing Teeth

Clinical Aspects and Challenges

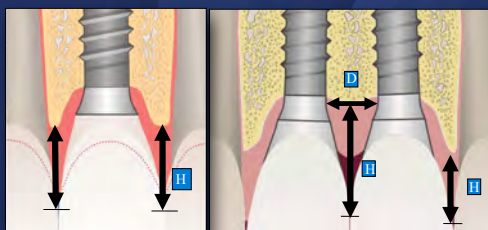
- Big difference between fresh extraction sites and healed ridge
- Big differences between sites with 2, 3 and 4 missing teeth
- Each situation is different and complex in nature
- Compared to single tooth replacements, an excellent outcome is difficult to achieve



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Risk Factor	Low	Medium	High
Medical status	healthy patient intact immune s.		reduced immune system
Smoking habit	non-smoker	light smoker < 10 sig/d	heavy smoker ≥ 10 sig/d
Patient's esthetic demand	low	medium	high
Lip line	low	medium	high
Gingival biotype	thick low-scalloped	medium thick medium scalloped	thin high scalloped
Shape of tooth crown	rectangular		triangular
Bone level of adjacent teeth	≤ 5 mm to contact point	5.5 to 6.5 mm to contact point	≥ 7 mm to contact point
Local infection at implant site	none	chronic	acute
Restorative status of neighb. teeth	virgin		restored
Width of edentulous space	1 tooth ≥ 7 mm* 1 tooth ≥ 5.5 mm*	1 tooth < 7 mm* 1 tooth < 5.5 mm*	2 teeth and more
Soft tissue anatomy	intact soft tissues		soft tissue defect
Bone defect at implant site	no bone deficiency	horizontal bone deficiency	vertical bone deficiency

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Critical dimensions: $H > 5 \text{ mm}$ $D < 3 \text{ mm}$

Tarnow, Wagner, Fletcher: The effect of the distance from the contact point to the crest of bone on the presence or absence of the interproximal dental papilla. *J Periodontol* 43: 995, 1992
Tarnow, Cho, Wallace: The effect of inter-implant distance on the height of inter-implant bone crest. *J Periodontol* 71:544, 2000



Problem #1: 2 missing adjacent teeth in the anterior maxilla

Relevant clinical questions:

- How many implants?
- Which implant type?

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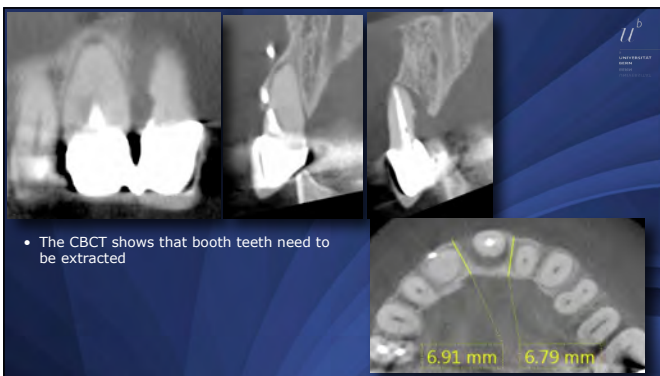












Risk Factor	Low	Medium	High
Medical status	Healthy and/or (well managed)		
Smoking habit	non-smoker		
Palate's arch development		medium	
lip line			high
Gingival height		medium thick, medium thickness	
Shape of tooth crown	retrognathic		
Bone level of adjacent teeth		1.5 to 2.5 mm to contact point	
Vertical dimension of maxillary arch	none		
Retention of upper lip height teeth			enhanced
Width of upper lip			2 teeth lost more
Soft tissue anatomy			soft tissue grafted
Bone density at implant site		medium	bone deficiency

Category C

Treatment Plan

- Extraction 11 and 21 with socket grafting and a soft tissue graft in area 21
- 3 months of healing
- Implant placement in area 11 and 21 with simultaneous contour augmentation



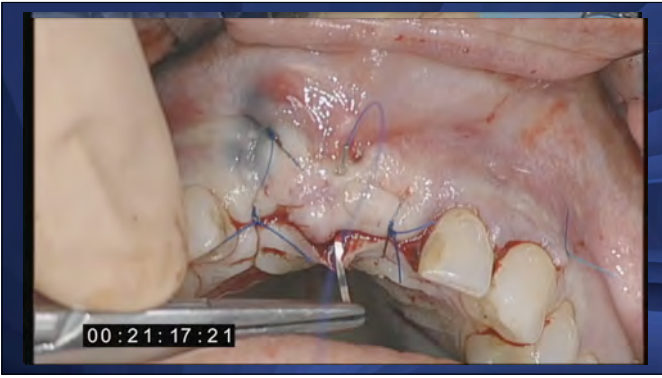


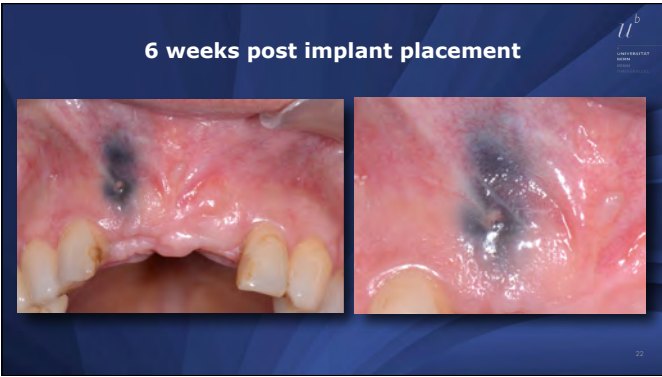


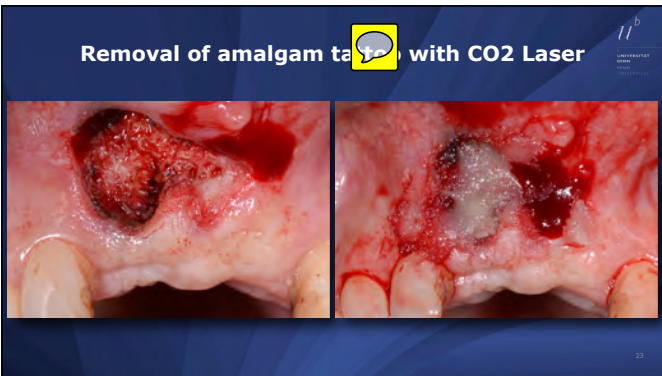






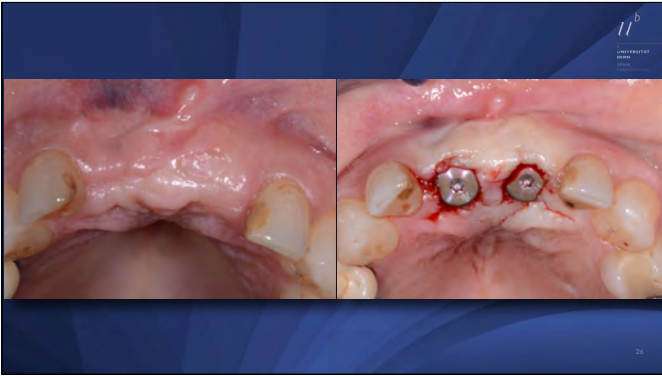








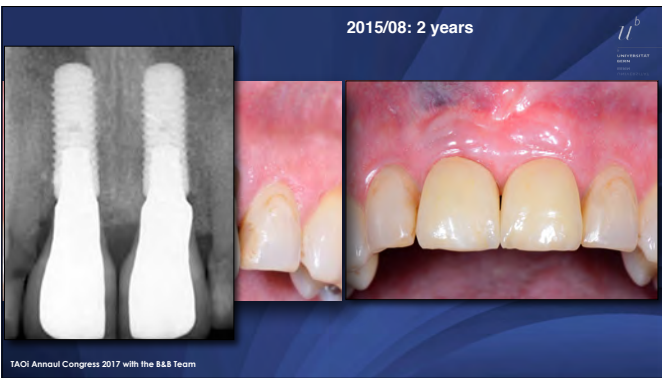








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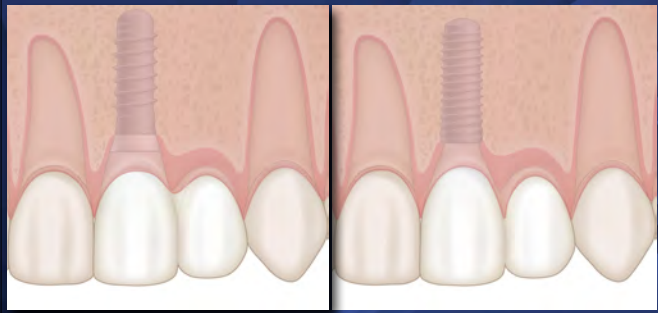
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Problem #1: 2 missing adjacent teeth in the anterior maxilla

A lateral incisor plus an adjacent tooth missing

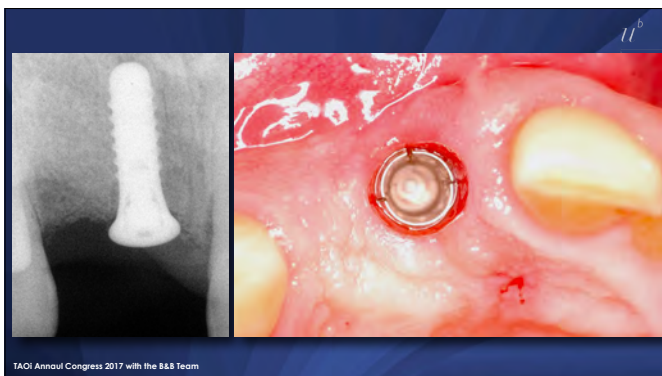
- How many implants?
- Which implant type?

A missing lateral incisor plus an adjacent tooth















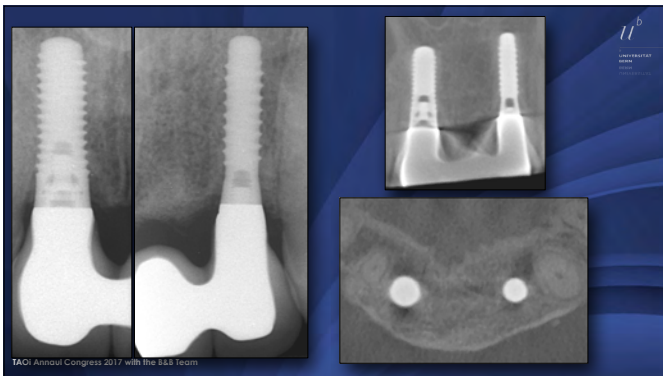


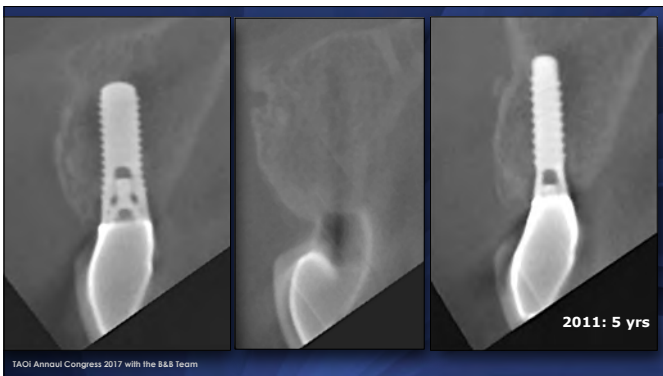




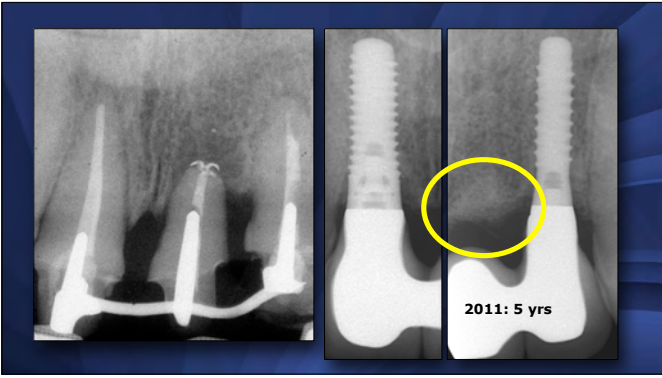






















Problem #3: 4 missing maxillary incisors

Important questions

- How many implants?

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This slide features a diagram with two panels. The left panel shows a cross-section of the upper jaw with four missing incisors. The right panel shows the same cross-section with four dental implants placed in the positions of the missing teeth. The text 'Important questions' and a bullet point 'How many implants?' are centered below the diagram.

Favorite Solution: Only 2 Implants

• Clear preference for TL Implants

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This slide features a diagram with two panels. The left panel shows a cross-section of the upper jaw with four missing incisors. The right panel shows the same cross-section with two dental implants placed in the positions of the missing teeth, with a bridge structure connecting them. The text 'Favorite Solution: Only 2 Implants' and a bullet point 'Clear preference for TL Implants' are centered below the diagram.

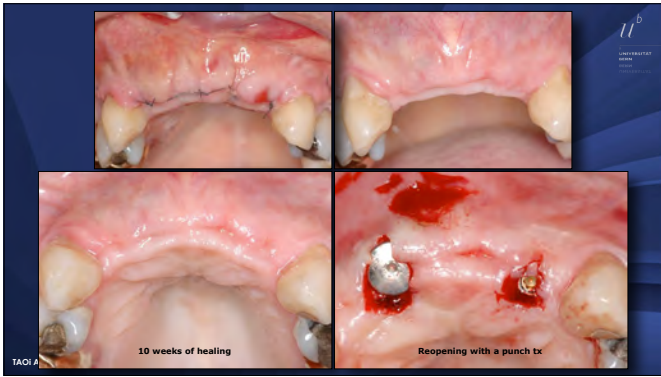
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This block contains four images. On the left is a clinical photograph of a patient's upper teeth. In the middle is a close-up clinical photograph of a patient's smile. On the right are two radiographic (X-ray) images showing dental implants in the upper jaw.

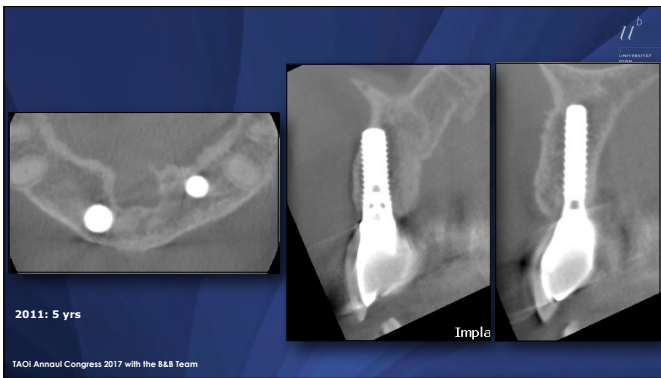
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This block contains two clinical photographs. The left image shows a patient's upper teeth, which appear to be a complete denture or a set of prosthetic teeth. The right image is a close-up photograph of a patient's smile, showing the teeth and the surrounding soft tissue.









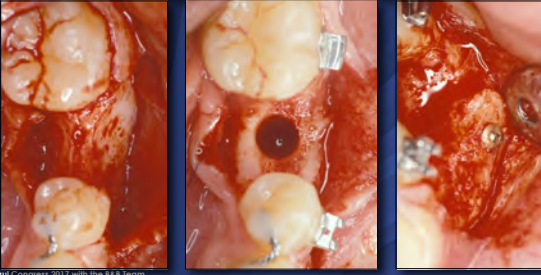
Complex Cases in Implant Dentistry – Surgical Aspects

**Implant sites with a flattened ridge
requiring a Ridge Augmentation
(Staged Approach)**

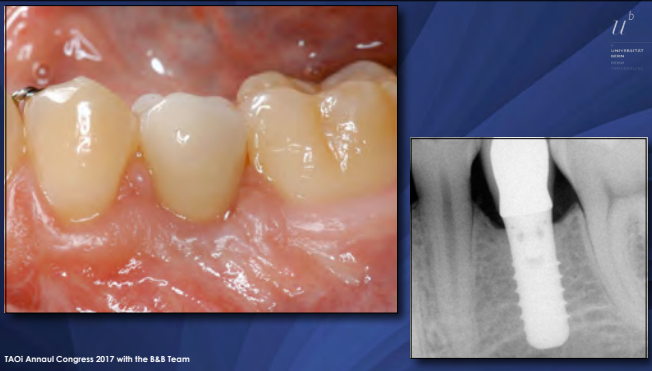
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von Arx T, Buser D: Horizontal ridge augmentation using block grafts, BioOss and collagen membranes: A clinical study in 42 patients. Clin Oral Impl Res 17: 359, 2006

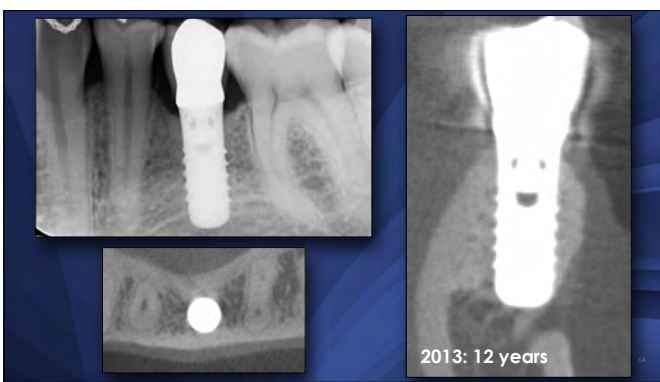


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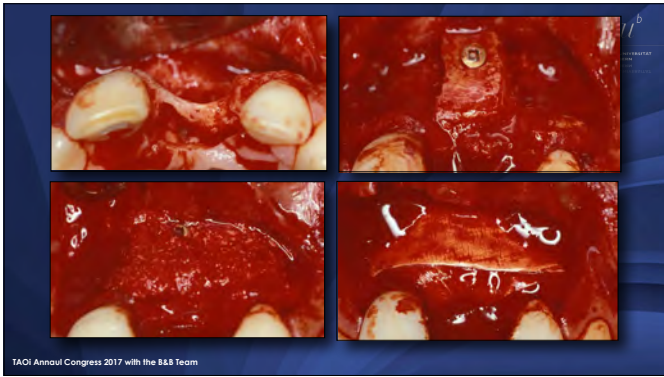


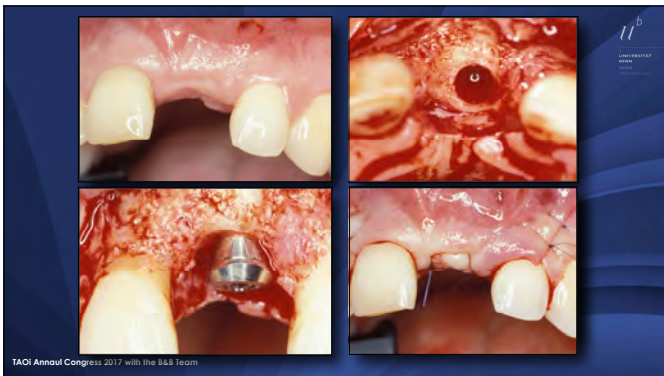




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2011: 10 years



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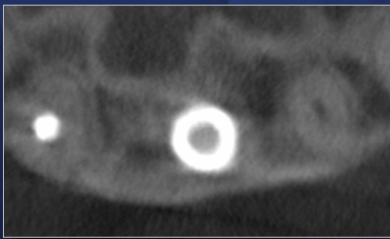
2000

2011: 10 years



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2011: 10 years

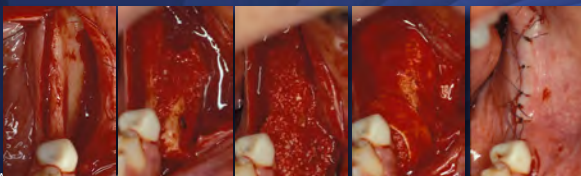


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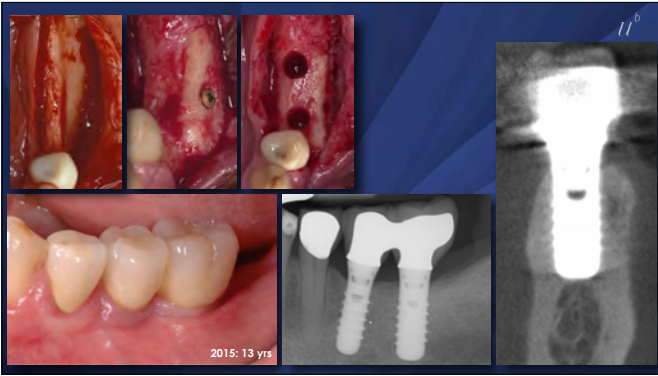
Ridge Augmentation with GBR – Staged Approach

- Buser D, Brägger U, Lang NP, Nyman S: Regeneration and enlargement of jaw bone using guided tissue regeneration. Clin Oral Impl Res 1: 22, 1990
- Buser D, Dula K, Lang NP, Nyman S: Long-term stability of osseointegrated implants in bone regenerated with the membrane technique. 5-year results of a prospective study with 12 implants. Clin Oral Impl Res 7: 175, 1996
- Buser D, Dula K, Hirt HP, Schenk RK: Lateral ridge augmentation using autografts and barrier membranes. A clinical study in 40 partially edentulous patients. J Oral Maxillofac Surg 54: 420, 1996
- Buser D, Ingimarsson S, Dula K, Lussi A, Hirt HP, Belser UC: Long-term stability of osseointegrated implants in augmented bone: a 5-year prospective study in partially edentulous patients. Int J Periodontics Restorative Dent 22:109-117, 2002
- von Arx T, Buser D: Horizontal ridge augmentation with autogenous block grafts and the GBR technique: A prospective study in 42 patients. Clin Oral Impl Res 17:359-366, 2006
- Chappuis V, Cavusoglu Y, Buser D, von Arx T: Lateral ridge augmentation using autogenous block grafts and guided bone regeneration: A 10-year prospective case series study. Clin Impl Dent Rel Res 2016 (e-pub)

Authors & Year	Membrane	approach	Bone filler	Pat	Implants	Follow-up	Survival rates	Success rates
Buser et al. 2002	e-PTFE	staged	autograft block	40	61	5 Y	100.0%	98.3%
Chappuis et al. 2016	collagen	staged	autograft block & DBBM	38	52	10 Y	98.1%	98.1%



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Chappuis V, Cavusoglu Y, Buser D, von Arx T: Lateral ridge augmentation using autogenous block grafts and guided bone regeneration: A 10-year prospective case series study. Clin Implant Dent Rel Res 19:85-96, 2017

- 38 Patients with 52 implants have been recalled after 10 years of Implant placement into augmented ridges
- During the study period, one implant was lost after 5 years of function
- The success rate was 98.1%
- The graft resorption was 7.7% as examined with Cone Beam CT's
- The clinical and radiographic parameters were in line with previous studies and indicative for successful implants

	imPLI	imSBI	PD	DM
Maxilla	0.31±0.22	0.43±0.08	4.20±1.04	-2.87±1.22
Mandible	0.30±0.27	0.07±0.12	3.87±0.98	-1.14±1.59
p-value	0.3051	0.0301	0.0172	0.0006

CONCLUSIONS

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Handling of Sites with Multiple Missing Teeth

- These are all complex cases, and difficult to handle
 - A team approach is highly recommended
 - Sometimes you need a comprehensive treatment planning
- Today, we do everything to avoid adjacent implants
 - Exception: Two adjacent central incisors
- Implant placement is always combined with local contour-augmentation using GBR
- Excellent esthetic outcomes are difficult to obtain, they can be optimised
 - Significant vertical tissue deficiencies are the most difficult risk factor in such cases

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Sites with a Flattened Ridge requiring a Staged Approach

- These sites have trously decreased in the past 15 years
 - Mid 1990's: 50% of cases
 - Today: Less than 10%
- The stability of the grafting material becomes an important aspect
- Ridge augmentation with a block graft and a collagen membrane is well documented
 - von Arx & Buser COUR 2006
 - Chappuis et al. CIDRR 2017
- The clinical outcomes are highly predictable
- The surgical technique is complex, the morbidity high

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