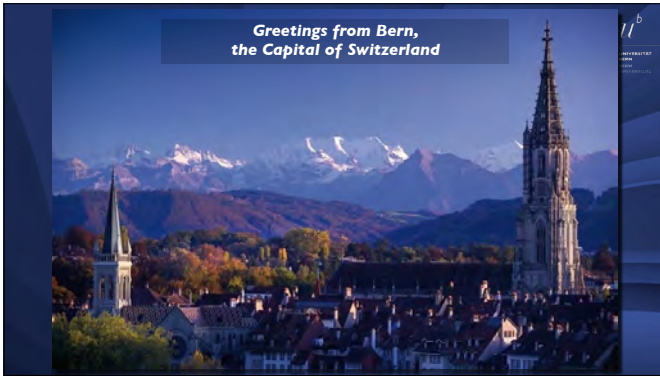




State-of-the-art Clinical Procedures in Partially Edentulous Implant Patients – How to achieve excellent long-term Results in Daily Practice

Prof. Buser & Belser
School of Dental Medicine
University of Bern, Switzerland

Greetings from Bern, the Capital of Switzerland



Bern and the famous Swiss Mountains



Bernese Alps

Matterhorn/Zermatt

zmk bern
Zahnmedizinische
Kliniken Bern

Master Courses
at the University of Bern
School of Dental Medicine

CCDE
Center for Continuing Dental Education

CCDE Video Library
New Release
Animation Video Early Placement

Handout
Request to:
info@ccde.ch

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My Clinical Background

- I am a trained Swiss Oral Surgeon
 - ✓ Single degree Oral Surgeon, 3-year specialty program for dentists
- Swiss Oral Surgeons are surgical specialists somewhere between an OMFS and a Periodontist
 - ✓ They think in smaller flap dimensions and fine surgical techniques
 - ✓ They are used to collaborate with restorative dentists and periodontists
- Our department treats 550+ implant patients per year
 - ✓ 750 to 800 implants are placed, mostly in partially edentulous patients
 - ✓ I personally treat about 150 patients per year
 - ✓ My personal experience is now 30+ years with more than 5'000 patients
 - ✓ I always work in a Team Approach with a Prosthodontist or a GP



TAOi
 台灣植牙醫學會
 Taiwan Academy of Osseointegration
 夏季國際學術研討會暨會員大會

Topics

- All surgical and prosthetic aspects of implant therapy in partially edentulous patients
- How we work in a team
- No discussion on fully edentulous patients

TOPICS – Day 1

- Factors influencing the long-term stability of dental implants
- Surgical procedures in posterior sites: Standard implant placement with or without flap elevation
- Surgical procedures in posterior sites: Implant placement with GBR
- Implant placement and sinus floor elevation: Lateral window vs. Osteotome technique, when simultaneous, when staged?
- Prosthetic planning and restorative principles in posterior sites
- Fundamental esthetic principles revisited in the context of anterior maxillary implant restorations - a critical appraisal
- Esthetic risk assessment and basic surgical principles in esthetic sites
- Prosthetic handling of esthetic challenges: case reports

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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 peri-implant soft tissue deficiencies

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Implant Dentistry Today I

- Today, we are in a phase of routine application of implant therapy
- In our department, we treat more than 550+ patients per year with roughly 750 to 800 implants per year
- More than 90% of our patients are partially edentulous
 - ✓ The single tooth replacement is the no. 1 indication (> 50%)
 - ✓ Average of 1.40 implants per patients
- Most patients belong to the baby boomer generation
 - ✓ The average age of our patients is roughly 63 years
 - ✓ Many patients have a compromised dentition or anatomy
 - ✓ Less than 10% of our patients has age <30 (most trauma patients)
- When providing implant therapy, it's a must to offer successful long-term outcomes
 - ✓ We always aim at a long-term success of 30+ years

Bornstein, Halbritter, Hamisch, Buser: Current indications and surgical procedures in implant dentistry. A retrospective 3-year analysis of 1206 patients receiving 1817 implants in a referral clinic. Int J Oral Maxillofac Implants 20: 1109-1116, 2008

Engel Brugger, Bornstein, Kuchler, Janner, Chappuis, Buser: Implant Therapy in a Surgical Specialty Clinic: An Analysis of Patients, Indications, Surgical Procedures, Risk Factors and Early Failures. Int J Oral Maxillofac Implants 30:151-160, 2015

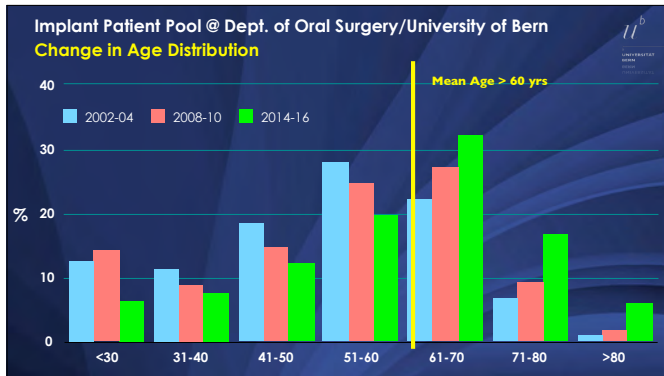
Ducommun, Rahman, Chappuis, Buser, Suter, Buser: Examination of the patient pool 2014-16 (data analyzed)

Change in Age Distribution

• Patients of age > 40 are often compromised and have one or several risk factors

- ✓ Medical risk factors
- ✓ Dental risk factors
- ✓ Anatomic risk factors
- ✓ Smoking, however, is not so frequent in this age group

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Implant Indications

- Today, more than 90% of our implant patients are partially edentulous

Indication	Jaw	2002-2004				2008-2010				2014-2016			
		n	%	n	%	n	%	n	%	n	%	n	%
Single tooth gap	max	469	38.9	677	56.2	576	36.4	835	52.8	594	41.5	823	51.4
	mand	208	17.3			259	16.4			229	16.0		
Distal ext. sit.	max	114	9.4	255	21.1	176	11.1	346	21.8	190	13.3	343	21.4
	mand	141	11.7			170	10.7			153	10.7		
Ext. edent. space	max	131	10.9	207	17.2	233	14.7	321	20.3	230	16.1	329	20.6
	mand	76	6.3			88	5.6			99	7.0		
Edentulous jaw	max	16	1.3	67	5.5	28	1.8	82	5.1	46	3.2	105	6.6
	mand	51	4.2			54	3.3			59	4.1		

TAOI Annual Congress 2017 with the B&B Team Bornstein et al. 2008; Engel-Brugger et al. 2015; Ducommun et al. (in manuscript)

Implant Locations

2002-2004	5	75	97	116	49	79	115	125	81	50	111	85	87	2	1077
2008-2010	10	137	140	145	69	116	154	141	85	71	137	123	137	3	1468
2014-2016	9	137	133	122	67	87	157	122	104	75	145	120	170	13	1461
max	17	16	15	14	13	12	11	21	22	23	24	25	26	27	
mand	47	46	45	44	43	42	41	31	32	33	34	35	36	37	
2002-2004	17	151	63	52	61	11	9	8	10	59	43	68	169	19	740
2008-2010	19	178	75	50	58	19	15	12	13	62	49	79	168	14	811
2014-2016	18	175	83	48	73	11	14	10	17	63	46	75	158	9	800

Bornstein et al. 2008; Engel-Brugger et al. 2015; Ducommun et al. (in manuscript)

Implant Locations

Posterior Maxilla: Esthetic Zone: 879 impl = 38.9%

2014-2016	9	137	133	122	67	87	157	122	104	75	145	120	170	13	1461	64.6%
max	17	16	15	14	13	12	11	21	22	23	24	25	26	27		
mand	47	46	45	44	43	42	41	31	32	33	34	35	36	37		
2014-2016	18	175	83	48	73	11	14	10	17	63	46	75	158	9	800	35.4%

Posterior Mandible: 612 impl = 27.1%

Total = 2'261

Bornstein et al. 2008; Engel-Brugger et al. 2015; Ducommun et al. (in manuscript)

Implant Dentistry Today II

- **Implant therapy is highly predictable, if ...**
 - ✓ indications are carefully chosen using evidence-based criteria
 - ✓ well documented surgical and prosthetic protocols are followed
 - ✓ the patients are kept in a maintenance care program
 - ✓ the patients have a good hygiene and do not smoke too much (≤ 5 zig/d)
- **There are several 10-year studies available today performed under these conditions showing excellent success and survival rates**
 - ✓ Studies with modern implant surfaces such as SLA, Osseotite, TiOblast
 - ✓ The majority of studies showed 10-year success rates $>95\%$
- **The benchmarks at the University of Bern are even slightly higher**
 - ✓ The early failure rate during healing is roughly 1% *Bornstein et al. 2008, Engel et al. 2015*
 - ✓ The 10-year success rate is today at 98% *Buser et al. 2012, Chappuis et al. 2016*

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Albrektsson, Buser & Sennerby: Crestal bone loss and oral implants.
Cln Implant Dent Rel Res 14:783, 2012

TABLE 1 Frequency of Implants with Reported Peri-Implant Infection and Significant Bone Loss Leading to Implant Removal or Other Surgical Intervention. Interpreted Data from Ten Long-Term Follow-Up Studies on Three Different Implant Surfaces

Study	Surface	Patients	Implants	Follow-Up (Year)	CSR	Mean Bone Loss (mm)	Peri-Implant Infection	
							n	%
Al-Nawas et al. 2010 ¹¹	TiOblast	108	516	7-15	89.7%	2.6	18*	3.4
Fischer and Stenberg 2011	SLA	24	142	10	93.1%	1.3	3	2.1
Buser et al. 2012 ¹²	SLA	303	511	10	98.8	-	9 ^b	1.8
Degidi et al. 2012 ¹³	TiUnite	59	210	10	97.6%	1.9	15 ^b	8.2
Chen et al. 2012 ¹⁴	TiUnite	46	121	10	99.2%	0.7	2	1.8
Glasser 2012 ¹⁵	TiUnite	?	66	11	97.1%	1.7	1	1.5
							49	2.7

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TOPICS – Day 1

- **Factors influencing the long-term stability of dental implants**
- Surgical procedures in posterior sites: Standard implant placement with or without flap elevation
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3 Surgical Strategies for Long-term Success with Implants

- **Our treatment concepts are strictly evidence-based and conservative**
 - ✓ Primary Objectives:
 - * Successful outcomes with high predictability
 - * Low risk for complications
 - ✓ No cowboy techniques
- **In routine application, we only use biomaterials with a good scientific documentation based on preclinical and clinical studies**
 - ✓ Implants, barrier membranes, and bone grafting materials
 - ✓ No copy-cat biomaterials
- **In the past 15 years, our treatment concepts have been carefully modified to improve the attractiveness of implant therapy**
 - ✓ Secondary Objectives:
 - * Least number of surgical procedures
 - * Reduction of morbidity/pain for patients
 - * Reduction of healing periods and treatment time

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Current Objectives of Implant Therapy

- Successful outcomes from an esthetic and functional point of view
- Esthetic outcomes with long-term stability
- A low risk of complications during healing and during function

Primary Objectives

- The least number of surgical interventions to reduce invasiveness
- The least possible pain and morbidity
- Short healing and overall treatment periods
- Treatment with good cost-effectiveness

Secondary Objectives

Our Benchmark for Implant Success Rates



- **Low failure rates during healing**
 - ✓ Early failure rate during healing around 1% *Bornstein et al. 2008, Engel et al. 2015*
- **High success rates in long-term studies**
 - ✓ 97% in a 10-year study with SLA surface solid screw implants *Buser et al. 2012*
 - ✓ 89% in a 20-year study with TPS hollow-screw/cylinder implants *Chappuis et al. 2013*
 - ✓ Failure rates for heavy smokers are higher
- **These success rates are a strong marketing tool for the acquisition of referrals**
 - ✓ We have more than 100 referring dentists
 - ✓ The fundamental success factors of our business are (a) top treatment quality, and (b) a top service quality for the patient and the referring dentist
 - ✓ I do a lot of marketing with public lectures (Senior University, Rotary Club, Lions Club, Kiwanis Club etc.)

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Clinical Studies of the University of Bern in the past 27 Years: Excellent Long-term Results

Buser, Weber, Lang: Tissue integration of non-submerged implants. 1-year results of a prospective study with 100 ITI hollow-cylinder and hollow-screw implants. *Clin Oral Implants Res* 1: 33, 1990

Buser, Weber, Bragger, Baltiger: Tissue integration of one-stage ITI implants. 3-year results of a longitudinal study with hollow-cylinder and hollow-screw implants. *Int J Oral Maxillofac Implants* 4: 405, 1991

Buser, Mericsky-Stern, Bernard, Behneke, Behneke, Hilt, Buser, Lang: Long-term evaluation of non-submerged ITI implants. Part I: An 8-year life table analysis of a prospective multi-center study with 2359 implants. *Clin Oral Implants Res* 8:161, 1997

Bornstein, Lussi, Schmid, Belsler, Buser: Early loading of titanium implants with a sandblasted and acid-etched (SLA) surface. 3-year results of a prospective study in partially edentulous patients. *Int J Oral Maxillofac Implants* 18:659, 2003

Bornstein, Schmid, Belsler, Lussi, Buser: Early loading of non-submerged titanium implants with a sandblasted and acid-etched (SLA) surface: 5-year results of a prospective study in partially edentulous patients. *Clin Oral Implants Res* 16: 631, 2005

Bornstein, Hart, Rohlfinger, Morton, Buser: Early loading after 3-weeks of healing of non-submerged titanium implants with a chemically modified sandblasted and acid-etched surface: 4-month results of a prospective case series study in the posterior mandible. *Clin Impl Dent Rel Res* 11:338-347, 2009

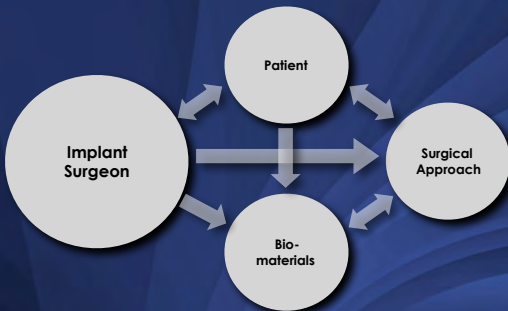
Bornstein, Willmehen, Bragger, Buser: Early loading at 21 days of non-submerged titanium implants with a chemically modified sandblasted and acid-etched surface: 3 years results of a prospective study in the posterior mandible. *J Periodontol* 81: 809-18, 2010

Buser, Janner, Willmehen, Bragger, Ramseler, Salvi: 10-Year Survival and Success Rates of 511 Titanium Implants with a Sandblasted and Acid-etched (SLA) Surface: A Retrospective Study in 303 Partially Edentulous Patients. *Clin Impl Dent Rel Res* 14:839-851, 2012

Chappuis, Buser, Bragger, Bornstein, Salvi, Buser: Long-term outcomes of dental implants with a titanium plasma-sprayed (TPS) surface: A 20-year prospective case series study in partially edentulous patients. *Clin Impl Dent Rel Res* 15:780-90, 2013

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 Relat Res*. 19:85-96, 2017

Factors influencing the Long-term Success of Dental Implants



Buser & Chen 2008

Key Elements for Long-term Success of Dental Implants

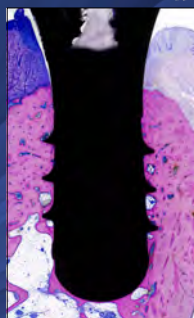


- **Careful pre-operative analysis of a given patient**
 - ✓ Establish the risk profile of the patient
- **Choose the correct surgical approach**
 - ✓ Understand the tissue biology
 - ✓ Choose an appropriate implant with a good scientific documentation
- **Insert the implant in the correct 3D position and axis**
 - ✓ Restoration driven implant placement
- **Make sure that the implant is fully embedded in bone of sufficient volume**
 - ✓ In case of a bone deficiency, rebuild the bone with GBR or SFE
- **Make sure to have a wide band of keratinized mucosa (KM)**
 - ✓ If KM is lacking, reestablish it with a soft tissue graft
- **Establish an efficient supportive care program with a dental hygienist**
 - ✓ Try to convert every patient into a (low risk patient)

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Basic Principles of Implant Surgery

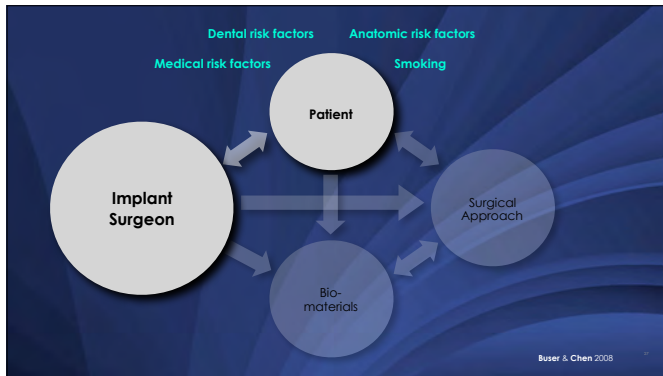
- **Select an appropriate implant type**
 - ✓ Implant diameter and length
 - ✓ Implant shape and surface
- **Insert the implant in a correct 3D prosthetic position**
 - ✓ Restoration-driven implant placement
 - ✓ The implant must achieve primary stability
- **The implant must be completely imbedded in healthy bone**
 - ✓ Facial and oral bone walls should be at least 1 mm
 - ✓ In case of a local bone deficiency → GBR
- **The implant should be surrounded by healthy and keratinized mucosa**



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Key Elements for Long-term Success of Dental Implants

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- **Establish an efficient supportive care program with a dental hygienist**
 - ✓ Try to convert every patient into a low risk patients



Daily Routine in Implant Dentistry

Importance of a careful pre-operative Analysis

- **It is important to have a detailed knowledge about the risk factors involved**
 - ✓ Medical and dental risk factors
 - ✓ Smoking
 - ✓ Anatomic risk factors, which includes bone and soft tissue deficiencies
- **More than 50% of all implants are placed in sites with a horizontal and/or vertical bone deficiency**
 - ✓ Implants in post-extraction sites
 - ✓ Implants in the posterior maxilla with reduced bone height
 - ✓ Implants in healed sites with facial and/or vertical bone atrophy
- **A detailed 3-dimensional (3D) radiographic examination is often required for a proper treatment planning**
 - ✓ Excellent progress has been made with Cone Beam CT in the past 15 years

Cone Beam Computed Tomography (CBCT)

A revolution of 3D radiologic examination



New Tom
Quantitative Radiology, Italy

I-CAT
Henry Schein, USA

3D Accutomo
Morita, Japan

Cone Beam Computed Tomography (CBCT)

Major progress in the past 15 years

On the left is a photograph of the **3D Accutomo 90** CBCT unit. On the right is a screenshot of the **3D Accutomo 170** software interface. The screenshot lists several features:

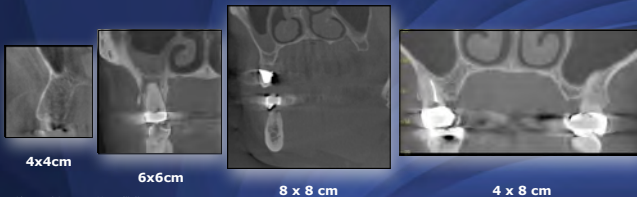
- 3D Accutomo 170
- REALIZED: Groundbreaking Resolution of 60 µm Voxels
- The 3D Accutomo 170 offers a minute voxel size of just 60µm (micrometer). This equi-line axial combined with the unit's 14 bit grayscale capability displays an amazing level of clarity never before seen in the world of 3D-CT imaging.
- Newly developed Zoom Reconstruction Function
- Plus image data capabilities: 40 X 400 mm, 60 X 400 mm, 80 X 400 mm, 100 X 400 mm, 120 X 400 mm
- Offers High resolution 2D-CT images with low patient dose
- Display both hard and soft tissue
- A wide dynamic range and precise grayscale differentiation capability
- Enables comprehensive examination for diagnosing temporal bone, paranasal sinuses, mandible, skull base, etc.
- One Data Viewer Software
- Variable rendering functions
- Inter-serial network compatibility
- Compact: Floor space: 1,400 mm X 1,200 mm
- More Information (© 2012 Morita) (All rights reserved)

3D Accutomo 90
Morita, Japan

3D Accutomo 170
Morita, Japan

Cone Beam Computed Tomography (CBCT)

- Since 2011: We can choose from 7 different volume sizes
- ALARA principle: As small as possible, as large as necessary
- ALADA principle: Resolution as good as necessary

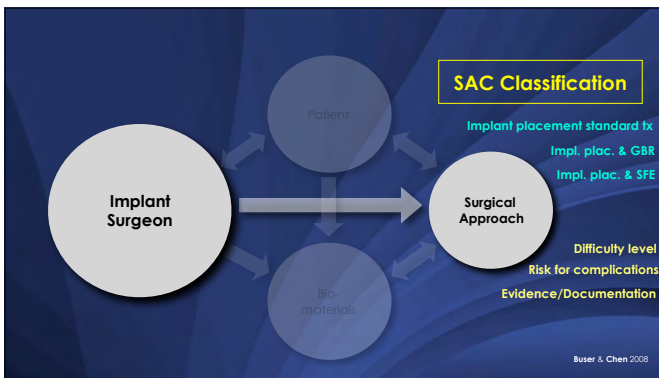


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Key Elements for Long-term Success of Dental Implants

- Careful pre-operative analysis of a given patient
 - ✓ Establish the risk profile of the patient
- Choose the correct surgical approach
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 - ✓ Choose an appropriate implant with a good scientific documentation
- Insert the implant in the correct 3D position and axis
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- Make sure that the implant is fully embedded in bone of sufficient volume
 - ✓ In case of a bone deficiency: rebuild the bone with GBR or SFE
- Make sure to have a wide band of keratinized mucosa (KM)
 - ✓ If KM is lacking: reestablish it with a soft tissue graft
- Establish an efficient supportive care program with a dental hygienist
 - ✓ Try to convert every patient into a low risk patients

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The SAC Classification

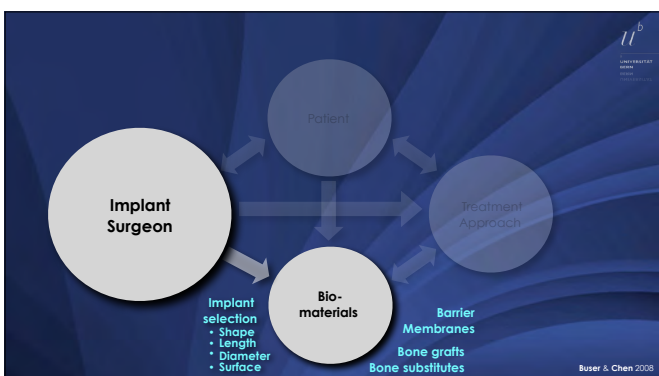


Classifies the degree of difficulty of an implant case. In doing so it

- identifies the skill level required to undertake the treatment
- identifies the risk of complications

S = Straight forward
A = Advanced
C = Complex

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Selection of Biomaterials in Implant Dentistry

Criteria for the Selection of Implants

- Titanium as material of choice for most patients
- Zirconia implants only on demand in less than 1%
- Screw-type implants to provide good primary stability
- Proper implant dimensions based on prosthetic and anatomic considerations
 - ✓ Diameter of the implant body and the implant shoulder (platform)
- Modern hydrophilic implant surfaces offer several advantages
 - ✓ Our group has a long tradition to successfully use the SLA (since 1997) and the hydrophilic SLActive implant surface (since 2005)
 - ✓ Innicell (Thommen Medical) is another hydrophilic implant surface

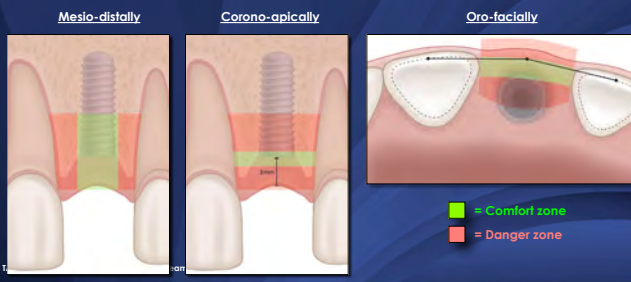
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Buser, Martin, Belser: Optimizing esthetics for implant restorations in the anterior maxilla: Anatomic and surgical considerations. *Int J Oral Maxillofac Implants* 19 (Suppl 1): 43, 2004



- 68-year old patient, no medical risk factors, non-smoker
- Implant placement with SFE in the left maxilla by a MaxFac surgeon
- Patient is very unhappy, since she has no occlusal contact
- All 3 implants show significant bone loss

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3D radiograph (CBCT)

- Impl 24 has major bone loss
- Impl 26 penetrates into the sinus
- Impl 25 & 26 have been placed too close, both implants have an axis problem

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Basic Principles of Implant Surgery

- Select an appropriate implant type
 - Implant diameter and length
 - Implant shape and surface
- Insert the implant in a correct 3D prosthetic position
 - Restoration-driven Implant placement
 - The implant must achieve primary stability
- The implant must be completely imbedded in healthy bone**
 - Facial and oral bone walls should be at least 1 mm
 - In case of a local bone deficiency → GBR
- The implant should be surrounded by healthy and keratinized mucosa**

The border smooth to micro rough surface (SLA) is always located subcrestally (≥1mm)

The Influence of Bone Thickness on Facial Marginal Bone Response: Stage 1 Placement Through Stage 2 Uncovering

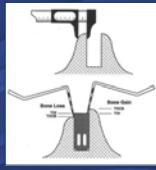
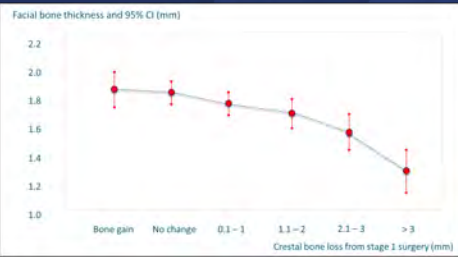
J. Robert Spray,* C. Gary Black,* Harold F. Morris,^{†§} and Shigeru Ochi^{‡§}

* Central Arkansas Veterans Healthcare System, Little Rock, AR; College of Health Related Professions, University of Arkansas for Medical Sciences, Little Rock, AR;
 ‡ Dental Implant Clinical Research Group, VA Medical Center, Ann Arbor, MI
 † Department of Restorative Dentistry, Temple University, School of Dentistry, Philadelphia, PA.
 § University of Otago, School of Dentistry, Dunedin, New Zealand.

Background: Various causes of facial bone loss around dental implants are reported in the literature; however, reports on the influence of residual facial bone thickness on the facial bone response (loss or gain) have not been published. This study measured changes in vertical dimension of facial bone between implant insertion and uncovering and compared these changes to facial bone thickness for more than 3,000 hydroxyapatite (HA)-coated and non-HA-coated root-form dental implants.

Methods: Subjects were predominantly white males, 18 to 80+ years of age (mean 62.9 years), who were patients at 30 Department of Veterans Affairs Medical Centers and two university dental clinics. Alveolar

Facial bone thickness (Spray et al. 2000)



Key Elements for Long-term Success of Dental Implants

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 - Establish the risk profile of the patient
- Choose the correct surgical approach
 - Understand the tissue biology
 - Choose an appropriate implant with a good scientific documentation
- Insert the implant in the correct 3D position and axis
 - Restoration driven implant placement
- Make sure that the implant is fully embedded in bone of sufficient volume
 - In case of a bone deficiency, rebuild the bone with GR or SR
- Make sure to have a wide band of keratinized mucosa (KM)
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Significance of keratinized Mucosa around Implants

- Today, there is consensus that KM is an important prerequisite for long-term success
 - Lin et al. J Periodontol 2013
 - Roccuzzo et al. COIR 2015
- As surgeon, you can always get a band of KM
 - Careful extraction technique
 - Correct incision technique at implant placement or at implant reopening
 - Rarely we do soft tissue grafting to widen KM



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Latest publications to peri-implant keratinized Mucosa

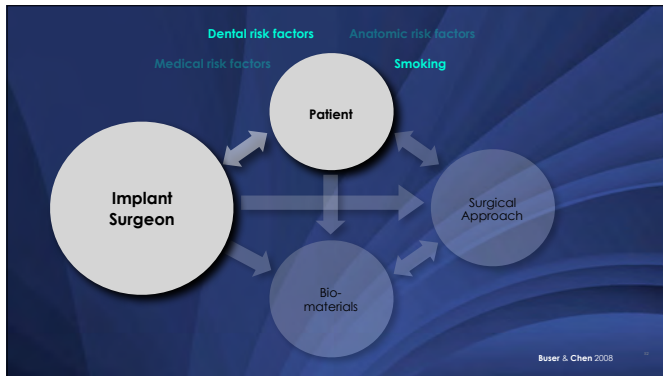
CLINICAL ORAL IMPLANTS RESEARCH	
<p>Review</p> <p>The Significance of Keratinized Mucosa on Implant Health: A Systematic Review</p> <p>Qin-Hua Liu,¹ Huan-Liang Chen,² and Meng-Lay Wang³</p> <p>Conclusion: Based on current available evidence, a lack of adequate KM around endosseous dental implants is associated with more plaque accumulation, tissue inflammation, MR, and AL. <i>J Periodontol</i> 2013;84:1755-1767.</p>	<p>Mario Roccuzzo Giuseppe Cerasola Paola Dall'Acqua</p> <p>Keratinized mucosa around implants in partially edentulous posterior mandible: 10-year results of a prospective comparative study</p> <p>Conclusion: Implants that are not surrounded by KT are more prone to plaque accumulation and REC, even in patients exercising sufficient oral hygiene and receiving adequate supporting periodontal therapy (SPT). In selected cases, particularly in the edentulous posterior mandible, where ridge resorption leads to reduced vestibular depth and lack of KT, additional FGG can be beneficial to facilitate proper oral hygiene procedures.</p>



Key Elements for Long-term Success of Dental Implants

- Careful pre-operative analysis of a given patient
 - ✓ Establish the risk profile of the patient
- Choose the correct surgical approach
 - ✓ Understand the tissue biology
 - ✓ Choose an appropriate implant with a good scientific documentation
- Insert the implant in the correct 3D position and axis
 - ✓ Restoration driven implant placement
- Make sure that the implant is fully embedded in bone of sufficient volume
 - ✓ In case of a bone deficiency, rebuild the bone with GBR or GBR
- Make sure to have a wide band of keratinized mucosa (KM)
 - ✓ If KM is lacking, reestablish it with a soft tissue graft
- Establish an efficient supportive care program with a dental hygienist
 - ✓ Try to convert every patient into a «low risk patient»

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Long-term success: Compliance with supportive care

Ten-year results of a three-arm prospective cohort study on implants in periodontally compromised patients. Part I: Implant loss and radiographic bone loss

Roccuzzo M. et al. - Clin Oral Implants Res 2010

	Regular supportive care	Number of subjects	Subjects with implant loss	Subjects with perimplant bone loss ≥ 3 mm
Periodontal health	No	4	0/4	0/4
	Yes	24	2/24	2/24
Moderate periodontitis	No	11	5/11	7/11
	Yes	26	1/26	3/26
Advanced periodontitis	No	7	4/7	4/7
	Yes	29	3/29	7/29

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Provided by Prof. Saki



You have requested the following article:

Association of Preventive Maintenance Therapy Compliance and Peri-implant Diseases: A Cross-Sectional Study
Alberto Monje, Hom-Lay Wang, and José Hart
Journal of Periodontology, Vol. 81, No. 1, Pages 1-15
<https://doi.org/10.1902/jor.2010.130103>

Association of Preventive Maintenance Therapy Compliance and Peri-implant Diseases: A Cross-Sectional Study
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Aim: This study was aimed at investigating the association between peri-implant maintenance therapy (PMT) and the frequency of peri-implant diseases, and to further identify the factors that contribute to failure of PMT compliance.

Material and methods: A cross-sectional study on healthy partial edentulous patients was conducted. These were grouped in the following categories according to the PMT compliance: regular compliers (RC) (≥ 2 PMT/year), erratic compliers (EC) (< 2 PMT/year), and non-compliers (NC) (0 PMT/year). Radiographic and clinical analyses were carried out including probing pocket depth (PPD), plaque index (PI), bleeding on probing (BOP), mucosal redness (MR), supuration (SUP), keratinized mucosa dimension (KM) and marginal bone loss (MBL). A multiple logistic regression model was estimated at implant- and patient-level to obtain the adjusted odds ratios and to control the possible confounding effects among variables.

Results: Overall, 206 implants in 115 patients fulfilled the inclusion criteria. At patient-level, it was shown that the association between compliance and the peri-implant condition was statistically significant ($p=0.043$). Compliance was associated with 30% less conditions of peri-implantitis. The probability of PMT compliance was substantially associated with the frequency of peri-implantitis (OR=0.13, $p=0.009$). Patients with history of periodontal disease multiplied their probability of being EC (vs. NC) 4.23 times with respect to not having history of periodontal disease ($p=0.022$). Moreover, light smokers significantly resulted to be MC when compared to RC ($p=0.043$) and EC ($p=0.018$). Nevertheless, mucositis did not find to be statistically associated with the level of compliance. In addition, PPD, PI, BOP, MR and S significantly varied according to the PMT compliance and peri-implant condition.

Conclusions: Peri-implant maintenance compliance ≥ 2 PMT/year seems to be crucial to prevent peri-implantitis in healthy patients. Furthermore, history of periodontal disease and disease severity as well as extensiveness and smoking appear to be factors that influence the compliance risk profile (NCT02789306).

KEYWORDS: peri-implantitis, mucositis, dental implants, maintenance, oral hygiene, tobacco

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Supportive Care Program and Oral Hygiene

- The dentist must keep the patient in a supportive care program
- The frequency of recall visits depends on the patient's risk profile
 - ✓ Every 6 months in patients with a standard risk profile
 - ✓ Every 3 to 4 months in patients with increased risks (heavy smokers, perio patients, diabetes etc.)

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