UNIVERSITY OF FLORIDA

Center for Implant Dentistry

Restorative Driven Implant Dentistry: Diagnosis, Planning & Techniques for Success

Dr. Will Martin
Gainesville, FL

October 2012

Disclosures

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Center for Implant Dentistry

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Disclosures

Affiliations

- ITI - International Team for Implantology
- The Straumann Company

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ITI International Team for Implantology

www.iti.ch

Course Introduction

Course Introduction

Keys to Esthetic Success

- Patient selection
- Restoration-driven planning
- Site enhancement procedures
- 3-dimensional implant placement
- Shaping of the "transition zone"
- Optimal laboratory communication:
  - shade selection
  - impression procedures
  - material selection
- Delivery and maintenance

Keys to Esthetic Success

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  - impression procedures
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- Delivery and maintenance

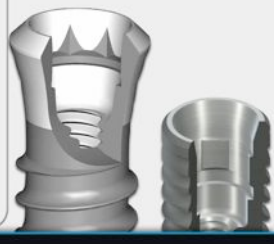
Course Agenda

Esthetic Risk Factors | Low | Medium | High

- **Keys to Restorative Success:**
  - **Patient Selection**

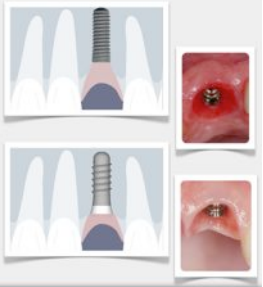
Course Agenda

- **Keys to Restorative Success:**
  - Patient Selection
  - **Prosthetic-Based Implant Indications**



Course Agenda

- **Keys to Restorative Success:**
  - Patient Selection
  - Prosthetic-Based Implant Indications
  - **Managing the Transition Zone**



Course Agenda

- **Keys to Restorative Success:**
  - Patient Selection
  - Prosthetic-Based Implant Indications
  - Managing the Transition Zone
  - **Patient Examples - Single & Adjacent**

Course Agenda

- Keys to Restorative Success:
  - Patient Selection
  - Prosthetic-Based Implant Indications
  - Managing the Transition Zone
  - Patient Examples - Single & Adjacent
- **Dental Photography**

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Our Practice Philosophy

Practice Philosophy (1):

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Center for Implant Dentistry

"Teams out-perform individuals! Especially when performance requires multiple skills, judgment and expertise".

- John Glenn - US Astronaut

Practice Philosophy (1): TEAM Approach

- Jim Ruskin - Emma Lewis - Dean Morton - James Green - Luiz Rueda - Frank Lozano - Dawn Martin - Page Jacobson - Tim Wheeler - Cal Dolche - Mitchell Jim - James Clarke - Steve Cole - Cecilia Donofrio - Lazlo Molnar - Luiz Gonzaga - Roy Rosado - Arne Boeckler - Deanna Hardee - Hidekazu Hayashi - Nick DeTure - Cal King - Ernie Moebius - Functional Esthetics - Michael Patras - Neel Patel - Glenn Dean - Ailsa Nicol - Alachua Dental Lab - Zahra Rashid - Glynn Watts - Heather Stowell

Practice Philosophy (1): TEAM Approach

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Practice Philosophy (2):

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Restoration-driven planning and placement of dental implants.

You wouldn't build a home without a blue-print would you?

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Consultation Visit: Patient Evaluation

Diagnostics

- Dental Health Status
- Restorability
- Soft tissue evaluation
- Hard tissue evaluation
- Anatomical structures of concern
- Inter-arch relationship and space availability

Diagnostics

- Dental Health Status:
  - Restorative
  - Endodontic
  - Periodontal
  - Occlusal

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Ellegaard et. al. 1997, Korman et. al. 1997, Nieri et. al 2002, Karoussis et. al. 2003, Feloutzis et. al. 2003, Shimpuku et. al. 2003, Grucia et. al. 2004

Diagnostics
Partially Edentulous

- Restorability:

Diagnostics
Partially Edentulous

- Restorability:

Diagnostics
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Diagnostics
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- Restorability:

Diagnostics

Partially Edentulous

- Restorability:

Diagnostics

Partially Edentulous

- Soft tissue evaluation:
  - excess or deficit

Diagnostics

Partially Edentulous

- Soft tissue evaluation:
  - excess or deficit

Diagnostics

Partially Edentulous

- Soft tissue evaluation:
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Diagnostics

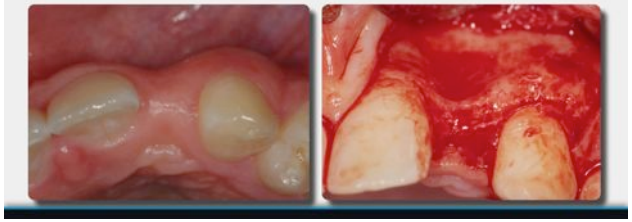
Partially Edentulous

- Soft tissue evaluation:
  - excess or deficit

Diagnostics

Partially Edentulous

- Hard tissue evaluation:
  - vertical and horizontal alveolar bone dimensions



Diagnostics

Partially Edentulous

- Hard tissue evaluation:
  - vertical and horizontal alveolar bone dimensions

Diagnostics

Partially Edentulous

- Anatomical structures of concern

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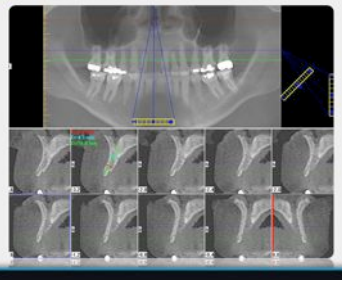


Diagnostics

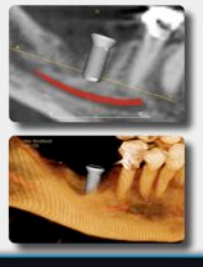
Partially Edentulous

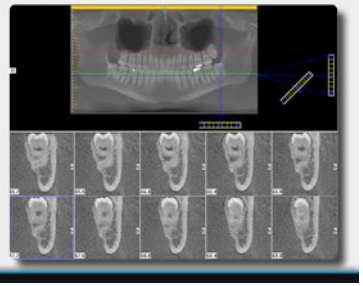
- Anatomical structures of concern

Diagnostics

Partially Edentulous

- Anatomical structures of concern





Diagnostics

Partially Edentulous

- Inter-arch relationship and space availability

Diagnostics

Partially Edentulous

- Inter-arch relationship and space availability

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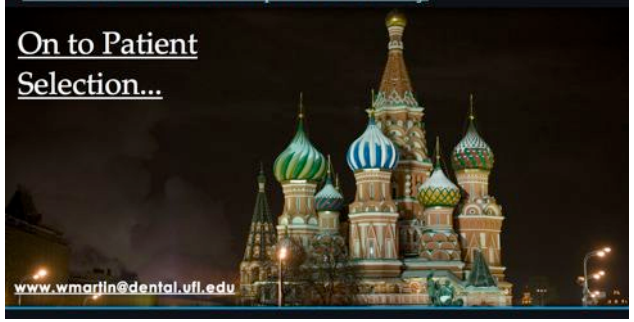
Diagnostics

Partially Edentulous

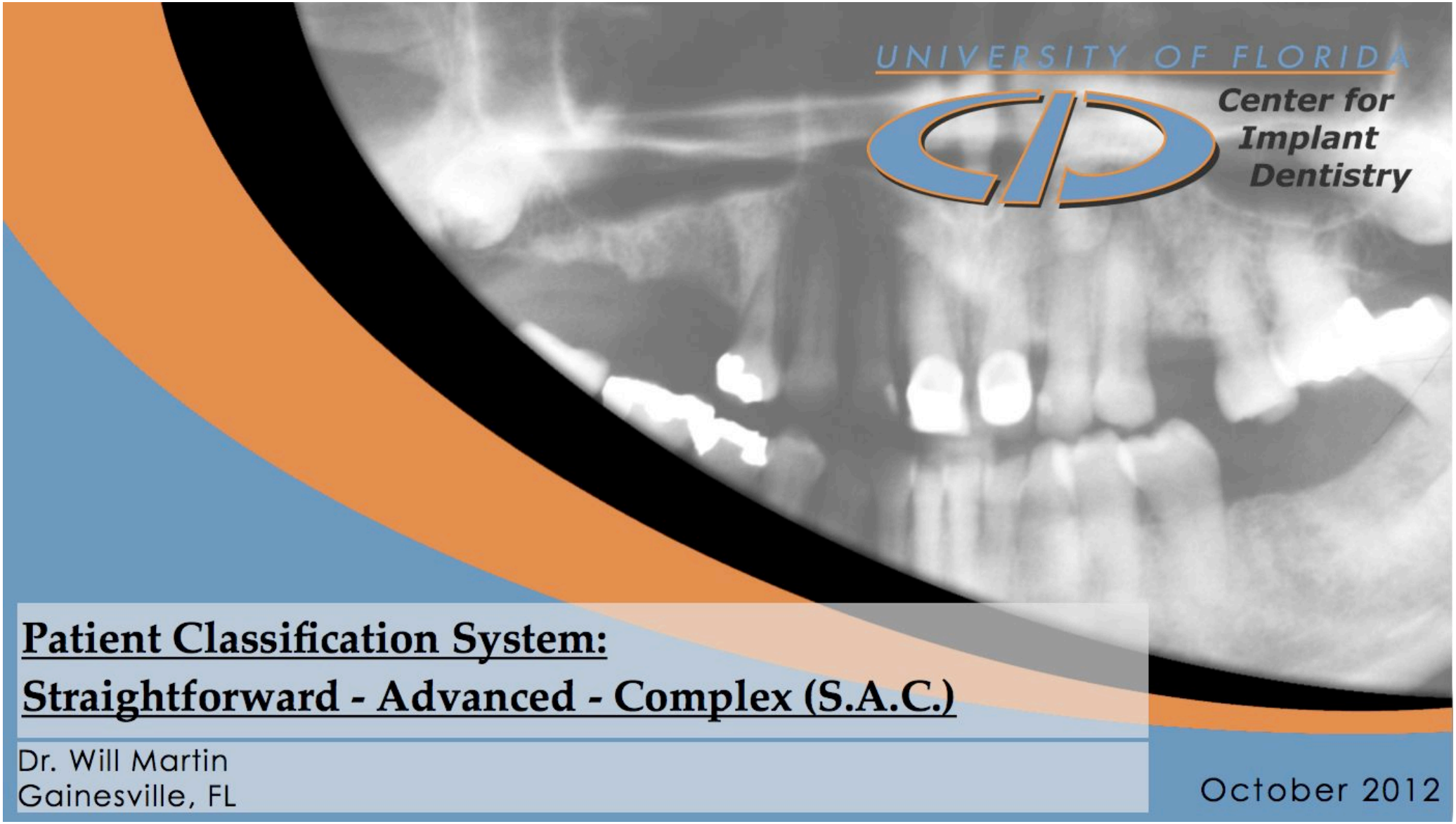
- Inter-arch relationship and space availability

Restorative Driven Implant Dentistry

On to Patient Selection...



www.wmarlin@dental.ufl.edu



Patient Classification System: Straightforward - Advanced - Complex (S.A.C.)

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Clinical Situations...anterior partially edentulous

Clinical Situations...anterior partially edentulous

Clinical Situations...anterior partially edentulous

Clinical Situations...anterior partially edentulous

Clinical Situations...anterior partially edentulous

Clinical Situations...posterior partially edentulous

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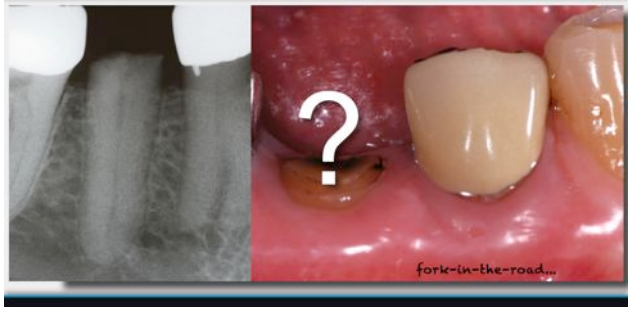


Clinical Situations...posterior partially edentulous

fork-in-the-road...

Clinical Situations...posterior partially edentulous

fork-in-the-road...

Clinical Situations...posterior partially edentulous

Clinical Situations...posterior partially edentulous

limited restorative space

Patient Treatment Classification

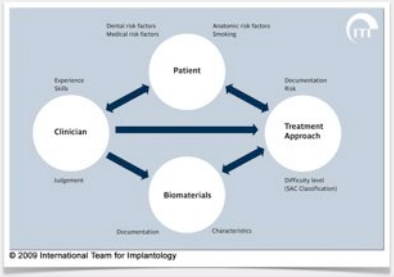
Swiss Society for Oral Implantology - 1999

- Established a patient classification system for selecting treatment based upon categories:
  - Simple
  - Advanced
  - Complex
- The SAC Classification had both surgical and restorative categories
- Basic classification system with many areas that were incomplete
- Established a good foundation to build upon

Treatment Classification

- ITI Conference - March 2007
- Multi-disciplinary group of 28 clinicians
- Publication of the proceedings
- **Aim** - provide guidelines for various types of restorative and surgical cases based upon a system referred to as:
  - **Straightforward (S)**
  - **Advanced (A)**
  - **Complex (C)**

Four Factors Influencing Outcomes



Chen & Buser 2008

Determinants of Classification

Determinants of Classification

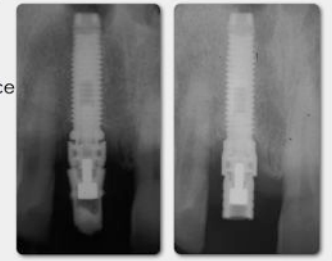
- Esthetic vs. Non-Esthetic Sites

Determinants of Classification

- Esthetic vs. Non-Esthetic Sites
- Complexity of the process

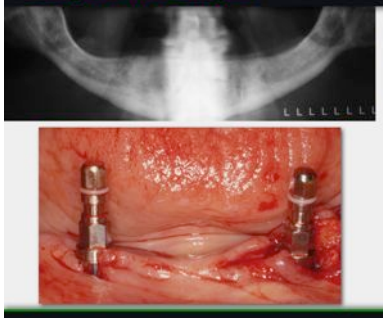
Determinants of Classification

- Esthetic vs. Non-Esthetic Sites
- Complexity of the process
- Risk of Complications
  - Competence & Experience



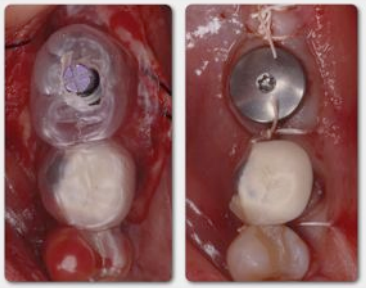
Normative Classification

Straightforward - Surgical



- Adequate Bone
- Low Esthetic Risk
- Mandible:
  - single sites
  - distal extensions
  - extended edentulous
  - edentulous 2-4 implants

Straightforward - Surgical



- Adequate Bone
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  - single sites
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Straightforward - Restorative

- Adequate space
- Low Esthetic Risk
- Single sites
- Extended edentulous
- Over-dentures

Straightforward - Restorative

- Adequate space
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Straightforward - Restorative

- Adequate space
- Low Esthetic Risk
- Single sites
- Extended edentulous
- Over-dentures

Advanced - Surgical

- Variable Esthetic Risk
- Immediate Implants
- Adequate Bone:
  - Max. edent. - Rem.
  - Max. distal extension
  - Max. extended (NE)
  - Max. single sites
- Inadequate Bone:
  - Mand. single
  - Max. single
  - Mand. extended
  - Max. extended (NE)
- (NE) = non-esthetic

Advanced - Surgical

- Variable Esthetic Risk
- Immediate Implants
- Adequate Bone:
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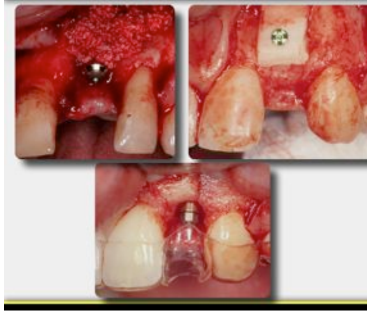
Advanced - Surgical



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  - Mand. single
  - Max. single
  - Mand. extended
  - Max. extended (NE)
- (NE) = non-esthetic

Advanced - Restorative

- Med. Esthetic Risk
- Maxilla:
  - Single sites (EZ)
  - Over-denture
- Mandible:
  - Over-denture
  - Fixed detachable
  - Single sites (EZ)

  - (EZ) = esthetic zone

Advanced - Restorative

- Med. Esthetic Risk
- Maxilla:
  - Single sites (EZ)
  - Over-denture
- Mandible:
  - Over-denture
  - Fixed detachable
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Advanced - Restorative

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  - Over-denture
- Mandible:
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  - Fixed detachable
  - Single sites (EZ)

  - (EZ) = esthetic zone

Complex - Surgical

- Variable Esthetic Risk
- Immediate Implants
- Adequate Bone:
  - Max. edent. - fixed
  - Max. extended - (EZ)
- Inadequate Bone:
  - Mand. edent.
  - Max. edent.
  - Max. extended (EZ)

  - (EZ) = esthetic zone

Complex - Surgical

- Variable Esthetic Risk
- Immediate Implants
- Adequate Bone:
  - Max. edent. - fixed
  - Max. extended - (EZ)
- Inadequate Bone:
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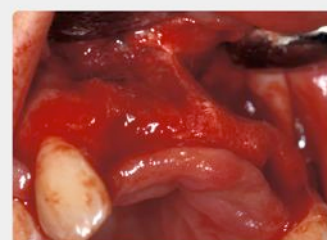
  - Max. edent.
  - Max. extended (EZ)

  - (EZ) = esthetic zone

Complex - Surgical



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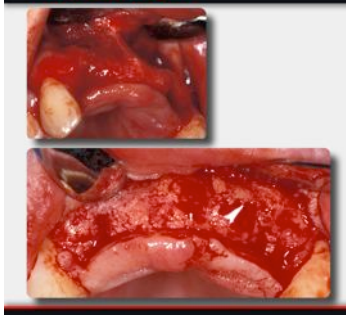
Complex - Surgical



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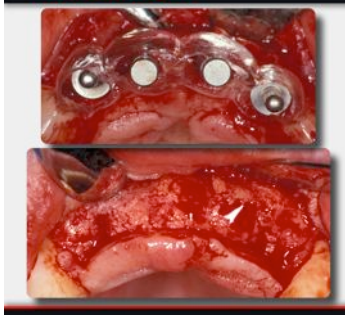
Complex - Surgical



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  - Max. edent.
  - Max. extended (EZ)
- (EZ) = esthetic zone

Complex - Restorative

- High Esthetic Risk
- Maxilla:
  - Fixed-detachable
  - Extended
  - FDP's
  - Immediate loading

Complex - Restorative

- High Esthetic Risk
- Maxilla:
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- High Esthetic Risk
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  - Extended
  - FDP's
  - Immediate loading

Modifying Factors

Modifying Factors

- **General**
  - Patient's Health Situation
  - Growth Considerations

Risk Factor	Remarks
Medical	• Severe bone disease causing impaired bone healing • Immunological disease • Medication with steroids • Uncontrolled diabetes mellitus • Irradiated bone • Others
Periodontal	• Active periodontal disease • History of refractive periodontitis • Genetic predisposition
Oral Hygiene/ Compliance	• Home care measured by gingival indices • Personality, intellectual aspects
Occlusion	• Bruxism

Buser et al. 2004

Modifying Factors

- **General**
  - Patient's Health Situation
  - Growth Considerations
  - Potential for Complications

Buser et al. 2004

Modifying Factors

- **General**
  - Patient's Health Situation
  - Growth Considerations
  - Potential for Complications

Buser et al. 2004

Modifying Factors

- Esthetic

Esthetic Risk Factor	Level of Risk		
	Low	Moderate	High
Medical status	Healthy, co-operative patient with an intact immune system.		Reduced immune system
Smoking habit	Non-smoker	Light smoker (< 10 cigs/day)	Heavy smoker (> 10 cigs/day)
Patient's esthetic expectations	Low	Medium	High
Lip line	Low	Medium	High
Gingival biotype	Low scalloped, thick	Medium scalloped, medium thick	High scalloped, thin
Shape of tooth crowns	Rectangular		Triangular
Infection at implant site	None	Chronic	Acute
Bone level at adjacent teeth	≤ 5 mm to contact point	5.5 to 6.5 mm to contact point	≥ 7 mm to contact point
Restorative status of neighboring teeth	Virgin		Restored
Width of edentulous span	1 tooth (≥ 7 mm)	1 tooth (≤ 7mm)	2 teeth or more
Soft tissue anatomy	Intact soft tissue		Soft tissue defects
Bone anatomy of alveolar crest	Alveolar crest without bone deficiency	Horizontal bone deficiency	Vertical bone deficiency

Martin et al. 2006

Modifying Factors

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The goal of risk assessment is to identify patients whose implant therapy carries a high risk of a negative outcome.

Martin et al. 2006

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We will cover this in more detail in an upcoming section.

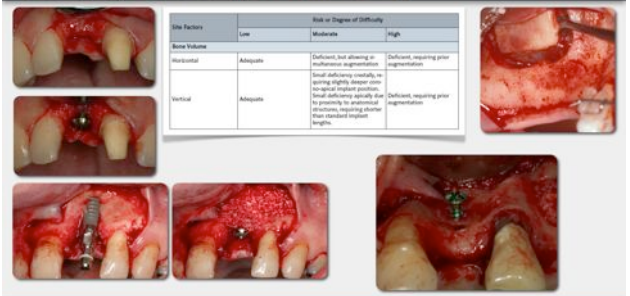
Martin et al. 2006

Modifying Factors - Surgical

Site Factors	Risk or Degree of Difficulty		
	Low	Moderate	High
Bone Volume			
Horizontal	Adequate	Deficient, but allowing simultaneous augmentation	Deficient, requiring prior augmentation
Vertical	Adequate	Small deficiency crestally, requiring slightly deeper coronal-apical implant position. Small deficiency apically due to proximity to anatomical structures, requiring shorter than standard implant lengths.	Deficient, requiring prior augmentation
Anatomic Risk			
Proximity to vital anatomic structures	Minimal risk of involvement	Moderate risk of involvement	High risk of involvement
Esthetic Risk			
Esthetic zone	No		Yes
Biotype	Thick		Thin
Thickness of facial bone wall	sufficient ≥ 1 mm		insufficient < 1 mm
Complexity			
Number of prior or simultaneous procedures	Implant placement without adjunctive procedures	Implant placement with simultaneous procedures	Implant placement with staged procedures
Complications			
Risk of surgical complications	Minimal	Moderate	High
Consequences of complications	No adverse effect	Suboptimal outcome	Severely compromised outcome

Modifying Factors - Surgical - Limited Opening

Modifying Factors - Surgical - Bone Volume



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Modifying Factors - Surgical - Anatomic Risk

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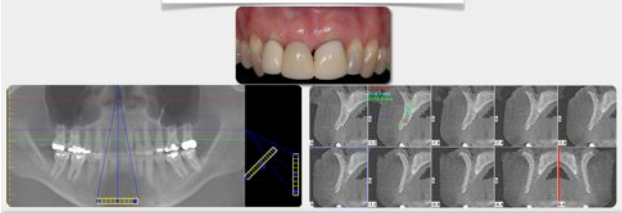

Modifying Factors - Surgical - Esthetic Risk

Site Factors	Risk or Degree of Difficulty		
	Low	Moderate	High
Esthetic Risk			
Esthetic zone	No		Yes
Biotype	Thick		Thin
Thickness of facial bone wall	sufficient ≥ 1 mm		insufficient < 1 mm

Modifying Factors - Restorative

Issue	Notes	Degree of Difficulty		
		Low	Moderate	High
Oral Environment				
General oral health		No active disease		Active disease
Condition of adjacent teeth		Restored teeth		Virgin teeth
Reason for tooth loss		Caries/Trauma		Periodontal disease or occlusal parafunction
Restorative Volume				
Inter-arch distance	Refers to the distance from the proposed implant restorative margin to the opposing occlusion	Adequate for planned restoration	Restricted space, but can be managed	Adjunctive therapy will be necessary to gain sufficient space for the planned restoration
Mesio-distal space	The arch length available to fit tooth replacements	Sufficient to fit replacements for missing teeth	Some reduction in size or number of teeth will be necessary	Adjunctive therapy will be needed to achieve a satisfactory result
Span of restoration		Single tooth	Extended edentulous space	Full arch
Volume and characteristics of the edentulous saddle	Refers to whether there is sufficient tissue volume to support the final restoration, or some prosthetic replacement of soft tissues will be necessary.	No prosthetic soft tissue replacement will be necessary		Prosthetic replacement of soft tissue will be needed for esthetics or phonetics

Modifying Factors - Restorative - Environment

Issue	Notes	Degree of Difficulty		
		Low	Moderate	High
Oral Environment				
General oral health		No active disease		Active disease
Condition of adjacent teeth		Restored teeth		Virgin teeth
Reason for tooth loss		Caries/Trauma		Periodontal disease or occlusal parafunction

Modifying Factors - Restorative - Environment

Issue	Notes	Degree of Difficulty		
		Low	Moderate	High
Restorative Volume				
Inter-arch distance	Refers to the distance from the proposed implant restorative margin to the opposing occlusion	Adequate for planned restoration	Restricted space, but can be managed	Adjunctive therapy will be necessary to gain sufficient space for the planned restoration

Modifying Factors - Restorative - Environment

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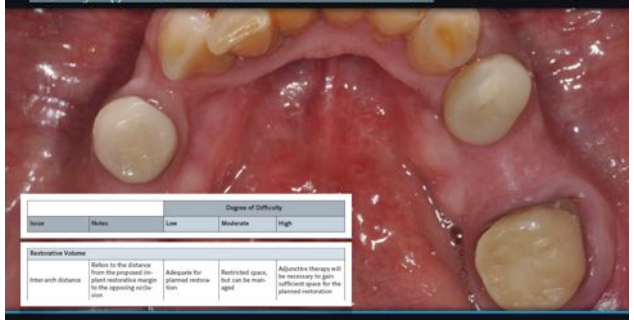
Modifying Factors - Restorative - Environment



Issue	Notes	Degree of Difficulty		
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Inter-arch distance	Refers to the distance from the proposed implant restorative margin to the opposing occlusion	Adequate for planned restoration	Restricted space, but can be managed	Adjunctive therapy will be necessary to gain sufficient space for the planned restoration

Modifying Factors - Restorative - Environment

Issue	Notes	Degree of Difficulty		
		Low	Moderate	High
Span of restoration		Single tooth	Extended edentulous space	Full arch

Modifying Factors - Restorative - Environment

Issue	Notes	Degree of Difficulty		
		Low	Moderate	High
Volume and characteristics of the edentulous saddle	Refers to whether there is sufficient tissue volume to support the final restoration, or some prosthetic replacement of soft tissues will be necessary.	No prosthetic soft tissue replacement will be necessary		Prosthetic replacement of soft tissue will be needed for esthetics or phonetics

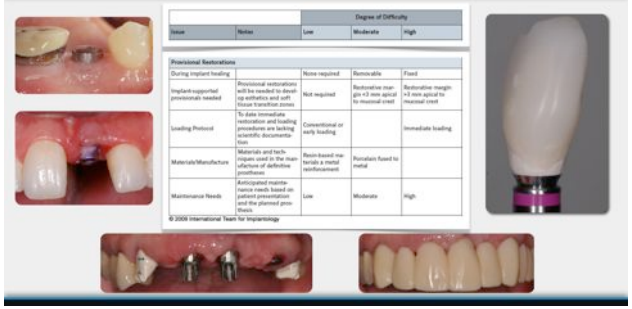
Modifying Factors - Restorative

Issue	Notes	Degree of Difficulty		
		Low	Moderate	High
Occlusion				
Occlusal scheme		Anterior guidance		No guidance
Involvement in occlusion	The degree to which the implant prosthesis is involved in the patient's occlusal scheme	Minimal involvement		Implant restoration is involved in guidance
Occlusal parafunction	Risk of complication to the restoration, but not to implant survival	Absent		Present
Provisional Restorations				
During implant healing		None required	Removable	Fixed
Implant-supported provisionals needed	Provisional restorations will be needed to develop esthetics and soft tissue transition zones	Not required	Restorative margin <3 mm apical to mucosal crest	Restorative margin >3 mm apical to mucosal crest
Loading Protocol	To date immediate restoration and loading procedures are lacking scientific documentation	Conventional or early loading		Immediate loading
Materials/Manufacture	Materials and techniques used in the manufacture of definitive prostheses	Resin-based materials a metal reinforcement	Porcelain fused to metal	
Maintenance Needs	Anticipated maintenance needs based on patient presentation and the planned prosthesis	Low	Moderate	High

Modifying Factors - Restorative - Occlusion

Issue	Notes	Degree of Difficulty		
		Low	Moderate	High
Occlusion				
Occlusal scheme		Anterior guidance		No guidance
Involvement in occlusion	The degree to which the implant prosthesis is involved in the patient's occlusal scheme	Minimal involvement		Implant restoration is involved in guidance
Occlusal parafunction	Risk of complication to the restoration, but not to implant survival	Absent		Present

Modifying Factors - Restorative - Provisional Restorations



Issue	Notes	Degree of Difficulty: Low	Moderate	High
Provisional Restorations				
During implant healing		None required	Removable	Fixed
Implant-supported provisionals needed	Provisional restorations will be needed to develop esthetics and soft tissue transition zones	Not required	Restorative margin ≤3 mm apical to mucosal crest	Restorative margin >3 mm apical to mucosal crest
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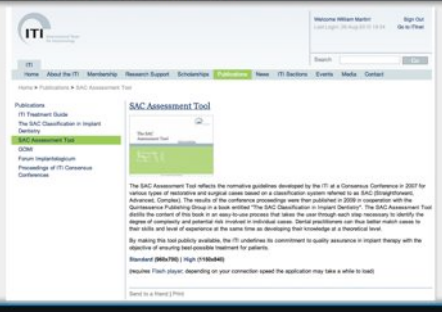
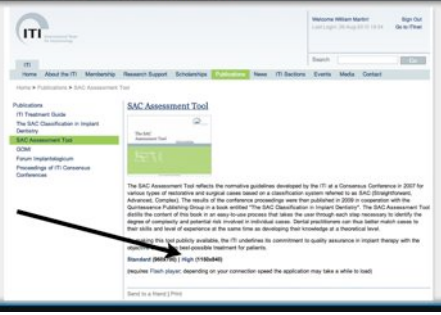
Interactive SAC Assessment

www.iti.ch - International Team for Implantology - Website

www.iti.ch - SAC Assessment Tool

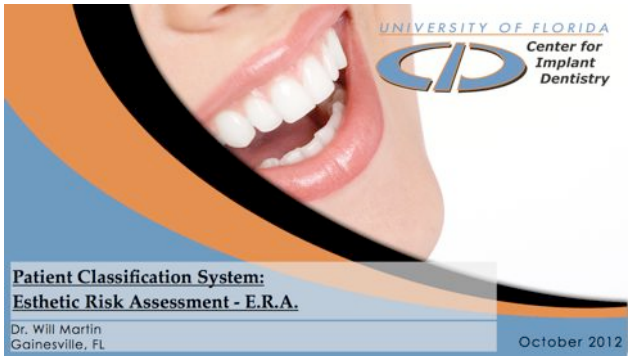


www.iti.ch - SAC Assessment Tool



Patient 1 - Single tooth replacement - esthetic zone

Patient 1 - Restorative Assessment



Understanding, communicating and addressing these anatomical limitations prior to initiating implant therapy can help to prevent negative situations.

Esthetic Restorations: Teeth vs. Implants

Esthetic Restorations: Teeth vs. Implants

Introduction of:

- existing tissue anatomy
- limitations to augmentation
- effects of implant biology
- tissue manipulation
- implant components
- patient demands...

What defines an implant rehabilitation as esthetic?

ITI Consensus Conference: Gstaad, Switzerland 2003

ITI Consensus Statements - IJOMI 2004, Vol. 19, Supplement

Outcome Analysis of Implant Restorations Located in the Anterior Maxilla: A Review of the Recent Literature

Urs C. Belser, DMD, Prof Dr Med Dent[1]/Bruno Schmid, DMD[2]/Frank Higginbottom, DMD[3]/ Daniel Buser, DMD, Prof Dr Med Dent[4]

ITI Consensus Conference: Gstaad, Switzerland 2003

ITI Consensus Statements - IJOMI 2004, Vol. 19, Supplement

Consensus Conference Proceedings

Outcome Analysis of Implant Restorations Located in the Anterior Maxilla: A Review of the Recent Literature

Definition of standards for an esthetic, fixed implant restoration

ITI Consensus Conference: Gstaad, Switzerland 2003

ITI Consensus Statements - IJOMI 2004, Vol. 19, Supplement

An implant prosthesis that is in harmony with the peri-oral facial structures of the patient.

Definition of standards for an esthetic, fixed implant restoration

ITI Consensus Conference: Gstaad, Switzerland 2003

ITI Consensus Statements - IJOMI 2004, Vol. 19, Supplement

Esthetic peri-implant tissues including: health, height, volume, color and contours in harmony with the healthy surrounding dentition.

Definition of standards for an esthetic, fixed implant restoration

ITI Consensus Conference: Gstaad, Switzerland 2003

ITI Consensus Statements - IJOMI 2004, Vol. 19, Supplement

A restoration that imitates the natural appearance of the missing dental unit(s) in color, form, texture, size and optical properties.

Definition of standards for an esthetic, fixed implant restoration

Patient's Perspective:

Esthetic - Function - Confidence - Maintenance

Patient's Perspective:

Esthetic - Function - Confidence - Maintenance

4-years

Monday morning consultation...

- Healthy
- Hx. of trauma
- 1 attempted hard tissue graft

Esthetic Risk Assessment

Determining Esthetic Risk

The goal of risk assessment is to identify patients whose implant therapy carries a high risk of a negative outcome.

ITI Treatment Guide - Vol. 1 Publication

Implant Therapy in the Esthetic Zone: Single-Tooth Replacements

Editors: D. Buser, U. Belser, D. Wismeijer

Esthetic Risk Factors	Low	Medium	High
Medical status	Healthy		Compromised
Smoking habit	Non-smoker	<10 cig/day	>10 cig/day
Patient's esthetic expectation	Low	Medium	High
Lip line	Low	Medium	High
Gingival biotype	Thick	Medium	Thin
Shape of tooth crowns	Rectangular		Triangular
Infection at implant site	None	Chronic	Acute
Bone level at adjacent teeth	≤ 5 mm to CP	5.5-6.5 mm to CP	≥ 7 mm to CP
Restorative status of neighboring teeth	Virgin		Restored
Width of edentulous span	1 tooth ideal	1 tooth tight	2 teeth or more
Soft-tissue anatomy	Intact soft tissue		Soft tissue defect
Bone anatomy of alveolar crest	Defect absent	Horizontal defect	Vertical defect

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Planning - General Risk Assessment

General Risk Factors for Implant Therapy:

- *Medical:*
  - Impaired healing, Immunologic diseases, medications, uncontrolled diabetes mellitus, irradiated bone, others.
- *Periodontal:*
  - Active periodontal disease, hx. of refractory periodontitis, genetic disposition
- *Oral Hygiene/Compliance:*
  - Home care, personality, intellectual aspects.
- *Occlusion:*
  - Bruxism

Buser and coworkers, 2004

Esthetic Risk Factors	Low	Medium	High
Medical status	Healthy		Compromised
Smoking habit	Non-smoker	<10 cig/day	>10 cig/day

Heitz-Mayfield LJ, Huynh-Ba G. IJOMI 2009

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
Patient's esthetic expectation	Low	Medium	High

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

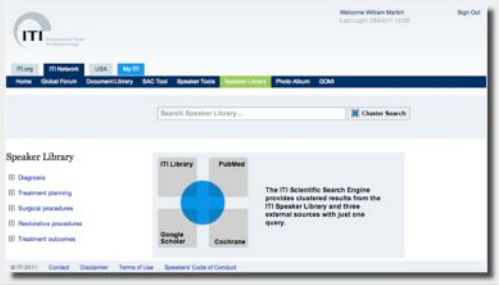
Esthetic Risk Factors	Low	Medium	High
Lip line	Low	Medium	High

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

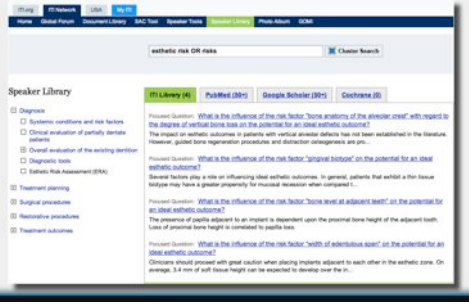
Esthetic Risk Factors	Low	Medium	High
Gingival biotype	Thick	Medium	Thin

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

ITI Curriculum Project



ITI Curriculum Project



"soft-tissue biotype and its influence on esthetic outcomes"

keywords: biotype and implants, phenotype and implants

Lindhe J, Berglundh T. (1998)., **Sanavi F, Weisgold AS, Rose LF. (1998).**, Weber HP, Cochran DL.(1998)., **Kan JY, Rungcharassaeng K, Umezu K, Kois JC. (2003).**, Baillie B. (2004)., Kois JC. (2004)., Kan JY, Rungcharassaeng K, Lozada JL. (2005)., Lee DW, Park KH, Moon IS. (2005)., De Kok IJ, Chang SS, Moriarty JD, Cooper LF.(2006)., Klinge B, Meyle J. (2006)., Bouri A, Jr., Bissada N, et.al. (2008)., **Evans CD, Chen ST. (2008).**, Kawai ES, Almeida AL. (2008)., **Romeo E, Lops D, et.al. (2008).**, **Zigdon H, Machtei EE. (2008).**

Bold = selected articles

"soft-tissue biotype and its influence on esthetic outcomes"

keywords: biotype and implants, phenotype and implants

< With regards to tissue biotype and the potential for esthetic outcomes, several factors play a role on influencing the outcomes. In general, **thin tissue biotype situations have a greater propensity for mucosal recession** when compared to thick tissue biotypes. Long-term prospective studies on tissue stability and esthetic outcomes are needed. >

Esthetic Risk Factors	Low	Medium	High
Gingival biotype	Thick	Medium	Thin

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
Shape of tooth crowns	Rectangular		Triangular

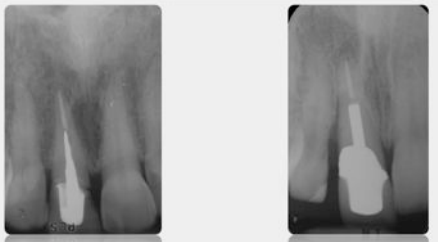
Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
Infection at implant site	None	Chronic	Acute

Lindeboom et. al. 2006, Ellegaard et. al. 1997, Korman et. al. 1997, Nieri et. al 2002, Karoussis et. al. 2003, Felouzis et. al. 2003, Shimpuku et. al. 2003, Grucia et. al. 2004

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
Bone level at adjacent teeth	≤ 5 mm to CP	5.5-6.5 mm to CP	≥ 7 mm to CP



Martin et. al. ITI Treatment Guide, Vol. 1, 2006

"level of inter-proximal bone support"

keywords: "proximal bone levels and implants, bone crest and implants"

Tarnow DP, Magner AW, et.al. (1992)., Weber HP, Buser D, et.al. (1992)., Bragger U, Hafeli U, et.al. (1998)., Chang M, Wennstrom JL, et.al. (1999)., Zybutz M, Rapoport D, et.al. (2000)., **Choquet V, Hermans M, et.al. (2001).,** Hardt CR, Grondahl K, et.al. (2002)., Wyatt CC, Zarb GA. (2002)., Joly JC, de Lima AF, da Silva RC. (2003)., **Kan JY, Rungcharassaeng K, et.al. (2003)., Belser UC, Schmid B, et.al. (2004).,** Hartman GA, Cochran DL. (2004)., Hanggi MP, Hanggi DC, et.al. (2005)., Ryser MR, Block MS, Mercante DE. (2005)., Cardaropoli G, Lekholm U, Wennstrom JL. (2006)., Abreu MH, Bianchini MA, et.al. (2007)., Covani U, Cornelini R, Barone A. (2007)., Hurzeler M, Fickl S, et.al. (2007)., Koutouzis T, Wennstrom JL. (2007)., Botticelli D, Renzi A, Lindhe J, Berglundh T. (2008)., Cappiello M, Luongo R, et.al. (2008)., **Degidi M, Nardi D, Piattelli A. (2008).,** den Hartog L, Slater JJ, et.al. (2008)., Galli F, Capelli M, et.al. (2008)., Jemt T. (2008)., **Lops D, Chiapasco M, et.al. (2008).,** Belser UC, Grutter L, et.al. (2009)., Pikner SS, Grondahl K, et.al. (2009).

Bold = selected articles

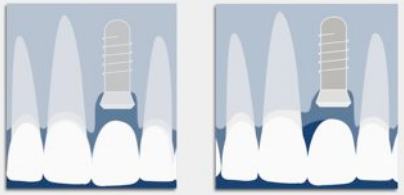
"level of inter-proximal bone support"

keywords: "proximal bone levels and implants, bone crest and implants"

< The level of the inter-proximal papilla of the implant is independent of the proximal bone level next to the implant, but is **related to the inter-proximal bone level next to the adjacent teeth.** >

"level of inter-proximal bone support"

< Two clinical situations that can influence esthetic outcomes: adequate and inadequate proximal bone support on the neighboring tooth. >



Adequate support

Bone loss = Papilla loss

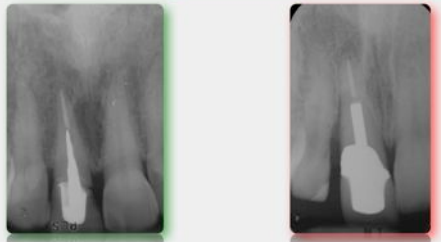
"level of inter-proximal bone support"

< Two clinical situations that can influence esthetic outcomes: adequate and inadequate proximal bone support on the neighboring tooth. >

Adequate support

Bone loss = Papilla loss

Esthetic Risk Factors	Low	Medium	High
Bone level at adjacent teeth	≤ 5 mm to CP	5.5-6.5 mm to CP	≥ 7 mm to CP



Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
Restorative status of neighboring teeth	Virgin		Restored

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
Width of edentulous span	1 tooth ideal	1 tooth tight	2 teeth or more

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

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Martin et. al. ITI Treatment Guide, Vol. 1, 2006

"width of the edentulous span"

keywords: "adjacent implants and esthetics, edentulous span and implants"

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Bold = selected articles

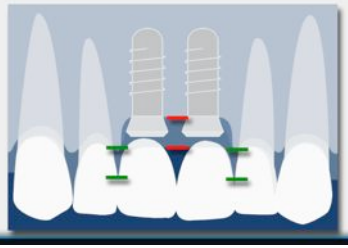
"width of the edentulous span"

keywords: "adjacent implants and esthetics, edentulous span and implants"

< Clinicians should proceed with **great caution when placing two implants adjacent to each other in the esthetic zone**. In most cases, only 2, 3, or 4 mm of soft tissue height **(average 3.4 mm)** can be expected to form over the inter-implant crest of bone. These results showed that modification of treatment plans may be necessary when esthetics are critical for success (Tarnow 2000). >

"width of the edentulous span"

< Loss of interproximal tissue support in extended edentulous spans restored with adjacent implants >



Esthetic Risk Factors	Low	Medium	High
Width of edentulous span	1 tooth ideal	1 tooth tight	2 teeth or more

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
Soft-tissue anatomy	Intact soft tissue		Soft tissue defect

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

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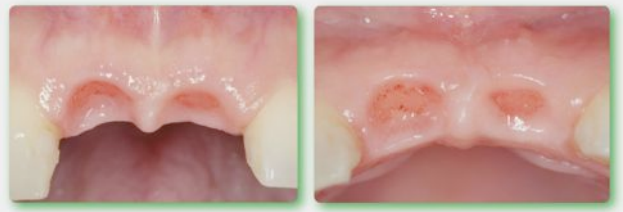
Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
Bone anatomy of alveolar crest	Defect absent	Horizontal defect	Vertical defect



Martin et. al. ITI Treatment Guide, Vol. 1, 2006

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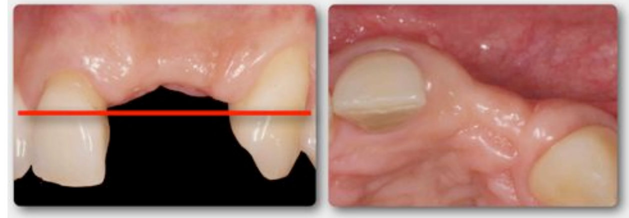

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

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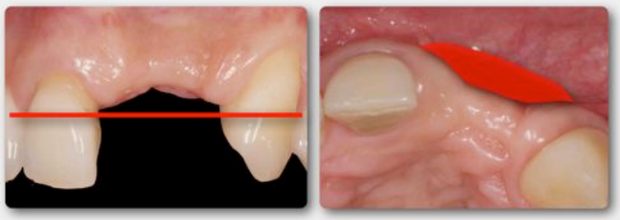

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

"vertical defects in the esthetic zone"

keywords: "vertical augmentation and implants and esthetics, vertical onlay grafts and maxilla, vertical defects and maxilla "

Simion M, Trisi P, et.al. (1994)., Nystrom E, Ahlqvist J, et.al. (1996)., Schliephake H, Neukam FW, et.al. (1997)., Fugazzotto PA. (1998)., Schultze-Mosgau S, Schliephake H, et.al. (2000)., Chiapasco M, Romeo E, et.al. (2001)., McAllister BS. (2001)., Simion M, Jovanovic SA, et.al. (2001)., Cordaro L, Amade DS, et.al. (2002)., **Hammerle CH, Jung RE, et.al. (2002).,** Jensen OT, Cockrell R, et.al. (2002)., Lin Y, Wang X, et.al. (2002)., Fiorellini JP, Nevins ML. (2003)., Reinert S, Konig S, et.al. (2003)., Buser D, Martin W, et.al. (2004)., Chiapasco M, Consolo U, et.al. (2004)., Chiapasco M, Romeo E, et.al. (2004)., Roccuzzo M, Ramieri G, et.al. (2004)., Perry M, Hodges N, et.al. (2005)., Thor A, Wannfors K, et.al. (2005)., Chiapasco M, Lang NP, et.al. (2006)., Chiapasco M, Zaniboni M, et.al.(2006)., **Esposito M, Grusovin MG, et.al. (2006)., Aghaloo TL, Moy PK. (2007).,** Barone A, Covani U. (2007)., Chiapasco M, Brusati R, et.al. (2007)., Chiapasco M, Zaniboni M, et.al. (2007)., Levin L, Nitzan D, et.al. (2007)., Marchetti C, Corinaldesi G, et.al. (2007)., Gunbay T, Koyuncu BO, et.al. (2008)., **Rocchietta I, Fontana F, et.al. (2008)., Saulacic N, Iizuka T, et.al. (2008).,** Barone A, Varanini P, et.al. (2009)., Maestre-Ferrin L, Boronat-Lopez A, et.al. (2009)., Urban IA, Jovanovic SA, et.al. (2009).

Bold = selected articles

"vertical defects in the esthetic zone"

keywords: "vertical augmentation and implants and esthetics, vertical onlay grafts and maxilla, vertical defects and maxilla "

< Guided bone regeneration procedures and distraction osteogenesis can be used to augment bone vertically, but it is **unclear on their influence of esthetic outcomes with regards to implant reconstructions**. More in-depth, long-term, multi-center studies are required to provide further insight into augmentation procedures to support dental implant survival and potential for esthetic outcomes. >

Esthetic Risk Factors	Low	Medium	High
Bone anatomy of alveolar crest	Defect absent	Horizontal defect	Vertical defect

Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
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Martin et. al. ITI Treatment Guide, Vol. 1, 2006

Esthetic Risk Factors	Low	Medium	High
Medical status	Healthy		Compromised
Smoking habit	Non-smoker	<10 cig/day	>10 cig/day
Patient's esthetic expectation	Low	Medium	High
Lip line	Low	Medium	High
Gingival biotype	Thick	Medium	Thin
Shape of tooth crowns	Rectangular		Triangular
Infection at implant site	None	Chronic	Acute
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Martin et. al. ITI Treatment Guide, Vol. 1, 2006

L H

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Monday morning consultation...

- Healthy
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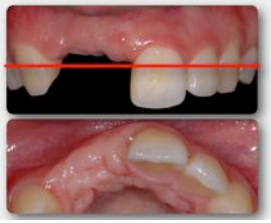
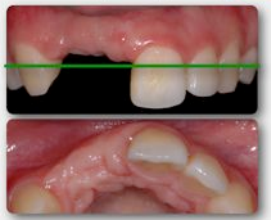
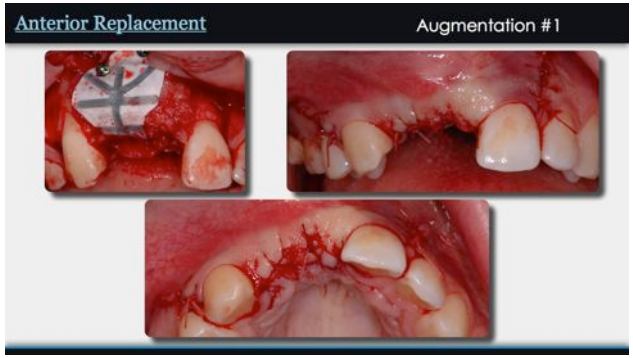
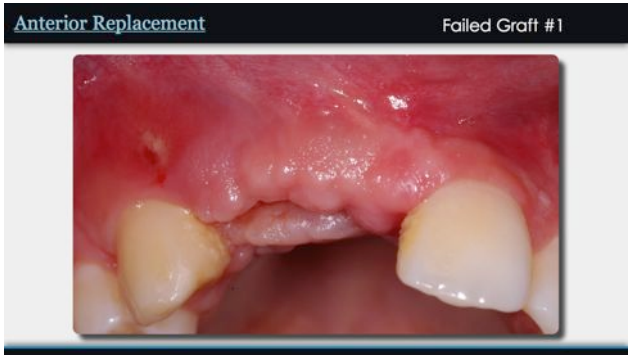


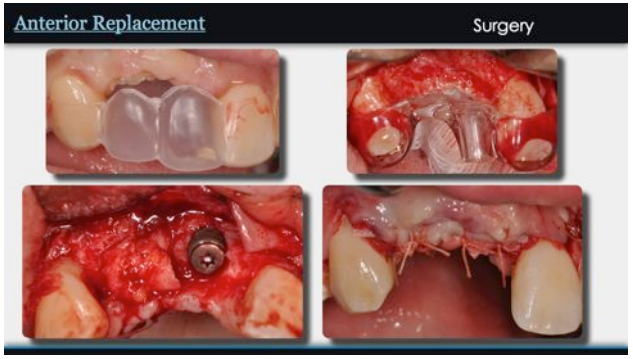


Anterior Replacement


Anterior Replacement
Augmentation #1


Anterior Replacement
Failed Graft #1

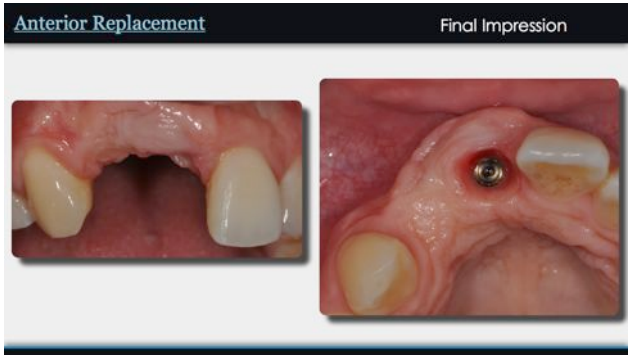

Anterior Replacement
Recovery Outcome


Anterior Replacement
Surgery


Anterior Replacement
Loading


Anterior Replacement
6-weeks


Anterior Replacement
6-months


Anterior Replacement
Final Impression

Anterior Replacement — Final Impression

Anterior Replacement — Framework Try-in

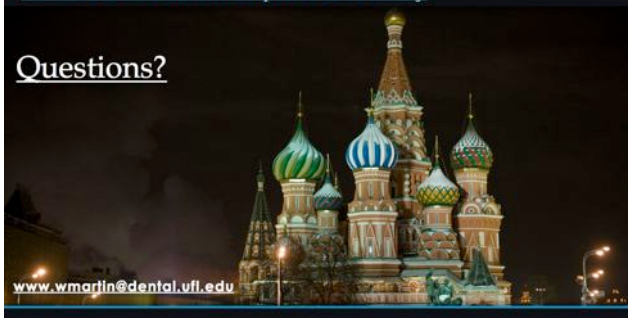
Anterior Replacement — Gradia Modification

Anterior Replacement — Final - Screw-retained Prosthesis

Anterior Replacement — Final - Screw-retained Prosthesis

Restorative Driven Implant Dentistry

Questions?



UNIVERSITY OF FLORIDA

Center for Implant Dentistry

Understand Your Tools of the Trade: Prosthetic Based Implant Classification

Dr. Will Martin
Gainesville, FL

October 2012

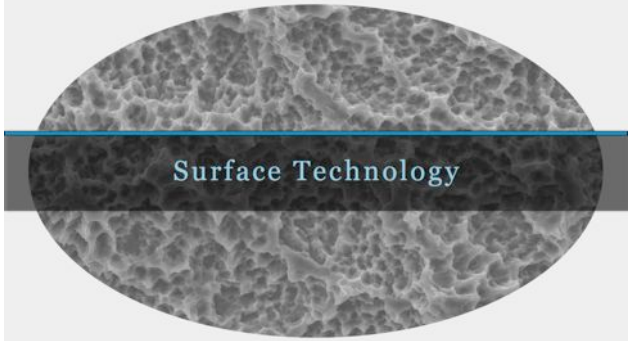
Know your "Tools of the Trade"

Prosthetic Based Implant Classification

Tools of the Trade

- Know your implant system:
  - Implant design
  - Biology (surface, micro-gap, etc...)
  - Implant Dimensions
    - restorative - platform
    - surgical - body
  - Instruments
  - Components

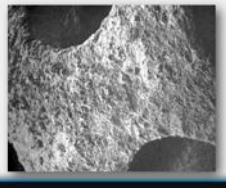
Roxolid™



My Journey with the Straumann® Dental Implant System 1996*

Soft Tissue Level Implant

TPS - Titanium Plasma Sprayed Surface

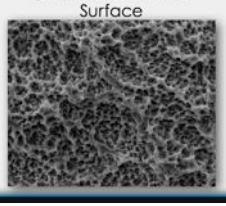


- Roughened surface
- Additive technology
- Loading performed 10-12 weeks
- Difficult to treat if it became exposed

My Journey with the Straumann® Dental Implant System 1997

Soft Tissue Level Implant

SLA® - Sandblasted (LG)& Acid Etched Surface

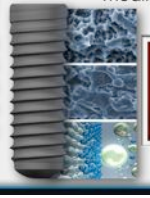


- Roughened surface
- Subtractive technology
- Loading performed 6-12 weeks (if not immediate)
- Easier to treat if it became exposed

My Journey with the Straumann® Dental Implant System 2005-6

Soft Tissue Level & Bone Level Implant

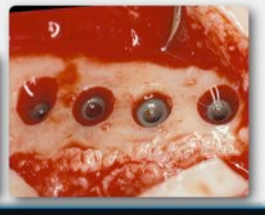
SLActive® - Chemically modified SLA® Surface



- Roughened surface
- Subtractive technology
- Chemically Modified
- Loading performed 3-4 weeks (if not immediate)
- Easier to treat if it became exposed

Animal Study - Buser et al. J Dent Res 2004

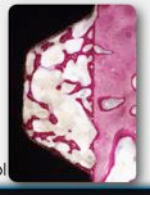
- Miniature pigs
- Implants positioned into healed sites (4 mths)
- Test and control implants exhibit same dimension and surface topography
- Experimental implants chemically modified
- Evaluated 1, 2, 4 and 8 weeks



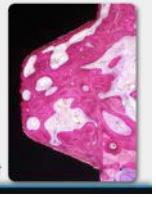
Animal Study - Buser et al. J Dent Res 2004

- Miniature pigs
- Implants positioned into healed sites (4 mths)
- Test and control implants exhibit same dimension and surface topography
- Experimental implants chemically modified
- Evaluated 1, 2, 4 and 8 weeks

Control



Test



Animal Study - Buser et al. J Dent Res 2004

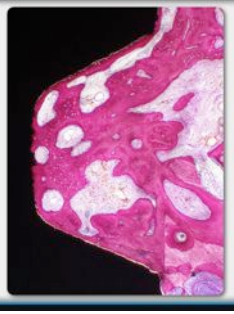


Fig. 1c: At 8 weeks, growth and reinforcement result in a further increase in bone density and an almost perfect coating of the implant surface with bone. Remodeling has started, replacing the primary bone by secondary osteons (arrows; bar = 500 µm).

Evolution of a Chemically Modified Surface...

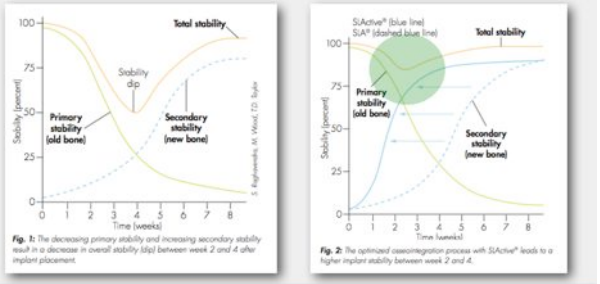
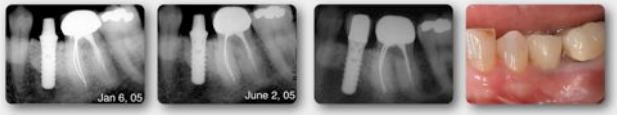


Fig. 1: The decreasing primary stability and increasing secondary stability result in a decrease in overall stability (dip) between week 2 and 4 after implant placement.

Fig. 2: The optimized osseointegration process with SLActive® leads to a higher implant stability between week 2 and 4.

Clinical Trial - Morton D et al. Clin Impl Dent. 2010

- Morton D, Bornstein M, Wittneben J, Martin W, Ruskin J, Hart C, Buser D.
- Early loading after 21-days of healing of non-submerged titanium implants with a chemically modified sandblasted and acid-etched surface: Two-year results of a prospective two-center study.



Clinical Implant Dentistry and Related Research 2009, 2010

Clinical Trial - Morton D et al. Clin Impl Dent. 2010

Material and Methods

All 56 patients, who presented with a single-tooth gap, extended edentulous space or a distal extension situation in the posterior jaw, met strict inclusion criteria and provided informed consent. A total of 89 SLActive® tissue level implants were with undisturbed healing for 21 days, after which time the implants were provisionally loaded in full occlusion, with definitive metal ceramic restorations fabricated and placed after 6 months of healing. Measurements were taken to assess soft tissue parameters and radiographs were obtained for up to 24 months after implant placement.

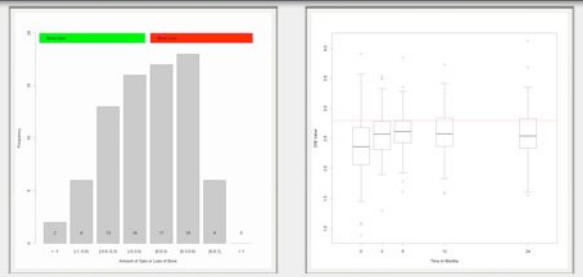
Results

Of the 89 implants placed, two (2.2 %) implants failed to integrate and were removed during healing, while two (2.2 %) more implants required a prolonged healing time. A total of 85 (95.5 %) implants were therefore loaded 21 days after placement. One implant was lost and therefore excluded from further analysis. The remaining implants all exhibited favorable clinical and radiographic findings (Tables 1 and 2). Based on strict success criteria, the implants were considered successfully integrated 2 years after insertion, resulting in a 2-year success rate of 97.7 %.

	0-3 weeks	12 months	24 months	60 months
Bern	56	56	56	56
Gainesville	35	33	33	33
TOTAL	91	89	89	89
Failures	2 (2.2%)	0	0	0

Clinical Implant Dentistry and Related Research 2009, 2010

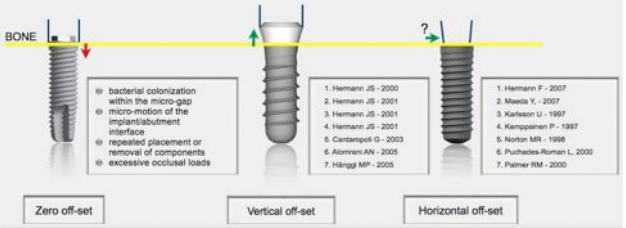
Clinical Trial - Morton D et al. Clin Impl Dent. 2010



Clinical Implant Dentistry and Related Research 2009, 2010

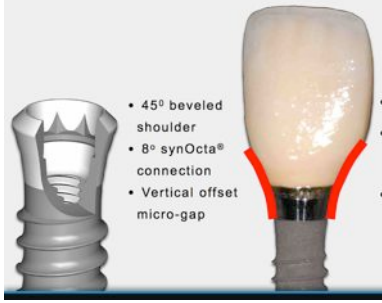
Trends in implant design

The influence of the micro-gap related to crestal bone preservation



Prosthetic Based Implant Classification

Soft-tissue level implant design



- 45º beveled shoulder
- 8º synOcta® connection
- Vertical offset micro-gap

- single-stage healing option
- trumpet shape collar initiates emergence profile
- similar to conventional restorative procedures

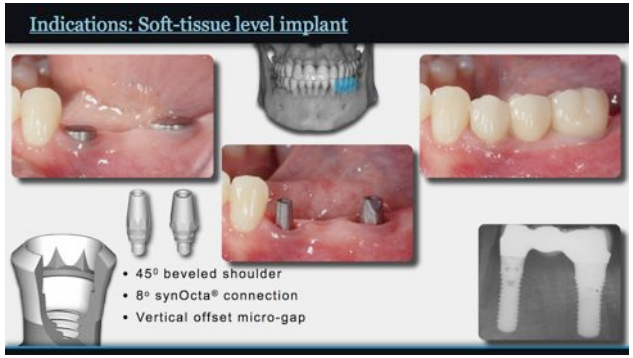
Soft-tissue level implant design: restorative components

- 45º beveled shoulder
- 8º synOcta® connection
- Vertical offset micro-gap

Indications: Soft-tissue level implant

- 45º beveled shoulder
- 8º synOcta® connection
- Vertical offset micro-gap

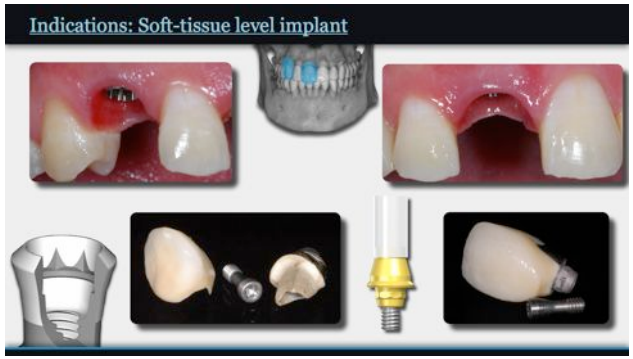
Indications: Soft-tissue level implant



Indications: Soft-tissue level implant

Indications: Soft-tissue level implant

Indications: Soft-tissue level implant



Indications: Soft-tissue level implant

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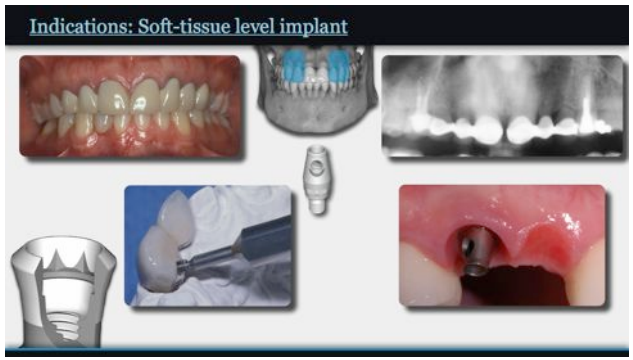
Indications: Soft-tissue level implant



Indications: Soft-tissue level implant

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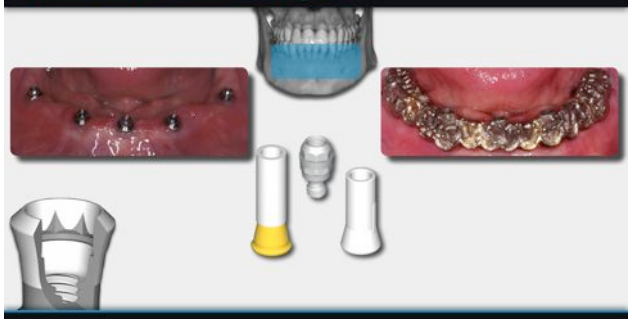
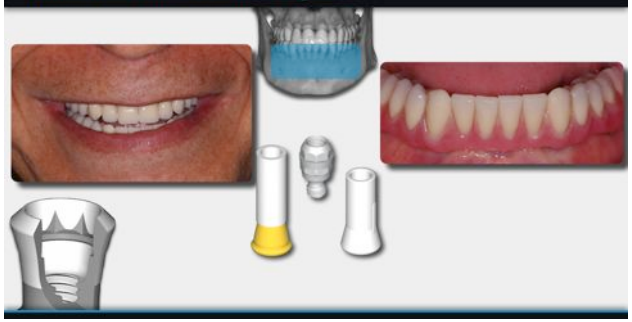
Indications: Soft-tissue level implant

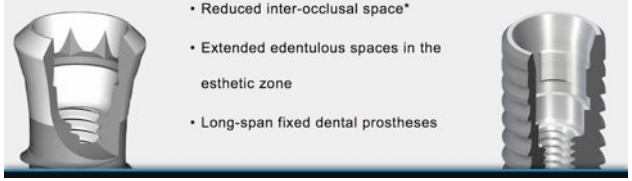


Indications: Soft-tissue level implant

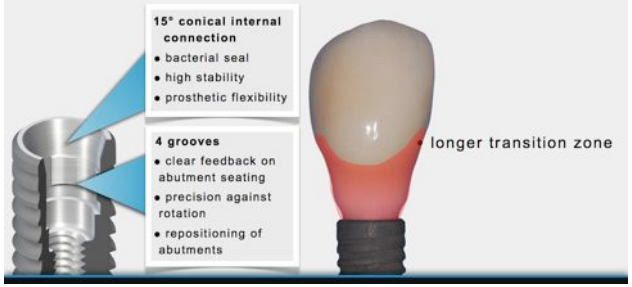


Limitations: Soft-tissue level implant = Indications: bone-level implant

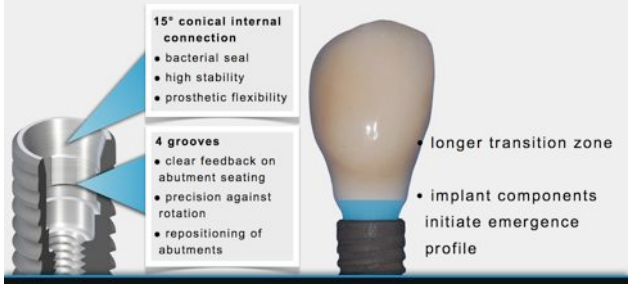
- Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip-line)
- Reduced intra-arch space
- Reduced inter-occlusal space*
- Extended edentulous spaces in the esthetic zone
- Long-span fixed dental prostheses



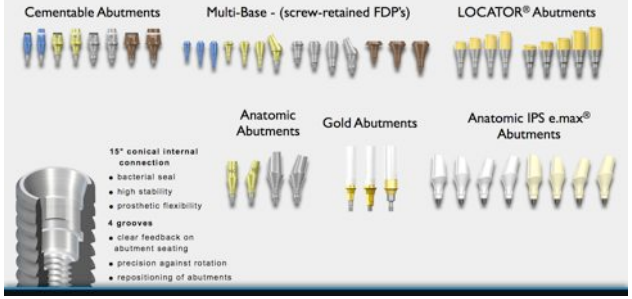
Bone-level implant design



Bone-level implant design



Bone-level implant design: restorative components



Limitations: Soft-tissue level implant = Indications: Bone-level implant

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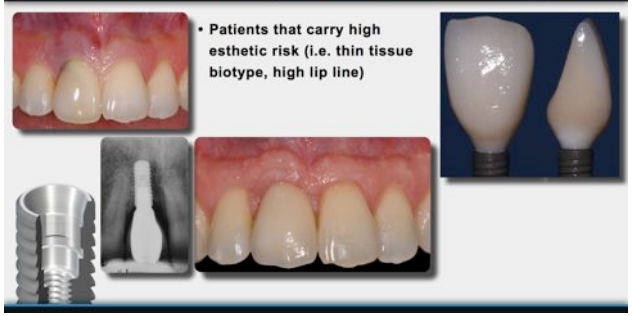
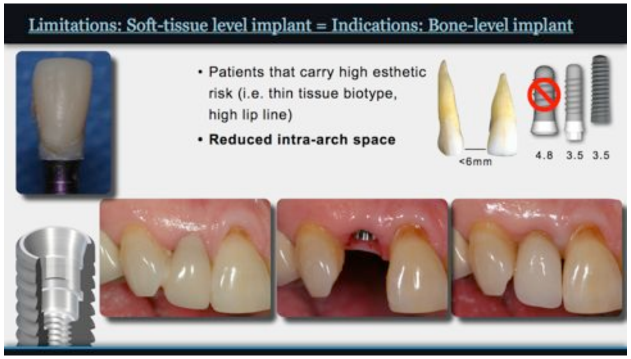
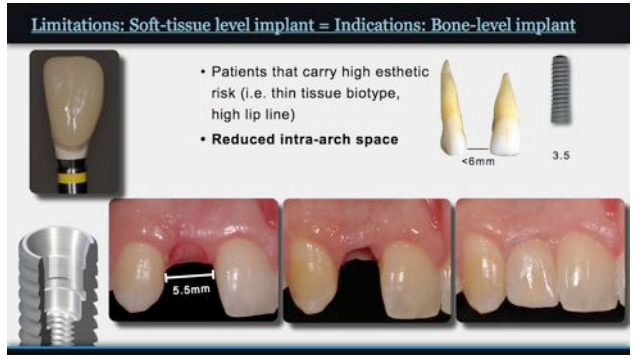
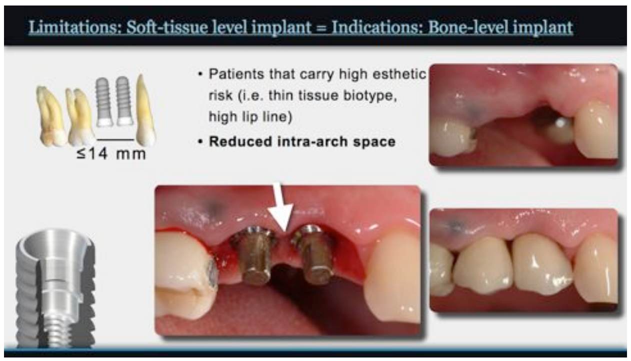
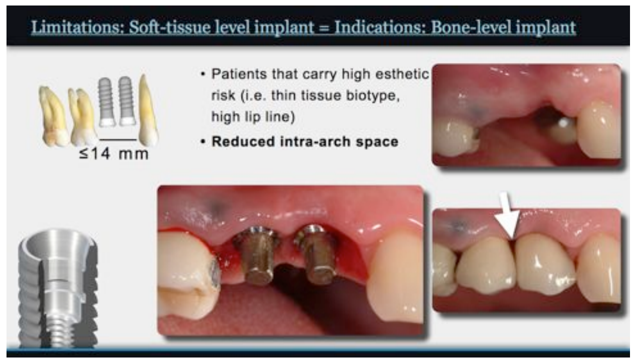



Limitations: Soft-tissue level implant = Indications: Bone-level implant
• Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip line)
• Reduced intra-arch space
<6mm
4.8
3.5
3.5


Limitations: Soft-tissue level implant = Indications: Bone-level implant
• Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip line)
• Reduced intra-arch space
<6mm
3.5
5.5mm


Limitations: Soft-tissue level implant = Indications: Bone-level implant
• Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip line)
• Reduced intra-arch space
≥15mm


Limitations: Soft-tissue level implant = Indications: Bone-level implant
• Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip line)
• Reduced intra-arch space
≤14 mm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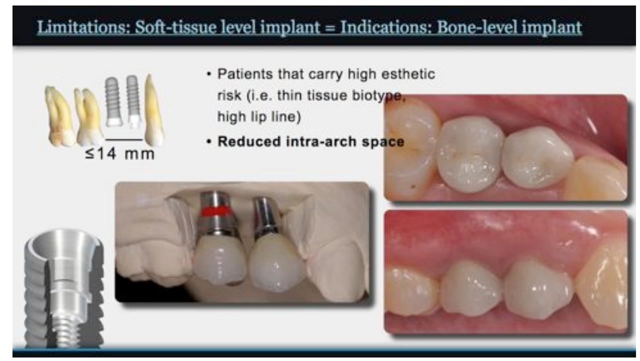
• Reduced intra-arch space
≤14 mm


Limitations: Soft-tissue level implant = Indications: Bone-level implant
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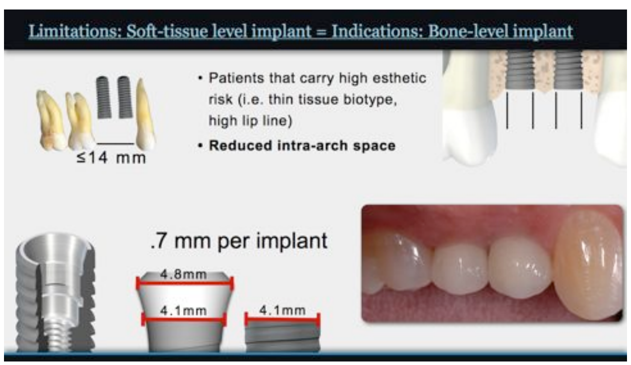
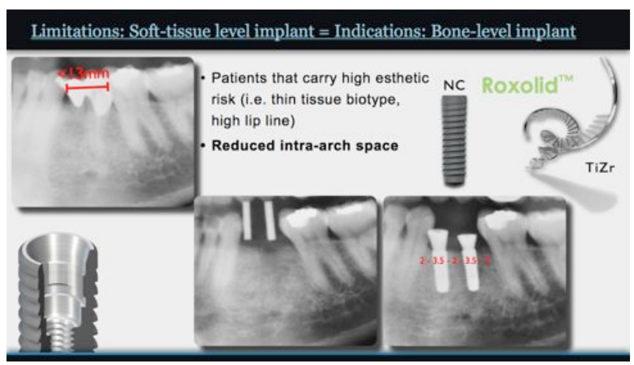
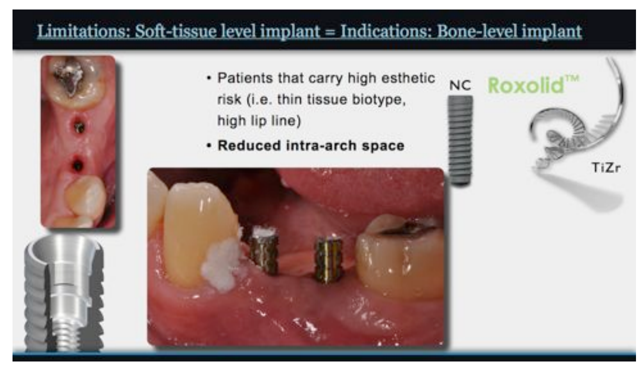
• Reduced intra-arch space
≤14 mm


Limitations: Soft-tissue level implant = Indications: Bone-level implant
• Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip line)
• Reduced intra-arch space
≤14 mm
.7 mm per implant
4.8mm
4.1mm
4.1mm


Limitations: Soft-tissue level implant = Indications: Bone-level implant
• Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip line)
• Reduced intra-arch space
NC
Roxolid™
TiZr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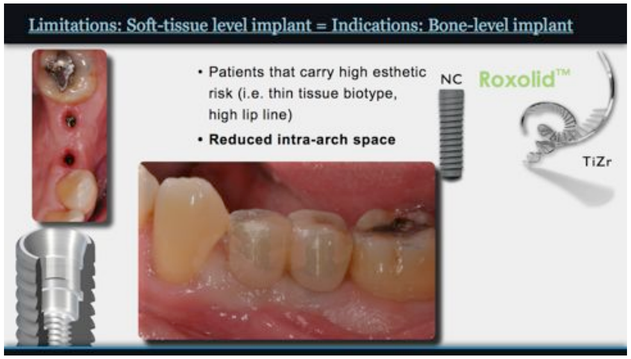
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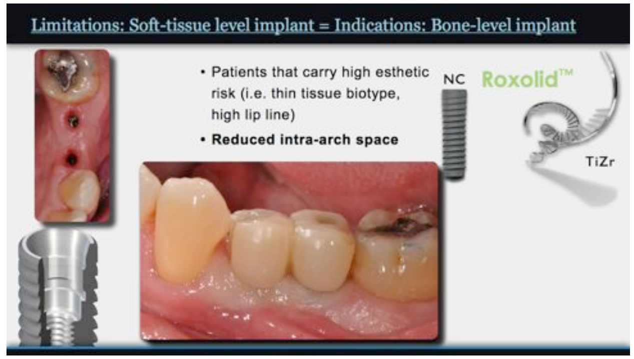
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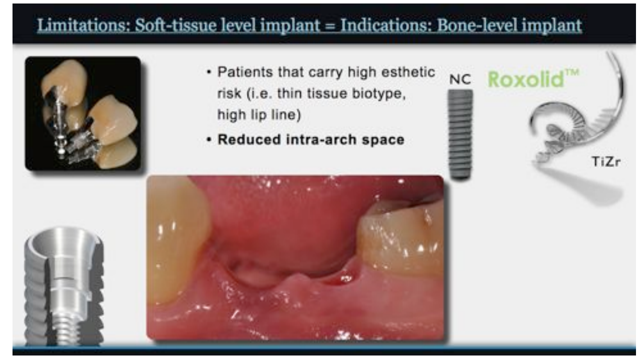
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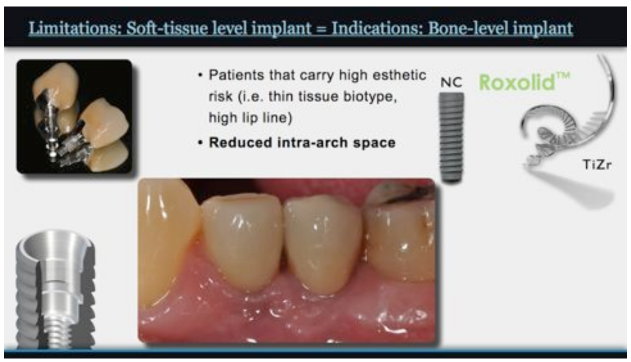
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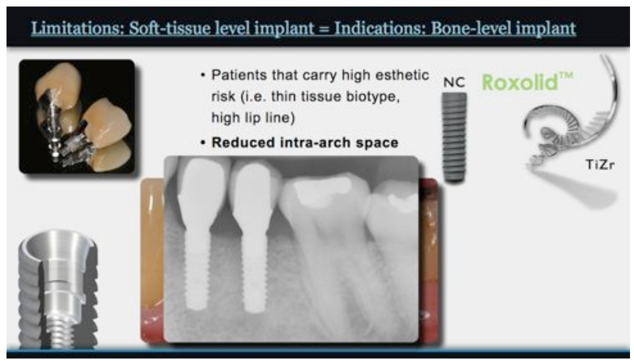
Limitations: Soft-tissue level implant = Indications: Bone-level implant
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NC
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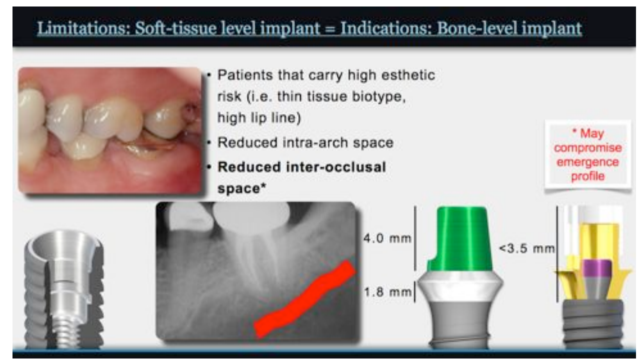
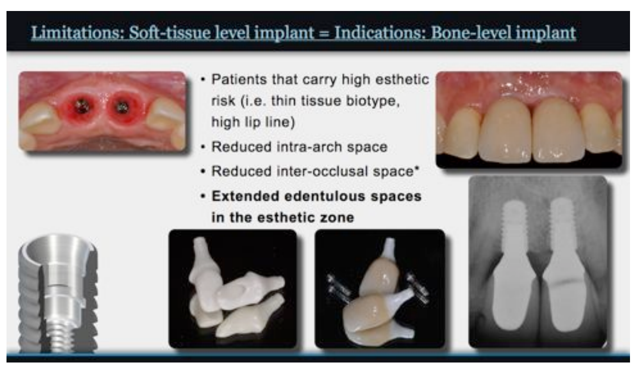
TiZr


Limitations: Soft-tissue level implant = Indications: Bone-level implant
• Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip line)
• Reduced intra-arch space
• Reduced inter-occlusal space*
* May compromise emergence profile
4.0 mm
1.8 mm
<3.5 mm


Limitations: Soft-tissue level implant = Indications: Bone-level implant
• Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip line)
• Reduced intra-arch space
• Reduced inter-occlusal space*
• Extended edentulous spaces in the esthetic zone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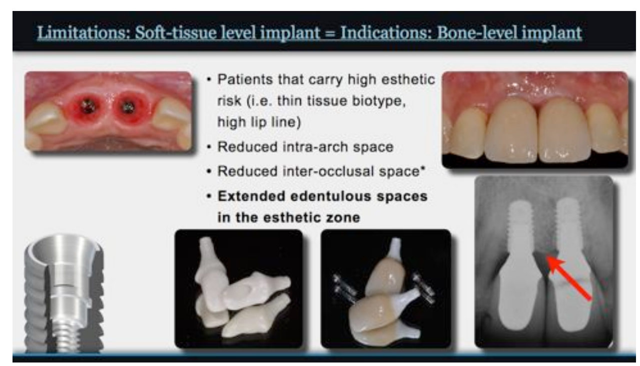
• Reduced inter-occlusal space*
• Extended edentulous spaces in the esthetic zone


Limitations: Soft-tissue level implant = Indications: Bone-level implant
• Patients that carry high esthetic risk (i.e. thin tissue biotype, high lip line)
• Reduced intra-arch space
• Reduced inter-occlusal space*
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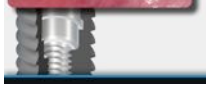
- **Long-span fixed dental prostheses**



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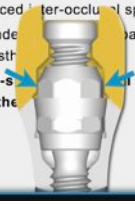

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- Extende[illegible]paces in the esth
- Long-s[illegible] prosthe

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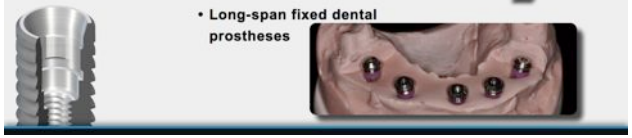

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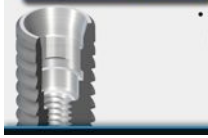
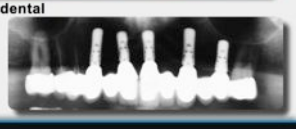


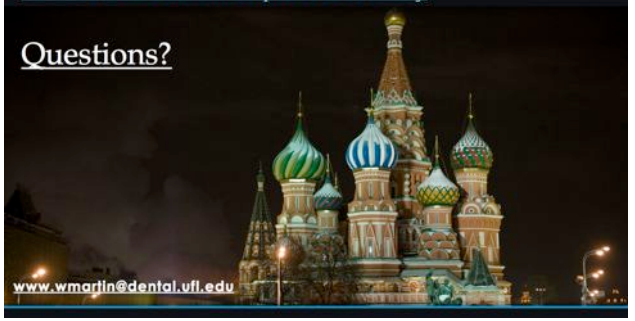
- **Long-span fixed dental prostheses**

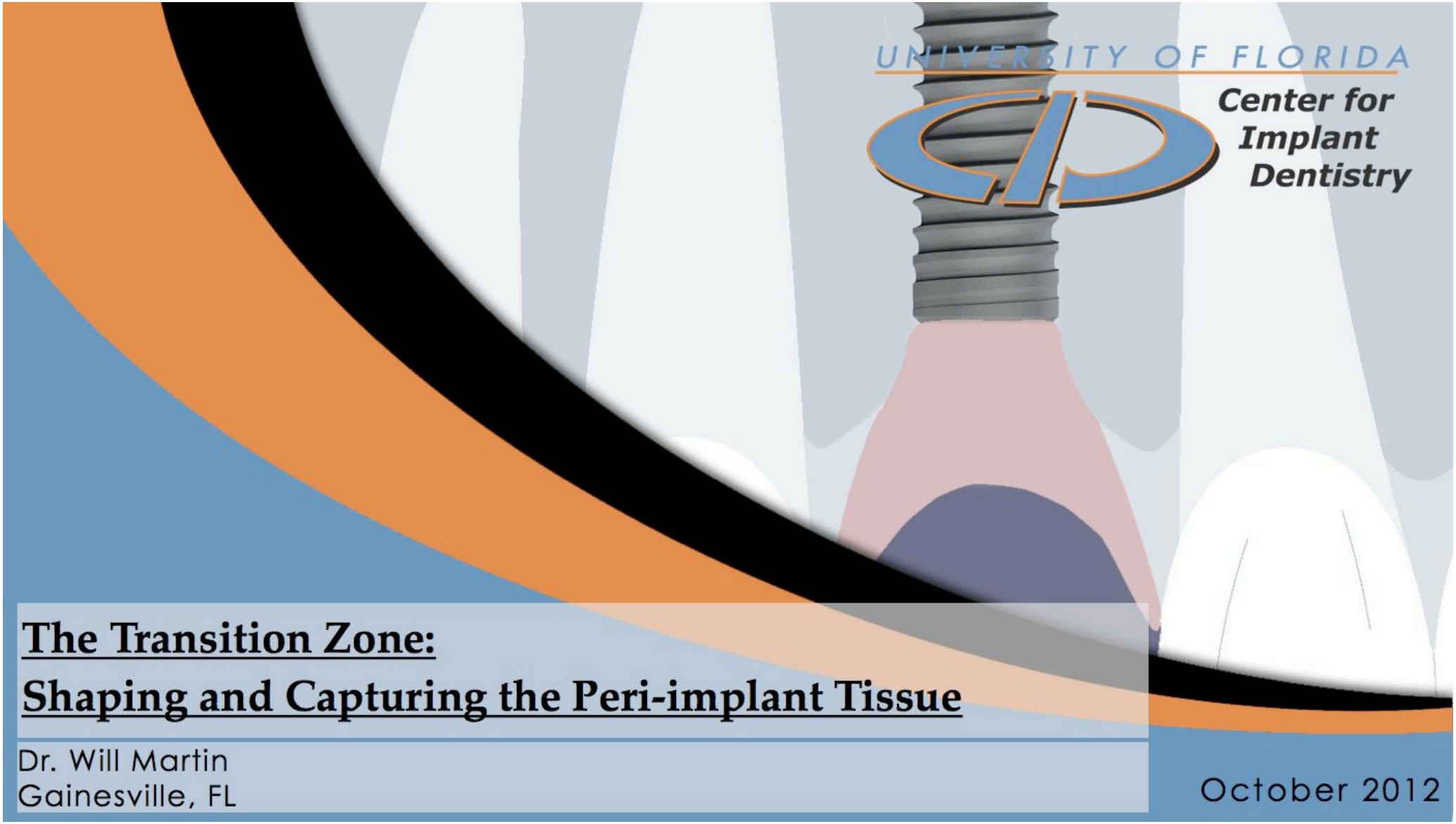


Key Surgical Consideration

Key Surgical Consideration - Vertical Positioning

Restorative Driven Implant Dentistry





The Transition Zone:
Shaping and Capturing the Peri-implant Tissue

Dr. Will Martin
Gainesville, FL

October 2012

Esthetic Compromises

Esthetic Compromises

Implant Positioning

Esthetic Compromises

Implant Positioning

Vertical/Horizontal Tissue Defects

Esthetic Compromises

Implant Positioning

Vertical/Horizontal Tissue Defects

Esthetic Compromises

Implant Positioning

Major Tissue Defects

Exposed Abutment Margin

Mucosal inflammation

Over- or Under- Contoured Restorations

Manage the Transition Zone

Manage the Transition Zone

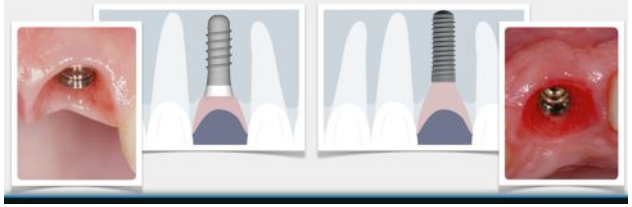
Manage the Transition Zone

- **provisional fabrication / technique**
- impression technique
- laboratory procedures
- improper seating at delivery:
  - binding (abutment)
  - proximal contacts
  - tissue resistance

Manage the Transition Zone

The Implant Restoration ***Transition Zone***
...the emergence profile created from the shoulder of the implant to the mucosal margin.

Martin et. al. ITI Treatment Guide, Vol. 1, 2006



Clinical Treatment - Manage the Transition Zone

Manage the Transition Zone

Manage the Transition Zone

Manage the Transition Zone

Literature Review

- **Is a provisional restoration always necessary to shape the peri-implant tissue?**

The evidence is based on expert opinions or case reports. Most authors agree that an implant provisional restoration is recommended in the esthetic region.

Belser UC, et.al., Pract Periodontics Aesthet Dent. 1996 Nov-Dec;8(9):873-83
Holst S, et.al., J Prosthet Dent. 2008 Sep;100(3):173-82
Priest G. J Esthet Restor Dent. 2006;18(6):326-38
Tung FF, et.al., J Prosthet Dent. 2001 Jan;85(1):34-9
Zinner ID, et.al., Implant Dent. 1994 Spring;3(1):24-8

Provisional Restorations - Components

PEEK (Polyether ether ketone)

PMMA

Titanium*

Zirconia*

*definitive abutment

Provisional Restorations - Materials

- **Crown former:**
  - vacuform from wax-up
  - polycarbonate crown
  - denture tooth
  - existing crown

Provisional Restorations - Materials

- **Veneer/Core Material:**
  - methyl methacrylate
  - ethyl methacrylate
  - CM composite resin
    - Bis-GMA
  - LC composite resin
    - Light Cured

Literature Review

- **Do implant provisionals affect the healing or health status of the peri-implant soft tissues?**

Several clinical reports and technical notes agree on the importance of a implant provisional in modeling an anatomically correct emergence profile. The literature is inconclusive when it comes to compare acrylic vs. composite as veneering materials for implant provisionals. Limited clinical data was found concerning the influence of these materials on the peri-implant soft tissue health.

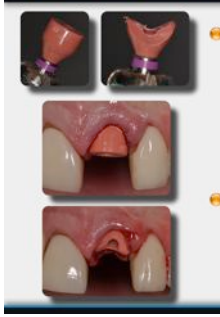
Belser UC, et.al., Pract Periodontics Aesthet Dent. 1996 Nov-Dec;8(9):873-83
Chee WW, et.al., J Prosthodont. 1997 Sep;6(3):218-20
Jemt T, Int J Periodontics Restorative Dent. 1999 Feb;19(1):20-9
Meiers JC, Freilich MA, J Prosthet Dent. 2004 Jan;95(1):14-8
Rompen E, et.al., J Prosthet Dent. 2007 Jun;97(6 Suppl):S119-25

Provisional Restorations - Materials

- **Adjuncts:**
  - Opaquer
  - Undercut block-out
  - Screw-head protection
  - Screw-access seal

Timing of Provisional Fabrication

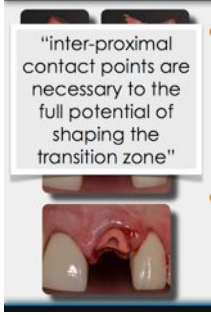
Provisional Restorations - Timing and Approach



- **Immediate:**
  - **Customized healing abutment**
  - Surgical Index - lab
  - Restoration - clinical
- Delayed:
  - Direct - clinical
  - Indirect - lab

Provisional Restorations - Timing and Approach

"inter-proximal contact points are necessary to the full potential of shaping the transition zone"



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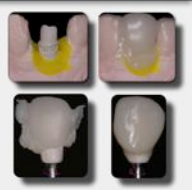

Provisional Restorations - Timing and Approach

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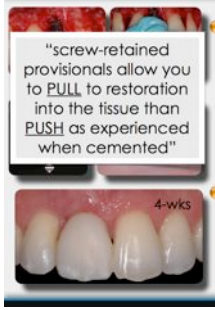
Provisional Restorations - Timing and Approach

"screw-retained provisionals allow you to PULL to restoration into the tissue than PUSH as experienced when cemented"



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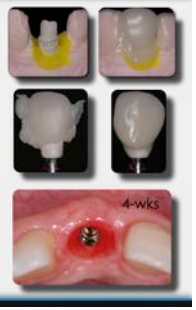

Provisional Restorations - Timing and Approach

- **Immediate:**
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- Delayed:
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  - Indirect - lab

3 yrs

Literature Review

- **Does an immediate provisional enhance the appearance of the peri-implant soft tissue?**

The influence of an immediate provisional (at the time of implant placement) on the peri-implant soft-tissue is mainly supported by case reports/series and technical notes. Here the information is divided when it comes to the enhancement of peri-implant soft tissues by an immediate provisional. Maintenance of tissue level seems to be most common finding among short- term clinical reports.

Cooper L, et.al. Int J Oral Maxillofac Implants. 2001 Mar-Apr;16(2):182-92.
Gallucci G, et. al.,Clin Oral Implants Res. 2008 Jun;19(6):546-52. Epub 2008 Apr 16.
Hall JA, et.al., Int J Prosthodont. 2006 Jan-Feb;19(1):17-9.
Hall JA, et. al., Clin Implant Dent Relat Res. 2007 Mar;9(1):34-45.

Provisional Restorations - Timing and Approach

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  - **Restoration - clinical**
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Provisional Restorations - Timing and Approach

"prepare components extra-orally"

- **Immediate:**
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Provisional Restorations - Timing and Approach

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  - **Direct - clinical**
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Provisional Fabrication

Clinical Technique @ www.ufcid.com

Loading visit

Provisional Fabrication

Clinical Technique @ www.ufcid.com

Unshaped Transition Zone

Provisional Fabrication

Clinical Technique @ www.ufcid.com

Ti Provisional Abutment

Provisional Fabrication

Clinical Technique @ www.ufcid.com

Modified & Opaqued Abutment

Provisional Fabrication

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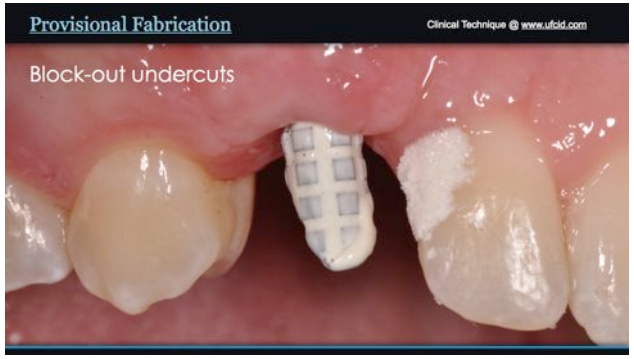
Block-out undercuts



Provisional Fabrication

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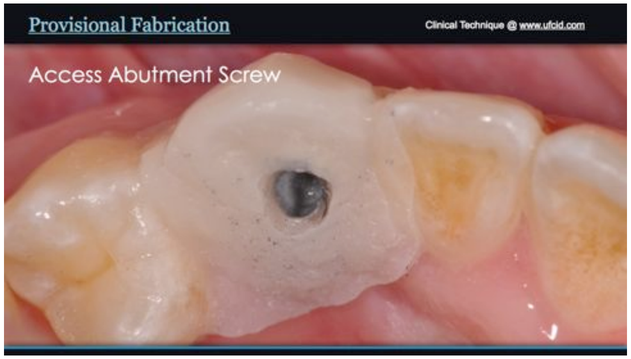
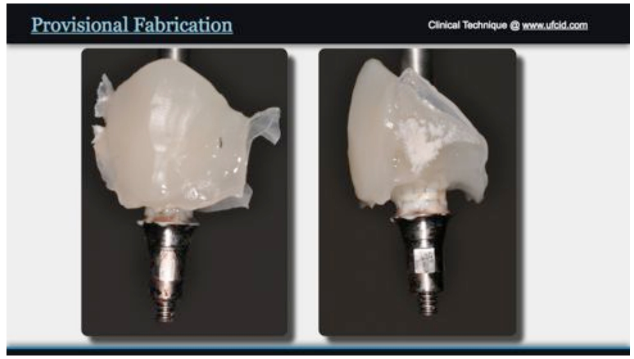
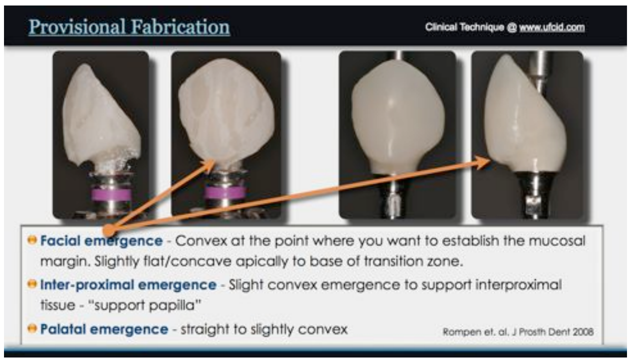
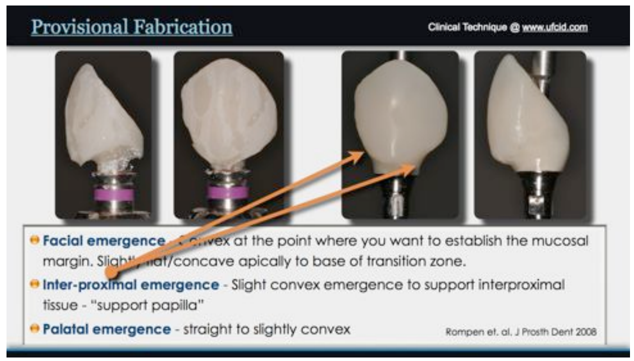
Vacuform Template


Provisional Fabrication
Clinical Technique @ www.ufcid.com
Access Abutment Screw


Provisional Fabrication
Clinical Technique @ www.ufcid.com


Provisional Fabrication
Clinical Technique @ www.ufcid.com


Provisional Fabrication
Clinical Technique @ www.ufcid.com
Facial emergence - Convex at the point where you want to establish the mucosal margin. Slightly flat/concave apically to base of transition zone.
Inter-proximal emergence - Slight convex emergence to support interproximal tissue - "support papilla"
Palatal emergence - straight to slightly convex
Rompen et. al. J Prosth Dent 2008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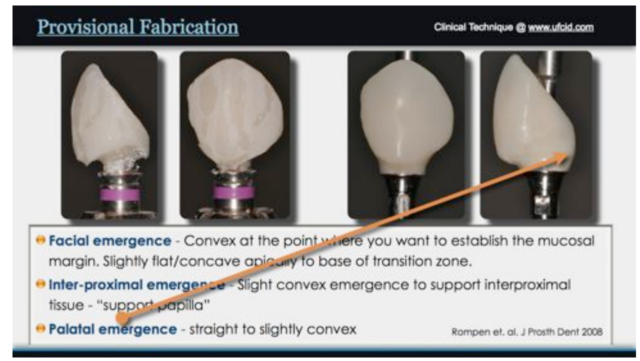
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Provisional Fabrication
Clinical Technique @ www.ufcid.com
Day 1

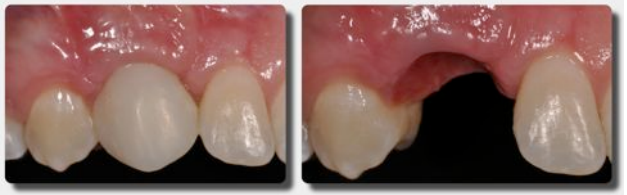

Provisional Fabrication
Clinical Technique @ www.ufcid.com
4-weeks


Capturing the Transition Zone

Capture the Transition Zone

Hinds, K. Int. J Perio Rest Dent.1997 - Clinical Technique @ www.ufcid.com

Capture the Transition Zone



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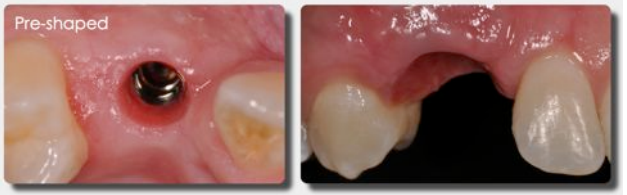

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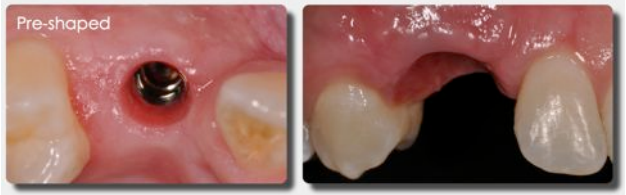


"Peri-implant soft-tissue is like a fluid filled sack, able to quickly collapse without support" - F. Spear

Capture the Transition Zone - Customized Impression Coping

Hinds, K. Int. J Perio Rest Dent.1997 - Clinical Technique @ www.ufcid.com

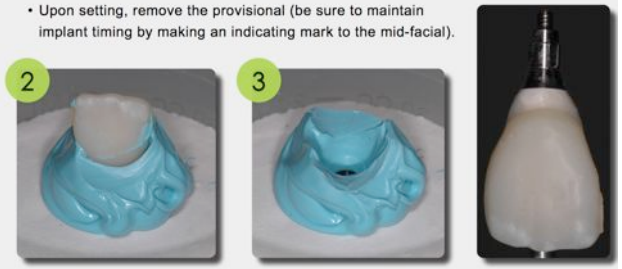
Customized Impression Coping - STEP BY STEP

- Place super-fast setting bite-registration material against the surface of the provisional - capturing the portion of the provisional that shaped the transition zone.

Hinds, K. Int. J Perio Rest Dent.1997 - Clinical Technique @ www.ufcid.com

Customized Impression Coping - STEP BY STEP

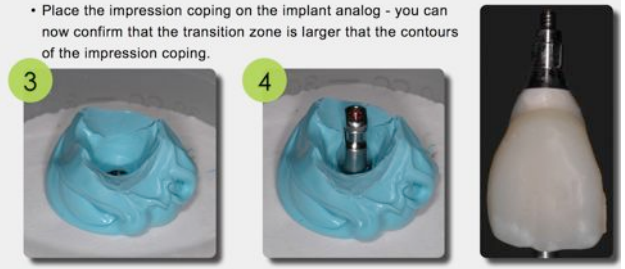
- Upon setting, remove the provisional (be sure to maintain implant timing by making an indicating mark to the mid-facial).



Hinds, K. Int. J Perio Rest Dent.1997 - Clinical Technique @ www.ufcid.com

Customized Impression Coping - STEP BY STEP

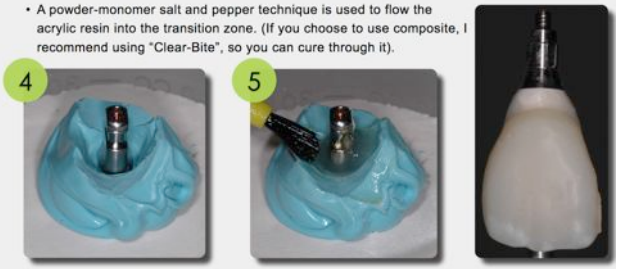
- Place the impression coping on the implant analog - you can now confirm that the transition zone is larger that the contours of the impression coping.



Hinds, K. Int. J Perio Rest Dent.1997 - Clinical Technique @ www.ufcid.com

Customized Impression Coping - STEP BY STEP

- A powder-monomer salt and pepper technique is used to flow the acrylic resin into the transition zone. (If you choose to use composite, I recommend using "Clear-Bite", so you can cure through it).



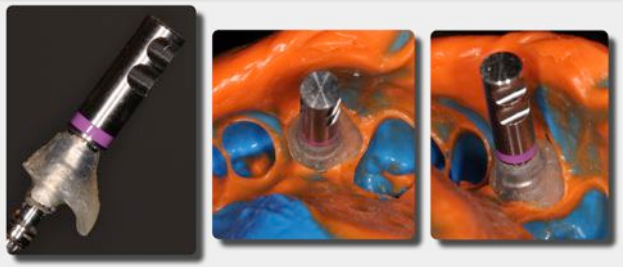
Hinds, K. Int. J Perio Rest Dent.1997 - Clinical Technique @ www.ufcid.com

Customized Impression Coping - STEP BY STEP

- Upon setting, remove any flash, positive "blebs" and confirm the contours match the provisional.
- Place the customized impression coping onto the implant in the mouth & impress.
- Inform your technician of the process you utilized.

Hinds, K. Int. J Perio Rest Dent.1997 - Clinical Technique @ www.ufcid.com

Capture the Transition Zone - Customized Impression Coping



Hinds, K. Int. J Perio Rest Dent.1997 - Clinical Technique @ www.ufcid.com

Capture the Transition Zone - Restoration Fabrication

Capture the Transition Zone - Restoration Fabrication

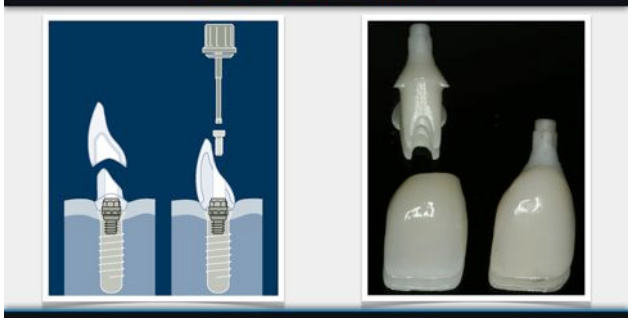
Capture the Transition Zone - Restoration Fabrication

Capture the Transition Zone - Restoration Fabrication

Capture the Transition Zone - Restoration Fabrication

Capture the Transition Zone - Restoration Fabrication

Screw vs. Cement Retained



Literature Review

- **What determines the choice between a screw-retained or a cemented restoration?**

The level of evidence regarding the majority of reviewed studies does not permit the definition of clear guidelines for the choice between screw-retained or cemented prostheses.

Some factors can influence the type of attachment to be used, such as retrievability, esthetics, occlusion, and retention. Among them, only the latter clearly address the choice toward screw-retained prostheses, in the case of limited interarch space or inadequate abutment height.

Vigolo P, et.al., Int J Oral Maxillofac Implants. 2004 Mar-Apr;19(2):260-5.
Higginbottom F, et.al., Int J Oral Maxillofac Implants. 2004;19 Suppl:62-72.
Hebel KS, Gajjar RC., J Prosthet Dent. 1997 Jan;77(1):28-35.
Michalakis KX, et.al., Int J Oral Maxillofac Implants. 2003 Sep-Oct;18(5):719-28.
Bernal G, et.al., J Prosthodont. 2003 Jun;12(2):111-5.

Screw vs. Cement Retained

Screw-Retained Restoration	Cement-Retained Restoration
Passive fit	
Esthetics	
Microgap colonization risk	Natural occlusal form
Retrievability	Cost
Retention	Angulation correction
Limited abutment height	Misaligned implants
Cement inclusion risk	Ease of fabrication
Deep insertion of implant	Access to posterior mouth
Multiple abutments restoration	

Screw vs. Cement Retained

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Screw vs. Cement Retained

Screw vs. Cement Retained

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Screw vs. Cement Retained

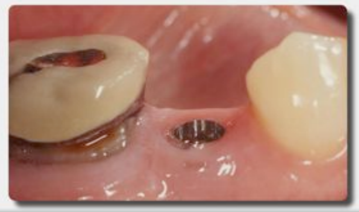
Screw vs. Cement Retained

Screw vs. Cement Retained

Treatment Protocol in Esthetic Zone

Cemented restorations

Regular-neck (4.8mm)
&
Wide-neck (6.5mm)



- ease of use
- versatile
- cost effective
- indications:
  - posterior
  - single units
  - multiple units

M & M laboratory

Cemented restorations

Regular-neck (4.8mm)
&
Wide-neck (6.5mm)

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M & M laboratory

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  - single units
  - multiple units

M & M laboratory

Cemented restorations

Regular-neck (4.8mm)

- ease of use
- versatile
- cost effective
- indications:
  - posterior
  - single units
  - multiple units

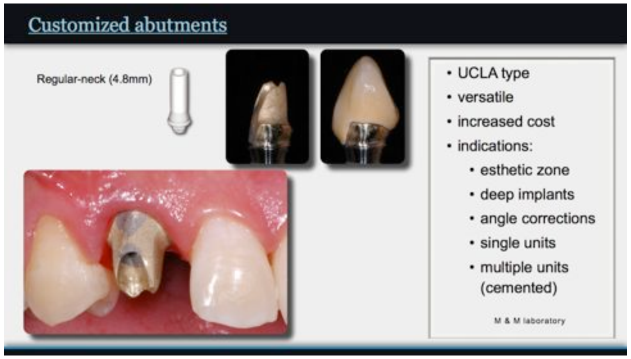
M & M laboratory

Cemented restorations

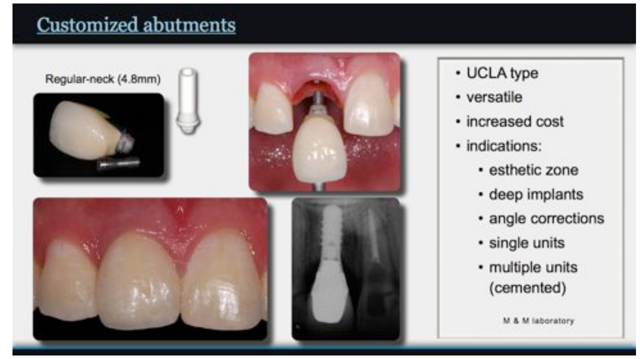
Regular-neck (4.8mm)

- ease of use
- versatile
- cost effective
- indications:
  - posterior
  - single units
  - multiple units

M & M laboratory


Customized abutments
Regular-neck (4.8mm)
• UCLA type
• versatile
• increased cost
• indications:
• esthetic zone
• deep implants
• angle corrections
• single units
• multiple units (cemented)
M & M laboratory

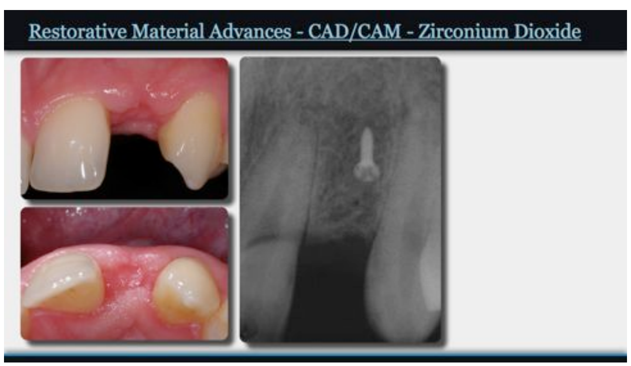

Customized abutments
Regular-neck (4.8mm)
• UCLA type
• versatile
• increased cost
• indications:
• esthetic zone
• deep implants
• angle corrections
• single units
• multiple units (cemented)
M & M laboratory

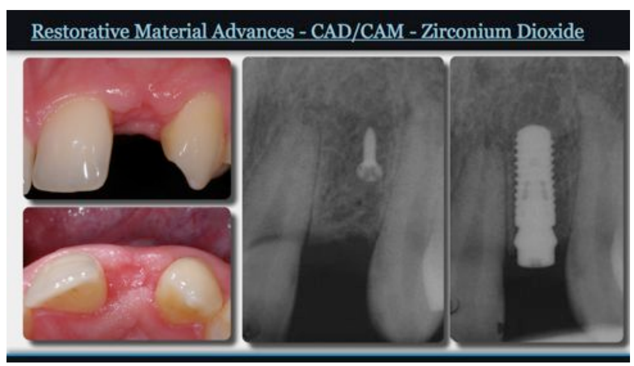

Customized abutments
Regular-neck (4.8mm)
• UCLA type
• versatile
• increased cost
• indications:
• esthetic zone
• deep implants
• angle corrections
• single units
• multiple units (cemented)
M & M laboratory


Customized abutments
BLI RC (4.1mm)
• UCLA type
• versatile
• increased cost
• indications:
• esthetic zone
• deep implants
• angle corrections
• single units
• multiple units (cemented)
M & M laboratory


Customized abutments
Regular-neck (4.8mm)
• UCLA type
• versatile
• increased cost
• indications:
• esthetic zone
• deep implants
• angle corrections
• single units
• multiple units (cemented)
M & M laboratory


Esthetic Zone: CAD/CAM


Restorative Material Advances - CAD/CAM - Zirconium Dioxide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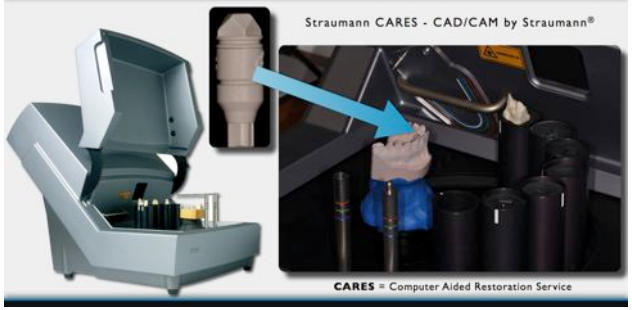
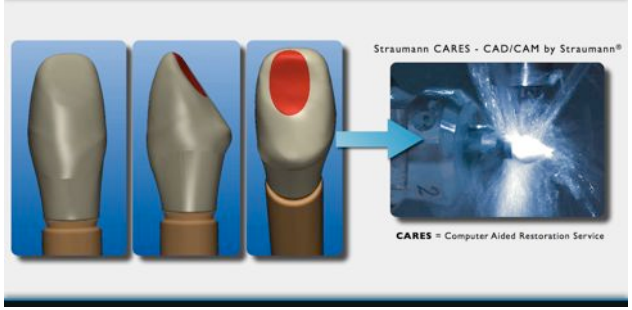
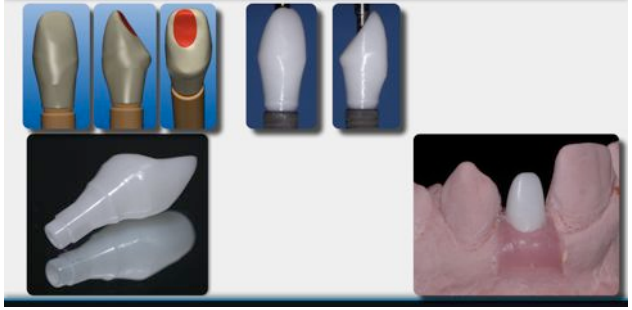


Restorative Material Advances - CAD/CAM - Zirconium Dioxide



Restorative Material Advances - CAD/CAM - Zirconium Dioxide



Restorative Material Advances - CAD/CAM - Zirconium Dioxide

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Restorative Material Advances - CAD/CAM - Zirconium Dioxide

Restorative Material Advances - CAD/CAM - Zirconium Dioxide


Restorative Driven Implant Dentistry
Questions?
www.wmartin@dental.ufl.edu

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Digital Dental Photography: Systems, Principles and Techniques

Dr. Will Martin
Gainesville, FL


Synopsis
Introduction
Digital Dental Photography
Challenges
Systems
Principles
Techniques
Trouble Shooting
Demonstration


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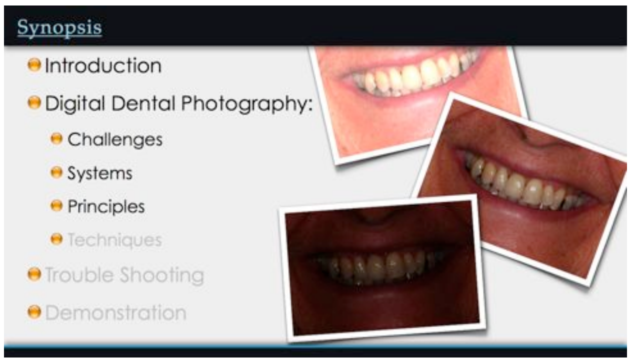
SIGMA
Nikon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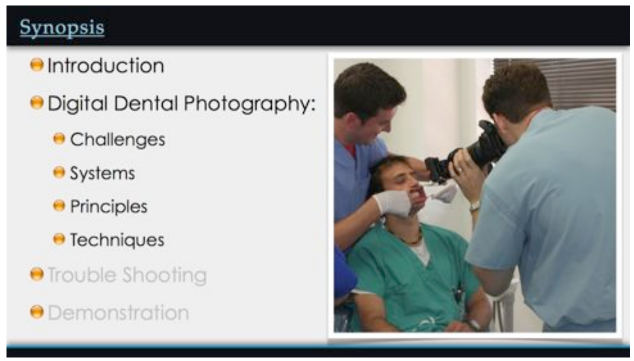
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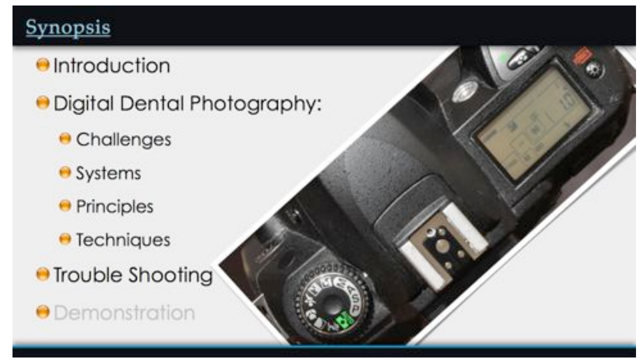
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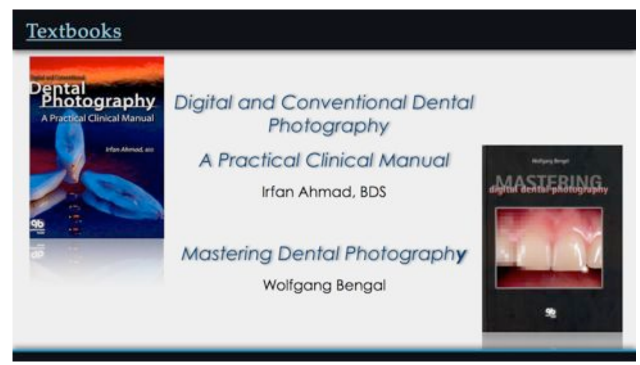
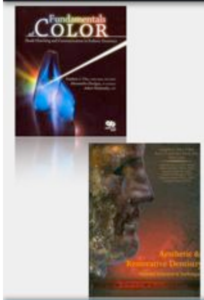
Digital Dental Photography:


Textbooks
Dental Photography
A Practical Clinical Manual
Digital and Conventional Dental Photography
A Practical Clinical Manual
Irfan Ahmad, BDS
Mastering Dental Photography
Wolfgang Bengal
MASTERING
digital dental photography

Textbooks



Fundamentals of Color

Shade Matching and Communication in Esthetic Dentistry

Dr. Stephen Chu, Dr. Alessandro Devigus, Adam Mieleszko

Digital Dental Photography

Steve Ratcliff

Aesthetic and Restorative Dentistry

Dr. Douglas Terry, Dr. Karl Leinfelder and Willie Geller

Considering Dental Photography?

- **Questions to ask yourself:**
  - Am I trying to improve *patient communication* techniques?
  - Am I trying to improve predictable esthetic results through improved *laboratory communication*?
  - Do I plan to *publish* articles?
  - Do I plan to *lecture*? If so, to whom?
    - Study Clubs
    - Major Meetings
  - What will my *commitment* be to dental photography?

Considering Dental Photography?

- **Clinical Applications of Digital Photography:**
  - Diagnosis and treatment planning
  - Legal documentation
  - Forensic documentation
  - Patient education, communication and motivation
  - Laboratory communication
  - Professional instruction
  - Publications
  - Insurance verification

Dr. Douglas Terry

What are we communicating?

- Lab Communication
- Communication with colleagues
- Patient Communication

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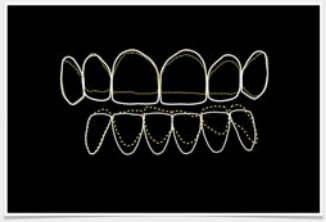


What are we communicating?

Considering Dental Photography?

- **Achieving excellent photographic results:**
  - **QUALITY** is not an act, it is a habit.
  - Good photography is **SYSTEMATIC**
    - Initially there are **protocols** for each shot
    - **Creativity** comes with experience

Dr. Frank Lozano

Depth of field - F-stop

Framing - excessive cropping

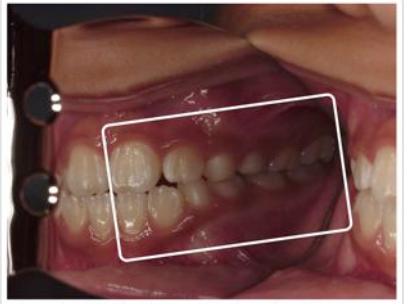
Framing - inadequate cropping

Exposure & White Balance

Move the tongue

Excess saliva

Mirror shots - inadequate framing & exposure



Mirror shots - inadequate framing & exposure

Mirror shots - framing and angulation

NO chair shots

NO glasses & place hair behind ears

Improper retraction

Digital Dental Update 2012

- **Important Points:**
  - Do not mistake off-the-shelf digital cameras as dental-ready systems
  - The equipment you select is as critical to the process as the actual photo techniques themselves.

Dr. Martin Goldstein

Digital Camera Anatomy:

- **Camera body:**
  - Modified point and shoot - fixed lens with adaptor
  - DSLR (digital single lens reflex)

Pros & Cons: Digital - Compact

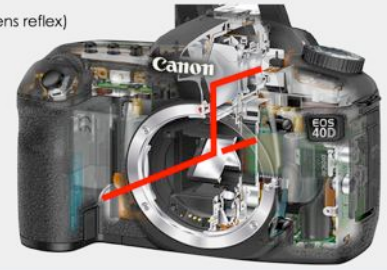
- Light weight and portable
- No viewfinder*, framing occurs through the LCD making dental photography difficult
- Working distance may require image editing procedures
- Affordable
- Flash diffuser*
- "Fish-eye" effect
- Lag times

Pros & Cons: Digital SLR

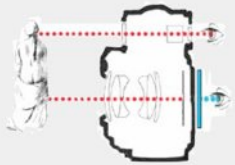
- Viewfinder and LCD option*
- CCD or CMOS
- Allows for interchangeable macro lens
- Live view options*
- Position of flash
- Lens Quality
- Eliminate "fish-eye" results
- HD Video*

Digital Camera Anatomy:

- **Camera body:**
  - DSLR (digital single lens reflex)



Digital Camera Anatomy:



Digital Compact

Digital SLR

Defining Type of Photography

- **Normal:** Objects on the sensor are much smaller than in real life
- **MACRO:** Objects are almost life size or slightly larger than life size on the sensor
- **MICRO:** Objects are magnified much larger than in real life

Digital Camera Anatomy:

- **Lens:**
  - Macro lens (60-105mm)
  - Macro lens adaptor

www.photomed.net

Digital Camera Anatomy:

- **Lens:**
  - Macro lens (60-105mm)
  - Macro lens adaptor

www.photomed.net

Digital Camera Anatomy:

- **Lens:**

Same patient

Macro lens adaptor

Macro lens (100mm)

Digital Camera Anatomy:

- **Lens:**

Same patient

Macro lens adaptor

Macro lens (100mm)

Digital Camera Anatomy:

- Lens:

Same patient

Macro lens adaptor

Macro lens (100mm)

Digital Camera Anatomy:

- Lens:

Clinical Example

Digital Camera Anatomy:

- Lens:

Pros: extra-oral

Pros: intra-oral

Macro lens (60mm)

Macro lens (105mm)

Digital Camera Anatomy:

- Lens:

Same patient

Macro lens (60mm)

Macro lens (105mm)

Digital Camera Anatomy:

- Lens:

Same patient

Macro lens (60mm)

Macro lens (105mm)

Digital Camera Anatomy:

- Flash:
  - Ring or Dual-point (M & TTL)
  - Diffuser

www.photomed.net

Digital Camera Anatomy:

- Flash:
  - Ring or Dual-point (M & TTL)
  - Diffuser

www.photomed.net

Digital Camera Anatomy:

- Flash:

Clinical Example

Digital Camera Anatomy:

- Flash:

Same patient

Ring

Dual-Point

Digital Camera Anatomy:

- **Flash:**

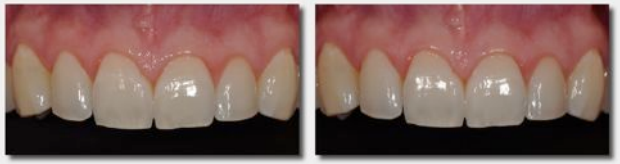
Same patient

Ring

Dual-Point

Digital Camera Anatomy:

- **Flash:**



Same patient

Ring

Dual-Point

Digital Camera Anatomy:

- **Flash:**

Dual-Point

Digital Camera Anatomy:

- These Flashes **EAT** Power
- Suggested 2200 mAh or higher

Label with #'s (1-x) in groups of 4 and keep together, when one goes bad, recycle all.

Digital Camera Anatomy:

- **Recording media:**
  - compact flash card
  - SD card

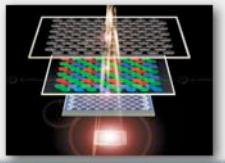
What is a CCD or CMOS?

- **CCD** - Charge Coupled Device

- **CMOS** - Complimentary Metal Oxide Semiconductor

What is a CCD or CMOS?

The light sensing electrodes of the digital sensor (CCD or CMOS) are only able to measure brightness levels, wavelength (hue) differences are achieved by placing an ordered matrix of red, green and blue filters over the entire sensor.

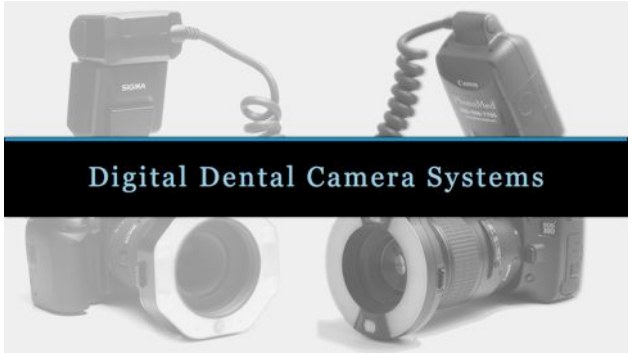


Dr. Douglas Terry

CCD/CMOS Color Variations

CCD Maintenance

CCD Maintenance



Digital Dental Camera Systems

Camera Specifications - Canon

First... Explaining Resolution

768 Pixels High

3072x2048 Pixels (6MP)

1024 pixels wide

768 Pixels High

3072x2048 Pixels (6MP)

1024 pixels wide

768 Pixels High

< 1 mega-pixel

Image becomes granular because resolution is lower than that of the screen

1024 pixels wide

768 Pixels High

Key:

*capture resolutions that will allow for editing while **not** overwhelming image size.*

1024 pixels wide

768 Pixels High

Key:

*capture resolutions that will allow for editing while **not** overwhelming image size.*

*Some large forum presentations are approx. 1920x1080

1024 pixels wide

Canon Family

Model	Date Announced	Resolution	LCD Screen	Live View?	Video?
D30	4/2000	3.1MP	1.8"	No	No
D60	2/2002	6.3MP	1.8"	No	No
10D	2/2003	6.3MP	1.8"	No	No
20D	8/2004	8.2MP	1.8"	No	No
30D	2/2006	8.2MP	2.5"	No	No
40D	8/2007	10.1MP	3.0"	Yes	No
50D	8/2008	15.1MP	3.0" hi-res.	Yes	No
60D	8/2010	18.0MP	3.0" hi-res.(3:2) articulating LCD	Yes	Yes



www.photomed.net, www.dpreview.com

Comparing Canon Lines

- The change between the **Rebel** vs. **EOS series** vs. **Pro series**
  - Weight and size increase with advancing series lines. Be aware that the Rebel series may be difficult to hold with the dental kit when the user has large hands.


www.photomed.net, www.dpreview.com

Nikon Digital SLR Family

D80 to D90

- Larger screen size with increased resolution
- Higher ISO Sensitivity
- Live View with HD Video (720p)

D90 to D7000

- custom settings
- Increased resolution with two SD slots
- Higher ISO Sensitivity
- Live View with HD Video with auto-focus 1080i

www.photomed.net, www.dpreview.com

Nikon Digital SLR Family

www.photomed.net, www.dpreview.com

Comparing the Canon and Nikon SLR Digital Cameras — PhotoMed

	Canon T3	Canon T3i	Canon T3i	Canon 60D	Nikon D90	Nikon D7000	Nikon D300s
Camera Resolution (in megapixels)	12.2	18.0	18.0	18.0	12.3	16.2	12.3
Sensor Size	22.2 x 14.8mm	22.3 x 14.9mm	22.3 x 14.9mm	22.3 x 14.9mm	23.6 x 15.8mm	23.6 x 15.6mm	23.6 x 15.8mm
Focal Length Mult.	1.6	1.6	1.6	1.6	1.5	1.5	1.5
ISO Settings	100-1600	100-12800	100-12800	100-12800	200-6400	100-6400	100-6400
Max Shutter Speed	1/4000 sec.	1/4000 sec.	1/4000 sec.	1/8000 sec.	1/4000 sec.	1/8000 sec.	1/8000 sec.
LCD Screen Size	2.7"	3.0" 3:2 Wide	3.0" 3:2 Wide articulating	3.0" 3:2 Wide articulating	3.0"	3.0"	3.0"
LCD Pixels	230,000	1,040,000	1,040,000	1,040,000	920,000	921,000	920,000
Max. Frames Per Sec.	3.0 fps	3.7 fps	3.7 fps	5.3 fps	4.5 fps	6.0 fps	7.0 fps
Memory Card Type	SD (secure digital)	SD (secure digital)	SD (secure digital)	SD (secure digital)	SD (secure digital)	SD - dual slots (secure digital)	CF & SD (compact flash & secure digital)
Live View?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Movie Mode?	720p HD 24, 25, 30fps for up to 17 mins. req. SD Class 6 card	1080p HD 24, 25, 30fps for up to 12 mins. req. SD Class 6 card	1080p HD 24, 25, 30fps for up to 12 mins. req. SD Class 6 card	1080p HD 24, 25, 30fps for up to 12 mins. req. SD Class 6 card	720p HD 24fps for up to 5 mins.	1080p HD 24fps for up to 20 mins. SD Class 6 card rec.	720p HD 24fps for up to 5 mins.
Macro Flash Compatibility	Canon MR-14EX Canon MT-24EX Metz MS-1 (w/ST-E2) Sigma EM-140DG	Canon MR-14EX Canon MT-24EX Metz MS-1 (w/ST-E2) Metz MS-1 Sigma EM-140DG	Canon MR-14EX Canon MT-24EX Metz MS-1 Sigma EM-140DG	Canon MR-14EX Canon MT-24EX Metz MS-1 Sigma EM-140DG	Metz MS-1 Nikon R1Dual Point Sigma EM-140DG	Metz MS-1 Nikon R1Dual Point Sigma EM-140DG	Metz MS-1 Nikon R1Dual Point Sigma EM-140DG
Macro Lens Compatibility	Canon 60mm EF-S Canon 100mm Canon L 100mm Sigma 105mm	Canon 60mm EF-S Canon 100mm Canon L 100mm Sigma 105mm	Canon 60mm EF-S Canon 100mm Canon L 100mm Sigma 105mm	Canon 60mm EF-S Canon 100mm Canon L 100mm Sigma 105mm	Nikon 60mm Nikon 85mm VR Nikon 105mm VR Sigma 105mm	Nikon 60mm Nikon 85mm VR Nikon 105mm VR Sigma 105mm	Nikon 60mm Nikon 85mm VR Nikon 105mm VR Sigma 105mm

Key Review Points:

- When selecting a digital camera system, components to **maximize quality** should be: **1)** lens, **2)** flash and then **3)** body.
- Select a lens with a **fixed** focal length of roughly 100mm and manual focus capability.
- Select a **flash** with a known neutral color temperature that mimics daylight - approx. **5500°K**. A dual point flash is recommended when capturing surface detail is important.

raw jpeg

Image File Formats:

JPEG vs RAW

- **JPEG** (Joint Photographic Experts Group) - also known as .jpg
- Is a commonly used method of **lossy compression** for digital photography (image).
- The degree of compression can be adjusted, allowing a selectable tradeoff between storage size and image quality. JPEG typically achieves 10:1 compression with little perceptible loss in image quality. As compression increases, file size decreases.

JPEG vs RAW

- **JPEG** (Joint Photographic Experts Group) - also known as .jpg

JPEG vs RAW

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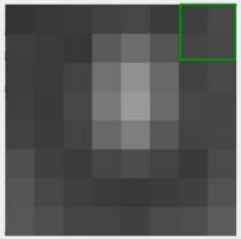
JPEG vs RAW

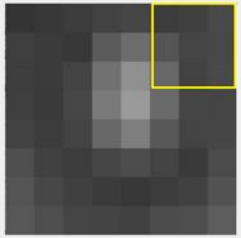
- **JPEG** (Joint Photographic Experts Group) - also known as .jpg



LOW Compression

JPEG vs RAW

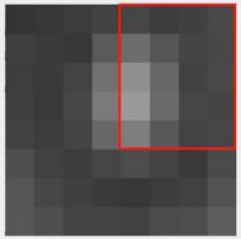
- **JPEG** (Joint Photographic Experts Group) - also known as .jpg



MED Compression

JPEG vs RAW

- **JPEG** (Joint Photographic Experts Group) - also known as .jpg



HIGH Compression

JPEG vs RAW

- **JPEG** (Joint Photographic Experts Group) - also known as .jpg

LOW Compression

MED Compression

HIGH Compression

JPEG vs RAW

- **RAW** - Raw Disc Image Format
  - "digital negative"
  - minimally processed data from sensor
  - requires conversion for use
  - wider dynamic range and color gamut
  - large file size
  - special software needed for conversion

Lens Filters: Protect your investment

- UV - **Protection Filter**

Photo Accessories:

- Cheek retractors

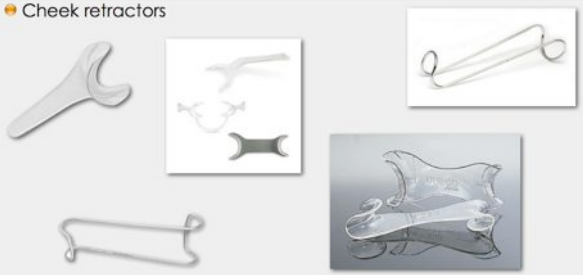


Photo Accessories:

- Cheek retractors
- Handle mirrors (Occlusal & Lateral) (PhotoMed)

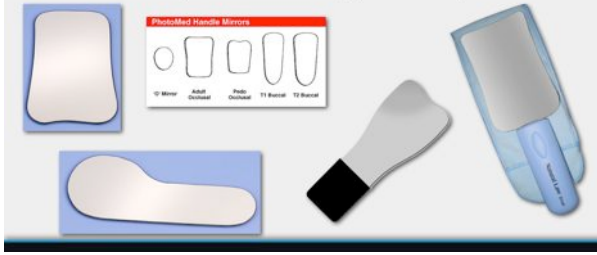


Photo Accessories:

- Cheek retractors
- Handle mirrors (Occlusal & Lateral) (PhotoMed)
- Background Contrast (Photomed, Praticon)

Photo Accessories:

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- Background Contrast (Photomed, Praticon)
- Warm water/heating pad
- Air syringe
- Suction

Photo Accessories:

- Cheek retractors
- Handle mirrors (Occlusal & Lateral) (PhotoMed)
- Background Contrast (Photomed, Praticon)
- Warm water/heating pad
- Air syringe
- Suction

Clinical Set-up:

- **Retractors** - Rectangular wire (Hu-Friedy)
- **Mirrors** - Titanium with handle: Lateral T1 and Adult occlusal. We keep a few Lateral T2 and Pedo occlusal as well. (Photomed.net)
- **Contrasters** - plastic 50/case (Practicon Dental®)
- **Heating Pads** - local pharmacy

Photographic Principles

General Overview:

- **Camera body:**
  - exposure control
  - white balance
- **Light Source:**
  - manual, TTL(ETTL)
- **Lens:**
  - framing & focal plane

Basics of Technique:

Exposure? What! Why?

- As magnification increases (macro-photography) - exposure increases by a factor of 4
- To obtain correct exposure, adjust the following factors:
  - Aperture, Shutter Speed, Film Speed, Light Source (Illumination)

Basics of Technique:

What is the most reliable adjustment?

- **A**perture, **S**hutter Speed, **F**ilm Speed, **L**ight Source (Illumination)

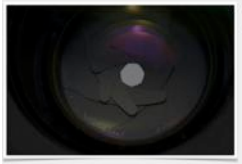
Aperture - Amount of light transmitted through the lens

Lower number, more light, **less** depth

Higher number, less light, **more** depth

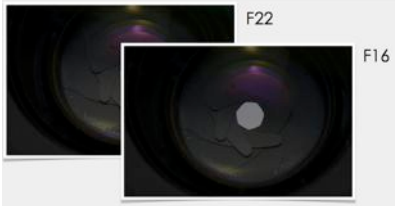
2.8, 4, 5.6, 8, 11, 16, 22, 32...

Aperture - Amount of light transmitted through the lens



F22

Aperture - Amount of light transmitted through the lens



F22

F16

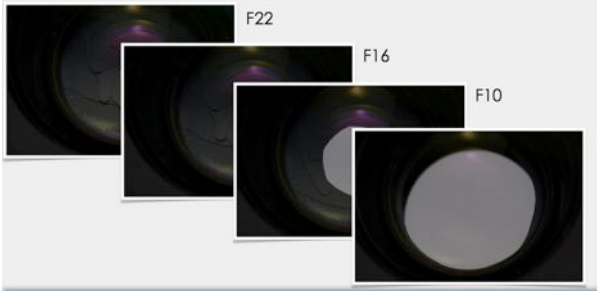
Aperture - Amount of light transmitted through the lens

F22

F16

F10

Aperture - Amount of light transmitted through the lens



F22

F16

F10

F4

Shutter Speed - Amount of time CCD is exposed to light

Method: Decrease shutter speed to increase light

CON: increase risk of blurring

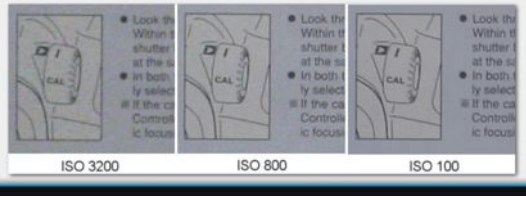
Not for dentistry, dental cameras need to be fixed at 1/200th

Film Speed - ISO Setting - adjusts sensitivity of CCD to light

Method: Increase the ISO setting

CON: Reduction in the image quality = granular images

Not for dentistry: dental cameras need to be fixed at ISO 100-200



Light Source - Illumination of the subject

PRO: User has control with decrease in negative side-effects

Caution: position and type of light

In Dentistry: utilize flash, not overhead light

Light Source

- **iTTL** (ETTL) vs. **Manual**

Canon

Push SEL until +0.3 blinks

Sigma

Light Source

- **iTTL** (ETTL) vs. **Manual**

Canon

Sigma

+ or - to increase or decrease

TTL (ETTL) vs. Manual Flash Control:

- **EXPOSURE** control:
  - **Automated TTL** exposure requires less initial learning, but may achieve less consistent results.
  - **Manual exposure** requires more initial learning, but can achieve very consistent results.
- A camera with both automated TTL features as well as manual exposure features is recommended, allowing the clinician to choose based upon situation and experience.

Dr. Douglas Terry

Light Source

- iTTL (ETTL) vs. Manual
- **Ring Flash** vs. **Point Flash**

To Summarize:

What are the most reliable adjustments for **under** and **over** exposure?

Aperture (within reason and understand risks)

&

Light Source (location and type)

White Balance:

- The **white balance** setting is used to **compensate** for different lighting conditions to insure that colors are faithfully recorded.
- The majority of digital camera systems offer an **AUTOMATIC** white balance feature. When selected, the camera will attempt to ascertain the type of light and then make proper adjustments.
- The **dental setting** provides a **difficult environment** for ideal results when the AUTOMATIC setting is used, **due to: operatory lights, and intra-oral environment.**

White Balance:

- Can be corrected prior to exposure or during the editing process assuming proper exposure was achieved.
- **In Clinic:**
  - Flash setting
  - Custom setting (5500 K)
  - Expo-disc
- **During editing:**
  - WhiBal card
  - Neutral grey card

Nikon Camera Settings - Dental Environment

- **Camera body:**
  - Aperture Priority (29 IO, 5 EO)
  - High Res - JPG
  - White Balance Setting - Flash
- **Lens:**
  - Manual Focus
- **Light Source:**
  - TTL

Exposure adjusted through flash output or camera body.

Canon Camera Settings - Dental Environment

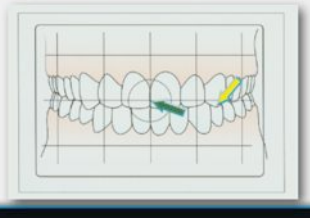
- **Camera body:**
  - Aperture Priority (29 IO, 5 EO)
  - High Res - JPG
  - White Balance Setting - Flash
- **Lens:**
  - Manual Focus
- **Light Source:**
  - ETTL +1/3

Exposure adjusted through flash output or camera body.

Clinical Principles:

Principles of Clinical Photography

- **Framing:**
  - what is in the shot
  - better framing = reduced editing



Framing

Framing

Framing

Framing

Framing

Focal Plane:

- ...depth of field

Focal Plane:

- ...depth of field

Focal Plane:

Focal Plane:

Focal Plane:

Adequate depth of field = Proper **F-stop** & **Focal Plane**

LCD - Camera Back

- **Calibrate** b/t monitor and camera

Keys for good photography:

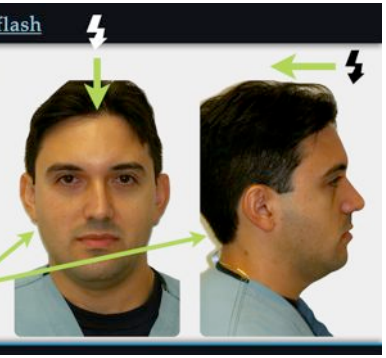
- Balanced Photographer
- Well Positioned Patient
- Excellent Retraction
- Clean Mirrors
- Centered Well Framed Shot
- Dry Field
- Parallel Occlusal Plane

Photographic Techniques

- **Standard Photographic Series:**
  - **Extra oral:**
    - Full frontal (rest & smile), Full Lateral, Smile
  - **Intra oral:**
    - Frontal, Frontal open, Oblique, Occlusal, Lateral
- **Miscellaneous Views:**
  - Clinical
  - Laboratory

Extra-Oral Photo: with flash

- Full Frontal - 1:infinity
- Full Lateral - 1:infinity



Accessory: Light-box (slave)

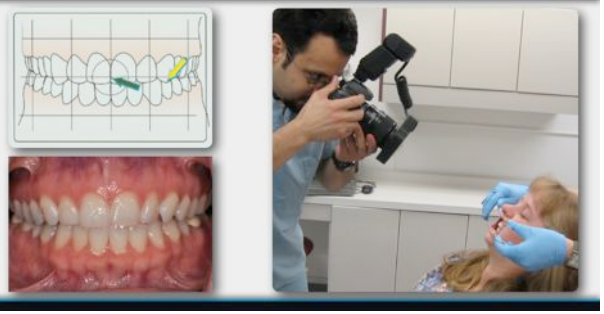
Extra-Oral Photos:

- Smile - 1:3

Intra-Oral Photos 1:2-2.5

- Frontal - 1:2-2.5
- Frontal Open - 1:2-2.5

Frontal:



Frontal:

Frontal:

Frontal: Troubleshooting

Align **perpendicular** to framed subject

Inferior

Perpendicular

Intra-Oral Photos 1:1 - 2:1

- Max & Mand. anterior - 1:1 - 2:1

Magnified Anterior:

- Similar center, cutoff at **distal** canine
- Focus on **mesial** of lateral
- Occlusal plane parallel

Intra-Oral Photos 1:2

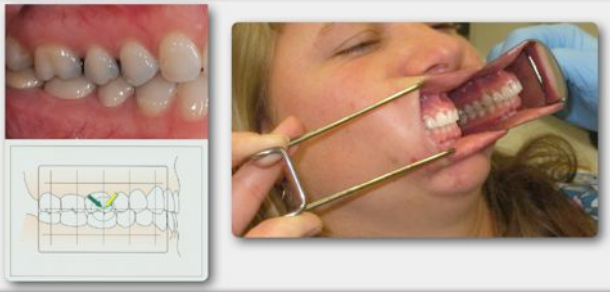
- Oblique (direct) - 1:2

Intra-Oral Photos 1:2

- Right Lateral (mirror) - 1:2
- Left Lateral (mirror) - 1:2

Lateral Views:

Lateral Views:



Intra-Oral Photos 1:2

- Maxillary Occlusal (mirror) - 1:2.5-3
- Mandibular Occlusal (mirror) - 1:2.5-3

Maxilla:

Maxilla:

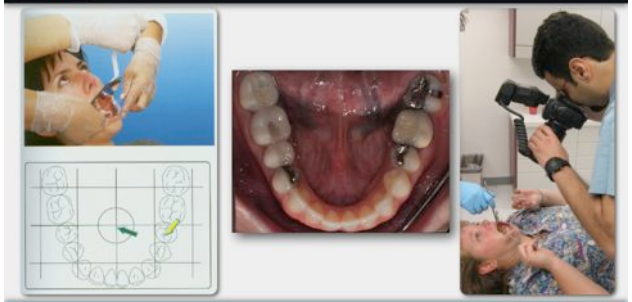


Photo Composition:

- Proper patient positioning
- Balanced camera and photographer
- Clean & Dry field
- Wide retraction
- Center subject
- Correct angle
- Crop with your viewfinder

Additional Views:

- Single tooth - 1:1, 2:1
- Quadrant
- Shade Communication
- Demonstration Views
- Miscellaneous

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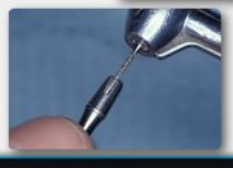

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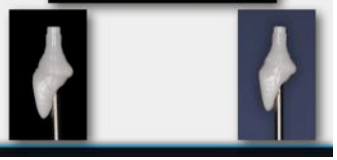

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- Single tooth - 1:1, 2:1
- Quadrant
- Shade Communication
- Demonstration Views
- Miscellaneous

F<5, flash off, monochrome

Additional Views:

Light Tent with *Circular Polarizer Filter*

Additional Extra-Oral:

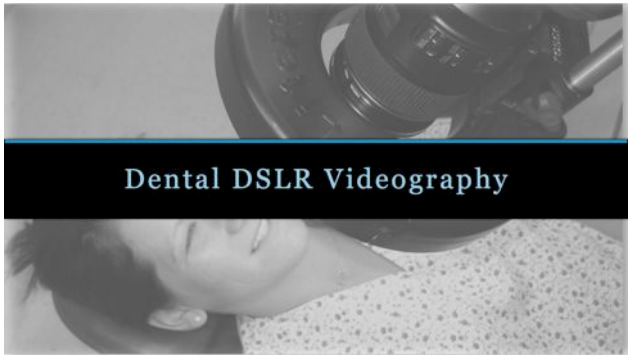
Large **Bounced Flash** = 3D lighting for better portraits especially with aesthetic treatment



Additional Extra-Oral:

Large **Bounced Flash** = 3D lighting for better portraits especially with aesthetic treatment

Ring 
 Bounce



Requirements

- DSLR capable of recording video
- Macro lens (preferable 85mm)
- Constant light source
- Stable anchor for camera - i.e. tripod

Flash Systems - Rosco Litepad

Flash System - Sima Video LED Flash x 4

Video Example

Photographic Challenges

Parallel to floor

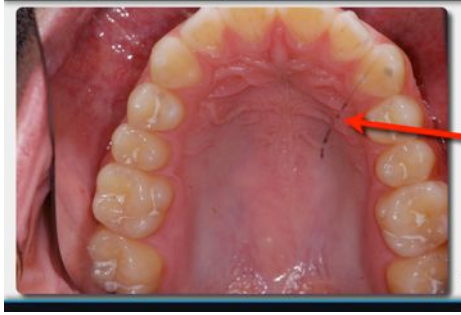
Photographic Challenges

Remove glasses

Photographic Challenges

Framing & Angulation

Photographic Challenges



Scratched mirror

Framing

Photographic Challenges

Framing
Angulation
Fogging of mirror

Over- or Under-exposure

What do you do **first** to trouble-shoot this situation?

Trouble Shooting:

1. Check camera settings
   - Aperture setting
   - F-stop (29 IO & 5 EO)
   - WB - Flash

Trouble Shooting:

2. Check if flash shoe is seated

Trouble Shooting:

3. Check flash settings

What if all is correct and pictures are still inconsistent?

Trouble Shooting:

4. Check the **BATTERIES!**

Most common reason for inconsistent exposure problems

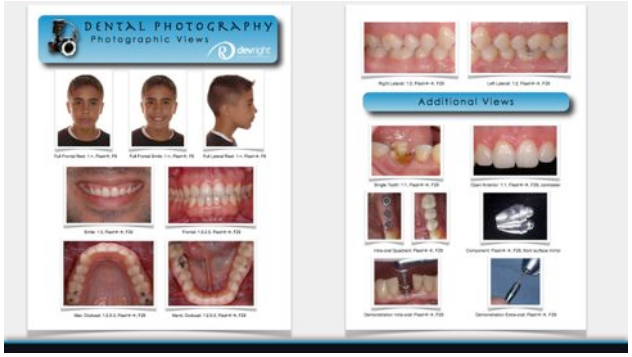
Digital Photography RULE:

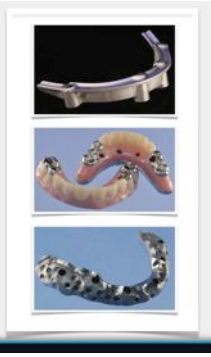
ALWAYS turn camera off before removing flash card.

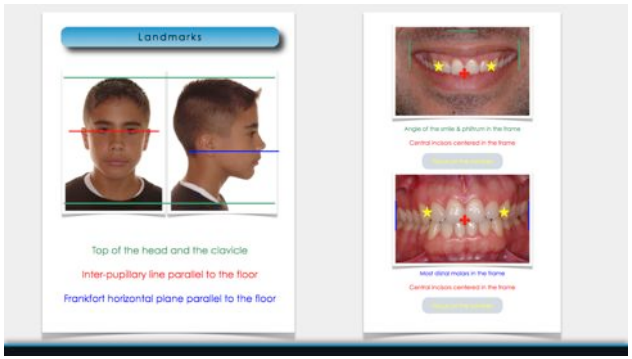
DENTAL PHOTOGRAPHY
Photographic Views

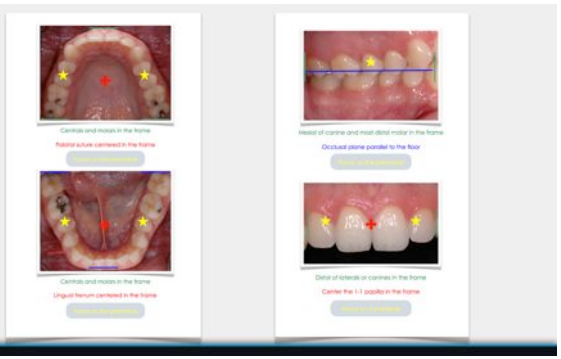
devright

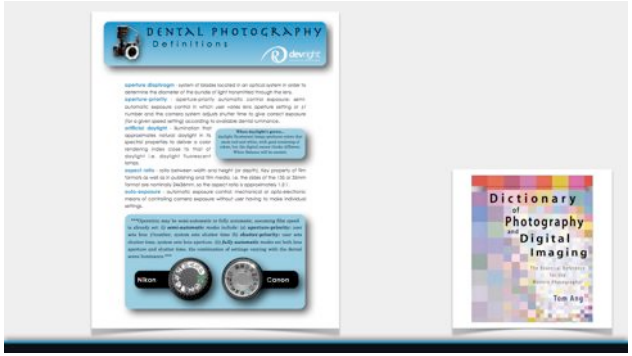
Clinical Photography Cheat-Sheet







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