

Academy of Osseointegration
Advancing the Vision of Implant Dentistry



Active Member
American Academy of Periodontology

IMPLANT COMPLICATIONS: CAUSES, CORRECTION AND PREVENTION

James Woodyard, DMD, MS
Diplomate American Board of Periodontology



Evansville, In



Thunder on the Ohio

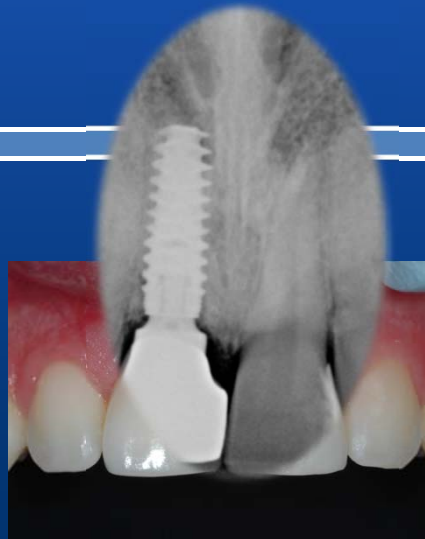


Disclaimer

- ❑ I am not being paid by any manufacturer or dental corporation for today's lecture
- ❑ No slides have been altered except cropping and resizing.
- ❑ I am in private practice and I put my pants on one leg at a time like everyone else in this room.



Why I like implants





Why I HATE implants....



Hard Lessons

2007 Implant and abutment



2007 after crown seated – called dentist





Peri-implantitis 4 years later...



- Patient compliant w/ 3 mo recall
- 2011 probe depth 6mm+ with soft tissue inflammation
- His general dentist would not address problem and the patient sought second opinion



Crown removed, area surgically debrided, healing abutment placed, and then crown/abutment replaced

Cement not visible on radiograph



Abutment margin too deep to clean





Here is a case I was really proud of!

9/2007



- Surgical guide perfect
- Osteotome sinus lift #14 perfect
- Placement was perfect



Still a Good Day

- #13 bone loss to first thread – acceptable
- Papilla maintained
- Occlusion is perfect
- Crowns with nice emergence
- Crowns look like they are seated well (#13 slight open margin)



□ 10/2008



Bad day

11/2008



- Buccal fistula on #14
- #14 -6 mm PD Facial and DB

Cement...





It gets worse... 7/2010



- Patient become non compliant with recall and disappears
- #13 PD 6-8mm
- #14 PD 6-8mm

Surgery 7/2010= Lingual cement



Bone Graft and membrane



Implants are not like teeth!

We all make mistakes

As long as we learn from them we are better!

That is why we are here today

Goals for Today

Peri-implant disease and bone loss

- Diagnosis
- Frequency
- Causes
- Consequences

How to avoid Complications

- Improper loading
- Prosthesis/abutment design or crown seating
- Improper placement
- Poor tissue quality
- Peri-implantitis in periodontitis patient

Techniques to Fix some Common problems

Loose screws

Broken screws

Removing implant crowns



What are the success rates of implants?

Where, for what, and for who?

Implant Success in my Office

Study or location	Time span	# of implants	Implant location / type	# of Failures	Percent success rate
Woodyard Perio- IN	2004-2017 13 years	3190	All areas, types of restorations and patients	103- mostly cluster	97.8%

➤ 95-98% success rates for single tooth implants based on current literature

Becker W, Dahlin C, Becker BE, et al. Int J Oral Maxillofac Implants 1994;9:31-40.

Gelb DA. Int J Oral Maxillofac Implants 1993;8:388-399.

Lazzara RJ. Int J Periodontics

Levin Let al . J Periodontol. 2006 Sep;77(9):1528-32



Implant Success and Survival Rates

- Implant survival rate with single crowns
 - 98% after 6 – 7 years
- Implant success with fixed partial dentures
 - 94% after 6 – 7 years
- Implant survival with fixed partial dentures
 - 95% after 5 years and 93% after 10 years
- Implant Success with Implant Overdentures
 - Maxilla 81% and Mandibular 96%

Creugers, J Dent 2000;28:209 – 217
Lindh, Clin Oral Impl Res 1998;9:60 – 90
Pjetursson, Clin Oral Impl Res 2004;15:625 - 642
Berglundh, J Clin Periodontol 2002;29:197 – 212

Goodacre CJ, Kan JY, Rungcharassaeng K. J Prosthet Dent. 1999 May;81(5):537-52. Clinical complications of osseointegrated implants.

If they fail is it Before or After Prosthetics

	Pre-prosthetic	Post-prosthetic
Fixed hybrid (8)	54%	46%
Overdenture (13)	60%	40%
Bridge FPD (8)	61%	39%
Single crowns (6)	47%	53%

Goodacre CJ, Kan JY, Rungcharassaeng K. J Prosthet Dent. 1999 May;81(5):537-52. Clinical complications of osseointegrated implants.

Time of Post-prosthetic Implant Loss (5 Studies)

- 57% of the failures occurred in 1st year
- 34% of the failures occurred in the 2nd year
- 9% of the failures occurred in the 3rd year

Goodacre CJ, Kan JY, Rungcharassaeng K. J Prosthet Dent. 1999 May;81(5):537-52. Clinical complications of osseointegrated implants.

Reasons for POST-prosthetic implant loss

- ❑ Improper loading
- ❑ Improper prosthesis / abutment design or crown seating
- ❑ Improper implant placement or size corresponding to proposed restoration.
- ❑ Lack of attached mucosa / poor tissue quality
- ❑ Peri-implantitis – cement, open or poor margins, presence of periodontitis
- ❑ Patient systemic factors – smoking, immunosuppression
- ❑ Patient maintenance noncompliance

****Most often it is a combination of several things and we have to focus on what we can control!!**

Goodacre CJ, Kan JY, Rungcharassaeng K. J Prosthet Dent. 1999 May;81(5):537-52. Clinical complications of osseointegrated implants.

Peri-implant disease

- ❑ There are two stages of periimplant disease: while **mucositis** is a reversible inflammation of the periimplant soft tissue without any bone loss, **periimplantitis** affects the soft and hard tissue, resulting in the loss of supporting peri-implant bone.

Albrektsson T, Isidor F. Consensus report of session IV. In: *Proceedings of the First European Workshop on Periodontology*, eds. Lang NP, Karring, T. London: Quintessence; 1994: 365 - 369.

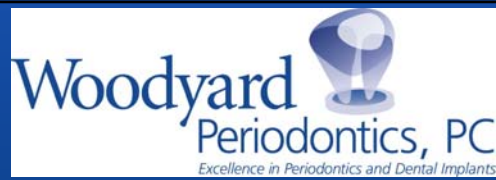
Diagnosis of Peri-implant disease

- Peri-mucosistis = gingivitis on teeth
 - Bleeding on probing
 - Visible soft tissue inflammation
 - Probe depths do not exceed 4 mm (3 mm for teeth)
 - Usually no pain
- Peri-implantitis = periodontitis on teeth
 - Periodontal probe depths exceed 4 mm
 - Visible soft tissue inflammation and/or swelling
 - Bleeding on probing and/or suppuration/pus
 - Radiographic bone loss beyond 1st thread during 1 year – due to 2D of radiographs this underestimates disease
 - Implant mobility
 - Often no pain or a dull ache



Cement retained restorations: A major cause for peri-implant disease

Peri-cementitis



CEMENTS ON RADIOGRAPHS... WHAT WE DO NOT SEE!



A DESCRIPTIVE STUDY OF THE RADIOGRAPHIC DENSITY OF IMPLANT RESTORATIVE CEMENTS

Chandur Wadhwani, BDS, MSD,^a Timothy Hess, DDS,^b Thomas Faber, DDS, MSD,^c Alfonso Piñeyro, DDS,^d and Curtis S. K. Chen, DDS, MSD, PhD^a
University of Washington, Seattle, Wash

Statement of problem. Cementation of implant prostheses is a common practice. Excess cement in the gingival sulcus may harm the periodontal tissues. Identification of the excess cement may be possible with the use of radiographs if the cement has sufficient radiopacity.

Purpose. The purpose of this study was to compare the radiographic density of different cements used for implant prostheses.



Tempbond NE
Improv
Relyx Luting

Test: 8 Cements

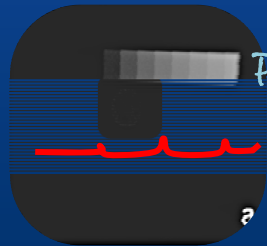




Implant Specific cements

IMPROV

PREMIER IMPLANT CEMENT



Problem !



Not visible- but could just be detected at 2mm thick

NOT detectable at ANY thickness

Visible



Temp Bond Original
Temp Bond NE
Zinc Phosphate

>1mm thick disk

Can residual cement be seen clinically on a radiograph?

- 53 patients w/ 53 single biohorizons internal implant crowns
- made with occ access holes covered with composite at cementation.
- Cleaned, radiographed and then removed to identify residual cement

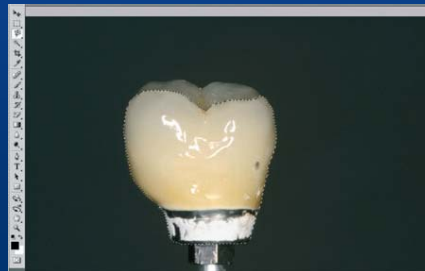


Linkevicius et al Clin oral Implants Res, 2012



Can residual cement be seen clinically on a radiograph?- **NO**

- **When Cement was present it was ONLY detected medially 7.5% and distally 11.3% on radiographs**
- Results -showed the deeper the margin the more cement that remained
- The only crowns that did not have cement has margins **less than 1 mm subgingivally.**



Linkevicius et al Clin oral Implants Res, 2012



We try to check

At bone level check- everything looked good



3 months later when cement detached



2009 J.Perio : A study confirming excess cement induced Peri-implantitis

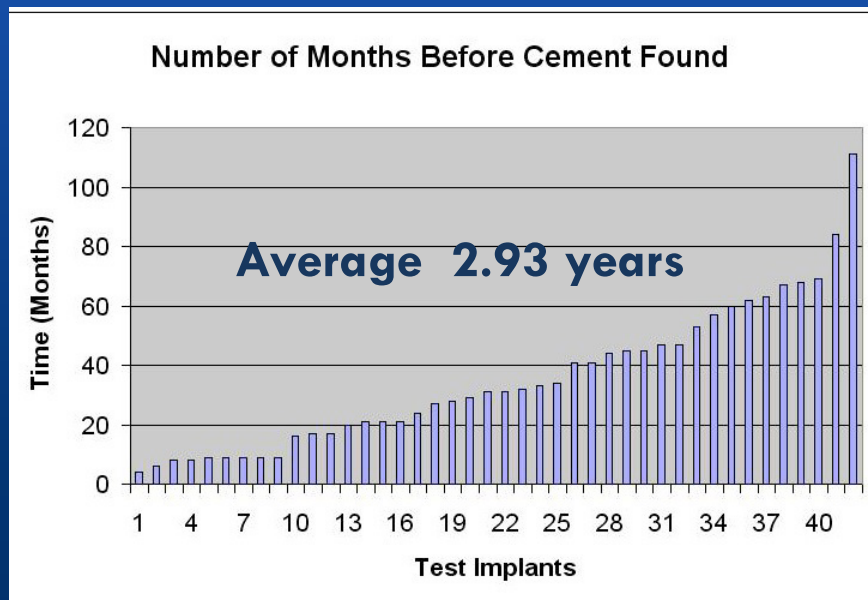
- **80 %** Peri-implantitis cases due to excess cement
- Excess cement acts as a **seeding surface** for **bacteria** to attach
- Once removed, **resolution** in **> 75%** cases
- Peri-implantitis delayed effect **4 months -10 years post restoration**

Wilson TG- Journal Periodontology Sept 2009



Cement is to Implants what Calculus is to Teeth

-James Woodyard



Time for peri-Implantitis to be detected- 4mths-10 yrs



Why does an implant behave differently when cemented?

It is all in the biologic attachment and the patients response to inflammation



Tooth

Biology!

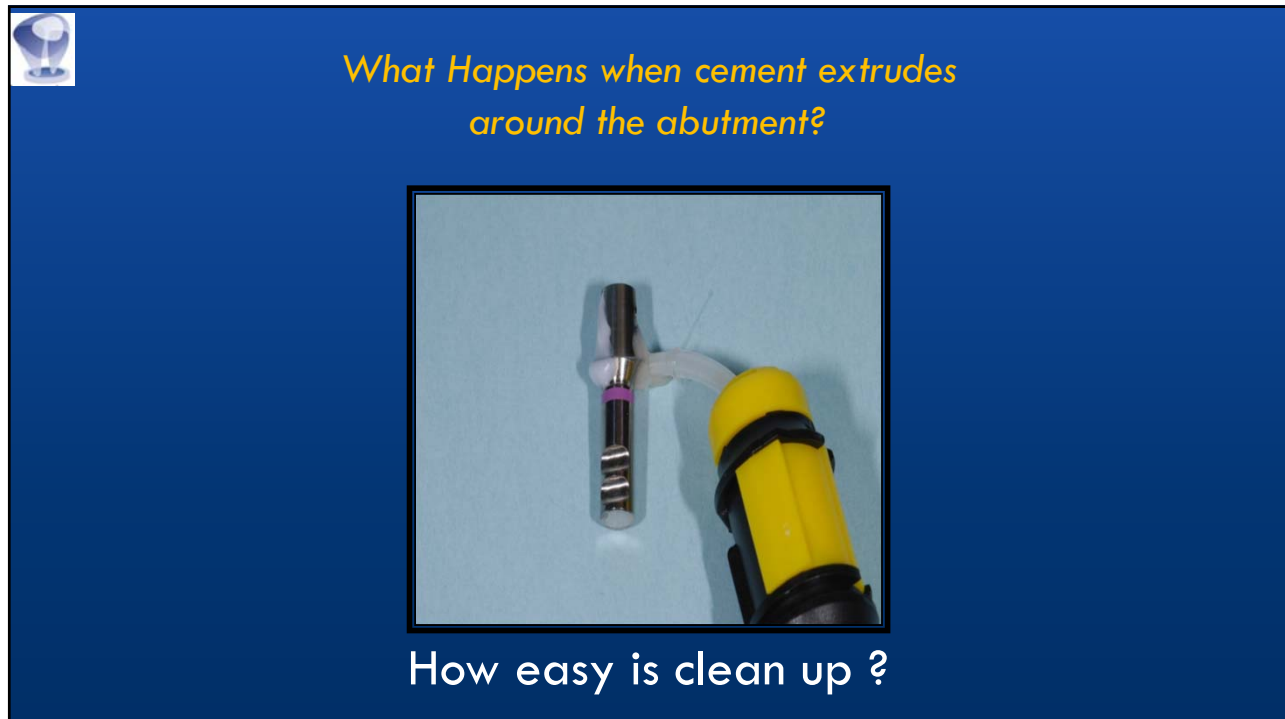
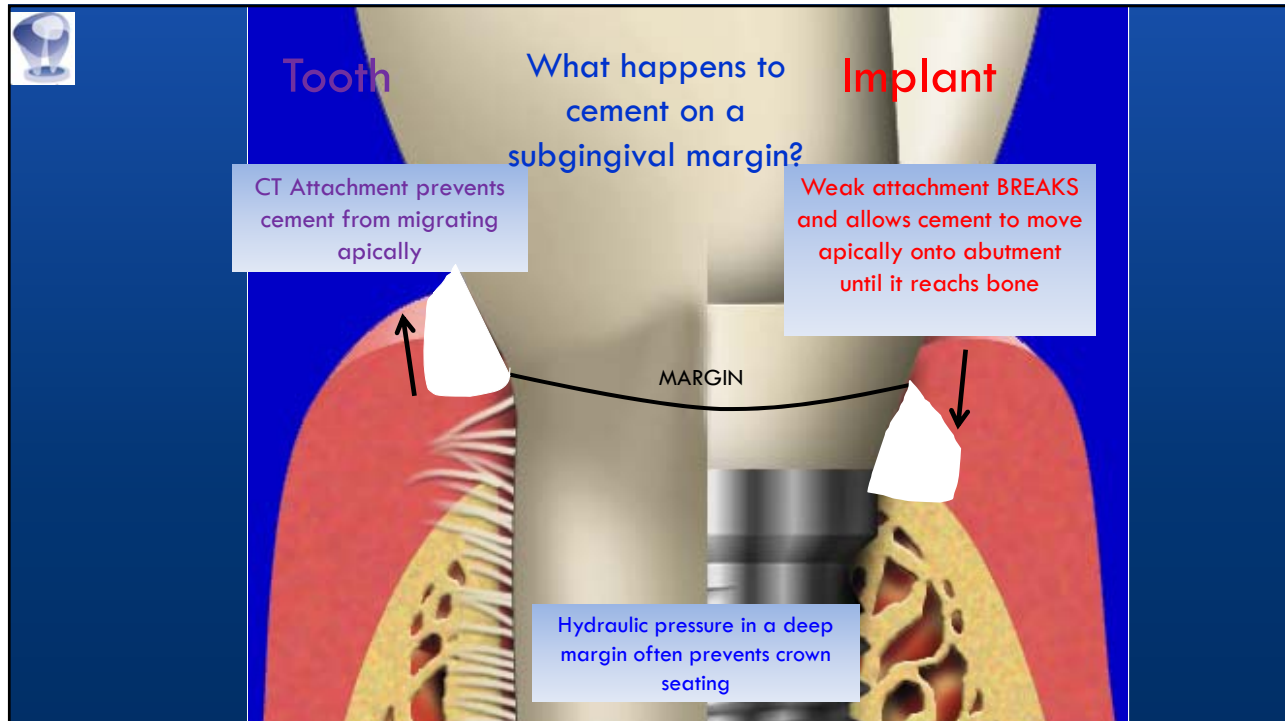
Implant

Well developed with
transverse fiber bundle
Insertion attachment

Hemidesmosomal
attachment only. No direct
insertion attachment

"Strong Seal"

"Weak Cuff"





*Allowed to set for 24
hours*



Clean up: Use plastic instruments to prevent
“scratching” surfaces





Problem !



Harder (adhesive) cements are more difficult to remove without damage, and residue likely to remain, particularly with "Platform / abutment" size mismatch

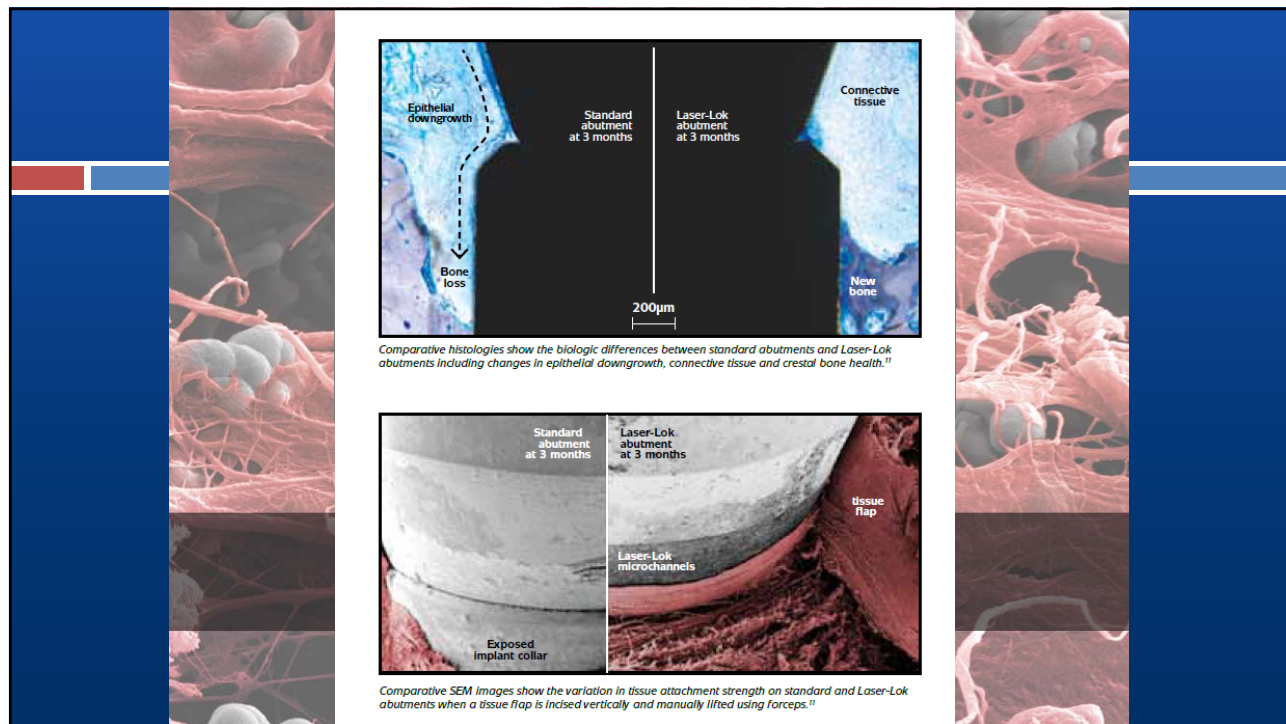
Laser-Lok[®]
microchannels

James Woodyard, DMD, MS

Attachment more like a tooth!



BIOHORIZONS[®]



Let's start with a patient



- CC: I have a blister on my gumline but no pain
- 10 mm buccal probe depth and class II furcation on the buccal of the tooth
- No mobility



Initial Radiograph



- Bone loss in furcation – diagnosis root perforation



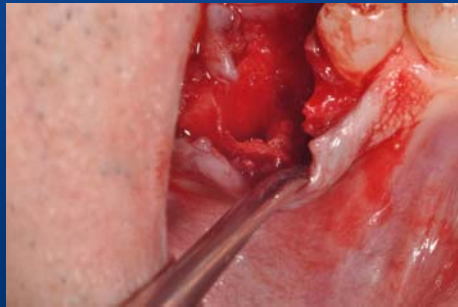
Surgical Access



- Perforation on mesial of distal root



Severe Bone Loss



- No buccal plate due to infection



Ridge Preservation



- Defect debrided and all remnants of soft tissue removed
- Buccal and lingual tissue flapped
- MinerOss cortical cancellous used to fill defect and covered with a Renovix collagen membrane



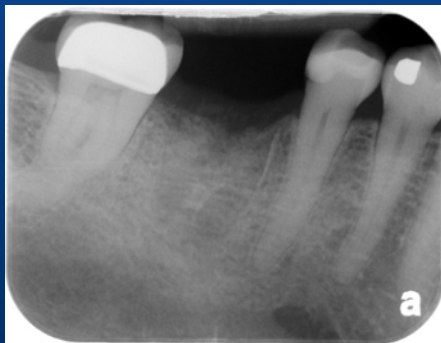
Surgical Closure



- PRF (platelet rich fibrin) added over the membrane to accelerate soft tissue healing and closure

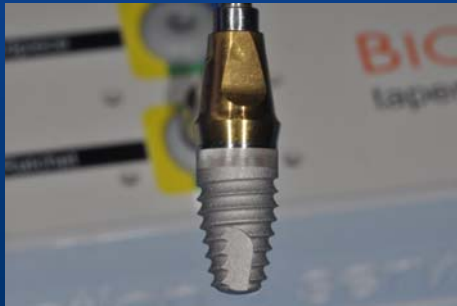


4 months Post Extraction





BioHorizons Laser-Lok 5.8 x 9 mm Implant



Placement with a Tissue Punch



3inOne abutment lets me visualize proposed margin of final restoration and proposed screw hole placement for screw retained restoration



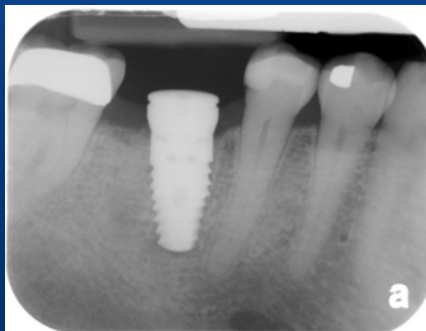
Internal Hex Attachment



- Color coded based on restorative components



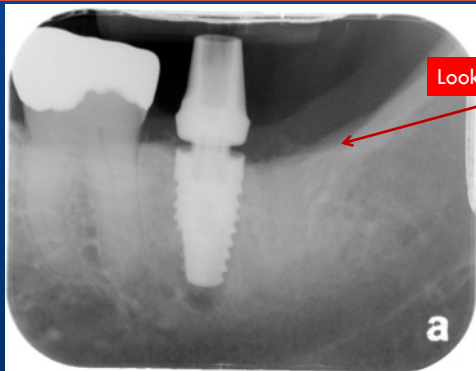
Healing Abutment



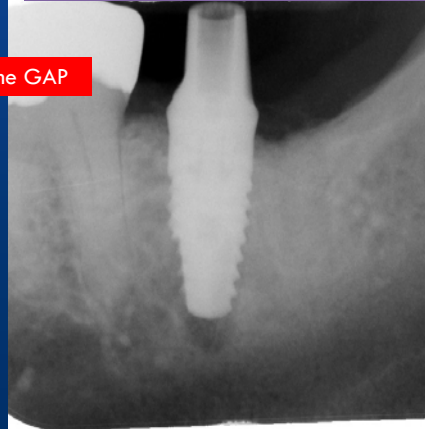


Is it seated?

This is a abutment or impression coping tightened and NOT seated



This is a abutment seated on a Laser Lok 5.7 mm implant



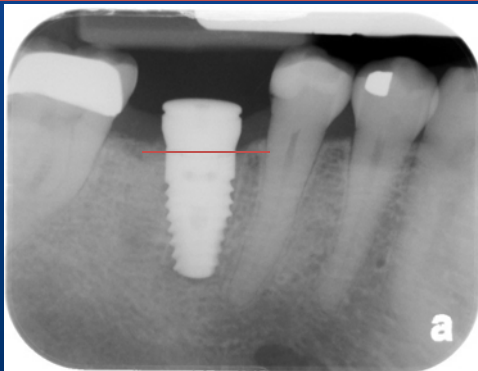
Final restoration 2 years after placement



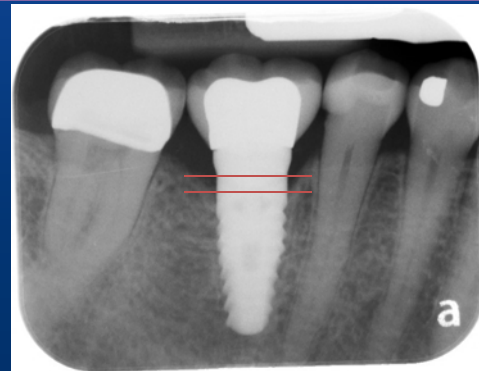


Could LazerLok tissue attachment this help with cement?

Initial placement



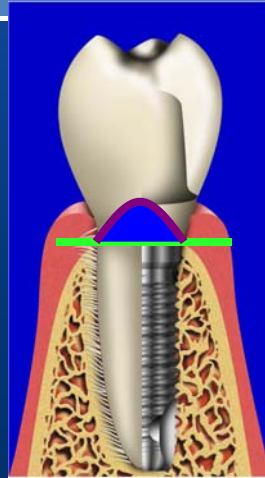
2 years later



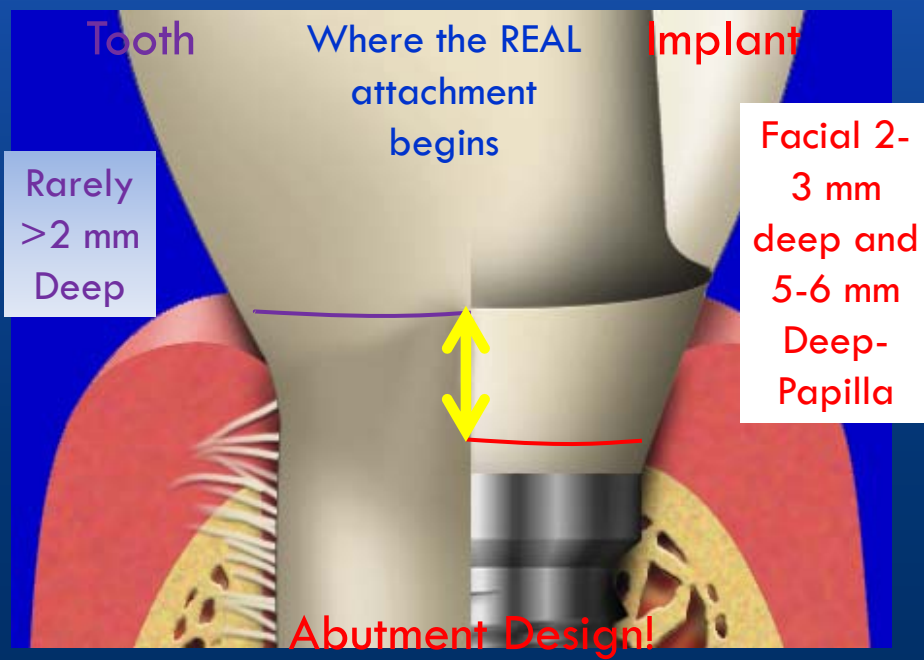
Improper loading and abutment/prosthesis design

Teeth and implants are different

Tooth versus implant



- Level of Microgap
- Level of Tooth CEJ
- Difference in attachment area
- CEJ is not round





Abutment NOT the Crown supports the tissue

Verify tissue height of final abutment $\leq 1\text{ mm}$
subgingival



Abutment



Abutment and crown design



- If cemented crown is desired, undercuts should be minimized and if they cannot then screw retained to support tissue is essential

Vindasiute et al, Clin Imp Dent and related research 2013



Implant and abutment design problems



- ❑ Often Crown margin too subgingival with prefabricated abutment- TOOTH MARGINS/CEJ'S ARE NOT ROUND!
- ❑ Abutment should support tissue – stock abutments rarely do this
- ❑ Overhangs can result in plaque and food impaction

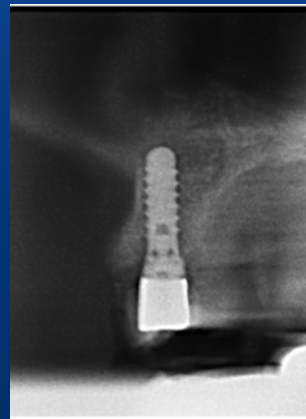


Margin too deep = cement

2 years post restoration- inflammation and probe depths 7-10mm



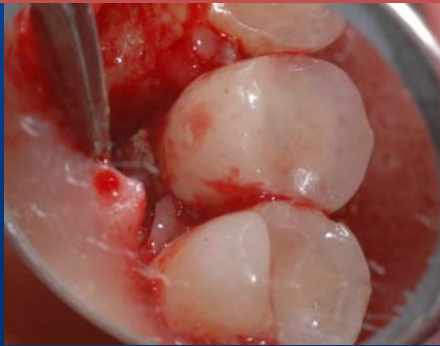
tomogram





Flap elevated

Palatal cement- MARGIN 6MM SUBGINGIVAL



Buccal cement-MARGIN 5MM SUBGINGIVAL



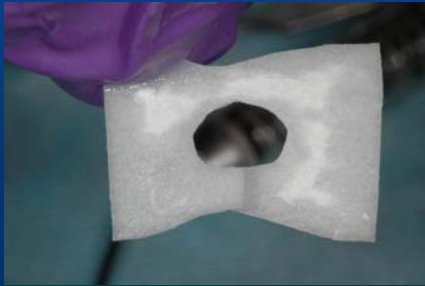
Debridement and Bone Braffing





Membrane

Membrane shaped



Placed in area



Closure





6 mo follow up

Initial 7-10 mm pd

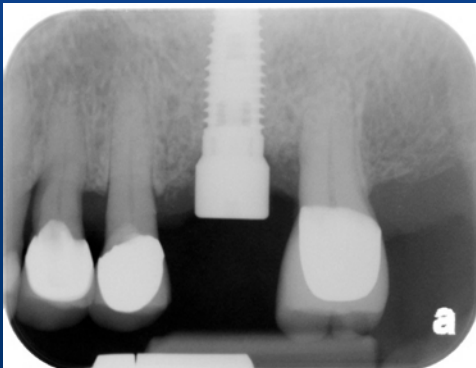


6 mo later 3 mm pd



Cement and abutment design

Final healing 1/2012



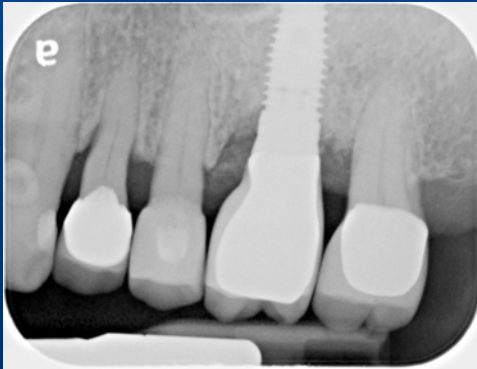
5/2012 PD 4mm of less



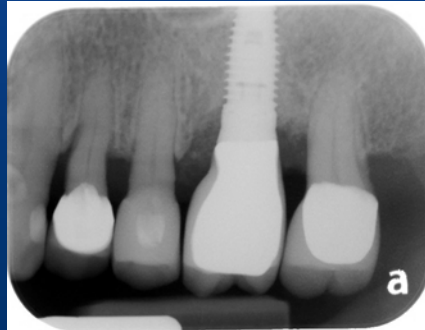


Cement and abutment design

8/2013 crown came off and recemented by GP



12/2013 PD 7 mm on mesial- no cement on x-ray



Problems-Cement, Abutment too short and Deep Margin





Result...

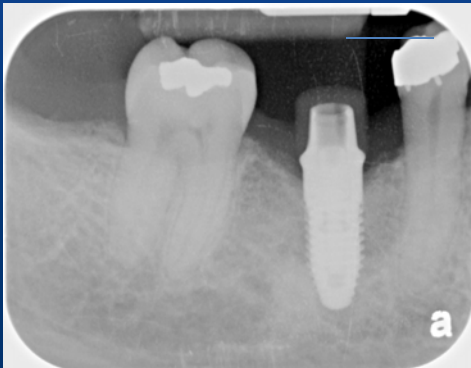


- Crown recemented at surgery with temp bond
- Pictures sent to GP and discuss that for long term crown and abutment needs to be replaced
- He retired and told her to leave it alone
- Dentist that took over had to deal with it



Abutment design

Final healing pre restoration

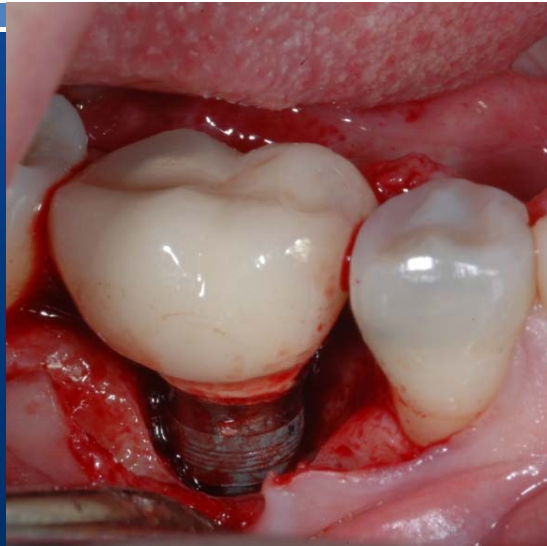


Final crown – see mesial





See the Damage Done



Radiopaque cement can be seen sometimes

Before flap



After flap notice no cement

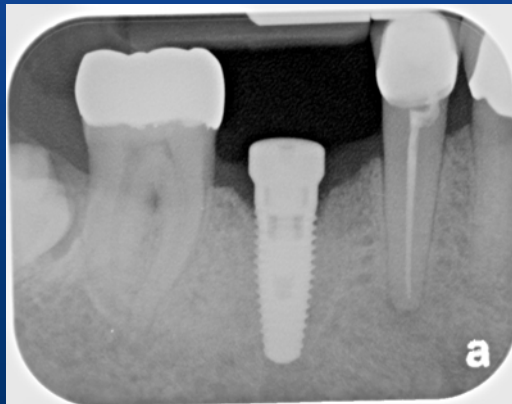




Occlusion on Implants

How they are different then Teeth

Occlusion?- Bruxer!



□ Before restoration



Crown design – should be flat and narrow B/L

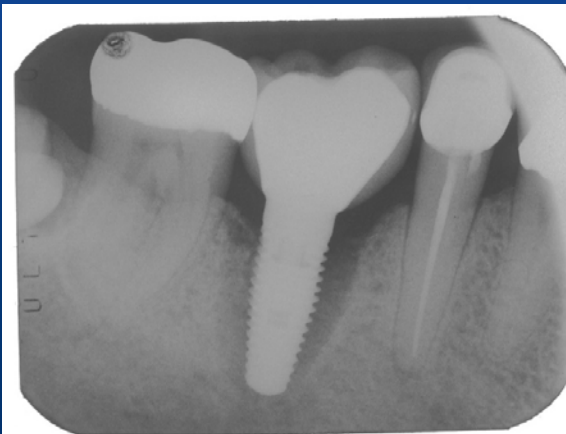
8 months after



8 months after rest

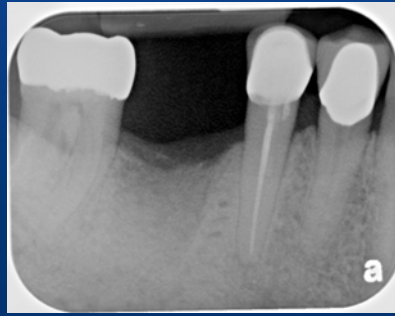


1 year in function





Damage done and how resolved – even left some cement



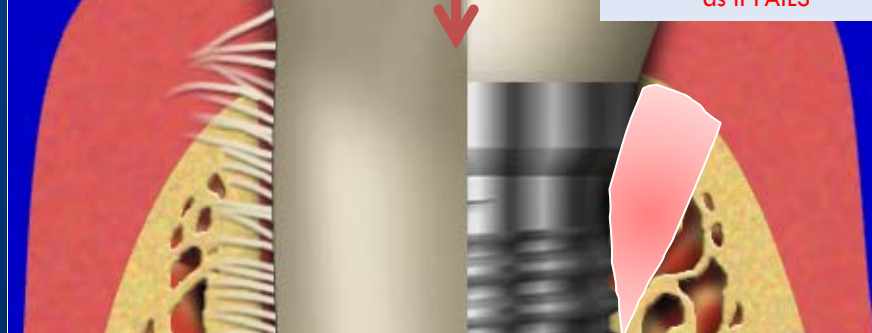
Tooth

PDL and crestal fibers allow teeth to repair, heal and reattach to bone when pressure is relieved. Repeated trauma can cause widened PDL space, Mobility and bone loss.

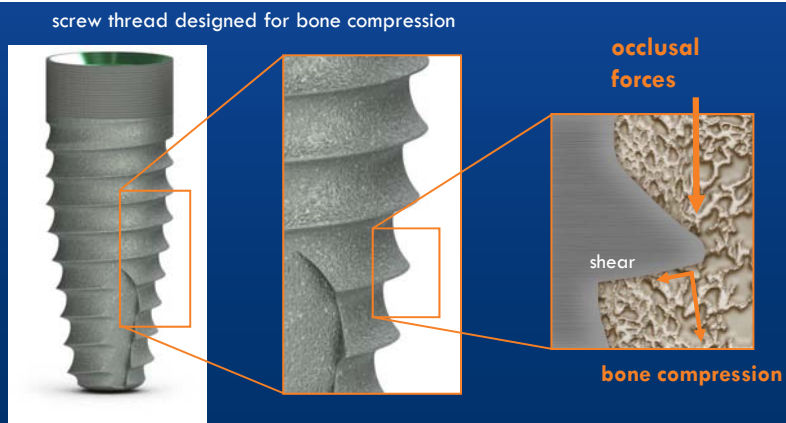
How Occlusal Trauma effects Implants and Teeth

Implant

Trauma cause microfractures in the implant/bone interface. This is replaced with fibrous connective tissue. **Healing/Repair does not occur.** Weakening the implant until it causes pain as it FAILS



Thread design – build for immediate load



buttress design has large, deep thread, and a low surface face to provide compressive rather than shear force



#14 pain on percussion

2015



2017





What is going on?



- Patient is severe Bruxer
- Dentist made the teeth out of occlusion completely
- No mobility, perio probing, or gingival inflammation



What are these used for?





The Effects of Hard and Soft Occlusal Splints on Nocturnal Bruxism

- ❑ HARD Occlusal Splint
 - ❑ Effect on Muscle activity: 80% significant decrease/20% had no change average of 25% decrease overall
 - ❑ Effect of Clinical Symptoms: 100% no increase in muscle pain or tiredness
- ❑ SOFT Occlusal Splints
 - ❑ Effect on Muscle activity: **50% significant increase**/10% showed significant decrease/40% no change
 - ❑ Effect on Clinical Symptoms: **40% muscle pain/20% muscle tiredness**

Okeson JP J Am Dent Assoc. 1987 Jun;114(6):788-91



“It may be concluded that in patients who have symptoms associated with increased nocturnal muscle activity, a soft occlusal splint is likely to be contraindicated.”

Okeson JP J Am Dent Assoc. 1987 Jun;114(6):788-91



The ONLY use for a soft mouthguard!!!



Forces with a Soft Splint and Bruxism





Forces with a well adjusted Hard Splint and Bruxism



You guessed it! She was wearing a soft splint!





Restoration design - Bruxer

Initial



Initial



Underengineered Restoration design



Cement too!



Now to a locator retained RPD



Ways to avoid this with Occlusal force issues

- ❑ Proper **occlusion** on implants
- ❑ Proper restorations design on occlusal table – **limit lateral forces**
- ❑ **Occlusal guards** are always good
- ❑ Do not shortcut in using fewer implants – **over engineer** – especially Bruxers
- ❑ **Margins** at gingiva or 1 mm below
- ❑ Design restorations to be cleansable, have the **abutment NOT the crown support the tissue** and screw retain as much as possible



Improper implant size

The is a correct size for each area!



External Resorption



Wanted to do immediate provisional circa 2004





Result is Recession due to Buccal bone loss

1 yr later



2 yrs later after crown lengthening

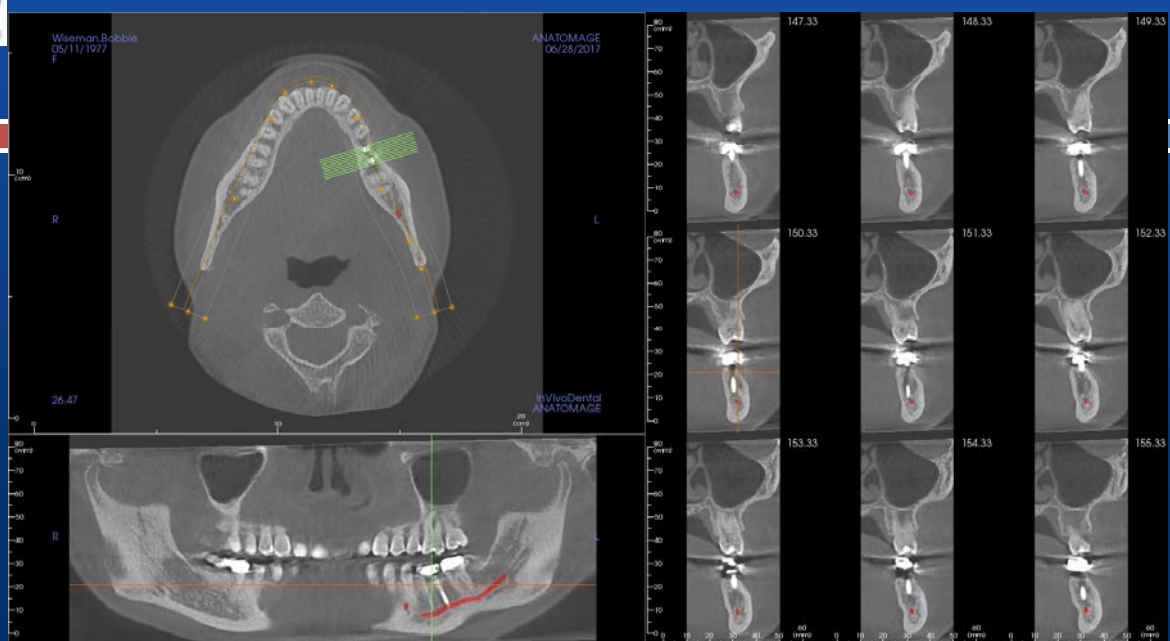


Initial presentation see #19





Initial presentation see #19

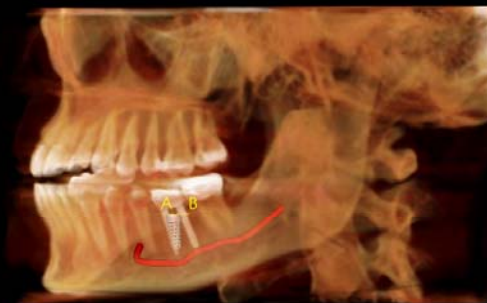
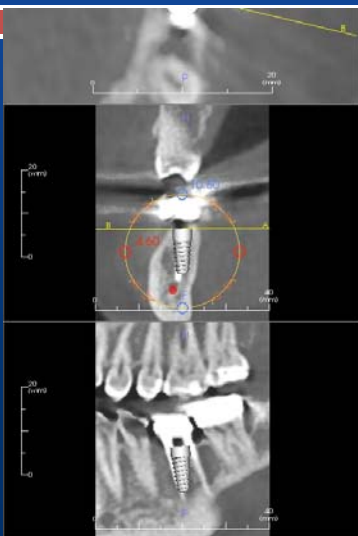




No paresthesia luckily



A Standard implant could have been done, but was not offered





Crown removal



How I fixed it.

Reverse torqued mini implants and removed, then placed implant

Added bone on the buccal and SECT graft





Custom Healing abutment with grafting

Surgical closure



Custom healing abutment



3 weeks later





Improper implant position

or how to extract implants



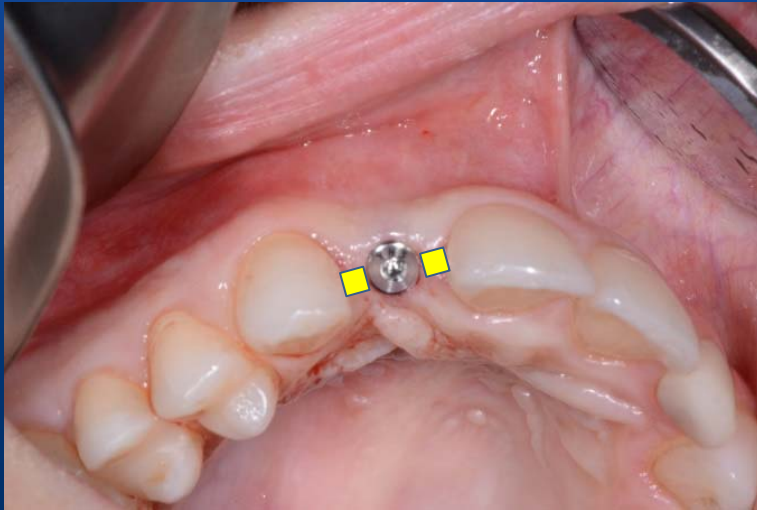
What is the Ideal Depth of a Implant when placed?



- 3-4 mm apical to CEJ of adjacent teeth



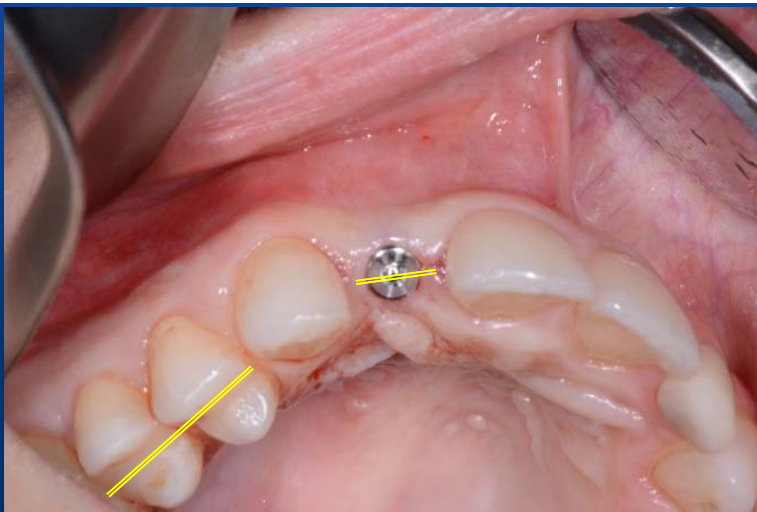
What is the Intertooth space of a Implant when placed?



- 1.5-2 mm of papilla may be in-between implant and adjacent tooth
- 4 mm in-between implants



What is the B-L position of a Implant when placed?



- In cingulum for anterior teeth
- In line with central groove for posterior teeth



Why does 2-3 mm matter so much?



Which will have deep periodontal pockets, trap food and likely develop periimplantitis?



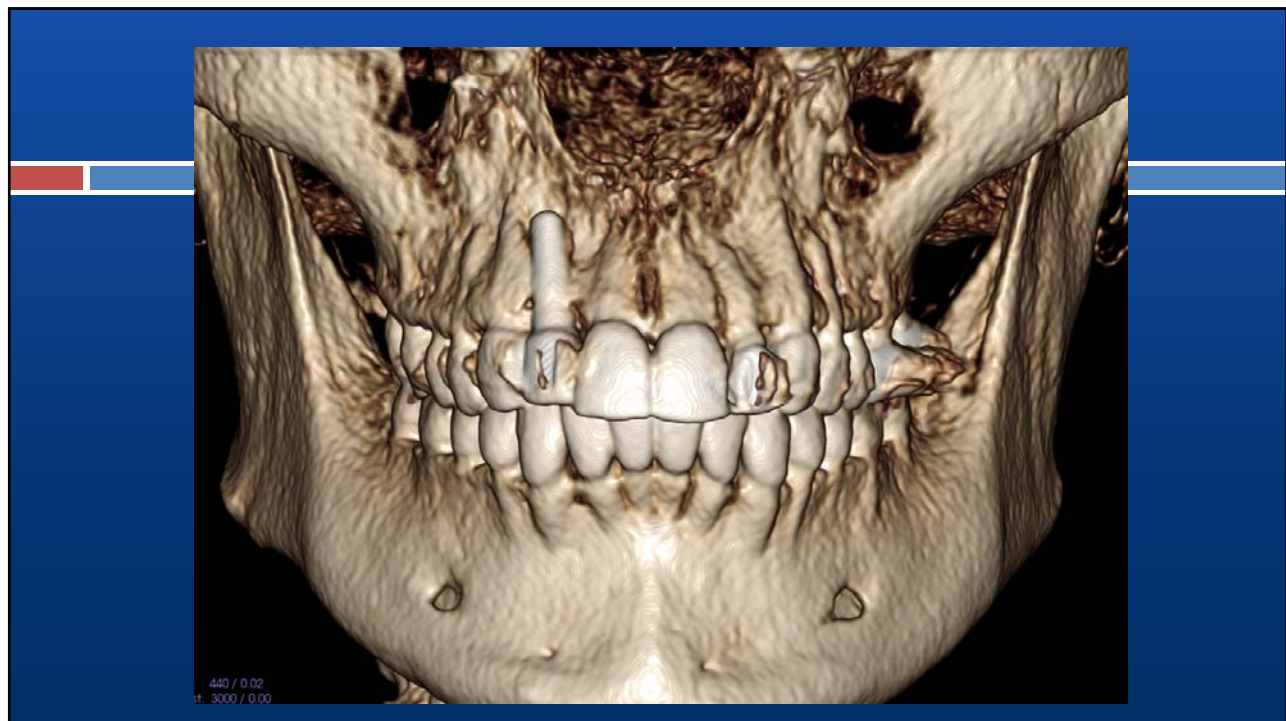
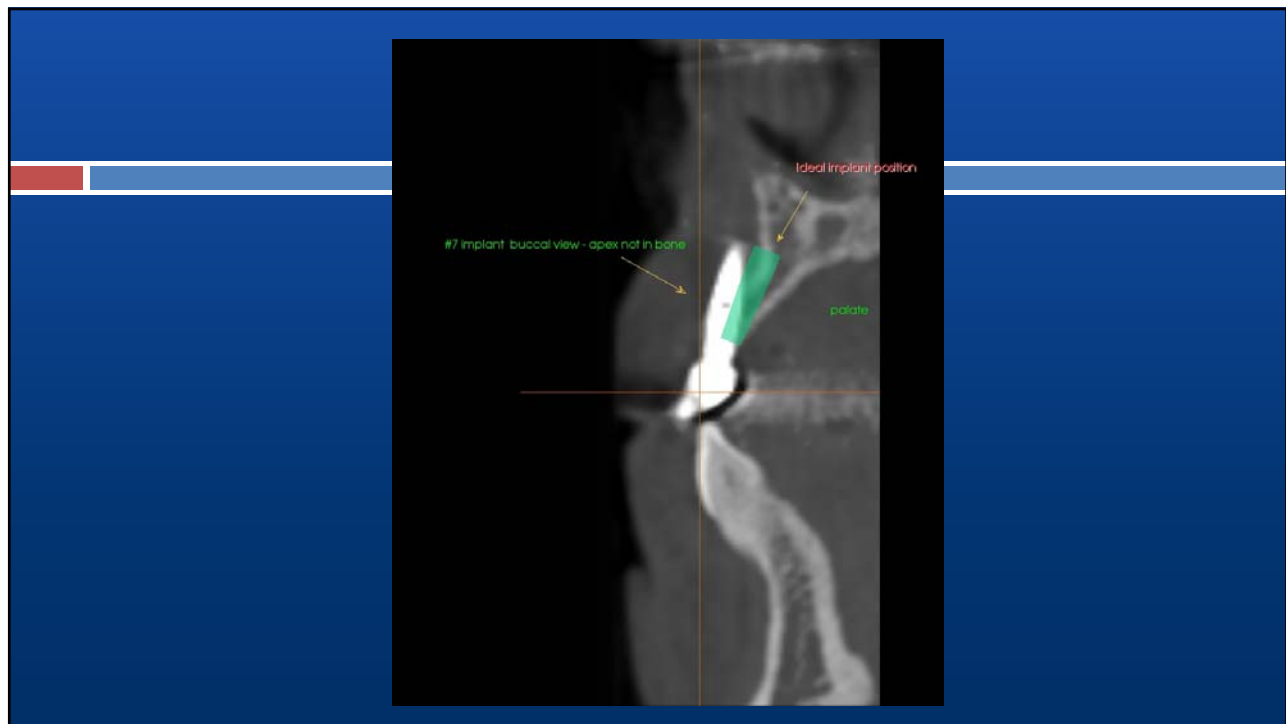
Implant Position





Count the threads!







What we did





What we did

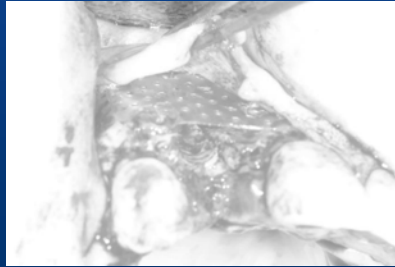


Sonicweld Rx

© KLS Martin



What we did

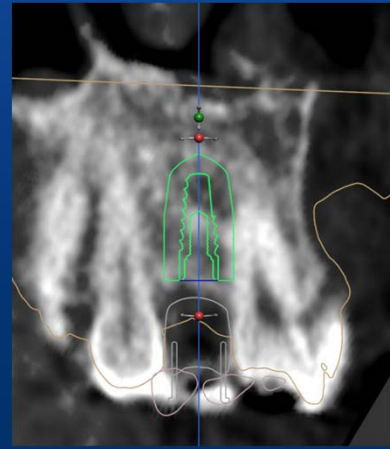
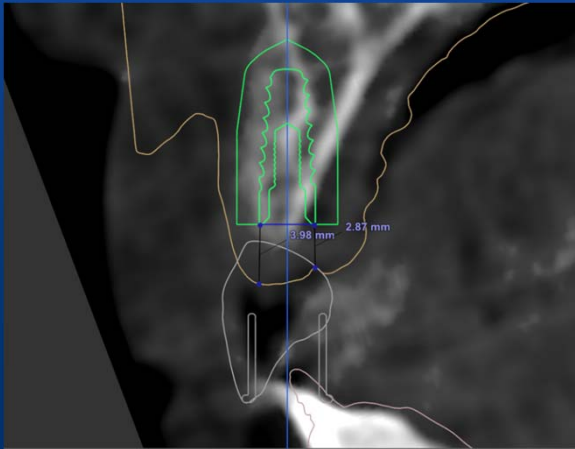


What we did





6 months later



6 months later





6 months later



6 months later





Provisional crown



After Provisional #7 and 10

Initial



Provisional





Implant Position and NO Attached Mucosa

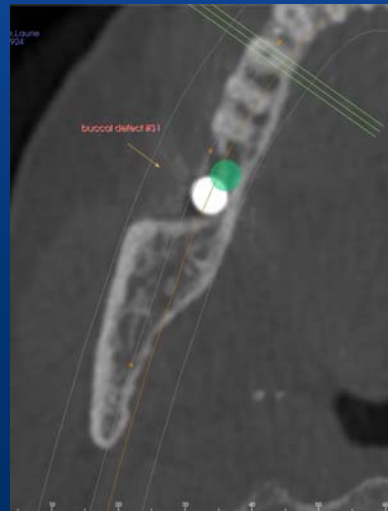
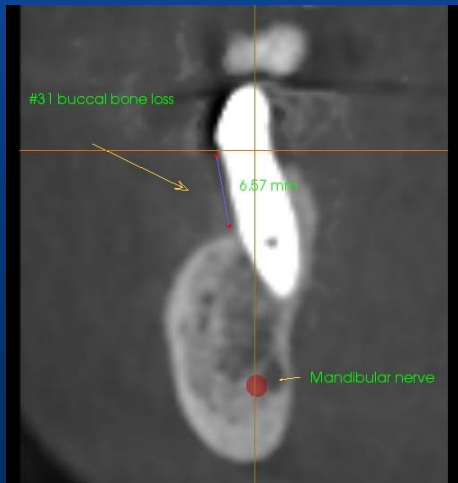


The crown will not stay seated

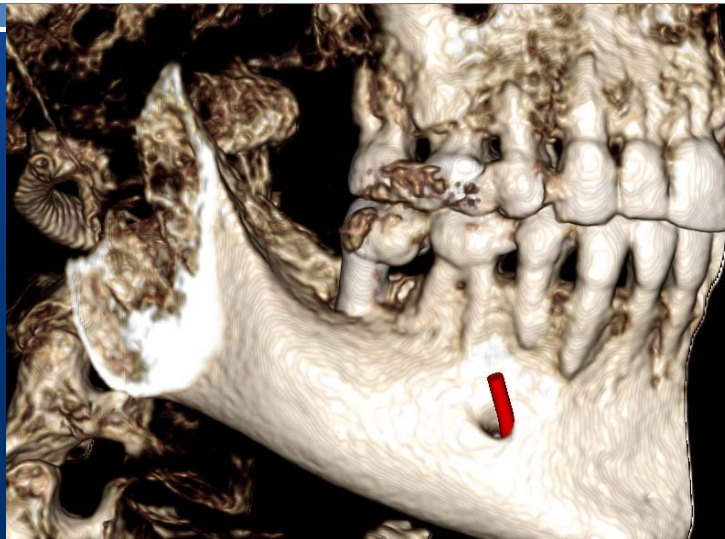




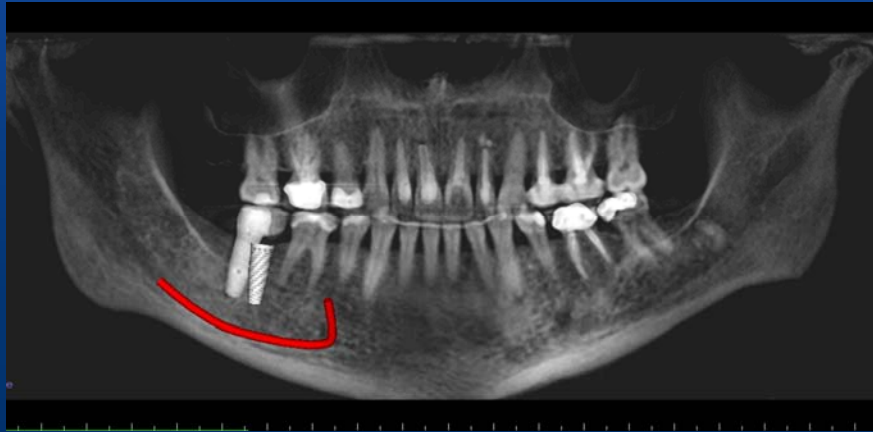
It should have been grafted



CBCT



Pan with ideal placement shown



Restorations – cantilever w/ cement



Implant removal



Connective tissue graft



Sonic weld graft 8 weeks later



Sonic weld

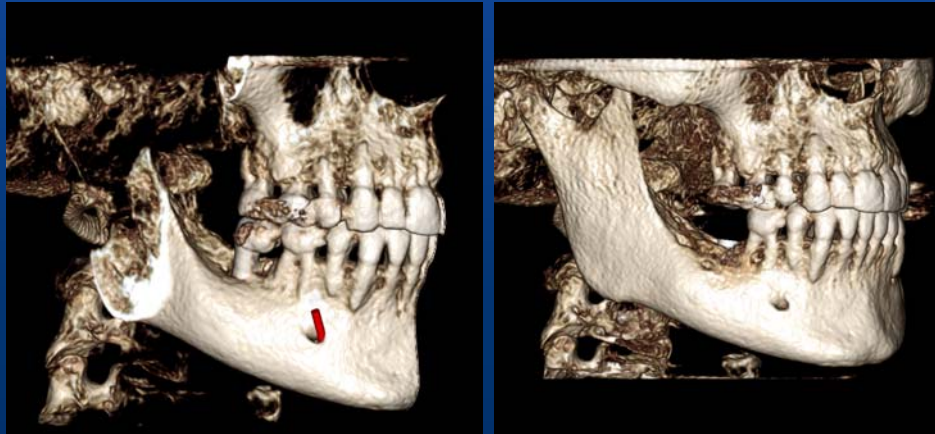


□ Platelet Rich Fibrin w/ alloderm





How much bone did we grow?



Implant placement





Ready to restore 1 yr of treatment

Old implant



New implant and bone



Final Results

Initial



Final





Final Results

Initial



Final



Make it easy – screw it in

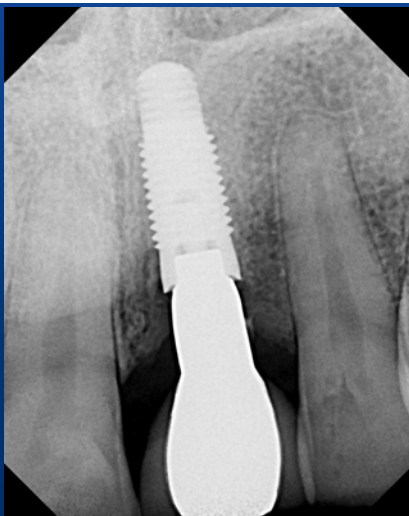




Thin tissue with recession and you can see implant



Radiographs – deep apical and facial placement and no facial bone



Long in the tooth...

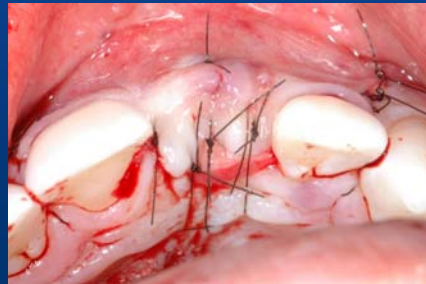


6 weeks later remove implant and bone graft





Closure after bone graft



5 month healing





6 month re-entry



Implant placement using surgical guide





Closure



Results prior to restoration

Before



After extensive surgery





3 yr follow up

2010



2013



3 yr follow up

2010



2013



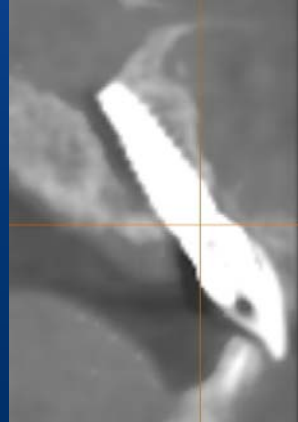


3 yr follow up

2010 tomogram



2013 CBCT – burnout on lingual



Referred to me to fix the blue tissue...





VERY deep

2007



2009



Crown and #24 removal

Crown and abutment



Defect and tooth removed





Cover screw, bone, membrane, and CT

Bone and CT



closure



Temp bridge day of surgery



Results after 9 years



How to avoid this

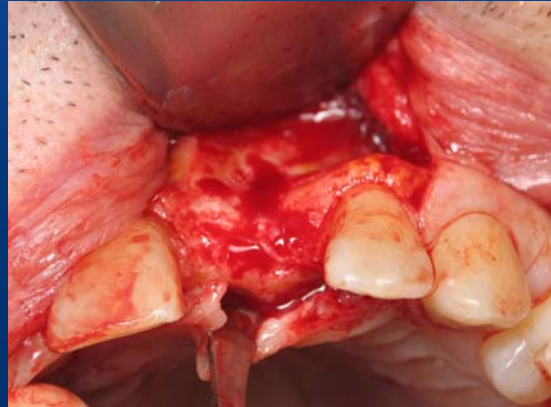
- When implant cannot be placed in proper position without bone grafting/soft tissue grafting then **do not do it**.
- **Make sure your surgeon understands these concepts.** They need to understand restorative concepts as well as the restoring dentist. If not send somewhere else!
- **Pre-prosthetic planning-** waxups, CAT scans, and CBCT surgical guides let you see the problem BEFORE you cause it!



How things should happen



Ridge augmentation and Implant w/ guide





10 yr follow up



10 years later

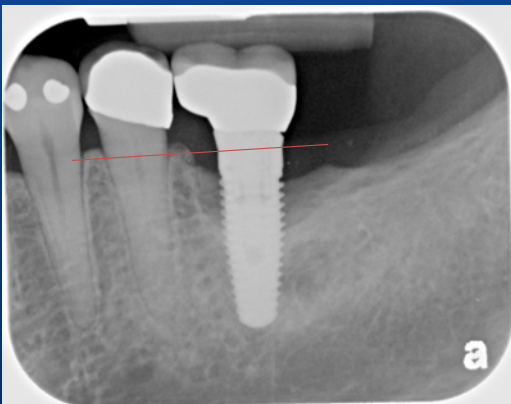




Lack of attached Mucosa around implants

They need it more than teeth

No Facial Bone or Tissue and Shallow placement



Implant Fenestration/Dehiscence (Evaluated in 6 Studies)

- 223 of 3156 implants affected-Mean of 7%
- May create soft tissue deficiency (**recession**) in esthetic areas

[Goodacre CJ, Kan JY, Rungcharassana K.](#) J Prosthet Dent. 1999 May;81(5):537-52.
Clinical complications of osseointegrated implants.

Fistulas (Evaluated in 10 Studies)

- 117 of 11,764 implants affected-Mean of 1%
- High incidence rates associated with **loose abutment screws**

[Goodacre CJ, Kan JY, Rungcharassana K.](#) J Prosthet Dent. 1999 May;81(5):537-52.
Clinical complications of osseointegrated implants.



Crown not seated with Fistula/Fenestration

Probe depth 7-10mm

2 years restored



Marginal bone loss

She has Periodontal disease on her other teeth

Tomogram view





Crown not seated, residual cement and severe bone loss



Bone graft, CT graft, Membrane



Membrane and suture closure



9 mo follow up

Initial 9 mm PD w/ fistula



Thick tissue 3 mm pd – pic from GP



How to avoid this

- If there is no attached tissue or tissue is very thin **grafting prior to placement** or at the time of placement is recommend
- If there are excessive frenum attachments – **remove those first and/or graft**
- Torque restoration in place and ideal/minimal occlusion to **prevent screw loosening**



Restoration contours

The final restoration determines where the tissue is



An Esthetic challenge

Initial



After bone grafting #7 and #10





Establishing an ideal gingival zenith



Internal Crown lengthening to create symmetry





Gingiva established now to restore Centrals and implants to create ideal tooth width



What happened?

Implant with provisionals



Final restoration





Facial contour #7 is under contoured looking gummy and #10 is overcontoured causing recession



How you can fix this

#10 initial contour



After recontoured intraorally





You must Create Tissue you can then Shape

Gingivectomy #7



Tissue graft #10 and tissue repositioning



Now new Crowns and Abutments 7 and 10 to further shape tissue

initial



4 weeks after surgery





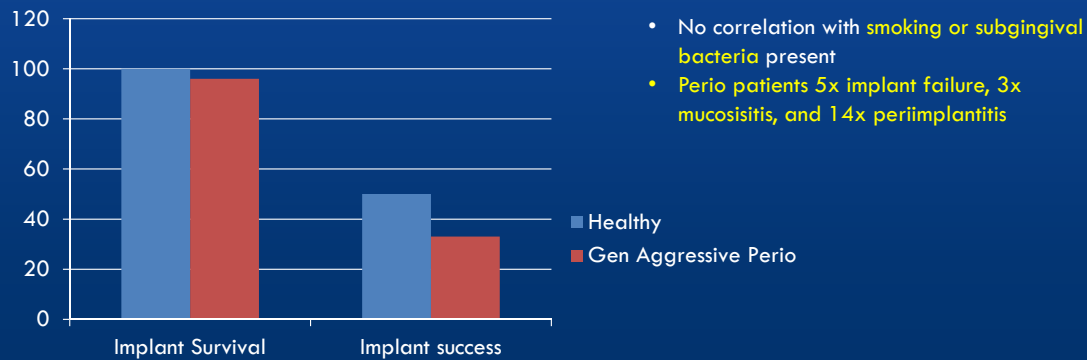
Periodontitis and implants

We need to treat these patients differently

Periodontitis and Implants

- Swierkot et al. JOP 2012
 - Randomized Prospective Study
 - 8 periodontally healthy pts
 - 35 pts with Generalized Aggressive Periodontitis (GAP)
 - Treated with Machined Titanium Implants and fixed or removable restorations
 - Strict 3 mo Perio Maintenance recall
 - 15 year study duration

Results



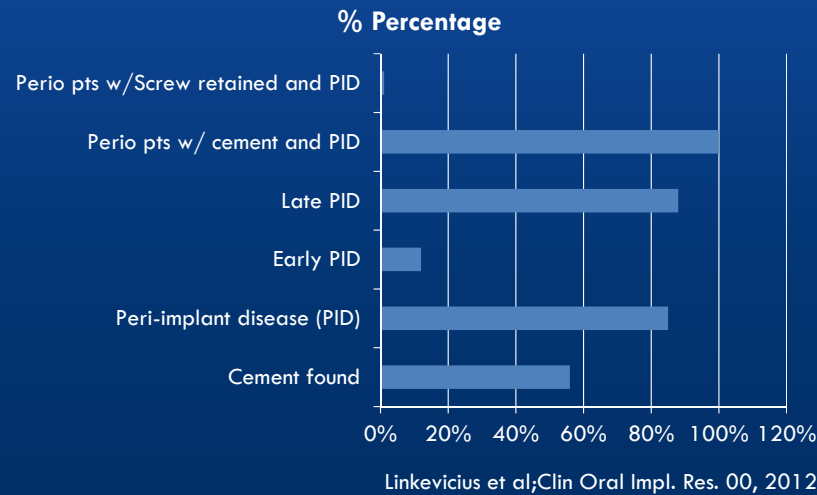
Swierkot et al. JOP 2012

How does residual cement effect patient with periodontitis differently?

- Retrospective Study over 5 years
- **Test group-77** patient w/ 129 implants cement retained. 35 patients had hx of periodontitis
- **Control group** -66 patient w/238 screw retained restorations. 35 patients had hx of periodontitis
- Implants used Biohorizons Internal w/ TPS surface

Linkevicius et al; Clin Oral Impl. Res. 00, 2012

Results



How can we avoid this

- ❑ TREAT PERIO FIRST!
- ❑ Use screw retained crowns on patients with periodontitis
- ❑ If cement necessary use supragingival margin with custom abutment
- ❑ If you do use cement and crown does not seat then remove and redo immediately



Some simple steps to prevent errors.

How to keep yourself out of the frying pan!

Laser-Lok[®]
microchannels

James Woodyard, DMD, MS



BIOHORIZONS[®]



Impression copings

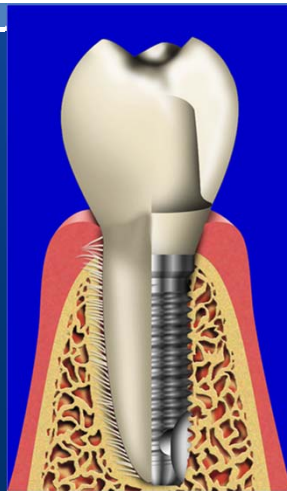
Verify impression coping seated



Use flowable composite to capture tissue contours if provisional used or indirect method



Abutment design – never Ass-u-me...



Parallel Abutments

☐ No ☐ Yes (Indicate which abutments will have restorations splinted together for insertion.)

Abutment Margin Depth

Facial _____ Mesial _____
Lingual _____ Distal _____

* If left blank, default values will be used

Abutment Margin Design

☐ Shoulder for all-ceramic* ☐ Chamfer for PFM/BruceZr*

Abutment Emergence Profile

☐ Surgical Placement ☐ Tissue Displacement* ☐ No Tissue Displacement

Laboratory Use Only By: _____



Abutment NOT Crown supports tissue

Verify tissue height of final abutment $\leq 1\text{mm}$ subgingival

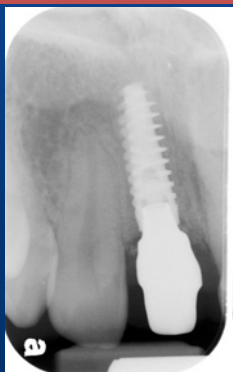


Soak your abutments in **Periodex** for 10 min prior to seating **or steam clean**

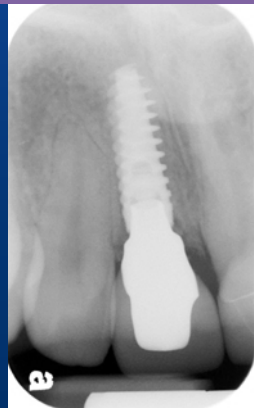


Abutment Seating

Verify abutment seating **BEFORE** you place crown

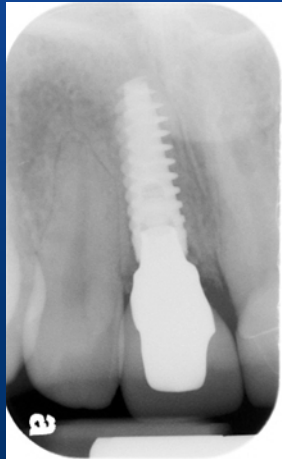


Verify Crown seats with radiograph **BEFORE** Cementation if you cannot **visibly** see margin





Final radiograph



- Take the final radiograph ASAP
- If not seated remove crown.
- Clean cement before it has a chance to set.



J Prosthet Dent 2009; July



TECHNIQUE FOR CONTROLLING THE CEMENT FOR AN IMPLANT CROWN

Chandur Wadhvani, BDS, MSD,^a and Alfonso Piñeyro, DDS^b
School of Dentistry, University of Washington, Seattle, Wash

Cementation of an implant prosthesis is an accepted protocol. Less demanding surgical placement of the implant, simpler laboratory techniques, passive fit, esthetics, and control of the occlusion are among some of the advantages.¹ However, disadvantages include unpredictable retention and resistance and the detrimental effect of cement flow into the soft tissues that can be difficult to remove. The soft tissue attachment onto the implant surface is more delicate than that seen at the natural tooth surface due to the lack of Sharpey fiber insertion, the reduced number of collagen fibers, and the direction in which

A method of controlling cement flow using a copy abutment with smaller dimensions, which can be quickly, easily, and economically fabricated at the time of implant abutment/crown insertion, is described. The use of polytetrafluoroethylene (PTFE) tape provides a space of approximately 50 μ m, which represents the cement space and may be used for both custom and prefabricated abutments.

PROCEDURE

1. Ensure fit of implant restoration and abutment complex.
2. Line the intaglio surface of the implant restoration with polytetrafluoroethylene (PTFE) tape, commonly known as Teflon tape, plumber's tape, or TFE (tetrafluoroethylene) threaded seal tape (Oatey Co, Cleveland, Ohio).
3. Place the implant restoration





1. Apply PTFE tape to fit surface of crown. (Paint vaseline on metal first)



2. Place abutment into crown



Fine mixing tip and bite registration material- fill crown





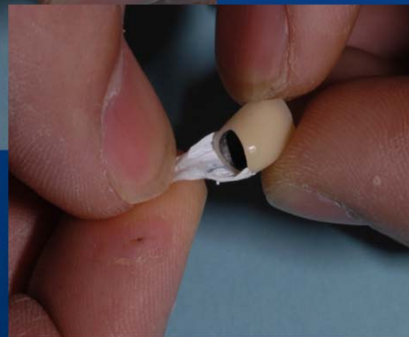
Make a "handle"

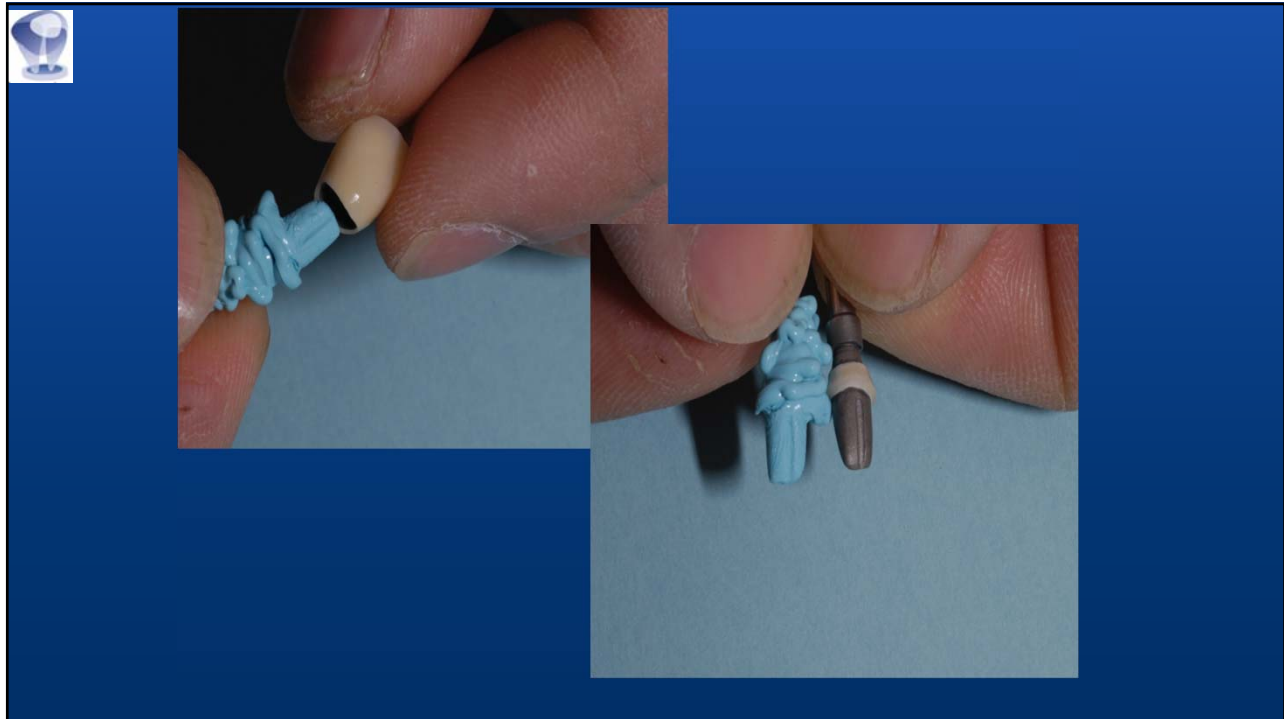


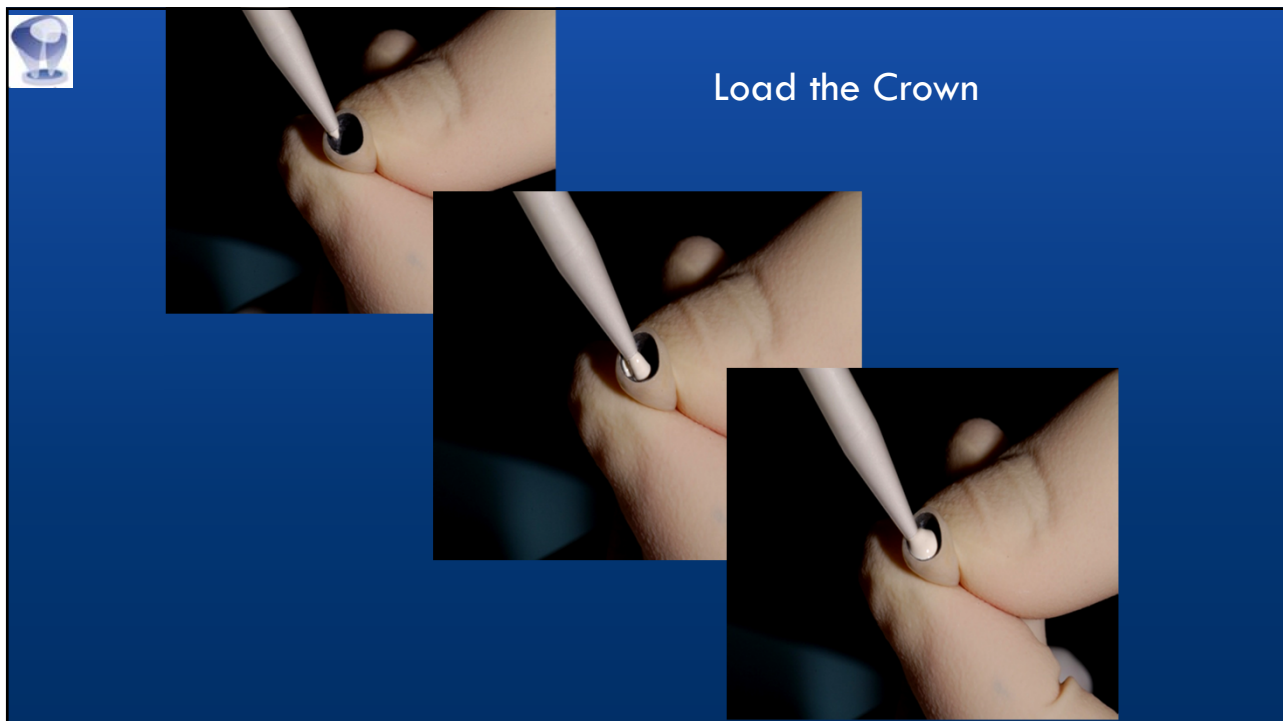
Remove copy
abutment

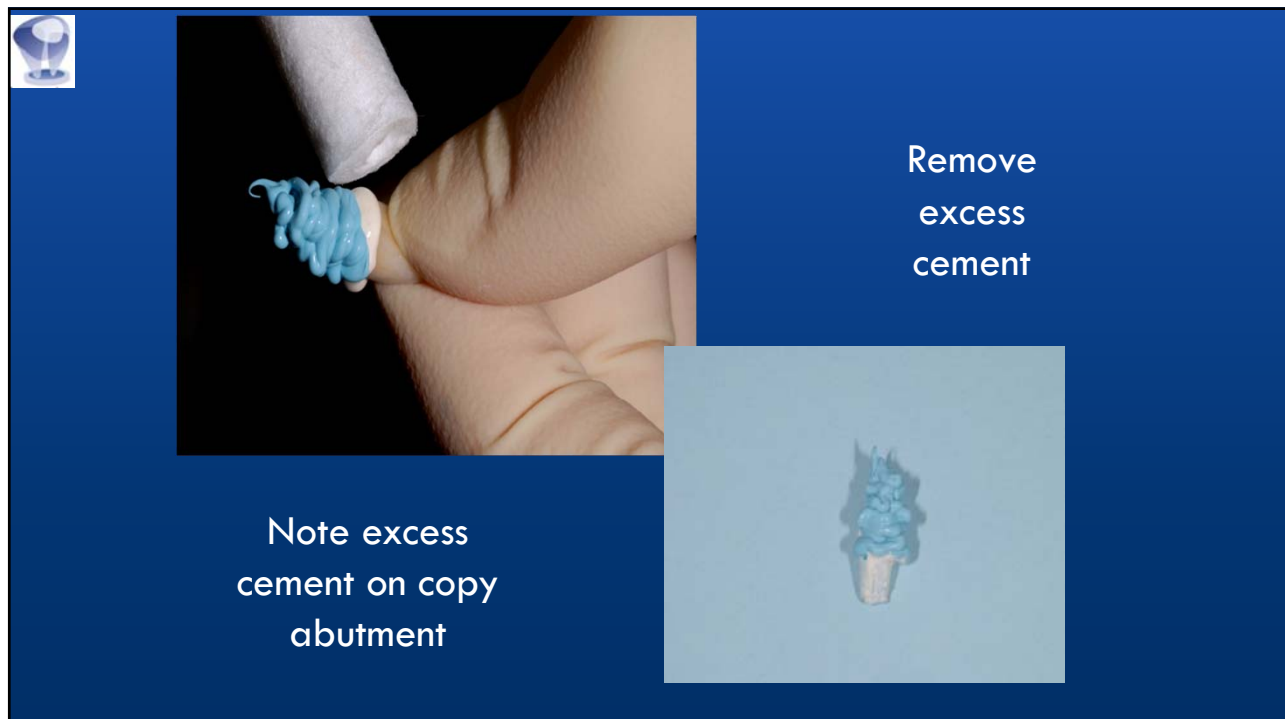
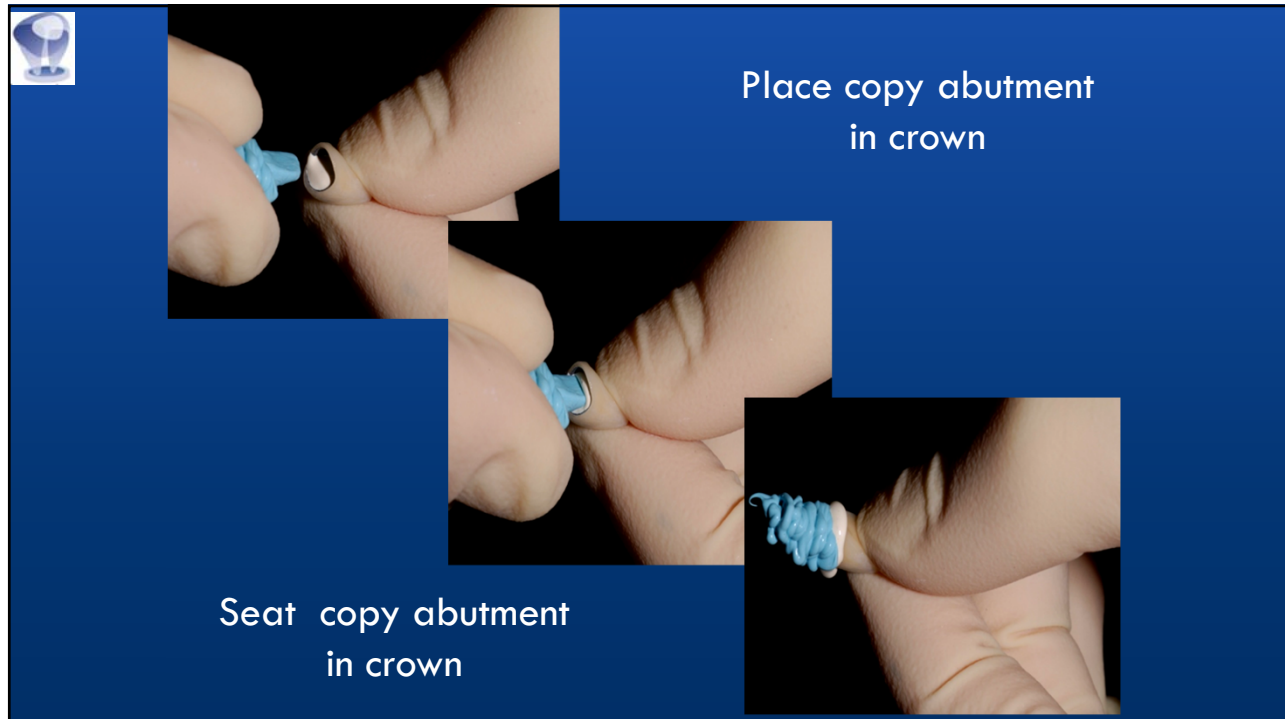


Remove PTFE-
"spacer"











Inspect crown
for even flow

Re-add minimal
amount of cement



Seat the Crown

Note- minimal
clean up





Cement vs screw retained

Cement

- Esthetics
- Occlusion
- Cost
- Passive fit
- Implant placement does placed screw hole on functional cusp of facial

Screw

- Retrievability- screws will get loose
- Hygiene
- Limited Occlusal space
- Chair-time
- Periodontitis patient
- Non-ideal implant placement

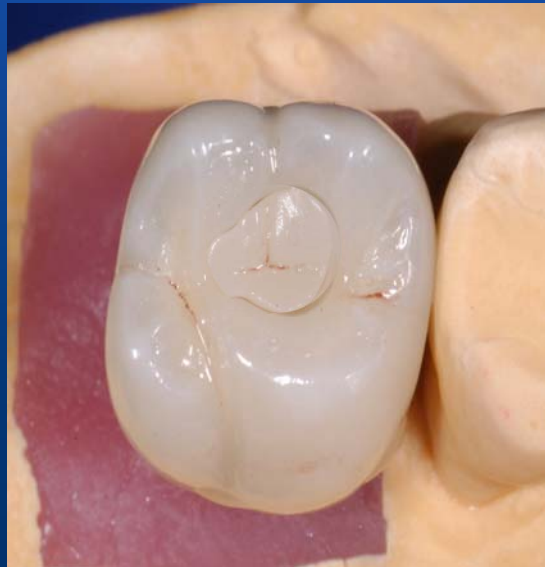
Health around implants

Screw Retention Healthier than Cemented

- 3 year study
- ITI implants
- Plaque index- Bleeding index-Gingival level

Soft tissues respond more favorably to screw-retained crowns when compared to cement-retained crowns.

Weber- 2006. COIR



What to do if something does not go right?

You are in the frying pan!



Abutment not seated



- If a implant or temp cement used
- www.salvin.com crown removal pliers try removing crown

Abutment not seated – GI cement



No bone loss but crown not seated due to cement setting



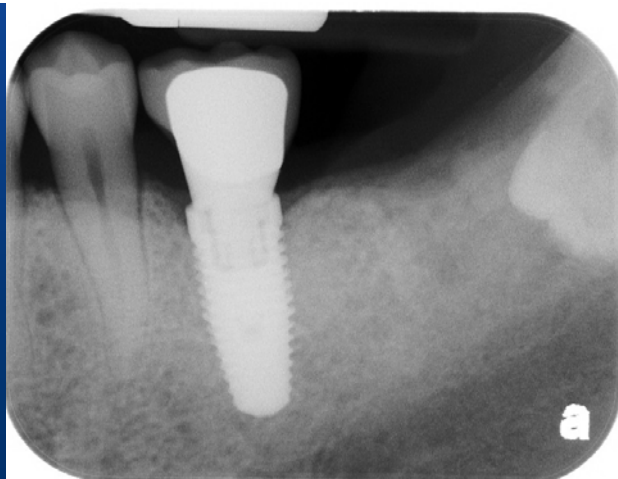
New impression etc.



Loose abutments

- ❑ Same technique can be used for non-solid abutments
- ❑ Important to removed implant restoration fully and clean with CHX
- ❑ Screw may need to be replaced
- ❑ Usually caused by improper occlusion on tooth, bruxism, or screw not torqued.

Wrong abutment – same technique



Consequences...

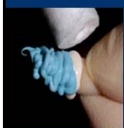
- ❑ **Cost to you!** If restoration has to be replaced
- ❑ **Cost to patient** and pain of another surgery if needed.
- ❑ Repair and or Implant replacement may be **impossible**.
- ❑ Success rate of implant repairs range from 50-90%. **Teeth are easier to fix. Implants are easier to replace.**

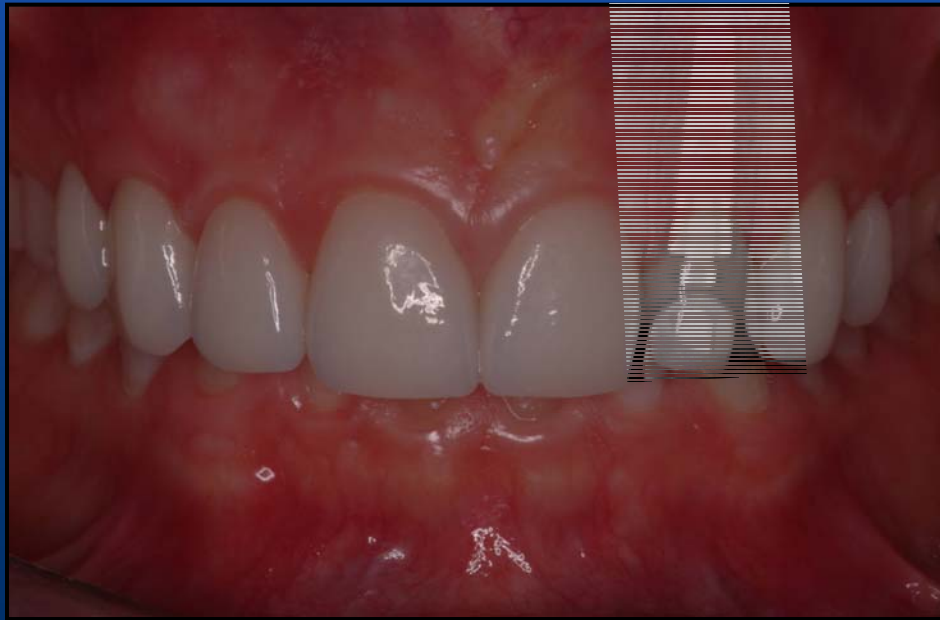


Key's to Healthy Implants



- ❑ **#1 Address dental disease FIRST**
 - ❑ Periodontal disease/ decay/ periapical pathology must be addressed first
- ❑ **#2 Implant diameter and position**
 - ❑ If you cannot get correct diameter and position in all planes do something else or bone graft
- ❑ **#3 Optimize the subgingival environment**
 - ❑ Must be clean, cleansable, and cement free- cementation protocol w/ a soft cement
- ❑ **#4 Occlusion and load**
 - ❑ Must be balanced and contact in clenching =implant occlusion
 - ❑ Do not overtighten components at surgery at restoration
- ❑ **#5 Crown/abutment margin design**
 - ❑ margins no more than 1mm below tissue height and follow tissue contour.
 - ❑ The abutment must support the tissue or ideally screw retained.
 - ❑ Facial should position tissue at ideal height; not overly compress and cause recession
- ❑ **#6 Healthy attached mucosa around restorations**
 - ❑ If there is no attached mucosa make some BEFORE you restore
 - ❑ DO NOT USE A RADIOSURGE – laser or rotary is best to shape tissue
- ❑ **#7 Every 3-6 month Hygiene maintenance even for overdentures**





Restorations and pictures courtesy of Dr. Dale Sorenson



Implants can be beautiful!

Initial



Final





Thank you and questions?

James G. Woodyard, DMD, MS

Webpage: www.woodyardperio.com

My personal email : drw@woodyardperio.com

Please email with any questions