

Controversies in Implant Connections, Design, Material and Surface *Separating Facts from Marketing Rhetoric*

CONTROVERSIES

MPLANT CONNECTIONS & SURFACES

Paragon's Implants

A Technology Report for Discerning Dentists
by Gerald A. Niznick, DMD, MSD

Open Letter to Nobel Biocare Customers

Implant Direct is pleased to offer the RePlant Tri-Lobe implant with FDA marketing approval to claim both surgical and prosthetic compatibility with Nobel Biocare's Replace Tapered Groovy Implant. The RePlant implant provides 20% greater strength because it is made from medical grade Titanium Alloy compared to the CP Titanium required for TiUnite application. Implant Direct also offers the RePlus implants with an evenly tapered body for bone expansion. The wider diameter of the RePlus implant increases the strength of the small diameter implant by approximately 50% compared to the Replace Implant and provides a platform switching interface with a standard Tri-lobe connection. Both RePlant and RePlus Implants have mini-threads to reduce stress concentration near the crest of the ridge, and double lead threads to reduce the number of turns needed to insert the implant. RePlant and RePlus implants have compatible, color-coded tri-lobe platforms that accepts Nobel Biocare's abutments and Implant Direct offers a complete line of Nobel compatible prosthetic components at reasonable prices as shown below. Implant Direct's state-of-the-art manufacturing facility has been the subject of several articles in Machining Trade Journals and was described in a Merrill Lynch Implant Industry Report as a "serious and dynamic operation". Dentists can view the factory on five live cameras at Implant Direct's website: www.implantdirect.com

Implant Direct RePlant \$150 Package includes Cover Screw & Transfer

Nobel Replace Groovy \$452 adding Cover Screw & Transfer

LECTURE

Compare Advantages of Implant Direct's RePlus™ Implant To Nobel Biocare's Tapered Replace™ Implant

IMPLANT PRICE ADVANTAGES

REPLACE® Implant, Abutment, CS, Transfer = \$643
REPLUS Includes: Abutment, CS, Transfer = \$200

3.7mmD IMPLANT > 3.5mmD PLATFORM
4.7mmD IMPLANT > 4.3mmD PLATFORM
5.7mmD IMPLANT > 5.0mmD PLATFORM

Platform Switching

ABUTMENT PRICE ADVANTAGES

Angled Abutment: \$85 vs \$217
Snappy Abutment: \$85 vs \$191
Gold/Plastic Abutment: \$100 vs \$202

3.5mmD Platform

4.3mmD Platform

5.0mmD Platform

STRENGTH ADVANTAGES

RePlus Made from TiAlloy - 20% stronger
Wall thickness: 3.7RePlus vs 3.5Replace = 44%
3.7RePlus vs 3.5 Replace = 50% > Torque to Fail

3.7mmD

4.7mmD

5.7mmD

BODY DESIGN ADVANTAGES

Evenly tapered from top to bottom - use Spectra-system drills for expansion in soft bone
Platform Switching Abutment Interface

3.7mmD

4.7mmD

5.7mmD

Platform Switching

THREAD DESIGN ADVANTAGES

Mini-threads near top - minimizes stress at crest
Double-lead threads on body for faster insertion
Vertical Cutting Groove for Self-Tapping

Platform Switching

PACKAGING ADVANTAGES

Color-Coded Fixture Mount designed for use as Transfer and Snappy Abutment
Cover Screw and Comfort Cap Included

LENGTH AND DRILL ADVANTAGES

REPLACE: 8, 10, X, 13, 15 - Length Specific Drills
REPLUS : 8, 10, 11.5, 13, 16 - 1 Drill for all lengths

Limitations of Zimmer Dental's TM Implant

Zimmer Dental has launched a version of the Screw-Vent® with a porous, non-threaded midsection made of what they call Trabecular Metal, claiming it is "THE BEST THING NEXT TO BONE™." Zimmer Dental's marketing claims it is the "first dental implant to offer a mid-section with up to 80% porosity" and reports that "human clinical studies of this Trabecular Metal Dental Implant began in 2010, data collection will continue in the coming years."

The concept of bone ingrowth with porous surfaces on dental implants is not new. The TPS surface treatments were popular in the 1980's and 1990's with Straumann and IMZ implants but soft tissue complications following exposure eventually contributed to their replacement with blasted and etched surfaces¹. The now obsolete Innova implant with a beaded, porous surface was first introduced in the 1980's. In fact, all press-fit implants other than Bicon, have faded from the scene because of the clinical observations that achieving initial stability, critical for osseointegration, is best achieved with implants having threads over the entire length². Optimizing initial stability in soft as well as dense bone allows for immediate loading in not only full arch splinted implants for "Teeth-in-1Day" procedures but also for free-standing single tooth replacements, even in soft bone of the maxilla. This has become a reality by varying the size of the socket depending on the density of the bone, optimizing stability by placing a tapered screw implant into an undersized socket prepared with straight step drills (G. Niznick: Achieving Osseointegration in Soft Bone. Oral Health August 2000). In the last decade, there has been an evolution to further optimize stability by improving thread design and surface area with progressively deeper threads towards the apex and adding micro-threads near the top of the implant. Improving the self-tapping features of implants with long vertical grooves eliminated the need for bone taps when used in conjunction with dense bone drilling procedures³. Double-lead threads on the body with quadruple-lead micro-threads with two vertical cutting grooves extending half-way up the implant, were introduced in 2006 by Implant Direct (Niznick Pat. # 7,677,891). Further refinements came in 2008 with the introduction of the ReActive tri-lobe and Legacy3 internal hex implants, adding progressively deeper, flat-based buttress threads. In 2009, the Legacy2 implant was launched with deeper buttress threads, and with three vertical cutting grooves extending 2/3rds the way up from the apex, further facilitating self-tapping insertion. In 2013, Implant Direct will introduce the InterActive Implant with micro-grooves above micro-threads to further optimize surface area and facilitate soft tissue attachment should the top of the implant become exposed. As shown below, not all screw implants are the same.

Obsolete Innova
Implant

Zimmer Dental's
TM Implant

Graphic representation

Nobel Replace™ RePlant® NobelActive™ ReActive® InterActive™ InterActive Implant on Cover

¹ Astrand P, Engquist B, Anzén B, et al. A three-year follow-up report of a comparative study of ITI Dental Implants® and Bränemark System® implants in the treatment of the partially edentulous maxilla. Clin Implant Dent Relat Res 2004; 6:130-141.
² Javed F, Romano GE. The role of primary stability for successful immediate loading of dental implants. A literature review. J Dent 2010; 38:612-620.
³ Marković A, Calvo-Guirado JL, Lazić Z, et al. Evaluation of primary stability of self-tapping and non-self-tapping dental implants. A 12-week clinical study. Clin Implant Dent Relat Res 2013; 15:341-349.

January 2018 CR Surveyed 1120 Dentists using Low Cost Implants

54% Reported using Implant Direct

Gordon J. Christensen

Clinicians Report® Serving Dentistry 42 YEARS

January 2018, Volume 11 Issue 1

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Clinicians Report 4

Clinical Performance of Lower Cost Implants (Continued from page 1)

Do lower cost implants perform as well as premium brands?

Yes, clinicians are reporting comparable success rates (data from current CR survey, n=1,120)

- Overall clinical success: 79% excellent; 14% good; 3% mixed results; 3% fair-poor
- Overall performance compared to higher cost implants: 86% about the same; 7% better; 7% worse
- Numerous brands in use: 33 separate companies were reported by clinicians and many more exist
- Challenges noted: 75% none; 12% no local rep; 6% fewer options; 5% implant failures; 5% less research; 4% poor fit of accessories; 3% lower quality

CR CONCLUSIONS: Implants don't have to be high priced and can be part of a successful general practice. Lower costs and fees can make implants available to a greater number of patients. Numerous lower cost systems are available with well-established histories of clinical success. Currently, Implant Direct is most popular. Intermittent problems of the past (*low quality, poor fit, few options*) are infrequent. A continuing challenge is the large number of companies marketing implants, and the uncertainty of their longevity on the market. If interested in adding implant placement to your practice, obtain education and start with relatively simple cases as you build your expertise in this valuable area.

CR performed elemental and metallurgical analyses of major brands:

- All implants were high grade pure titanium or titanium alloy
- None had detectable contaminants such as nickel, iron, or tin
- All implants exhibited surface topography to facilitate osseointegration



Comparison of Popular Lower Cost Brands

The following table shows the top 10 lower cost implant companies noted in the survey. Example and approximate costs are shown for comparison. Numerous additional companies and brands are

| Company | Example Implant | Approximate Costs | | Clinical Use (from survey) |
|------------------------|---------------------------------------|-------------------|----------------------------|-------------------------------|
| | | Implant Only | Implant with Accessories * | |
| Implant Direct | Legacy 2, 3, 4 4.2mm X 11.5mm | \$180 † | \$265 | 54% |
| Hiossen | ETIII SA 4.0mm X 11.5mm | \$175 | \$399 | 9% |
| Intra-Lock | Gold & Blue 4.0mm X 11.5mm | \$275 | \$480 | 8% |
| Glidewell Laboratories | Inclusive 4.2mm X 11.5mm | \$135 | \$304 | 7% |
| Blue Sky Bio | Bio Max NP 4.3mm X 11.5mm | \$135 | \$285 | 6% |
| OsteoReady | Performance Implant 4.2mm X 11.5mm | \$156 | \$333 | 5% |
| MIS | SEVEN 4.2mm X 11.5mm | \$180 | \$279 | 4% |
| MegaGen | AnyRidge 4.0mm X 11.5mm | \$280 | \$492 | 4% |
| OCO Biomedical | Engage 4.0mm X 12.0mm | \$189 † | \$264 | 3% |
| Sterngold | PUR NP 4.3mm X 12.0mm | \$129 | \$261 | 3% |

* With healing abutment, transfer coping, analog, and stock abutment

† Implant packaging includes some of the above accessories

Published numerous articles on the Changing Reality of Implant Dentistry

Separating Facts from Marketing Rhetoric

The Changing Reality of Implant Dentistry
A series in Dental Economics
by Gerald Niznick DMD, MSD

DE
Covering the business of dentistry

Implant dentistry
June 2010 pg 2-3

DE
Use The Force
Edentulous Jaw Restoration July 2010 pg 4-5

DE
Patient 2.0
What do patients expect from you? August 2010 pg 6-7

DE
Single Tooth Replacement
August 2010 pg 8-9

DE
2010 PRACTICE SURVEY

Team approach to implant dentistry November 2010 pg 8-9

www.implantdirect.com

Innovation. Quality. Service. Value.

The Simply Smarter Team Approach
Industry-Compatible Implants with "All-in-1 Packaging" for Simplicity and Value Plus Highest Rated Customer Support

Implant Specialty Center
27030 Melville Hills Rd, Calabasas, CA 91304
09/01/2012
Dear Dr. John Smith,
Thank you again for referring Jane Doe for dental implants. The surgery has been completed successfully and she has been advised to return to your office for the restorative procedures.
I am using Implant Direct's Logic™ implants, which come suspended on stainless carrier after "future inserts". These multi-axial, color-coded carriers are designed for use as implant level transfer and can also be shortened to create occlusal compound abutments. The abutments can be prepared to create contoured margins and the angle can be changed up to 12°. Each implant comes packaged with a 2mm tissue estimator and cover screw. To identify location associated with each implant, I have included the unique implant, via containing the trial abutment along with your name, the patient's name, and the last name of the referring doctor.

Simplified Team Communication with Patient Labels, Customizable Letter with Video Link plus Free Abutment & Transfer \$200

After Placing Transfer/Abutment in Empty implant Vial, Attach Free Label Identifying Referring Doctor, Patient & Tooth Number

Inside
"The Changing Reality of The Team Approach to Implant Dentistry"
by Dr. Gerald Niznick

www.implantdirect.com

Implant Direct
Featured in Articles and Interviews

jCD Journal of Clinical Dentistry

Dentistry Cosmetic Dentistry Turns Gold

Editorial on - Dental Implant Industry and Product Development

Interview with - Dr. Niznick on Value Segment Market

implants The International U.S.-Regenerative Cell Implantology

Article on - InterActive Evolution

Implant Practice + US

Article on - GPS Attachment and GoDirect Implants

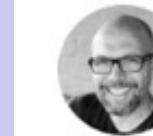
implants The International U.S.-Regenerative Cell Implantology

Article on - Implant-Abutment Connection

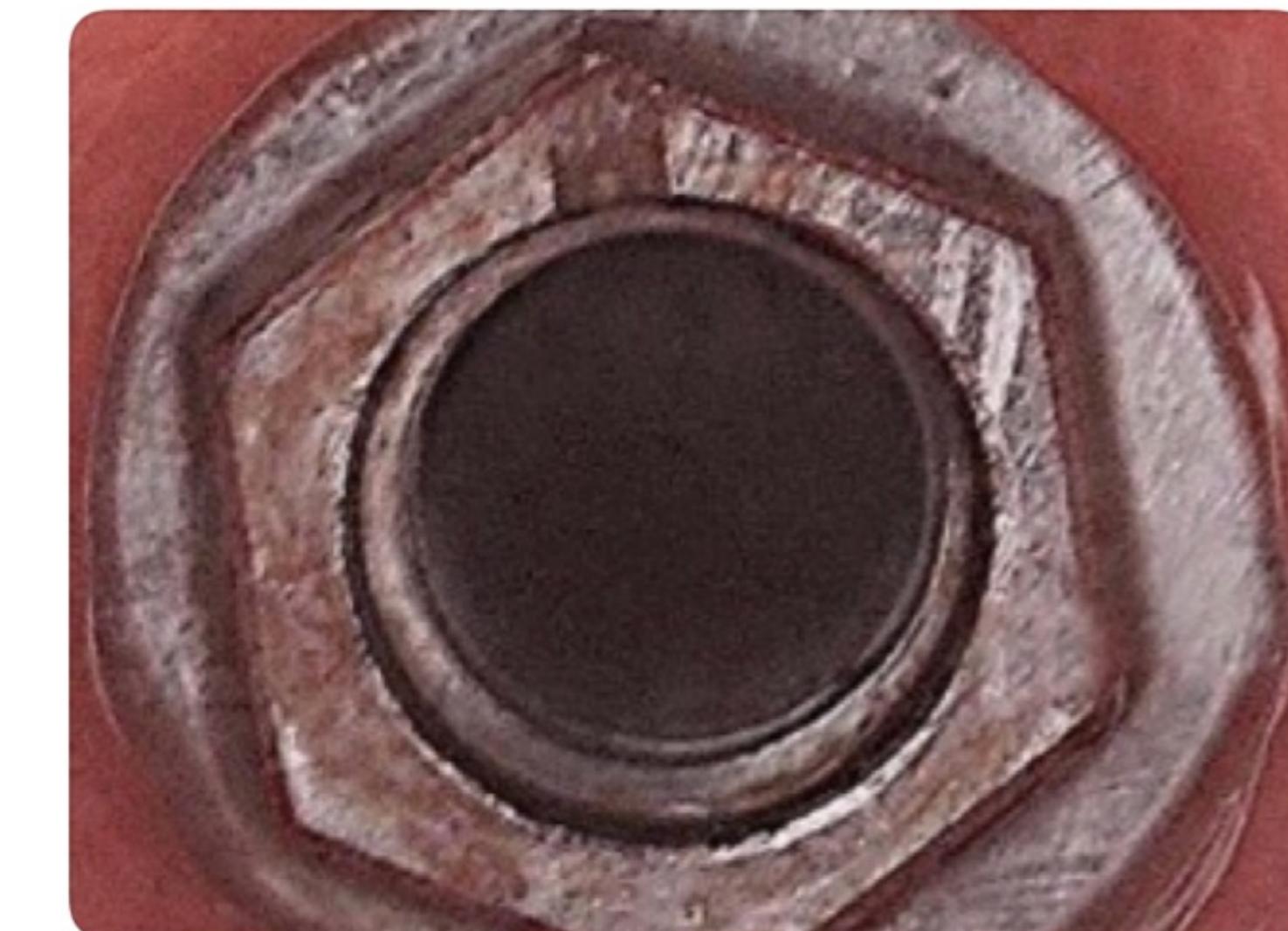
www.implantdirect.com

Innovation. Quality. Service. Value.

**QUESTION: What is the best Implant-Abutment Connection
Internal won over External, Conical won over Butt Joint**



Dear Dr. Niznick , this is just a closeup of the Southern Implant case. Looks like wear on the interface. Just to let you know that they prescribe a higher torque value, for prosthetic screws. Sometimes as high as 45Ncm.

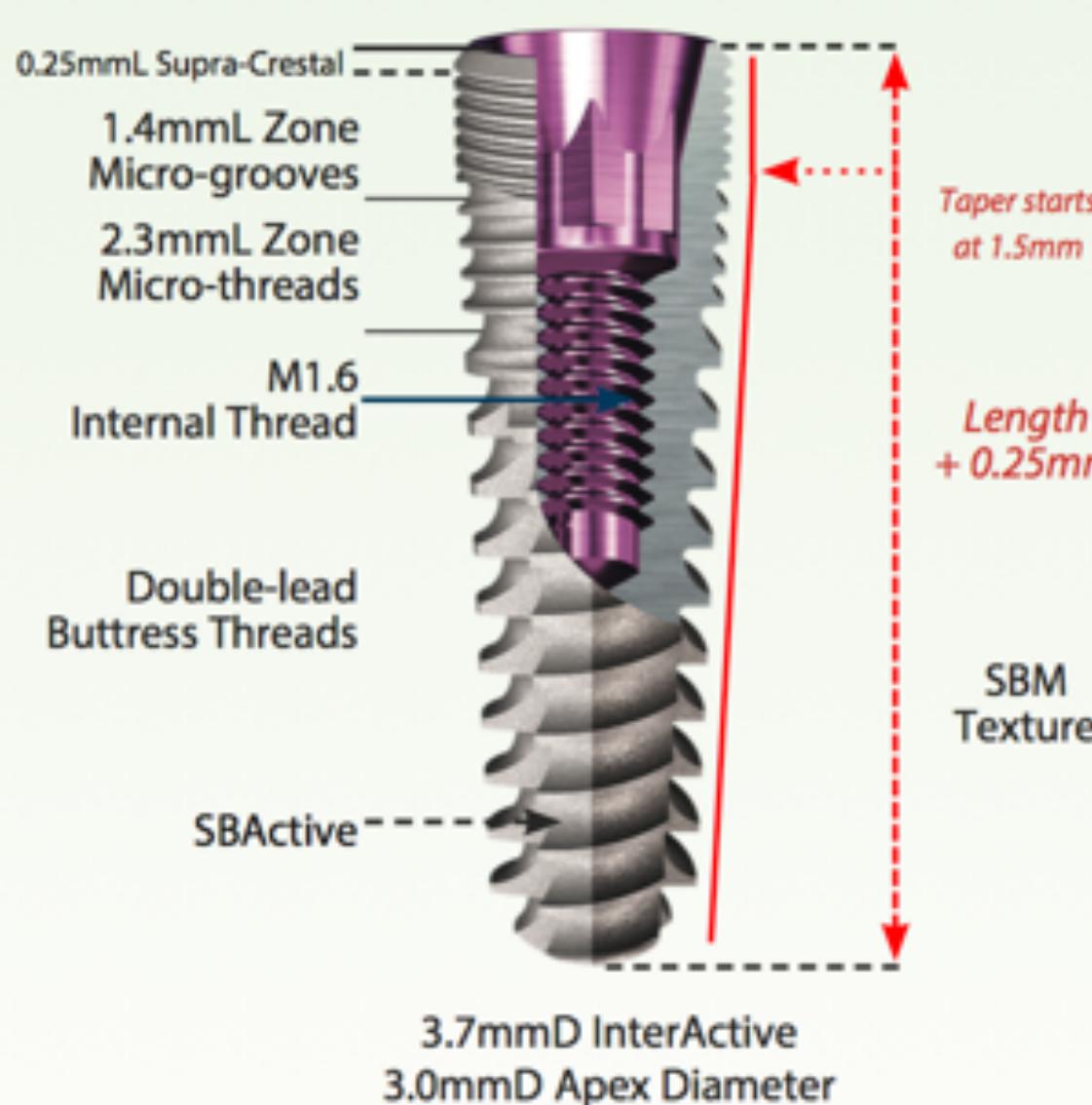


QUESTION: What is better 45deg. or 78deg. Conical Connection

Original Screw-Vent 45deg. lead-in bevel is the most copied connection

InterActive (NobelActive)

78deg. Bevel

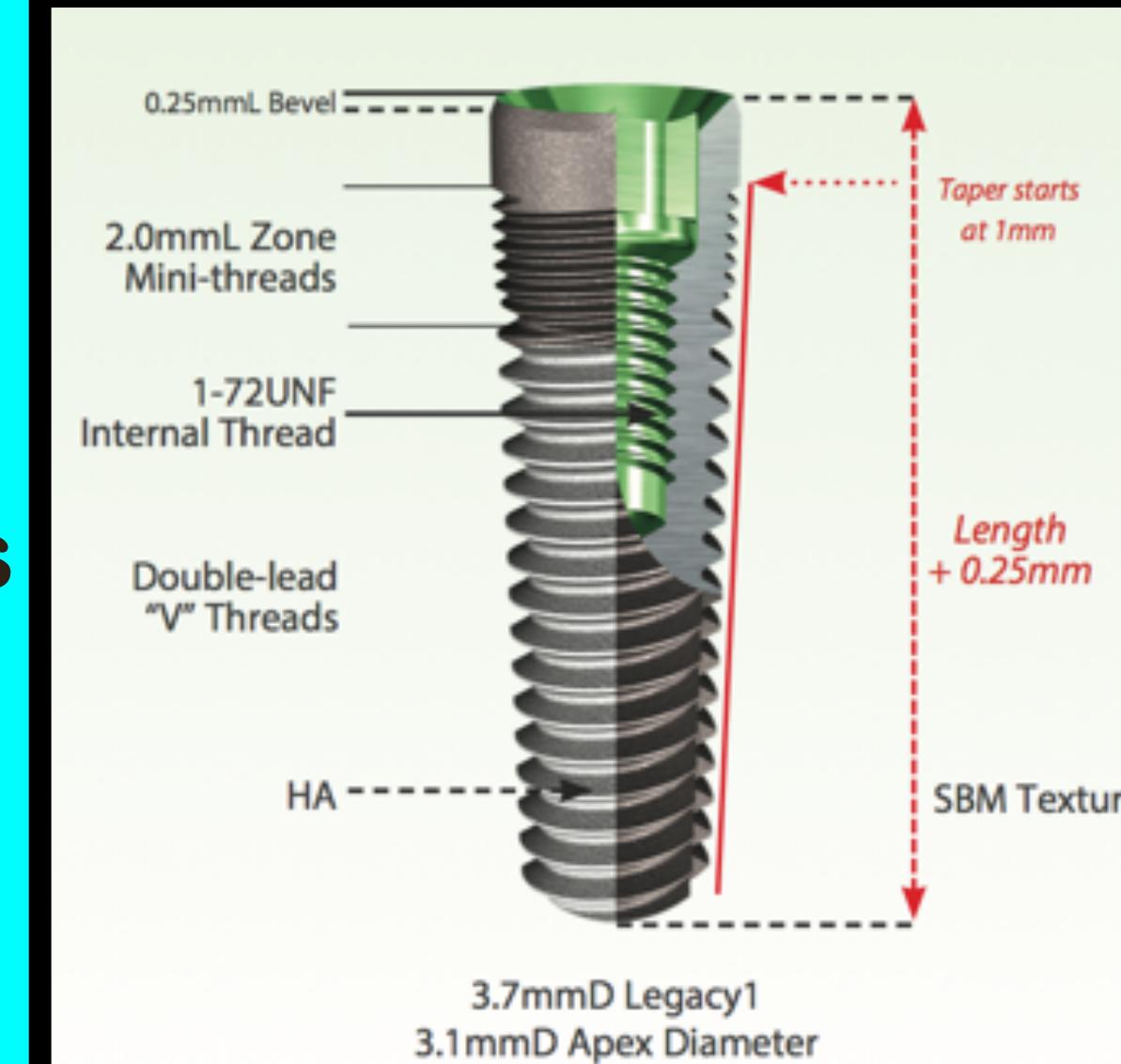


Implant Direct's
InterActive Nobel
Biocare's
NobelActive, Astra +
DISADVANTAGES:

- Thinner walls - increase chance of fracture
- May require X-Rays to confirm full seating
- Lowers Internal Hex by 0.8mm limits how short the implant can be.

Legacy Implant (Screw-Vent, BioHorizons, MIS)

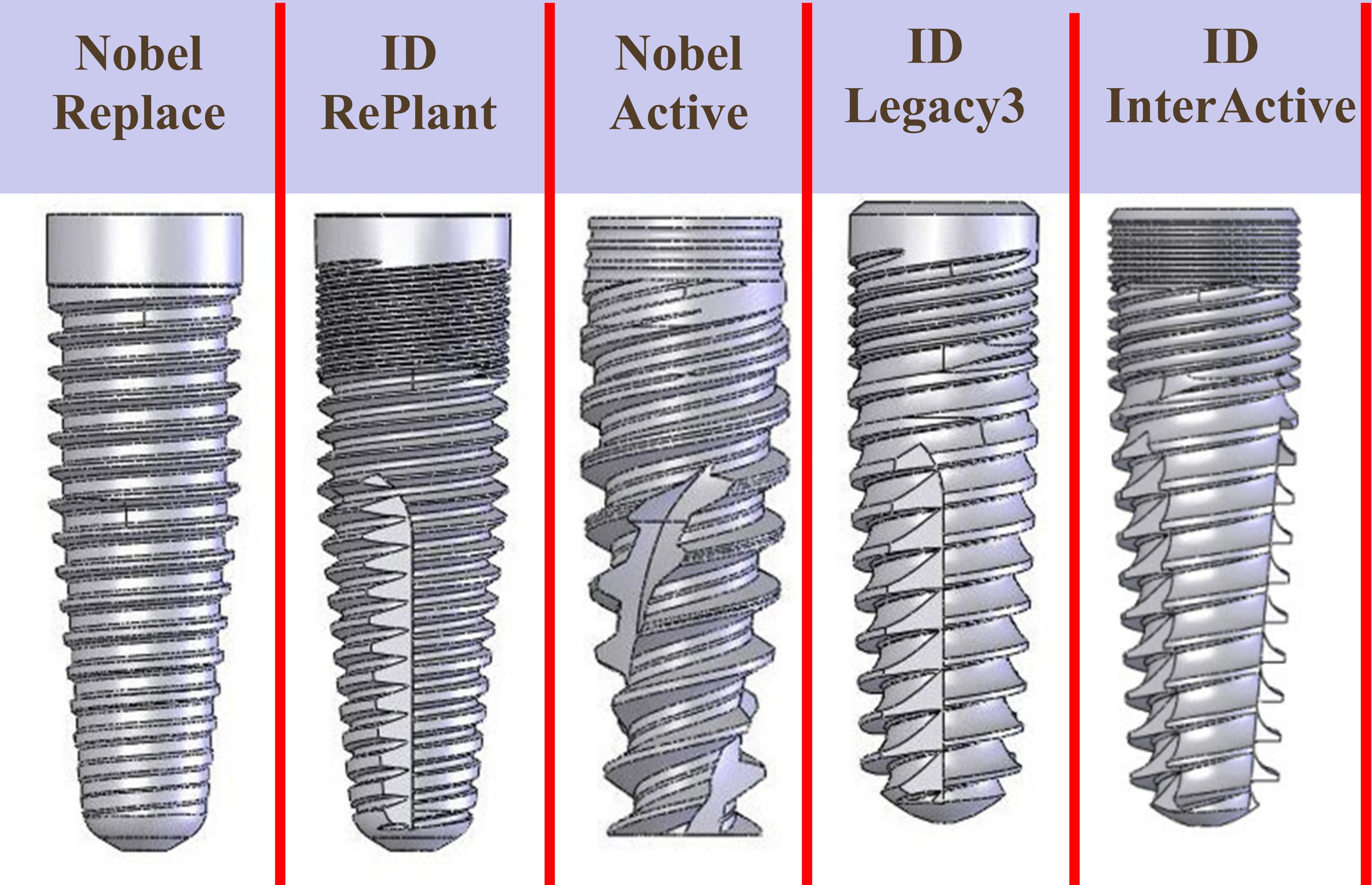
45deg. Bevel



Implant Direct's
Legacy
Zimmer Dental's
Screw-Vent,
BioHorizons, MIS +++
ADVANTAGES:

- Thicker walls for strength
- Easier to confirm full seating
- Hex closer to top, allowing for shorter implants.

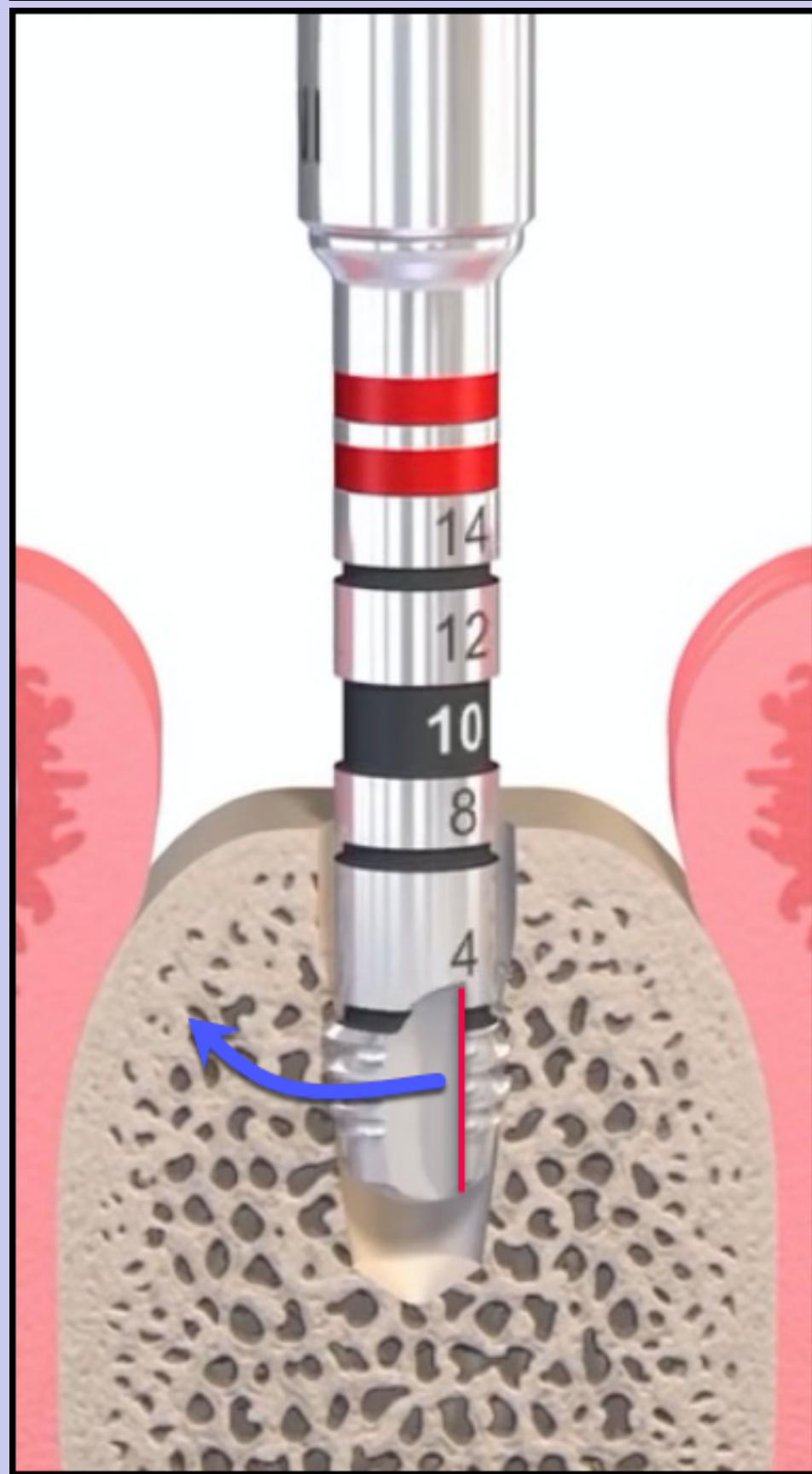
QUESTION: What is best design of the threads; tapered body; cutting groove?
Deeper the threads - less compression; Very tapered - not good in dense bone.



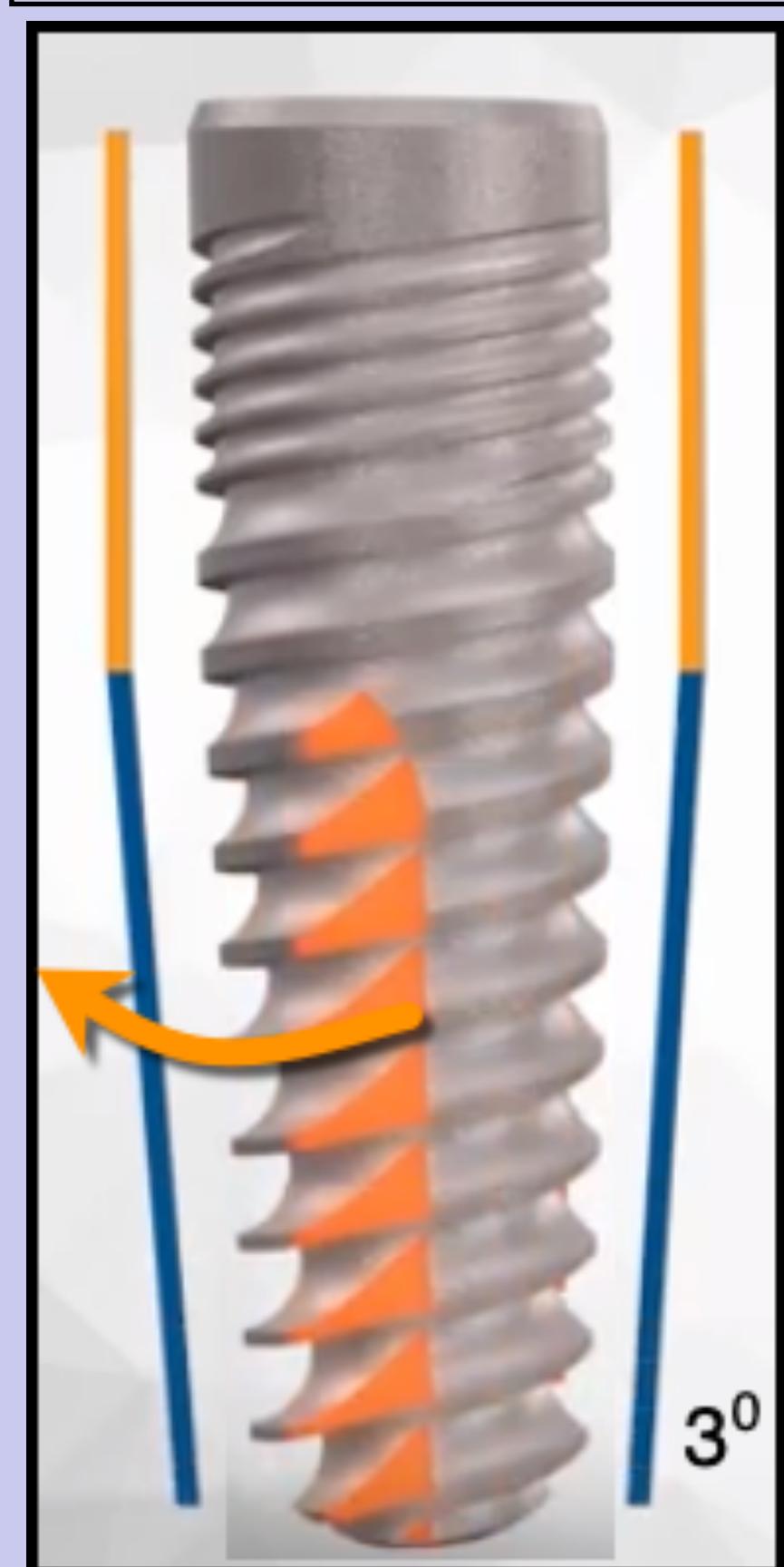
QUESTIONS? Effective, self-tapping design of a tapered implant?

A self-tapping implant has a relief and groove that cuts threads in clockwise rotation

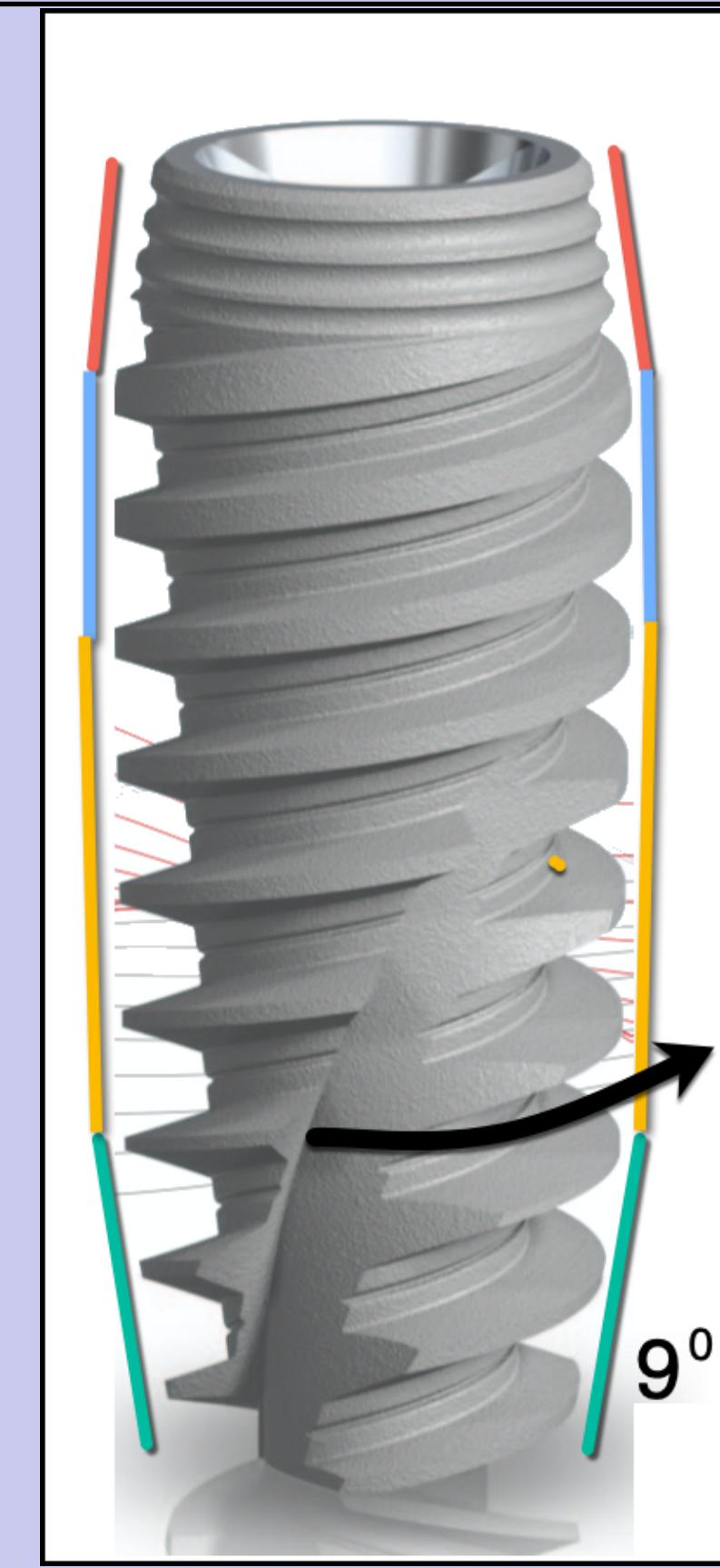
Relief precedes cutting edge



Relief precedes cutting edge



Relief follows cutting edge



BLX Straight Implants: no relief for bone chips-grooves dissecting threads

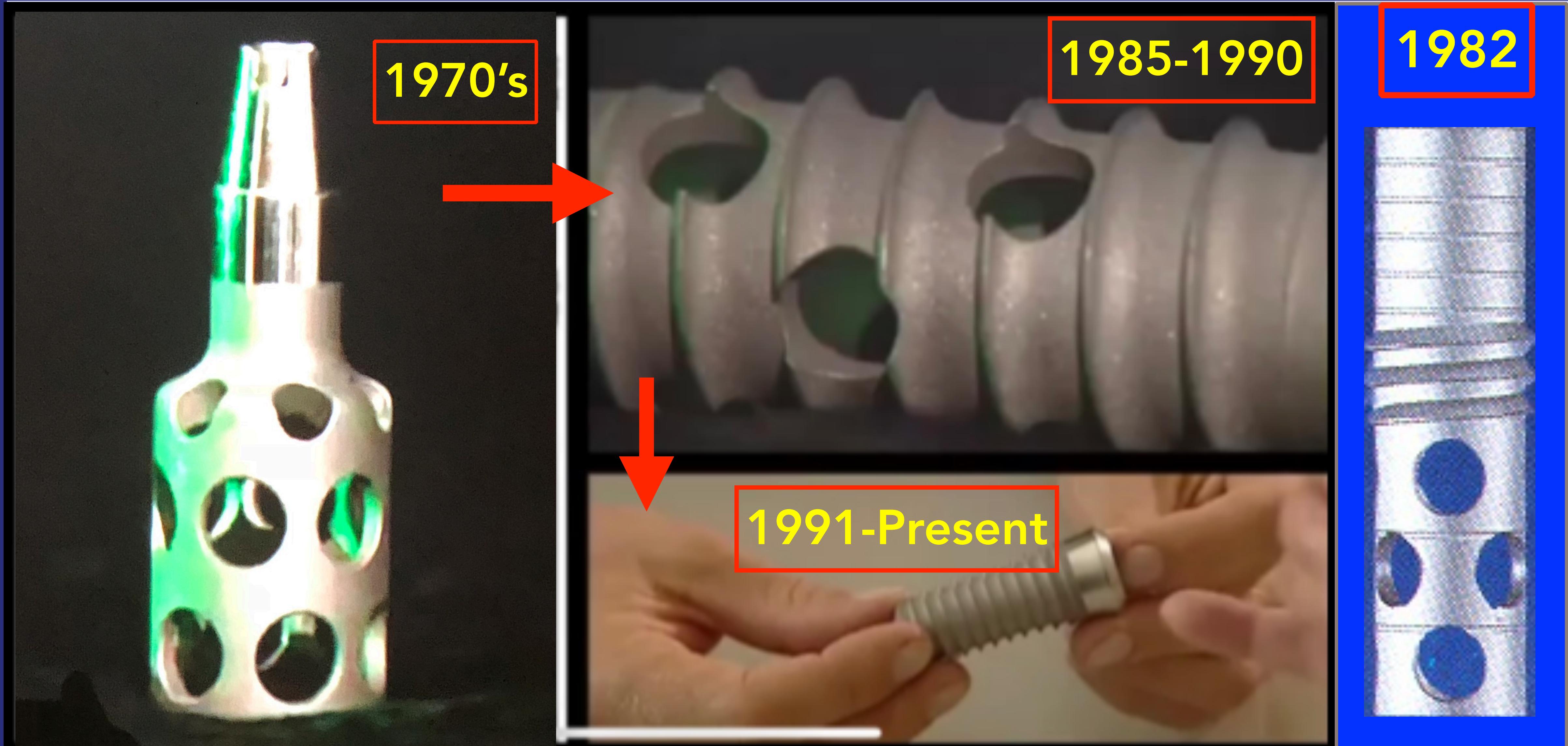


Straumann Bone Tap

Legacy 2 & 4

NobelActive

QUESTION: What companies have contributed to innovations
Straumann introduced tapered, bone-level implant in 2014, 15 years after Tapered Screw-Vent



QUESTION: What companies have contributed to innovations

Straumann introduced BLX in 2018 - Copy of Megagen with cutting grooves added

The spotlight turns to BLX

2018 EAO - Viena

Straumann has been addressing the topic of immediacy in tooth replacement for many years as the company seeks to meet demand for even shorter treatment times coupled with predictable and personalized treatment options.



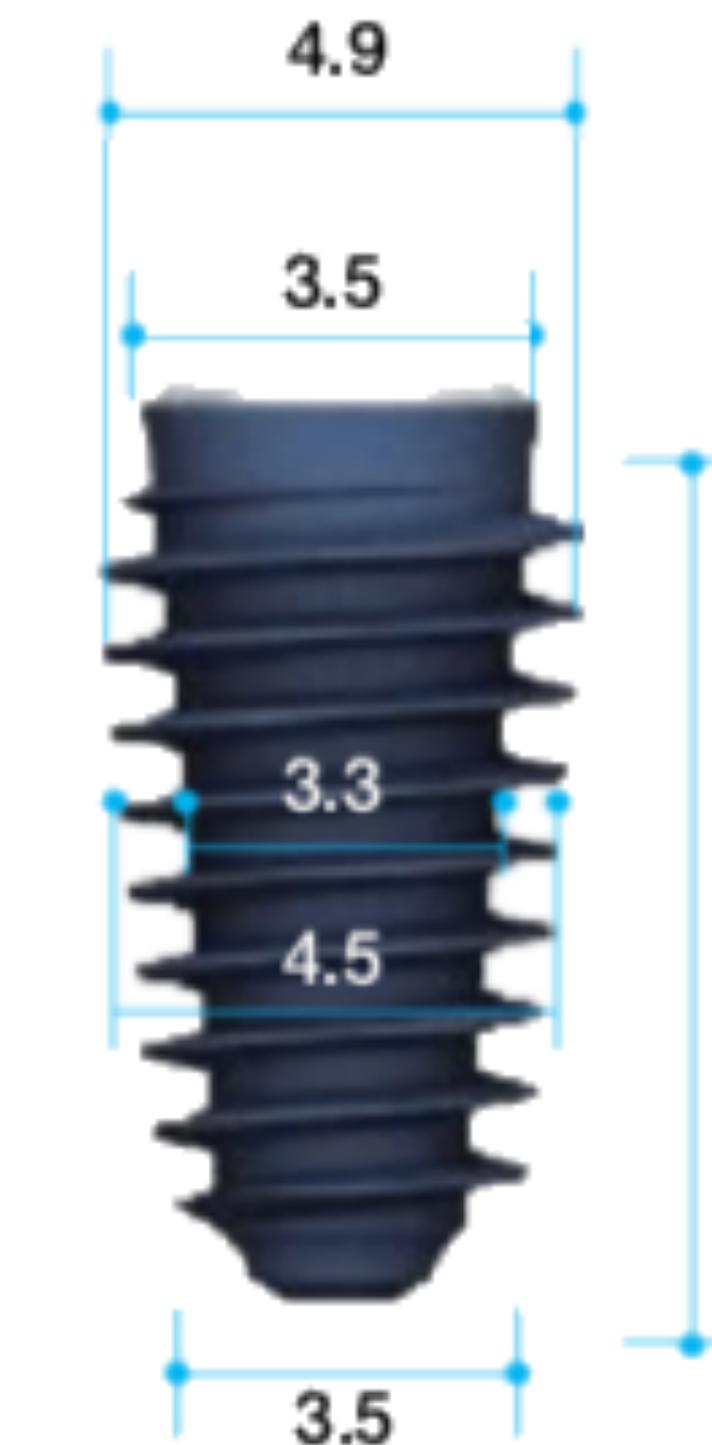
Niznick's First Rule of Implant Design -
Widest part of the implant should be at top

Implants

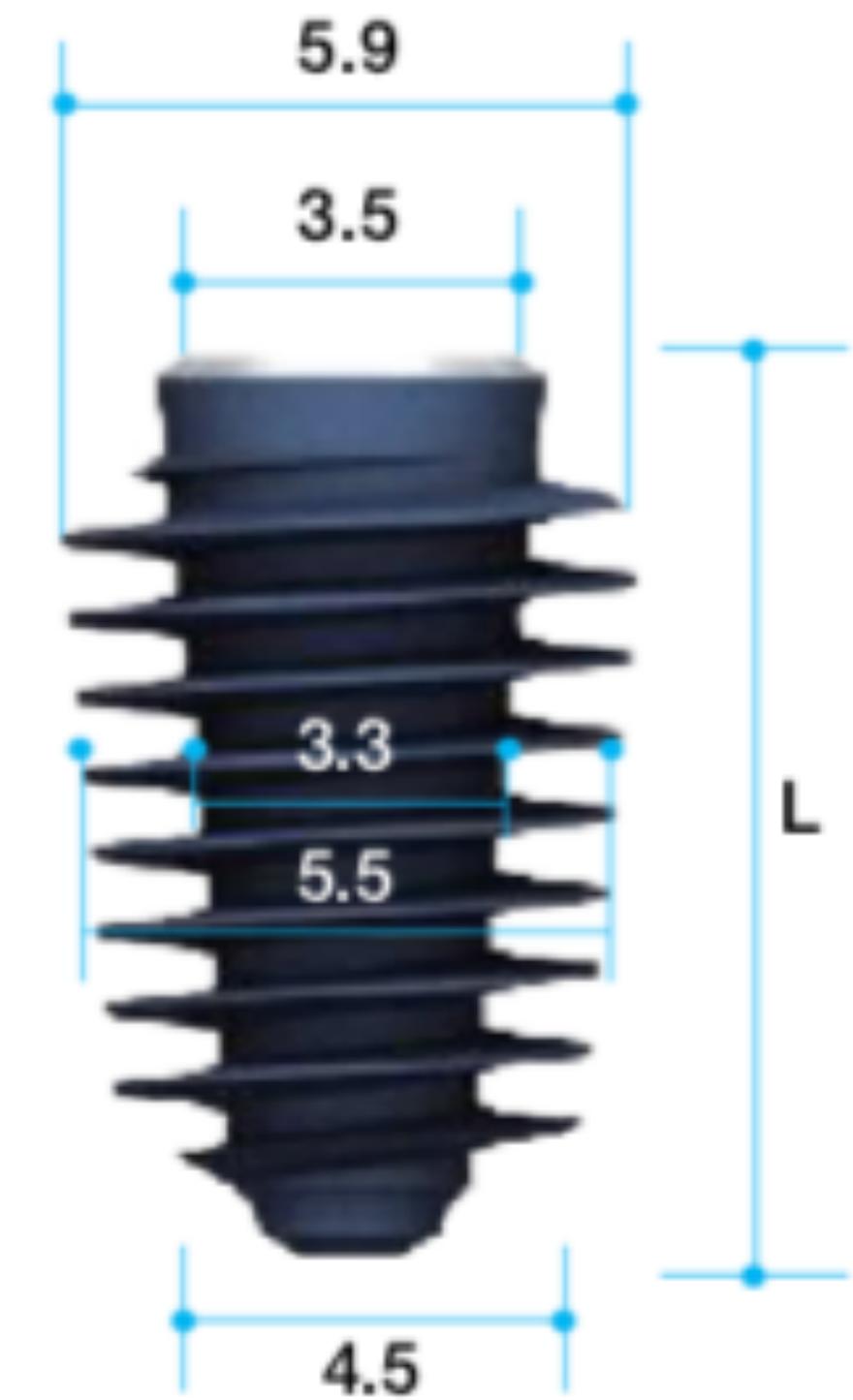


MEGA^IGEN
For Lifetime Smiles

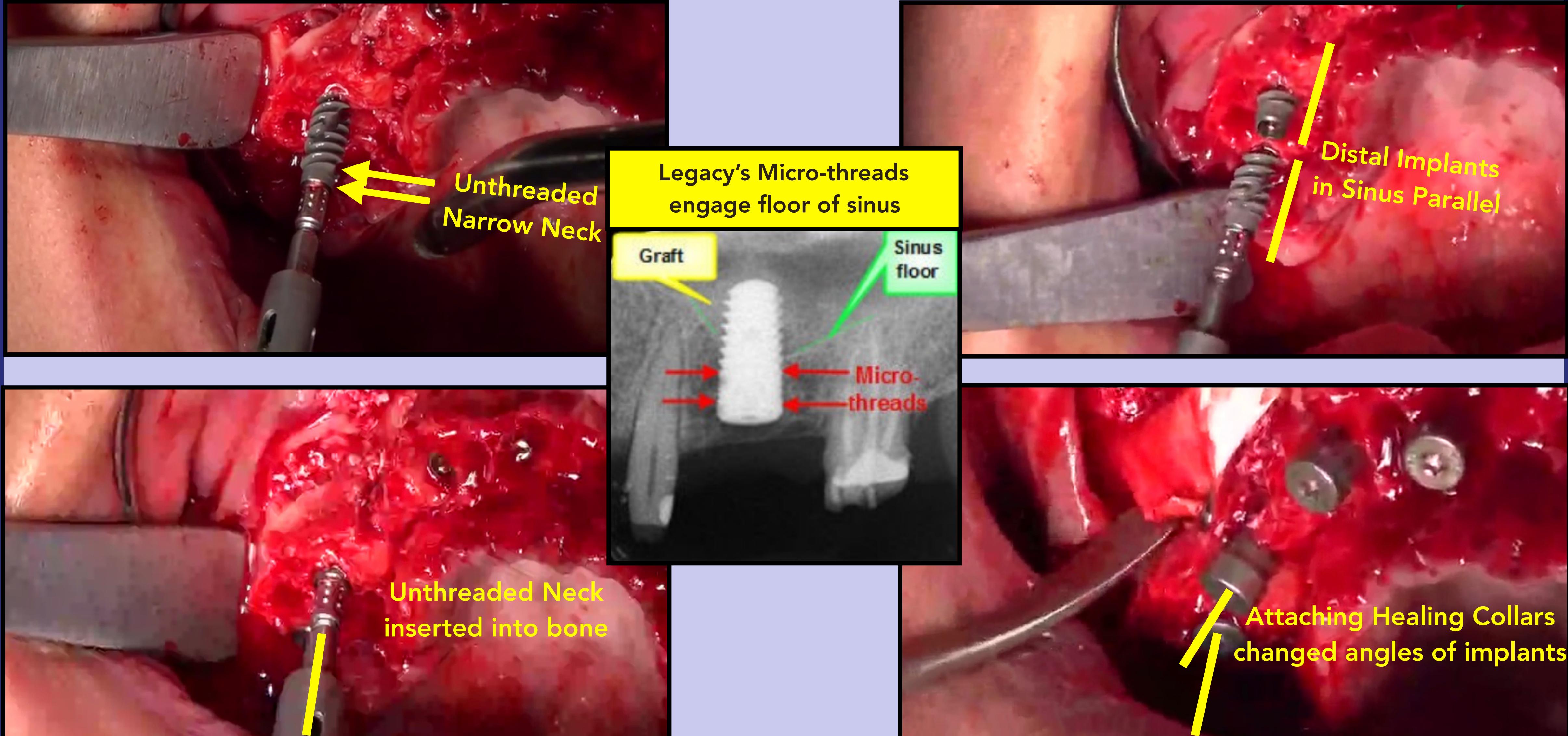
Regular Ø4.5



Wide Ø5.5



BLX Implants inserted through 2mm of bone into sinus elevation graft. *Note- once unthreaded, narrow neck submerged, implants lose stability*



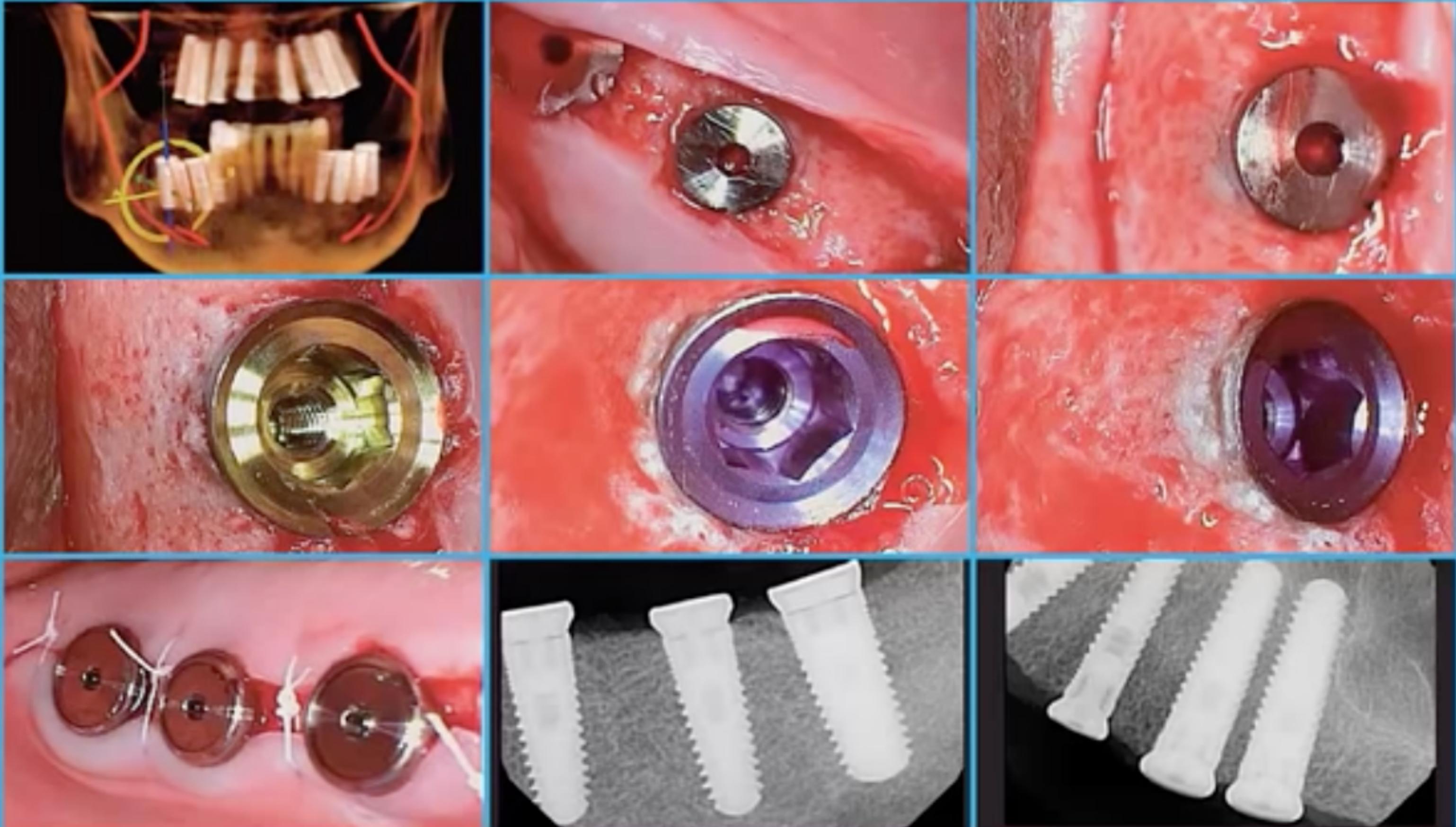
QUESTION? Should the Neck of the Implant Seal the Crestal Opening?

The theory behind the NobelActive back-taper and V3 Triangle is disproven by these clinical results

Subject: Uncovering
Date: 11/30/2011 3:30:45 P.M. Pacific Standard Time
From: drobrien@obteam.com

16 Legacy3 Implants seal crest at insertion Zero bone loss evident at uncovering

I just uncovered the case with 16 Legacy 3 implants and there was zero bone loss on all 16 !!! Very impressive surgical results. These are some of the photographs that I thought that you would like to see. This is by far the most user-friendly, forgiving, bone loving implant design that I have ever placed.

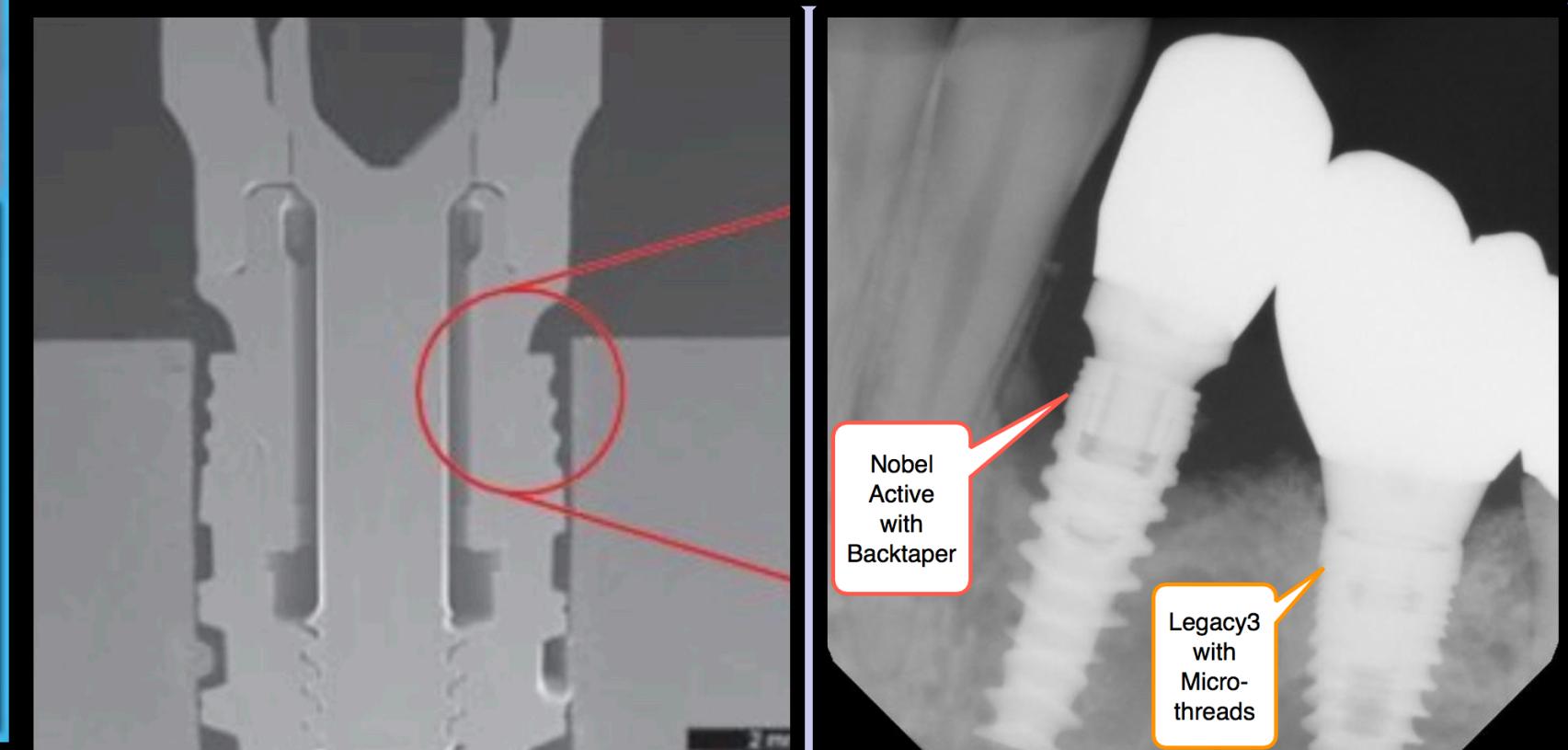


Megagen Design Theory



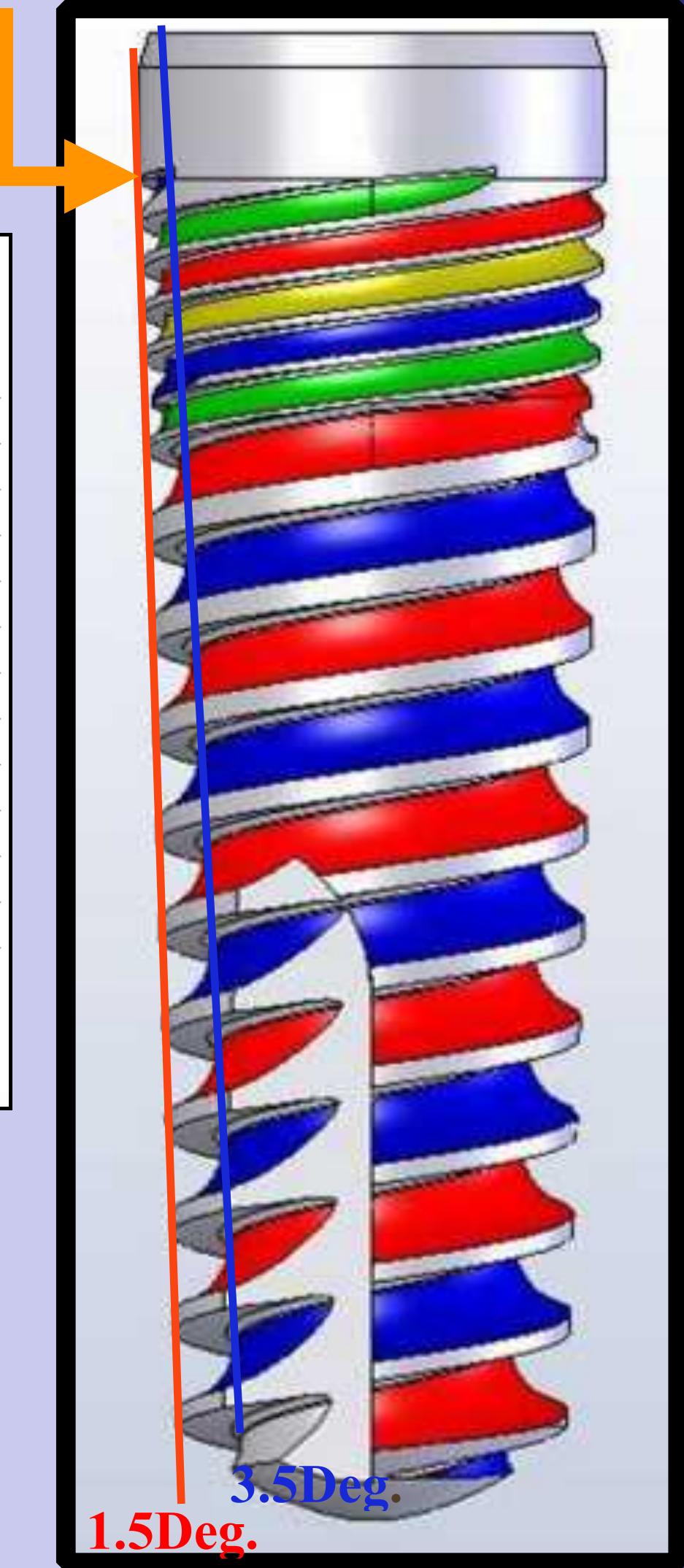
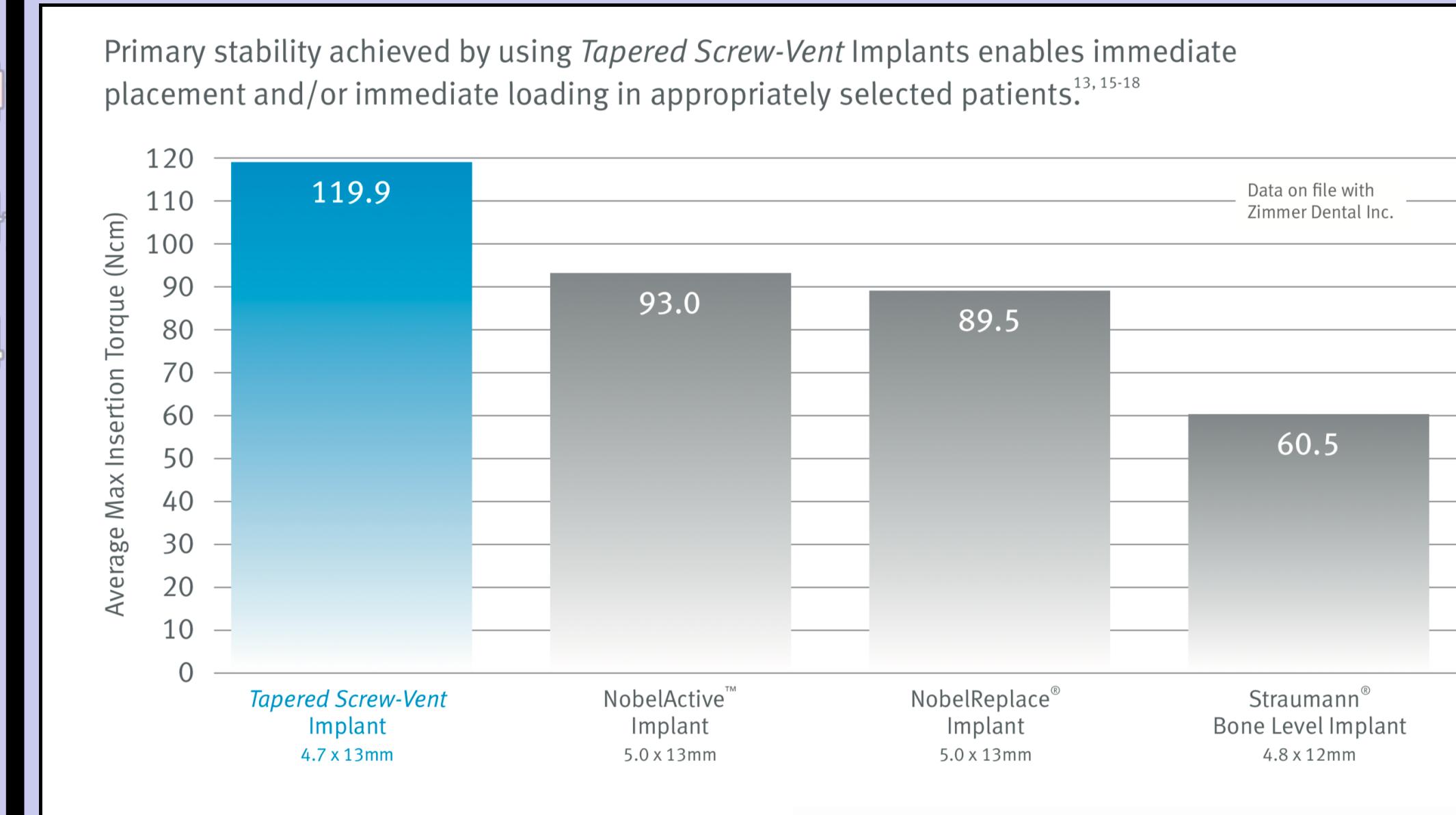
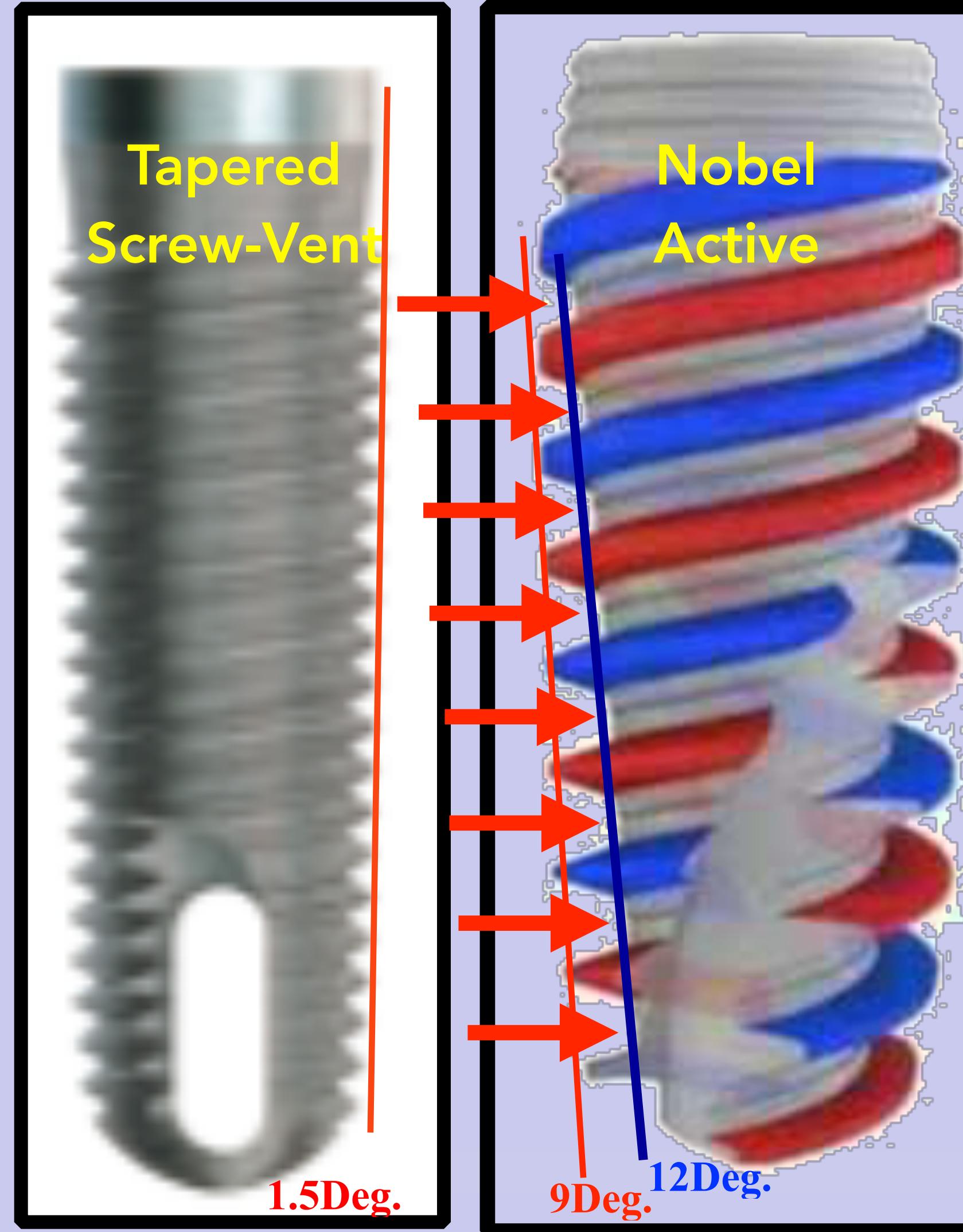
AnyRidge fixtures do not depend on the cortical bone for initial stability! Decreased stress on the cortical bone helps to prevent bone resorption following fixture placement.

NobelActive Back-taper



Zimmer Dental's Tapered Screw-Vent Brochure includes a comparison of Initial Stability.

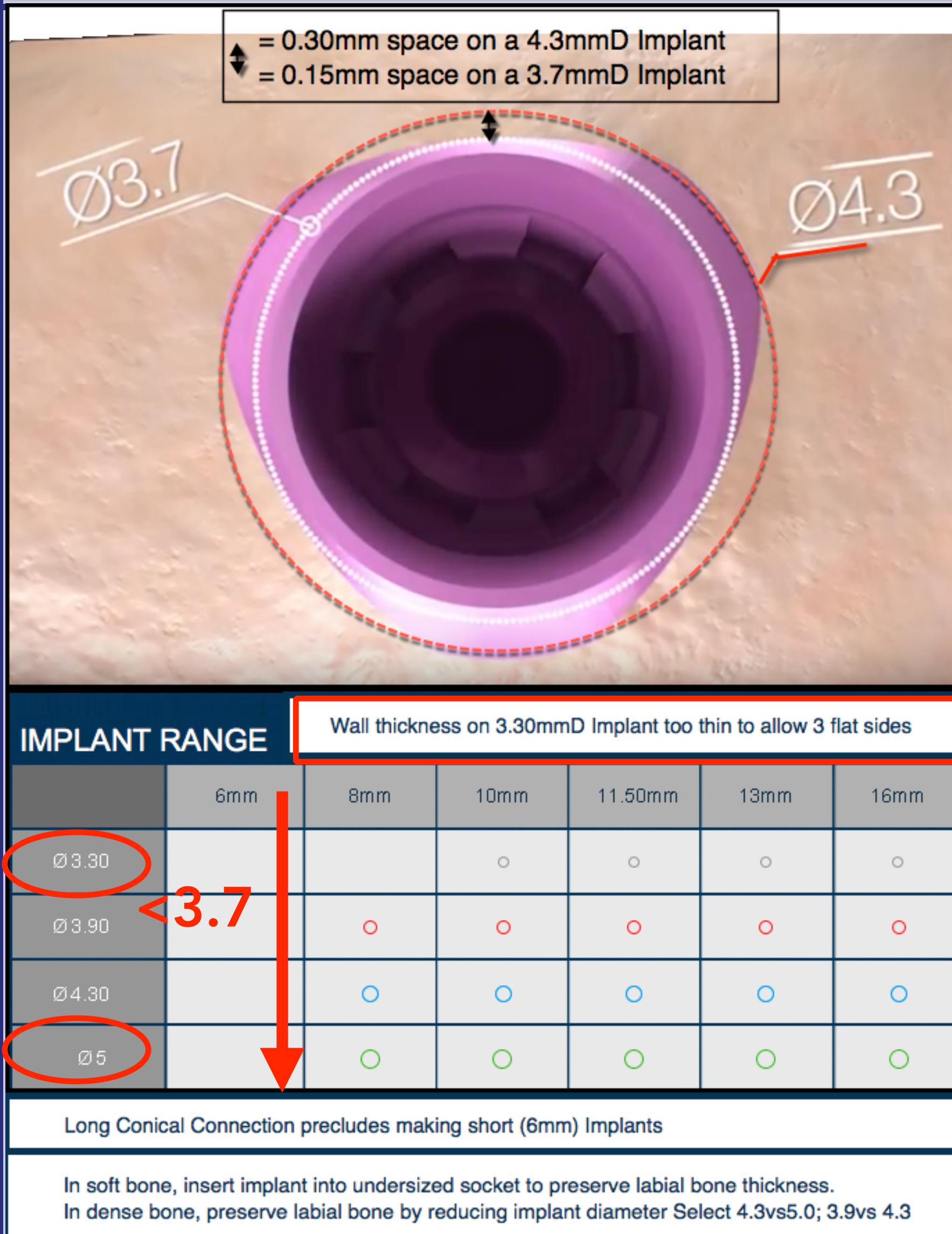
Screw-Vent generated 29% more primary stability than NobelActive with deeper threads



Tapered Screw-Vent generated 100% more primary stability than Straumann's Straight Bone-Level implant

Theory of MIS V3 Triangular shaped implant neck - leaves more room for bone growth.

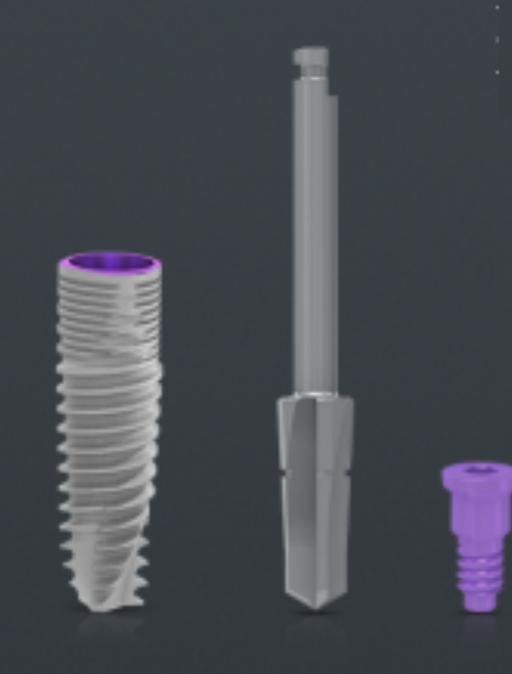
Thickness of labial plate is compromised by diameter of final drill, not diameter of Implant



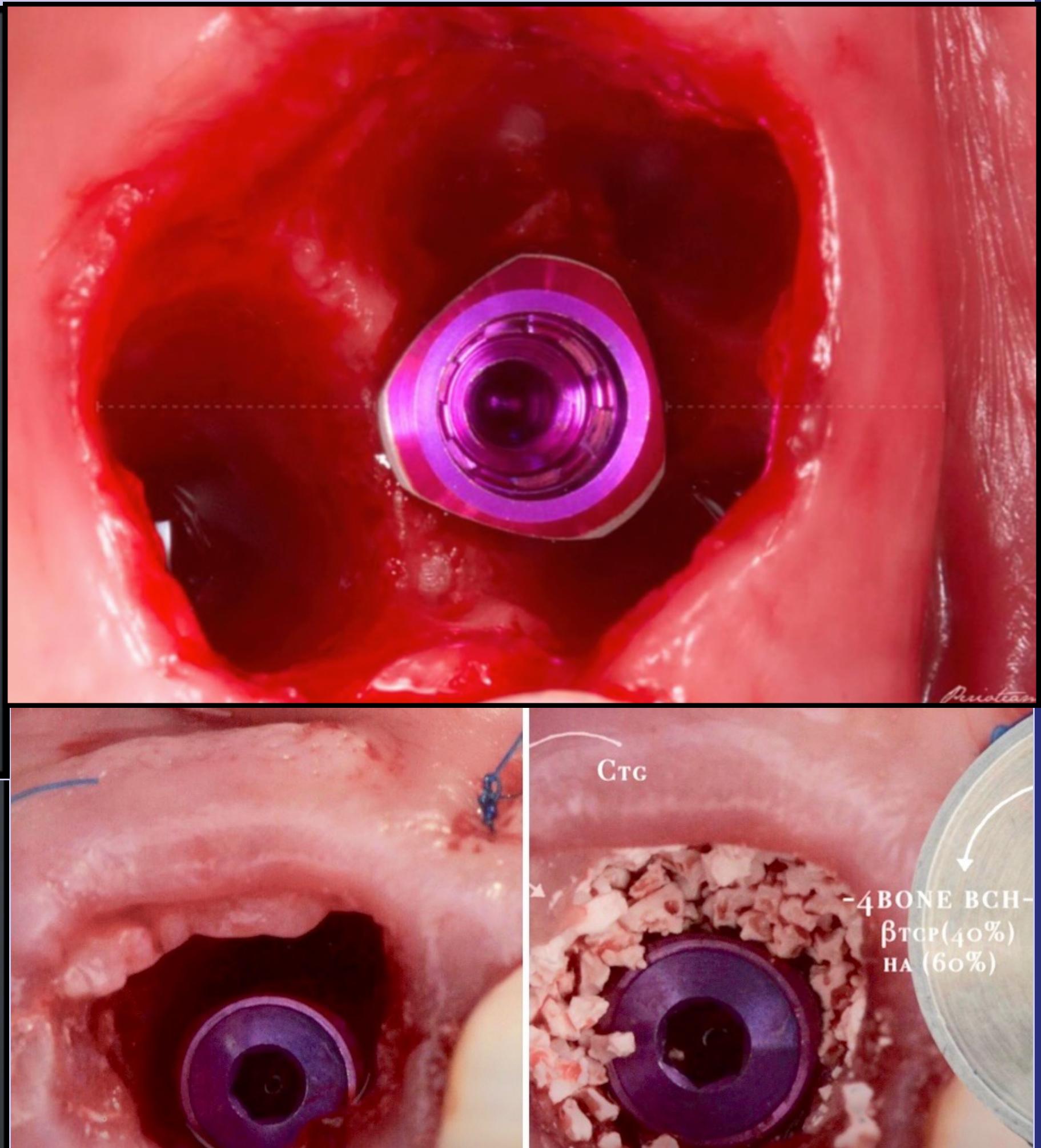
MIS's Seven Implant available in 5 diam. and 6 lengths vs V3 in 4 Diam. and 5 lengths



Free final sizing
tapered drill
unnecessary for
preparation of
socket in soft
bone.



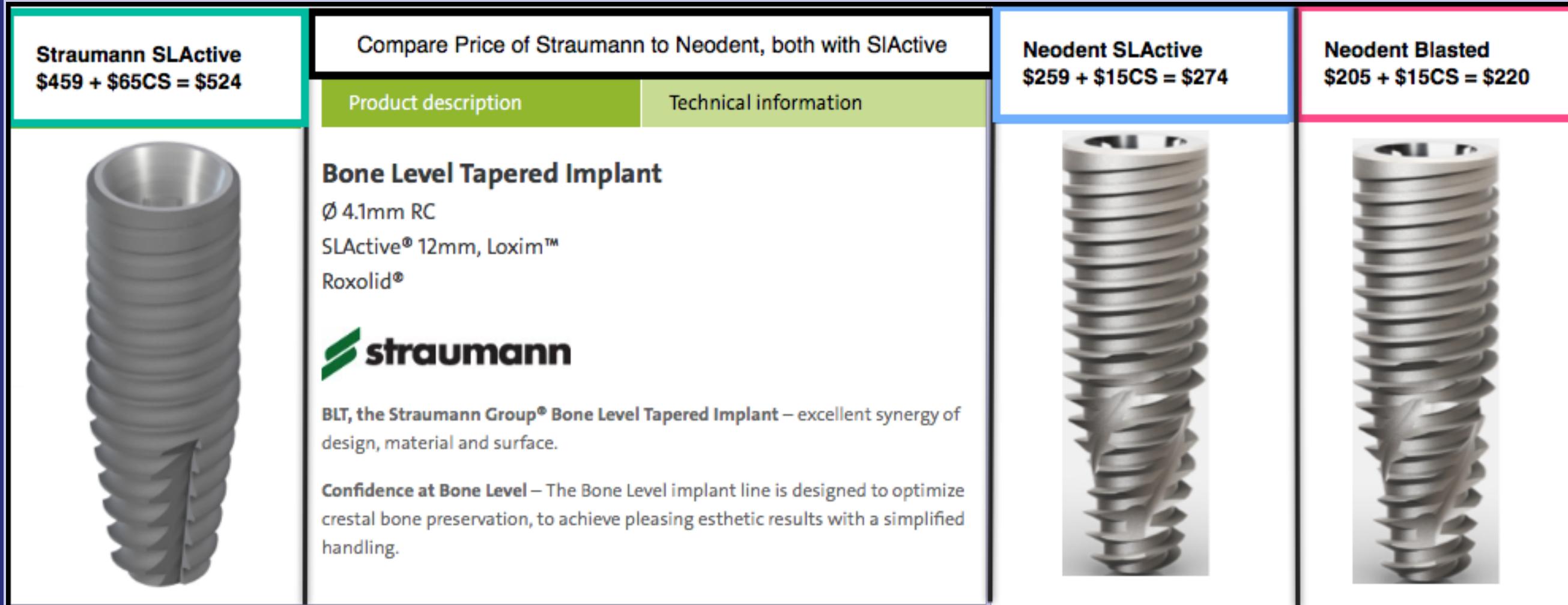
No justification for V3 flat areas for
Immediate placement with graft.



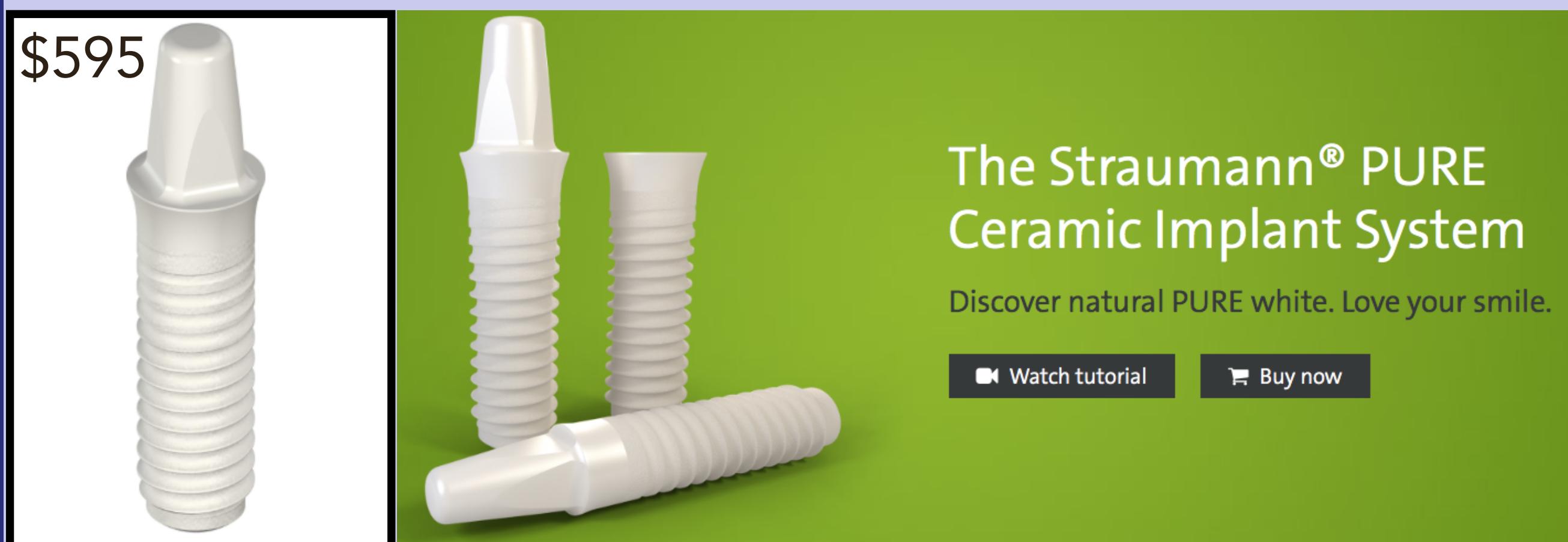
QUESTION? Is cost of implant directly related to clinical success - NO!

Straumann and Implant Direct Implants in the Same Patient - 72.5% Savings

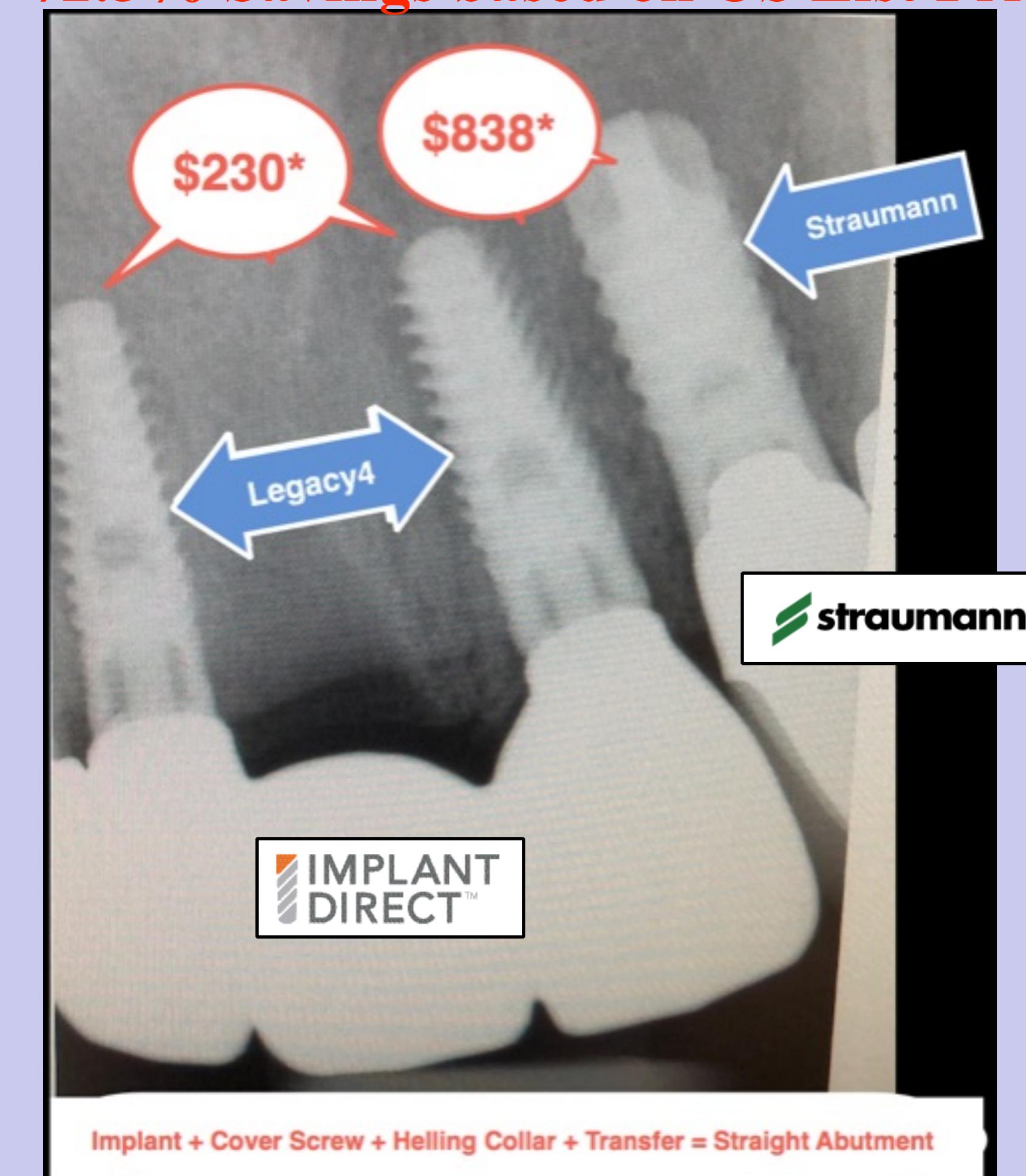
2014 Straumann launched a tapered, bone-level implant



Zirconia: 20Ncm Max. Torque- No Immediate Load

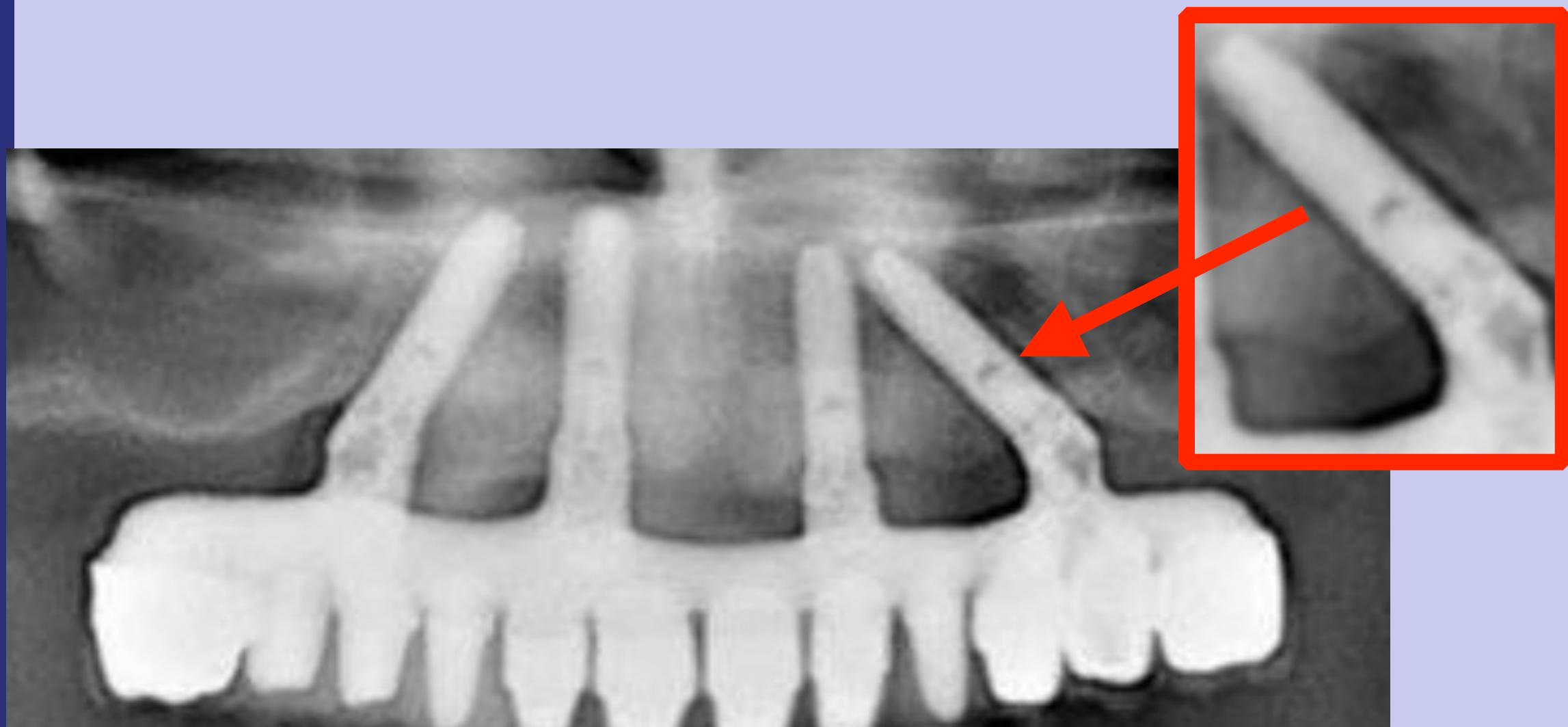


Legacy3 and Straumann bone-level implants in same patient.
72.5% Savings based on US List Price

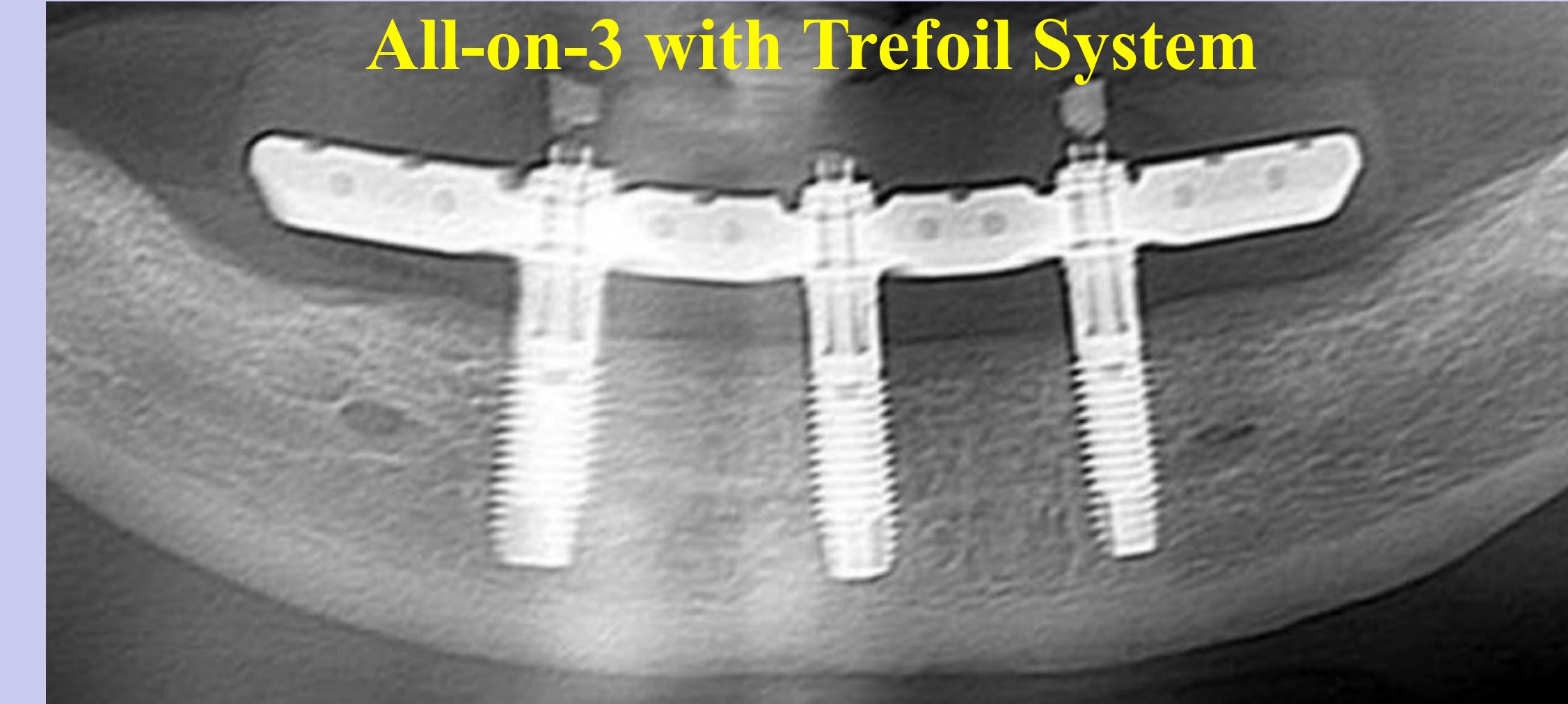


QUESTIONS: All-on-4, 3 or 2? Angled or Straight Implants?

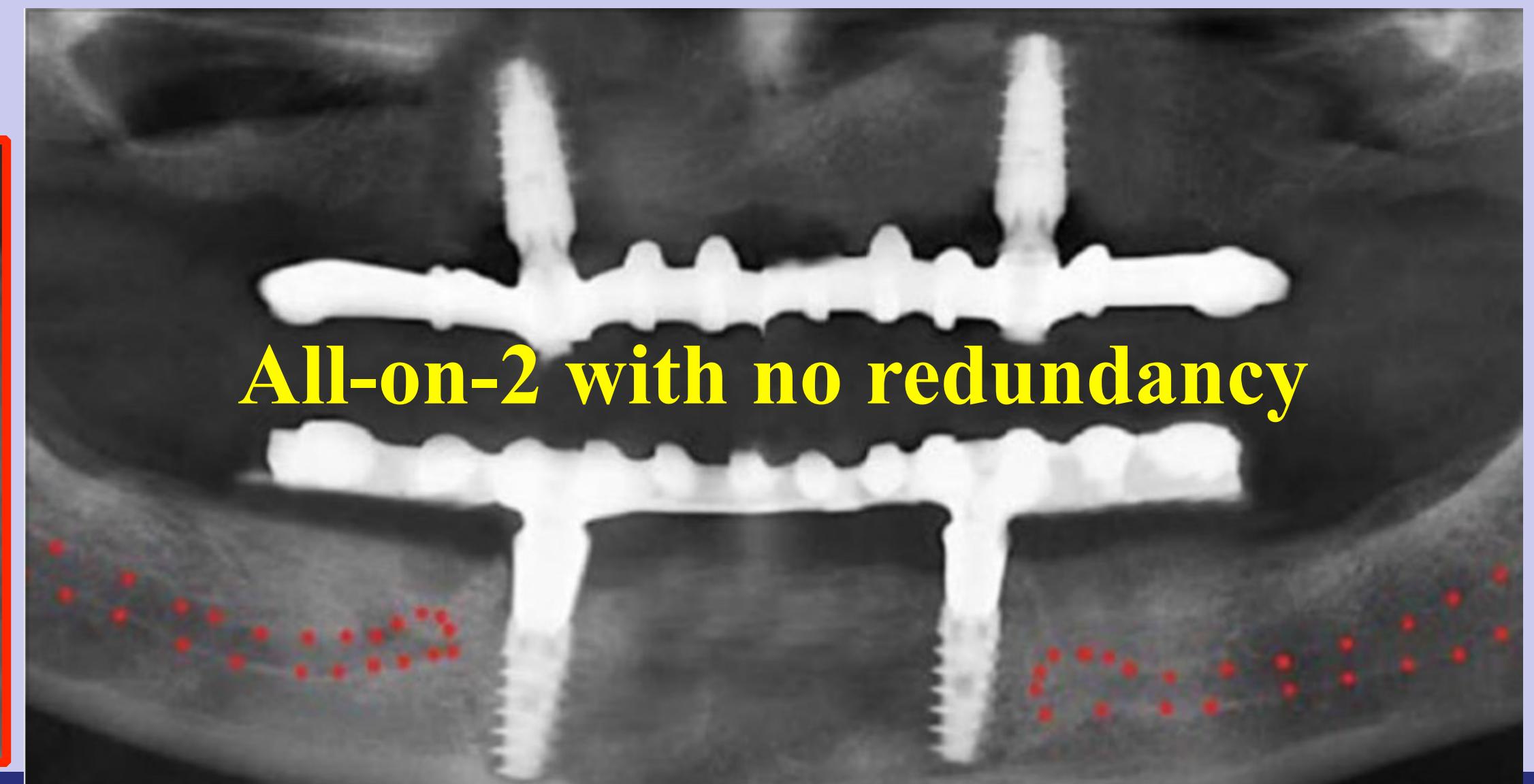
Concept to angle distal implants to reduce the length of cantilever extensions?



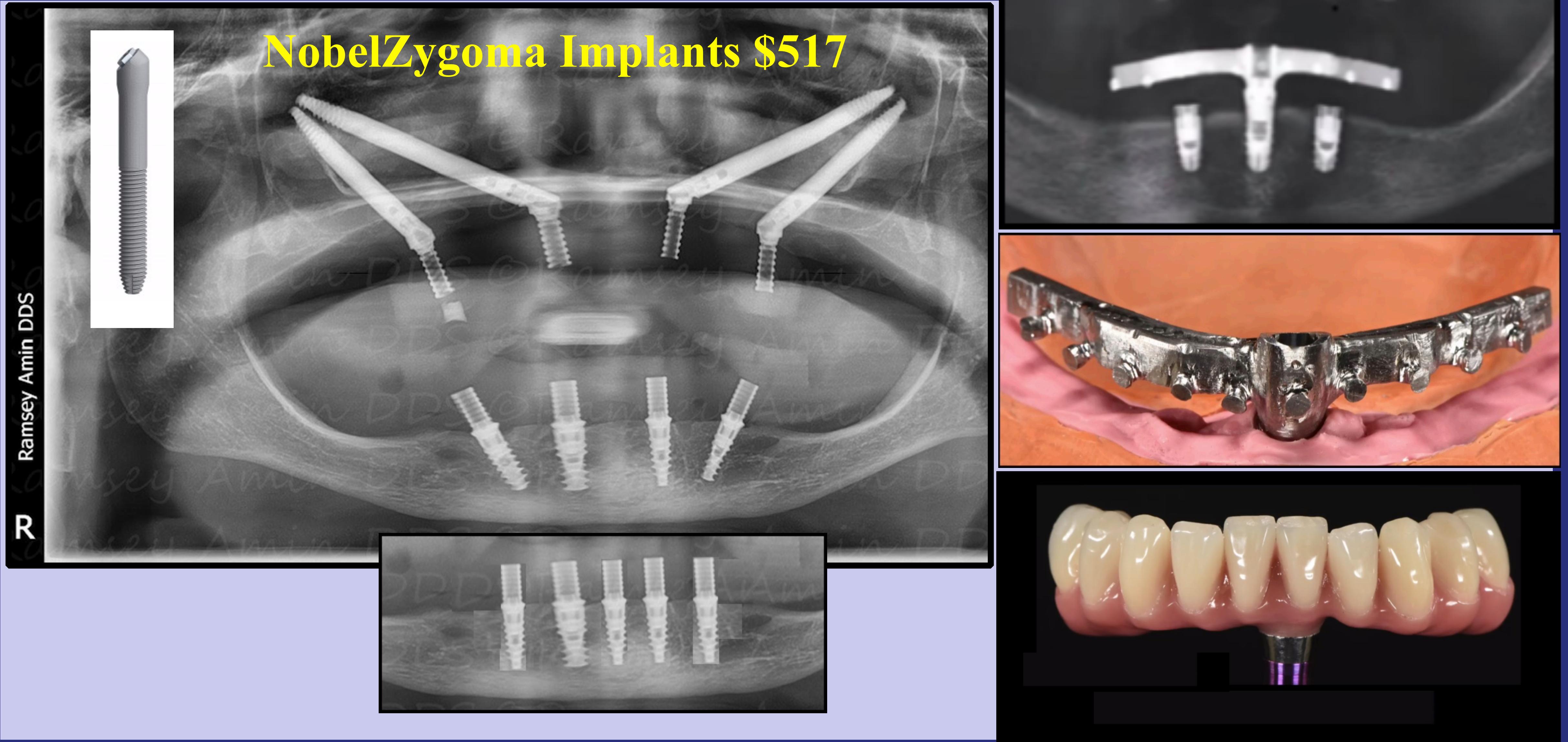
Nobel All-on-4 with Angled Implants



All-on-2 with no redundancy



QUESTION: *With Nobel promoting Trefoil and Zygoma Implants, is the concept of tipping implants distally to shorten cantilever debunked?*



QUESTION? What is Optimal in Maxilla - 4 or 6 Implants?

8 Teeth between the Maxillary sinuses SO should be able to place 6 implants

Nobel Biocare



33,249 followers

2 d

A 23-year-old patient with a severely degraded dentition came to the MALO CLINIC to seek help.

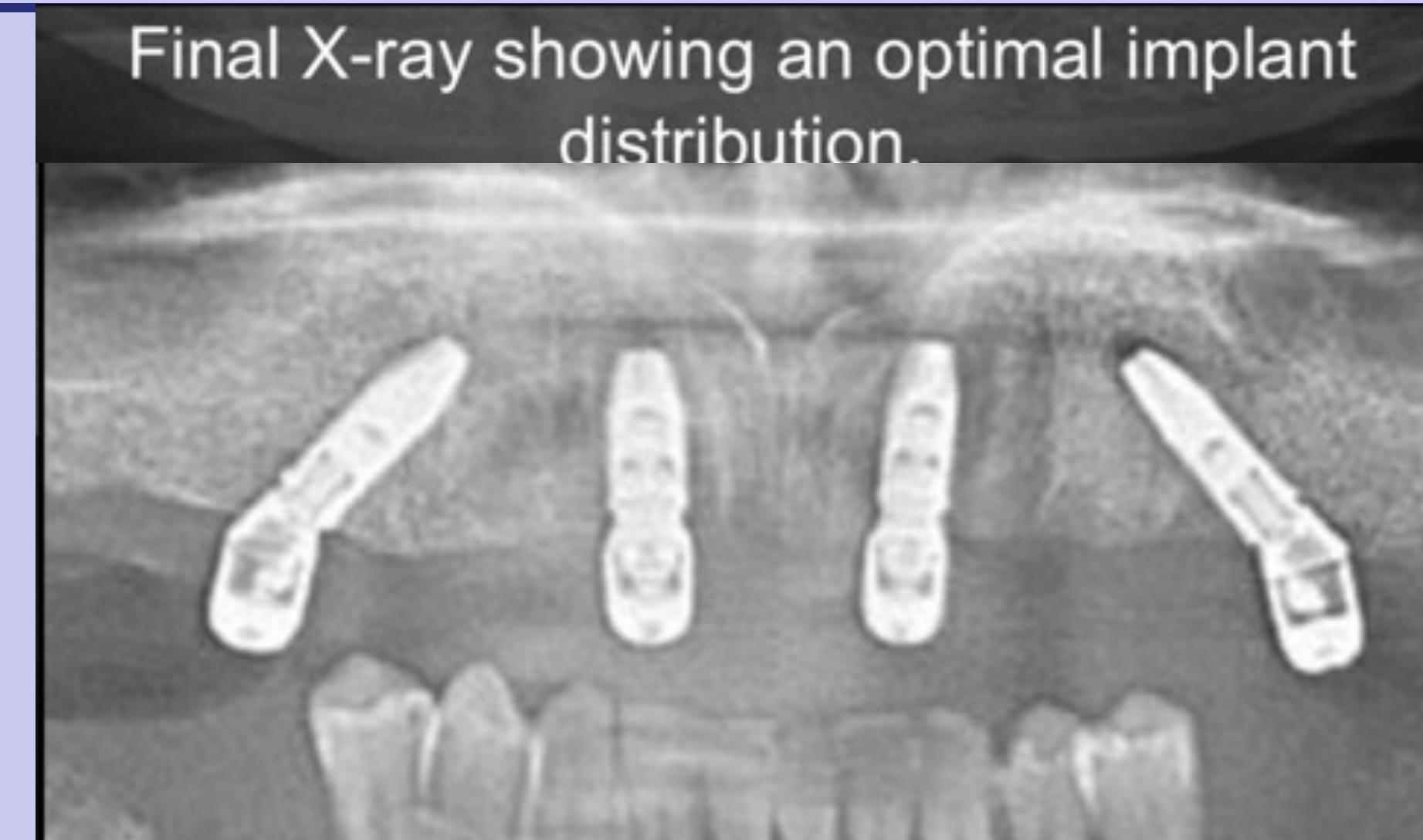
<https://bit.ly/2OzrwCZ>



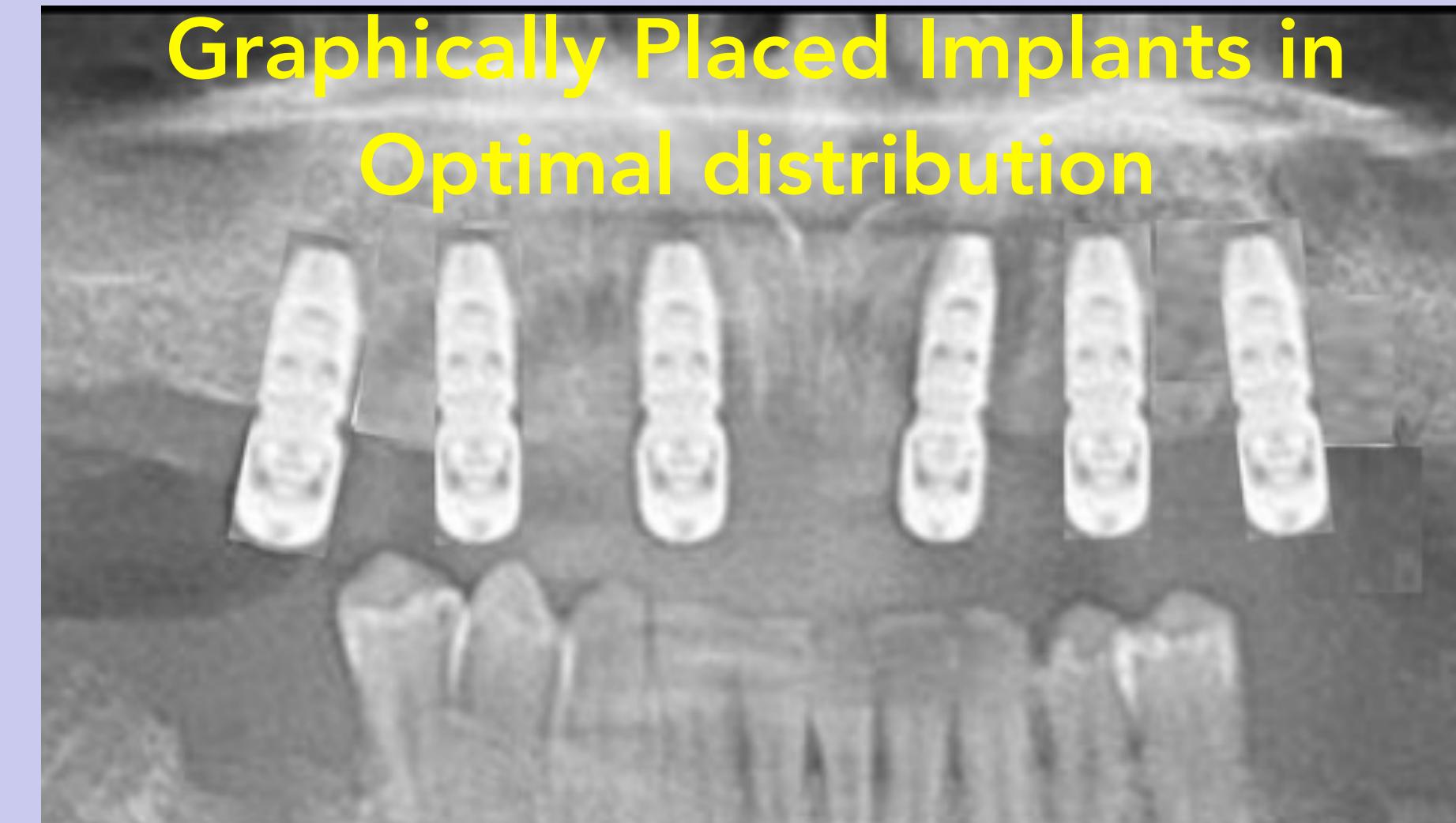
Clinical case: full-arch maxillary dental prosthesis using the All-on-4® treatment c...



Final X-ray showing an optimal implant distribution.



Graphically Placed Implants in Optimal distribution

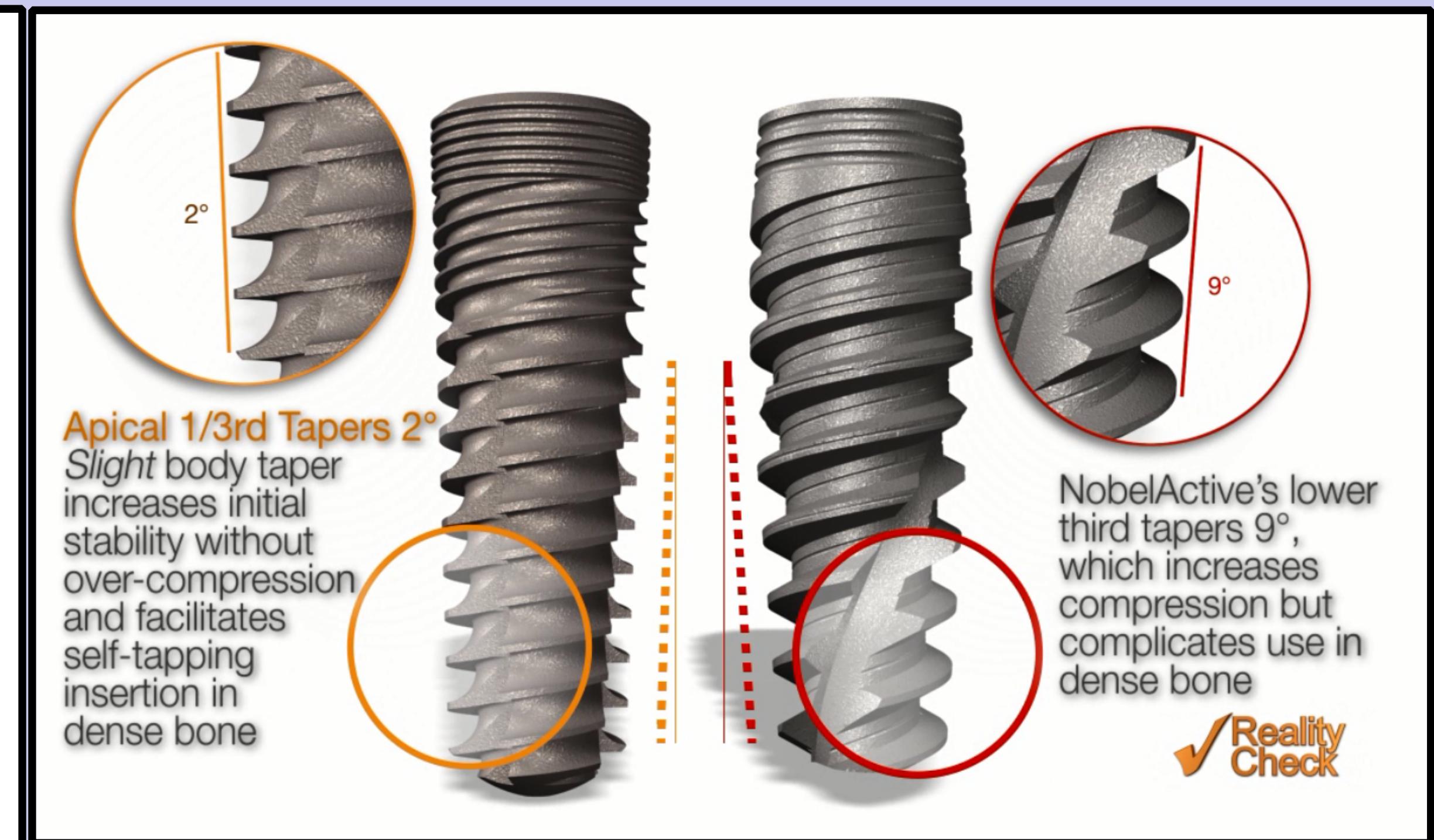
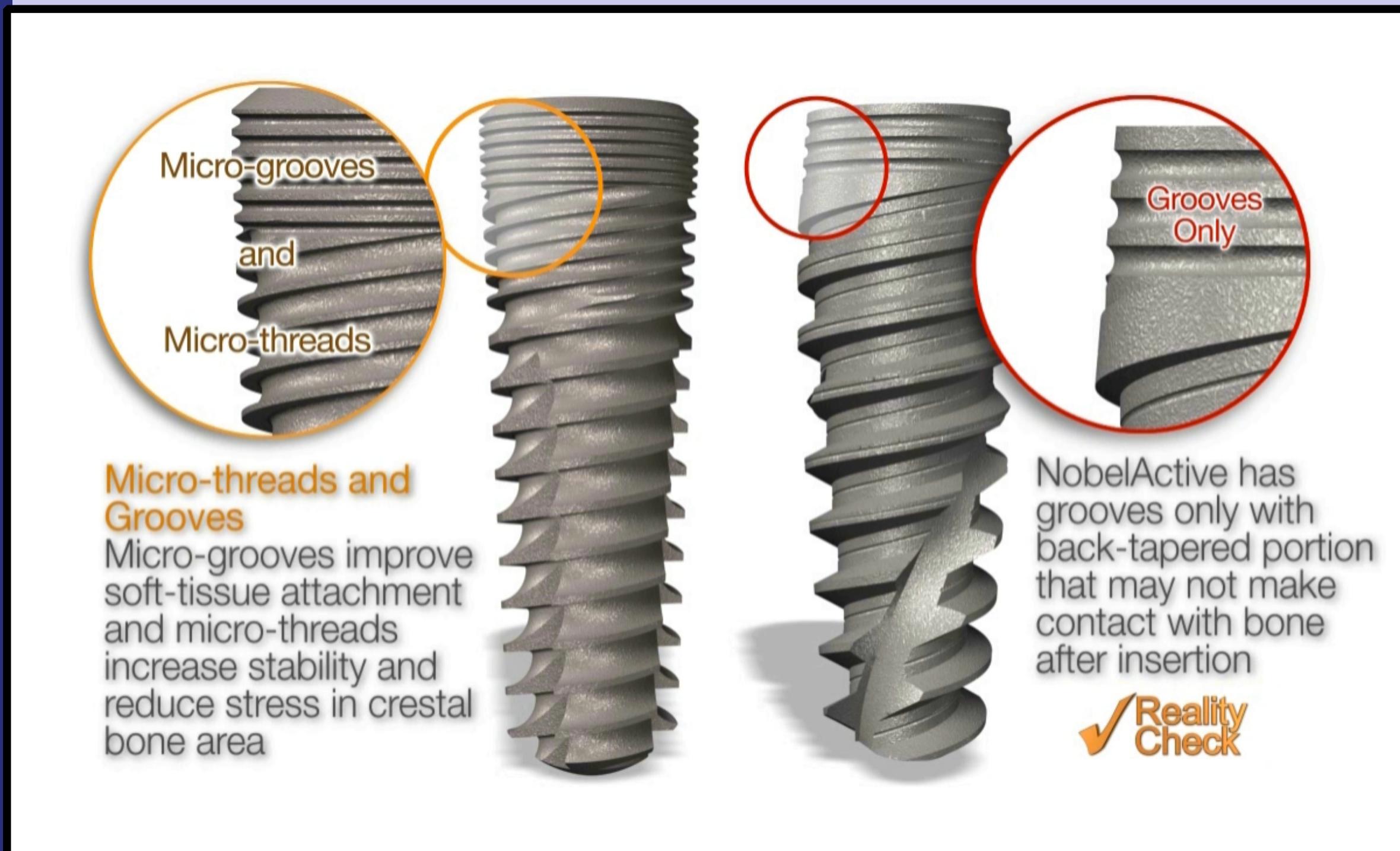


QUESTIONS? Micro-threads, Micro-grooves or both; Straight or Back-Tapered Coronal Region; slight (2deg.) or extreme (9deg.) taper

NobelActive has back tapered neck
InterActive sealed crestal opening

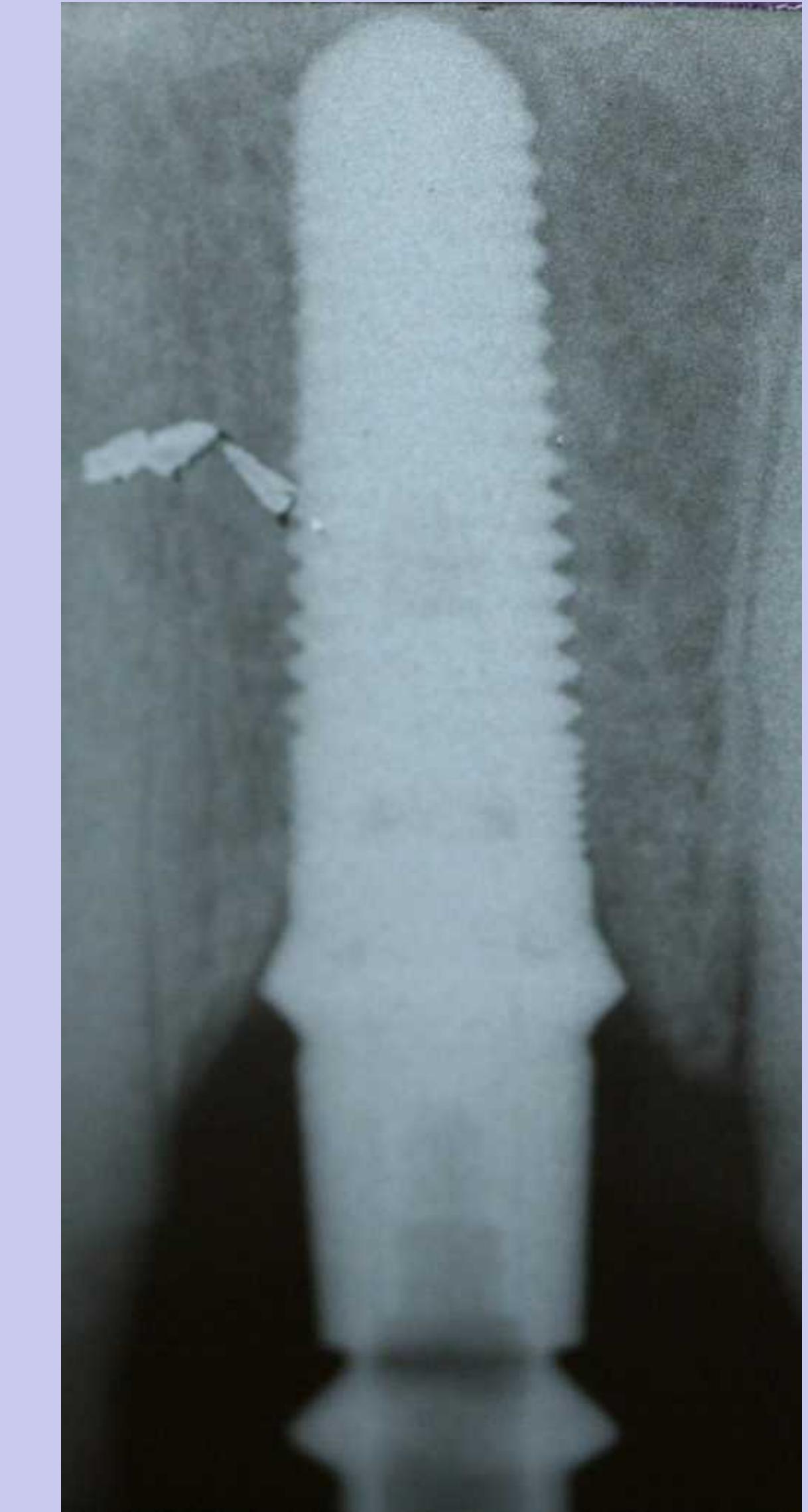
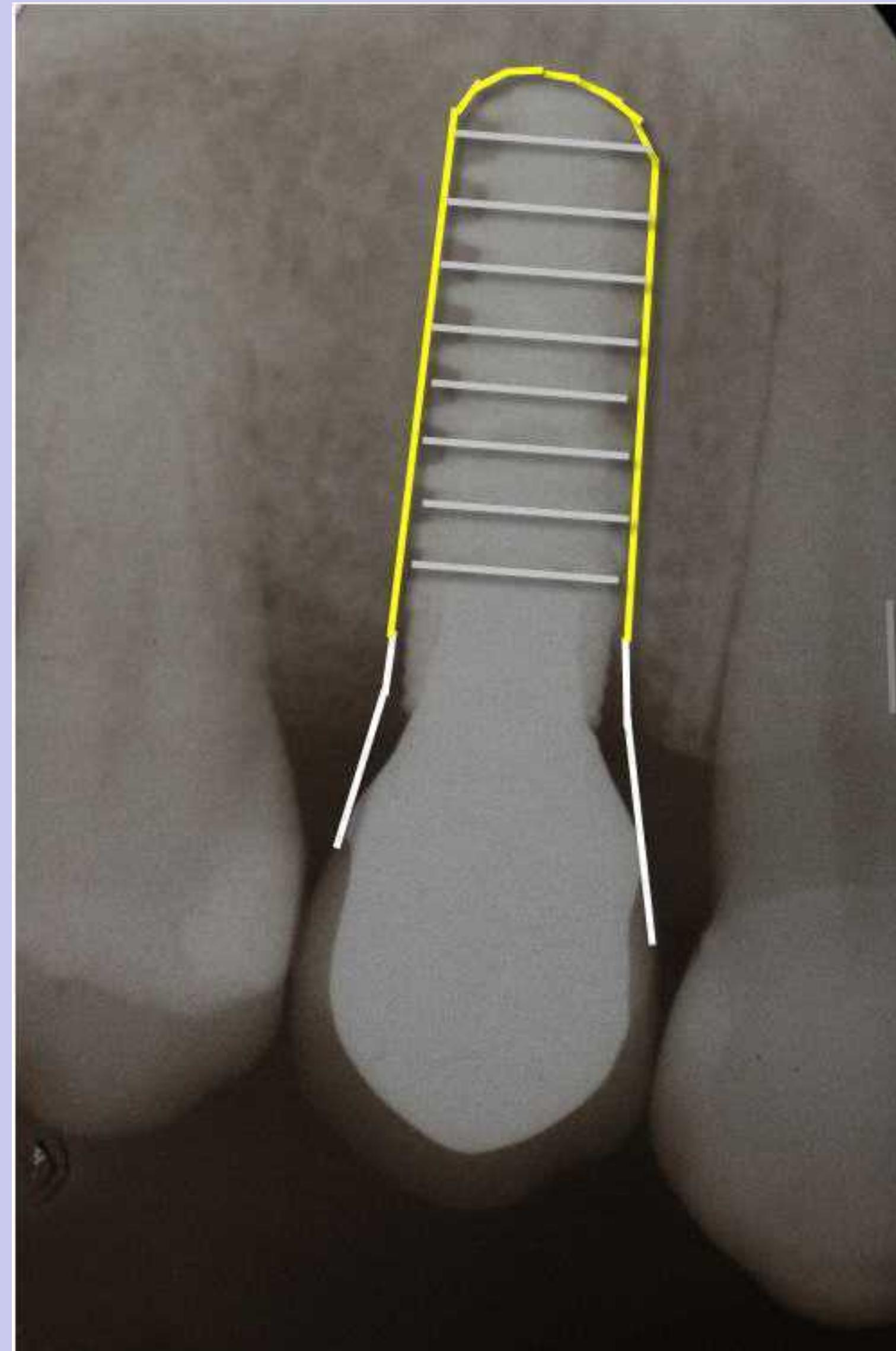
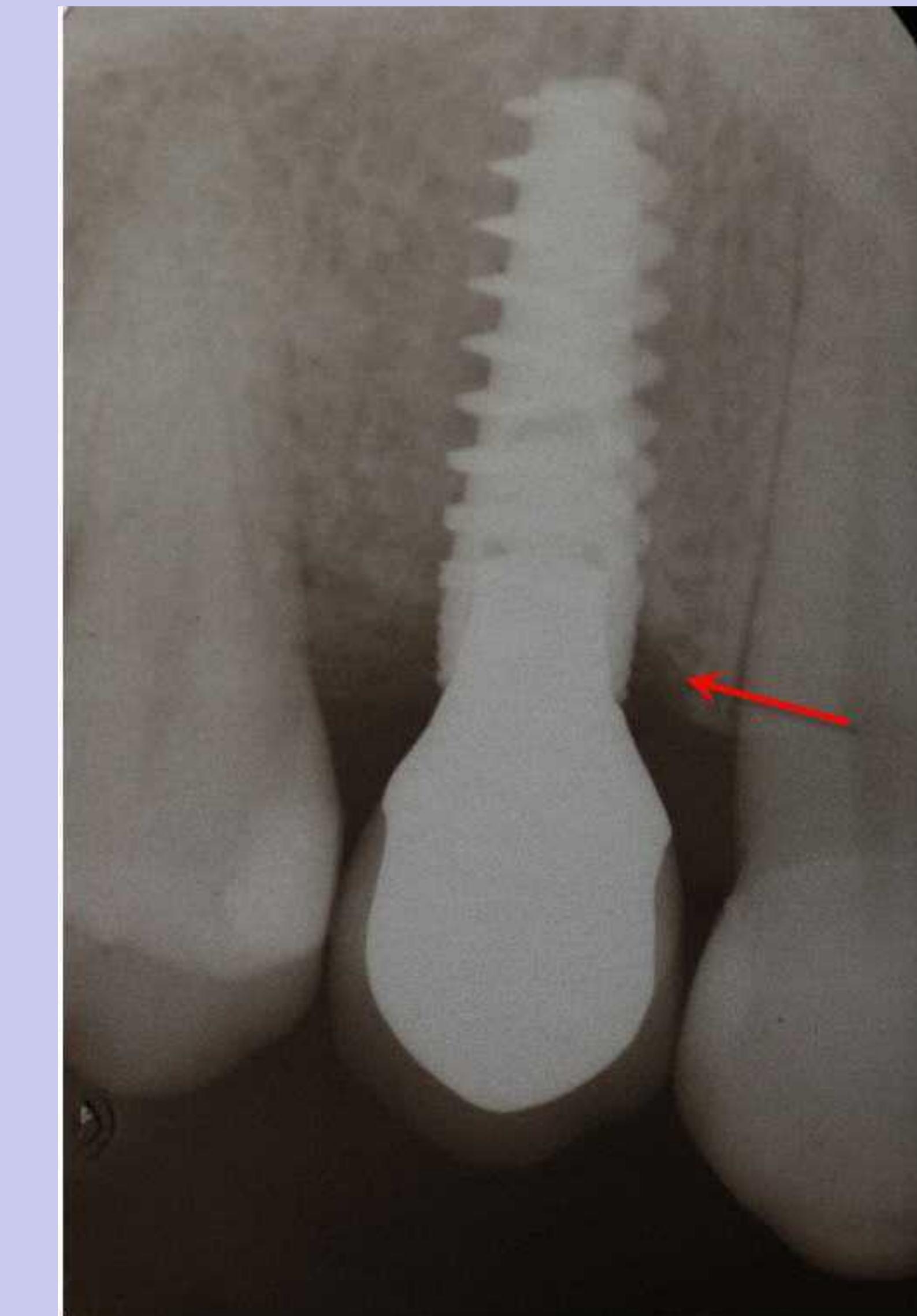
NobelActive has 9deg. taper with anti-clockwise cutting groove.

InterActive has 2deg. Taper with self-tapping vertical cutting groove



NobelActive Back-tapered Neck with Bone Loss

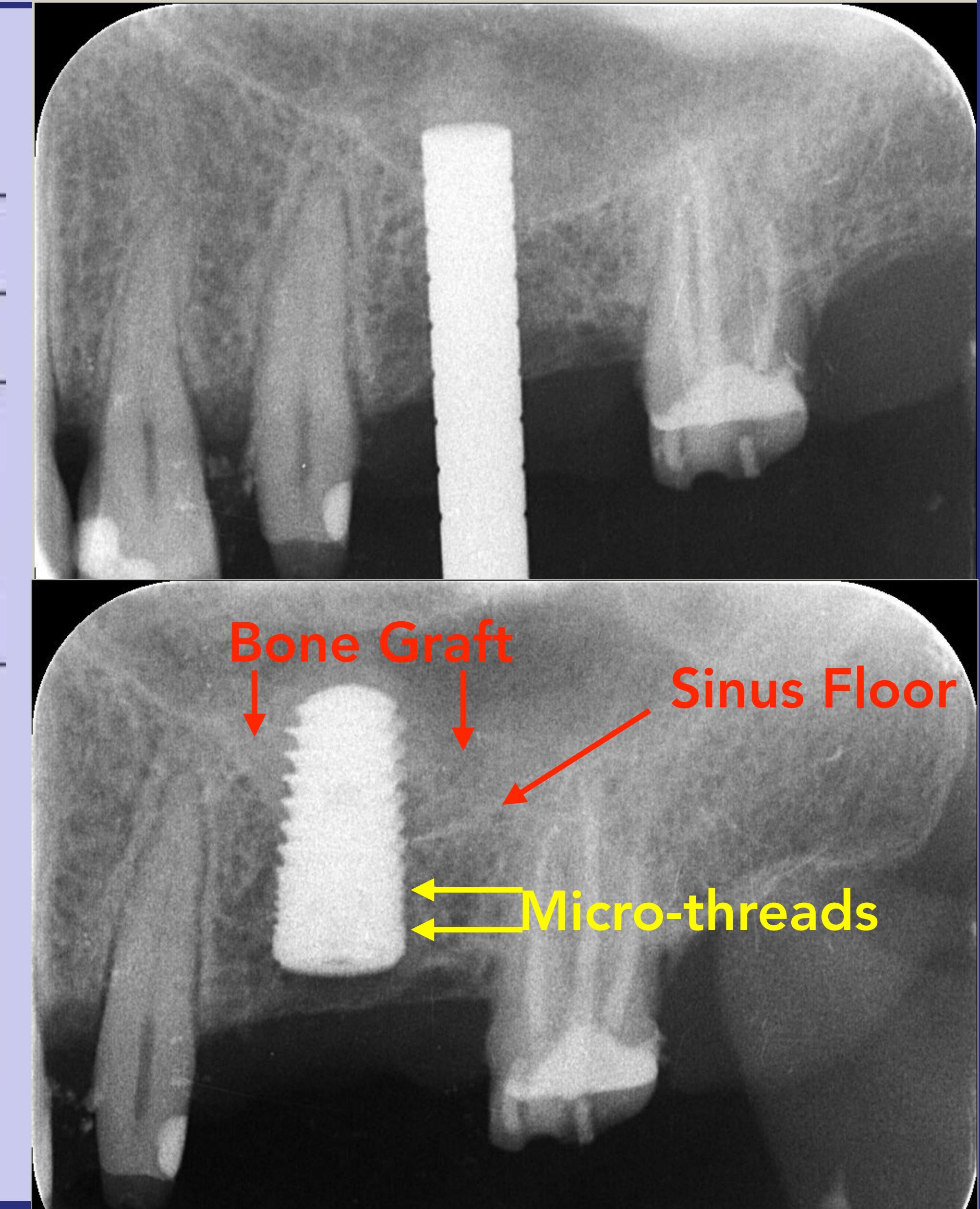
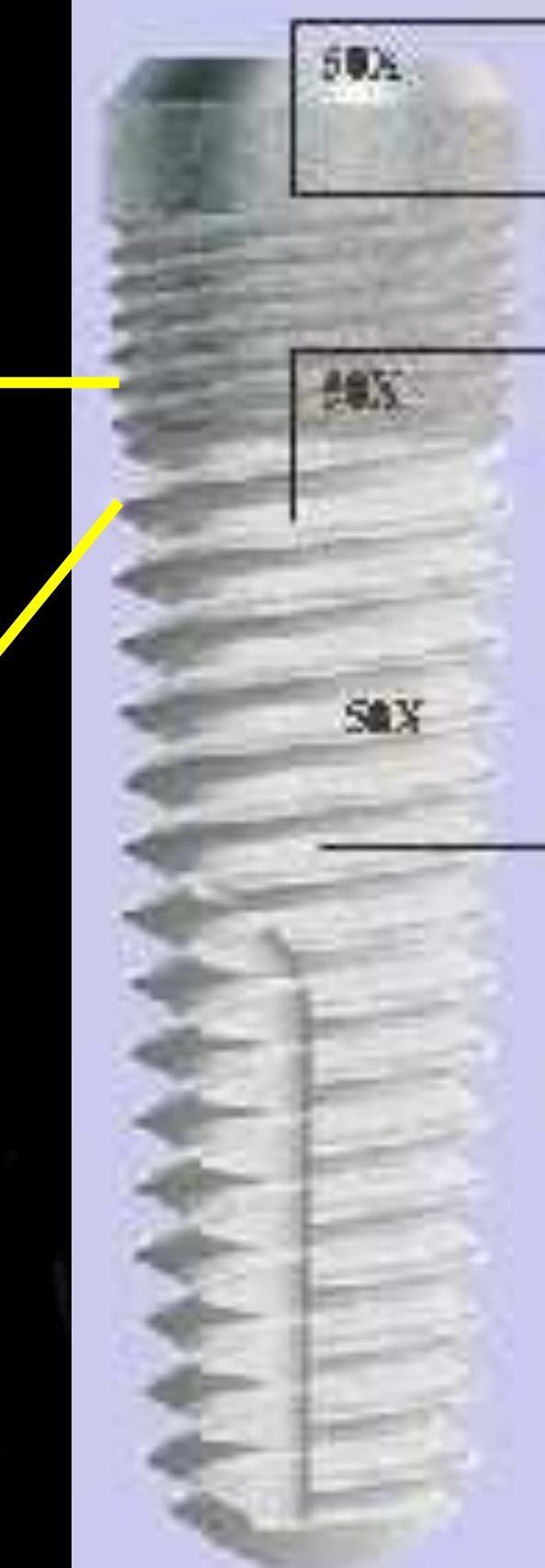
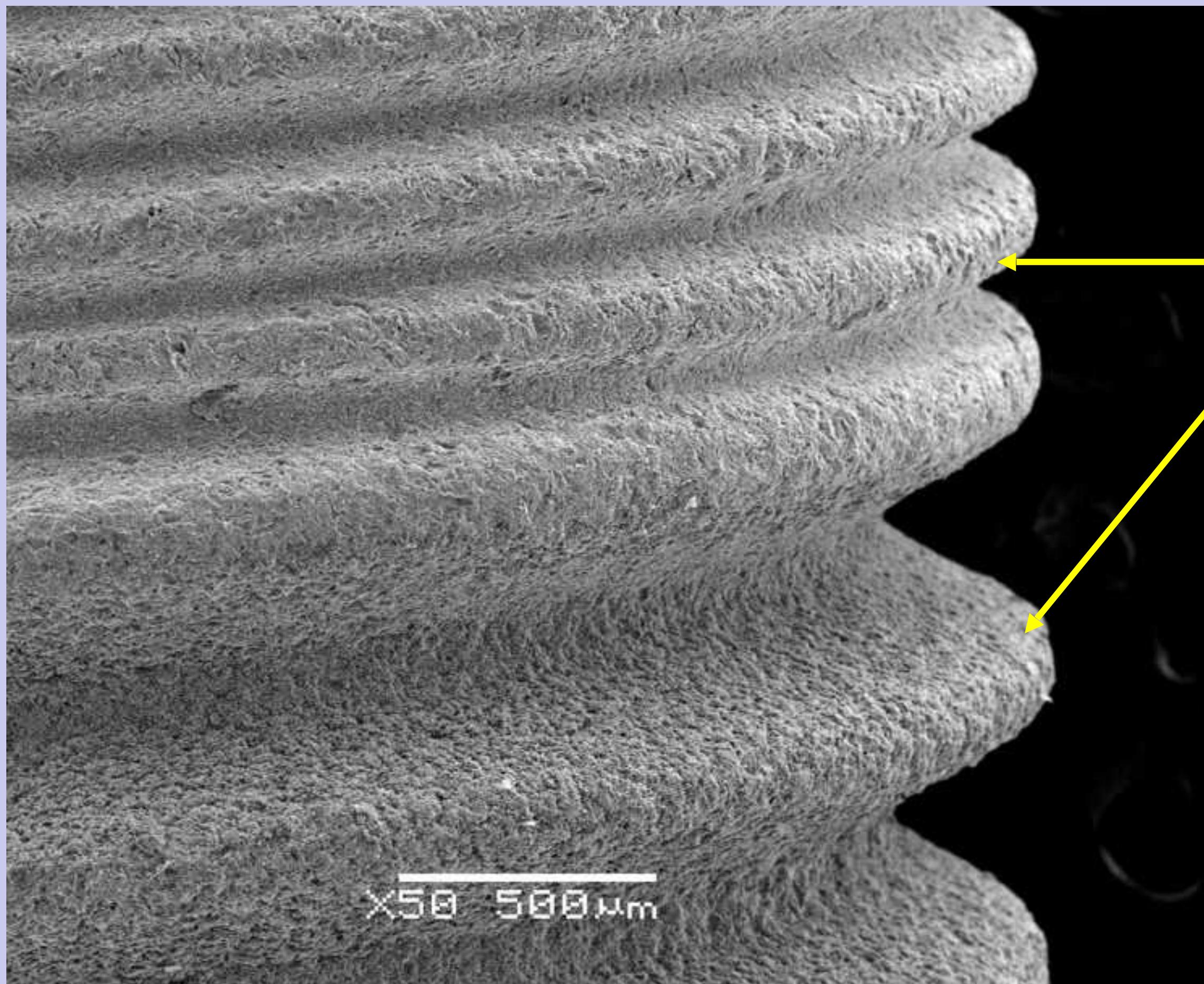
4.7 Screw Plant



Sinus Elevation with 3-4mm of Bone for thread engagement

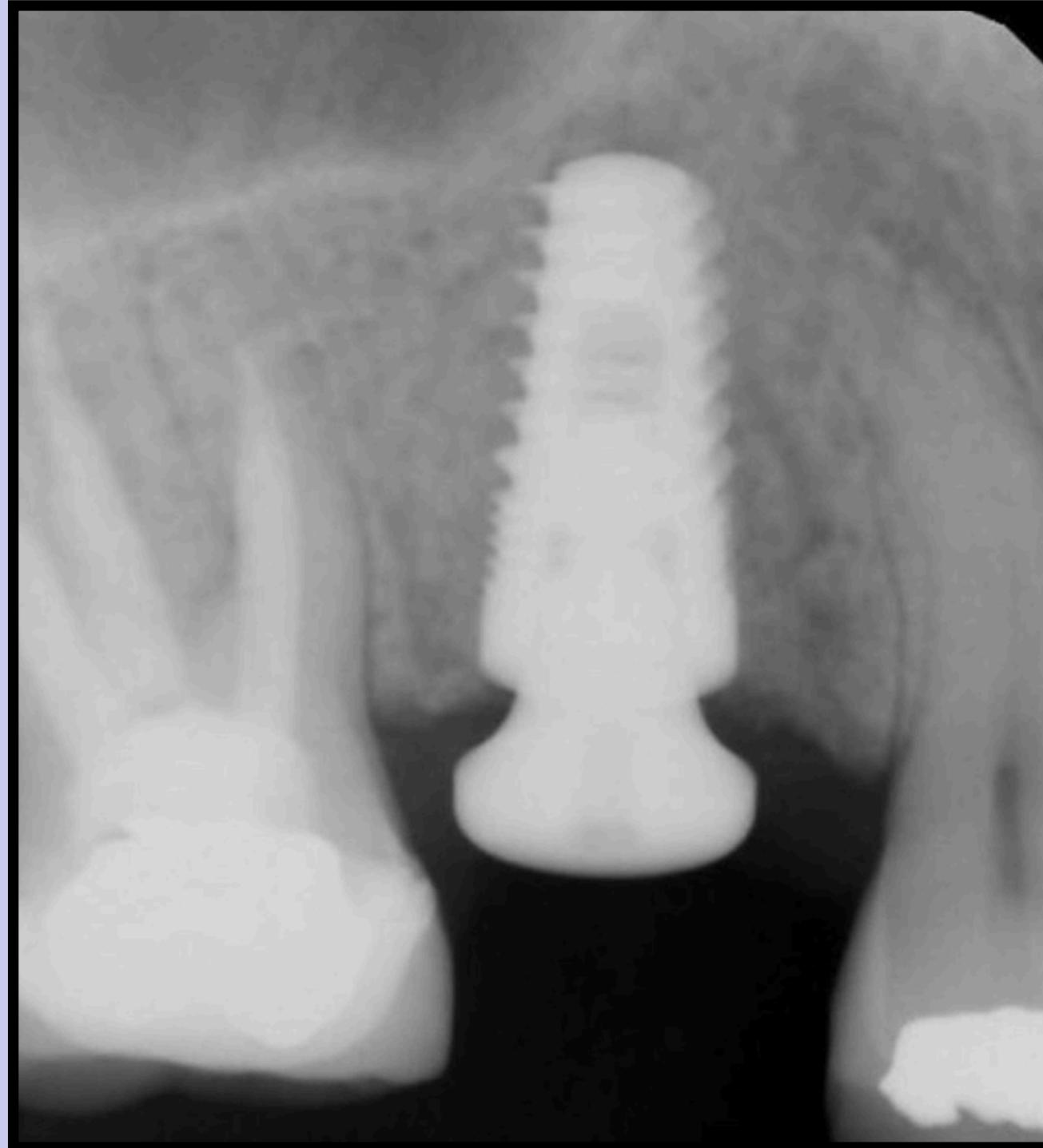
Micro-Threads Increase Initial Stability & HA Increases Bone Attachment

SEM at 50X of HA Coated ScrewPlant

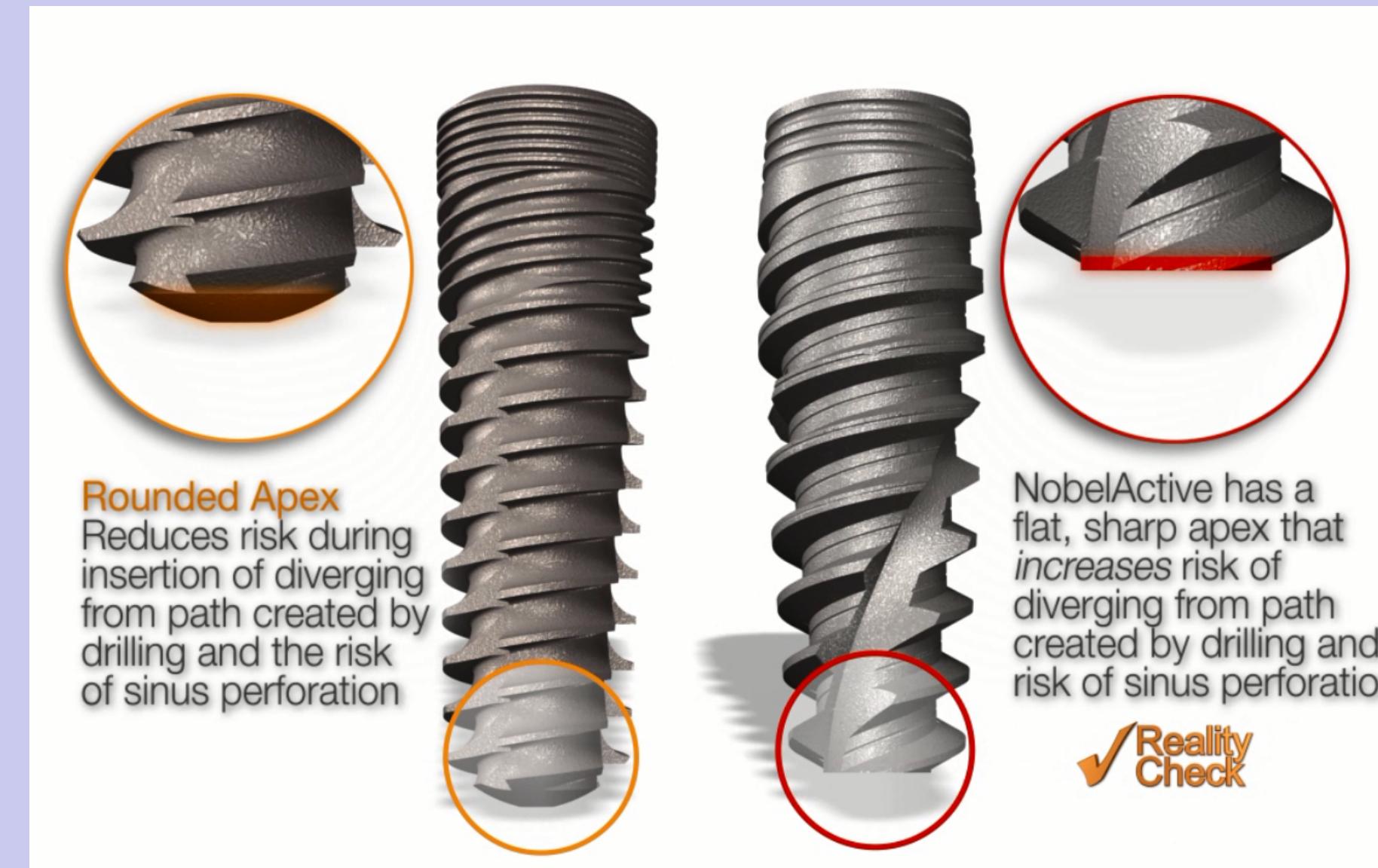


QUESTION: What is better, Round or Sharp Apex?

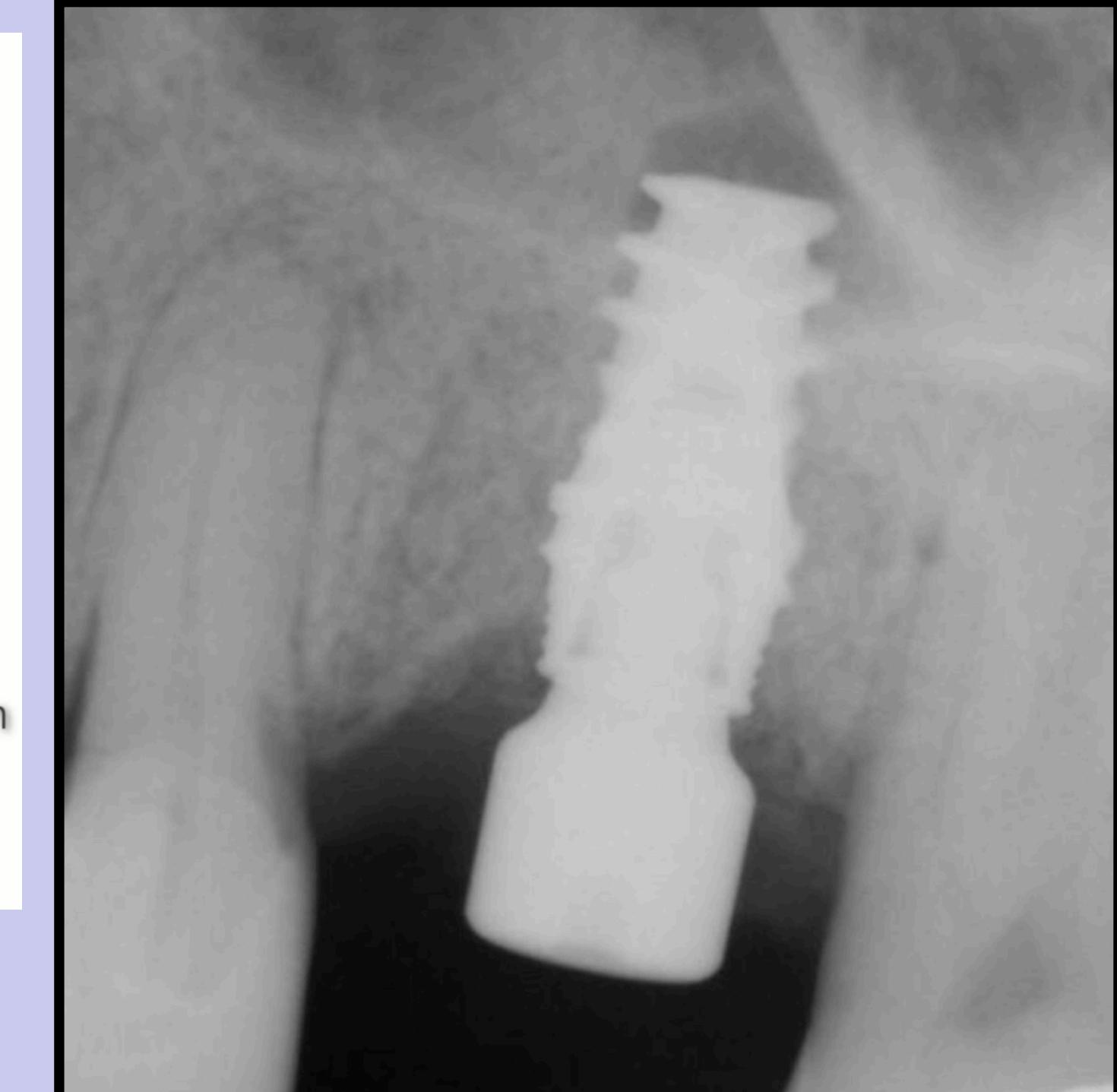
Sharp apex facilitates change in angle during insertion & can tear Sinus Membrane



Implant Direct
InterActive

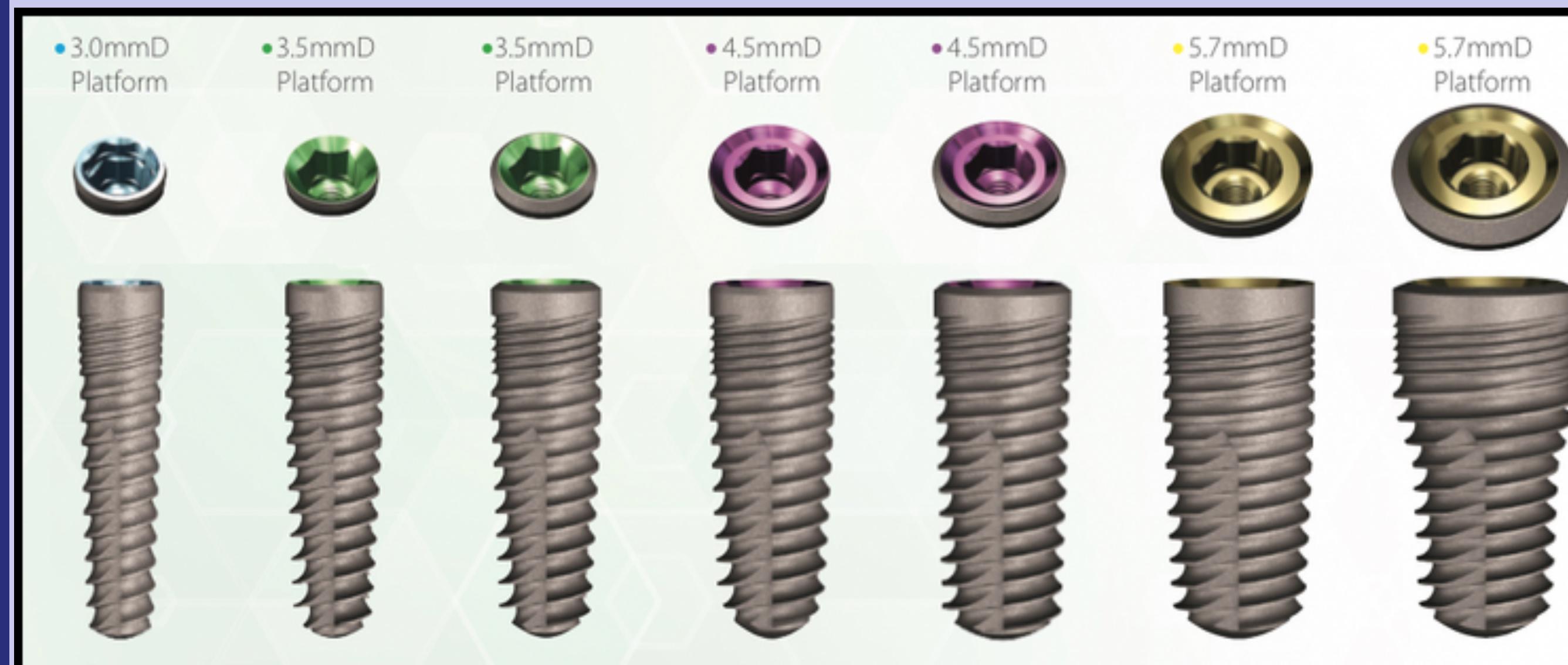
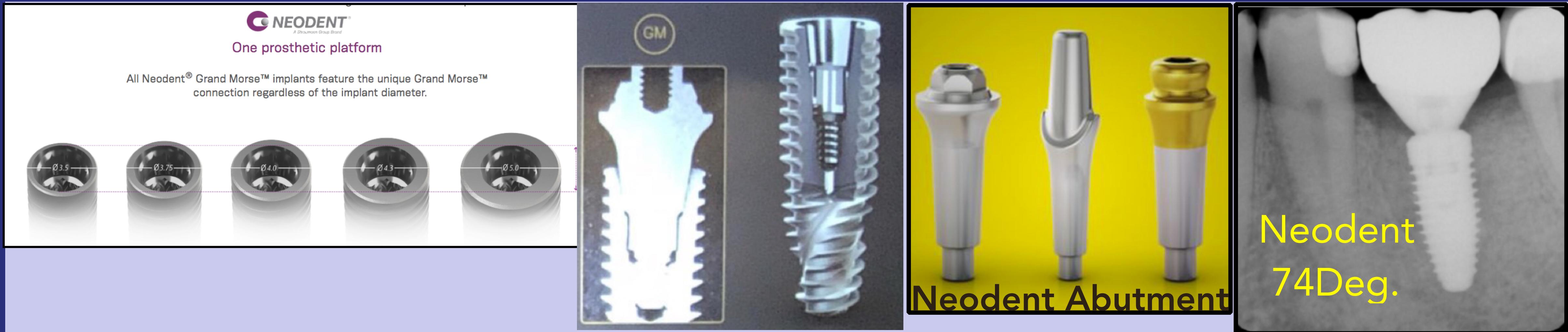


Adjust your implant
position during placement

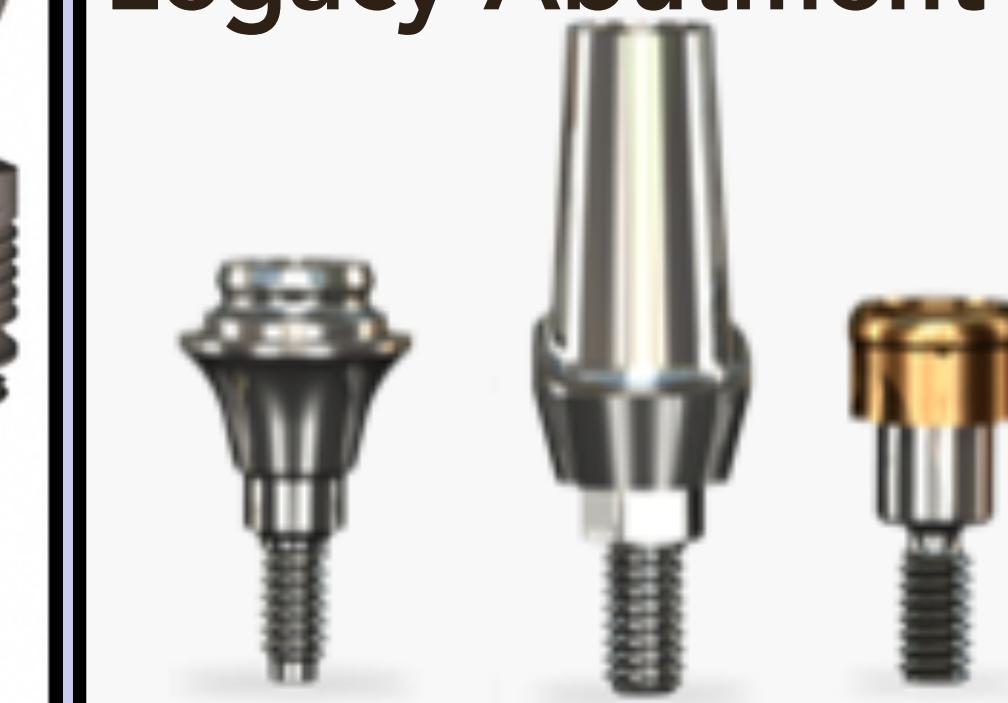


NobelBiocare
NobelActive

QUESTION? One Shaft Diameter for Reduced Abutment Inventory? Varying the Diameter Corresponding to Implant Diameter improves emergence profile



Legacy Abutment

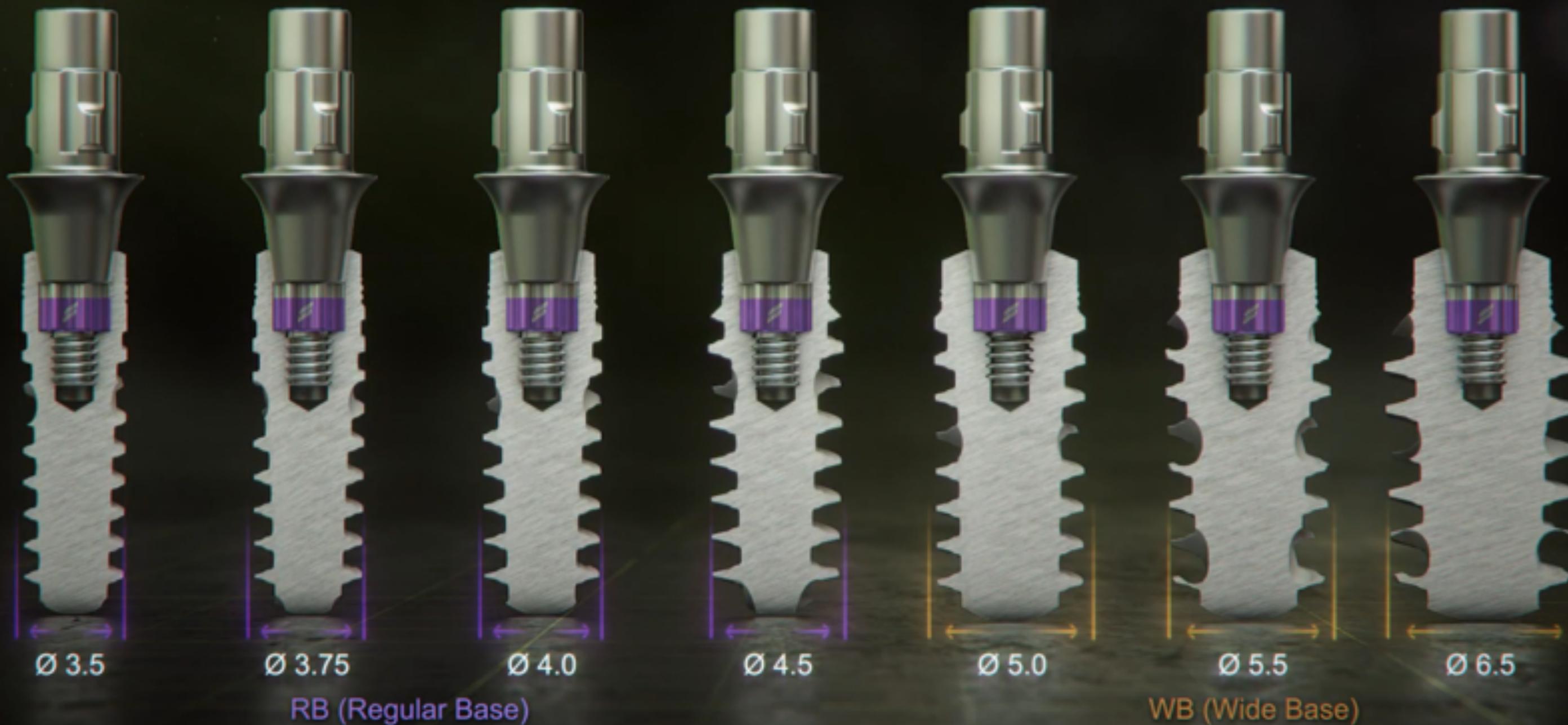


QUESTION? One Shaft Diameter for Reduced Abutment Inventory?

BLX Implants have same internal conical connection with wider butt-joint abutment option

Straumann's BLX System includes 7 Implant diameters, all with the same diameter internal conical connection. Wide abutments are available for 5.0, 5.5 & 6.5mm Implants

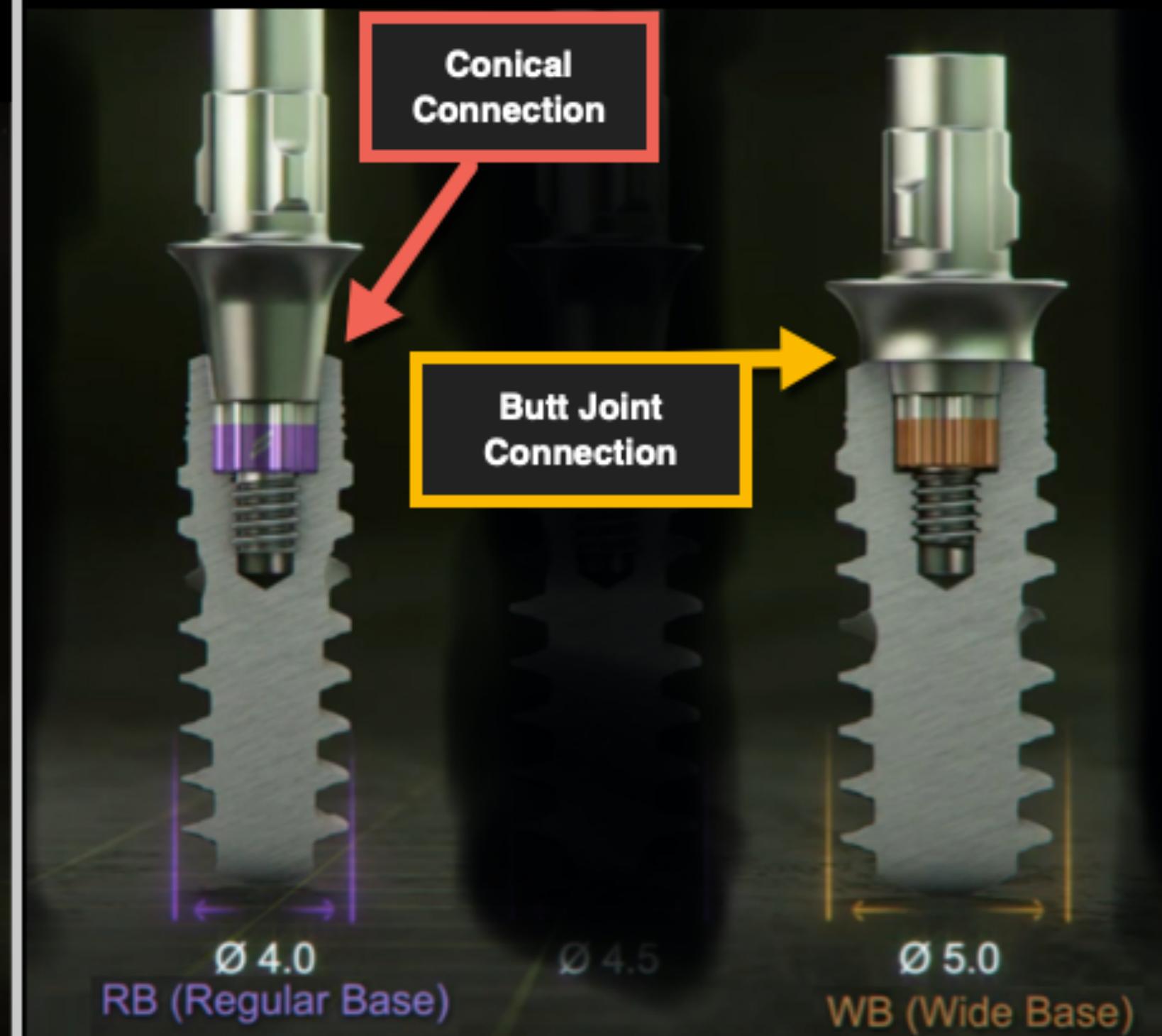
A single prosthetic range to manage all implant diameters
Regular Body abutments fit all implant diameters.



BLX slide added to original lecture slides

Wide abutments for improved emergence profile **have butt joint connections**

You may also chose Wide Body Abutments **ONLY** for 5.0, 5.5 and 6.5mm implants where a **wide emergence profile is desired**



QUESTION: Should the top part of the implant be textured or smooth?

Implant Direct launches LegacyP in Europe Only

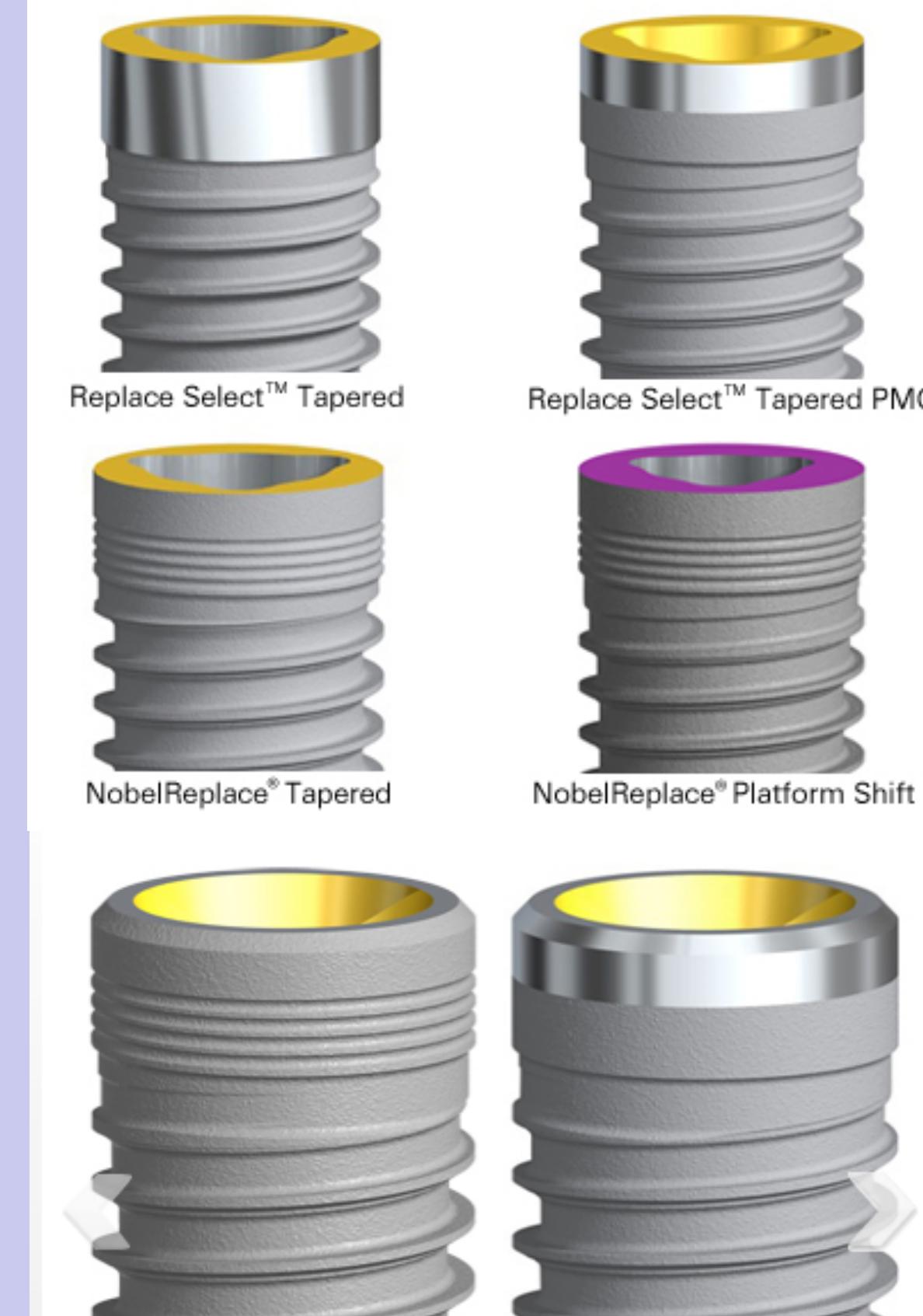
ID Launches LegacyP
After Niznick Retired



Legacy3 5 Year Study
documents 100% Success



Nobel RePlace Available in
various neck surfaces,
configurations and connections



QUESTION: Should the Textured Surface Extend to the Top?

2

PRODUCT STUDIES

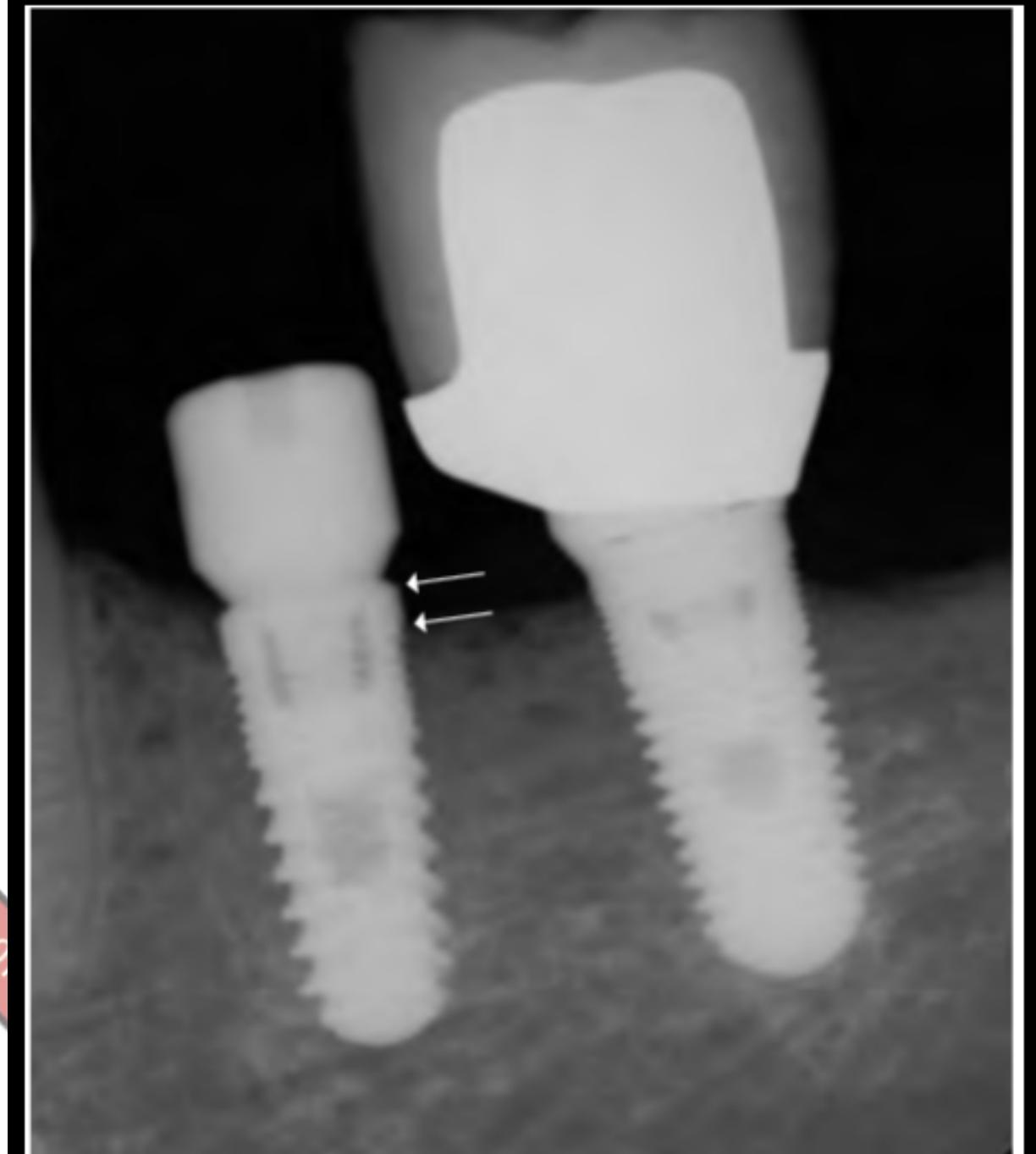
Analysis of a platform-switched, coronally mini-threaded, textured dental implant

100 per cent success rate

JOHN S. CAVALLARO JR.*^{*}, DDS, BROOKLYN, N.Y., USA

Since the original Bränemark fixture, implant designs are available which provide improved macro- and microscopic features and implant-abutment connections. These features include platform switching (the implant-abutment interface is medialized relative to the periphery of the coronal aspect of the implant body), coronal mini-threads, larger body threads, textured surfaces (soluble blast media, SBM) [1], tapered bodies and internal connections. A dental implant that incorporates all of these features was analyzed in this study (Legacy 3; Implant Direct, Valencia, CA, USA). Data were collected with respect to its survival and the amount of radiographic proximal bony change that took place from its insertion to prosthetic restoration and again at five years post-restoration of the implants.

A red diagonal banner at the bottom of the page with white text. The text reads "Media Fuchstal • © Copyright 2017 Teamwork Media Fuchstal • © Copyright 2017".



1 | Intraoral periapical radiograph depicting the measurement points used in the assessment of proximal bone levels. The top white arrow represents the most coronal aspect of the widest part of the implant body and the bottom white arrow shows the first bone to implant contact that is visibly discernible.

QUESTION? Should the Textured Surface Extend to the Top?
1996 Selective Surface Patent - Zimmer Dental's Screw-Vent still has this feature

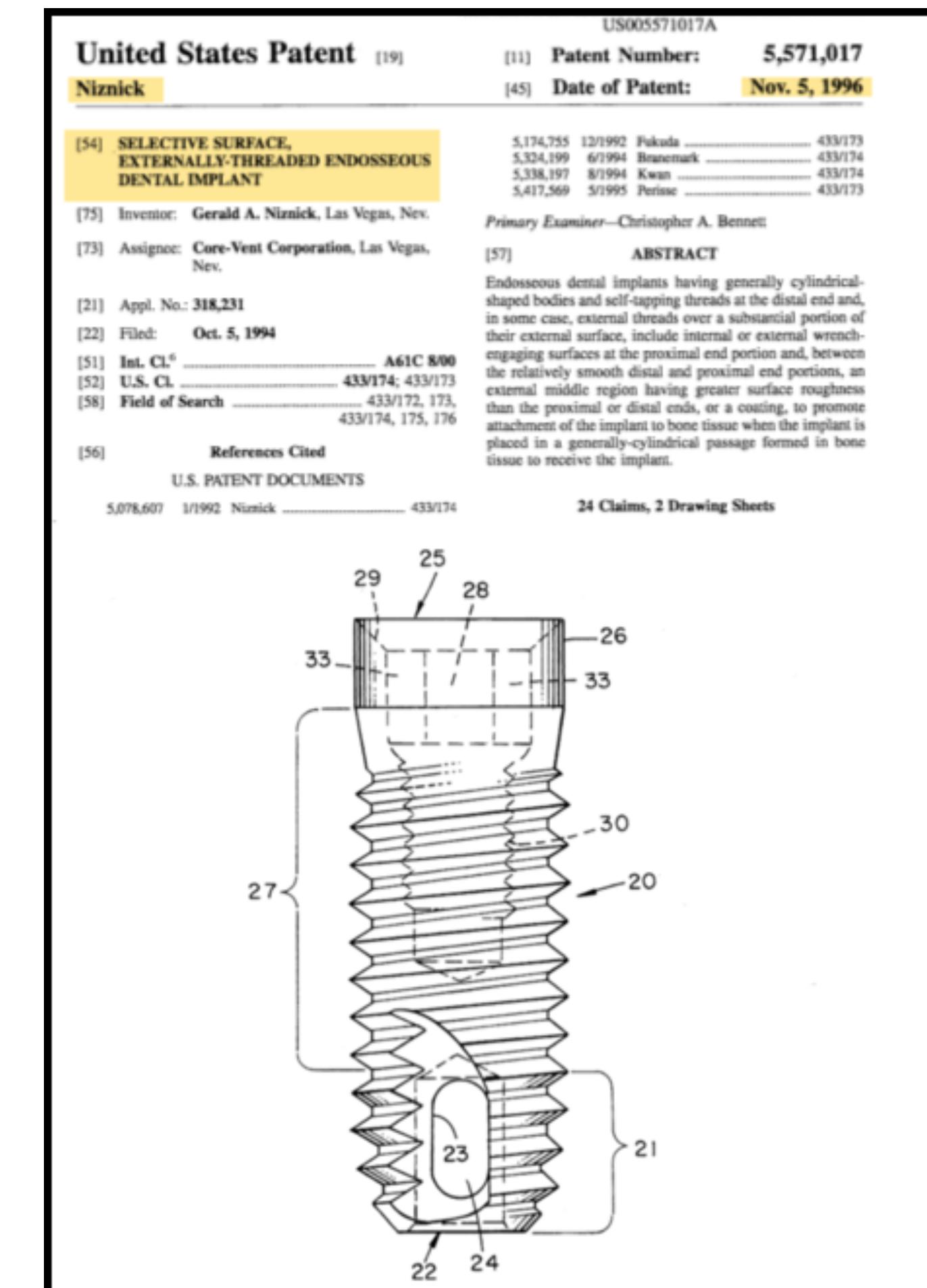
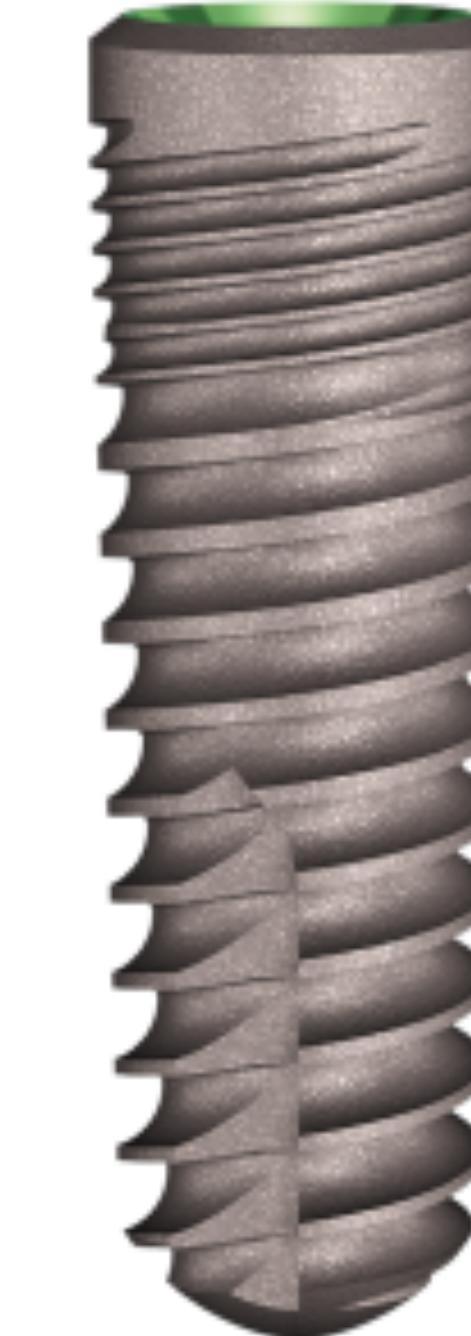
LegacyP with smooth top half



LegacyP



Legacy3



QUESTION: Debate over whether the top part of the implant should be textured
Buser Study showed less bone loss when Texture extended into soft tissue

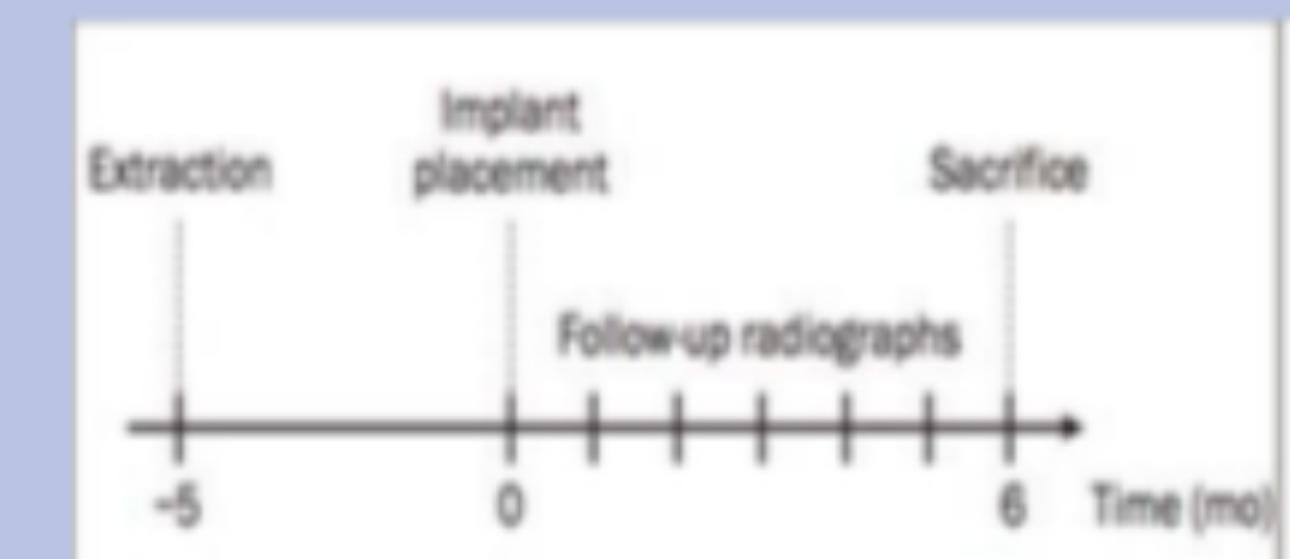
“Implants placed with the top of the SLA surface above the bone crest had significantly less bone loss than implants with the top of the SLA surface placed flush with the bone level.”

The Effect of a Machined Collar on Bone Loss: A.N. Alomrani, J.S. Hermann, A.A. Jones, D Buser JOMI 2005;20:677-686

RESULTS: Fifty-eight of the implants integrated and were analyzed on each proximal surface. Bone loss occurred around all implants over the 6 months of the study. In general, implants placed with the top of the SLA surface above the bone crest had significantly less bone loss than implants with the top of the SLA surface placed flush with the bone level. Apically placed implants had greater bone loss than coronally placed implants.

The magnitude of bone loss around paired control and test implants was approximately the same.

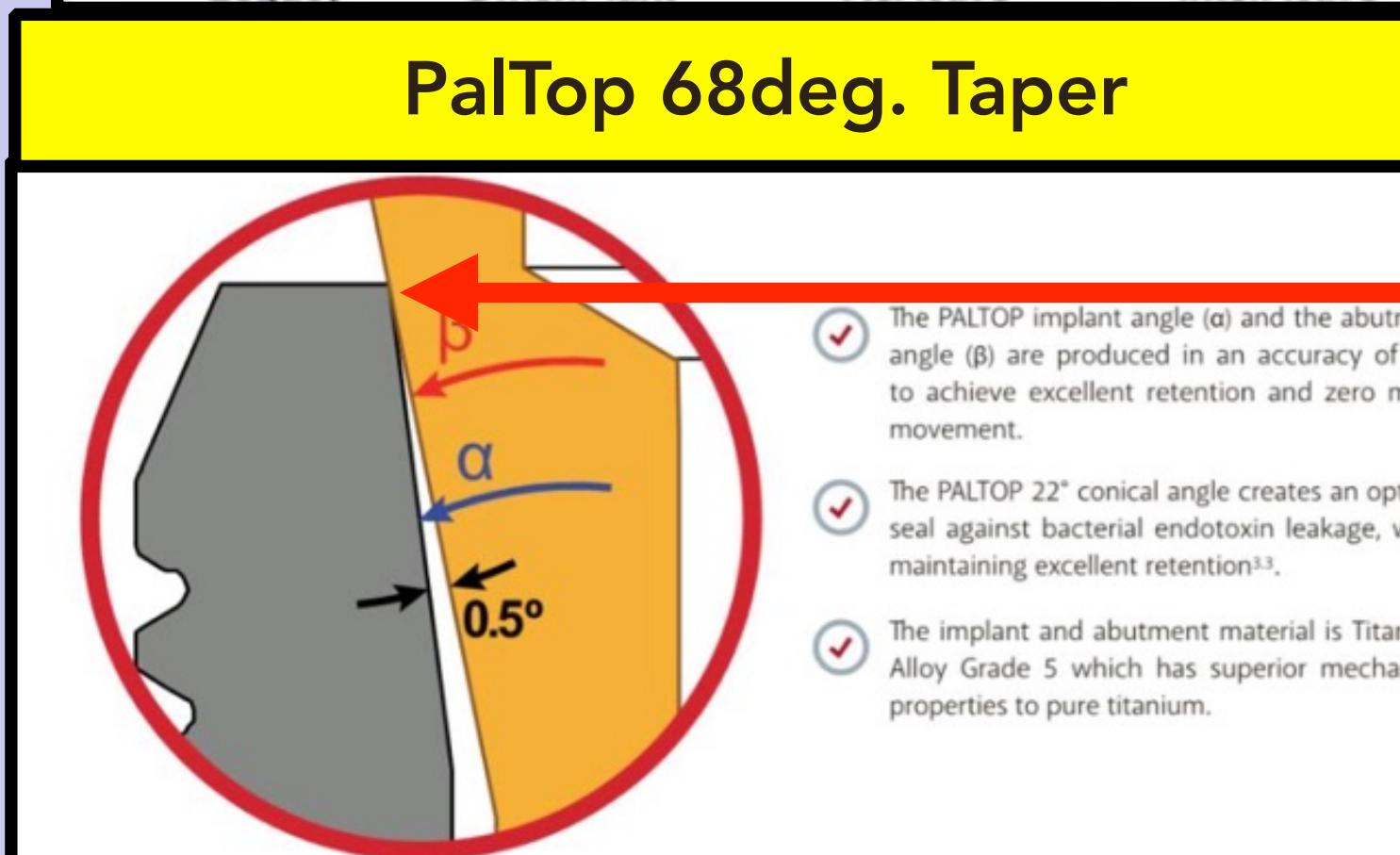
DISCUSSION AND CONCLUSION: The least bone loss with each implant type was observed when the top of the implant was placed above the alveolar crest. When there was no machined collar, the least distance from the implant top to the bone crest (not, however, the least bone loss) was observed when the top of the implant was level with the bone crest.



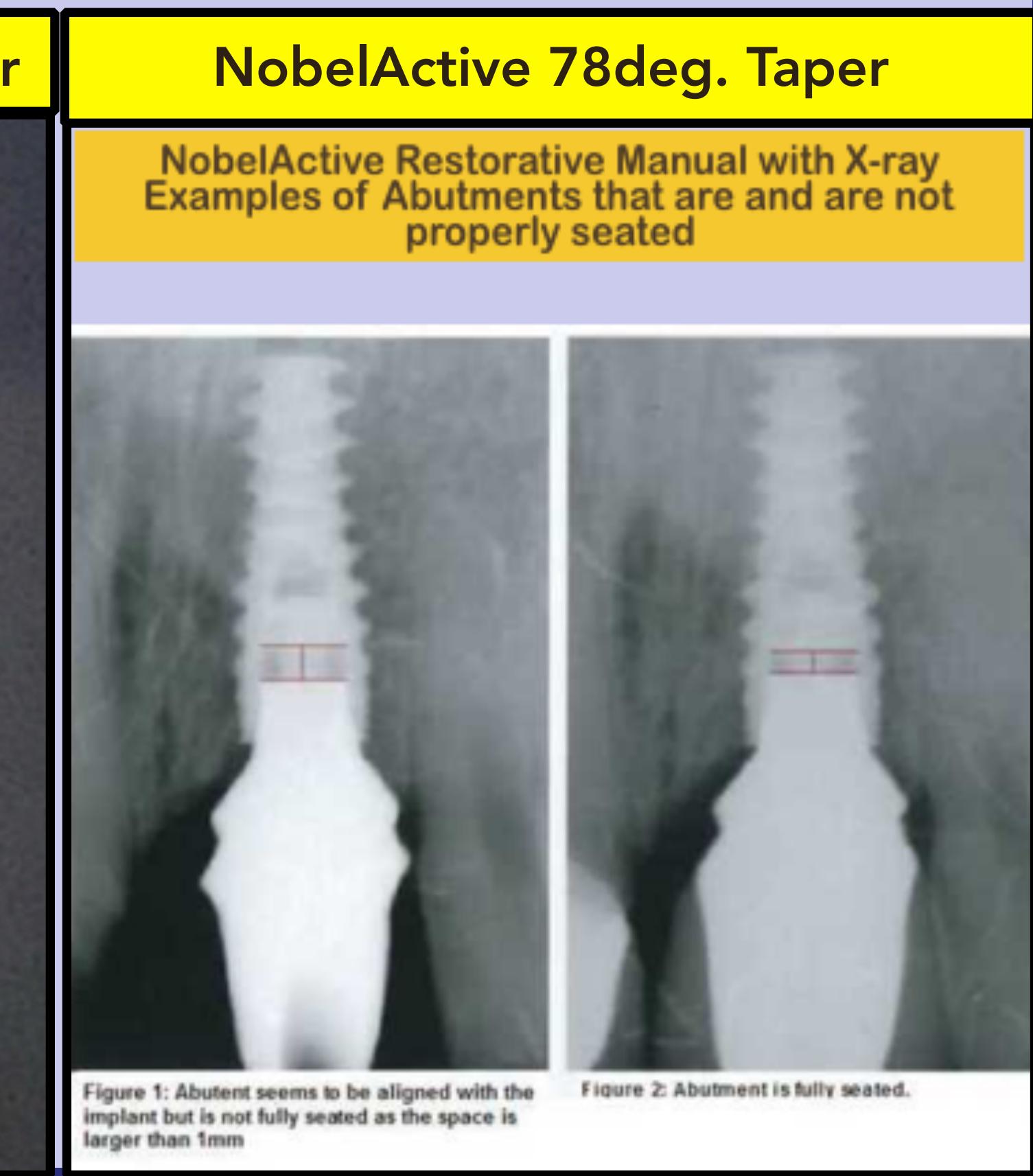
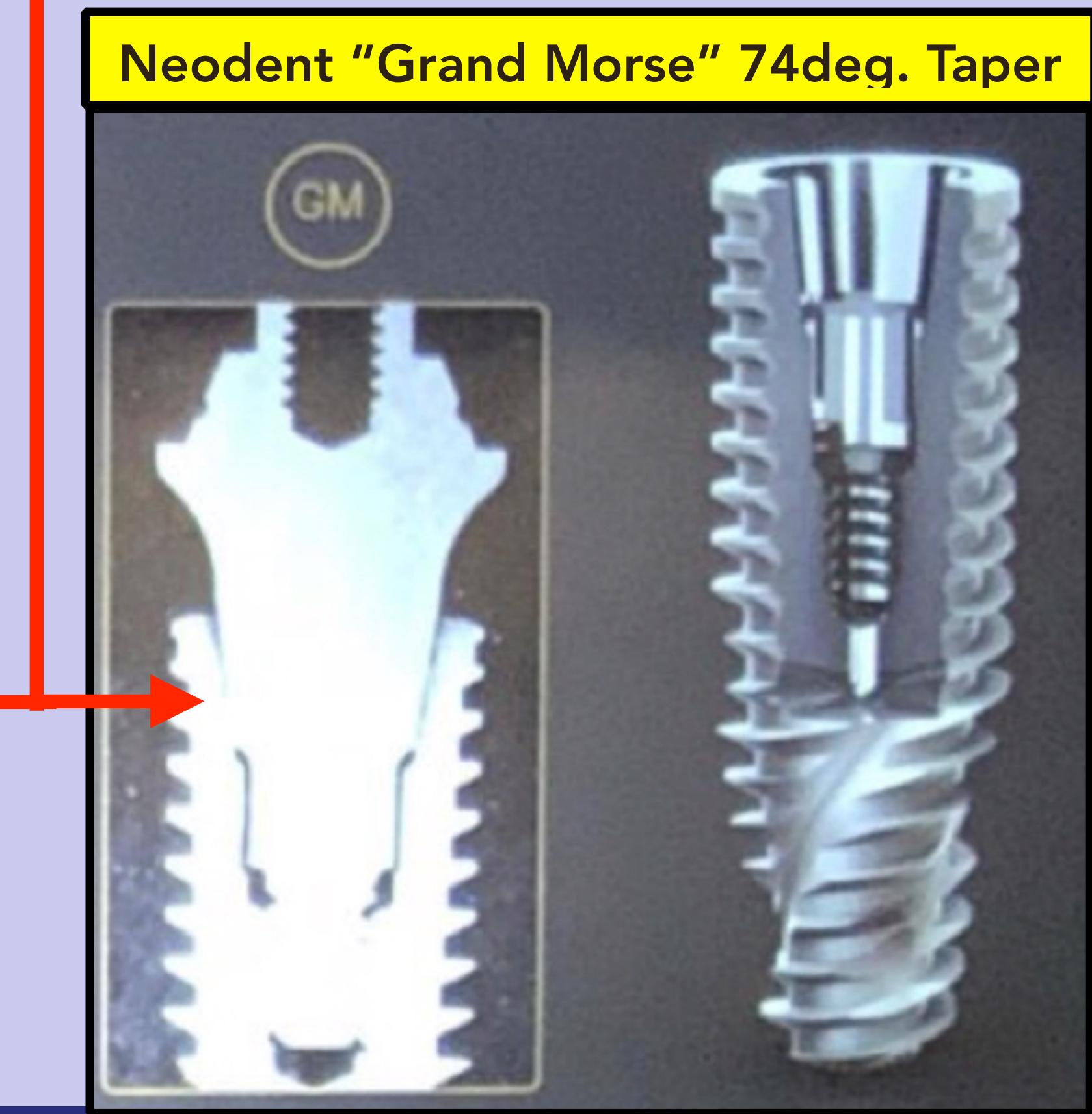
QUESTION: What is the best Implant-Abutment Connection?

Internal Conical Won; Morse Taper, Tripod, Butt-joint and External Hex Connections Lost

QUESTION? Does a longer lead-in bevel provide greater stability - No

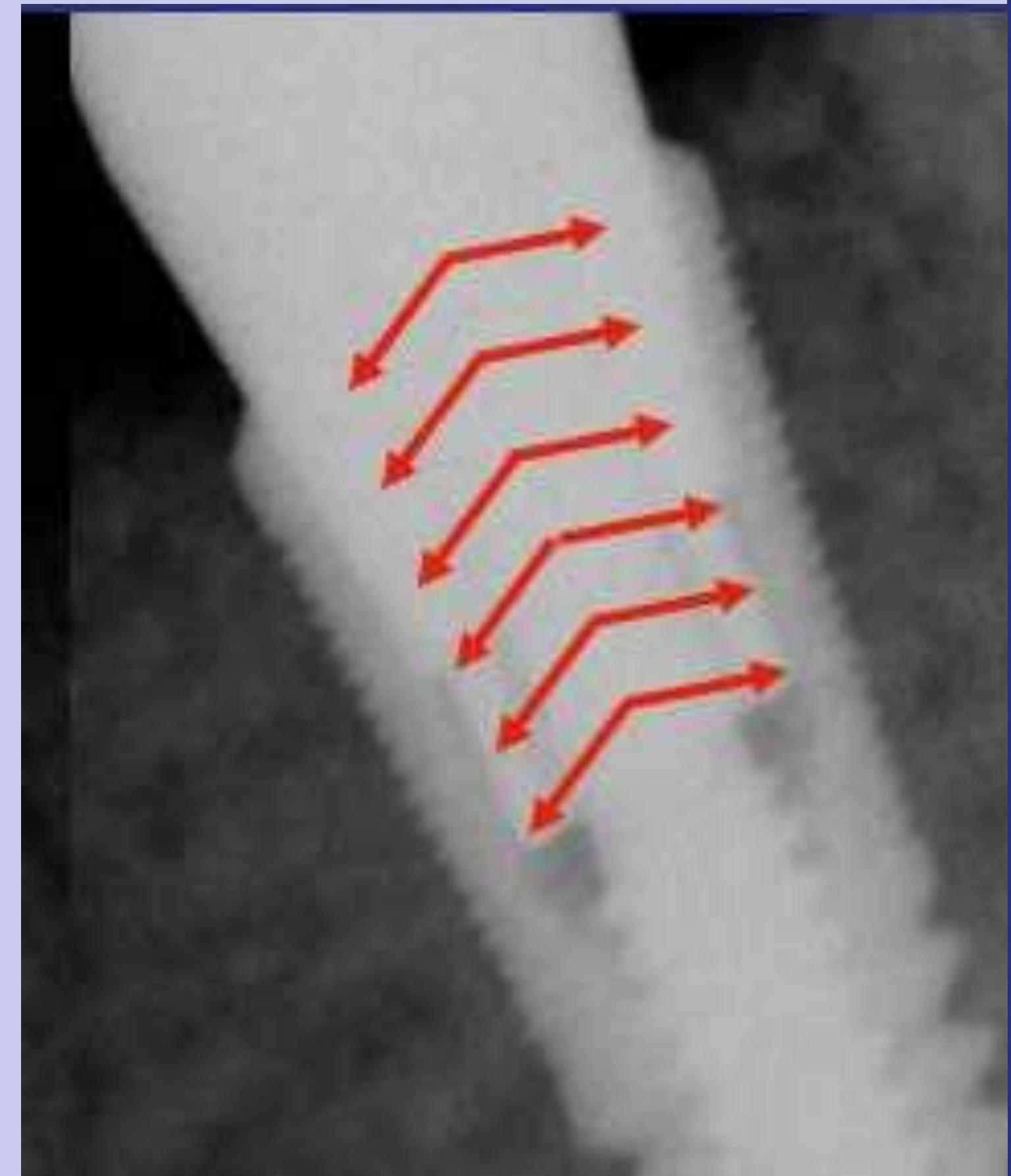
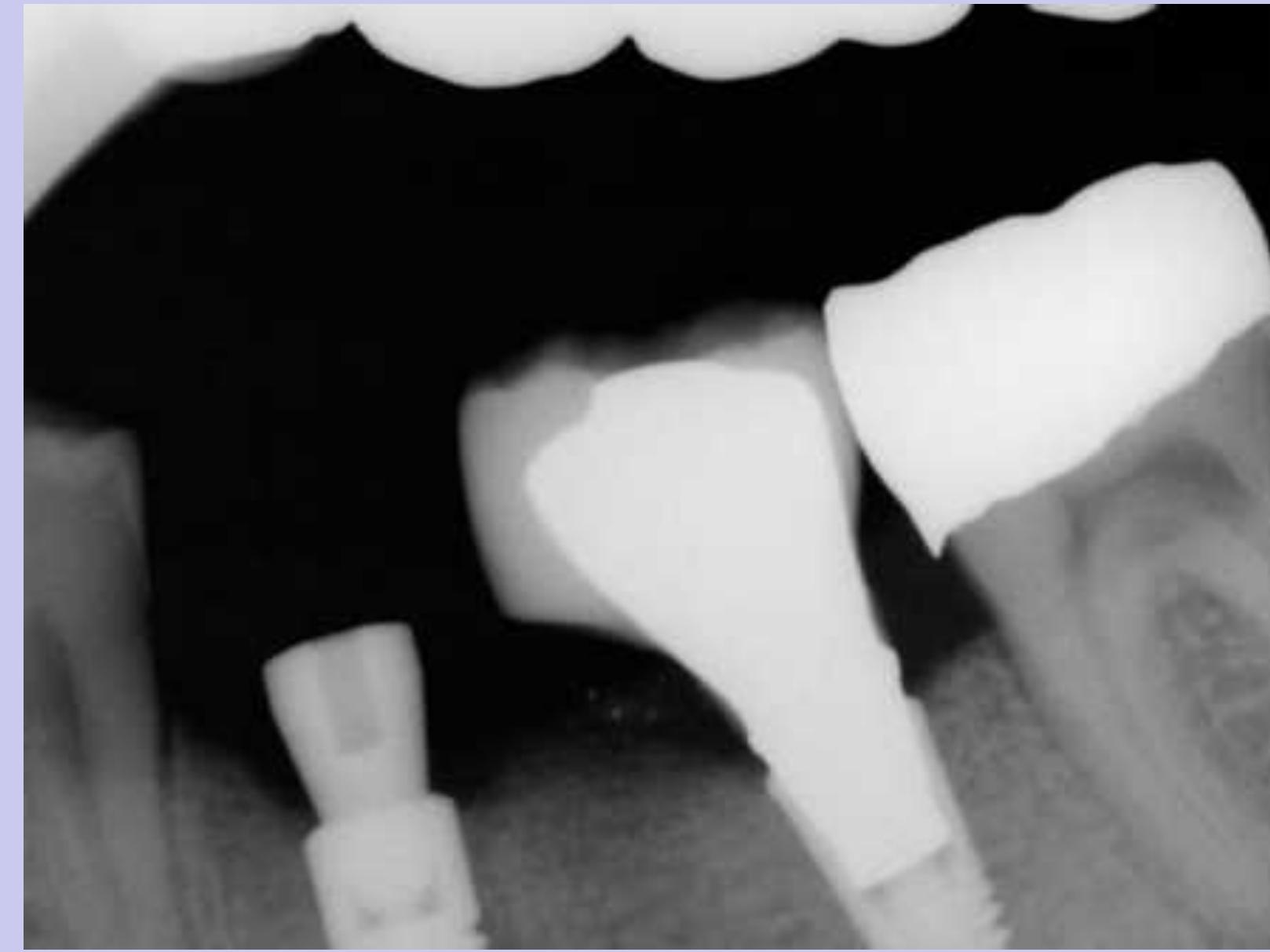
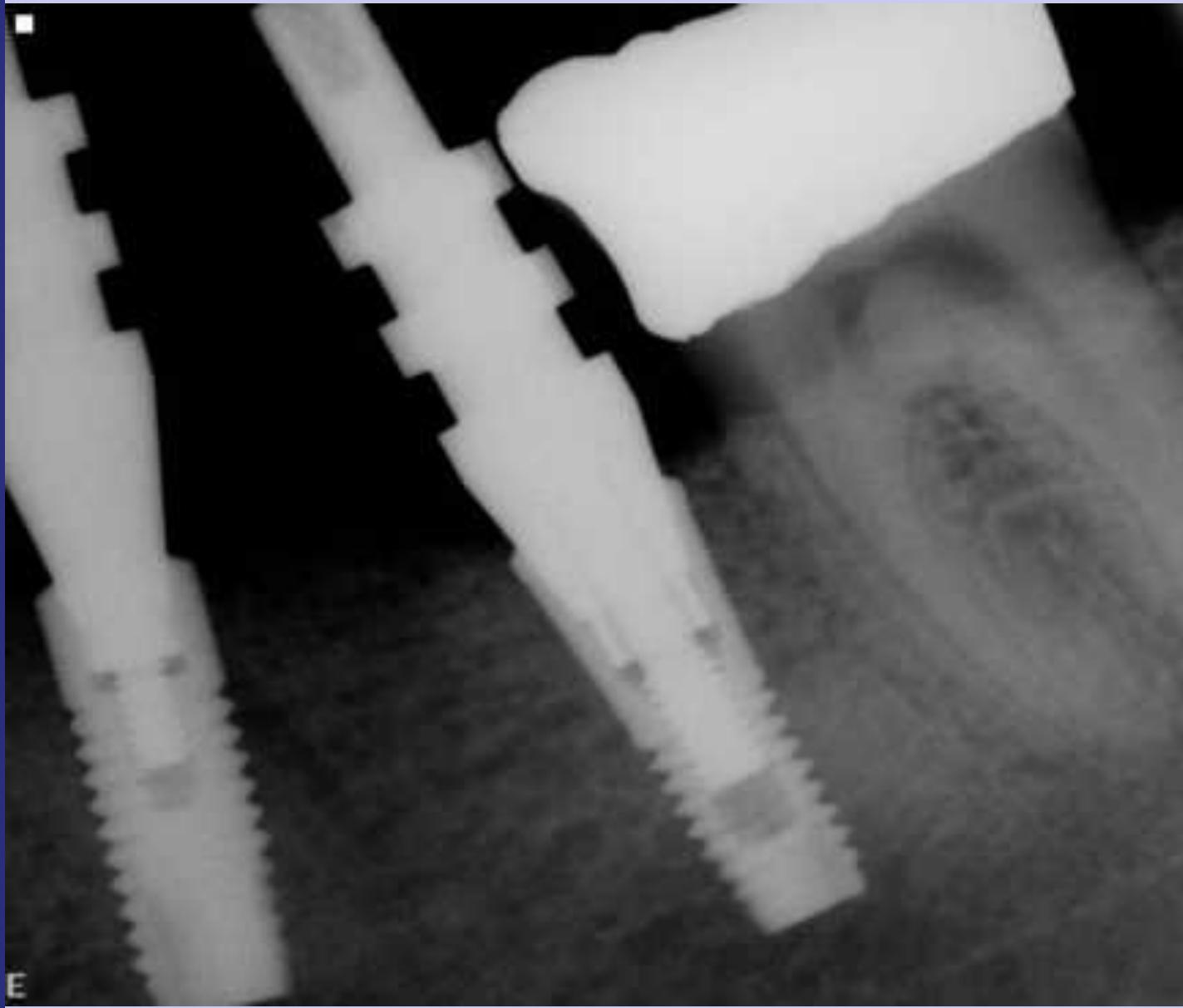


Metal only make contact in 3 points and to assure that occurs at opening to internal shaft, the Abutment has to be tapered 0.5-1.0 deg. less than lead in bevel.

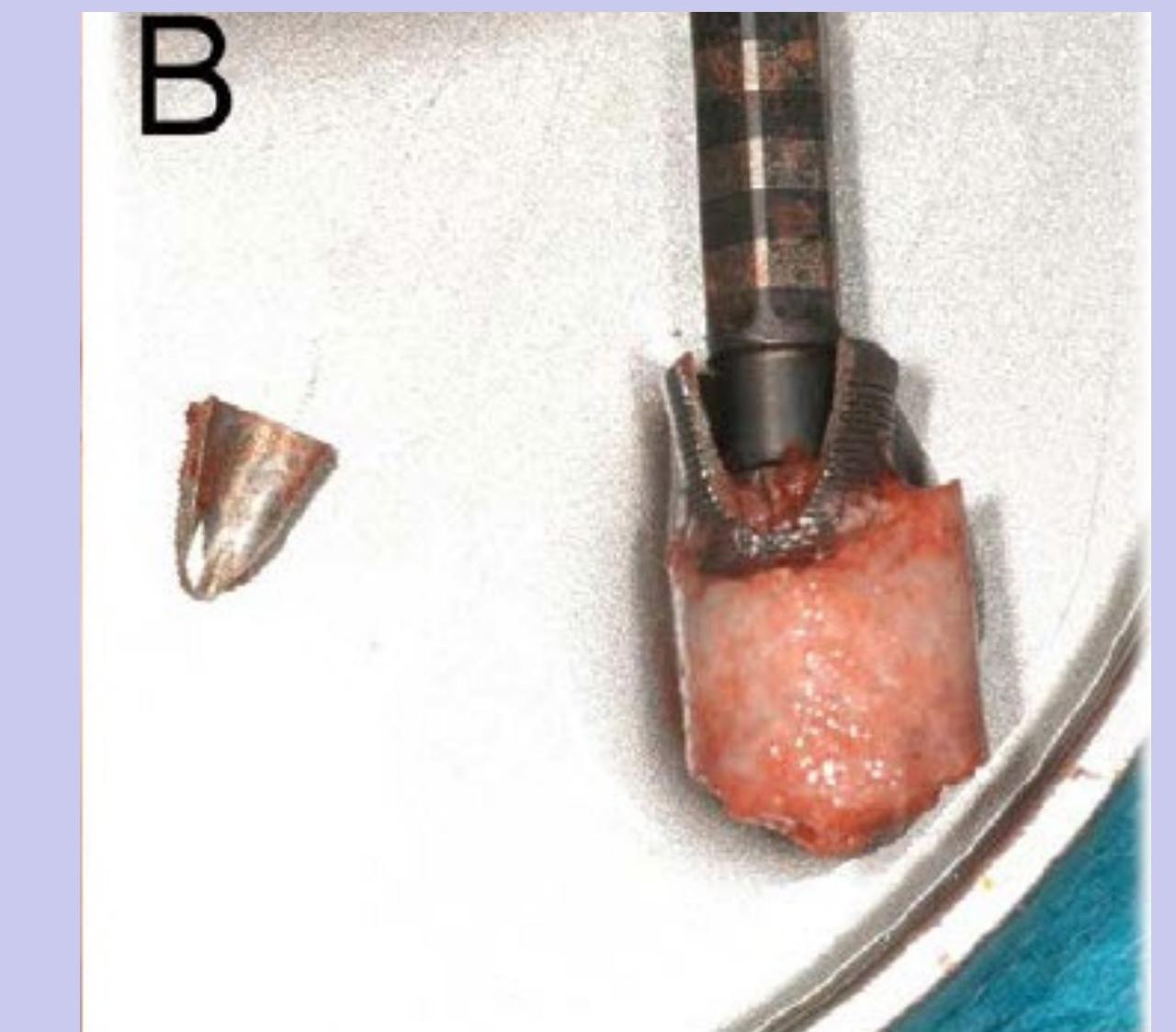
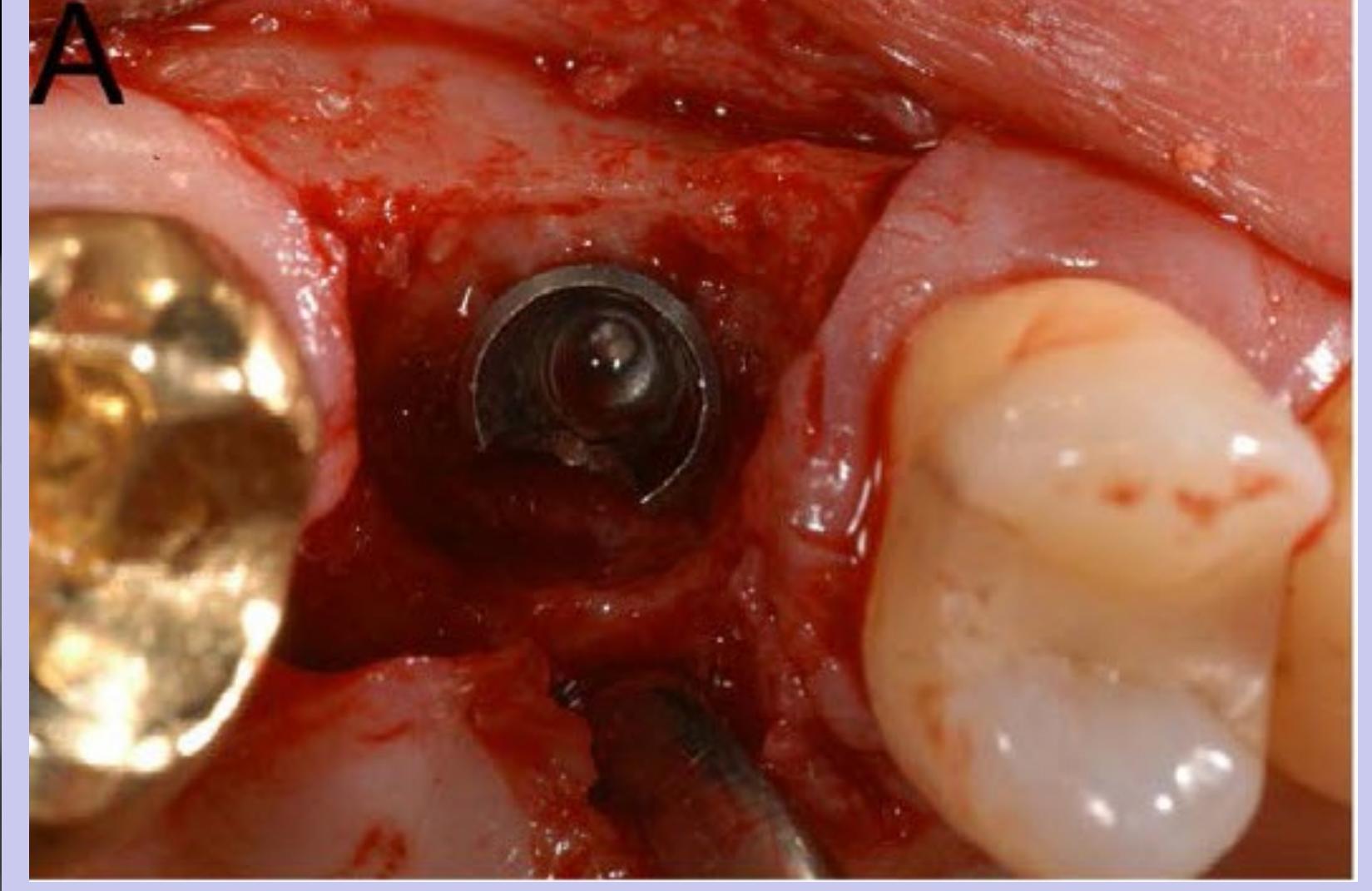


QUESTION: What is better - 45Deg. or 74-81deg Lead-in Bevel
Screw-Vent/Legacy/BH etc. all 45 Deg. Bevel - Lateral Stability without compromising strength

Astra Implant with 80deg. Lead-in Bevel
Restored October 2008



Astra 80deg. Internal Conical Connection results in thinner (weaker) walls
And a deeper wrench-engaging surface that precludes 6mm long implants

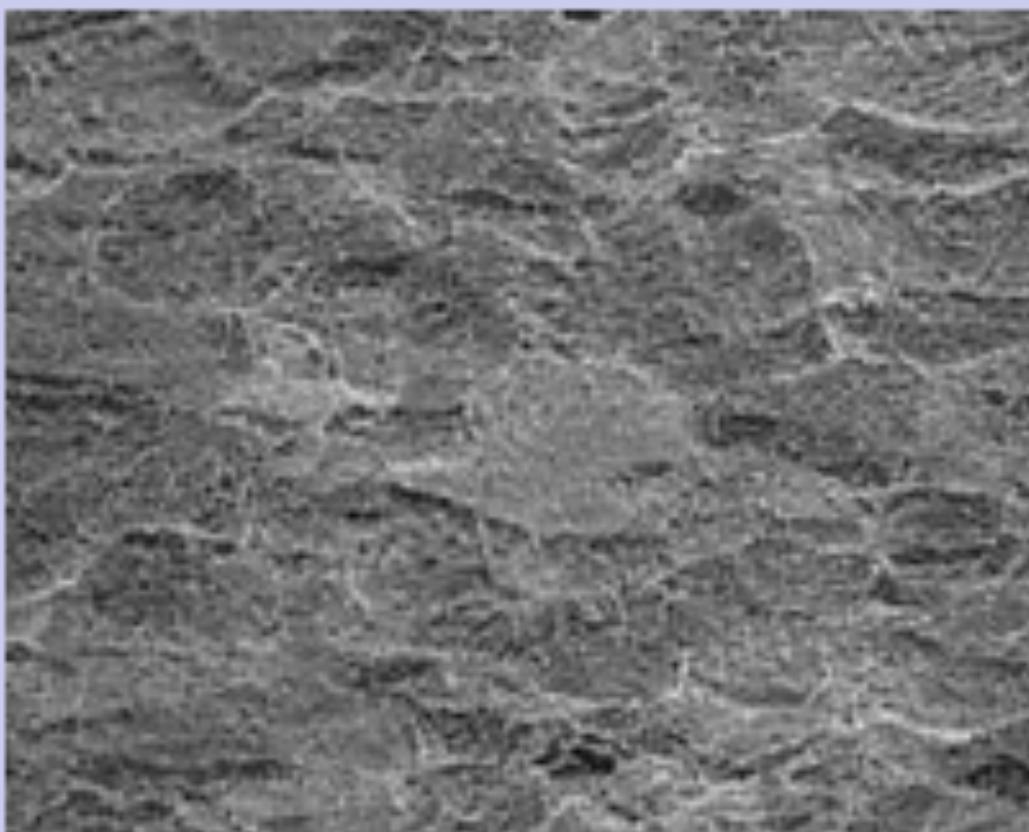


**QUESTION? What is the Ideal Surface? - Textured with soluble blast media
Machined and Etched too smooth. TPS (Titanium Plasma Spray) too porous. TiUnite anodized?**

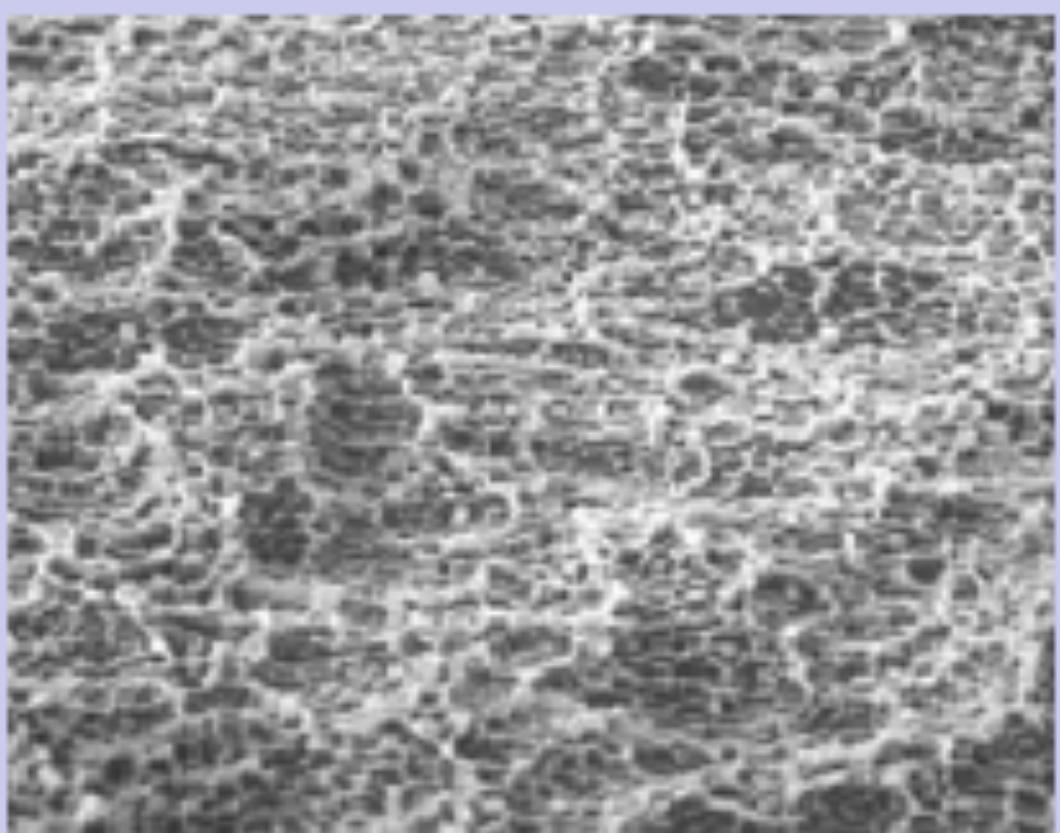
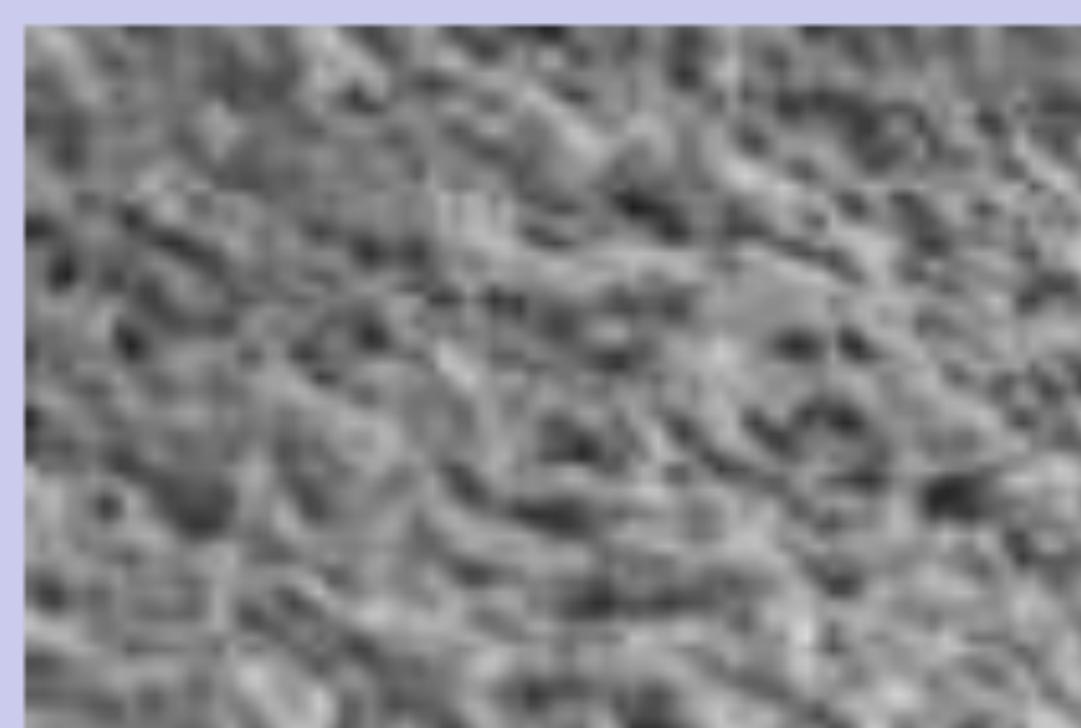
Machined Branemark



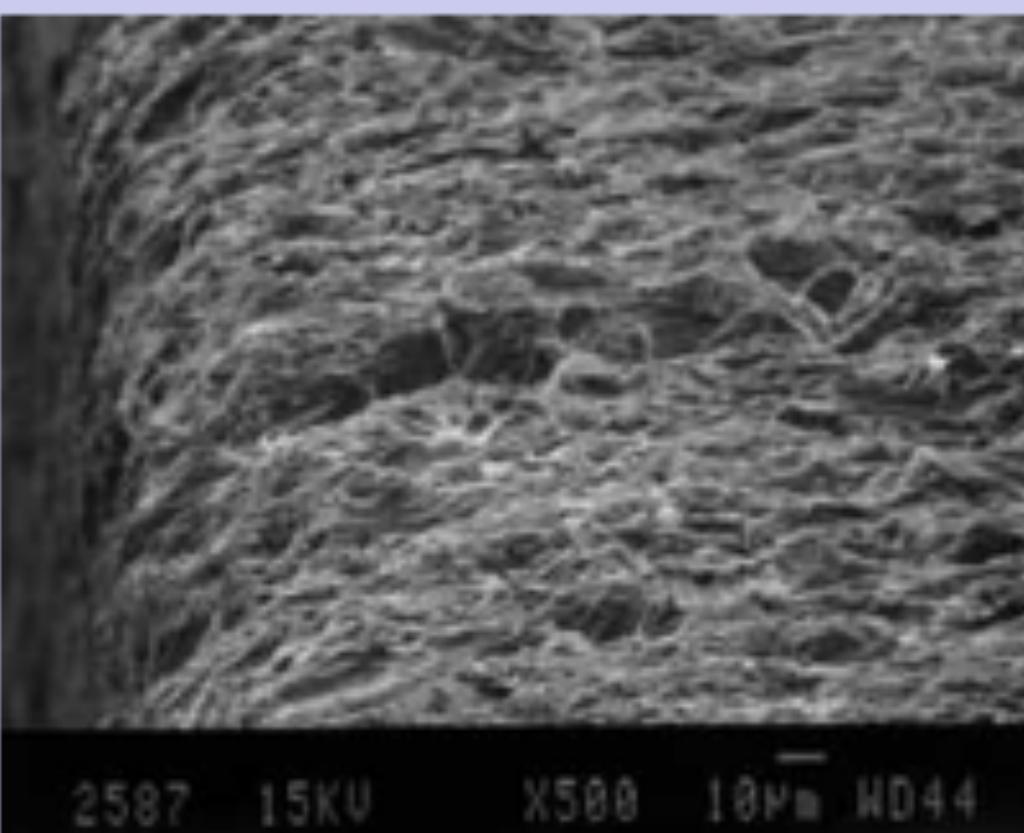
3i Etched Osseotite



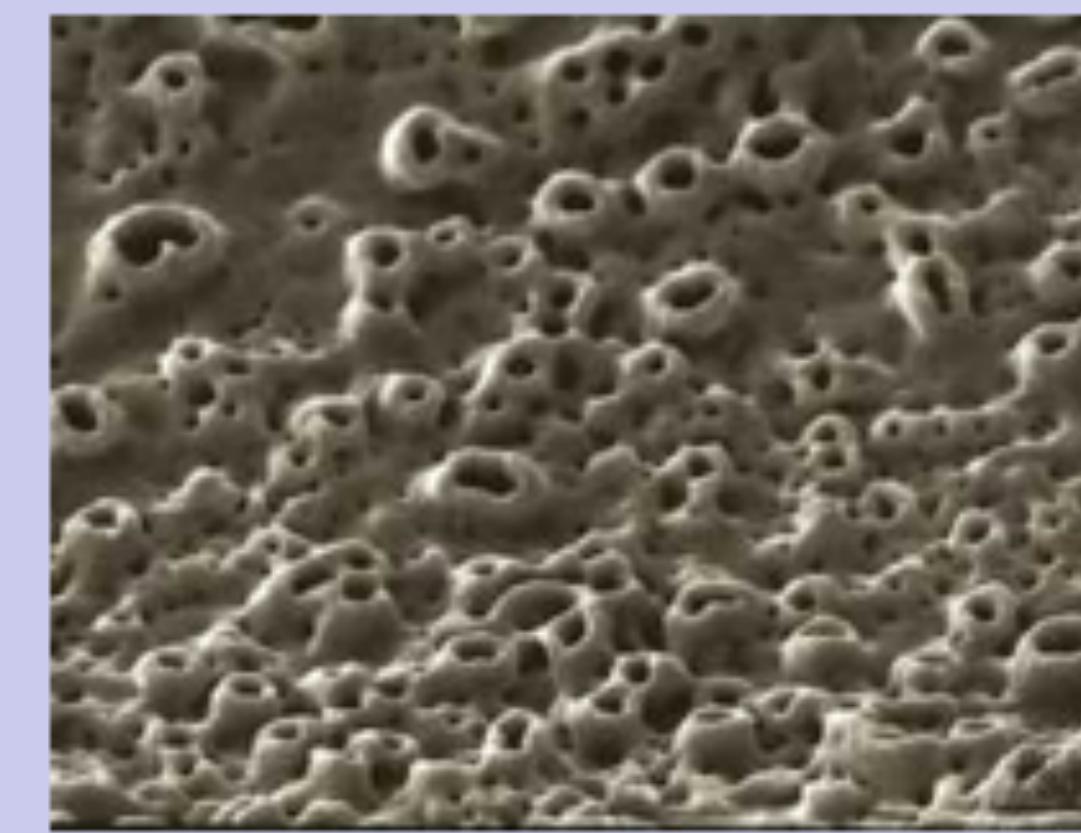
HA Coating



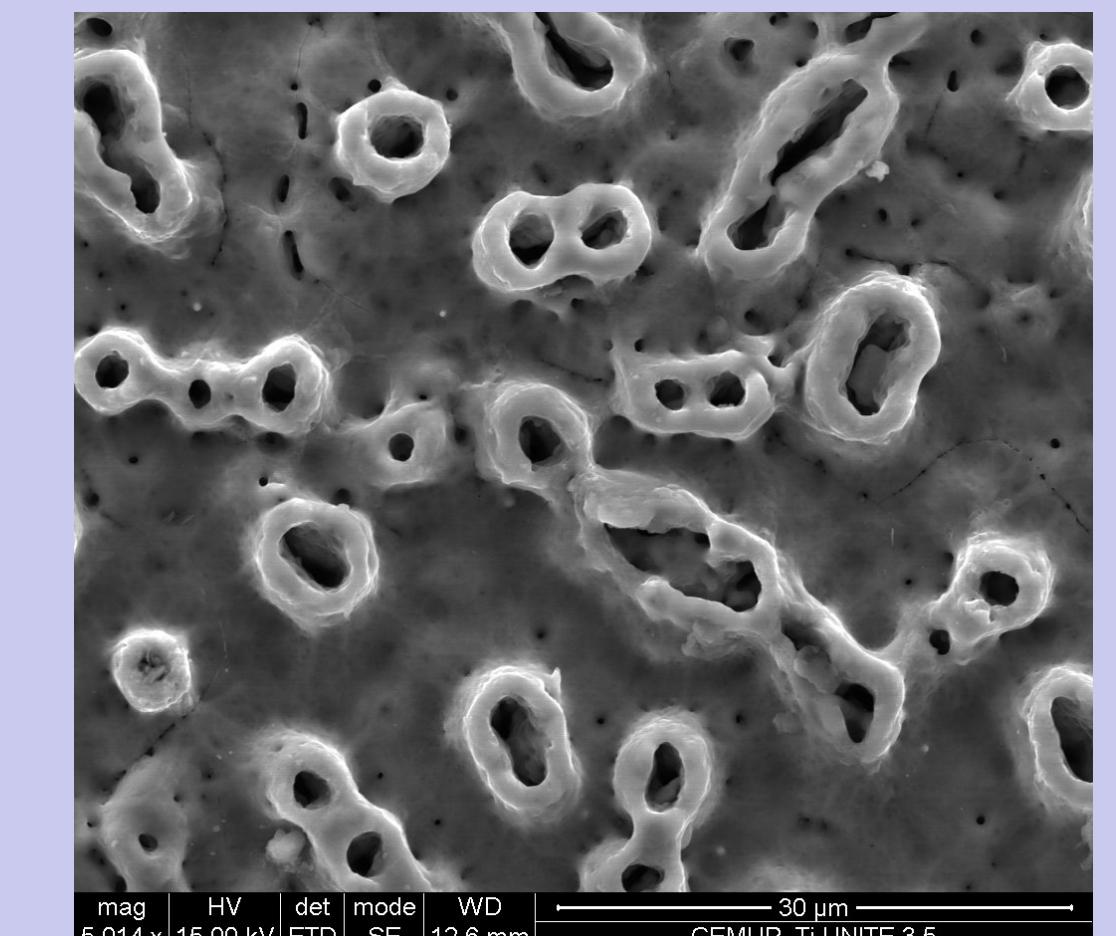
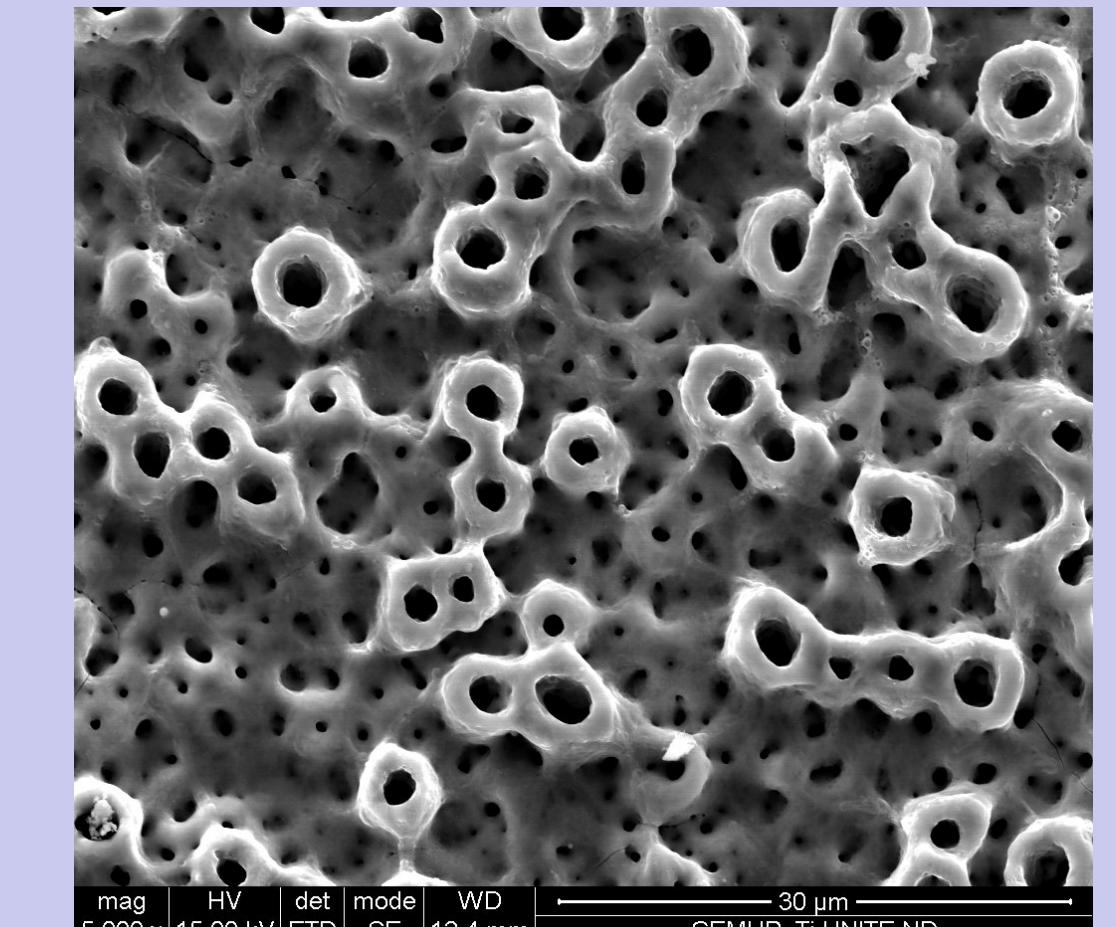
Blasted with AlO +
Etched Straumann



Blasted SBM Zimmer,
Lifecore, BioHorizons



Nobel TiUnite



TiUnite - Nobel

QUESTION? What does the published articles say about TiUnite?

Albrektsson- 36 year history of publishing articles promoting Nobel products

Albrektsson's Credibility Questionable!

Clinical Performance of Dental Implants with a Moderately Rough (TiUnite) Surface: A Meta-Analysis of Prospective Clinical Studies

Matthias Karl, Prof Dr Med Dent¹/Tomas Albrektsson, MD, PhD²

The International Journal of Oral & Maxillofacial Implants Volume 32, Number 4, 2017

Purpose: A moderately rough anodized titanium implant surface (TiUnite) was introduced in 2000. This review and meta-analysis aimed to assess implant survival and marginal bone level (MBL) changes documented in the literature. **Materials and Methods:** Repeated literature searches on dental implants were conducted, with the final search on October 7, 2016. The inclusion criteria were: prospective study, minimum of 20 patients, at least 12 months follow-up postloading, and TiUnite implant survival reported. Regression analysis was performed on implant survival and MBL change from implant surgery. Peri-implantitis as defined by the primary authors was reported at the patient level. **Results:** One hundred six out of 32,519 publications on dental implants met the inclusion criteria. Implant survival rates at 1 year were 99.50% at the implant level and 99.12% at the patient level, and survival rates at 10 years were 95.14% at the implant level and 91.50% at the patient level. Mean MBL change at 1 year was -0.409 mm at the implant level and -0.413 mm at the patient level, and at 5 years, it was -0.886 mm at the implant level and -1.029 mm at the patient level. Nineteen studies (18%) specifically reported peri-implantitis in 64 out of 1,229 patients with a mean follow-up of 47.89 months, indicating a prevalence of 5.20% at the patient level. **Conclusion:** Based on a meta-analysis of prospective studies, implants with the TiUnite surface provide a predictable treatment modality in a variety of indications. INT J ORAL MAXILLOFAC IMPLANTS 2017;32:717–734. doi: 10.11607/jomi.5699



Albrektsson, Branemark 1982
Clin. Applications in Biomaterials
"Fibroblast ... Soft Tissue"



Branemark et.al: JPD 1983
"Osteoblast ... Upper Jaw Fixture"



Nobel Biocare Website 2007
Claim: History of Osseointegration
Using Non-integrated SEM

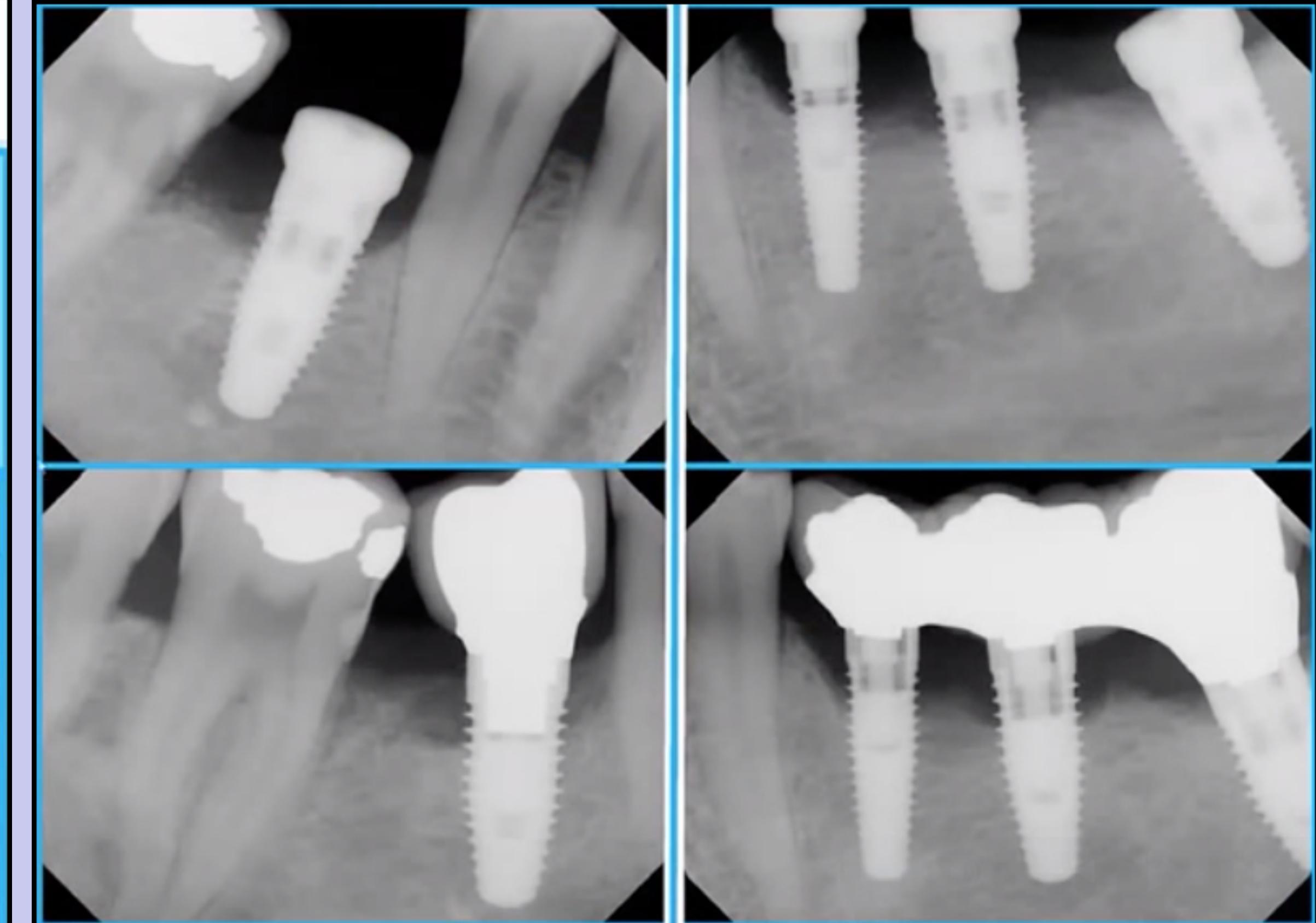
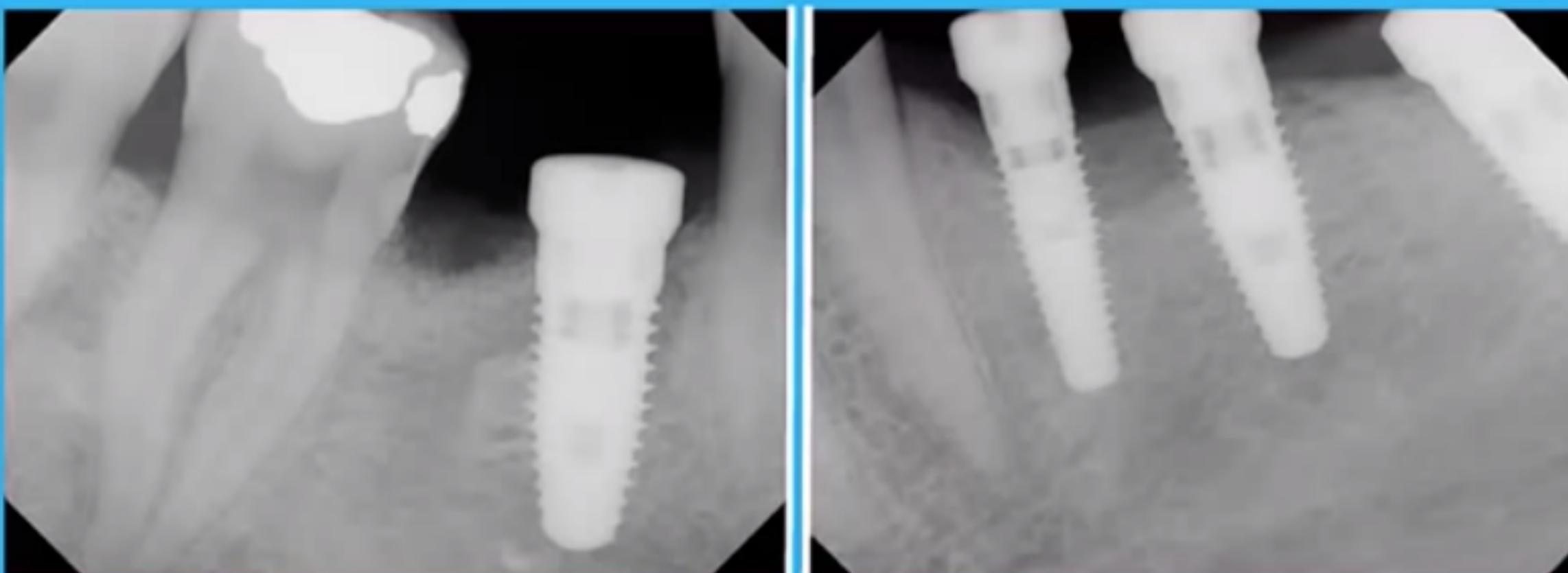
QUESTION? What did a Periodontist Report on NobelReplace Implants with TiUnite? “At least 25% of my cases are showing unacceptably high degree of early bone loss.”

Email from Toronto Periodontist to Nobel Reporting “Unacceptably high degree of early bone loss.”

Subject: Crestal bone loss
Date: 11/11/2011 5:49 A. A. Pacific Standard Time
From: murray.arlin@utoronto.ca
To: Kishores.Pranjivan@nobelbiocare.com, Kevin.McAuley@nobelbiocare.com, gniznick@aol.com

Hi Guys: Here is unfortunately a "typical example" of what I see too often with the Replace design. Pass these along if you like. I have not made an attempt at a comprehensive analysis but I would estimate that at least 25% of my cases are showing unacceptably high degrees of early bone loss.

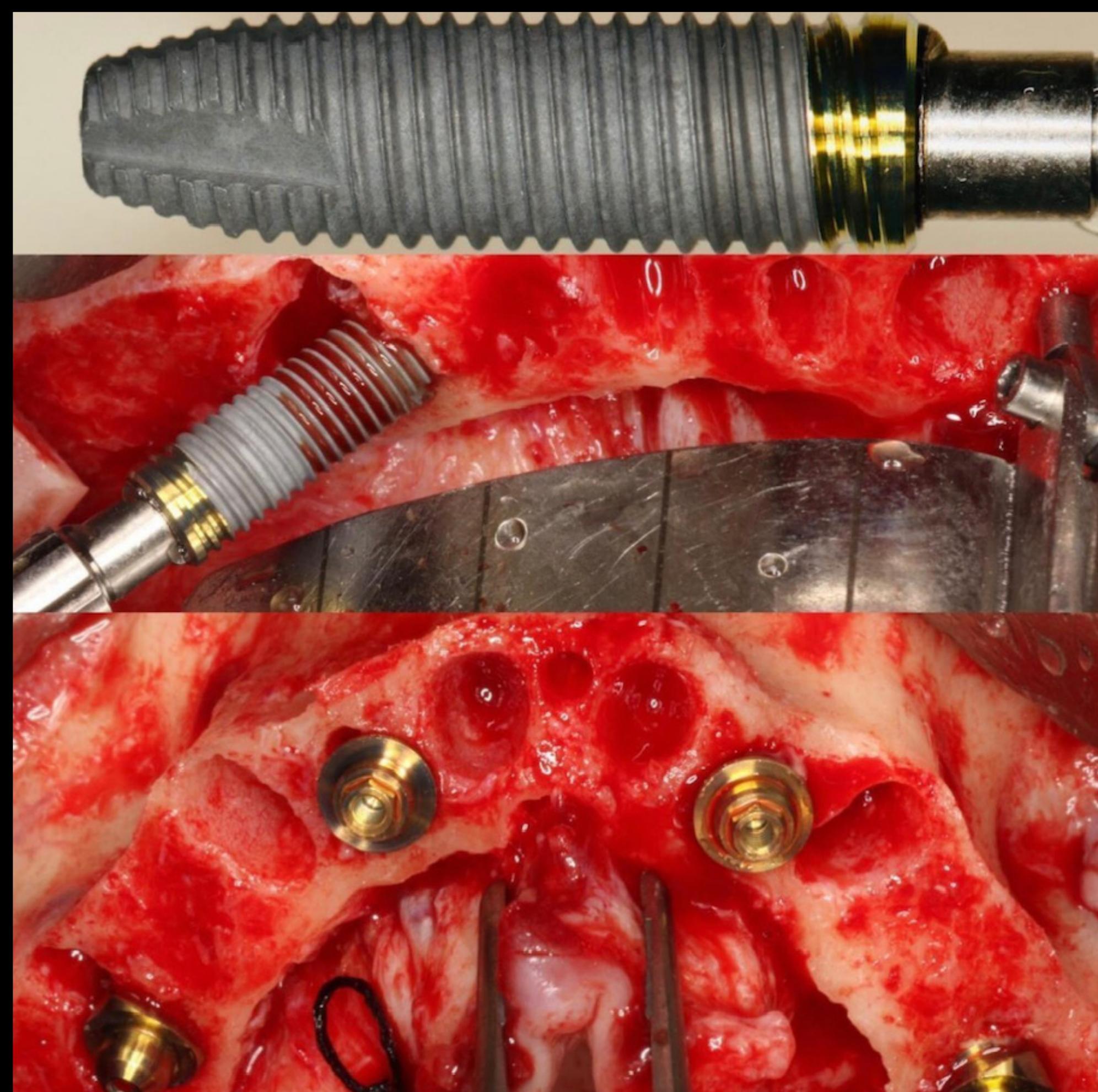
Murray Arlin, Periodontics and Implant Dentistry, Toronto
<http://www.MurrayArlin.com>



NobelBiocare Introduces “TiUltra Surface” modification - TiUnite Rough Surface on the Neck of the NobelDirect Claimed “soft tissue integration”

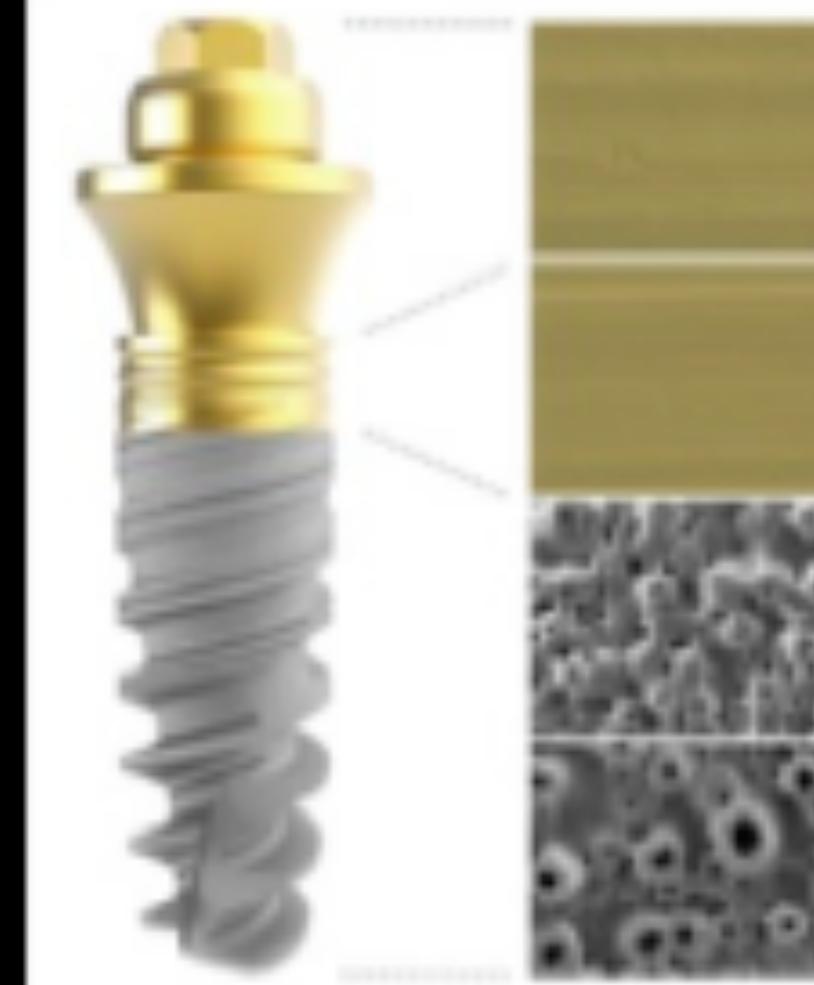


NobelBiocare Introduces “TiUltra Surface” modification - Anodized Smooth Surface of the Neck of Nobel Implants Claims “mucointegration”



Nobel Biocare
42,129 followers
10h

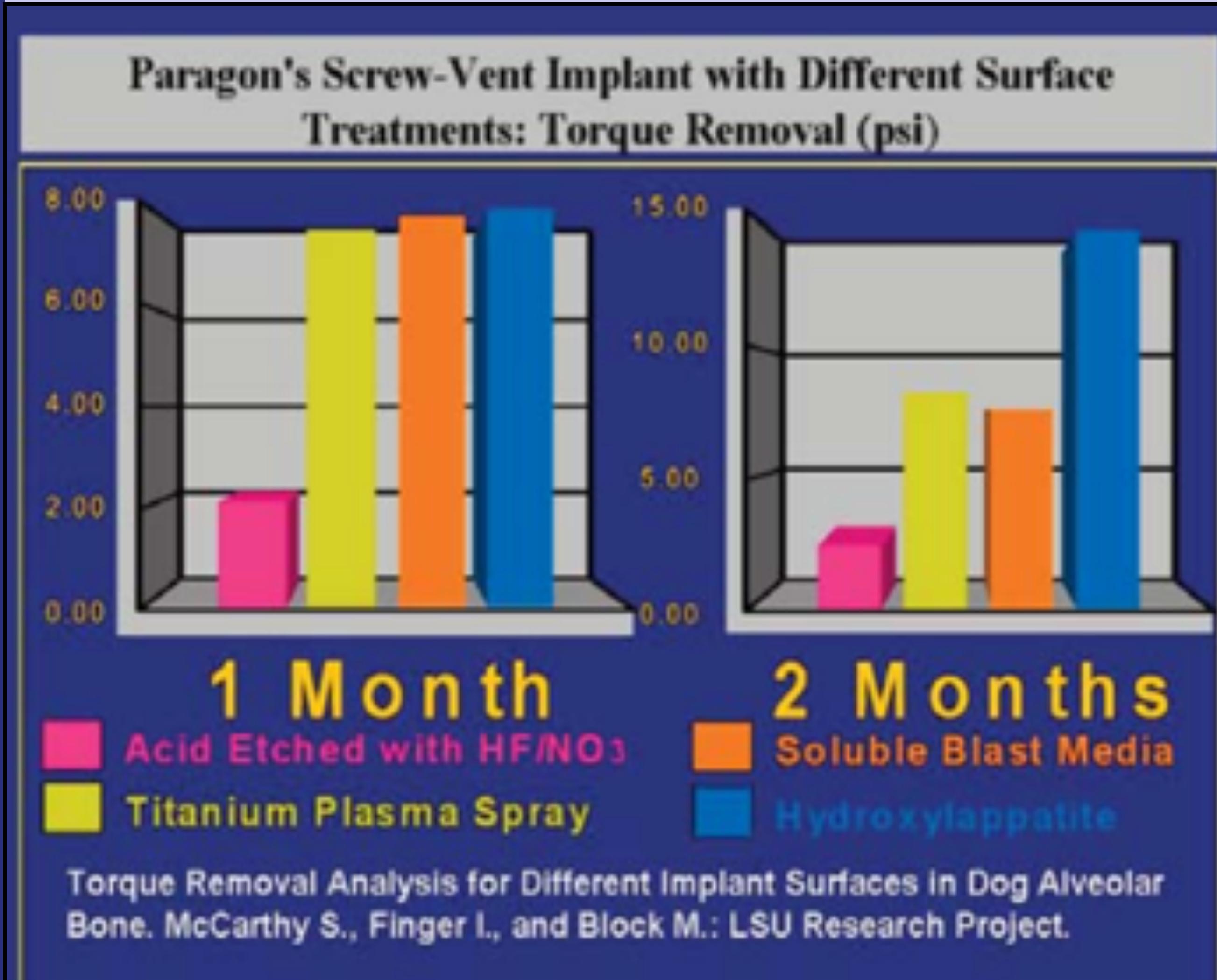
🌟 The Mucointegration era has begun 🌟
Introducing the Xeal abutment surface and TiUltra implant surface. From abutment to implant apex, surface chemistry and topography have been reimagined to optimise tissue integration at every level.
Discover more <https://lnkd.in/gkNfWtC>



Our expertise in anodisation technology is applied to the full implant system, from abutment to apex.

**QUESTION? What is the Ideal Surface? - HA doubled Torque Removal
Zimmer's Trabecular Metal midsection reduces critical initial stability**

Zimmer introduces Trabecular Metal



Trabecular Metal section slipped over core and apical threads welded on. *The weakness of this weld required FDA recall and change in surgical protocol*

"Product" section of the Recall Notice cites limitations for use of the 4.1mm TM Implant not required with 4.1mm Screw-Vent Implant:

"The 4.1mmD Trabecular Metal Implants are intended to be splinted to additional implants when used in the posterior region."

"Reason for Recall" section of the Recall Notice states:

"The Zimmer Dental voluntary device recall resulted from an investigation into the February 2012 complaint involving an apical tip of a 4.1mmD Trabecular Metal Implant which separated from the implant assembly during surgery on a patient with a dense (Type D1) thick, inferior border."

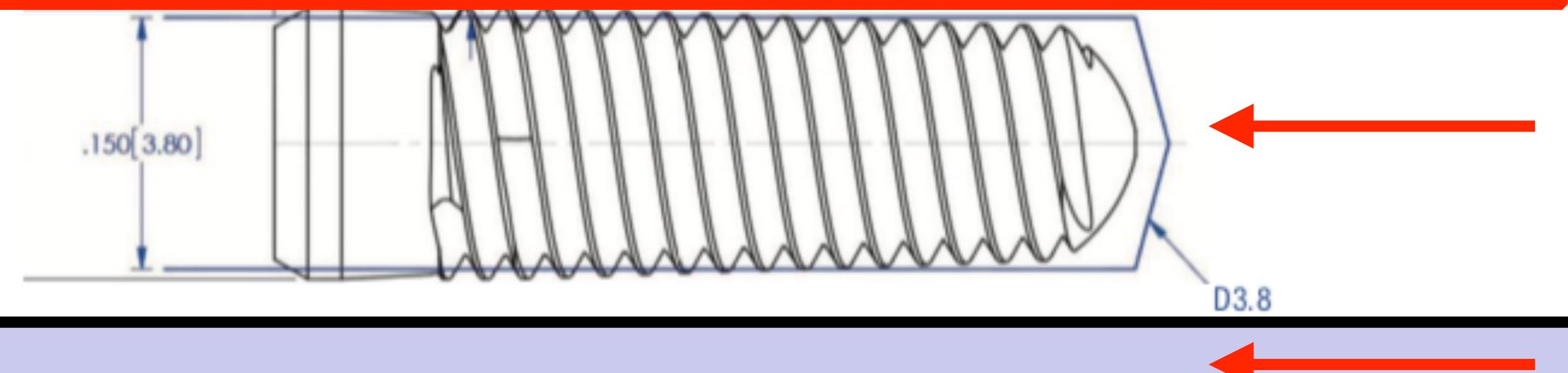
"Action" section of the Recall Notice states:

"Zimmer sent an Urgent Medical Device notification letter dated April 24, 2012, with an attached Technical Bulletin listing precautions present in the new Information for Use sent to distributors and customers via E-mail and FED EX. Notifications identified the issue and risks found with the device listing responsibilities, precautions and procedural precautions."

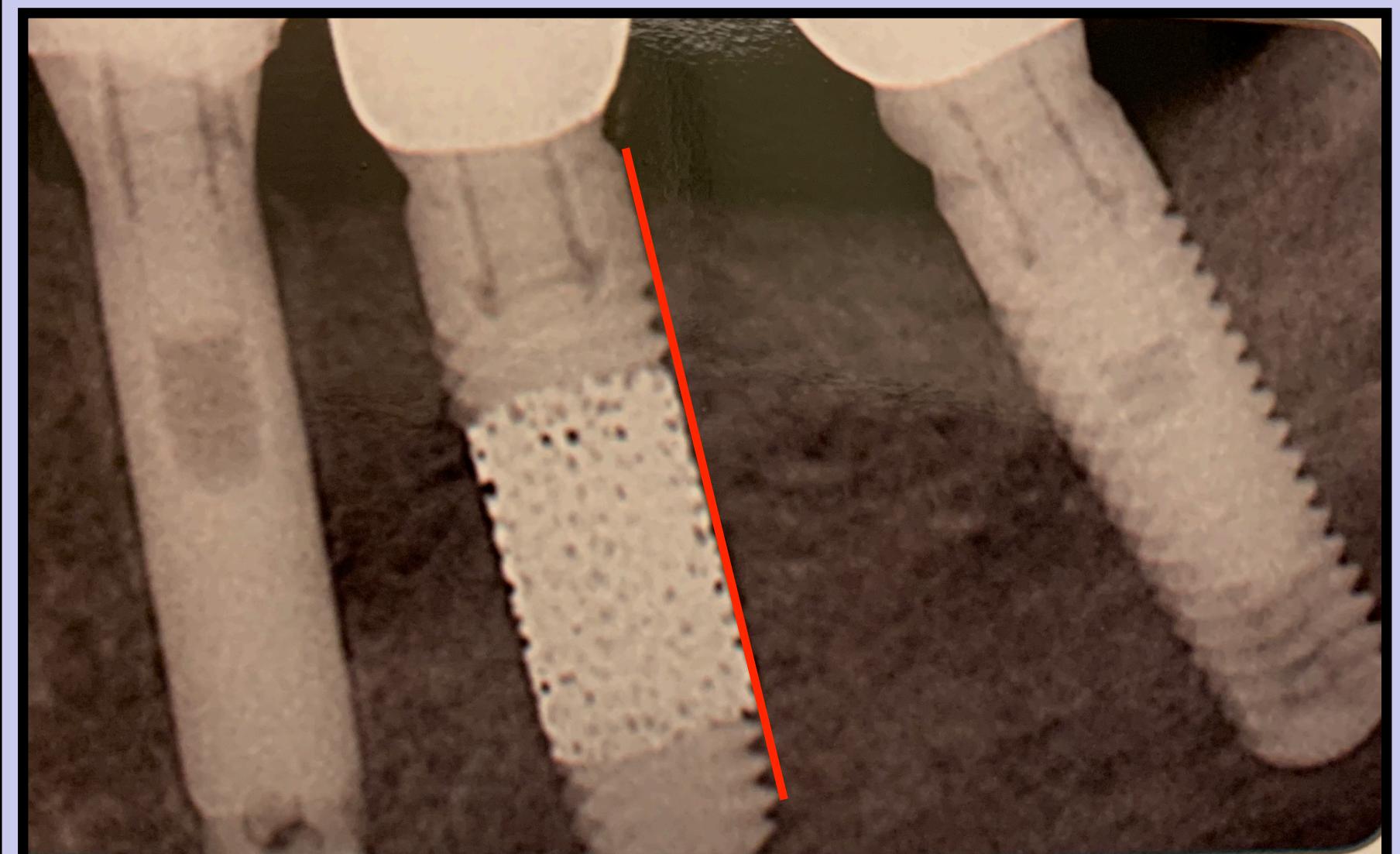
Change in Surgical Protocol in Dense Bone

Zimmer Dental's added "precautions" to reduce torque on the apical threads during insertion was to recommend use of a 3.8mmD straight drill as a final drill in dense bone for the 4.1mmD TM Implant rather than the 3.8/3.4mmD step drill originally recommended

Changed to Straight Drill leaving no thread engagement apically



Tapered Trabecular Metal Implant Replaced with Straight Design



QUESTION?: Any clinical advantage to a more hydrophilic surface?
QUESTION?: Is Straumann's SLActive Surface worth \$50-\$60 more?



Buser et al. [3] found that a hydrophilic SLA surface gave higher bone-to-implant contact than regular SLA. Nevertheless, previous in vivo studies performed by Albrektsson and co-workers [7,8] failed to demonstrate higher osseointegration using hydrophilic surfaced dental implants.

[3] Buser D, Broggini N, Wieland M, Schenk RK, Denzer AJ, Cochran DL, et al. Enhanced bone apposition to a chemically modified SLA titanium surface. *J Dent Res* 2004;83:529–33.

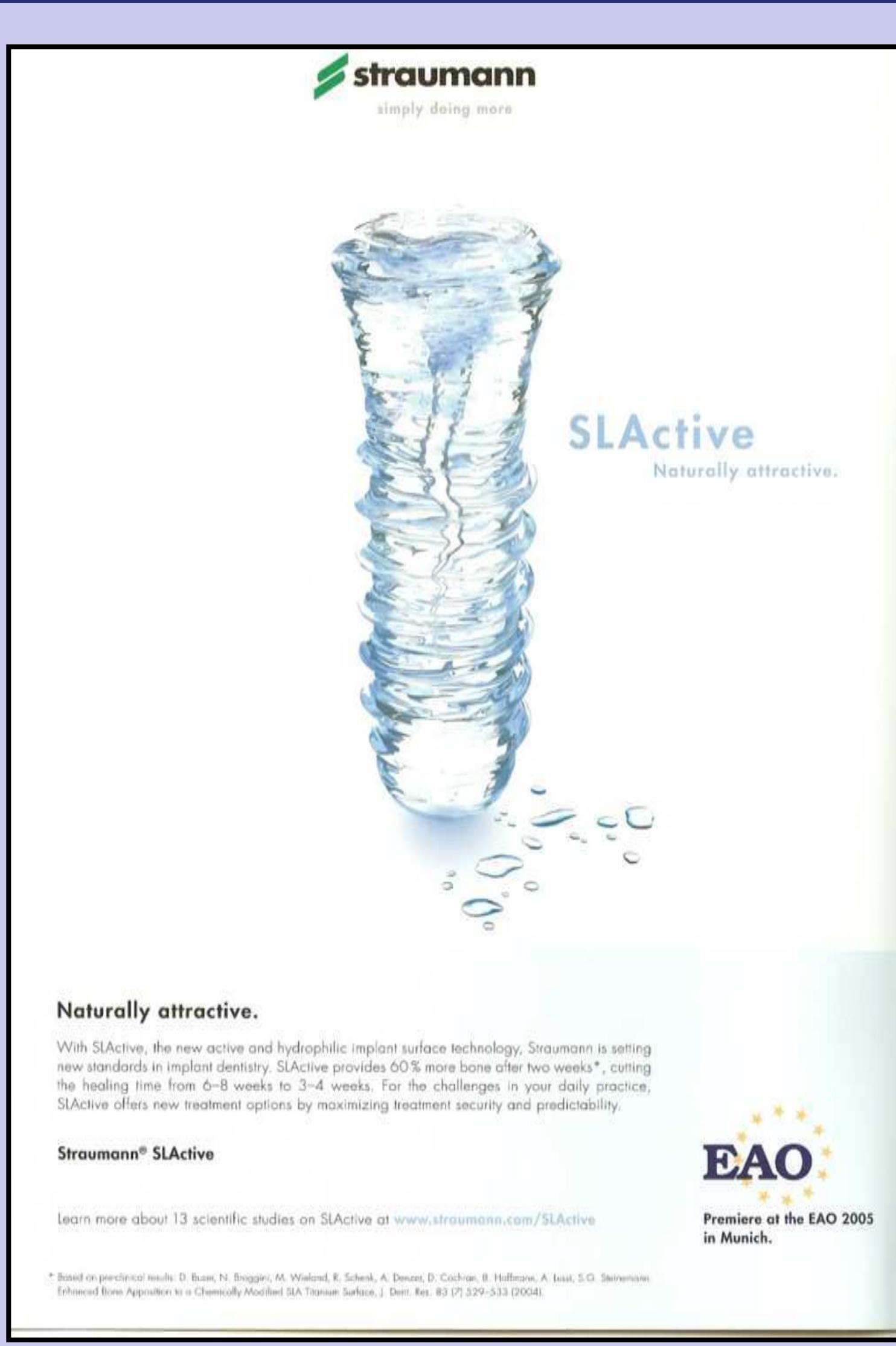
[7] Carlsson L, Albrektsson T, Berman C. Bone response to plasma-cleaned titanium implants. *Int J Oral Maxillofac Implants* 1989;4:199–204.

[8] Wennerberg A, Bolind P, Albrektsson T. Glow discharge pre-treated implants combined with temporary bone ischaemia. *Swed Dent J* 1991;15:95–101.

ROXOLID™

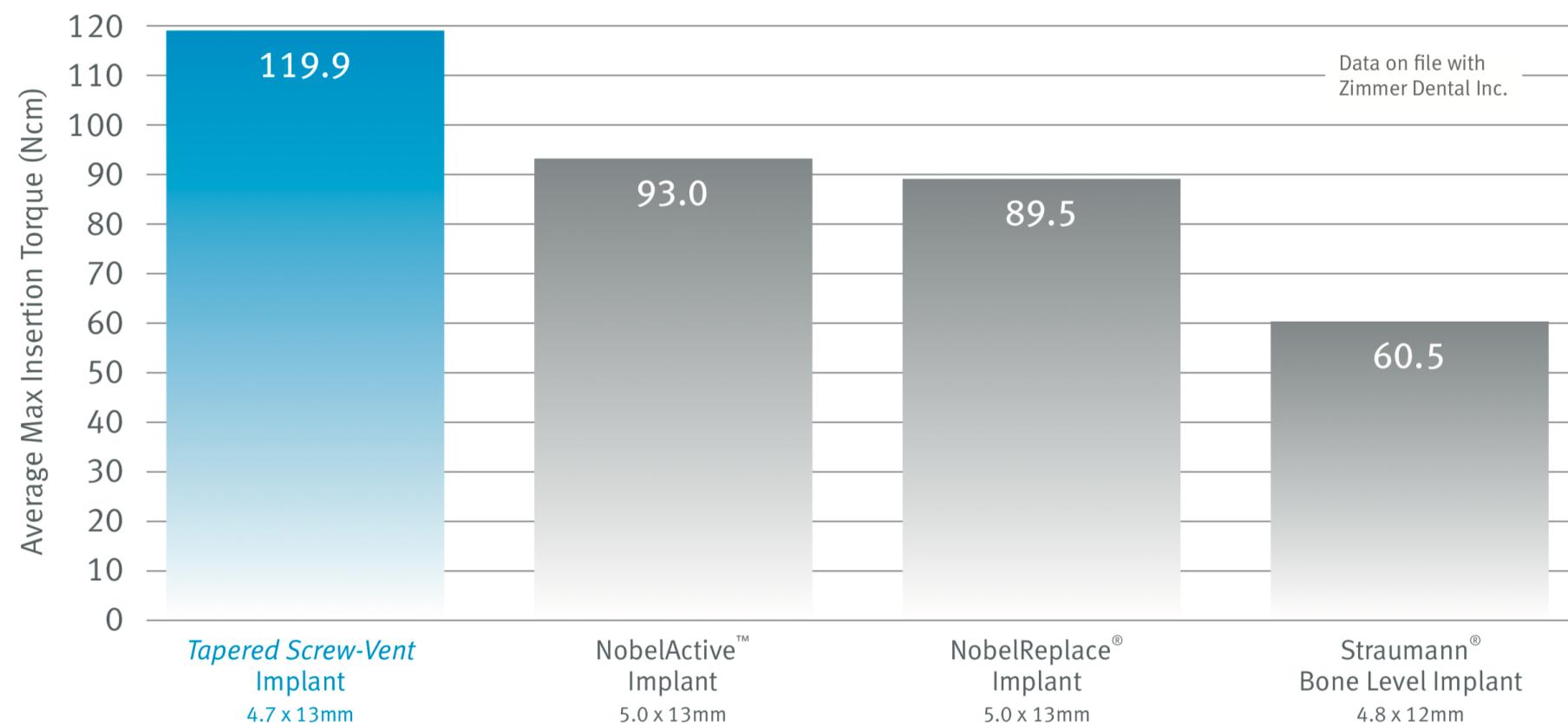
QUESTION?: Any advantage to Roxolid Ti/Zirconium alloy vs Ti6Al4V?

QUESTION?: Does Straumann's SLActive hydrophilic surface cut healing time from 6-8 weeks to 3-4 weeks and is it worth the \$50 extra charge?

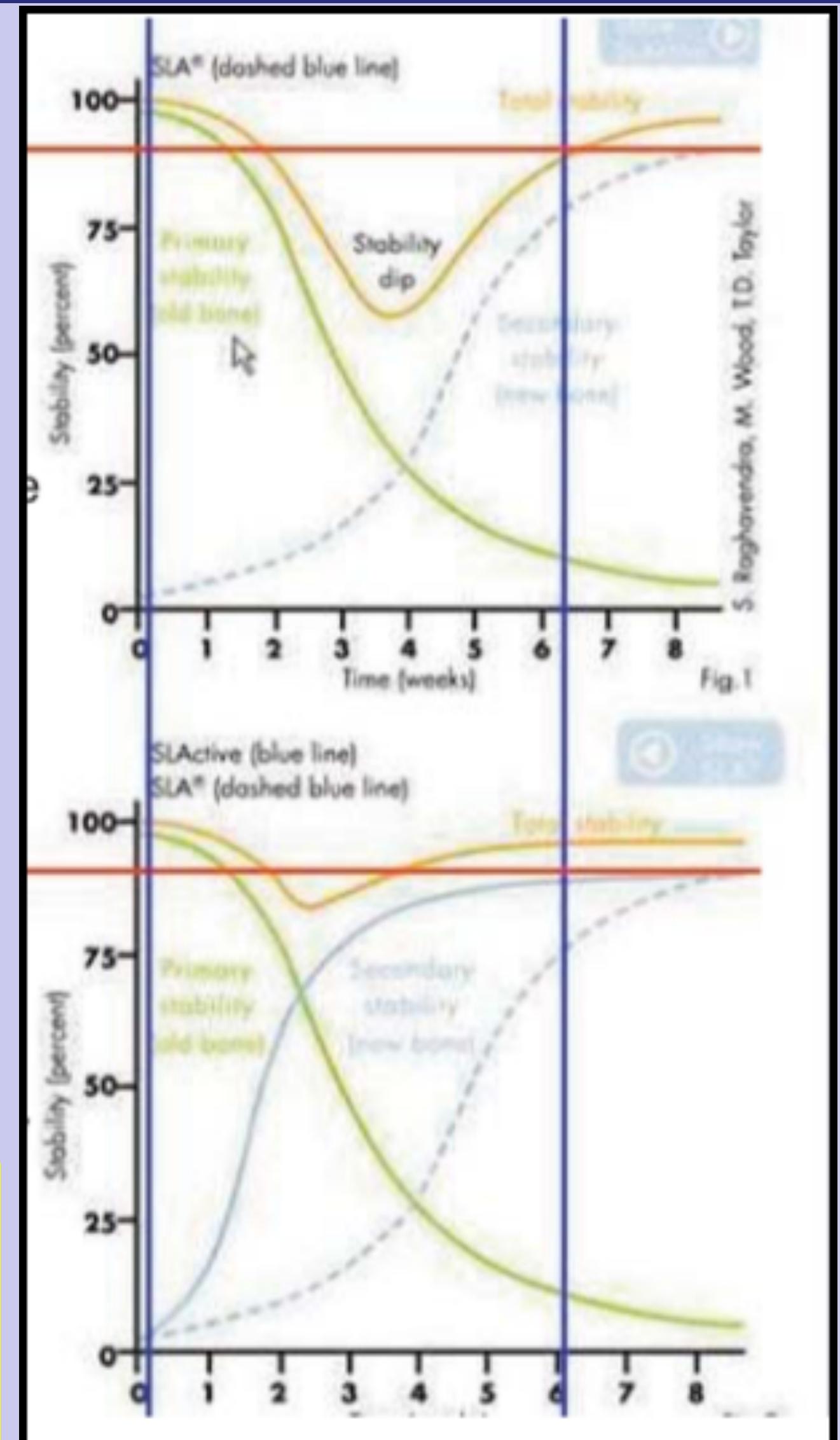


Letter to Buser:
“The issue is not how much torque it takes to remove an implant in the 3rd-4th week (graphs on right) but how much initial stability can be achieved.”

Primary stability achieved by using *Tapered Screw-Vent* Implants enables immediate placement and/or immediate loading in appropriately selected patients.^{13, 15-18}



Tapered Screw-Vent generated 100% more primary stability than Straumann's Straight Bone-Level implant



Straumann Claims SLActive Advantage is its Hydrophilic Properties

Demonstrated by showing blood running up the implant surface - HA and SBM Also

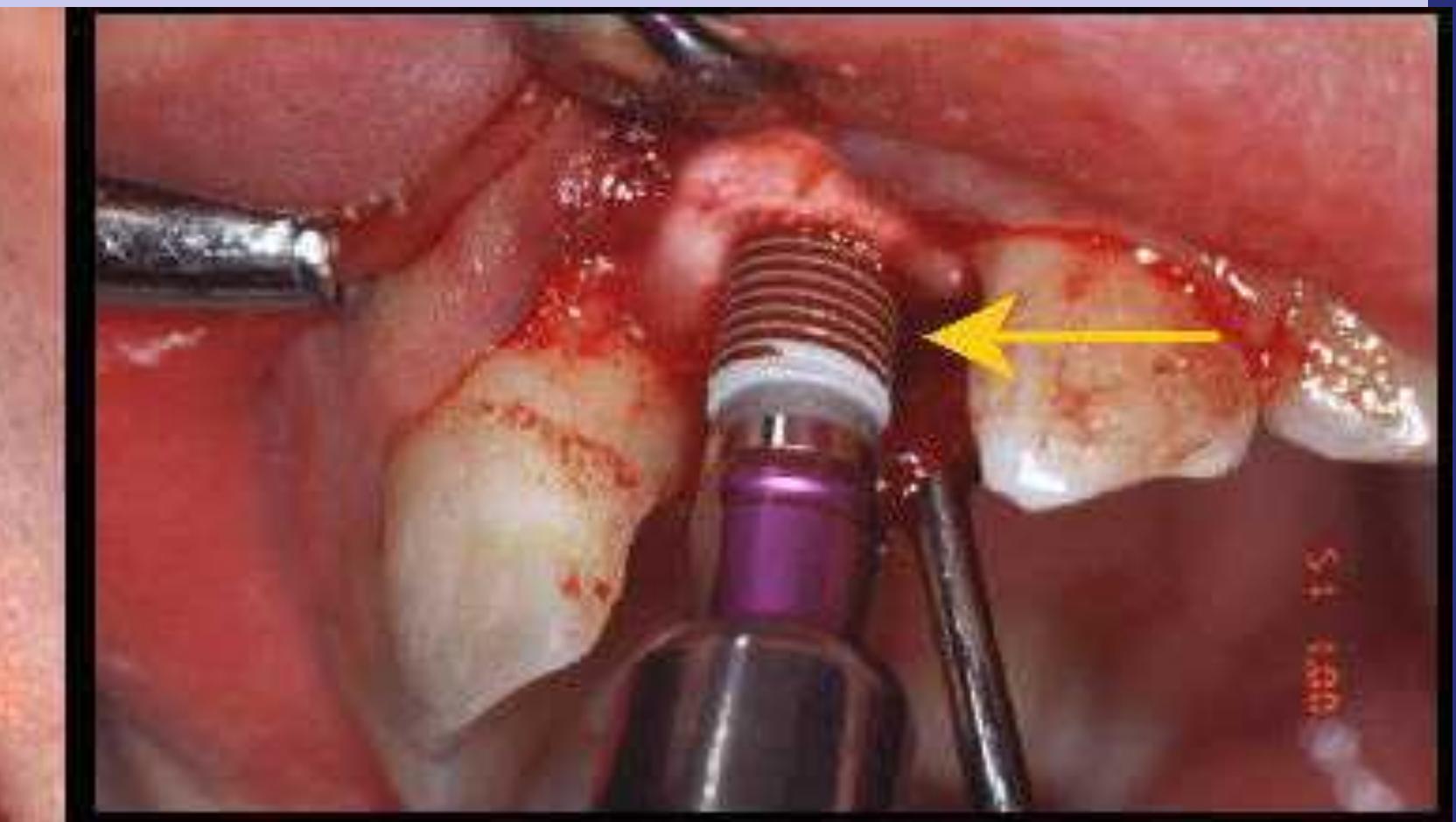
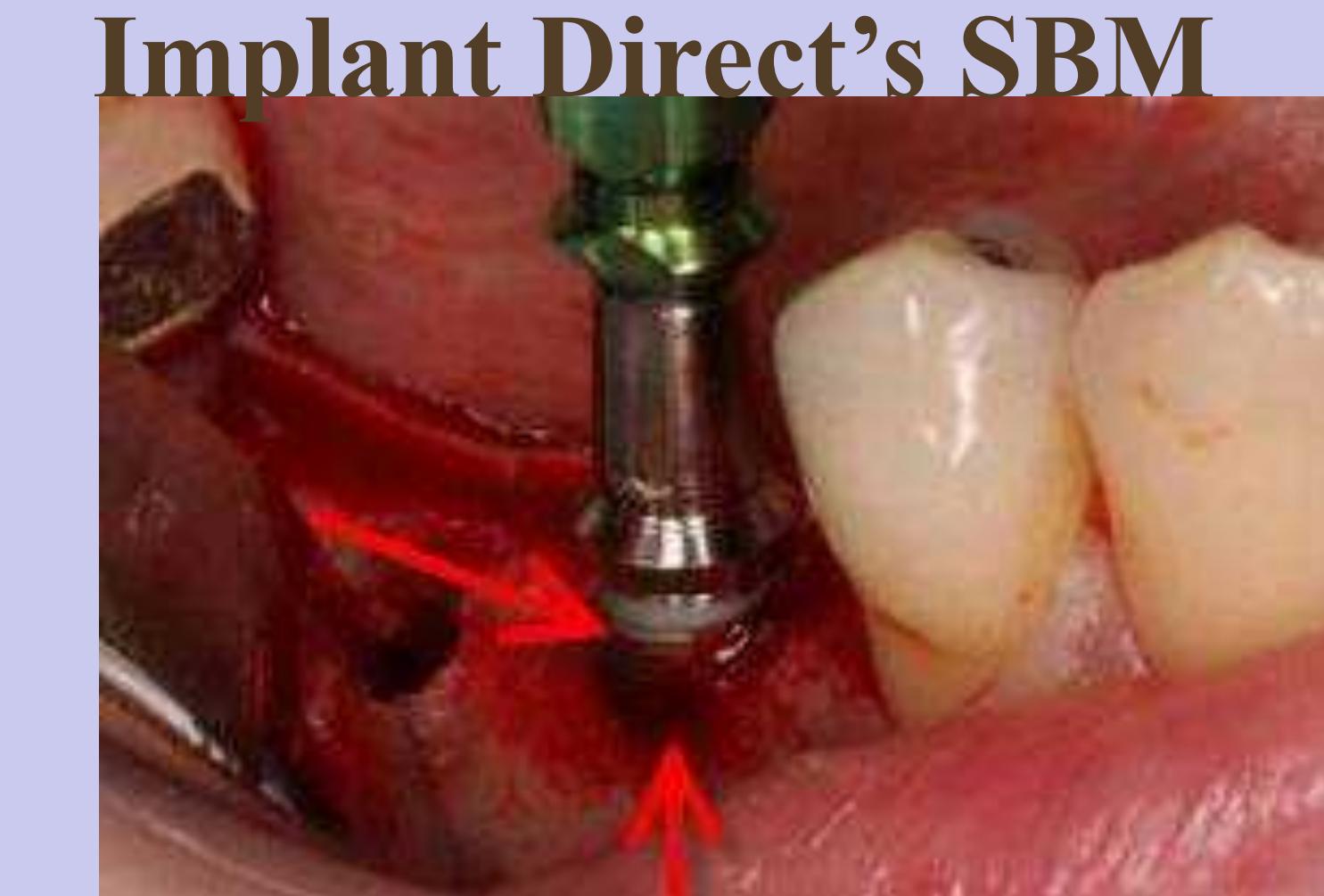


Straumann implants SLActive Surface Test



Straumann's SLActive

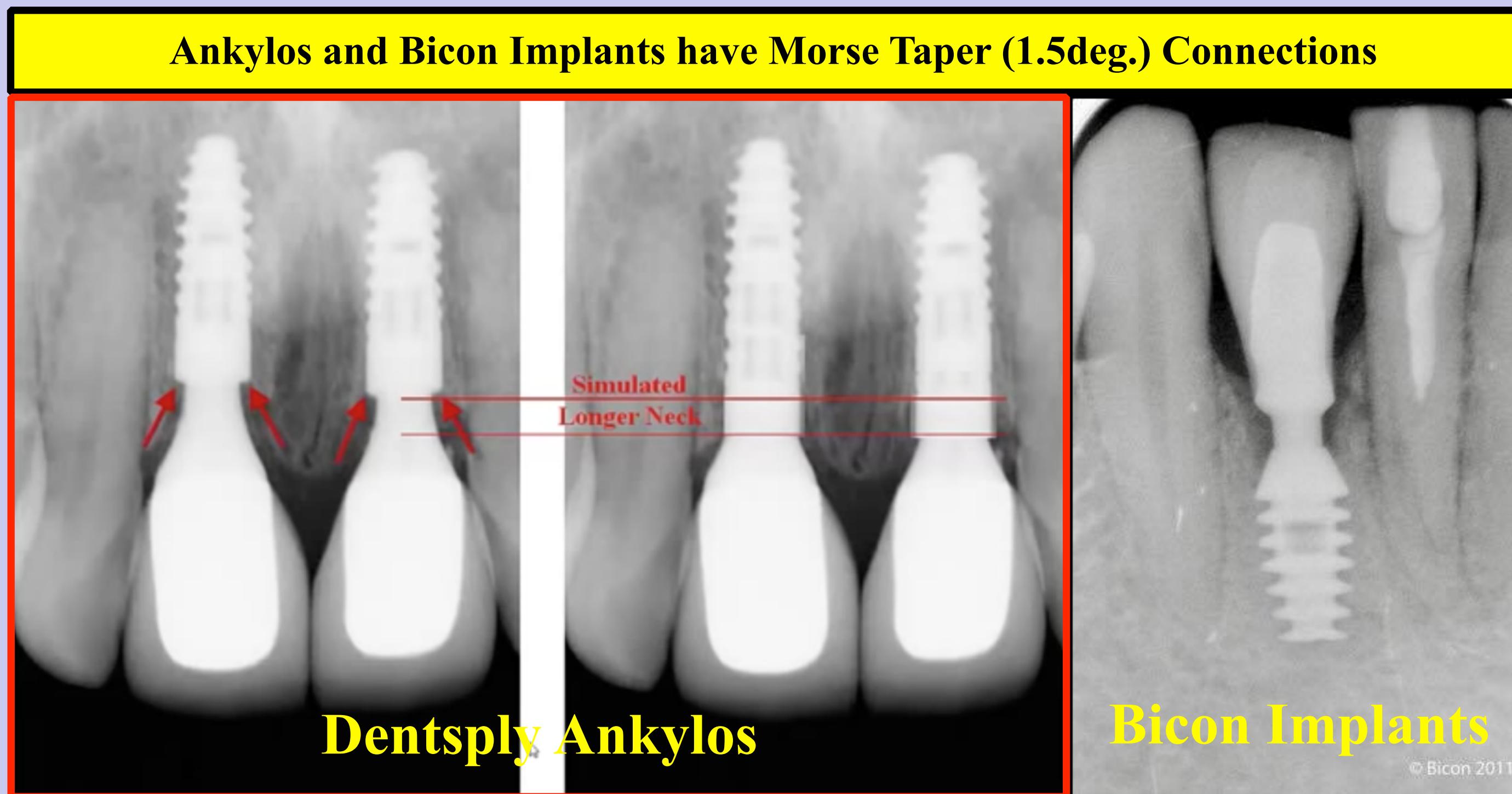
Implant Direct's HA Coated Surface



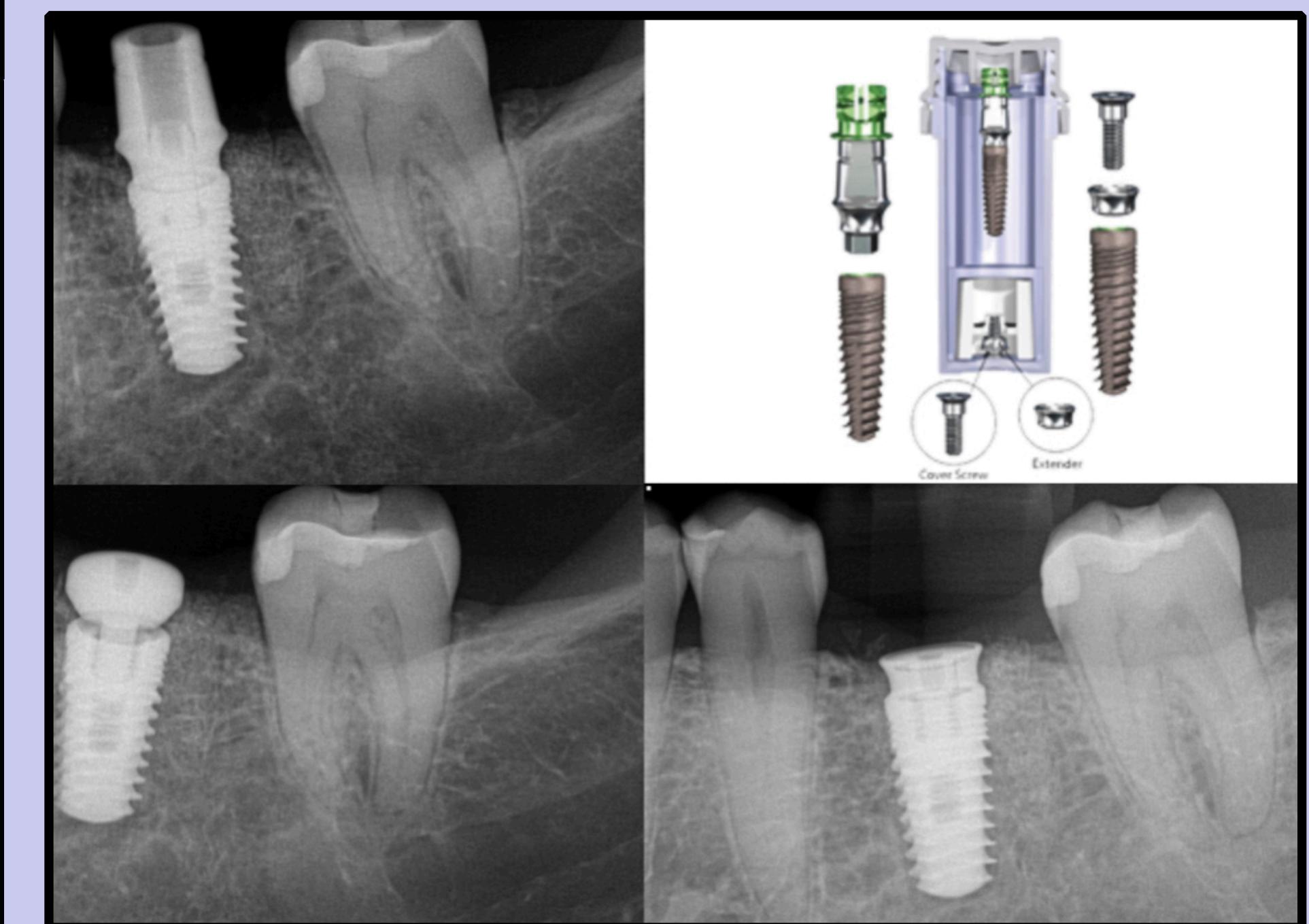
QUESTION: Any advantages to Subcrestal Placement? - NO!
Ankylos and Bicon Morse Taper (1.5deg.) dictates sub-crestal placement

Morse Taper Connection - 1.0-1.5 deg. mating tapers.
Subcortical placement of implant often required for
subgingival positioning of abutments' hight of contour.

Legacy4 Implant placed subcrestal - Dentist
used stock healing collar rather than concave
Healing Collar in All-in-1 packaging



Subcrestal Placement Sacrificed 2+mm of Crestal Bone
Support and complicated abutment attachment



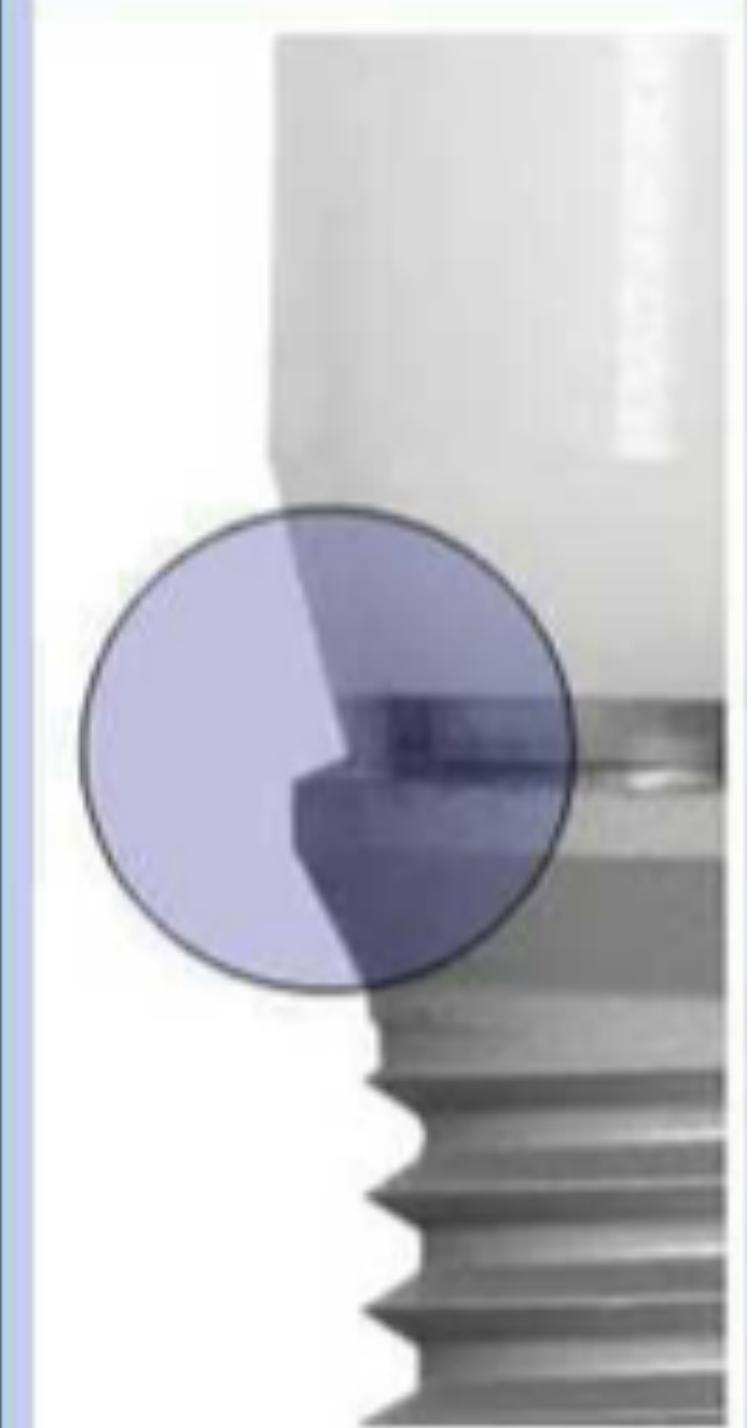
QUESTION: Does platform switching reduces bone loss?

Controlled Study “could not confirm ...a reduced peri-implant bone loss”

All Conical
Connections
Inset margin



3i External Hex Connection



To cite this article:
Enkling N, Jöhren P, Klimberg V, Bayer S, Mericske-Stern R, Jepsen S. Effect of platform switching on peri-implant bone levels: a randomized clinical trial.
Clin. Oral Impl. Res. 22, 2011; 1185–1192.
doi: 10.1111/j.1600-0501.2010.02090.x

Abstract

Objective: The concept of platform switching has been introduced to implant dentistry based on observations of reduced peri-implant bone loss. However, randomized clinical trials are still lacking. This study aimed to test the hypothesis that platform switching has a positive impact on crestal bone-level changes.

Material and methods: Two implants with diameters of 4 mm were inserted epicrestally into one side of the posterior mandibles of 25 subjects. After 3 months of submerged healing, the reentry surgery was performed. On the randomly placed test implant, an abutment 3.3 mm in diameter was mounted, resulting in a horizontal circular step of 0.35 mm (platform switching). The control implant was straight, with an abutment 4 mm in diameter. Single-tooth crowns were cemented provisionally. All patients were monitored at short intervals over the course of 1 year. Standardized radiographs and microbiological samples from the implants' inner spaces were obtained at baseline (implant surgery), and after 3, 4, and 12 months.

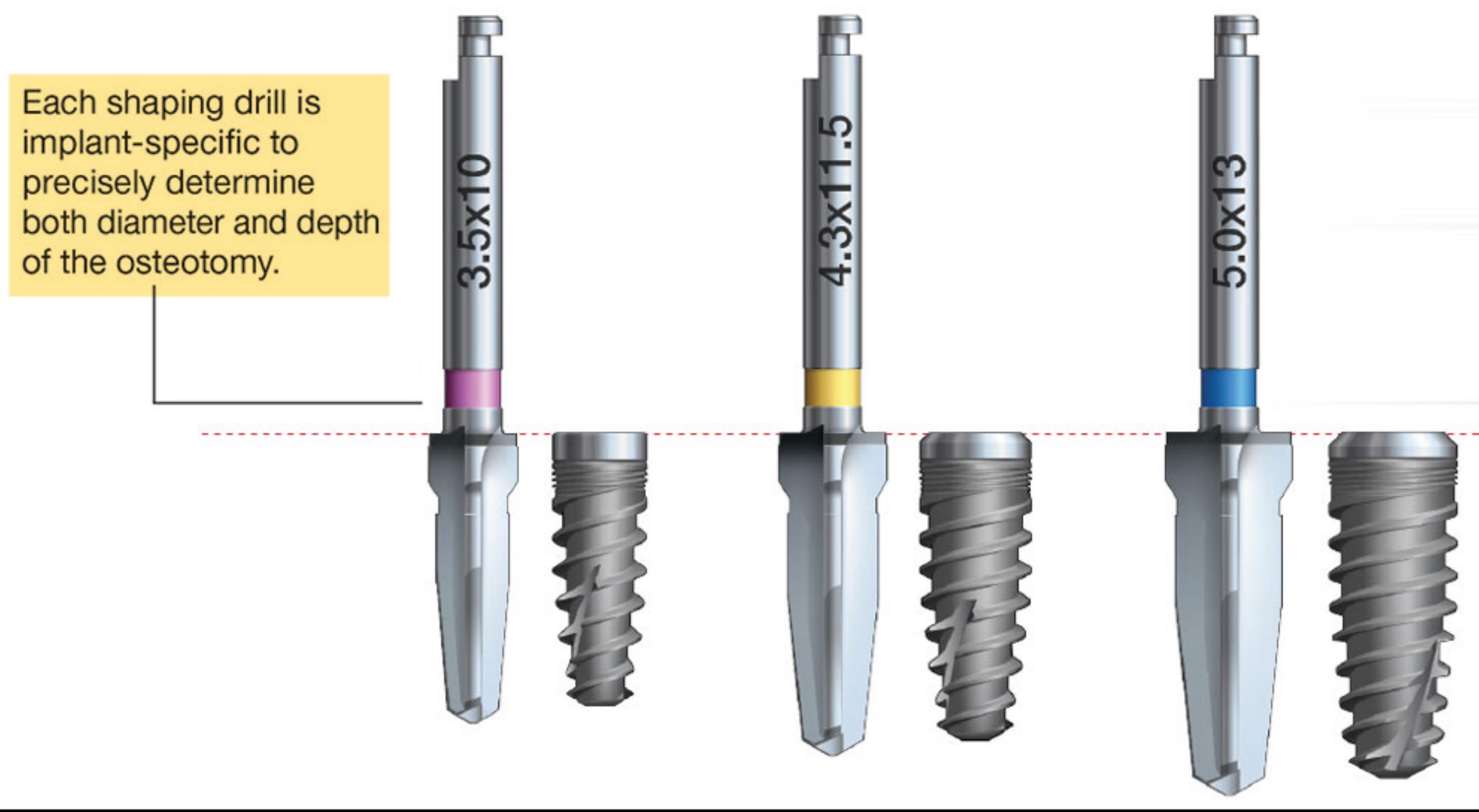
Results: After 1 year, the mean radiographic vertical bone loss at the test implants was 0.53 ± 0.35 mm and at the control implants, it was 0.58 ± 0.55 mm. The mean intraindividual difference was 0.05 ± 0.56 mm, which is significantly <0.35 mm ($P=0.0093$, post hoc power 79.9%). The crestal bone-level changes depended on time ($P<0.001$), but not on platform switching ($P=0.4$). The implants' internal spaces were contaminated by bacteria, with no significant differences in the total counts between the test and the control at any time point ($P=0.98$).

Conclusions: The present randomized clinical trial could not confirm the hypothesis of a reduced peri-implant bone loss at implants restored according to the concept of platform switching.

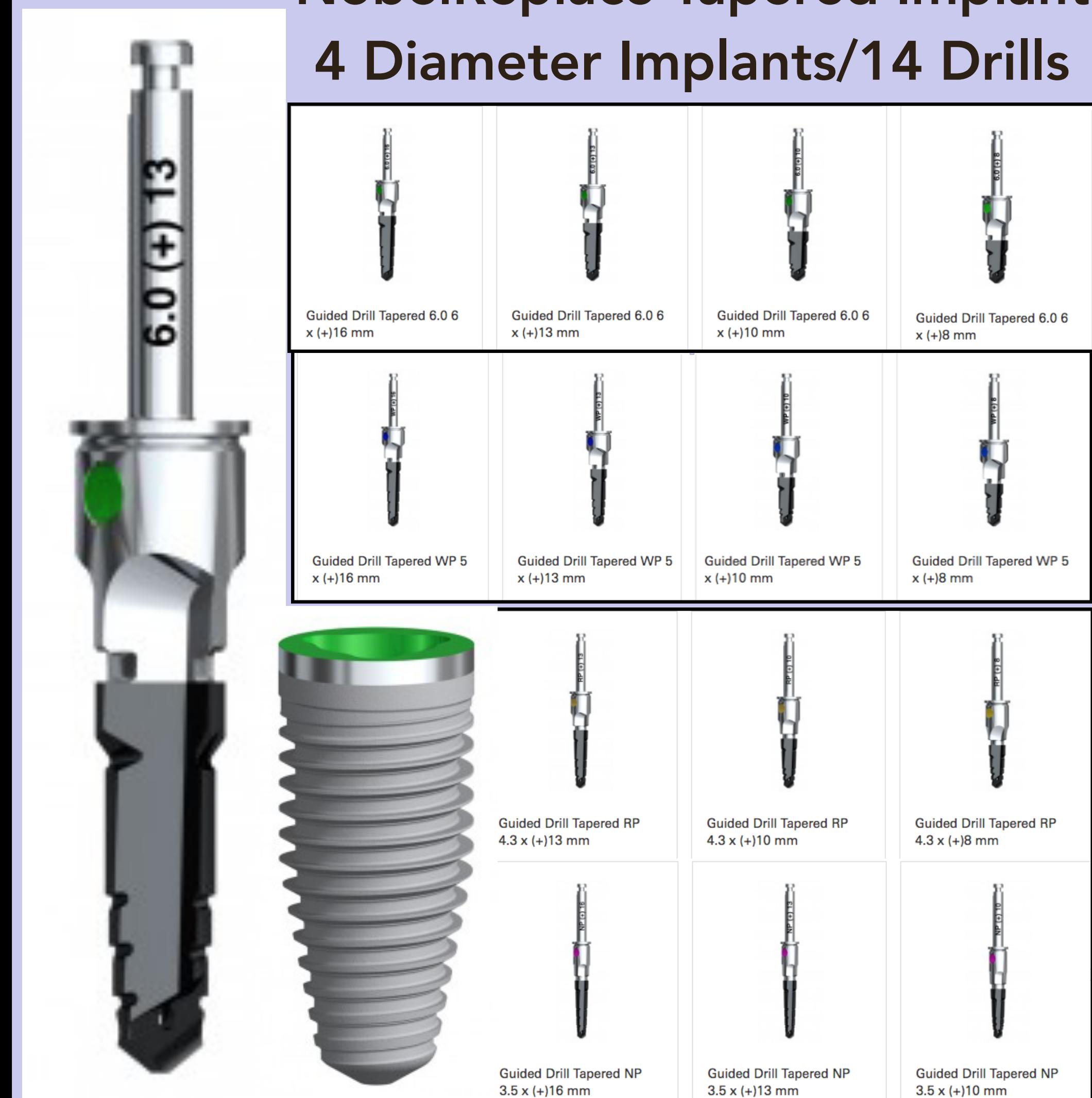
Questions: Straight or Tapered Drills for Tapered Implants?

Tapered drills need to be length and depth specific, adding significantly to number of drills

Neodent, Division of Straumann - “Each drill is
Implant-specific to diameter and depth (i.e. specific to
Implant Length and Diameter)

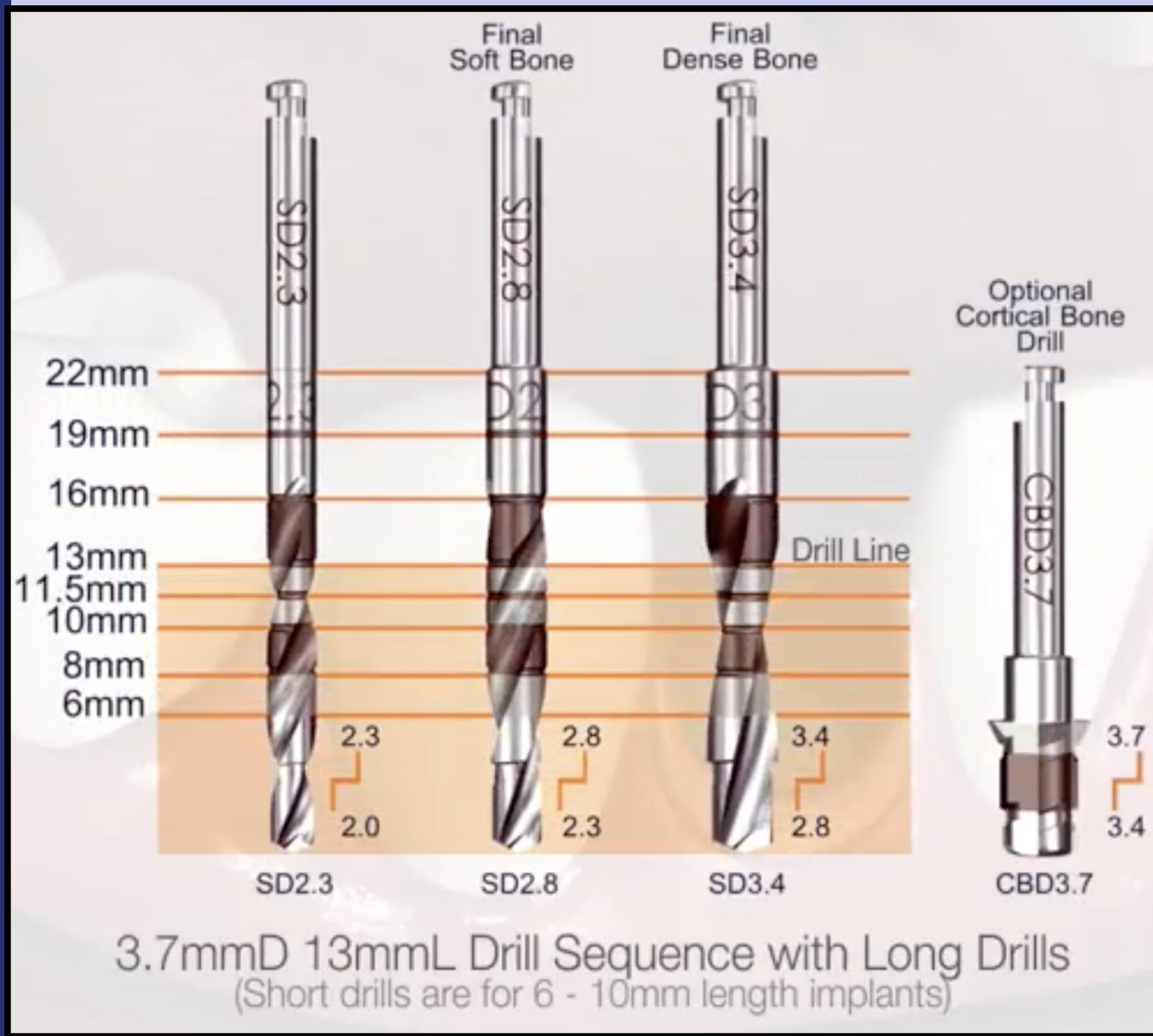


NobelReplace Tapered Implant
4 Diameter Implants/14 Drills



Use of Straight Step Drills eliminates need for length-specific drills

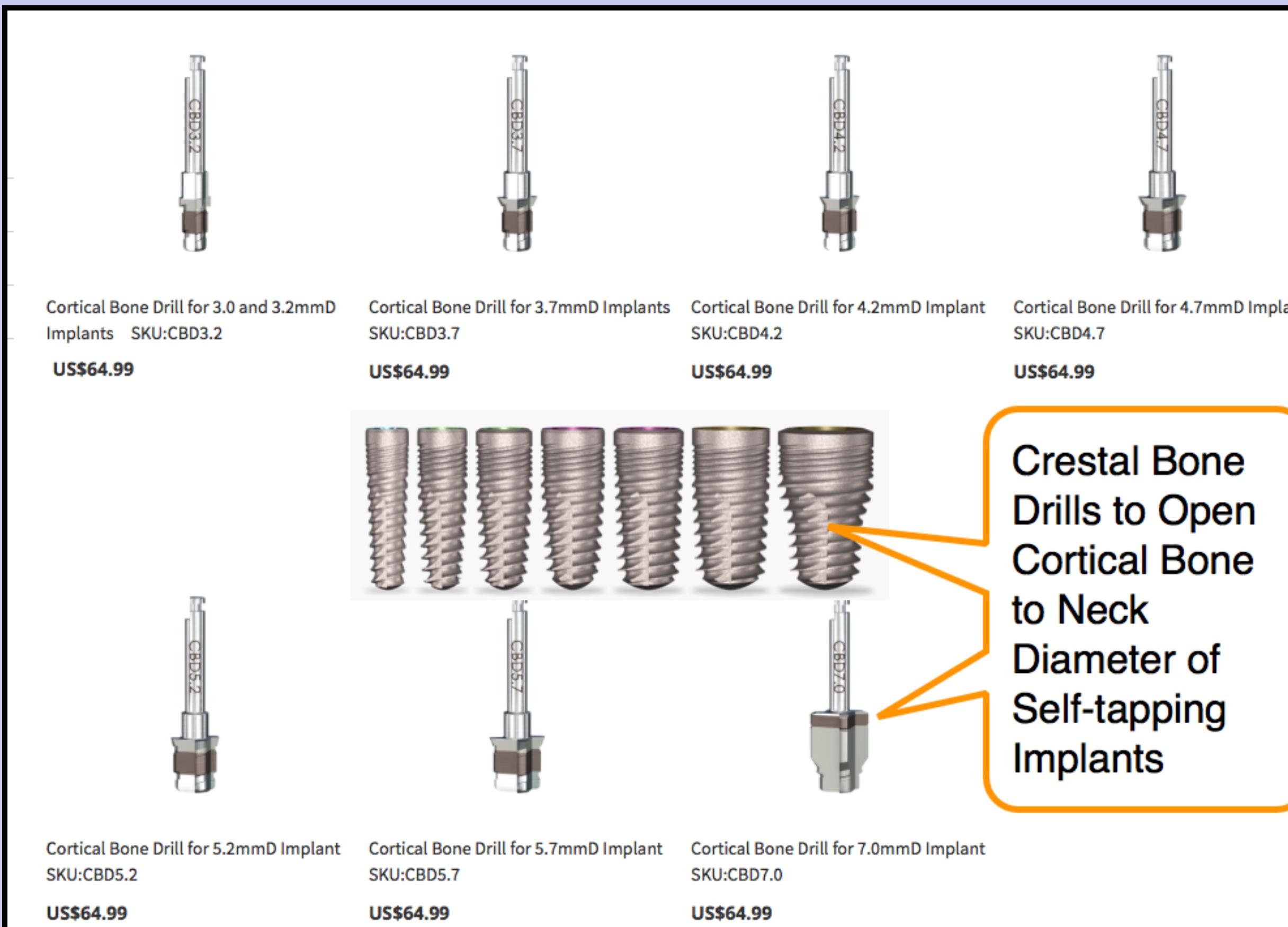
Zimmer's Screw-Vent and Implant Direct's implants allow soft-bone/hard bone option



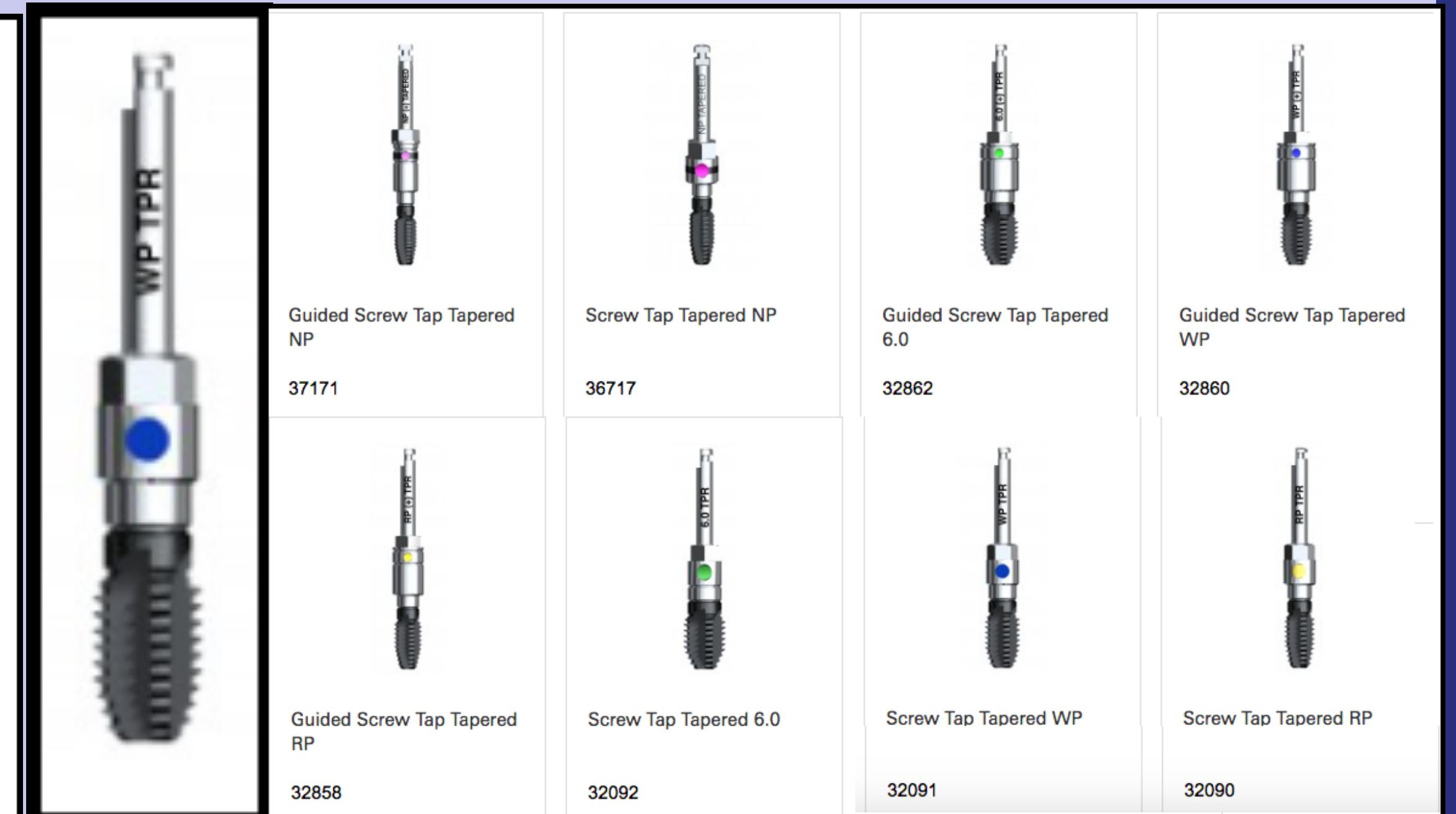
Question: Self-tapping Implant Design or Use of Bone Taps?

Strength of implant is also critical to whether the implant can be inserted self-tapping in Type 1 & 2 bone

Implant Direct Crestal Bone Drills
May be Required with Dense Cortical



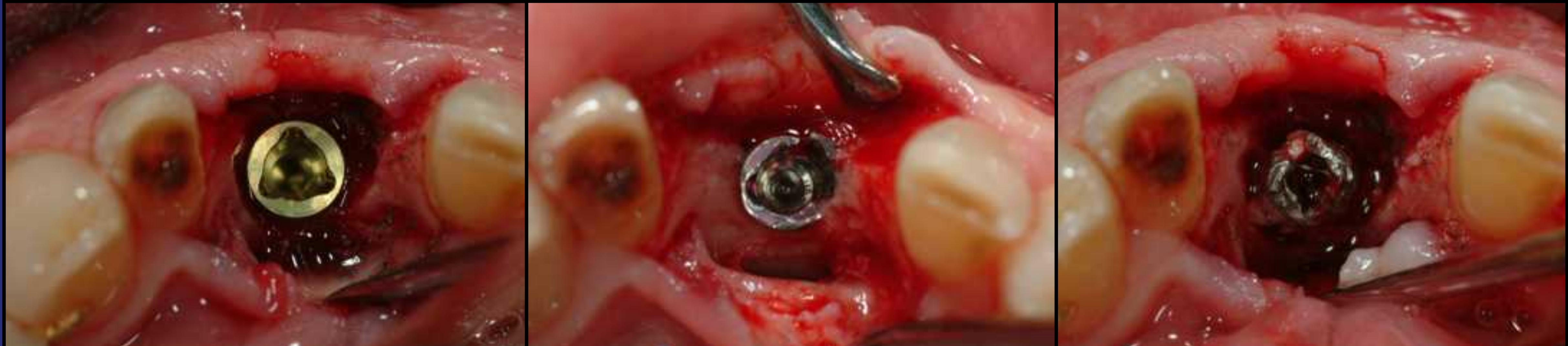
NobelReplace Surgical Bone Taps
Implants are not Self-tapping



**Question: What is Best Material for Dental Implants? Ti6Al4V (ID, Zimmer,BH)
Nobel uses Pure Titanium Gr. 4 (because of TiUnite), Straumann uses TiZr Alloy (brittle)**

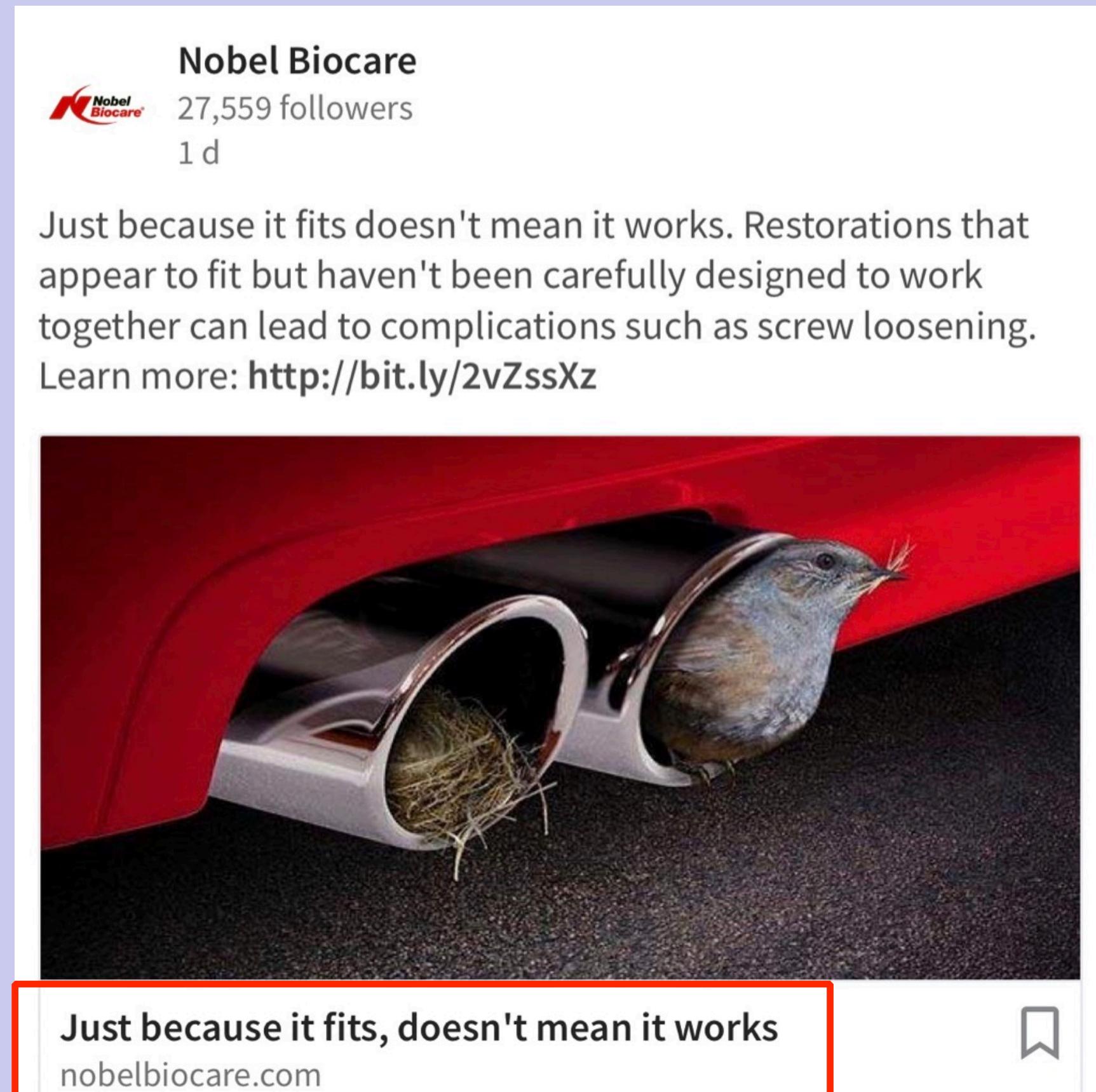


Fracture and Removal of a 3.5mmD NobelReplace Gr. 4 Implant

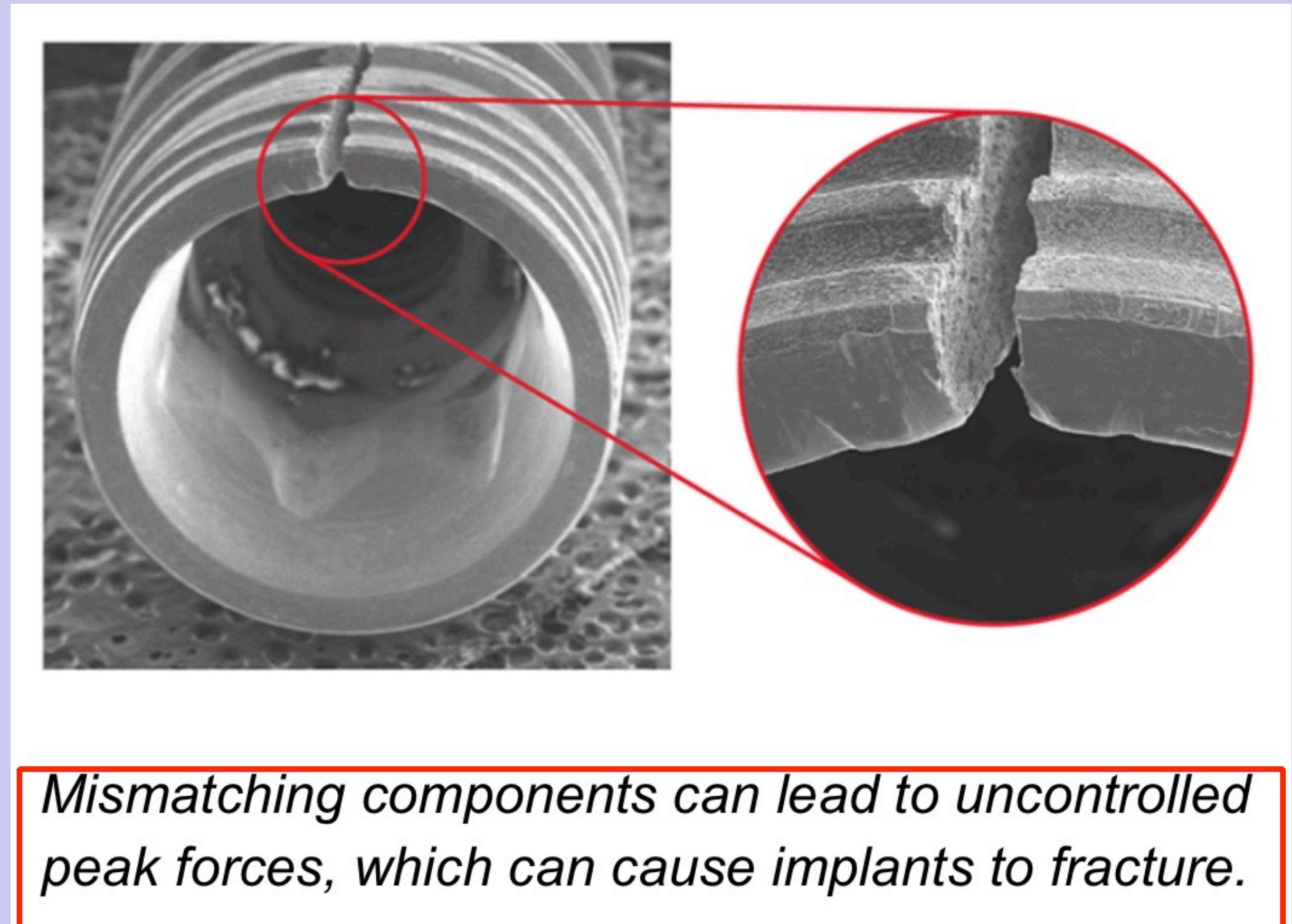


**QUESTION: Use of after-market abutments with Nobel and Straumann Implants?
Both Straumann and Nobel Advise against this to promote sale of their more expensive abutments**

NobelBiocare discourage use of industry compatible abutments with their implants **BUT Nobel now manages Implant Direct so they can share engineering drawings**



Fracture of NobelActive more likely due to thin walls from deep bevel and use of weaker CP Ti because TiUnite will not form on stronger Titanium alloy



Straumann acquired Medentika - is now selling Abutments for competitor's implants

NobelBiocare now selling Cad-milled Abutments for competitors' implants

The screenshot shows the Straumanngroup website interface. At the top, there is a search bar with the text "nobelreplace" and a magnifying glass icon. To the right of the search bar are links for "Advanced Search", "My order drafts", and "My Orders". The top navigation bar includes the "straumanngroup" logo and tabs for "Straumann", "Neodent", and "Medentika". Below the navigation, a breadcrumb trail shows "Shop > Medentika > Series B-H (MPS) > F-Series (NobelActive®, NobelReplace® Co...)".

Four product categories are displayed in a grid:

- Single- and Multi Unit Prosthesis**: Shows various dental prosthetic components.
- Removable Prosthesis**: Shows various dental prosthetic components.
- Prosthetic Auxiliaries**: Shows various dental prosthetic components.
- Instruments & Accessories**: Shows various dental instruments and accessories.

The screenshot shows the Nobel Biocare website interface. At the top, there is a navigation bar with the "Nobel Biocare" logo and links for "Discover", "Education", and "Shop". Below the navigation, a menu bar includes "Implants", "Abutments", "Regeneratives", "Drills", "Kits", and "Instruments". A breadcrumb trail shows "Shop > CAD/CAM".

A large red banner in the center says "CAD/CAM". Below the banner, a section titled "Currently Shopping by:" shows "Works with: Straumann Implants". At the bottom, it says "Showing items 1-12 of 16".

The screenshot shows the NobelReplace website interface. At the top, it says "Preable Abutments (52 products found)". Below that are buttons for "Show 12" and "Sort By Product ID Ascending". The main area is titled "NobelReplace Abutments" and displays five different types of dental abutments:

| Product | Description |
|---------|--|
| E 400 | Solid abutment straight NP 3,5 D 4,8 |
| E 410 | Solid abutment straight RP 4,3 D 5,0 |
| E 420 | Solid abutment straight WP 5,0 D 5,8 |
| E 500-1 | Solid abutment angled 18° Type 1 NP 3,5 D 4,6 |
| E 500-2 | Solid abutment angled 18° Type 2 NP 3,5 D 4,6 |

The screenshot shows the Straumann website interface. At the top, it says "Straumann Bonelevel Abutments". Below that are three items:

| Product | Description |
|--|---|
| 4A-A | Elos Accurate Desktop Position Locator Straumann Bone Lev... |
| Elos Accurate Desktop Position Locator | Straumann Bone Lev... |
| NobelProcera Wax-up Sleeve Engaging | Straumann Octagon 4.8 MZ |

1982-2017 - Gerald Niznick DMD, MSD received 33 US Patents related to Dental Implants

"Discovery consists of seeing what everybody has seen, and thinking what nobody has thought"
"The greatest obstacle to discovery is not ignorance - it is the illusion of knowledge"

