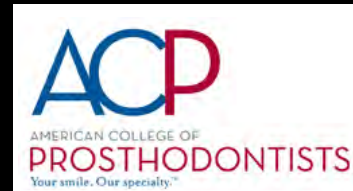


ZYGOMATIC & PTERYOMAXILLARY IMPLANTS GUIDED & UNGUIDED

American College of Prosthodontists
44th Annual Scientific Session
Baltimore, MD -- November 2, 2012

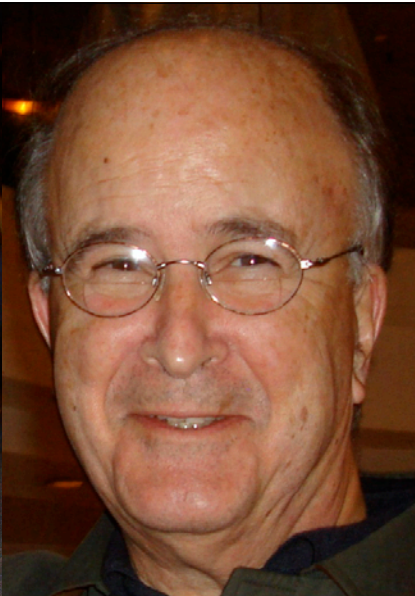
Thomas J. Balshi, D.D.S., Ph.D., F.A.C.P.,

Institute for Facial Esthetics
Fort Washington, PA, USA





Prof. Per-Ingvar Brånemark



Prof. George Zarb



Prof. Patrick Henry



Prof. Chantal Malevez



Prof. Daniel van Steenberghe



Zygomatic & Pterygomaxillary Implants

Points to Share with Fellow Prosthodontists

- Define zygomatic and pterygomaxillary implants?
- Do they work? *Evidence-based prosthodontics*
- Why use these locations for implants?
- Examples - *4 Patients*

Prosthetically-Driven Treatment



“**RETREATMENT** is challenging in scope and technology for both patient and the **DENTIST.**”

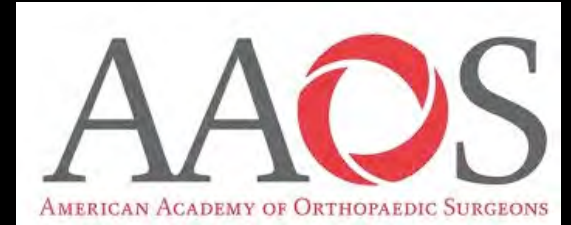
Dr. JP Wiens, ACP MESSENGER Fall 2012



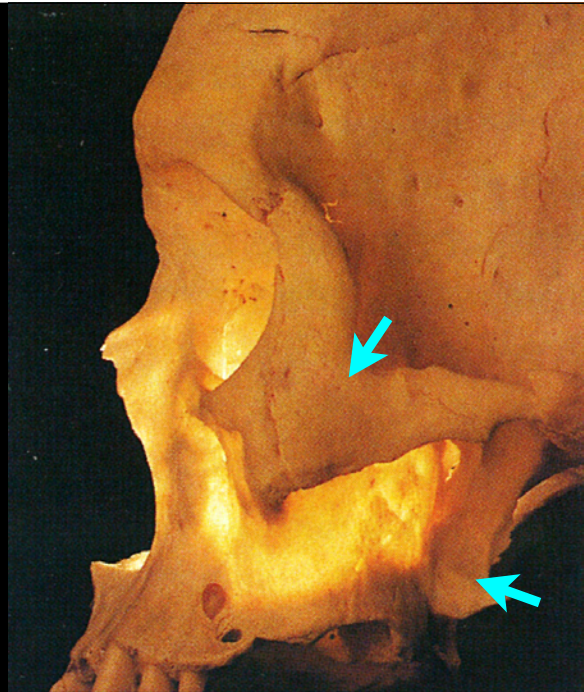
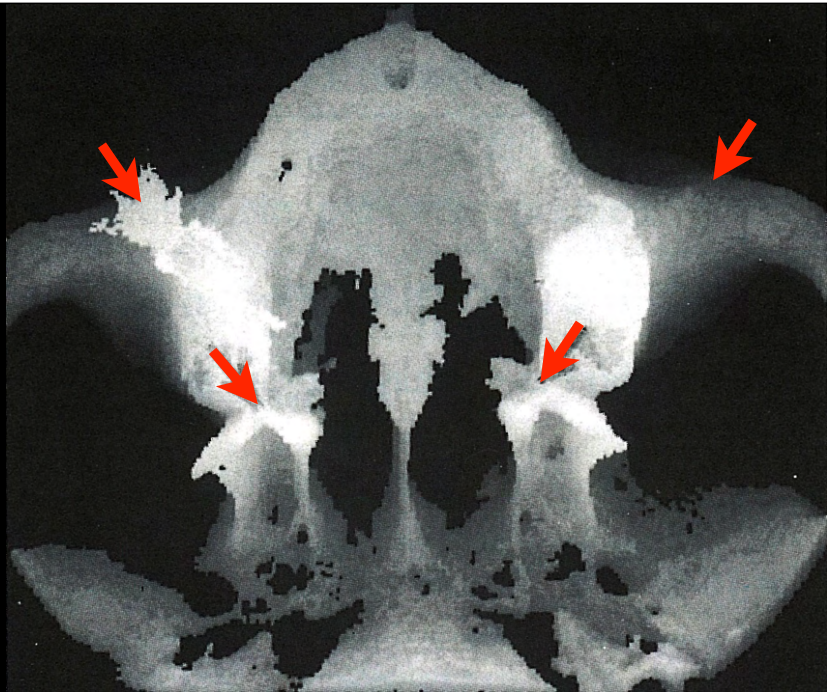
“**REVISION** is challenging in scope and technology for both patient and the **PROSTHODONTIST.**”



“Revision surgery is a complex procedure that requires extensive preoperative planning, specialized implants and tools, and mastery of difficult surgical techniques to achieve a good result.”

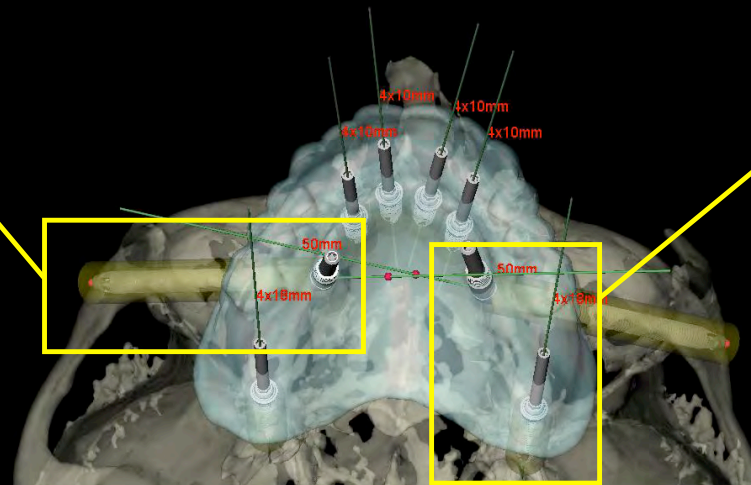


“**REVISION** is challenging in scope and technology for both patient and the **PROSTHODONTIST.**”



Zygomatic & Pterygomaxillary Implants

not only special implants - also special places



Pterygomaxillary Implants

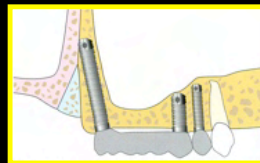
● Literature Terminology

1. Pterygoid implant
2. Pterygomaxillary implant
3. Tuberosity implant

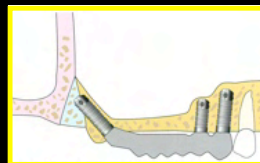
● Tuberosity \neq Pterygomaxillary

- | | |
|---------------------|----------------------------------|
| 1. Location | 5. Visualization |
| 2. Bone Quality | 6. Implant Length |
| 3. Vital Structures | 7. Technique Sensitive with Risk |
| 4. Implant Angle | |

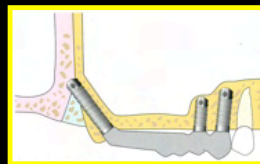
● Tuberosity



● Pyramidal Process of the Palantine



● Pterygoid Process of the Sphenoid



The real anatomic definition:

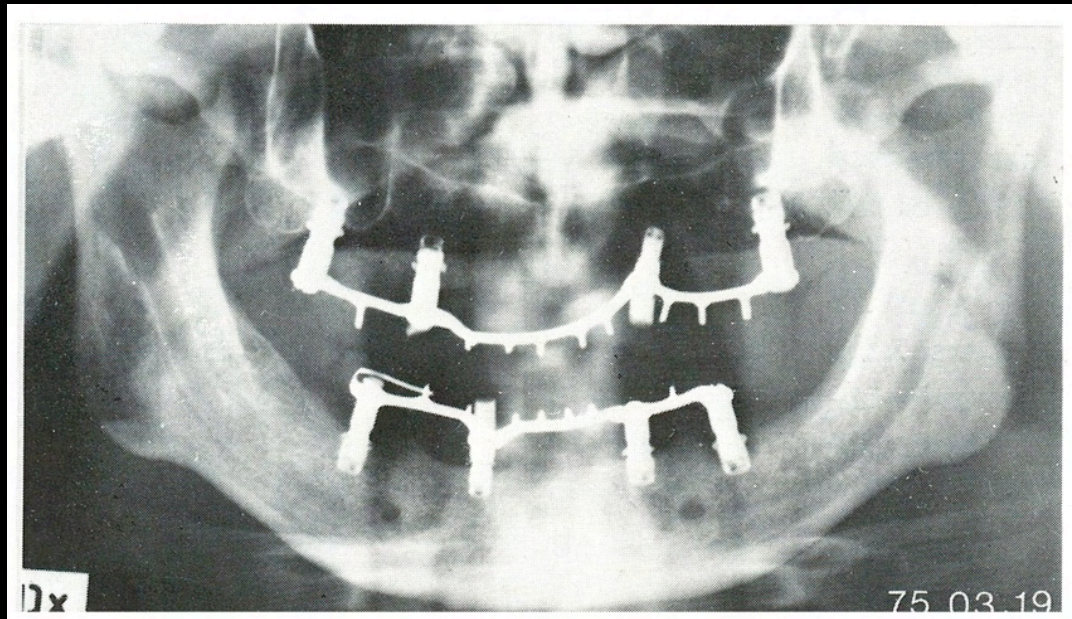
THROUGH THE TUBEROSITY & INTO THE PTERYGOID PLATES



Courtesy:
Reiser GM



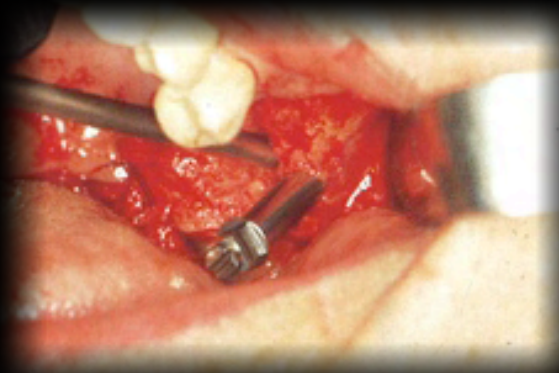
Brånemark
used the
Tuberosity
as early as
1975



Pterygomaxillary Implants



Jean-Francois Tulasne placed the first implant at the suggestion of Paul Tessier (1985)



Tulasne JF. Implant treatment of missing posterior dentition. In: Albrektsson T, Zarb GA (eds). The Brånemark Osseointegrated Implant. Chicago. **Quintessence.** 1989:103-115.

Pterygomaxillary Implants

- The maxillary tuberosity is often well developed but is made of bone that is too *spongy* to provide predictable osseointegration
- The *tuberosity rests against* an extremely dense mass of bone formed by the *pterygoid process* and the vertical point of the *palatine bone*



Tulasne JF. Implant treatment of missing posterior dentition. In: Albrektsson T, Zarb GA (eds). The Brånemark Osseointegrated Implant. Chicago. **Quintessence.** 1989:103-115.

Pterygomaxillary Implants

- September 1985 to December 1993
 - 44 patients
 - 51 machine-surface Brånemark System implants
 - Traditional 2-stage protocol
 - All partially edentulous
 - 7 implant failures
 - 86.5% CSR



Balshi TJ, Lee HY, Hernandez RE. The use of pterygomaxillary implants in the partially edentulous patient: a preliminary report. *Int J Oral Maxillofac Implants* 1995;10:89-98.

Pterygomaxillary Implants

- September 1985 to April 1998

- 189 fully edentulous patients
- 356 machine-surface Brånemark System implants
- Traditional 2-stage protocol
- 42 implant failures
- 88.2% CSR

TIME of STUDY	CSR
1985-1993	86.5%
1985-1998	88.2%



Balshi TJ, Wolfinger GJ, Balshi II SF. Analysis of 356 pterygomaxillary implants in edentulous arches for fixed prosthesis anchorage. *Int J Oral Maxillofac Implants* 1999;14:398-406.

Pterygomaxillary Implants

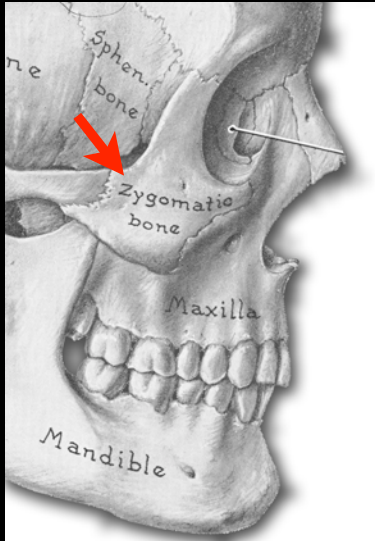
- December 1999 to March 2004
 - 82 fully edentulous arches
 - 164 TiUnite surface
 - 80 were immediately loaded; 84 traditional 2-stage protocol
 - 6 implant failures: 3 immediately loaded, 3 submerged
 - 96.3% CSR 96.3% immediately loaded, 96.4% submerged

TIME of STUDY	CSR
1985-1993	86.5%
1985-1998	88.2%
1999-2004	96.3%



Balshi SF, Wolfinger GJ, Balshi TJ. Analysis of 164 titanium oxide-surface implants in completely edentulous arches for fixed prosthesis support using the pterygomaxillary region. *Int J Oral Maxillofac Implants* 2005;20:946-952.

Zygoma Implants



- Osseointegration in the zygoma reported by **Brånemark** in **1988**
- Implant introduced in **1997**
- Current implant features
 - Self-tapping TiUnite Surface
 - Brånemark external hex
 - 2 diameters on the same implant: 3.9 and 4.6 mm
 - Variable lengths: 30, 35, 40, 42.5, 45, 47.5, 50, 52.5 mm
 - 45° turn at the coronal end



Zygoma Implants

- an implant into the sinus will not jeopardize sinus health
- an alternative to bone grafting or sinus lift procedures
- reduced treatment TIME with immediate LOADING
- Screw-retained prosthesis

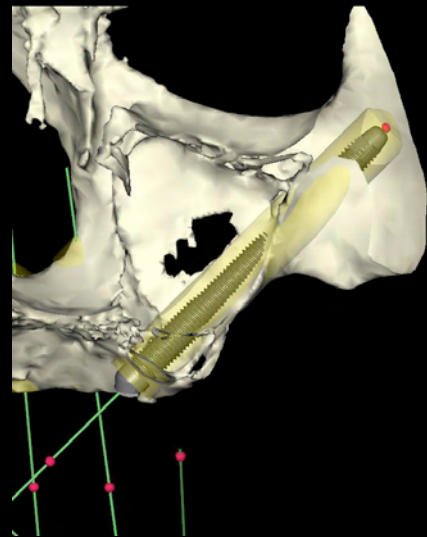
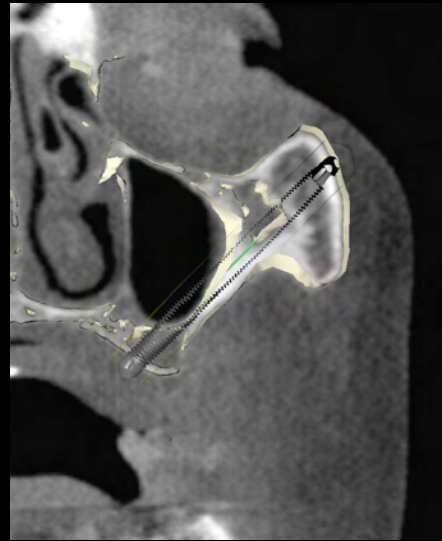


Malavez C, Daelemans P, Adriaenssens P, Durdu F. Use of zygomatic implants to deal with resorbed posterior maxillae. *Periodontology 2003*;33:82-89.



Zygoma Implants

- Dual anchorage in the maxilla and the zygoma



Malavez C, Daelemans P, Adriaenssens P, Durdu F. Use of zygomatic implants to deal with resorbed posterior maxillae. *Periodontology 2000* 2003;33:82-89.

Zygoma Implants

How much bone is actually in contact with the zygomatic implant in the zygoma?

In a retrospective study on 173 implants in 77 patients, it was shown that the mean height was **15.32 mm**.

Mean: **15.3 mm**

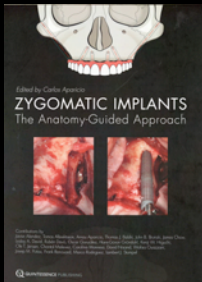
Max: **32.9 mm**

Min: **4.9 mm**

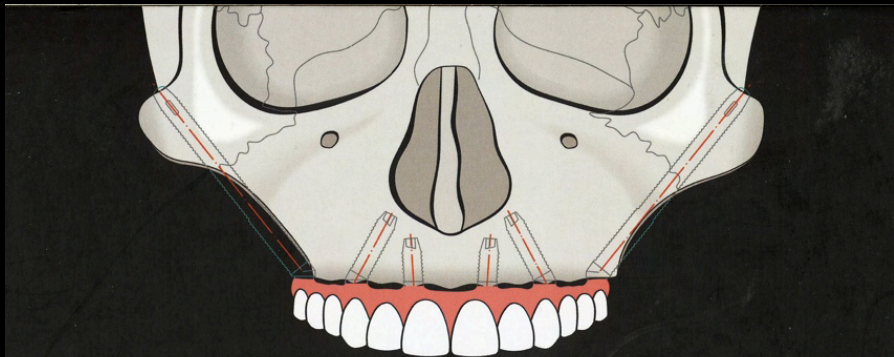
On average, **35.91%** of the zygoma implant was in contact with the zygoma bone.



Balshi TJ, Wolfinger GJ, Shuscavage NJ, Balshi SF. Zygoma bone-to-implant contact in 77 patients with partially or completely edentulous maxillas. *J Oral Maxillofac Surg* 2012; 70(9):2065-2069.



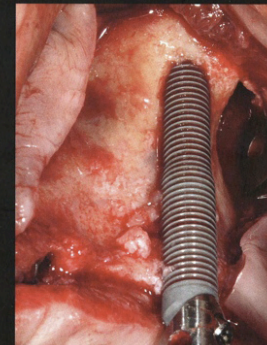
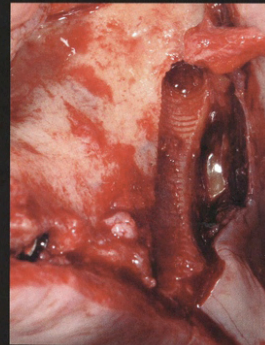
Quintessence
2012




Edited by Carlos Aparicio

ZYGOMATIC IMPLANTS

The Anatomy-Guided Approach



Contributions by
Javier Alandez, Tomas Albrektsson, Arnau Aparicio, Thomas J. Balshi, John B. Brunski, James Chow,
Lesley A. David, Rubén Davó, Oscar González, Hans-Göran Gröndahl, Kenji W. Higuchi,
Ole T. Jensen, Chantal Malevez, Carolina Manresa, David Nisand, Wafaa Ouazzani,
Josep M. Potau, Frank Renouard, Marco Rodriguez, Lambert J. Stumpel

 QUINTESSENCE PUBLISHING

Zygoma Implants

- May 2000 to December October 2006 - **TIAD**
 - 56 patients (27 men, 29 women)
 - All implants followed the Teeth in a Day™ 1-stage protocol
 - 110 Zygoma implants (76 machine surface; 34 TiUnite surface)
 - 14 unilateral Zygo treatment; 42 bilateral Zygo treatment
 - All patients were fully edentulous
 - 4 implant failures (96.37% CSR)



Balshi SF, Wolfinger GJ, Balshi TJ. A retrospective analysis of 110 zygomatic implants in a single-stage immediate loading protocol. *Int J Oral Maxillofac Implants* 2009;24:335-341.

Zygoma Implants

- Publications on immediate loading with zygoma implants

STUDY	# PATIENTS	# IMPLANTS	CUMULATIVE SURVIVAL RATE	LOADING PROTOCOL
Balshi et al, 2009	56	110	100%	Immediate
Bedrossian et al, 2006	14	28	100%	Immediate
Chow et al, 2006	5	10	100%	Immediate
Duarte et al, 2007	12	48	100%	6 hours
Davó et al, 2007	18	36	100%	48 hours
Aparicio et al, 2008	20	36	100%	24 hours
Maló et al, 2008	29	67	98.5%	24 hours
Bedrossian et al, 2011	36	74	97.3%	Immediate
Chow et al, 2011	16	37	100%	1 to 8 days

Zygoma Implants

the  experience

Life Table Analysis for delayed loading

PERIOD	# IMPLANTS	# FAILURES	SURVIVAL RATES	CUMULATIVE SURVIVAL RATE
0-3 months	55	0	100%	100%
3-6 months	55	2	96.4%	96.4%
6-9 months	53	1	98.1%	94.5%
1 year	52	3	94.2%	89.1%
7 years	49	0	100%	89.1%
8 years	49	0	100%	89.1%
9 years	49	0	100%	89.1%
10+ years	49	0	100%	89.1%

Zygoma Implants

the  experience

Life Table Analysis for immediate loading

PERIOD	# IMPLANTS	# FAILURES	SURVIVAL RATES	CUMULATIVE SURVIVAL RATE
0-3 months	293	3	98.9%	98.9%
3-6 months	284	1	99.7%	98.6%
6-9 months	277	0	100%	98.6%
9-12 months	272	1	99.6%	98.3%
1 year	257	1	99.6%	98.0%
2 years	237	0	100%	98.0%
3 years	174	0	100%	98.0%
4 years	118	0	100%	98.0%
5 years	77	0	100%	98.0%
6 years	41	0	100%	98.0%
7 years	29	0	100%	98.0%
8 years	6	0	100%	98.0%
9 years	4	0	100%	98.0%
10 years +	3	0	100%	98.0%

Zygomatic & Pterygomaxillary Implants

Why use these locations for implants?

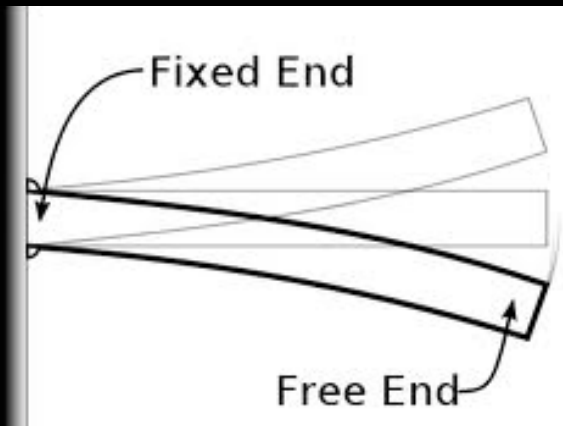
~~BONE
GRAFTING~~



Zygomatic & Pterygomaxillary Implants

Why use these locations for implants?

CANTILEVERS

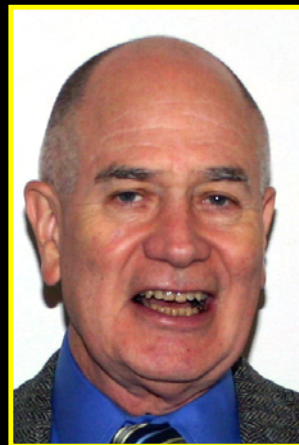


Neeraja K.



- Guided pterygomaxillary implants
- Partially-guided zygomatic implants

Dr. John Agar



Dr. Avi Bidra



Dr. Guillermo Zapata
3 PGP

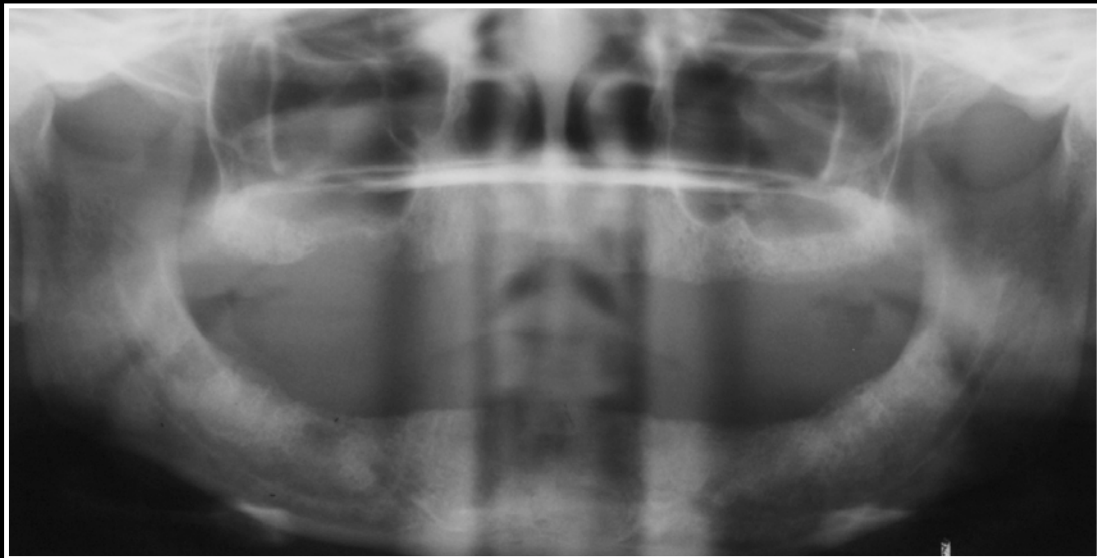


Neeraja K.



Neeraja K.





Implant 7

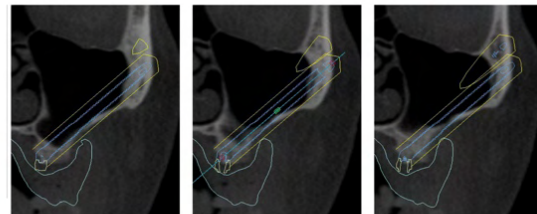
General Information

Manufacturer NobelBiocare
Product Name Brånemark System Zygoma TiUnite
Platform RP
Size ø 4.0 x 42.5 mm
REF 34736

Abutment Brånemark System Zygoma Multi-unit
Abutment 3 mm
Height 3 mm
REF 32330

Planning Warnings

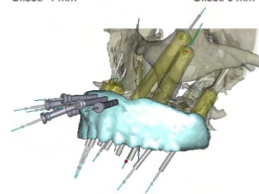
No warnings



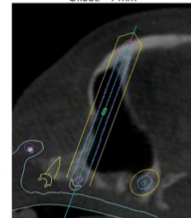
Offset: -1 mm

Offset: 0 mm

Offset: +1 mm



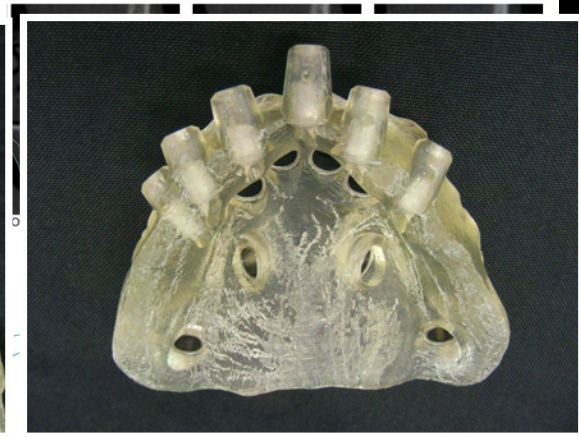
3D Overview



Parallel view

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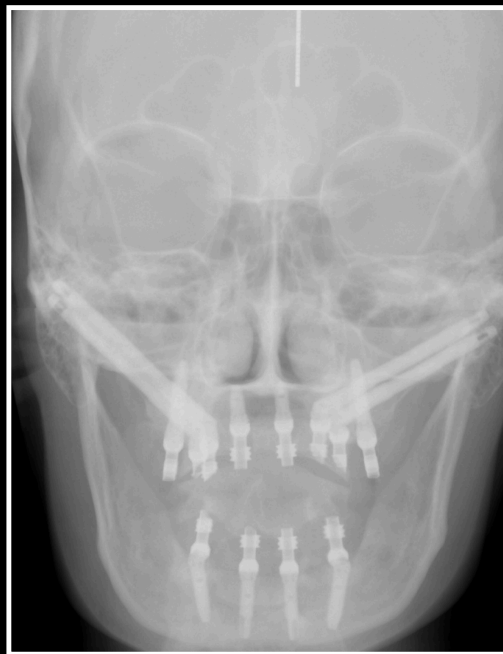
Implant 7



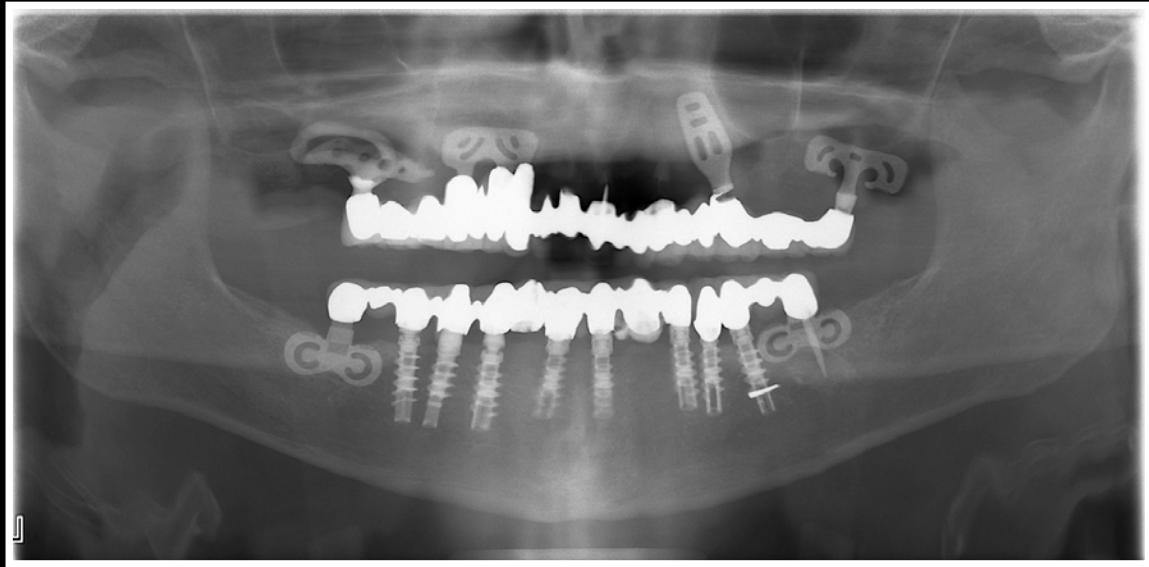
3D Overview

Parallel view

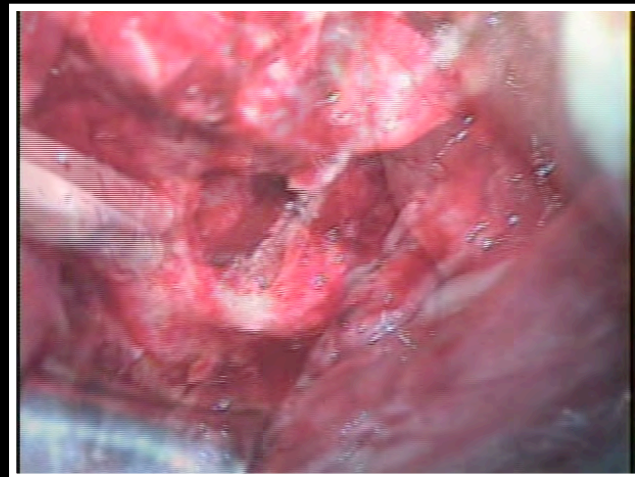
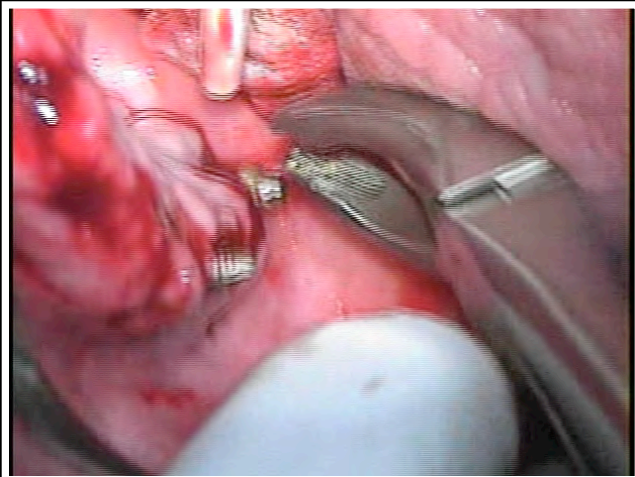
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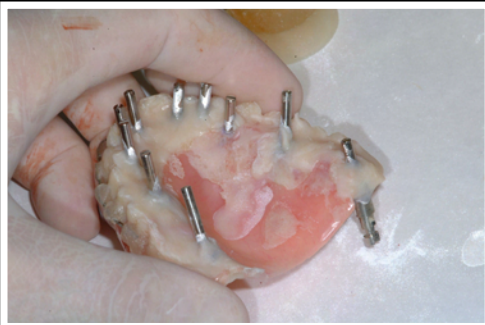
Jason K.



Teeth in a Day™ with Zygomatic Implants



Teeth in a Day™ with Zygomatic Implants



Prosthesis Stability is Dependent on Implant Position

Teeth in a Day™ with Zygomatic Implants

18 hours Post-Surgery

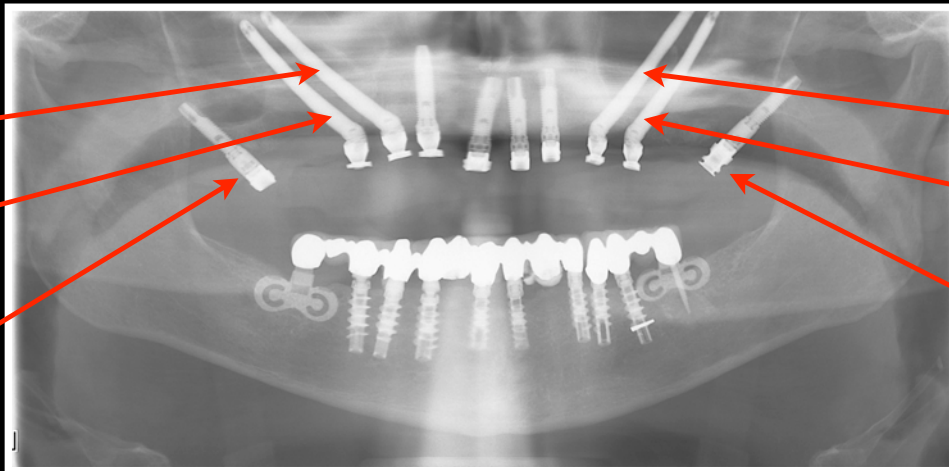
Zygomatic Implant Length

50mm

45mm

Pterygoid Implant Length

18mm



Zygomatic Implant Length

52.5mm

47.5mm

Pterygoid Implant Length

18mm

Teeth in a Day™ with Zygomatic Implants

Final Prosthesis Construction



CM Prosthesis

Teeth in a Day™ with Zygomatic Implants

Final Prosthesis Construction



CM Prosthesis

Teeth in a Day™ with Zygomatic Implants

Final Prosthesis Construction

CM Prosthesis
with Quad Zygo



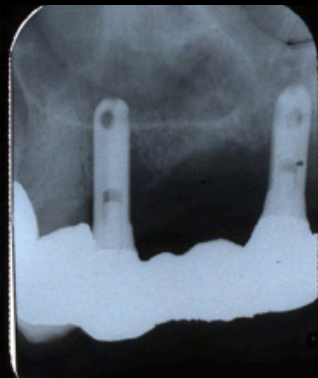
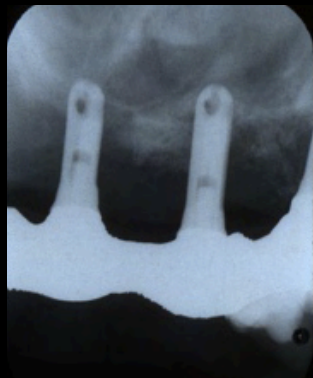
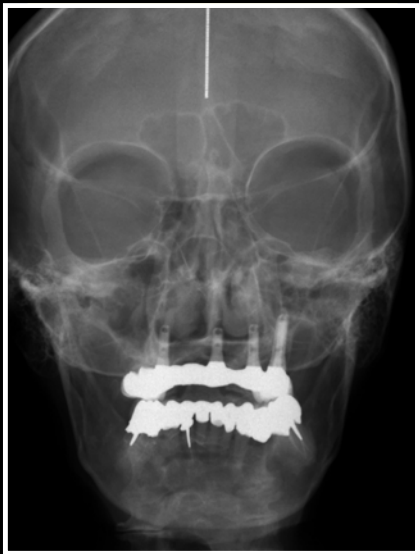
Teeth in a Day™ with Zygomatic Implants

Final Prosthesis Construction

CM Prosthesis
with Quad Zygo
and Bi-Lateral Pterygoids



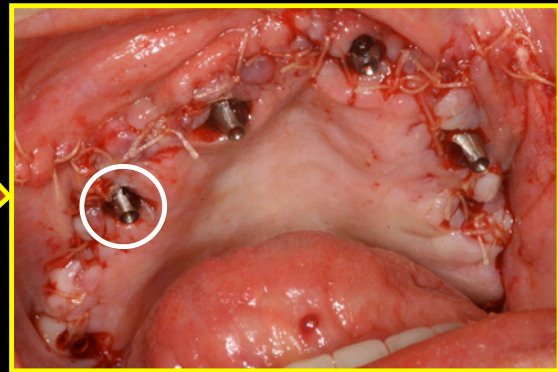
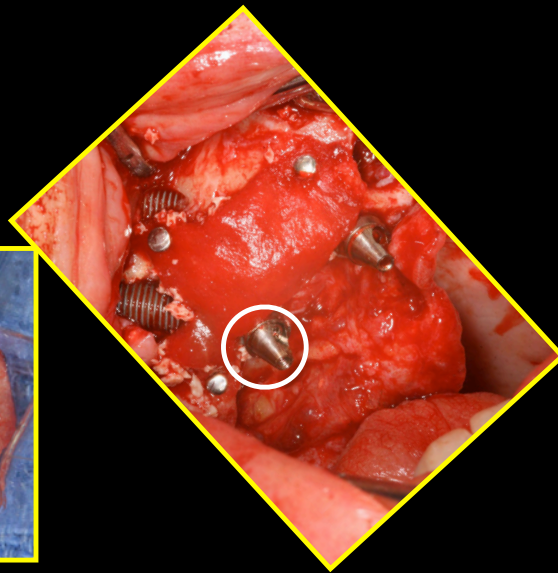
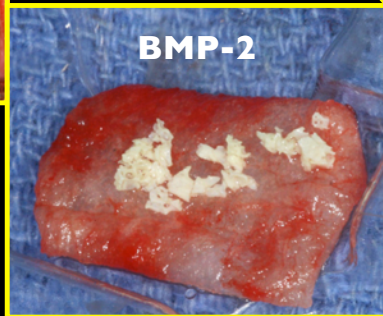
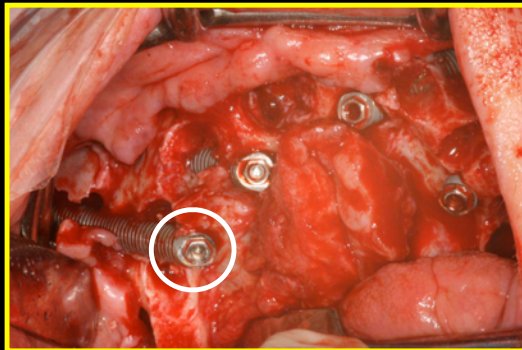
Helen M.





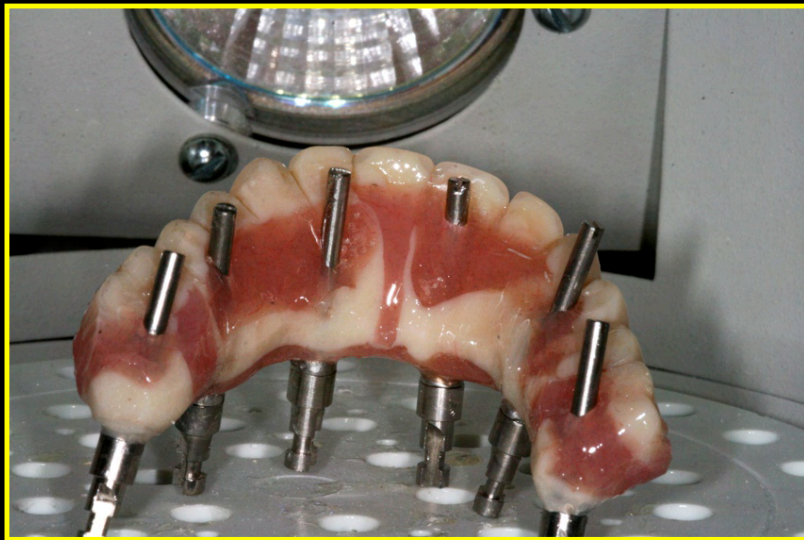
REVISION TREATMENT USING ONLY ZYGOMATIC & PTERYGOMAXILLARY IMPLANTS

4Z & 2P NBS



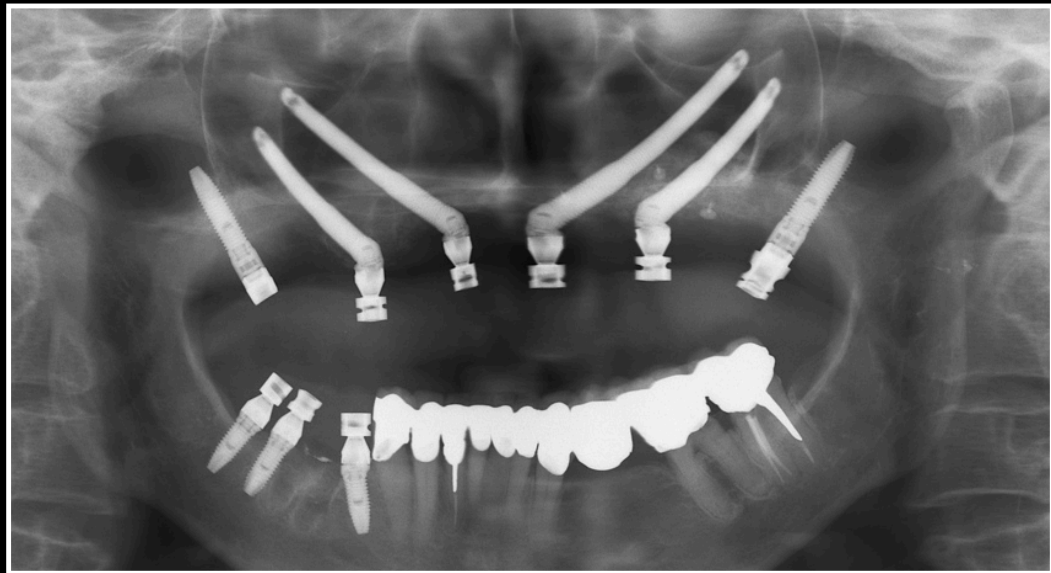
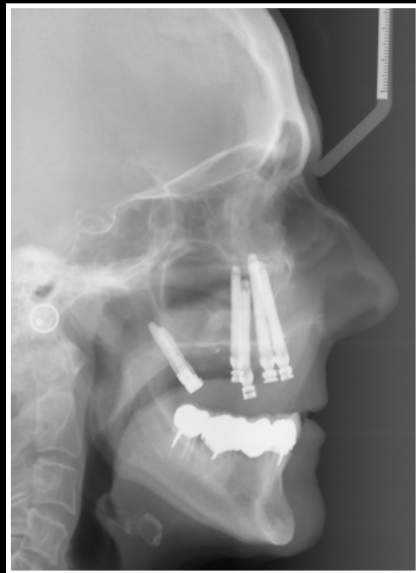
REVISION TREATMENT USING ONLY ZYGOMATIC & PTERYGOMAXILLARY IMPLANTS

4Z & 2P NBS



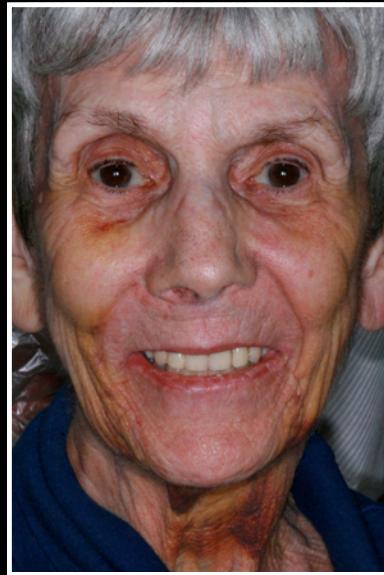
REVISION TREATMENT USING ONLY ZYGOMATIC & PTERYGOMAXILLARY IMPLANTS

4Z & 2P NBS



REVISION TREATMENT USING ONLY ZYGOMATIC & PTERYGOMAXILLARY IMPLANTS

4Z & 2P NBS



7 Days
Post Surgery

REVISION TREATMENT USING ONLY ZYGOMATIC & PTERYGOMAXILLARY IMPLANTS

4Z & 2P NBS



7 Days
Post Surgery

REVISION TREATMENT USING ONLY ZYGOMATIC & PTERYGOMAXILLARY IMPLANTS

4Z & 2P NBS

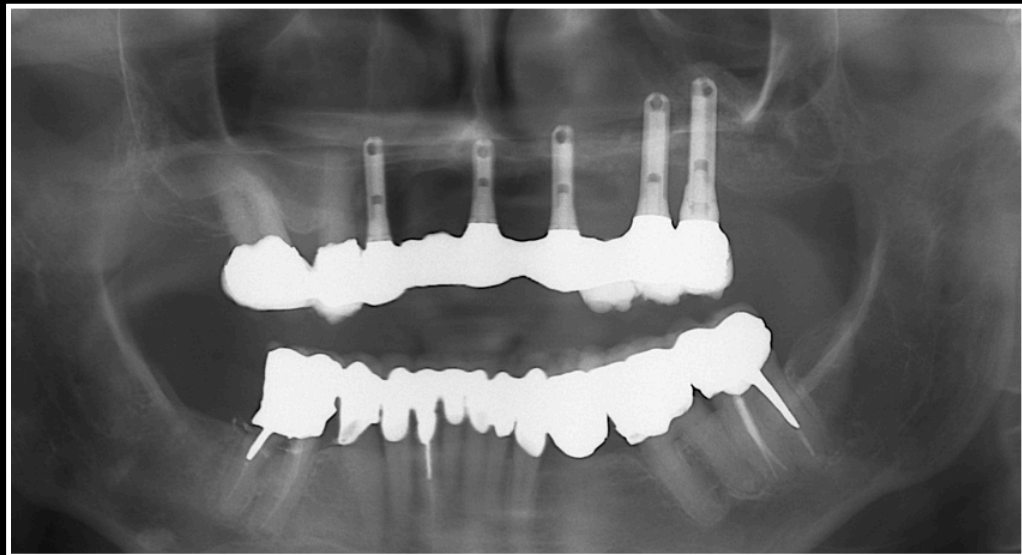


**Final Prosthesis
Construction**

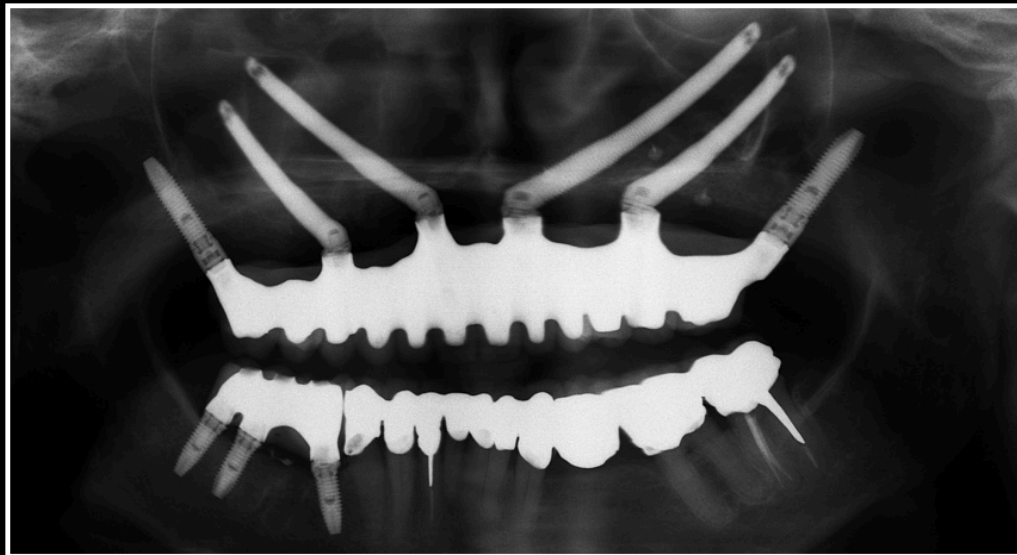
**Traditional PFM
Screw-Retained
Prosthesis**



Pre Treatment



Post 4-Z & 2-P NBS

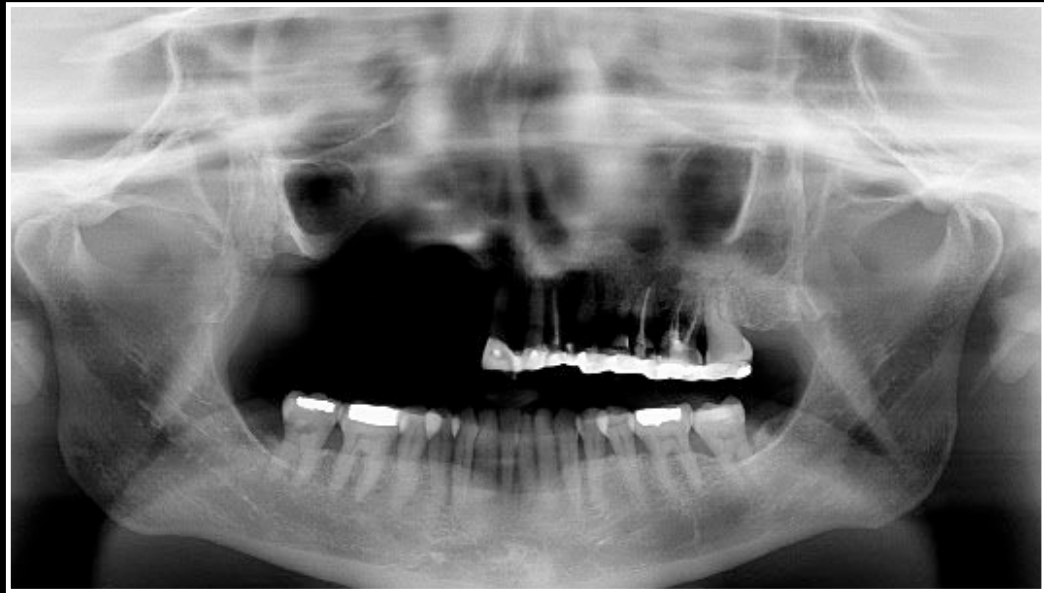


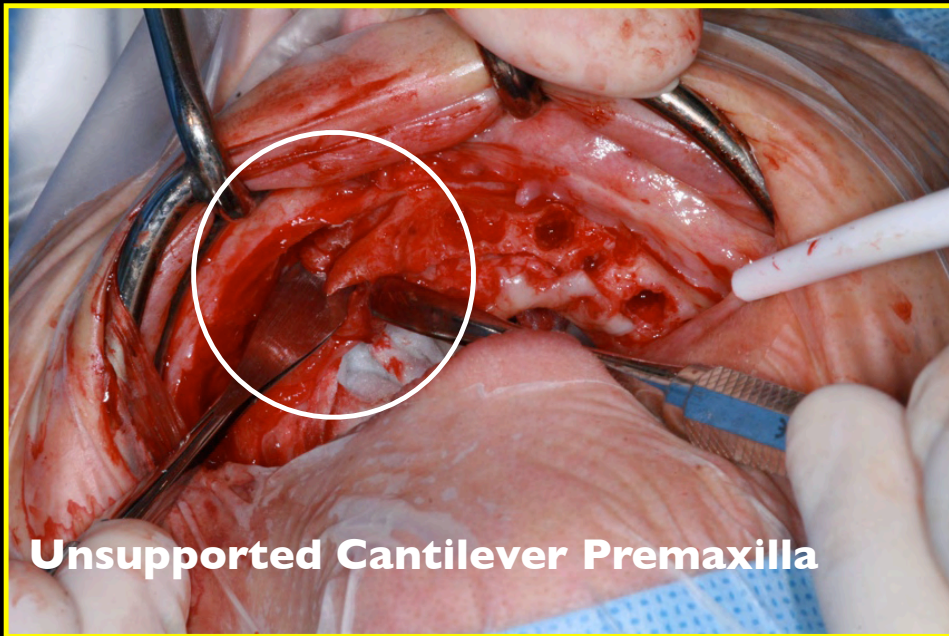


Lynne G.

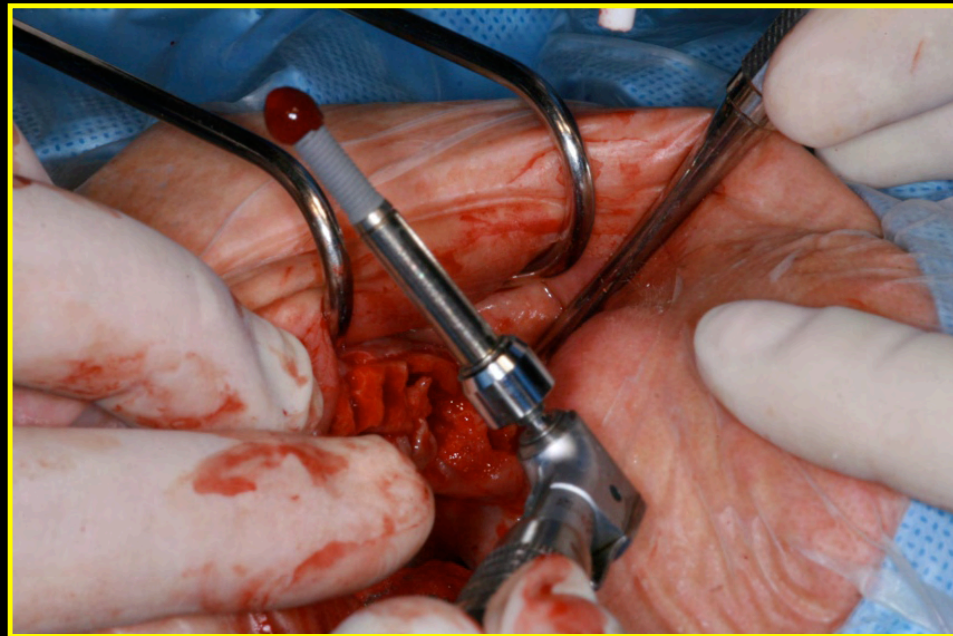




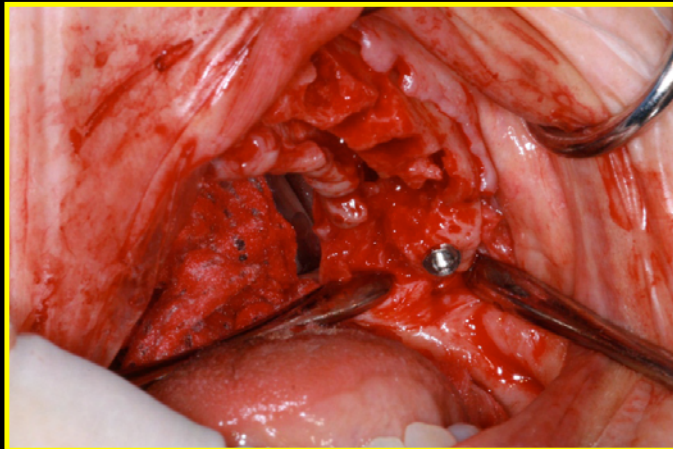
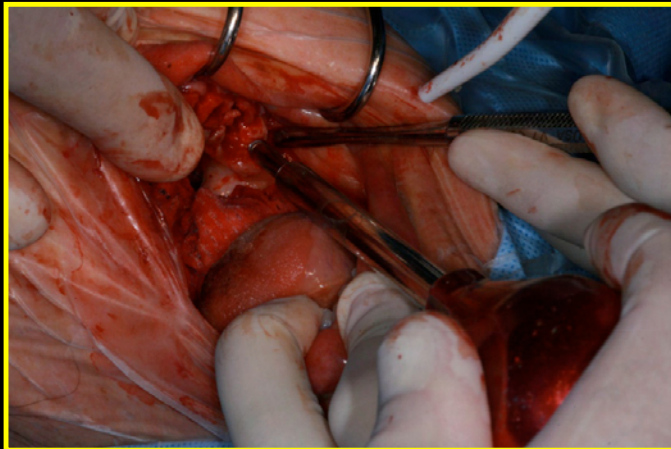
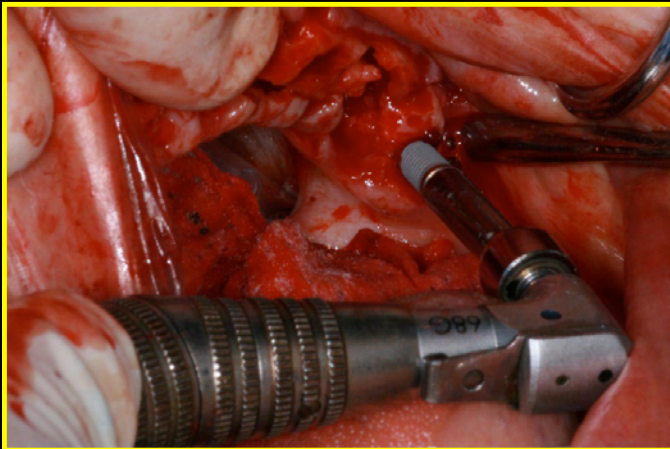


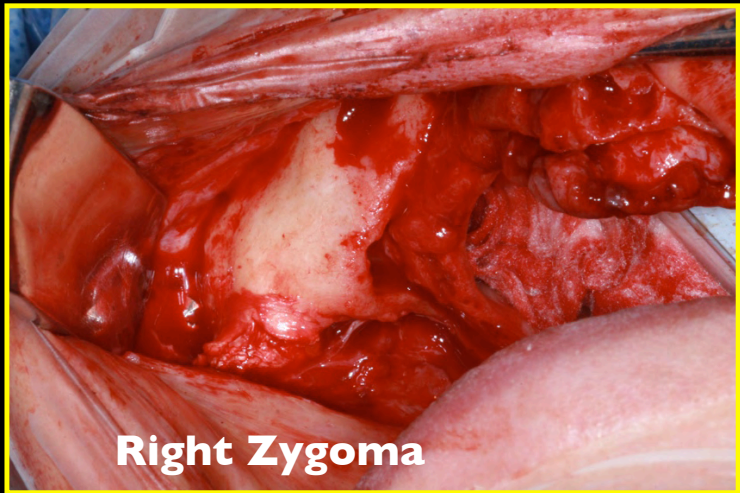


Unsupported Cantilever Premaxilla

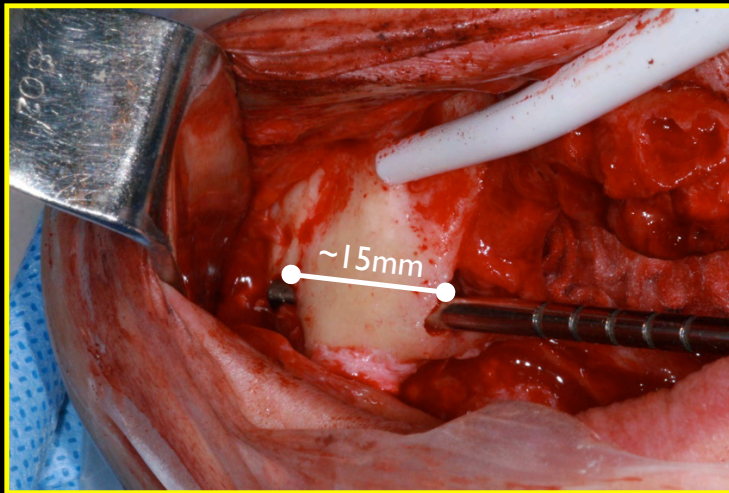


Left Pterygomaxillary Implant - 18 mm





Right Zygoma

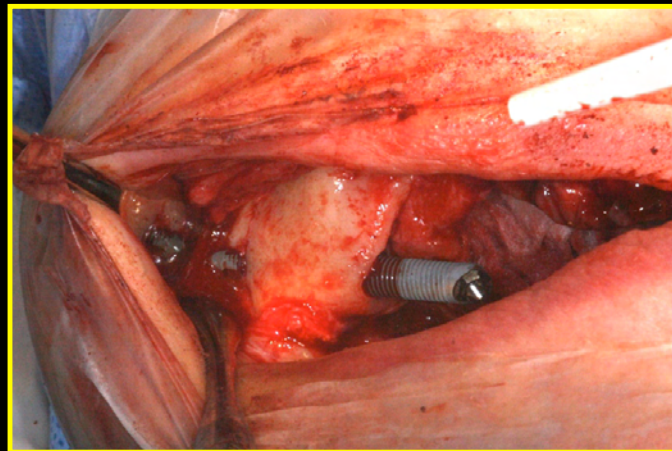
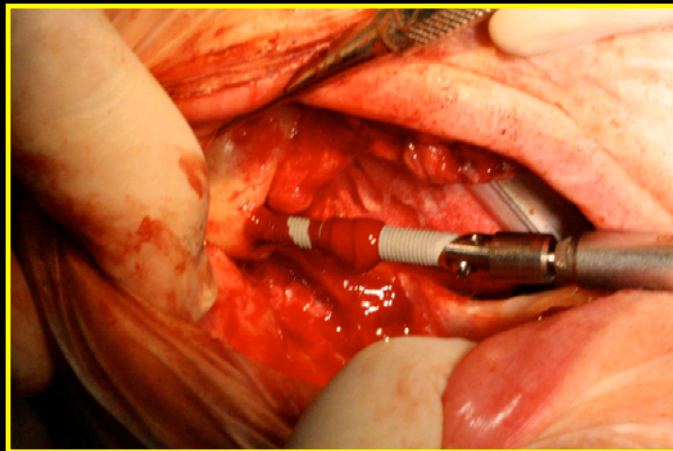


In a retrospective study on 173 implants in 77 patients, it was shown that the mean height was **15.32 mm**.



Balshi TJ, Wolfinger GJ, Shuscavage NJ, Balshi SF. Zygoma bone-to-implant contact in 77 patients with partially or completely edentulous maxillas. *J Oral Maxillofac Surg* 2012; 70(9):2065-2069.

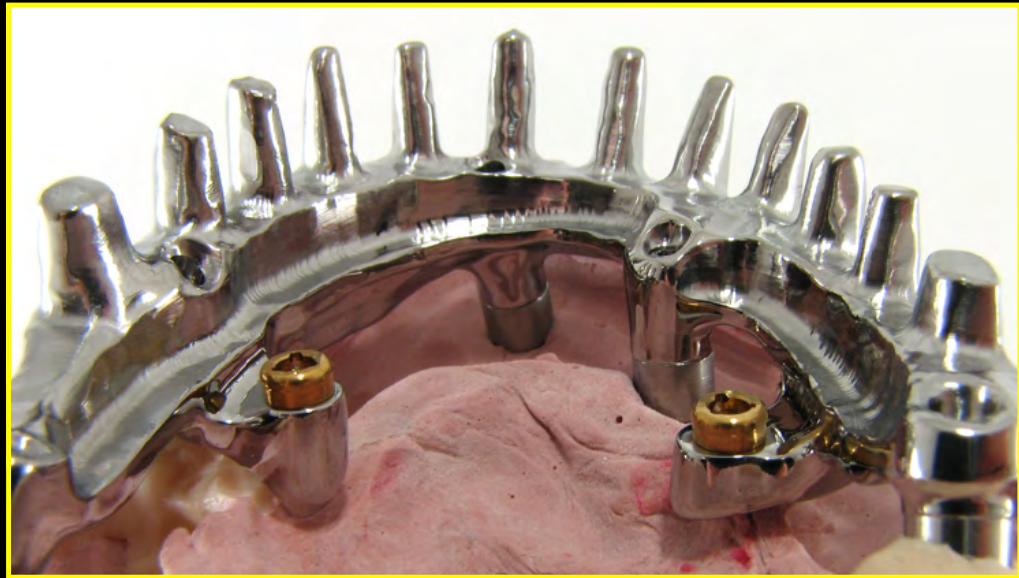
Right Zygomatic Implant - 30 mm



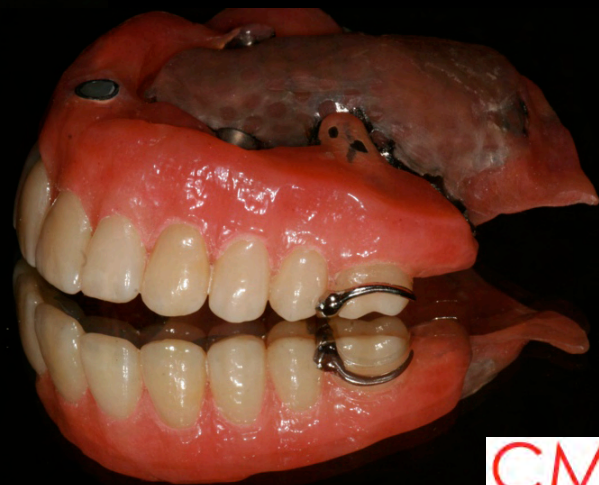


4 Months Post-Surgery





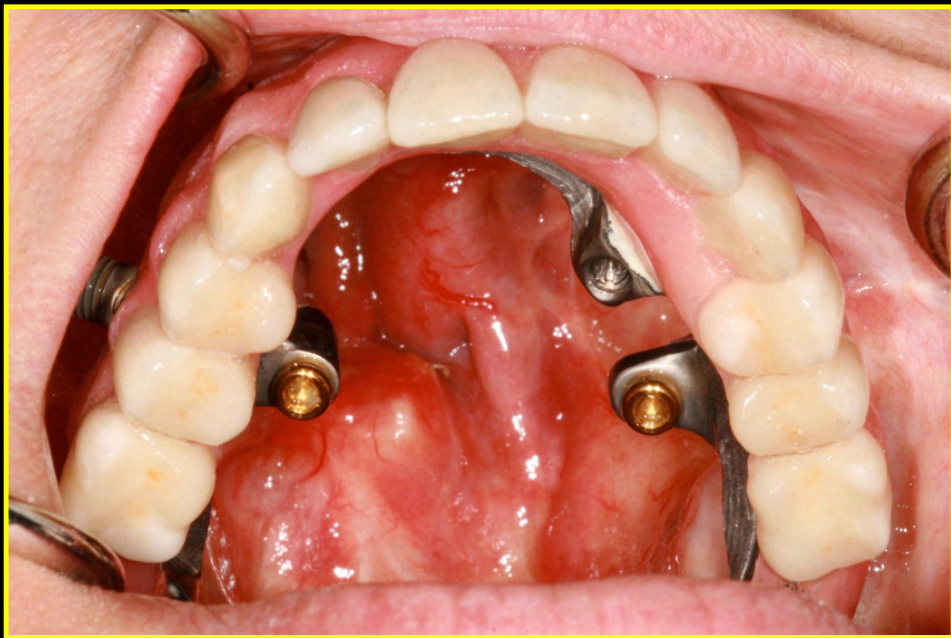


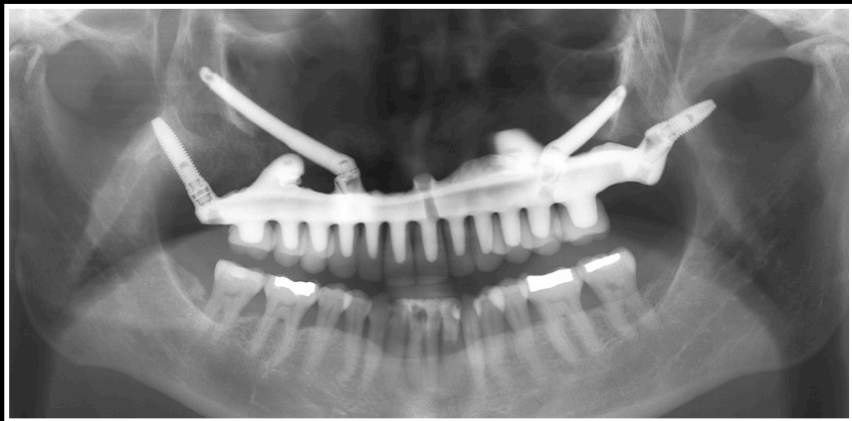
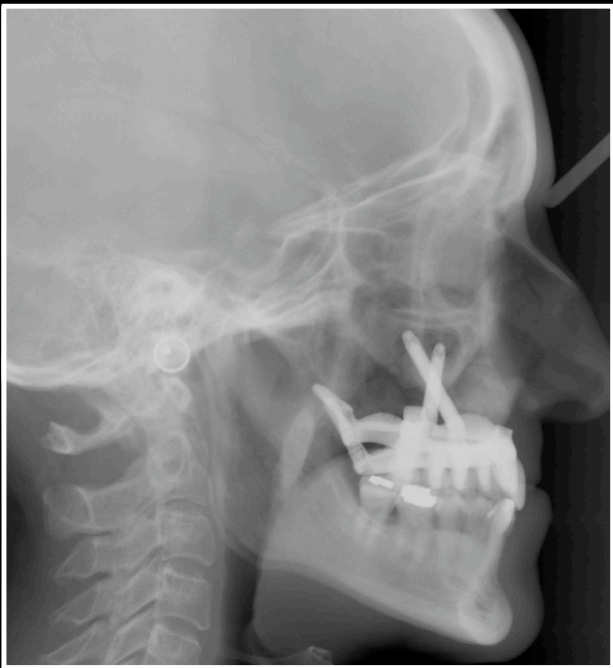




6 Months Post-Surgery









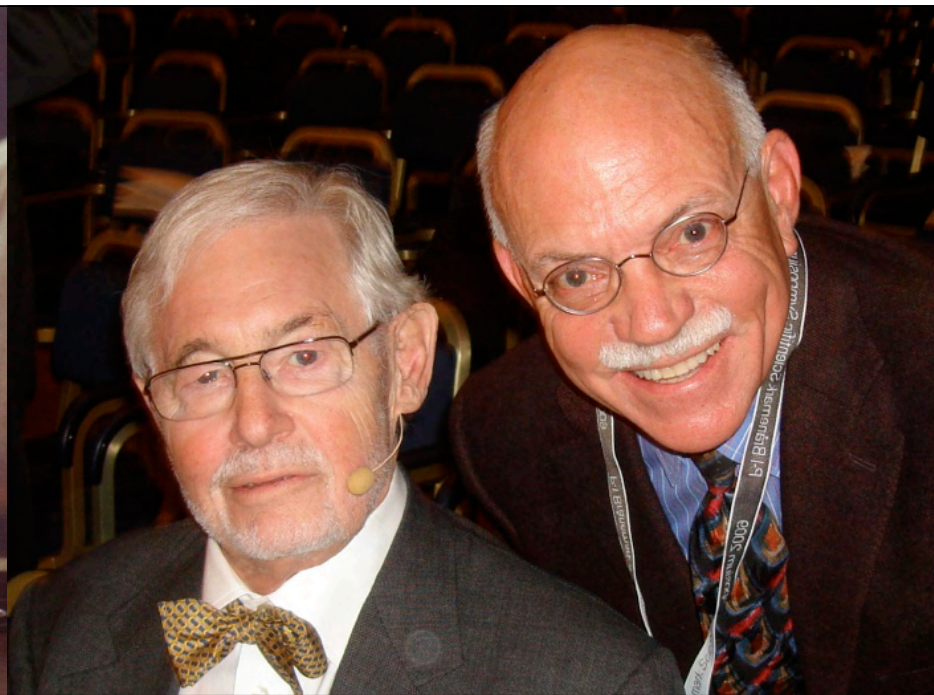
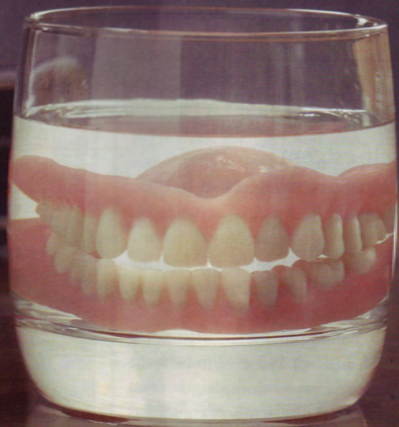


CONCLUSION

The No BoneZ Solution™ protocol,
using *pterygomaxillary* and *zygomatic* implants,
is the pinnacle of
implant prosthodontic **revision** treatment

“No one should have to die with their teeth in a glass of water beside their bed.”

Prof. Per-Ingvar Brånemark



The Institute for
Facial Esthetics
Ft. Washington,
Pennsylvania,
USA



THANK
YOU