ZYGOMATIC & PTERYOMAXILLARY IMPLANTS
GUIDED & UNGUIDED

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Thomas J. Balshi, D.D.S., Ph.D., F.A.C.P.,
Institute for Facial Esthetics
Fort Washington, PA, USA
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
1. Pterygoid implant
2. Pterygomaxillary implant
3. Tuberosity implant

**Literature Terminology**

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

**Tuberosity ≠ Pterygomaxillary**

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

The real anatomic definition:

**THROUGH THE TUBEROSITY & INTO THE PTERYGOID PLATES**

- Tuberosity
- Pyramidal Process of the Palantine
- Pterygoid Process of the Sphenoid

Courtesy: Reiser GM
Brånemark used the Tuberosity as early as 1975
Jean-Francois Tulasne placed the first implant at the suggestion of Paul Tessier (1985).

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*.

*Pterygomaxillary Implants*

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

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

<table>
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<th>TIME of STUDY</th>
<th>CSR</th>
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<tr>
<td>1985-1993</td>
<td>86.5%</td>
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<tr>
<td>1985-1998</td>
<td>88.2%</td>
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</table>

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

<table>
<thead>
<tr>
<th>TIME of STUDY</th>
<th>CSR</th>
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<tbody>
<tr>
<td>1985-1993</td>
<td>86.5%</td>
</tr>
<tr>
<td>1985-1998</td>
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<tr>
<td>1999-2004</td>
<td>96.3%</td>
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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

Zygoma Implants

- Dual anchorage in the maxilla and the zygoma

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.

Edited by Carlos Aparicio

ZYGOMATIC IMPLANTS
The Anatomy-Guided Approach

Contributions by
Zygoma Implants

- May 2000 to December October 2006 - TIAD
  - 56 patients (27 men, 29 women)
  - 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)

Publications on immediate loading with zygoma implants

<table>
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<tr>
<th>STUDY</th>
<th># PATIENTS</th>
<th># IMPLANTS</th>
<th>CUMULATIVE SURVIVAL RATE</th>
<th>LOADING PROTOCOL</th>
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<td>56</td>
<td>110</td>
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<td>Immediate</td>
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<td>14</td>
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<td>Chow et al, 2006</td>
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<td>Duarte et al, 2007</td>
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<td>6 hours</td>
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<td>Davó et al, 2007</td>
<td>18</td>
<td>36</td>
<td>100%</td>
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<td>Aparicio et al, 2008</td>
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<td>36</td>
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<td>24 hours</td>
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<td>Maló et al, 2008</td>
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<td>67</td>
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<td>74</td>
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<td>16</td>
<td>37</td>
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<td>1 to 8 days</td>
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<td>PERIOD</td>
<td># IMPLANTS</td>
<td># FAILURES</td>
<td>SURVIVAL RATES</td>
<td>CUMULATIVE SURVIVAL RATE</td>
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<td>-------------</td>
<td>------------</td>
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<td>----------------</td>
<td>-------------------------</td>
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<td>0-3 months</td>
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<td>3-6 months</td>
<td>55</td>
<td>2</td>
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<td>96.4%</td>
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<td>94.5%</td>
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<tr>
<td>1 year</td>
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<td>3</td>
<td>94.2%</td>
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<td>7 years</td>
<td>49</td>
<td>0</td>
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<td>89.1%</td>
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<td>8 years</td>
<td>49</td>
<td>0</td>
<td>100%</td>
<td>89.1%</td>
</tr>
<tr>
<td>9 years</td>
<td>49</td>
<td>0</td>
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<td>89.1%</td>
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<td>10+ years</td>
<td>49</td>
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### Life Table Analysis for Zygoma Implants

**Experience**

<table>
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<tr>
<th>PERIOD</th>
<th># IMPLANTS</th>
<th># FAILURES</th>
<th>SURVIVAL RATES</th>
<th>CUMULATIVE SURVIVAL RATE</th>
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<td>98.9%</td>
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<td>284</td>
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<td>99.7%</td>
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<td>6-9 months</td>
<td>277</td>
<td>0</td>
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<td>98.6%</td>
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<tr>
<td>9-12 months</td>
<td>272</td>
<td>1</td>
<td>99.6%</td>
<td>98.3%</td>
</tr>
<tr>
<td>1 year</td>
<td>257</td>
<td>1</td>
<td>99.6%</td>
<td>98.0%</td>
</tr>
<tr>
<td>2 years</td>
<td>237</td>
<td>0</td>
<td>100%</td>
<td>98.0%</td>
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<tr>
<td>3 years</td>
<td>174</td>
<td>0</td>
<td>100%</td>
<td>98.0%</td>
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<tr>
<td>4 years</td>
<td>118</td>
<td>0</td>
<td>100%</td>
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<tr>
<td>5 years</td>
<td>77</td>
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<tr>
<td>6 years</td>
<td>41</td>
<td>0</td>
<td>100%</td>
<td>98.0%</td>
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<tr>
<td>7 years</td>
<td>29</td>
<td>0</td>
<td>100%</td>
<td>98.0%</td>
</tr>
<tr>
<td>8 years</td>
<td>6</td>
<td>0</td>
<td>100%</td>
<td>98.0%</td>
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<tr>
<td>9 years</td>
<td>4</td>
<td>0</td>
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<tr>
<td>10 years +</td>
<td>3</td>
<td>0</td>
<td>100%</td>
<td>98.0%</td>
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</table>
Zygomatic & Pterygomaxillary Implants

Why use these locations for implants?

BONE GRAFTING

Donor Site
Zygomatic & Pterygomaxillary Implants

Why use these locations for implants?

CANTILEVERS

Dentistry Today, Misch CE, 2010
Zygomatic & Pterygomaxillary Implants

Why use these locations for implants?

OPTIMAL BIOMECHANICS
- Guided pterygomaxillary implants
- Partially-guided zygomatic implants
Neeraja 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
- 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
REVISION TREATMENT USING ONLY ZYGOMATIC & PTERYGOMAXILLARY IMPLANTS

BMP-2
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

7 Days Post Surgery
REVISION TREATMENT USING ONLY ZYGOMATIC & PTERYGOMAXILLARY IMPLANTS

7 Days Post Surgery

4Z & 2P NBS
Final Prosthesis Construction

Traditional PFM Screw-Retained Prosthesis
Unsupported Cantilever Premaxilla
Left Pterygomaxillary Implant - 18 mm
In a retrospective study on 173 implants in 77 patients, it was shown that the mean height was 15.32 mm.

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