



Hollings Cancer Center
An NCI-Designated Cancer Center

Innovative Updates on Head and Neck Reconstruction

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Disclosures

No financial disclosures or conflicts of interest

Nonfinancial: The presenter has no relevant nonfinancial relationship to disclose



MUSC Head & Neck Surgery

Wendy and Keith Wellin Endowed Chair/ Medical Director In Maxillofacial Prosthodontics and Oral Oncology

Clinical Associate Professor in Head and Neck Surgery and Oral and Maxillofacial Surgery (2022 to current)

Johns Hopkins University

Master of Business Administration 3x specialization in Healthcare, Innovation & Technology; Entrepreneurship, Innovation & Technology; Public & Private Sector Leadership (2024)

Baylor Scott & White Health

Maxillofacial Prosthodontist / Assistant Professor of Surgery (2016-2022)

Fellowship: MD Anderson Cancer Center

Chief Fellow, Dual Fellowship in Maxillofacial Prosthodontics and Oral Oncology (2016)

Residency: University of Pittsburgh

Certificate of Advanced Study in Prosthodontics (2015)

Dental School: University of Illinois at Chicago

Doctorate of Dental Surgery (2012)

Undergraduate: University of Illinois at Chicago

Bachelor of Sciences in Biochemistry (2008)



Maxillofacial Prosthodontist



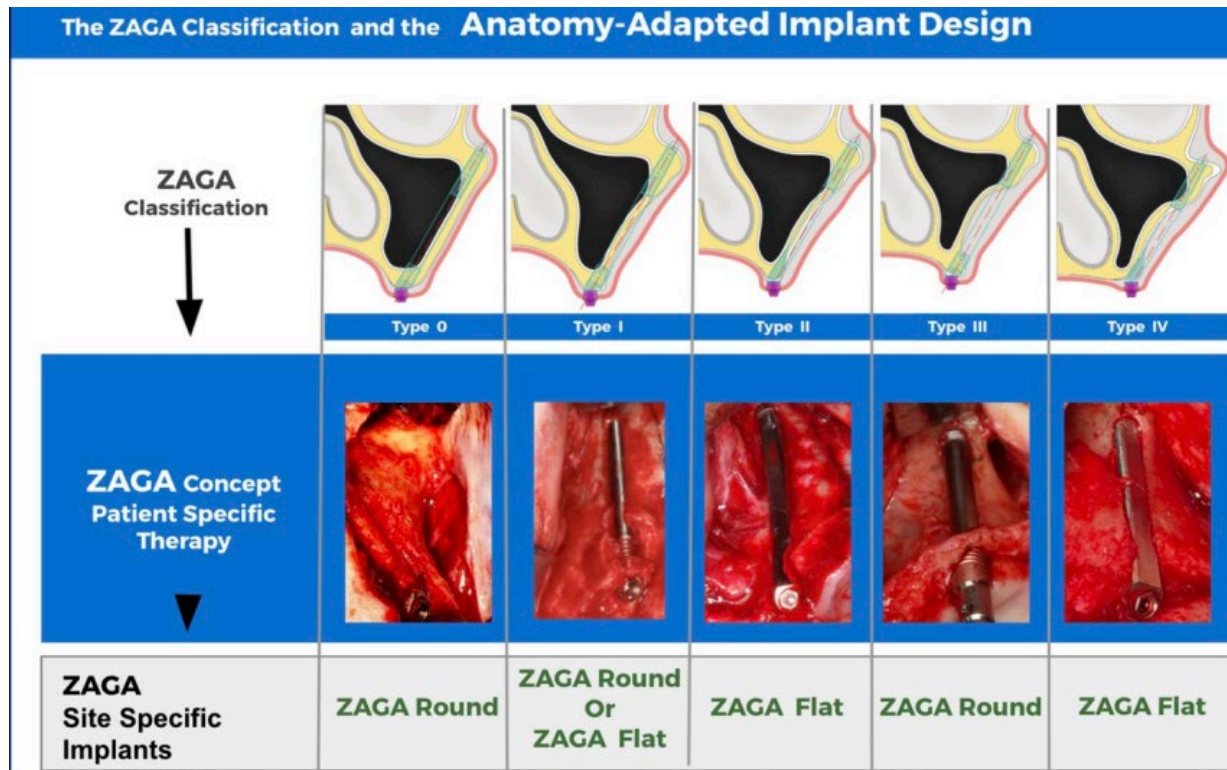
Specializing in the care of patients who require reconstruction of acquired and congenital oral and maxillofacial deformities restoring normal appearance and function and facial contours to patients who have lost ears, noses, eyes, jaws, etc., as a result of injury, cancer treatment or birth defects



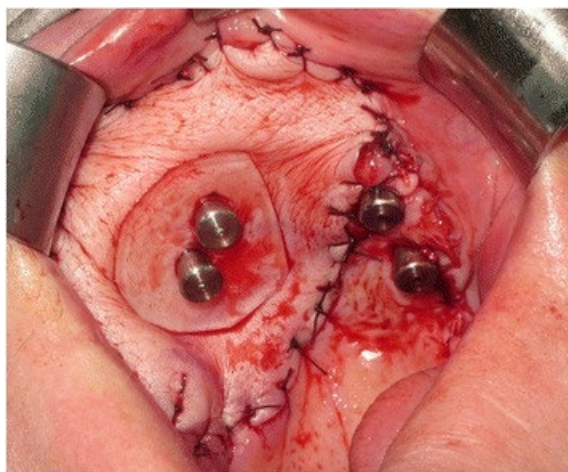
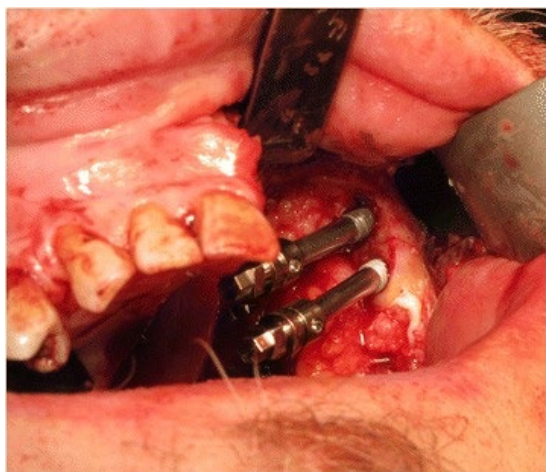
- 1942 – Dr. Dahl- first ever subperiosteal implant
- 1965- Per-Ingvar Brånemark, treated his first patient – Gösta Larsson – with the world's first titanium dental implant.
- 1980 – Branemark First Zygomatic implant
- 1982 – Toronto Conference
- 1984 – Linkow modification of subperiosteal implant
- 1989 – Dwight Hidalgo first fibular free flap for mandible
- 1990 – Immediate Loading
- 1992– Zlotolow for immediate fibula implants
- 1998 – All on 4
- 2000 – Guided Sx
- 2000+ - zygomatic implant development
- 1985/2010+ Pterygoid implants

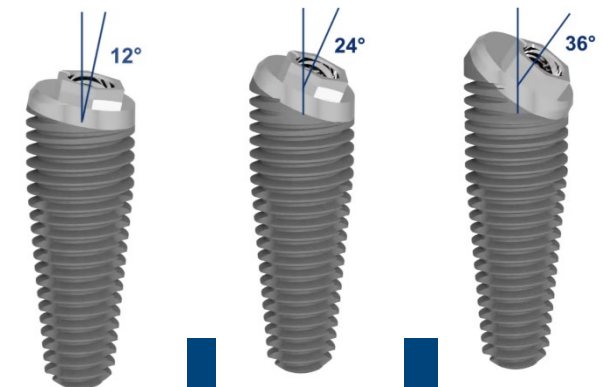
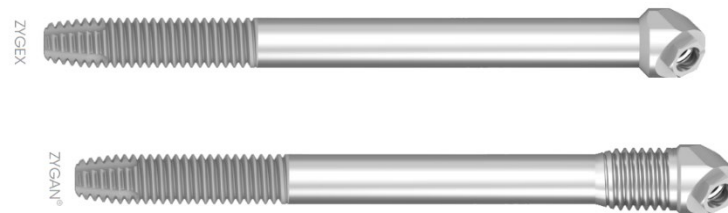
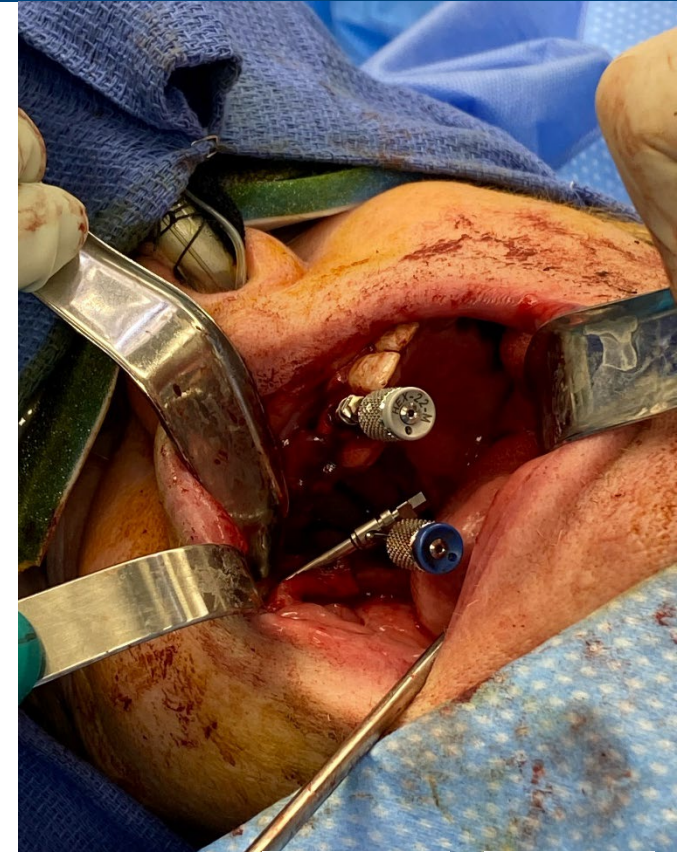
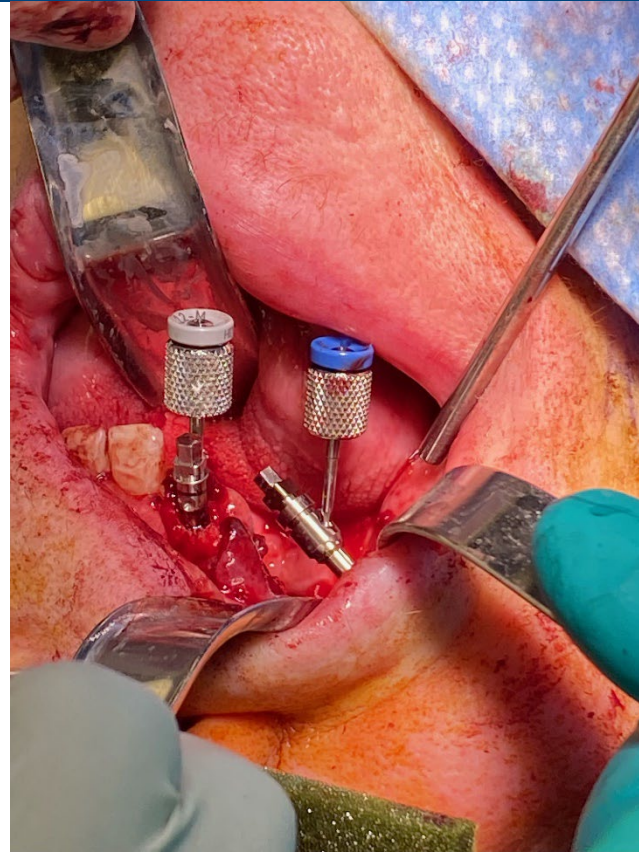
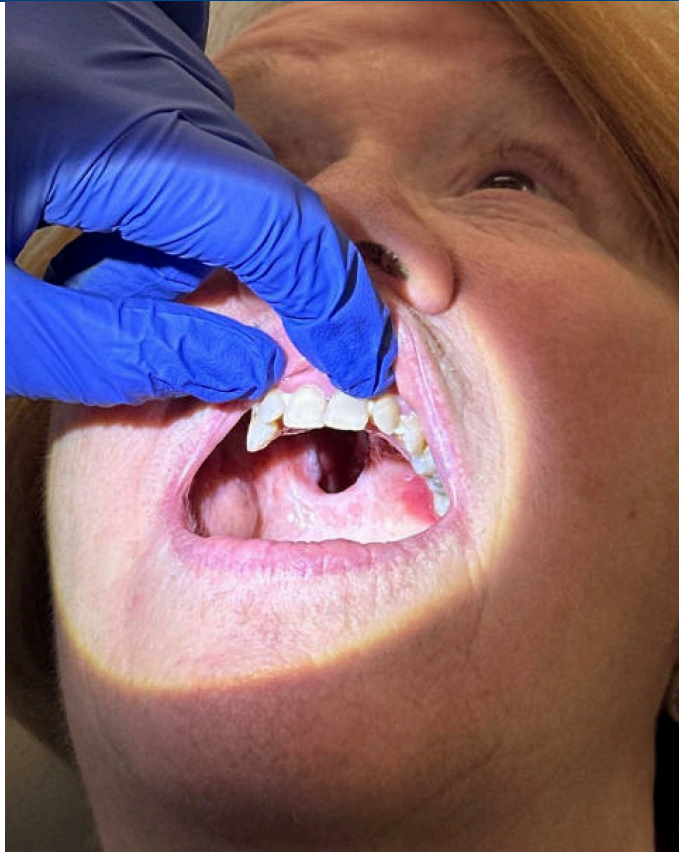


- 2011 – Dr. Carlos Aparicio
 - ZAGA (Zygoma Anatomy-Guided Approach) concept for zygomatic implants



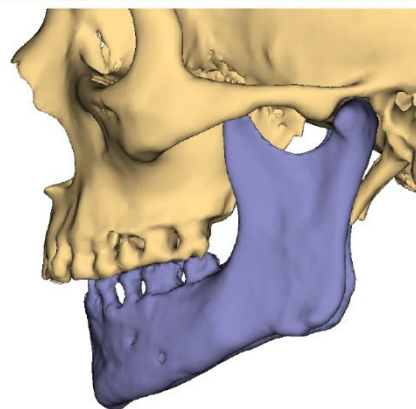
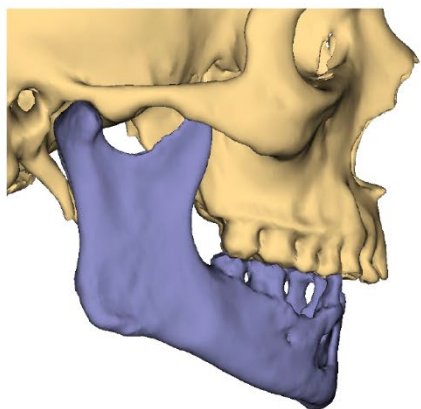
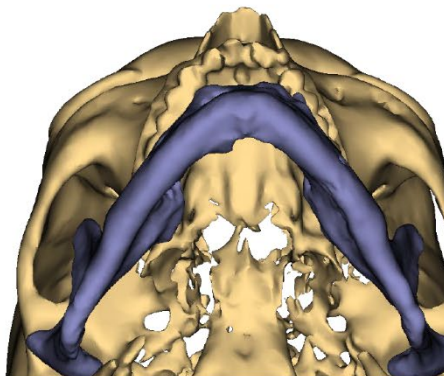
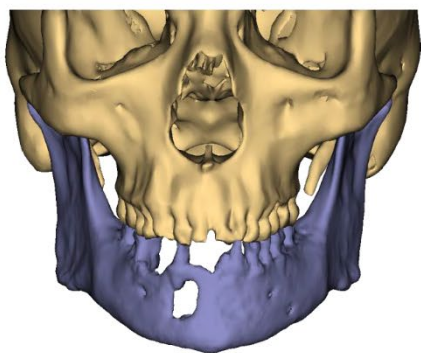
- 2017 – Dr. Chris Butterworth
 - ZIP (Zygomatic Implant perforated Flap)



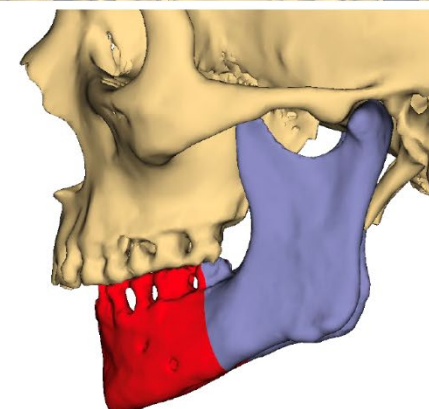
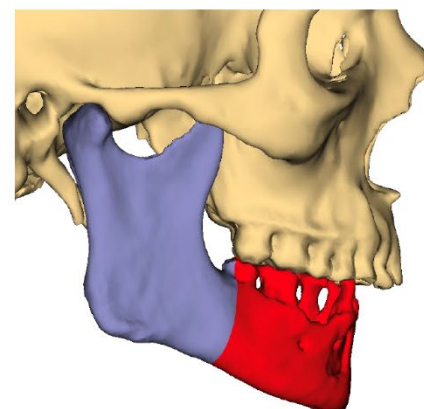
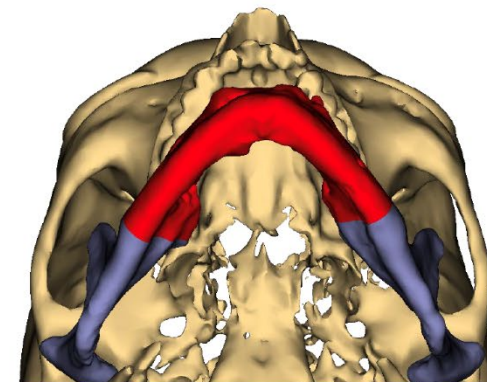
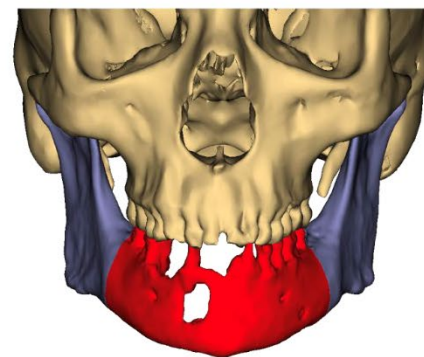


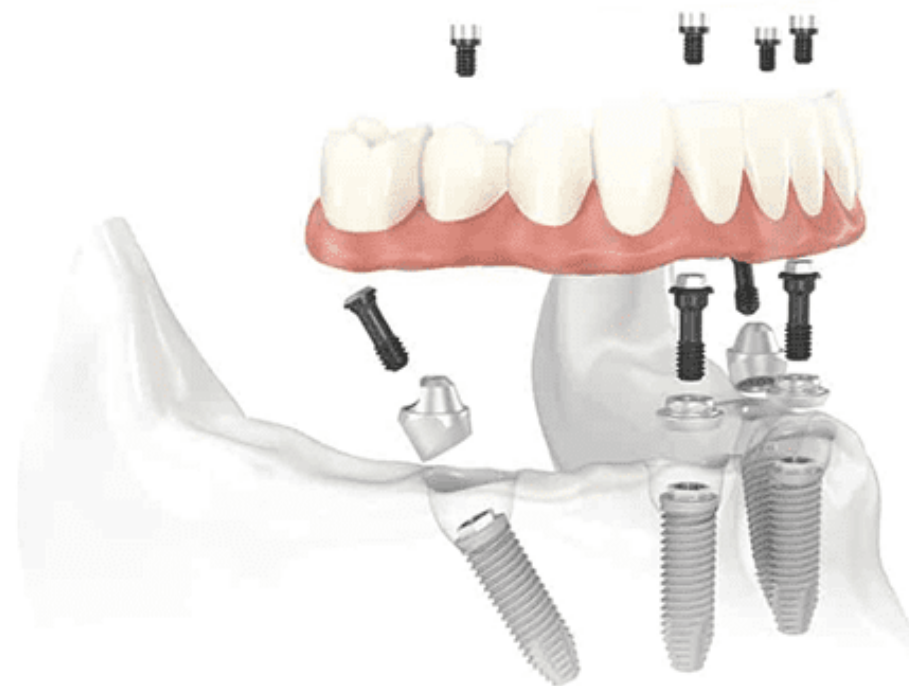
Virtual Surgical Planning

Surgical Plan: Pre-operative Position



Surgical Plan: Resection

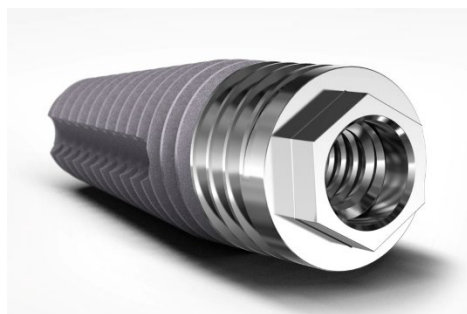
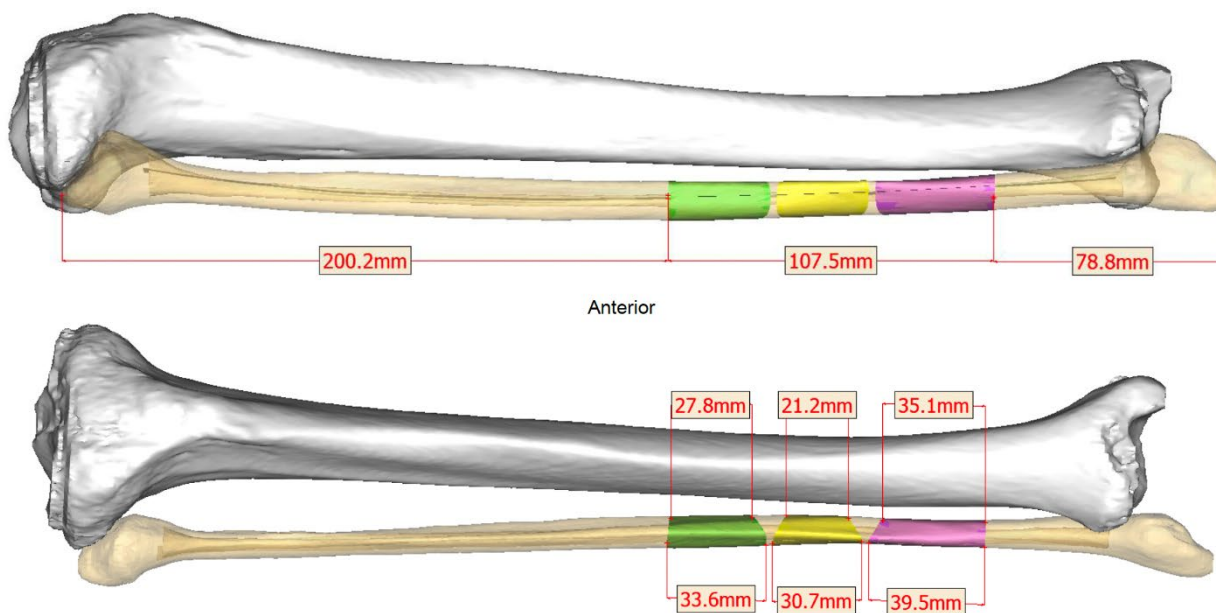




Surgical Plan: Patient specific right fibula graft

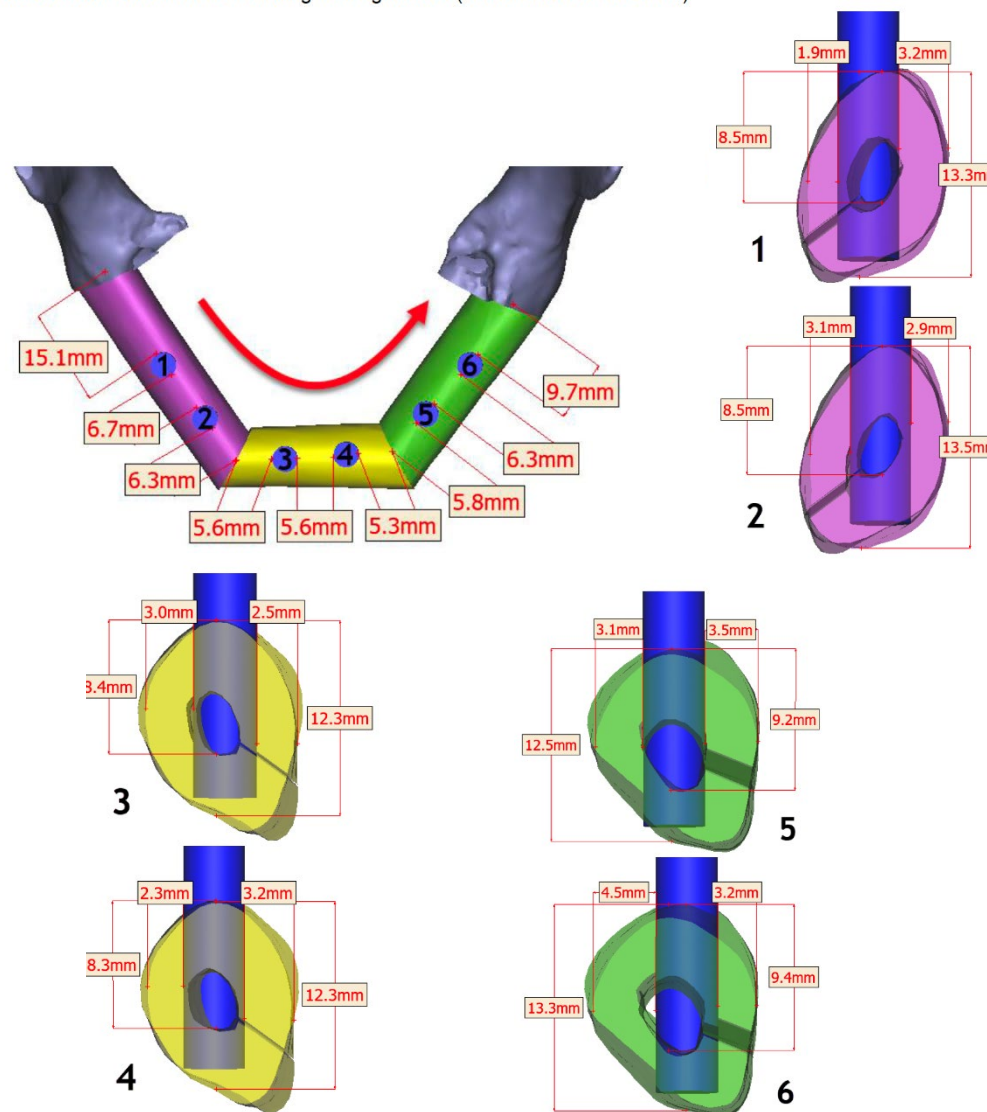
Lateral

Anterior



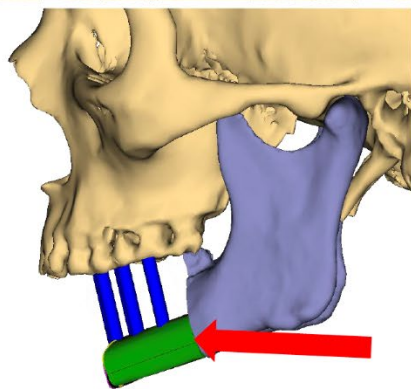
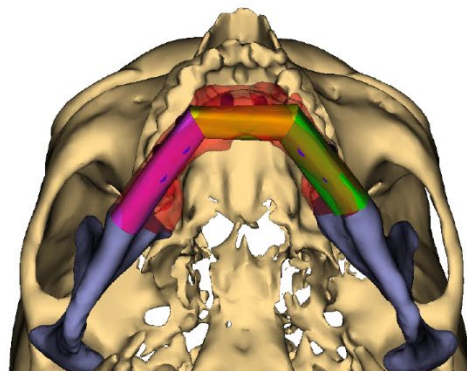
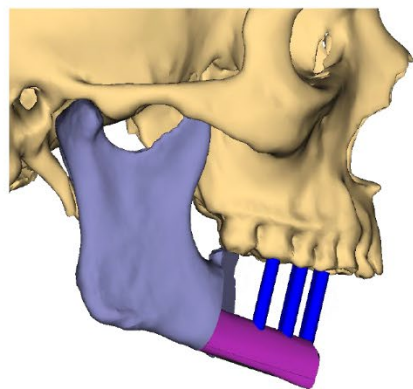
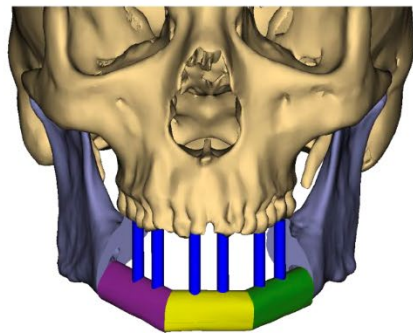
Surgical Plan: Cross-sectional screenshots of dental implants

All cross-sectional screenshots are taking from right to left (see direction or red arrow)

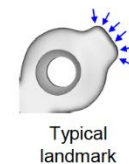
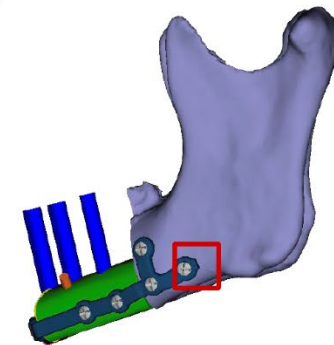
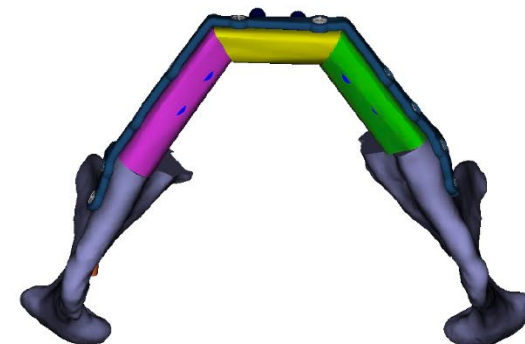
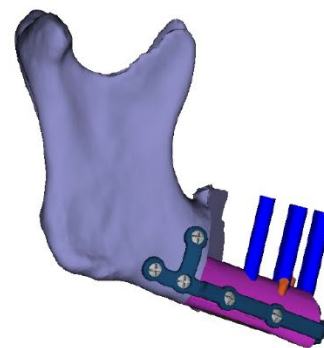
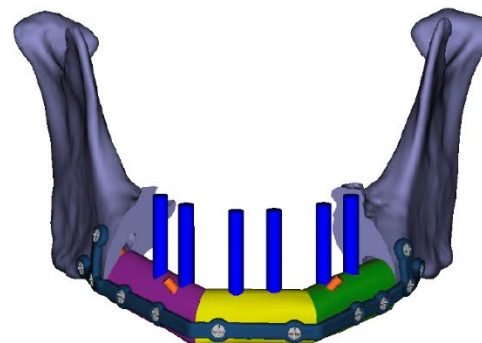


Surgical Plan: Reconstruction

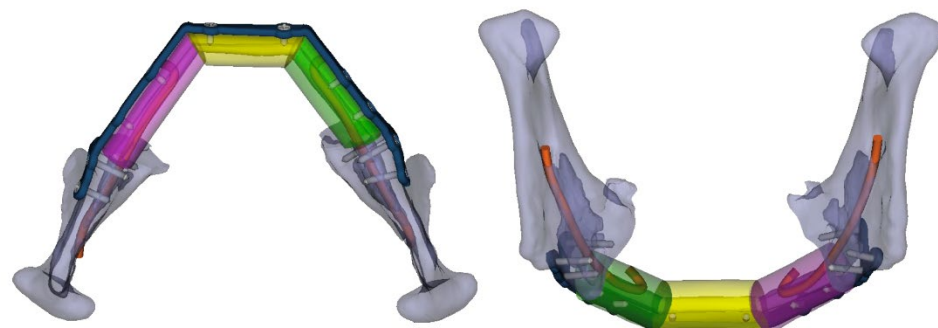
Vascularization posterior/left indicated by red arrow



Implant Design: Titanium 3D Printed Plate (2 mm)



Implant Design: Titanium 3D Printed Plate (screw angulation)



Bottom view

Back view

Screws Specifications for Titanium 3D Printed Implant

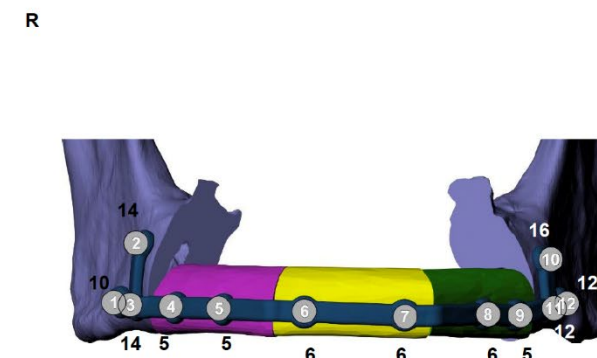
Hole ID	Length * (mm)	Diameter (mm)	Article number	Plating system
1	10.0	2.40	04.503.440.01C	MatrixMANDIBLE
2	14.0	2.40	04.503.444.01C	MatrixMANDIBLE
3	12.0	2.40	04.503.442.01C	MatrixMANDIBLE
10	16.0	2.40	04.503.446.01C	MatrixMANDIBLE
11-12	12.0	2.40	04.503.442.01C	MatrixMANDIBLE

* Recommended minimal length for screws for a bicortical fixation. Surgeon will make the sole determination of the final screw length to be used.

Hole ID	Length * (mm)	Diameter (mm)	Article number	Plating system
4-5	5.0	2.40	04.503.435.01C	MatrixMANDIBLE
6-8	6.0	2.40	04.503.436.01C	MatrixMANDIBLE
9	5.0	2.40	04.503.435.01C	MatrixMANDIBLE

* Recommended maximal length for screws for a monocortical fixation. Surgeon will make the sole determination of the final screw length to be used.

Screw identification

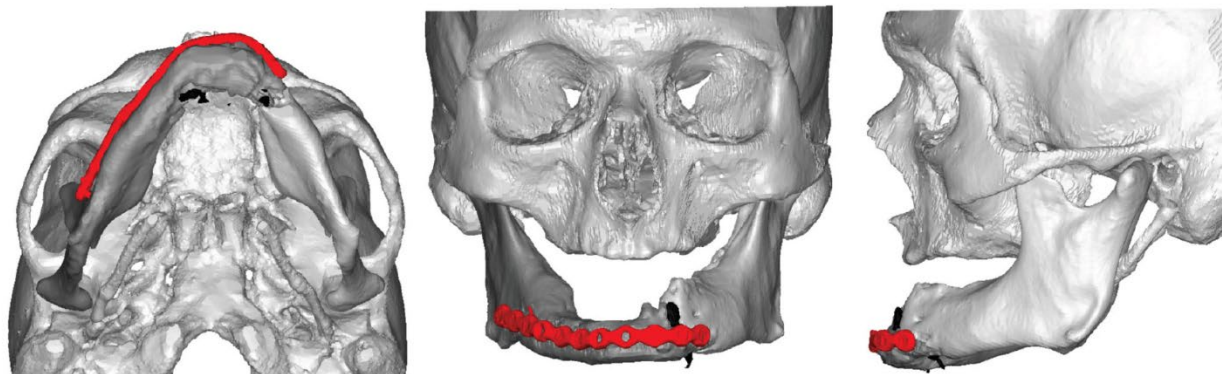


Legend:

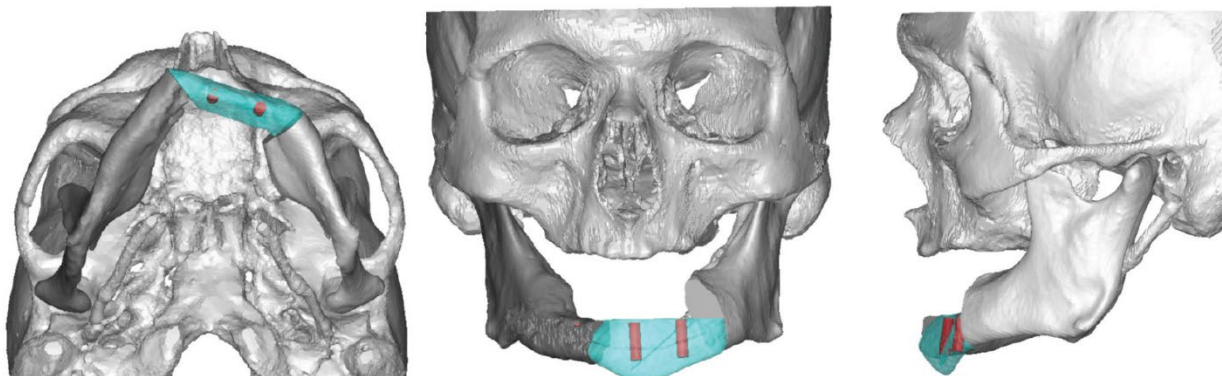
● MatrixMANDIBLE 2.4 mm

IMPORTANT: Personalized implants should not be bent in any way in order to preserve their mechanical integrity and fit

Preoperative Anatomy



Simulated Postoperative Anatomy

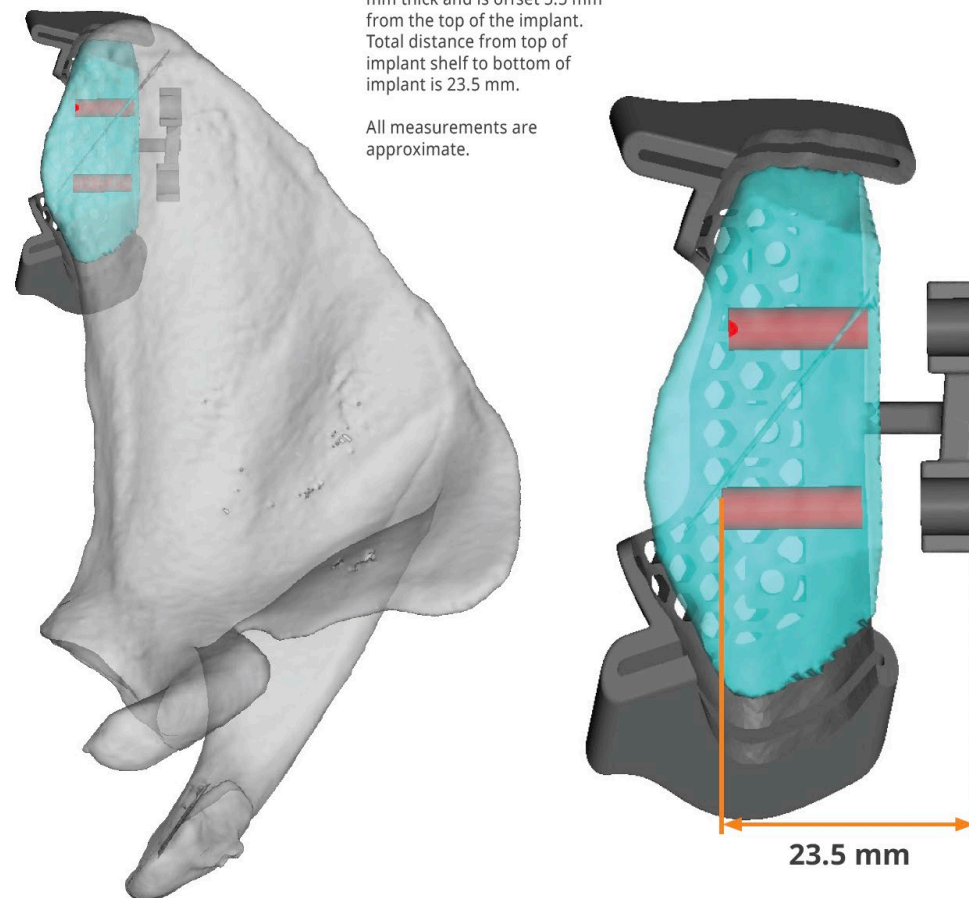


Scapula Guide Detail - Dental Implants

Dental Implant cylinders measure 4 mm x 13 mm.

Each dental implant shelf is 5 mm thick and is offset 5.5 mm from the top of the implant. Total distance from top of implant shelf to bottom of implant is 23.5 mm.

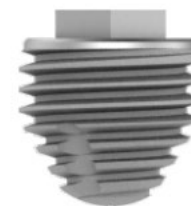
All measurements are approximate.



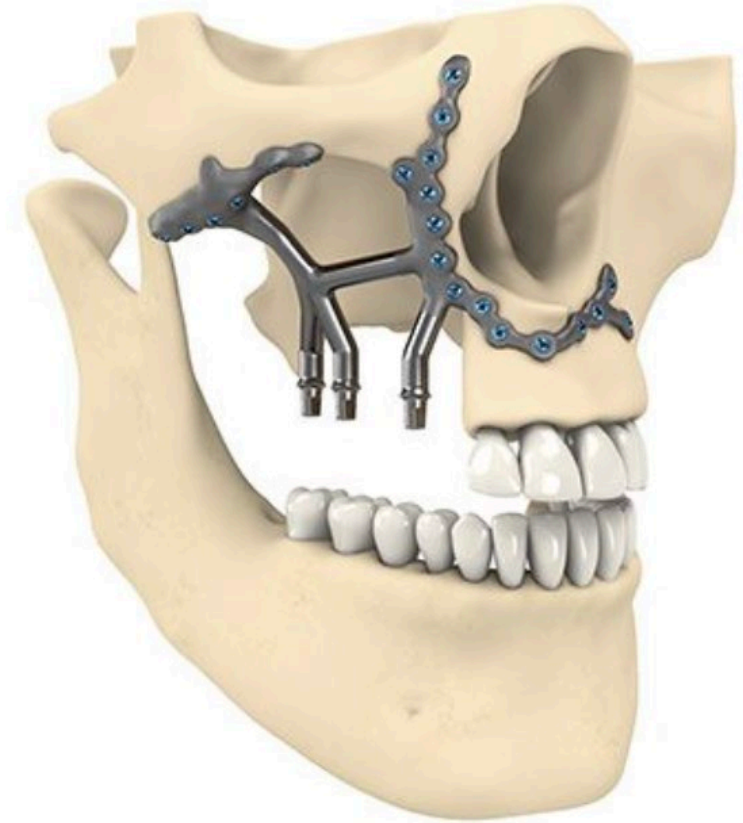
Ear in a Day



Eye in a Day



IET



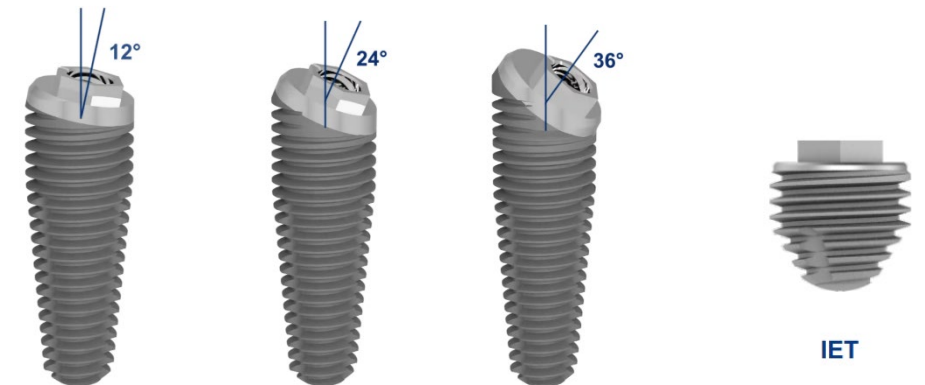
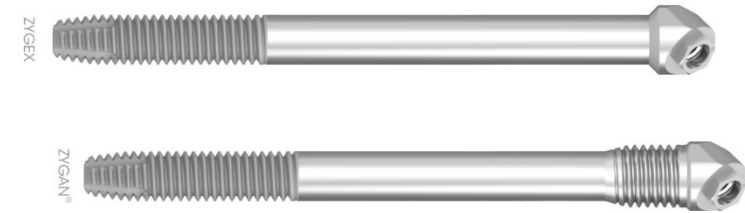
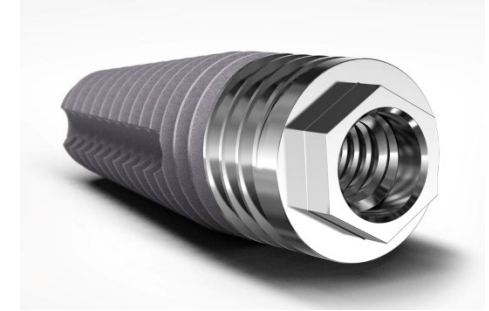
<https://www.klsmartin.com/en/products/individual-patient-solutions-cmf/ips-implants/ips-implants-preprosthetic/>

Reported Performance: Key Highlights

Feature	Reported Data	Description
Setting Time	2–3 minutes	Achieves strong adhesion even in moist, bleeding surgical sites
Bonding Strength	>400 lbs (≈180 kg)	Provides firm stabilization for bone fragments
Shear Strength	~0.5 MPa	Indicates high resistance to movement and load
Absorbability	Fully bioabsorbable	Naturally degrades as bone heals, avoiding removal surgery
Early Clinical Use	150+ cases reported	Tested in several hospitals across Zhejiang Province



- Understand long-term effect of endosseous implants on radiation dose delivery
- Long-term outcome
- Long-term effect on Quality of life



Thank you for your attention!
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