DAVID ALFI DDS MD

ALFI Oral, Dental Implant & Facial Surgery Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist LEADING MEDICINE

LINKS TO ALL SOCIALS

172242-210329 DSUS
The third-party trademarks used herein are the trademarks of their respective owners.
Results from Case Studies are not predictive of results in other cases. Results in other cases may vary.
CONFIDENTIAL. FOR INTERNAL USE ONLY. NOT FOR USE WITH ANY CUSTOMER OR FOR EXTERNAL DISTRIBUTION.

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

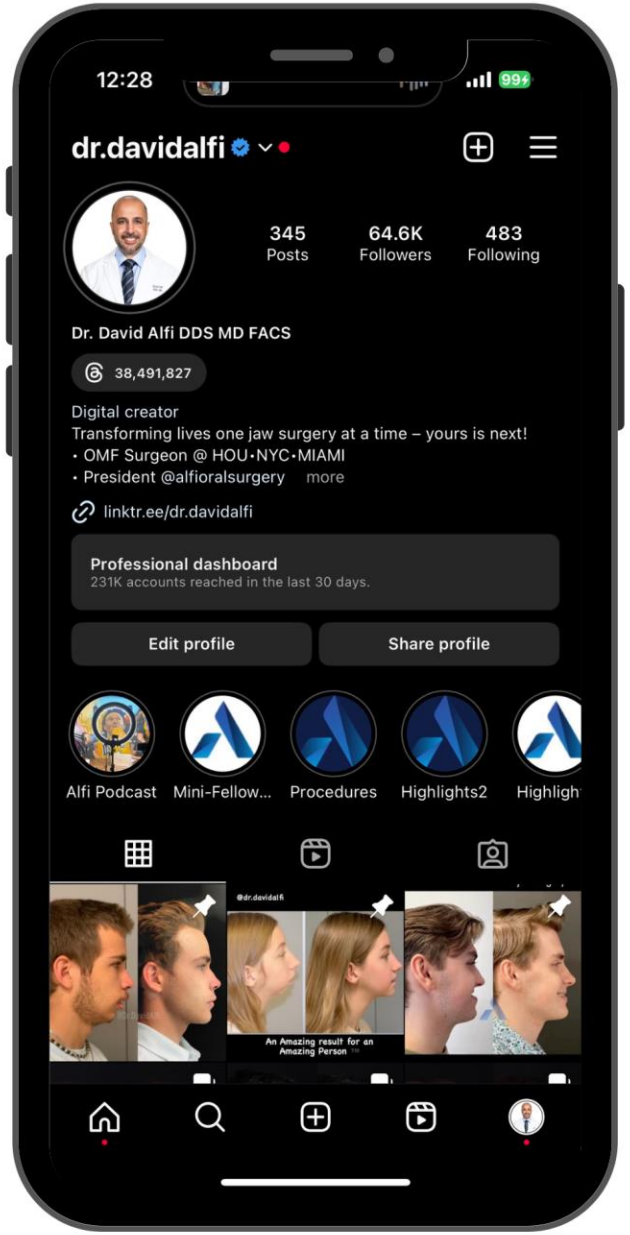
Texas Children's
Hospital®

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

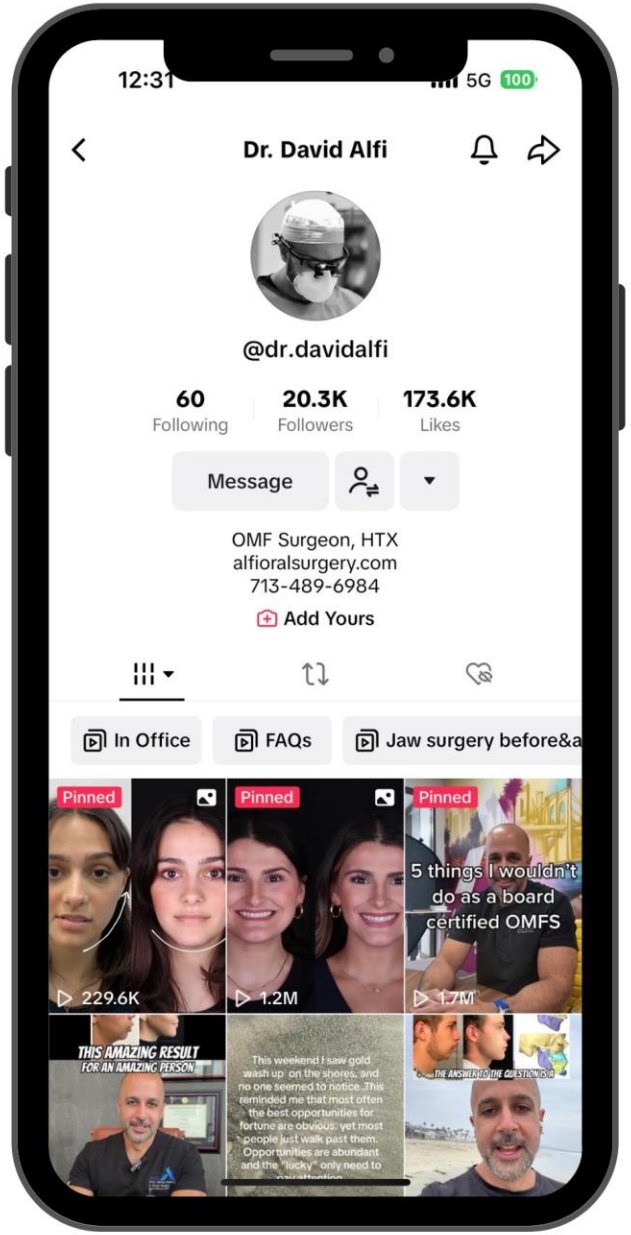
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



FOLLOW US ON SOCIAL MEDIA

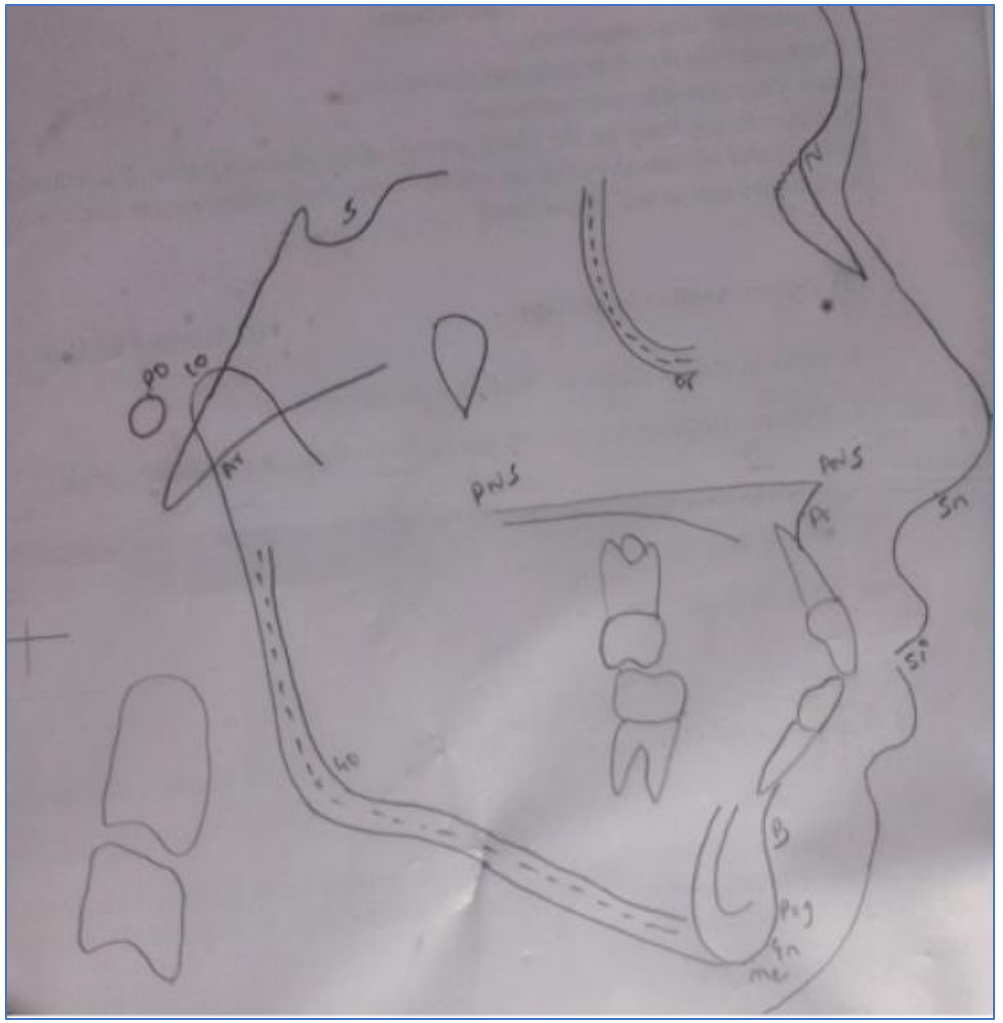


ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

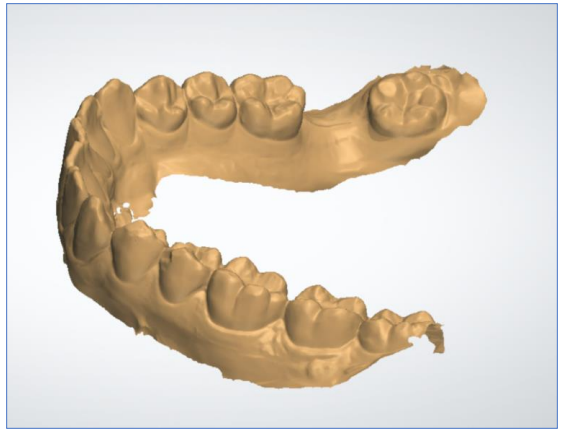


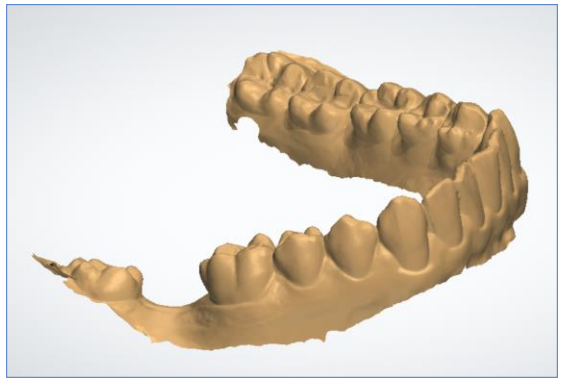
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

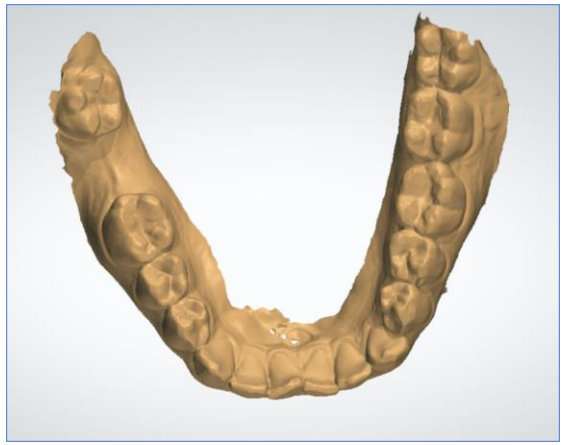
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





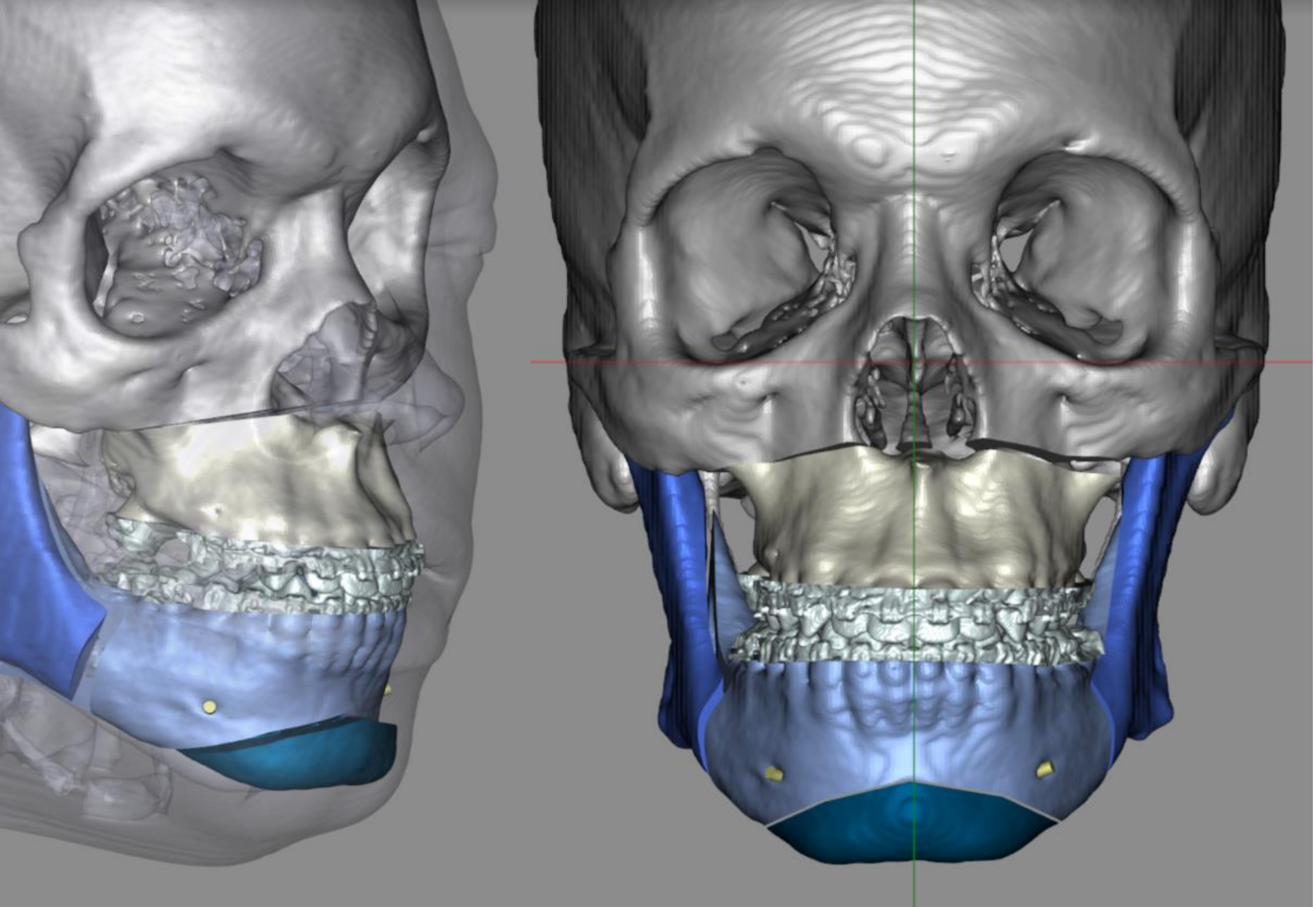


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

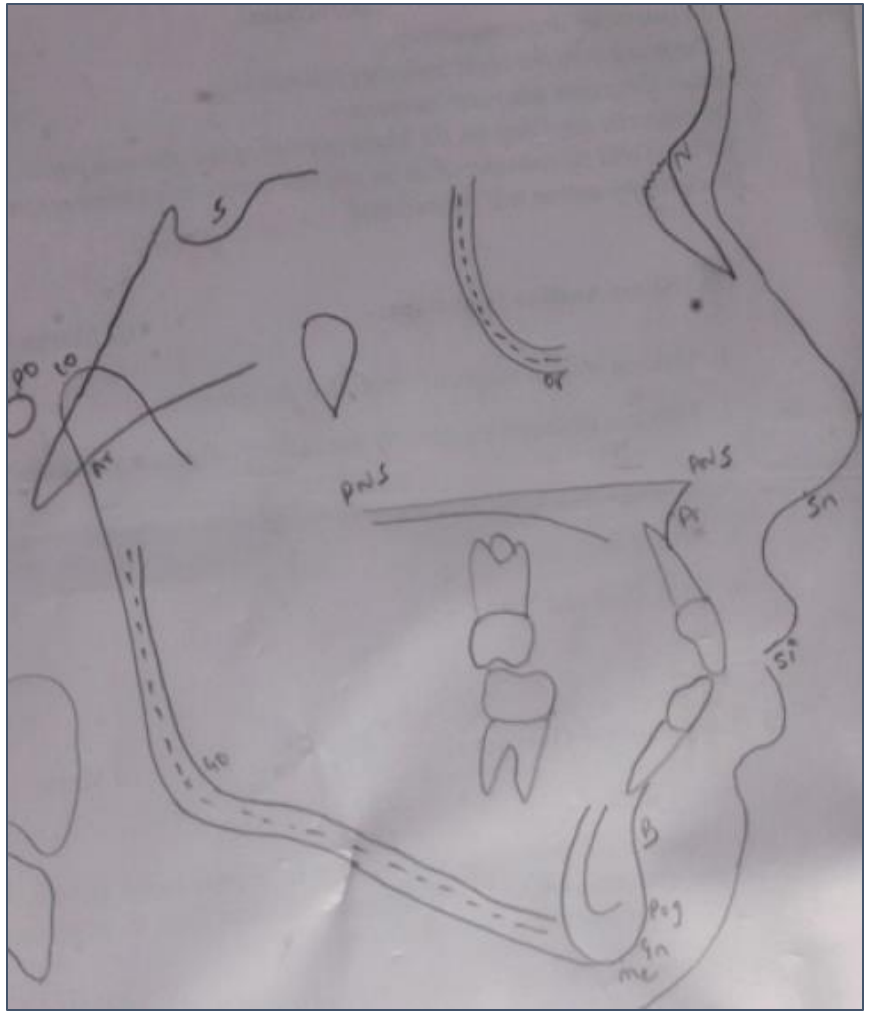
THE FUTURE IS NOW

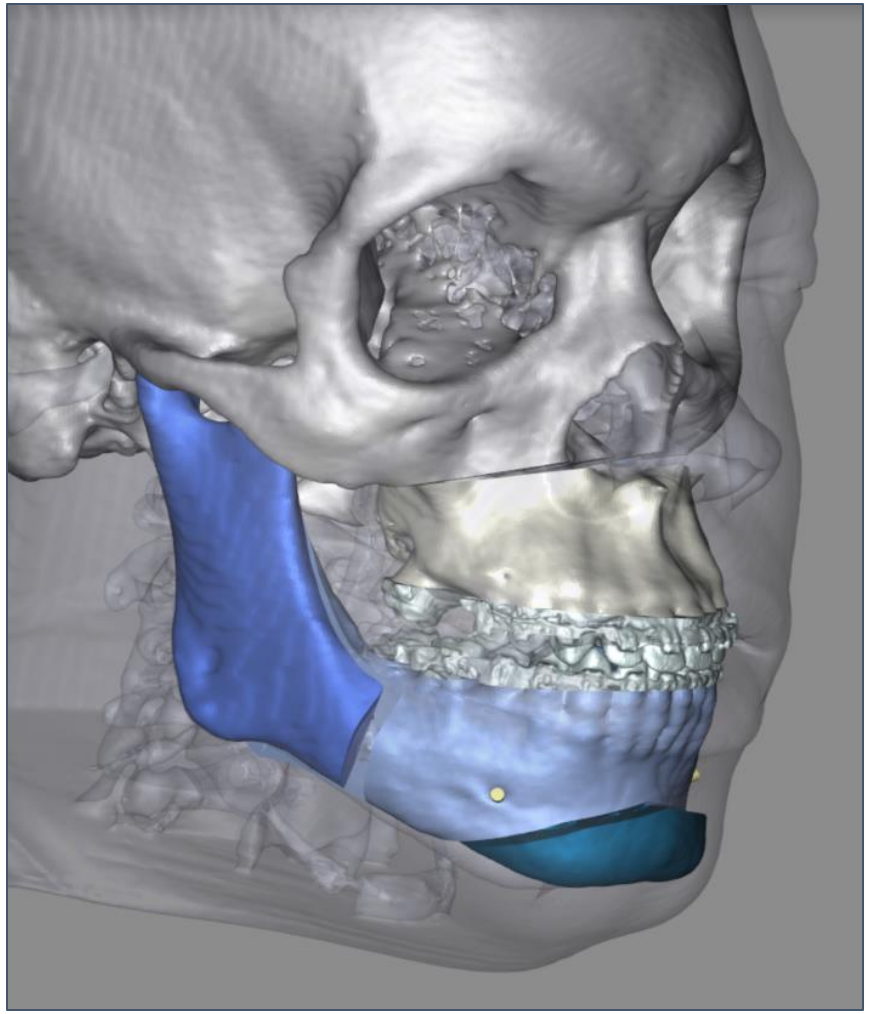
ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

The Use of Patient-Specific Implants in Oral and Maxillofacial Surgery

Michael F. Huang, DDS, MD[a,b,*], David Alfi, DDS, MD[a,b], Jonathan Alfi, MA[c], Andrew T. Huang, MD[d]

KEYWORDS

- Patient-specific implants • 3D printed plates
- Custom temporomandibular joint total joint replacement • Maxillofacial reconstruction
- Orthognathic surgery • Computer-aided design • Computer-aided manufacture

KEY POINTS

- Patient-specific cutting guides and patient-specific implants are becoming increasingly common in oral and maxillofacial surgery.
- Custom temporomandibular joint (TMJ) total joint prosthesis allows for individualized reconstruction of the TMJ.
- Computer-aided design and computer-aided manufacturing technology allows for the fabrication of patient-specific cutting guides and patient-specific reconstruction plates used for accurate and efficient reconstruction of complex maxillofacial defects with or without vascularized bone flaps.
- Improved accuracy of patient-specific implants allows for their application in orthognathic surgery, although their use in mandibular surgery, specifically the bilateral sagittal split osteotomy, has yet to be proven.

INTRODUCTION

Personalized medicine is a term that has gained momentum in the twenty-first century. The National Cancer Institute defines it as "a form of medicine that uses information about a person's gene, proteins, and environment to prevent, diagnose, and treat disease."[1] It refers to a shift away from the "one-size-fits-all" approach designed for the average patient toward treatments tailored for the individual. Given the complexity of the facial skeldesign and computer-aided manufacturing (CAD/CAM) technology, several recent developments have allowed the application of personalized medicine to oral and maxillofacial surgery in order to improve outcomes. The decreasing cost of this technology has also made it more affordable and accessible to patients. Patient-specific implants are currently used in multiple areas of oral and maxillofacial surgery, including temporomandibular joint (TMJ) total joint replacement, reconstruction of the maxillofacial skeleton, and orthognathic surgery.

ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

WELCOME TO THE

WORLD *OF* CUSTOM

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

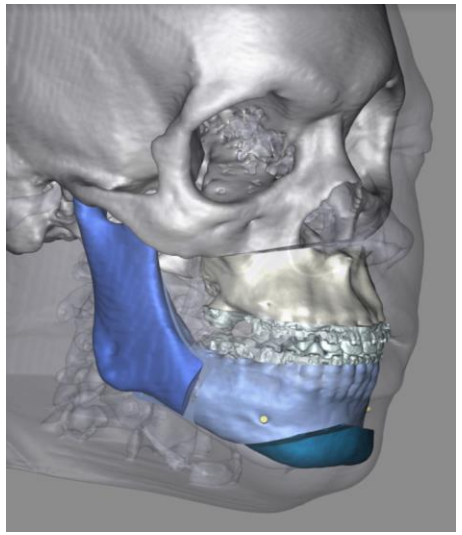
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

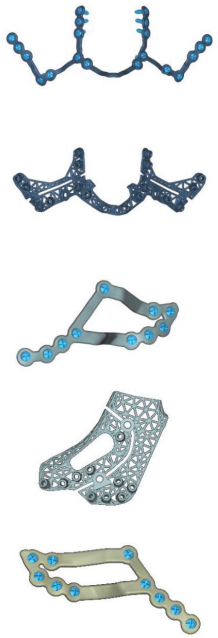
LINKS TO ALL SOCIALS

USING TODAYS TOOLS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

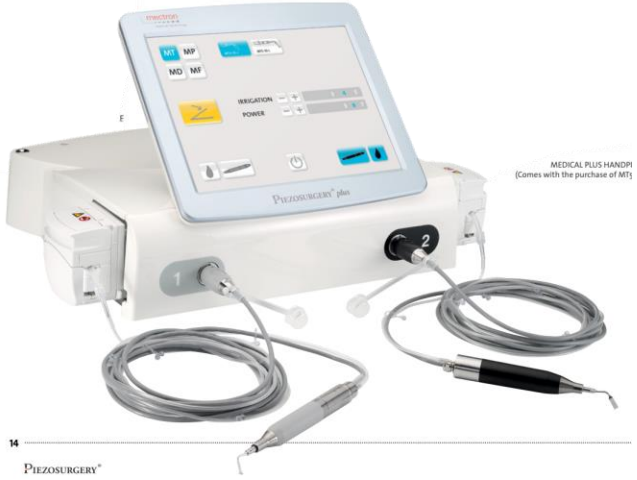


VIRTUAL PLANNING



CUSTOM TITANIUM PRINTED GUIDES & PLATES

BONE REGENERATION (VIVEGEN)

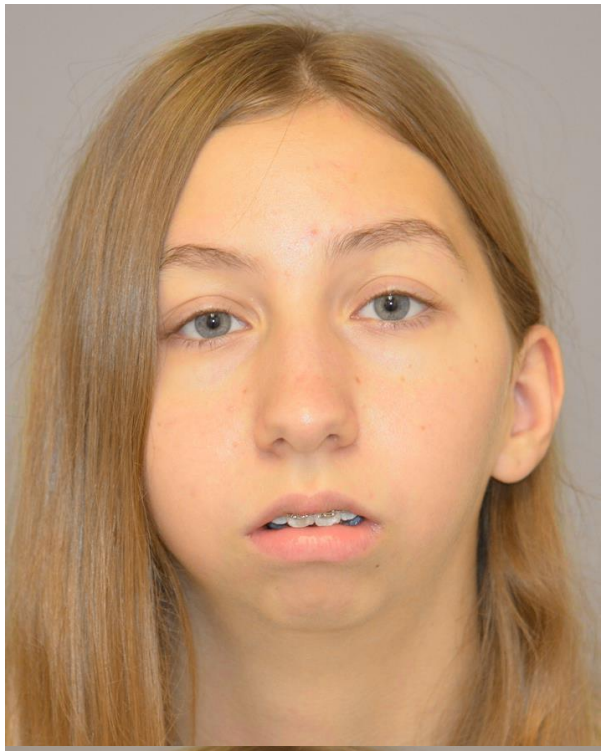


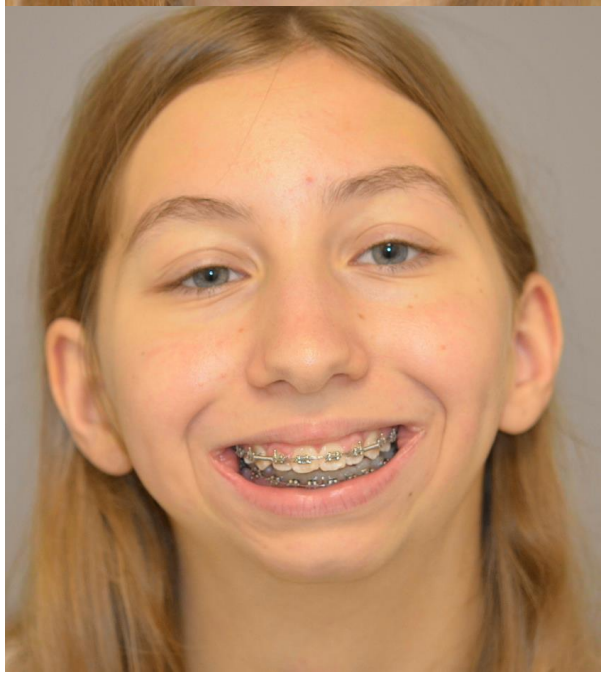
CUTTING TOOLS (PIEZOSURGERY)

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

Rheumatoid Arthritis Factor				
RA Latex Turbid.	10.1	IU/mL	0.0 - 13.9	01
Antinuclear Antibodies Direct				
ANA Direct	Negative		Negative	01
Sedimentation Rate-Westergren				
	2	mm/hr	0 - 32	01
Ferritin, Serum	20	ng/mL	15 - 77	01

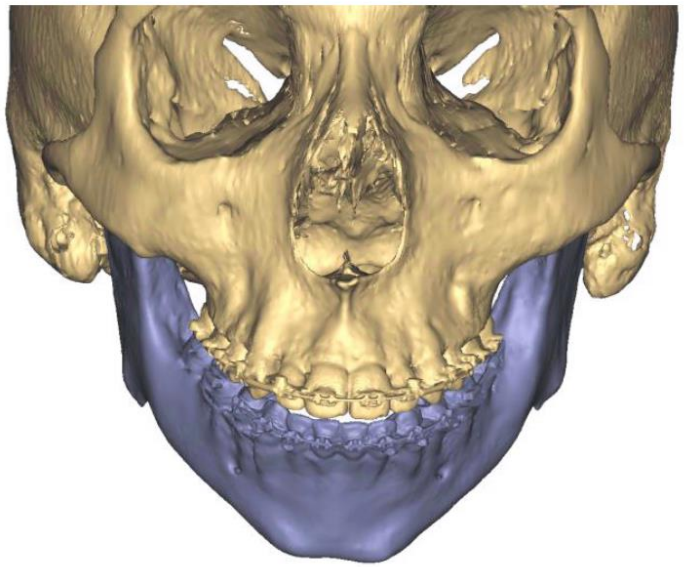
Significant variation of the temporomandibular joints with the shallow articular fossae and flat mandibular head bilaterally with significant narrowing of the articular joint space. The intra-articular disc is visualized bilaterally with the normal
alignment during open and closed positioning. There is no joint effusion.

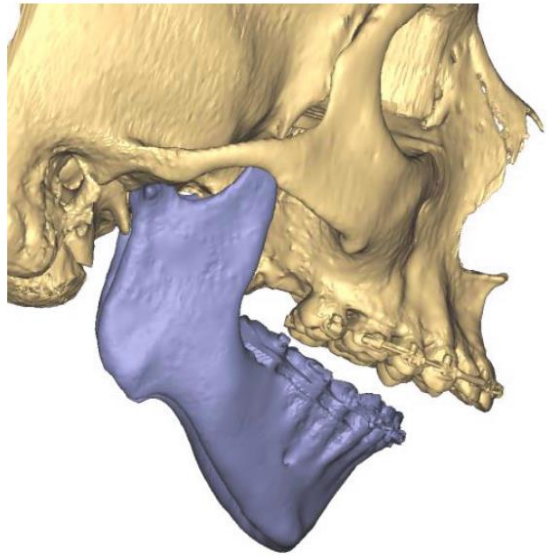
ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

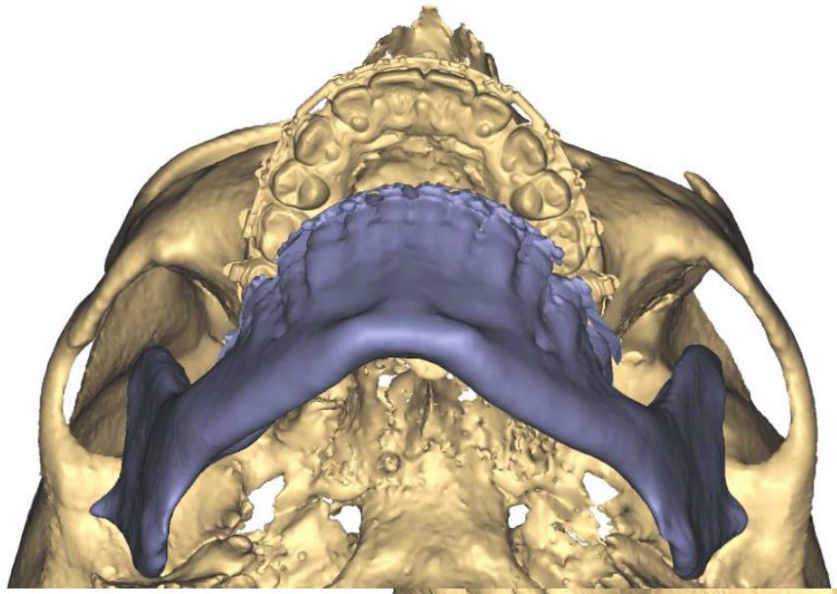
Texas Children's Hospital®

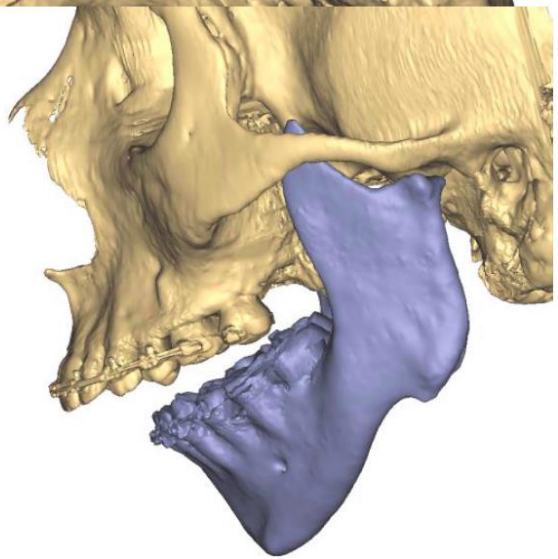
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







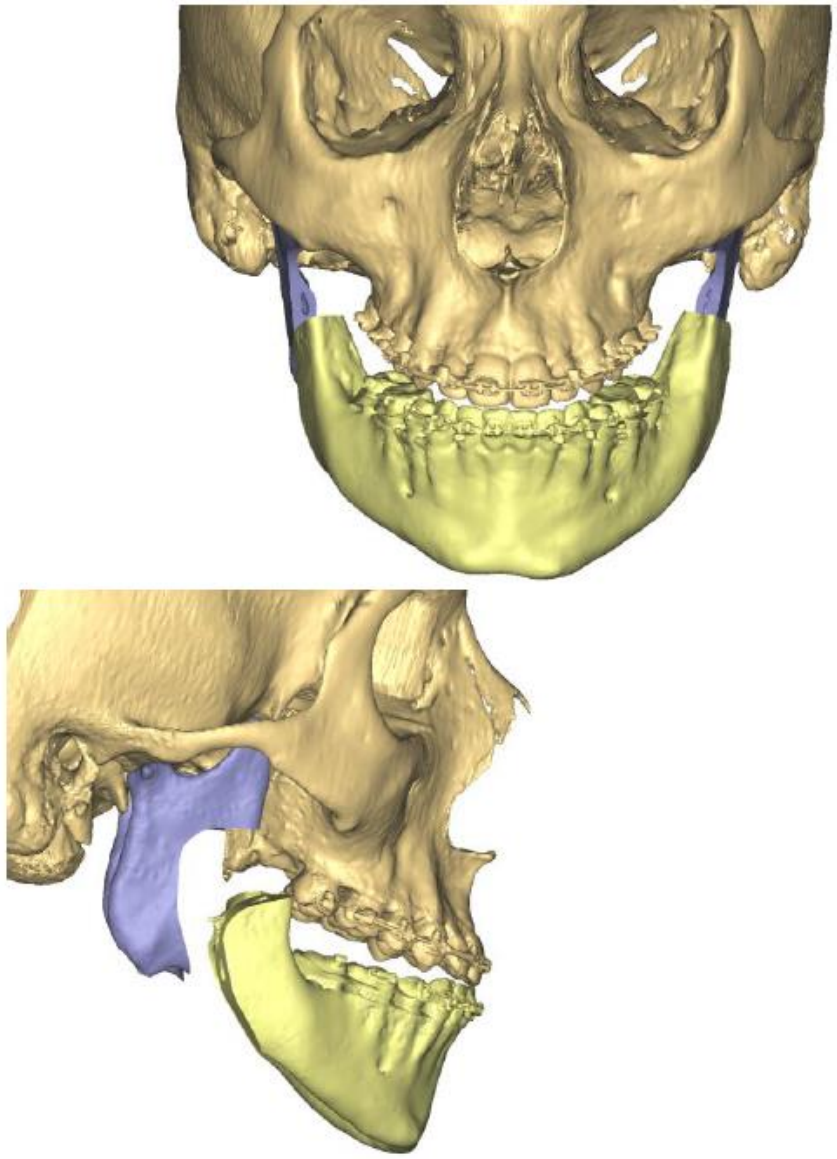


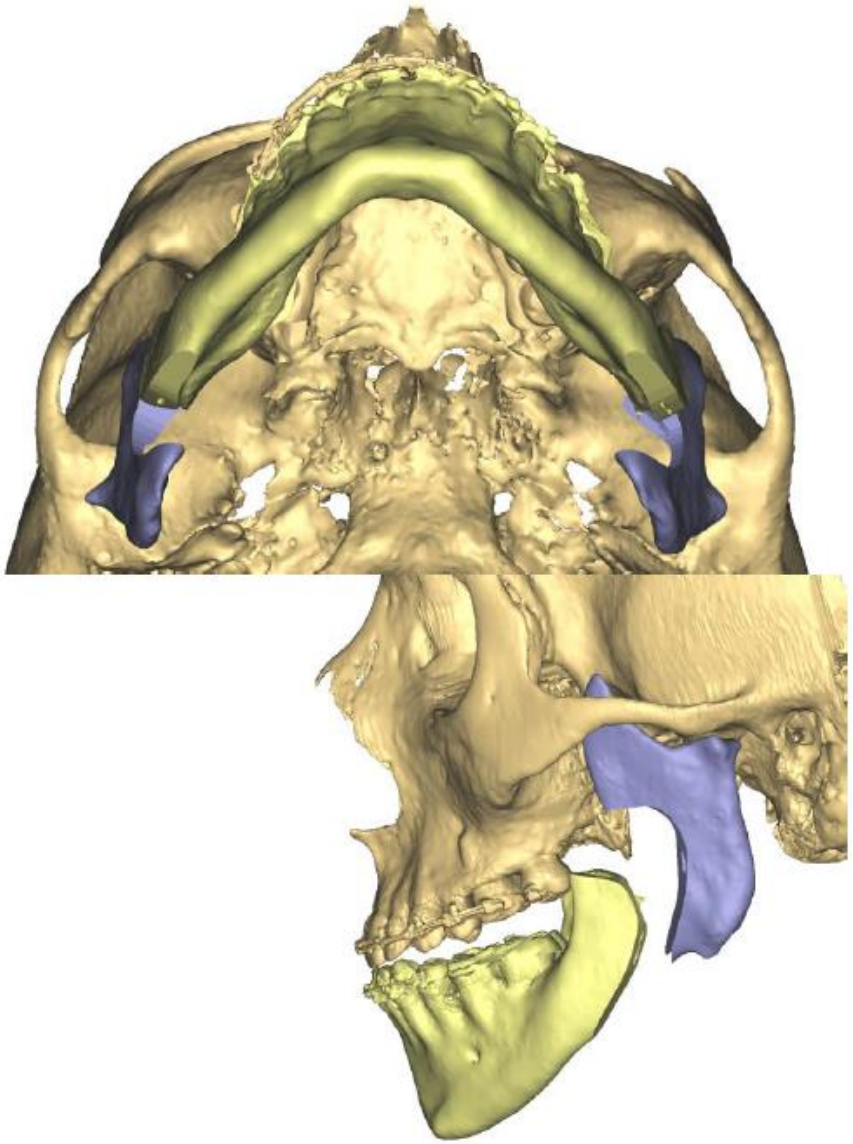
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



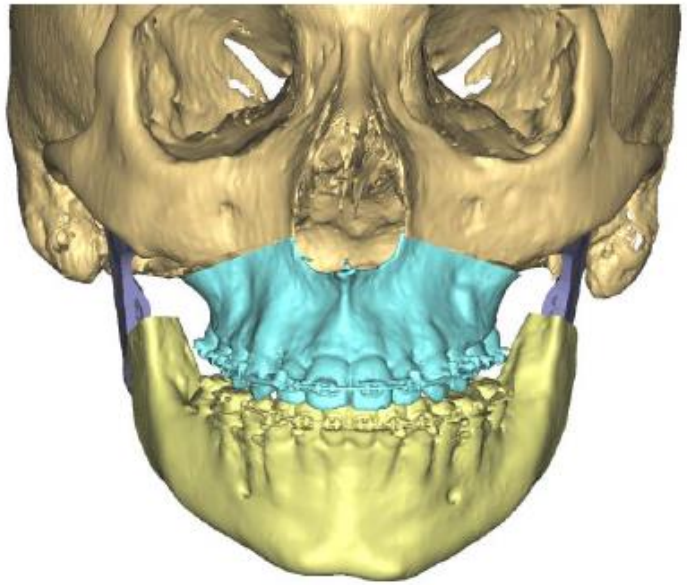


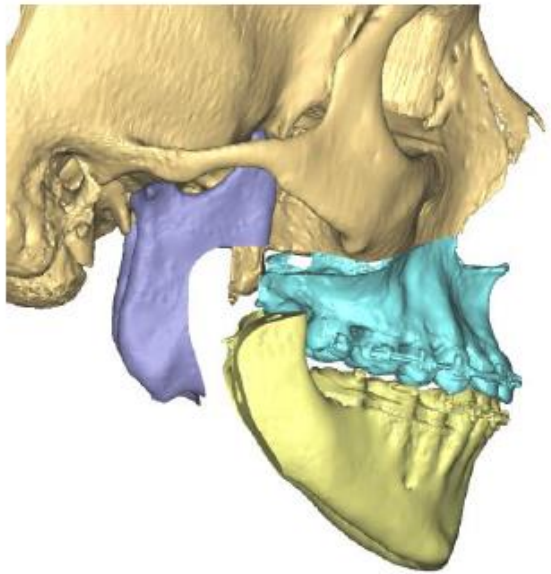
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

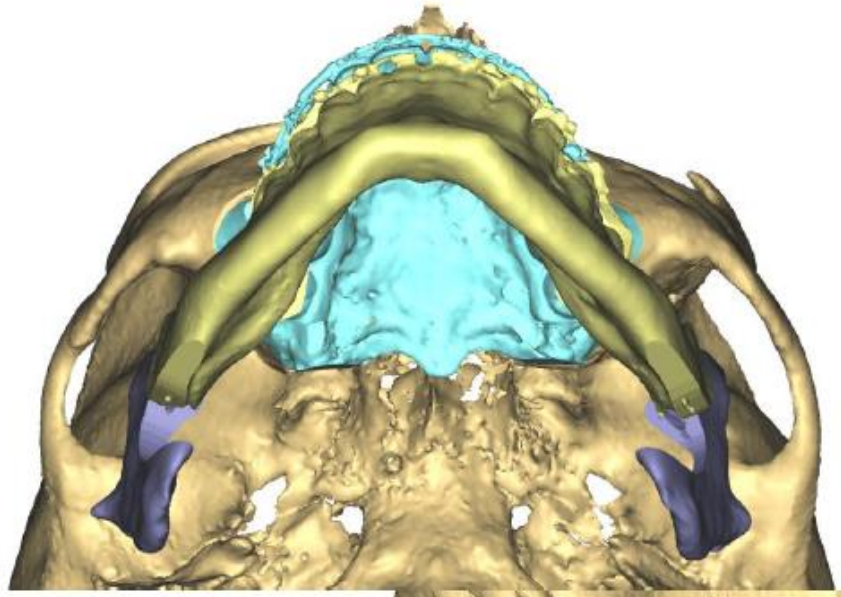
Texas Children's Hospital®

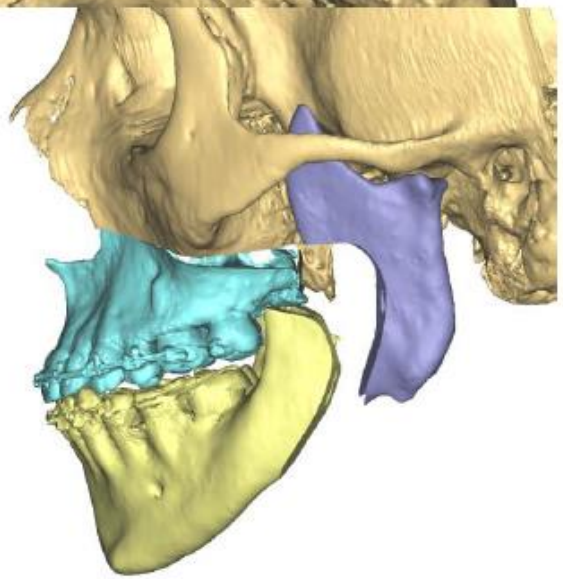
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







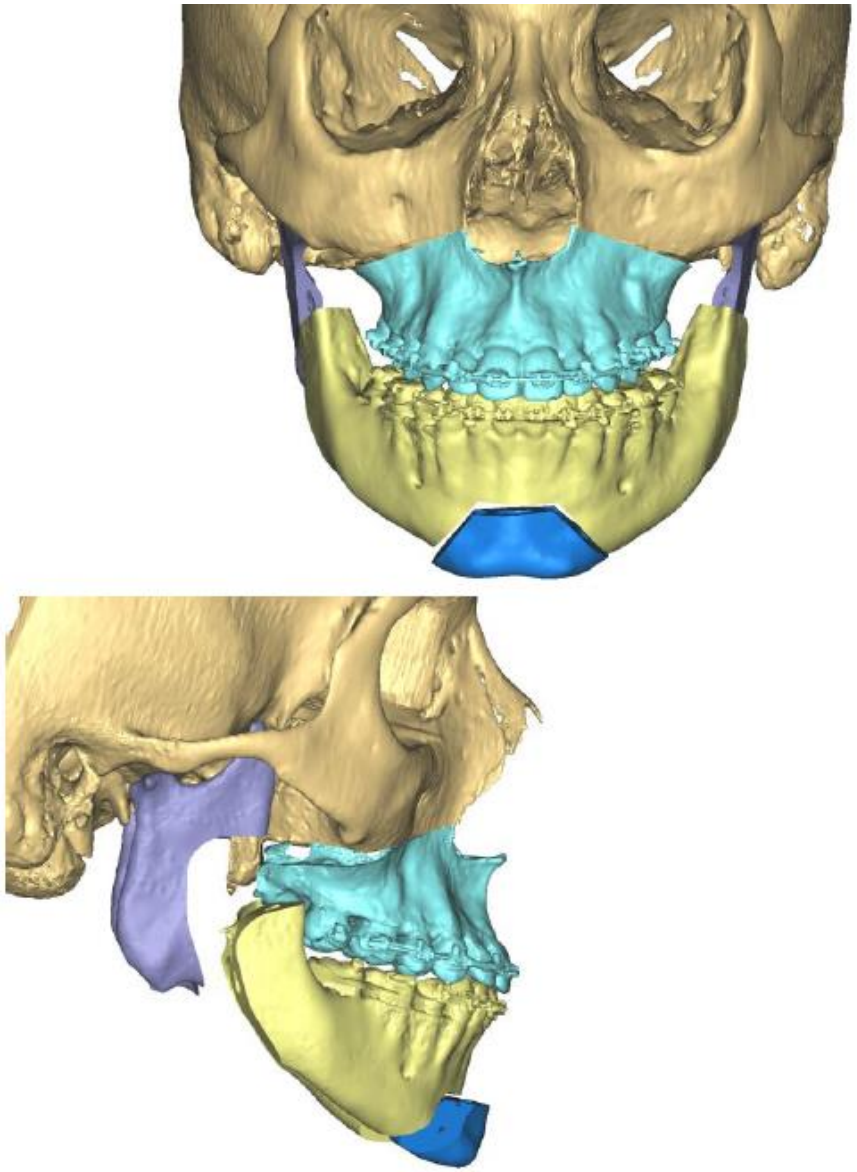


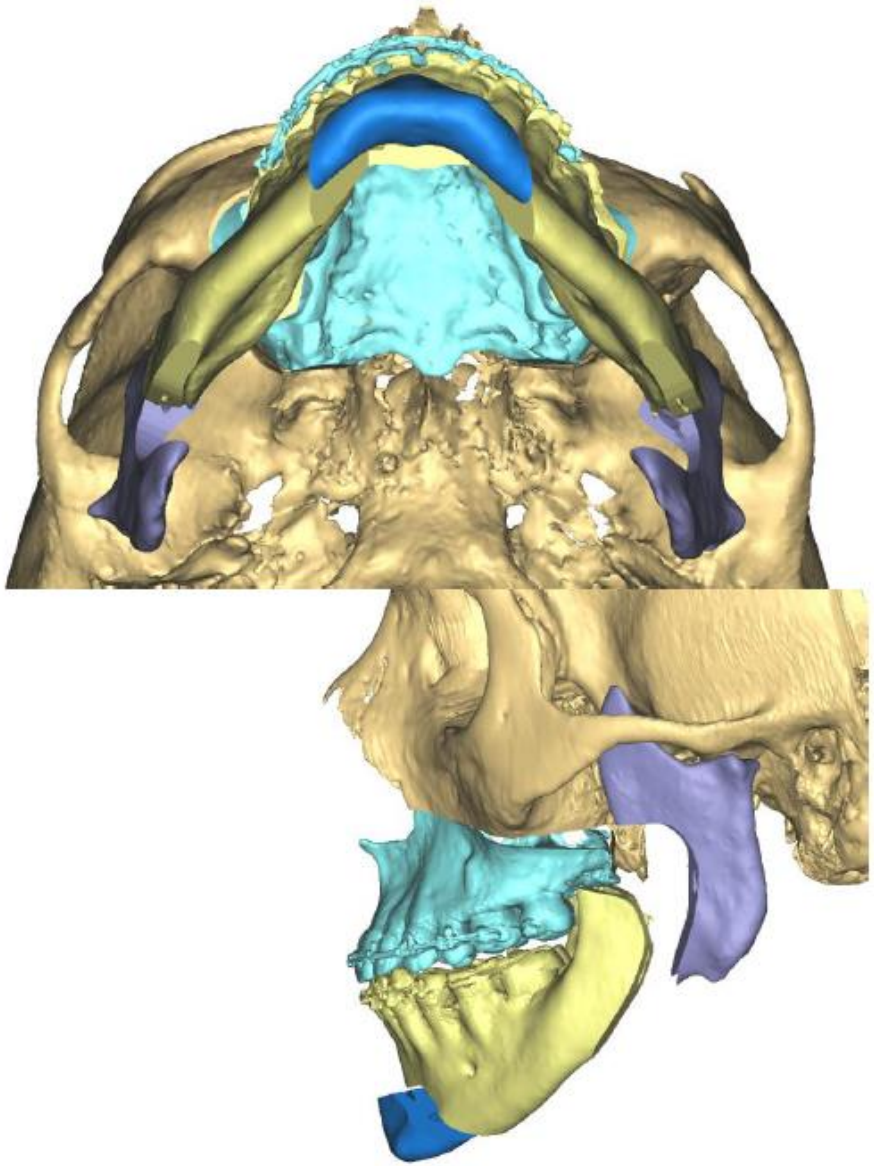
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

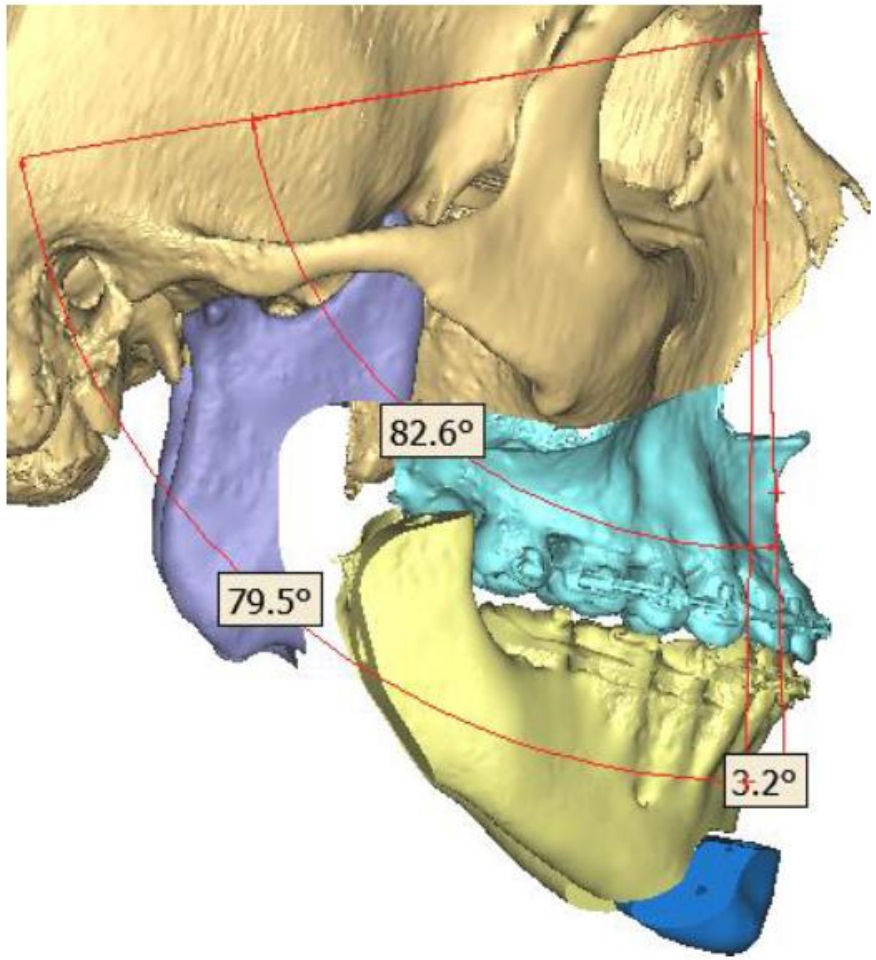
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

Point	Left/Right (mm)		Ant/Post (mm)		Up/Down (mm)	
A	0.4	R	0.9	Ant	1.5	Up
ANS	0.7	R	0.0	Ant	2.2	Up
Maxilla Incisor Midline	0.0	R	3.9	Ant	1.9	Up
Maxilla Canine L	0.3	L	4.4	Ant	0.6	Up
Maxilla Canine R	0.3	L	3.1	Ant	0.1	Down
Maxilla 1st Molar L	0.6	L	3.8	Ant	1.3	Down
Maxilla 1st Molar R	0.6	L	2.1	Ant	2.2	Down
L Lateral Buttress	0.2	L	0.9	Ant	1.4	Down
L Medial Buttress	0.5	R	0.9	Post	0.9	Up
R Lateral Buttress	0.5	R	1.6	Post	0.3	Up
R Medial Buttress	0.2	L	1.3	Post	2.6	Down
B	1.9	L	25.1	Ant	0.7	Up
Pog	1.1	L	34.1	Ant	2.8	Down
Me	2.0	L	37.4	Ant	5.2	Down
Mandible Incisor Midline	1.6	L	19.3	Ant	4.0	Up
Mandible Canine L	1.5	L	18.5	Ant	2.6	Up
Mandible Canine R	1.5	L	18.0	Ant	1.7	Up
Mandible 1st Molar L	1.5	L	17.6	Ant	1.7	Down
Mandible 1st Molar R	1.5	L	17.0	Ant	2.9	Down

Measurement (°)	Pre-Op 3D	Planned 3D	Delta 3D
SNA	81.6	82.6	1
SNB	64.5	79.5	15
ANB	17.1	3.2	-13.9
Maxillary Occlusal Plane	20.8	19.2	-1.6



ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

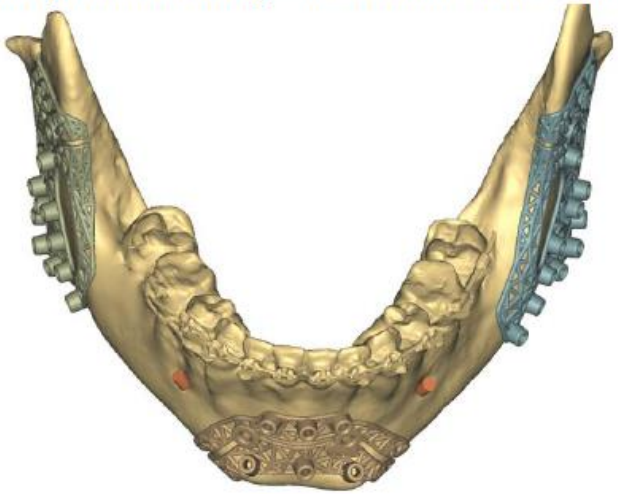
Texas Children's Hospital®

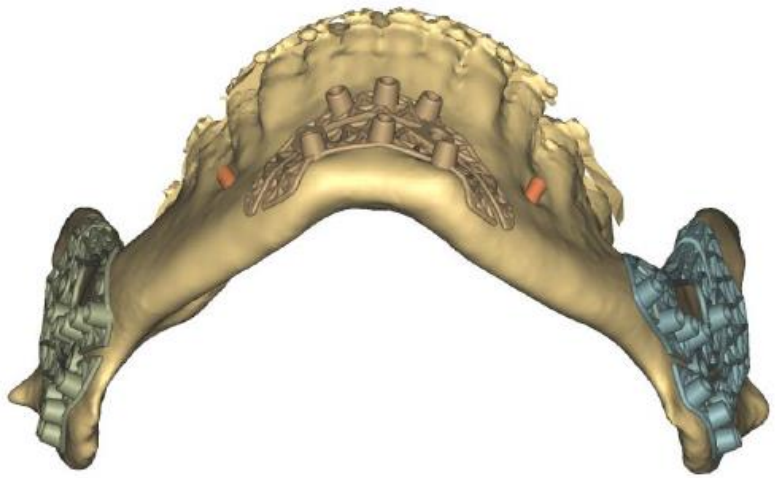
HOUSTON Methodist
LEADING MEDICINE

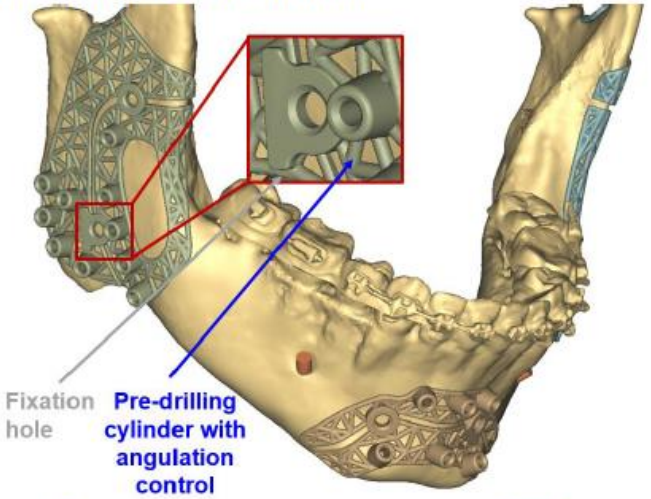
LINKS TO ALL SOCIALS

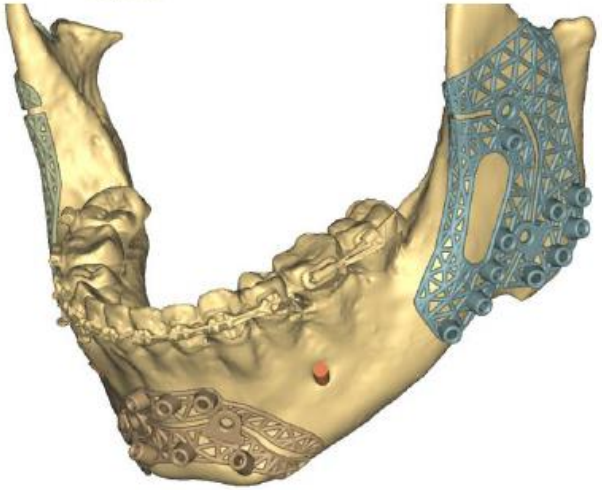
Guide Design: Titanium 3D printed Guide for Mandible

- Fixation hole (temporary fixation of guide): for use with MatrixORTHOGNATHIC Ø1.85 mm screws → indicated in grey
- Pre-drill cylinders with angulation control: for use with 1.4/1.5 mm DePuy Synthes drill bits → indicated in blue







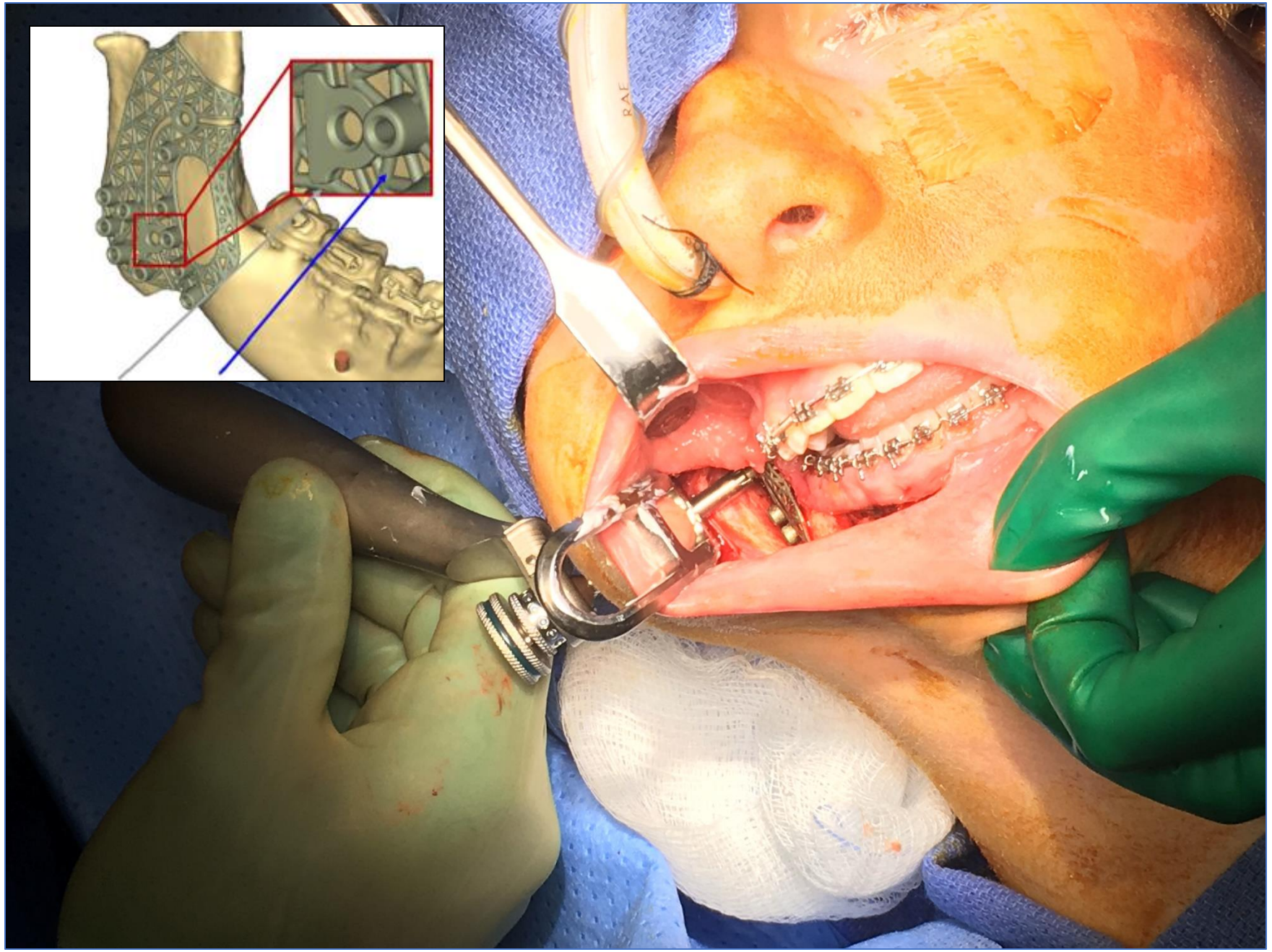


ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

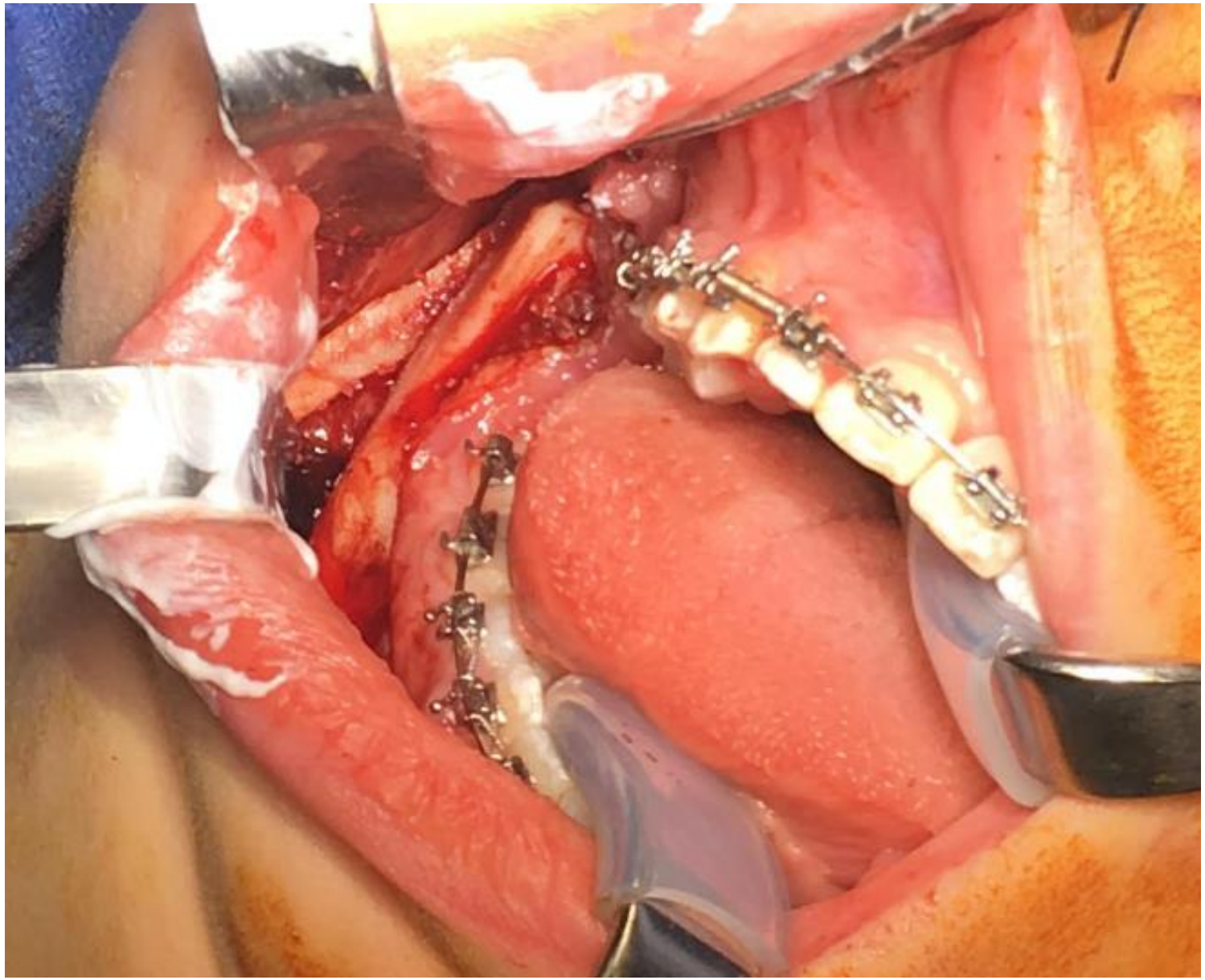
LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

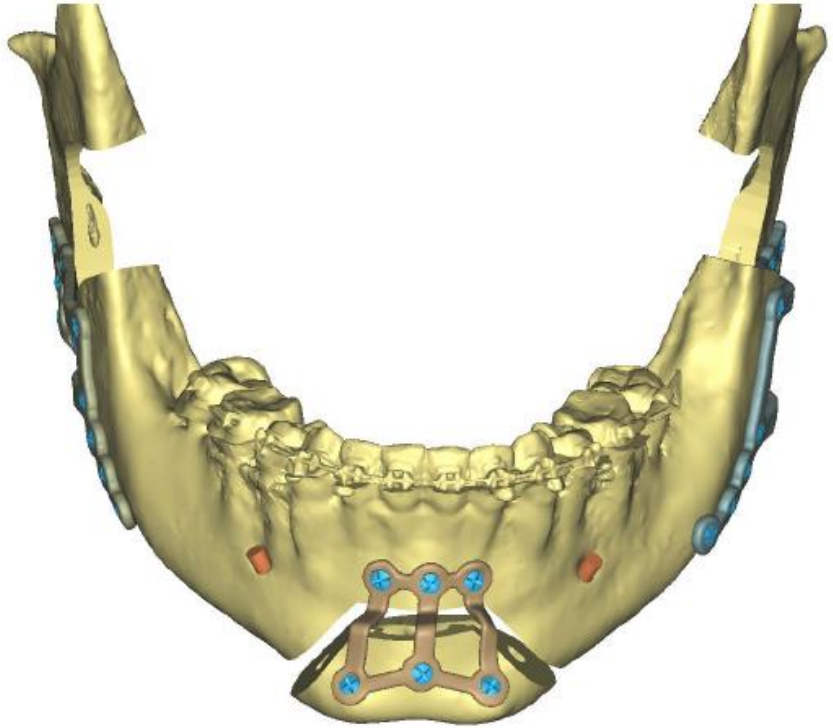
Texas Children's Hospital®

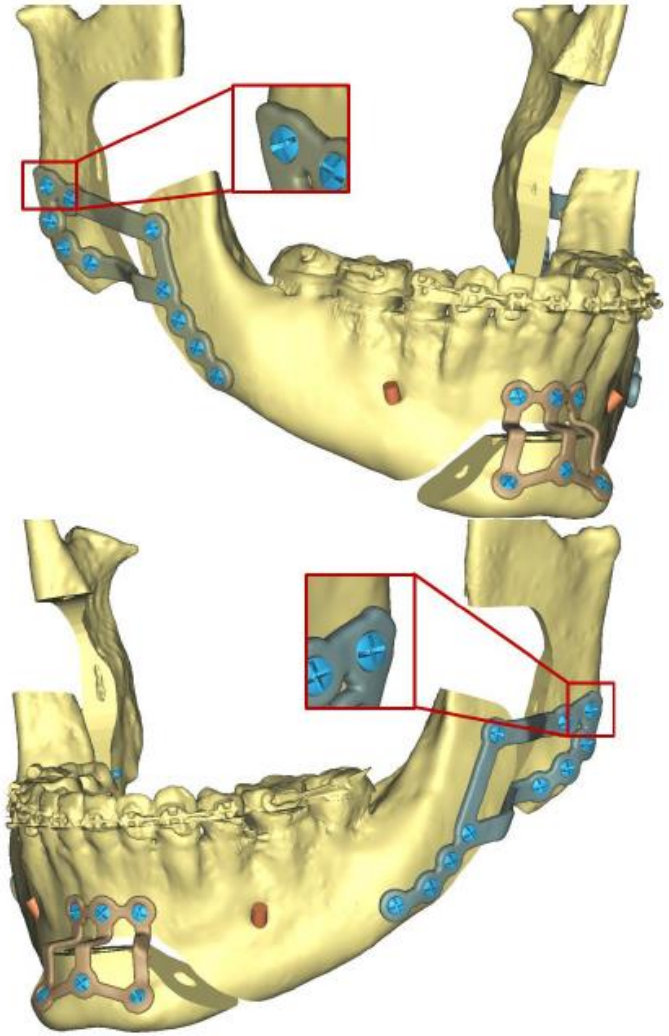
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

Implant Design: Titanium 3D printed Plate for Mandible, mini (1.5 mm, 1mm)

- Screw hole: for use with MatrixORTHOGNATHIC Ø1.85 mm screws
- All screw pre-drilling guided using surgical guides.





ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

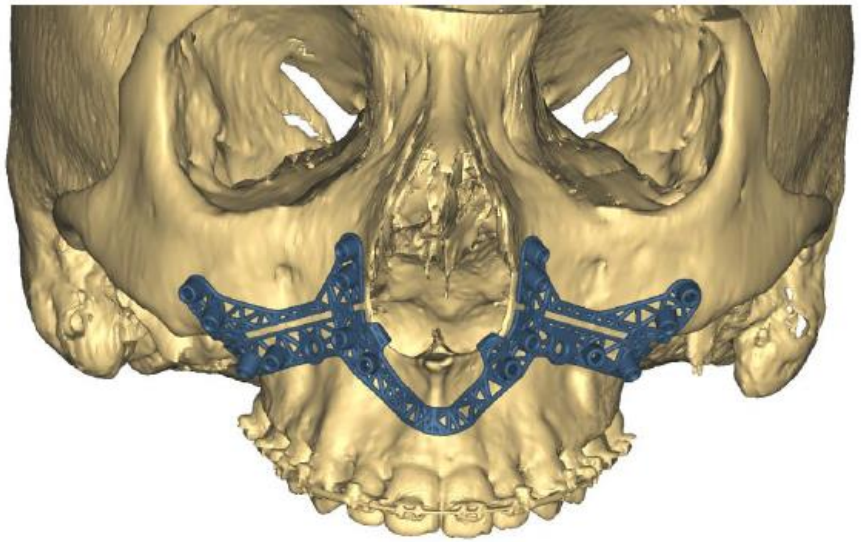
Texas Children's Hospital®

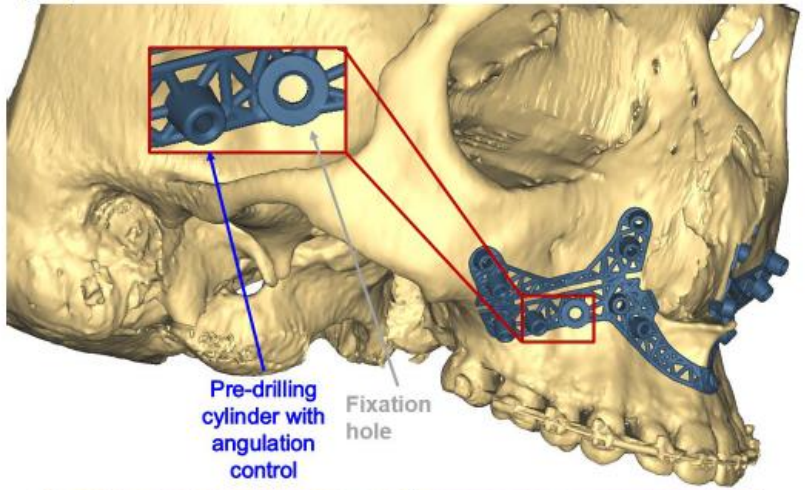
HOUSTON Methodist
LEADING MEDICINE

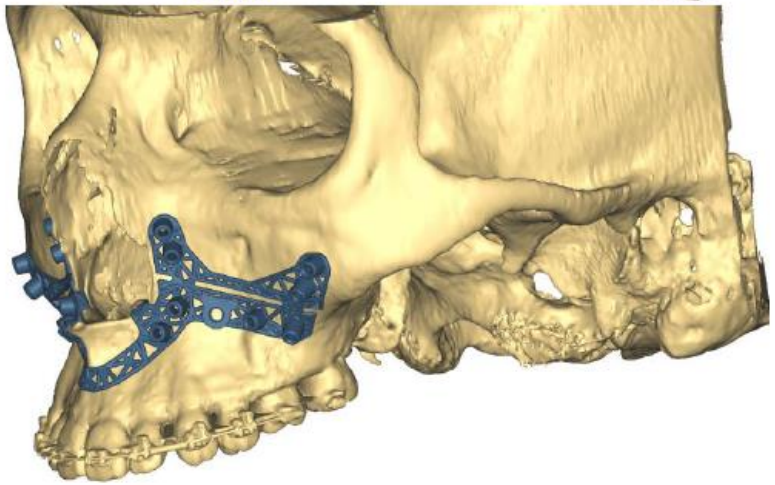
LINKS TO ALL SOCIALS

Guide Design: Titanium 3D printed Guide for Midface

- Fixation hole (temporary fixation of guide): for use with MatrixORTHOGNATHIC Ø1.85 mm screws → indicated in grey
- Pre-drill cylinders with angulation control: for use with 1.4/1.5 mm DePuy Synthes drill bits → indicated in blue







ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

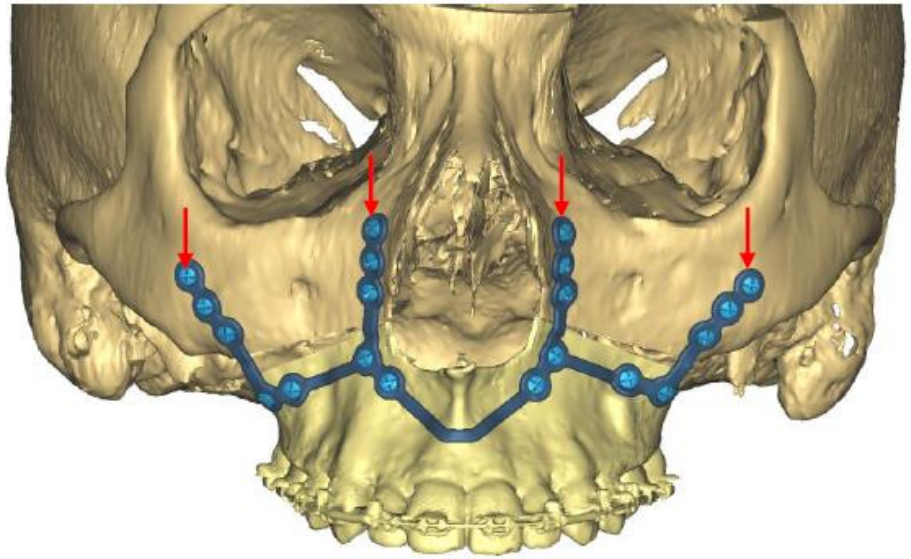
Texas Children's Hospital®

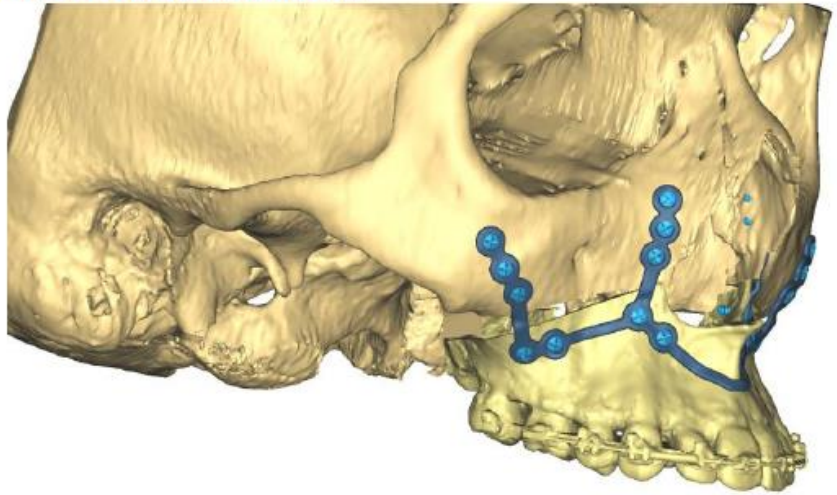
HOUSTON Methodist
LEADING MEDICINE

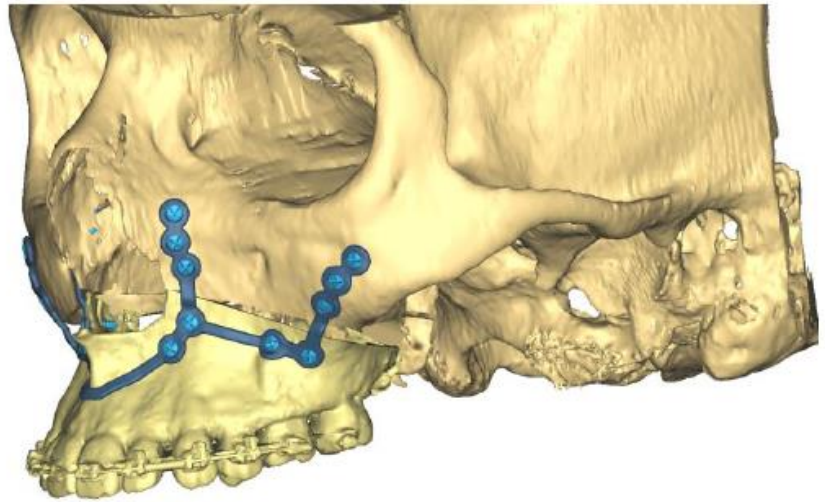
LINKS TO ALL SOCIALS

Implant Design: Titanium 3D printed Plate for Midface (1 mm)

- Screw hole: for use with MatrixORTHOGNATHIC Ø1.85 mm screws
- Screw pre-drilling guided using surgical guides. Non-guided screws are indicated with red arrows.





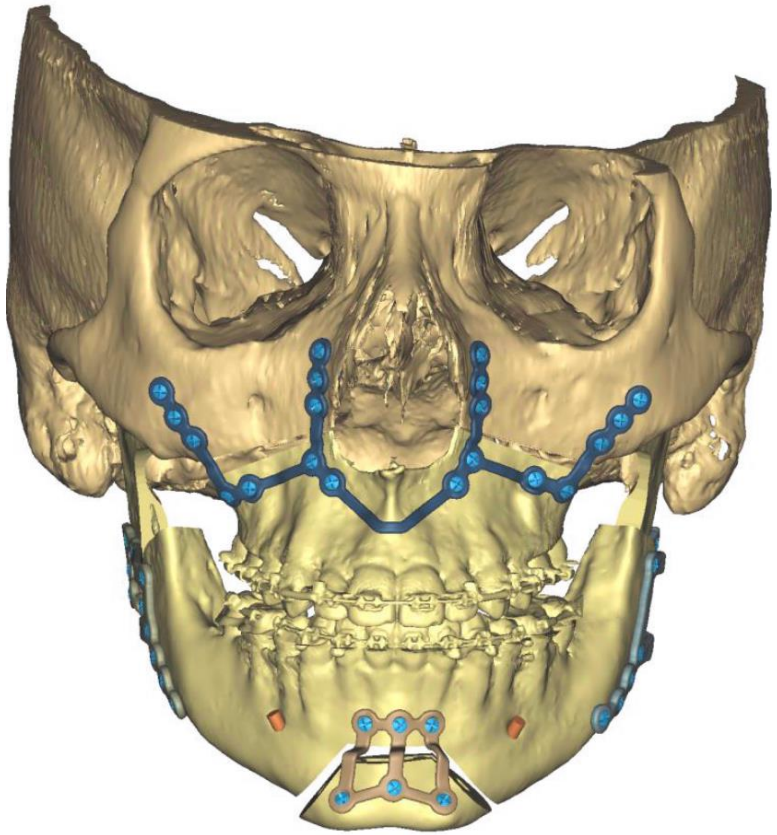


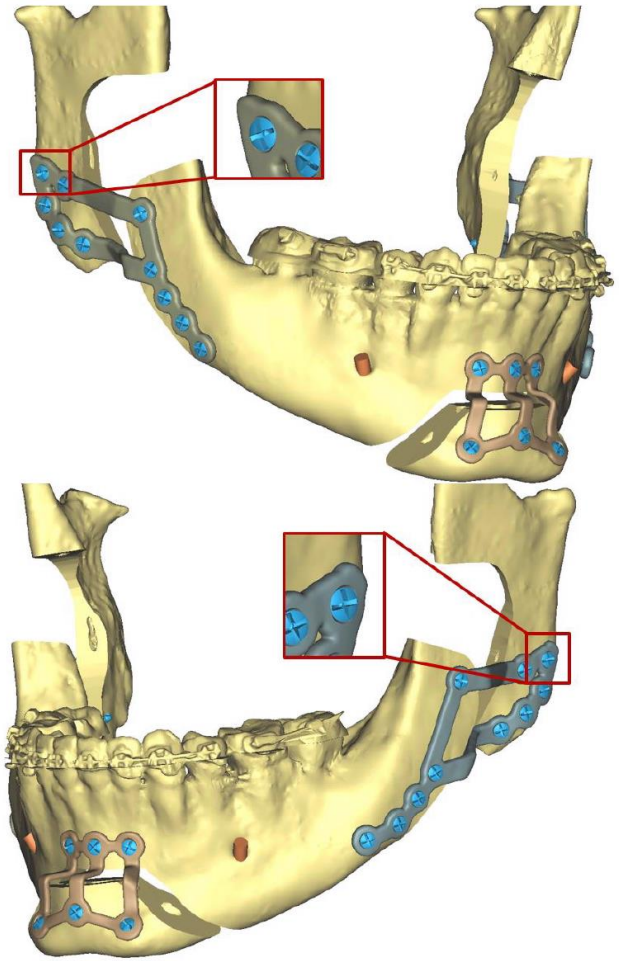
ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

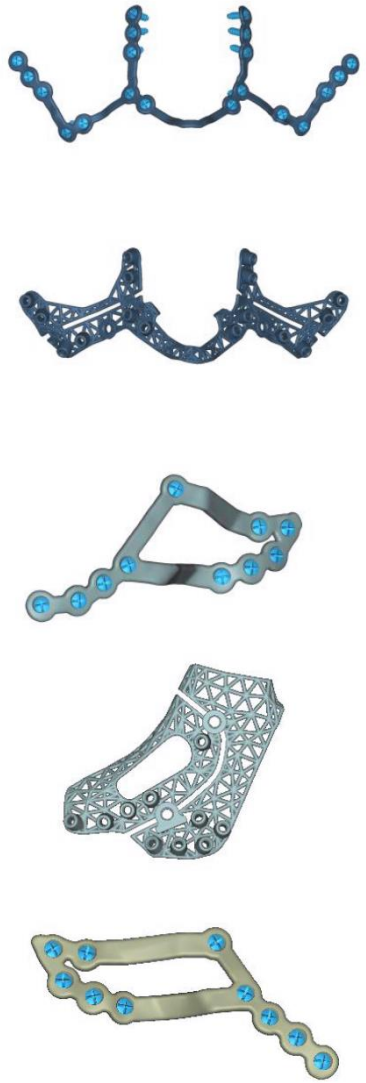
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





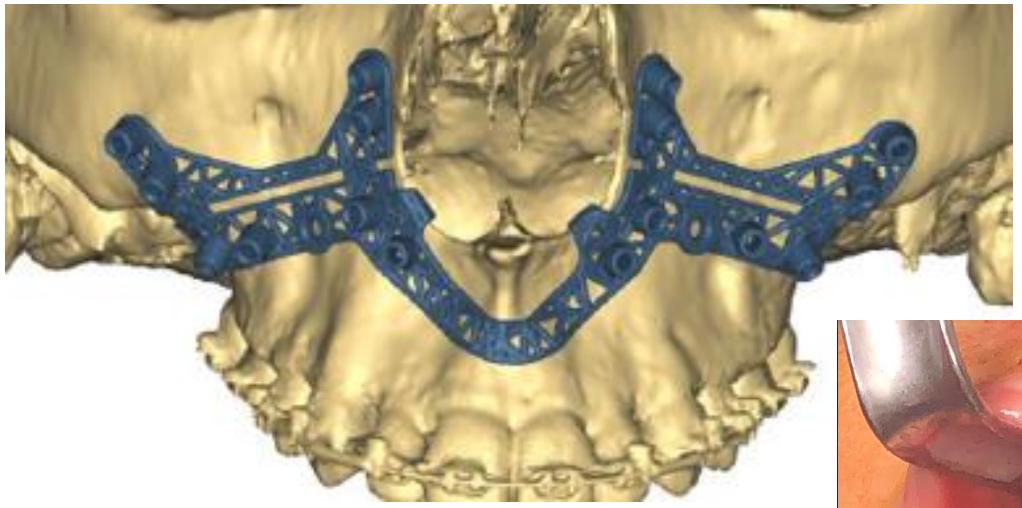


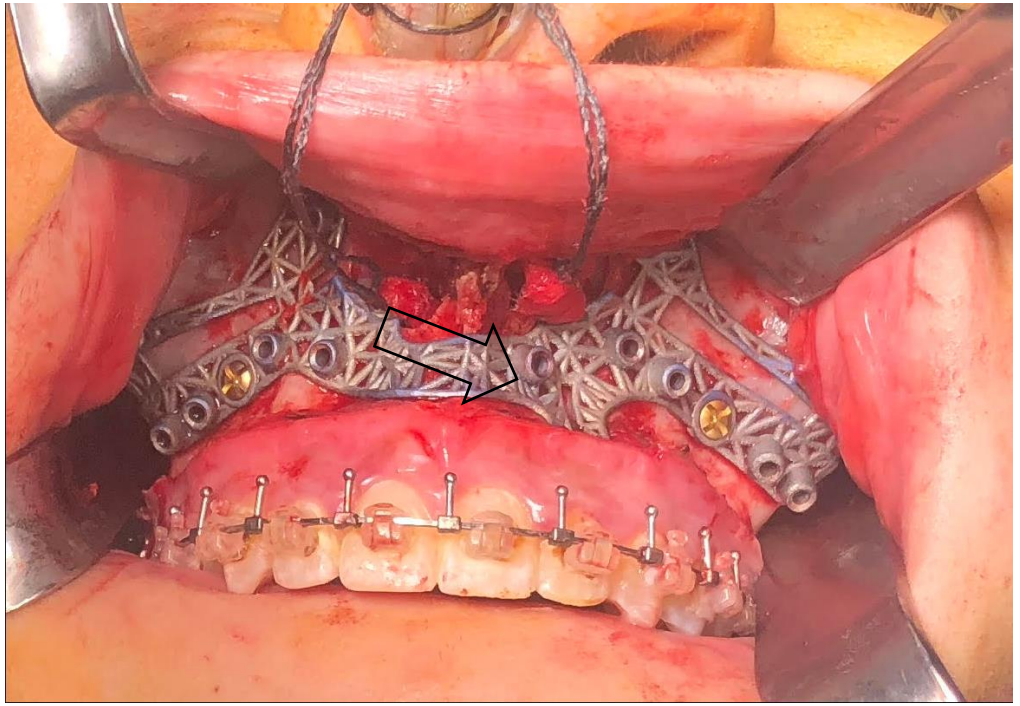
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



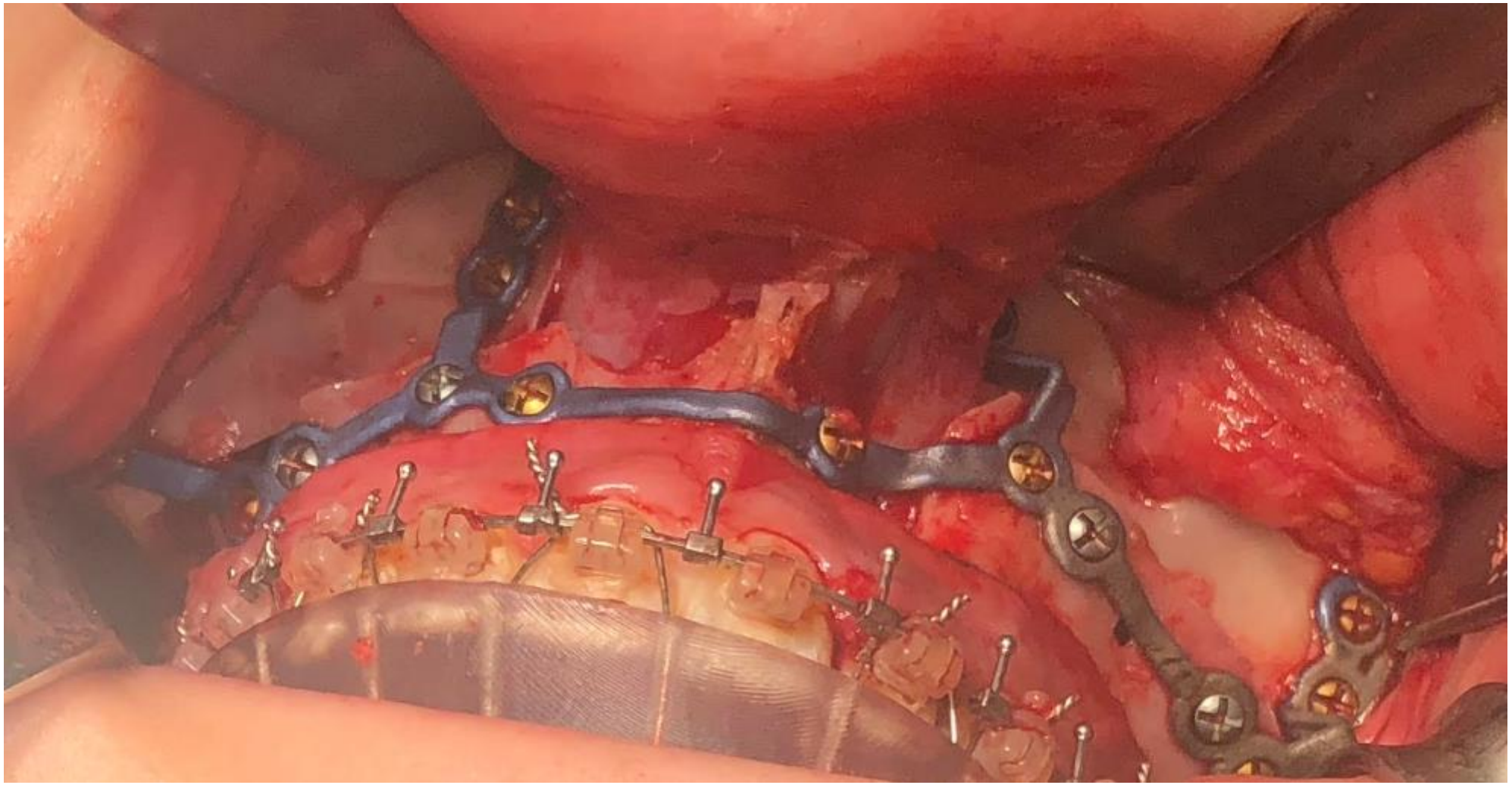


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

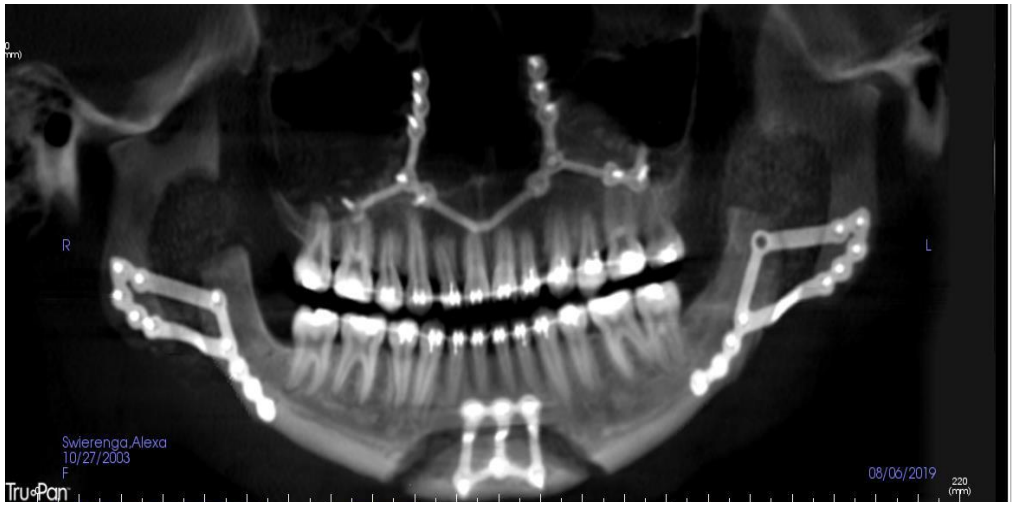


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

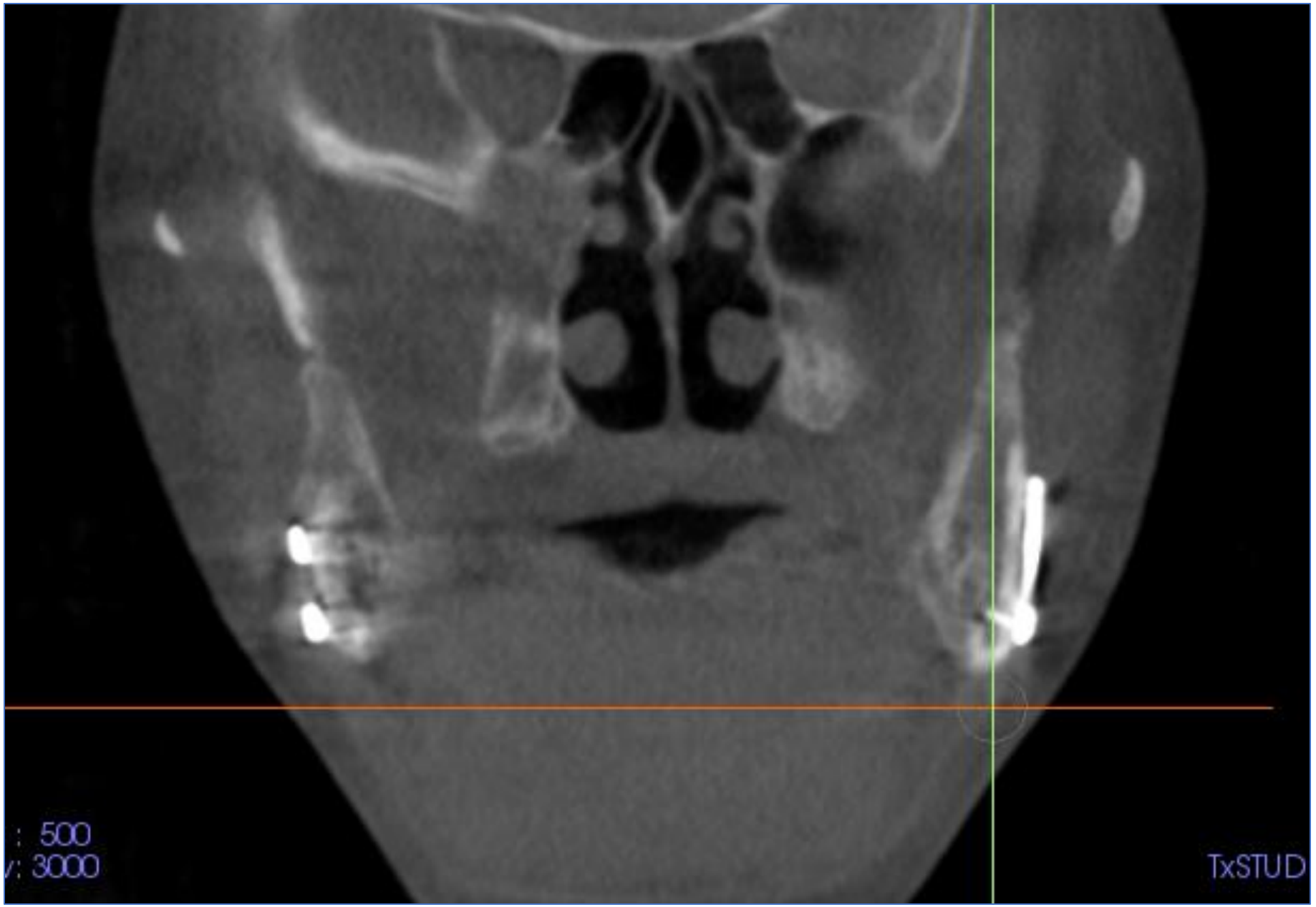


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

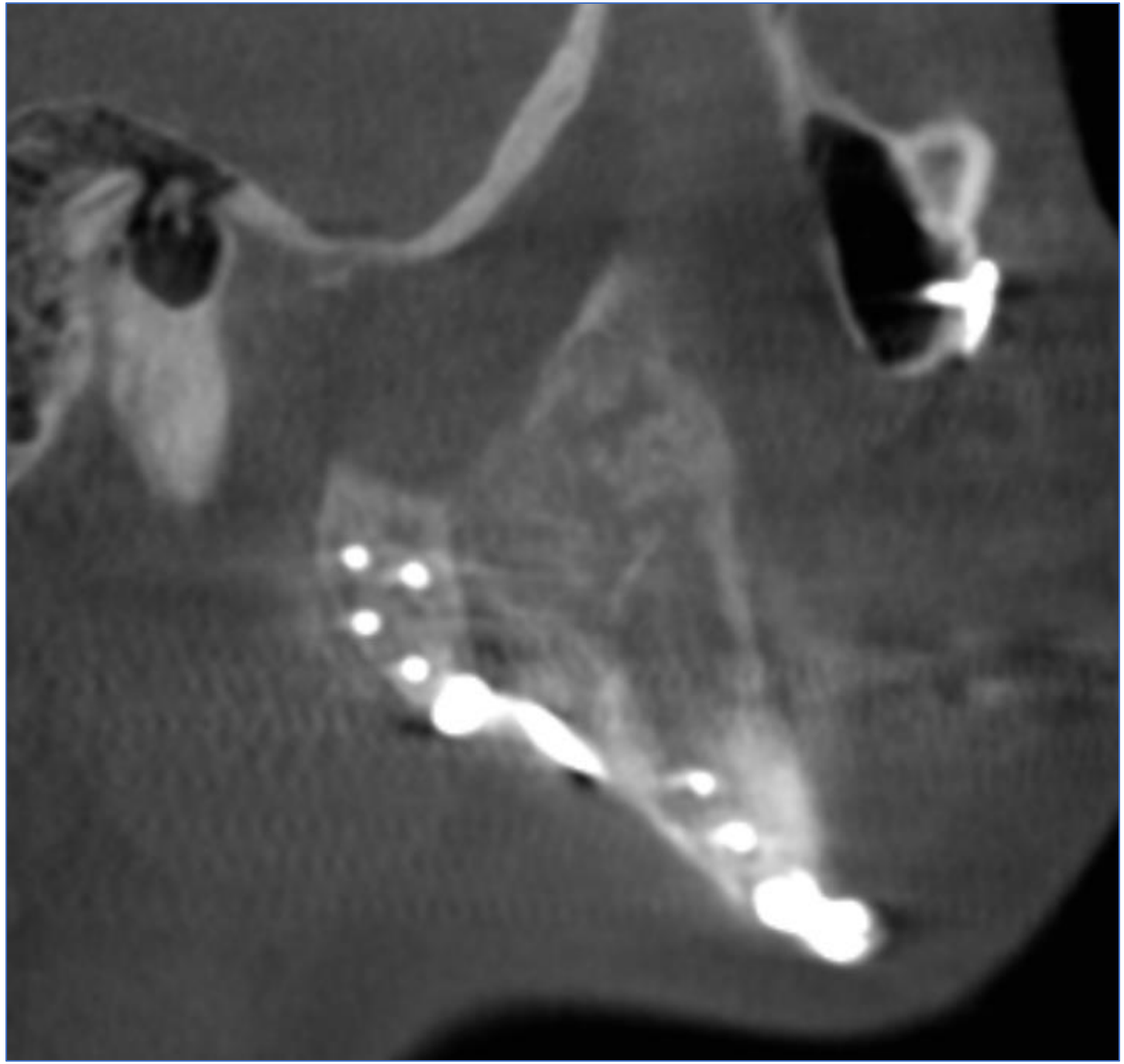


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

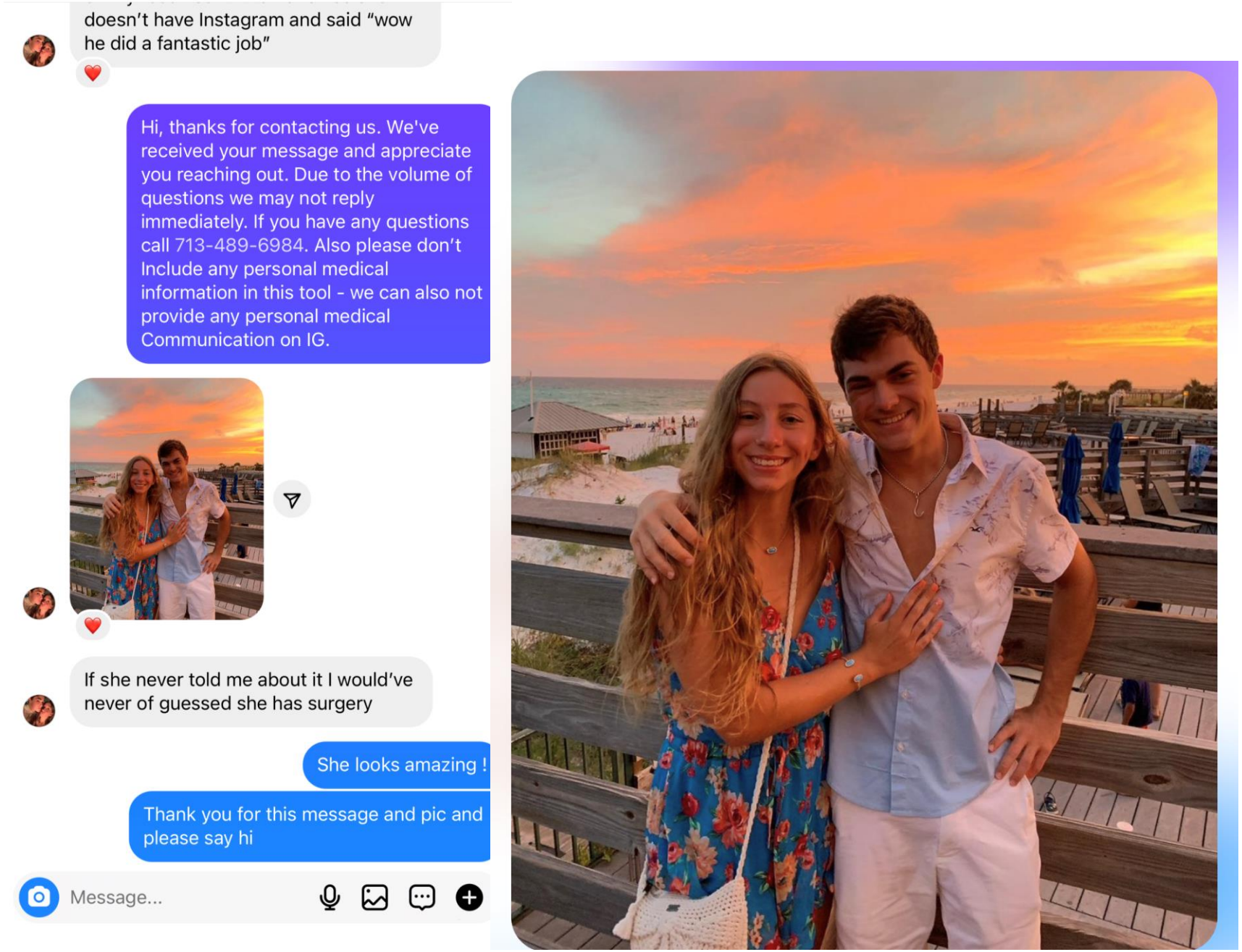
LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

CC: left TMJ pain

HPI: The patient is a 55-year-old woman who has had left TMJ problems for 13 years. She has managed her symptoms with an orthotic, until 3 months ago when she got worse. Now, she has daily. The pain is episodic, sometimes happening while at rest, other times when talking, or when chewing. The pain is severe is localized in the left temple, and left masseter, radiating, over the head, to the contralateral temple.

In addition to the pain, the patient has had intermitted locking (closed) of the left TMJ. She always been able to unlock her joint , by manipulating it.

X-RAYS: CBCT TMJs: Severe degenerative changes in the TMJs, left worse than right. On the left, there is significant condylar erosion, with irregular articular surface and significantly decrease joint space. On the right, the condyle has a large pseudocyst and some osteophytes.

ASSESMENT:

1. Severe left TMJ osteoarthritis, with severe arthralgia
2. Moderate to severe right TMJ osteoarthritis, with mild arthralgia

PLAN:

1. Kenalog injection in the left TMJ, under sedation
2. The patient may need a total joint replacement

ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

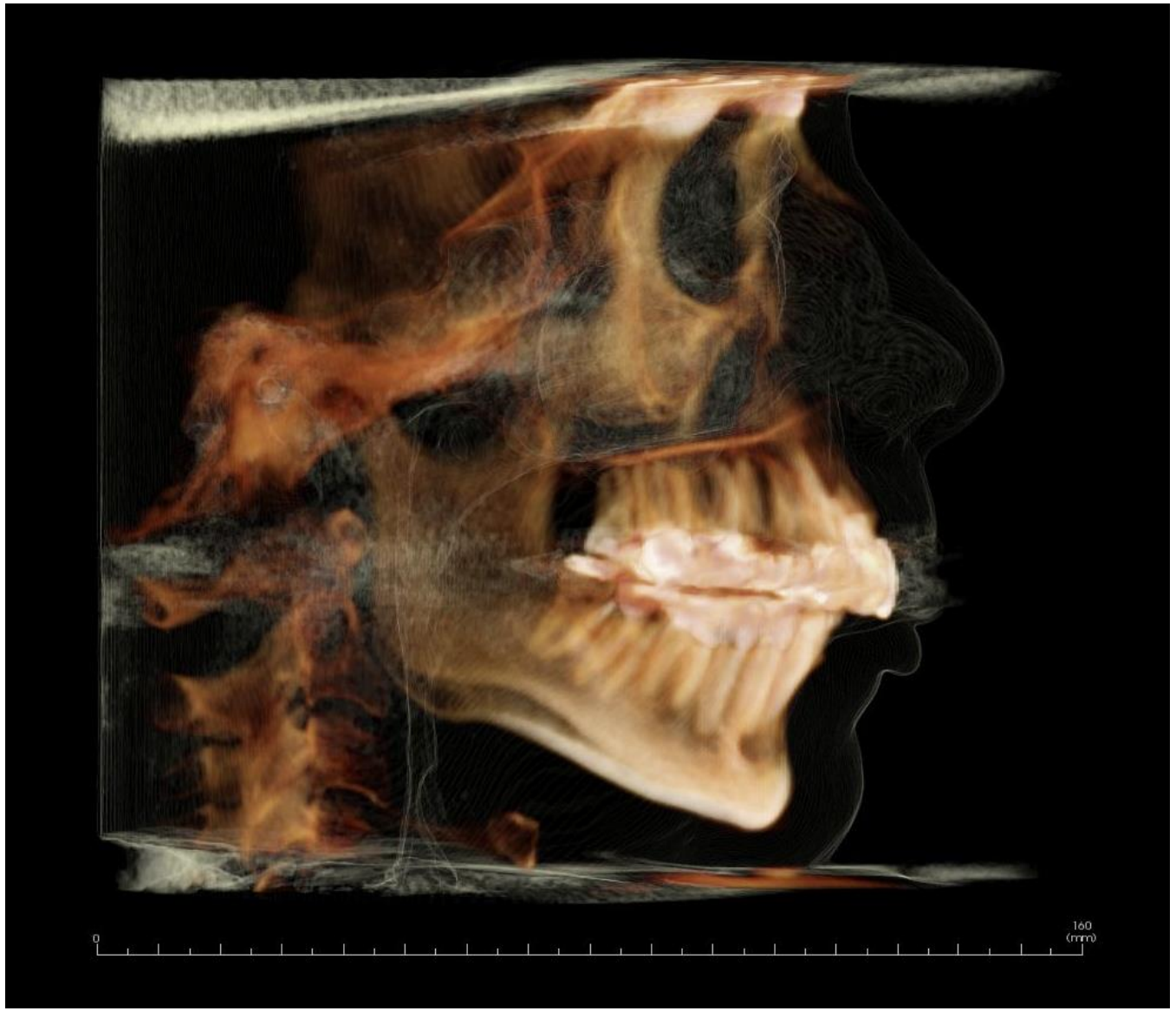
LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

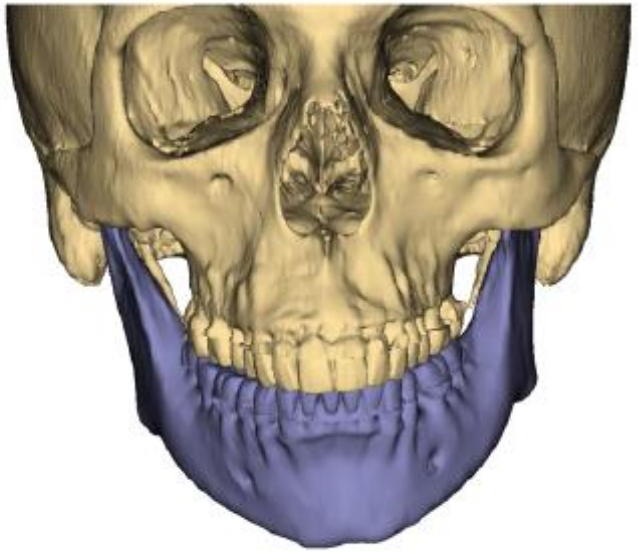


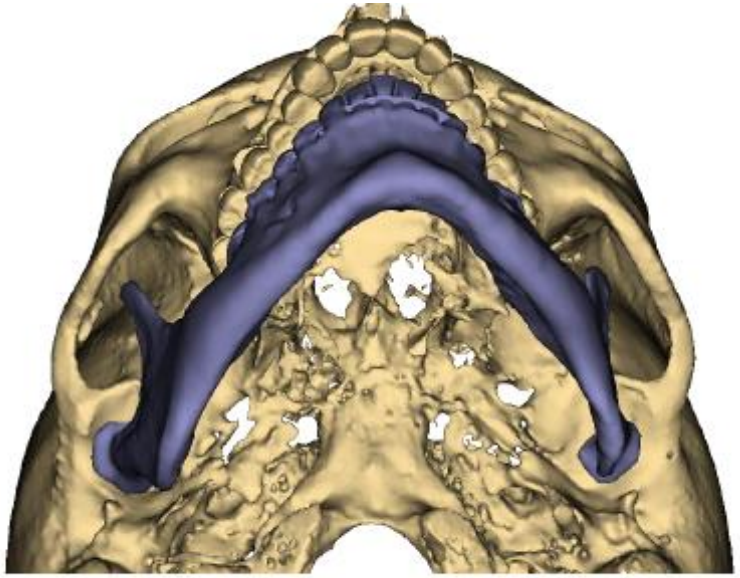
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

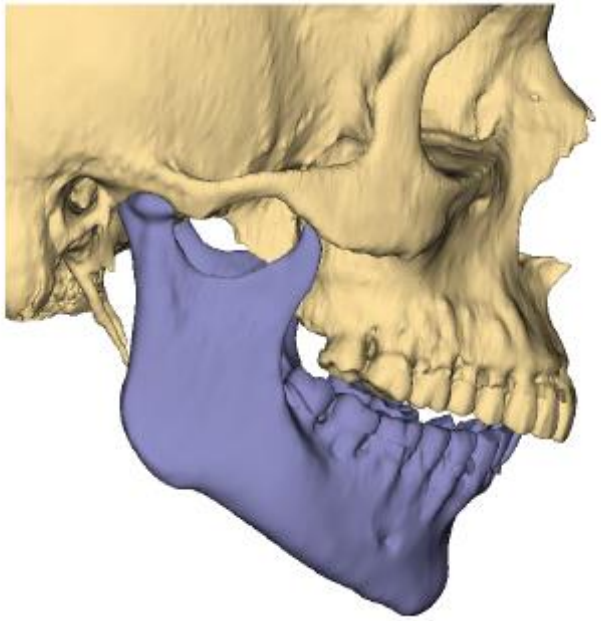
Texas Children's
Hospital®

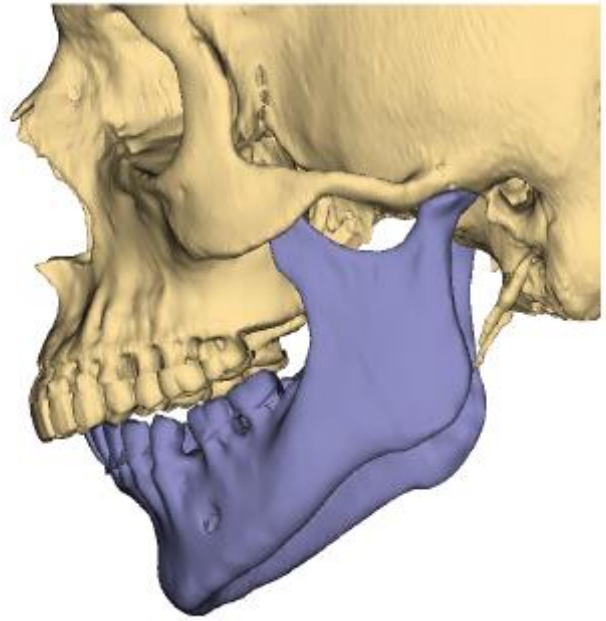
HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







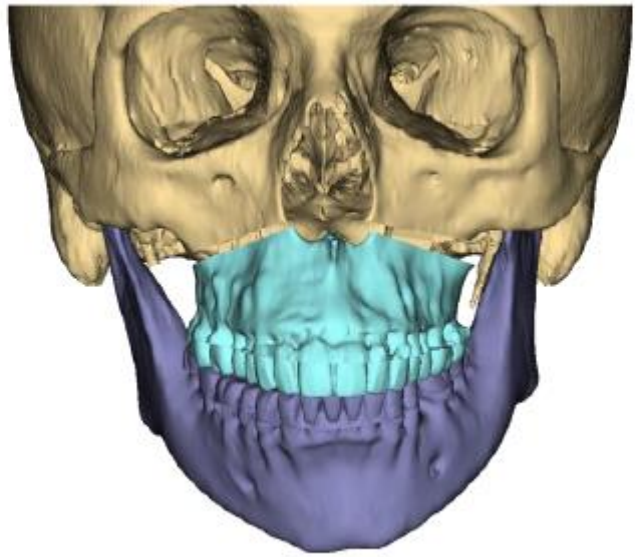


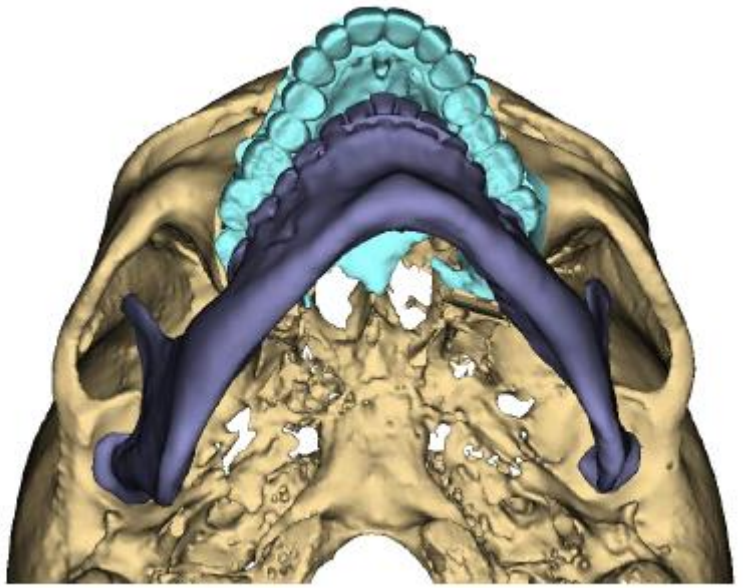
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

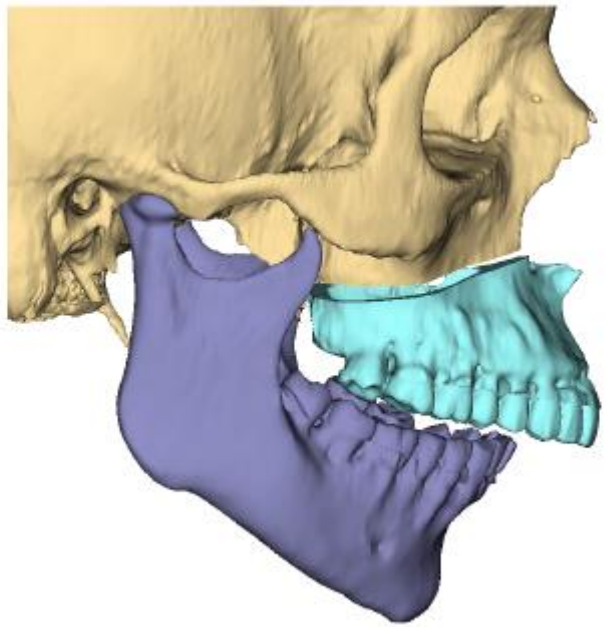
Texas Children's Hospital®

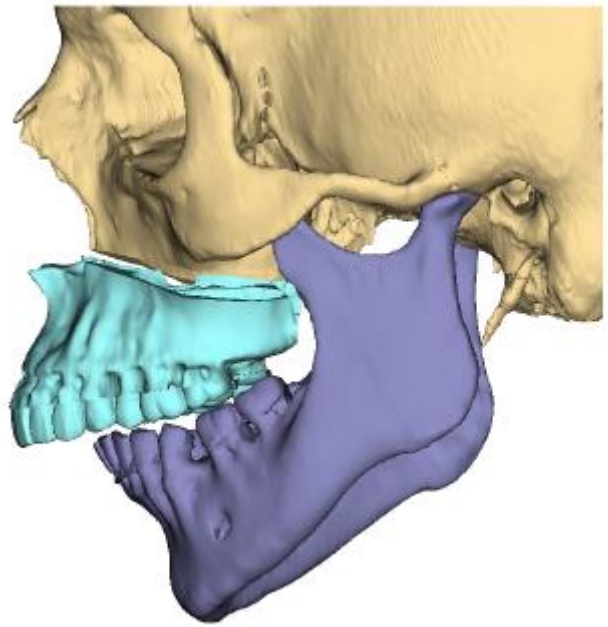
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







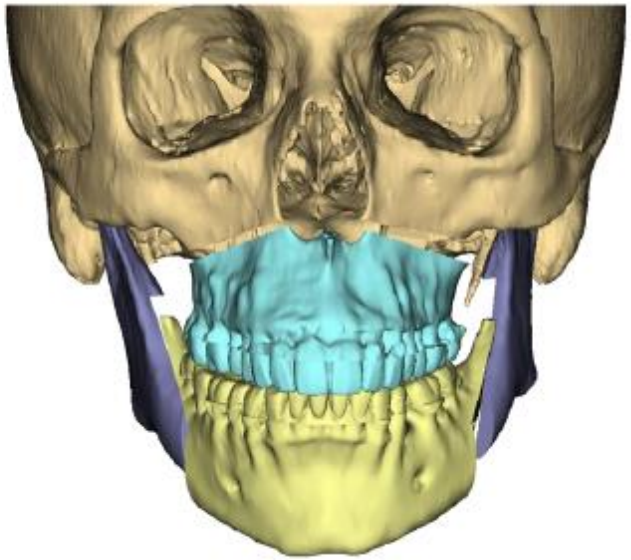


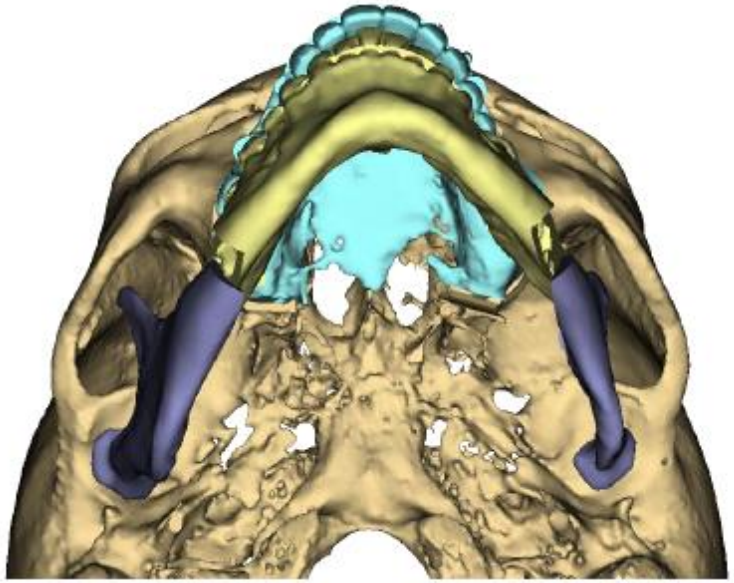
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

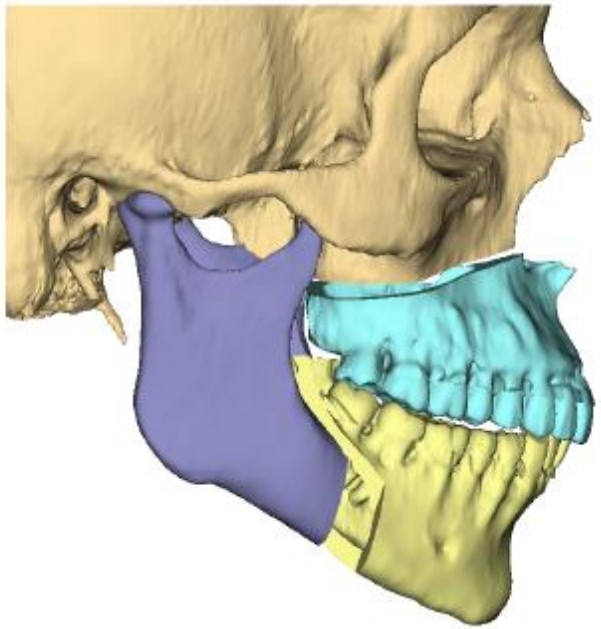
Texas Children's Hospital®

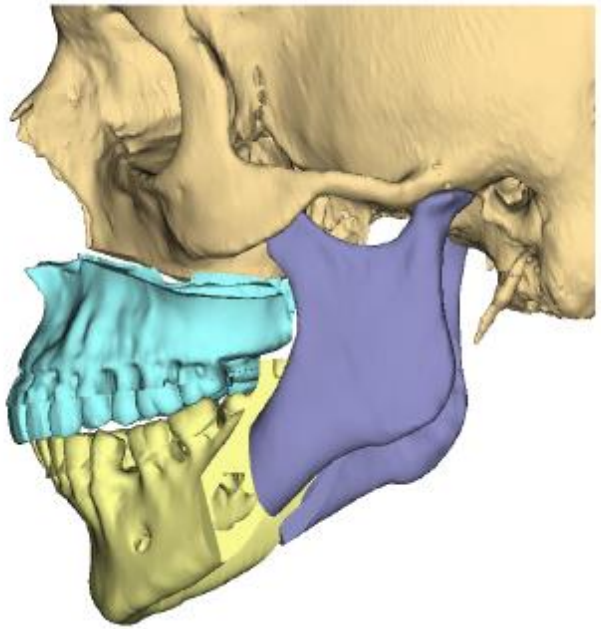
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







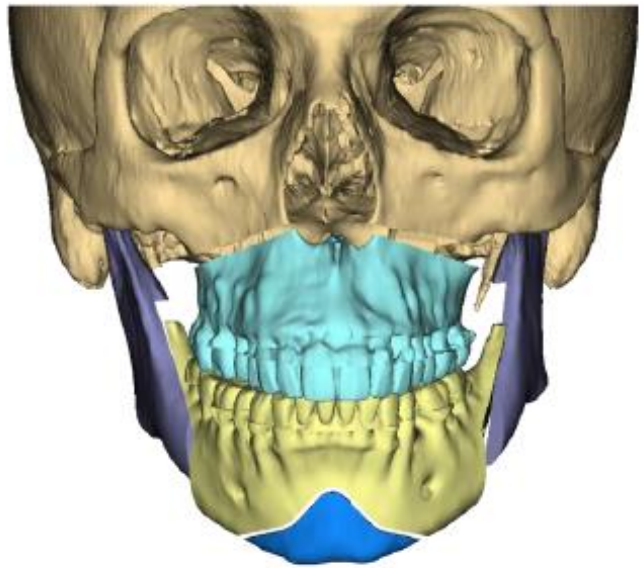


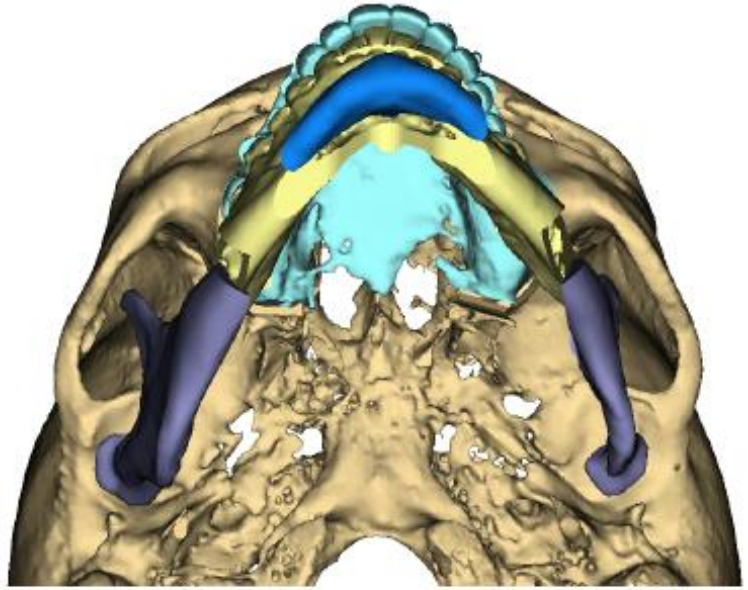
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

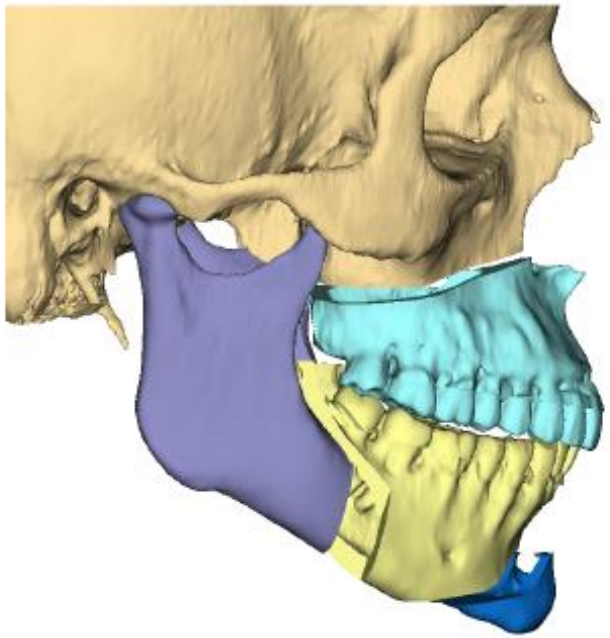
Texas Children's Hospital®

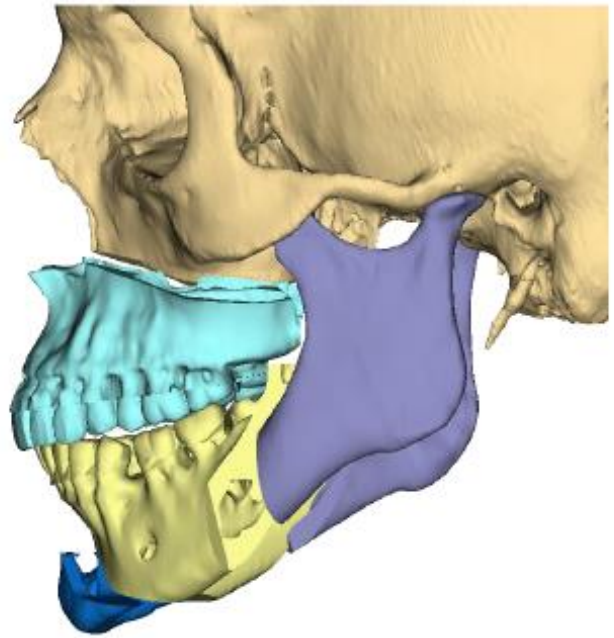
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







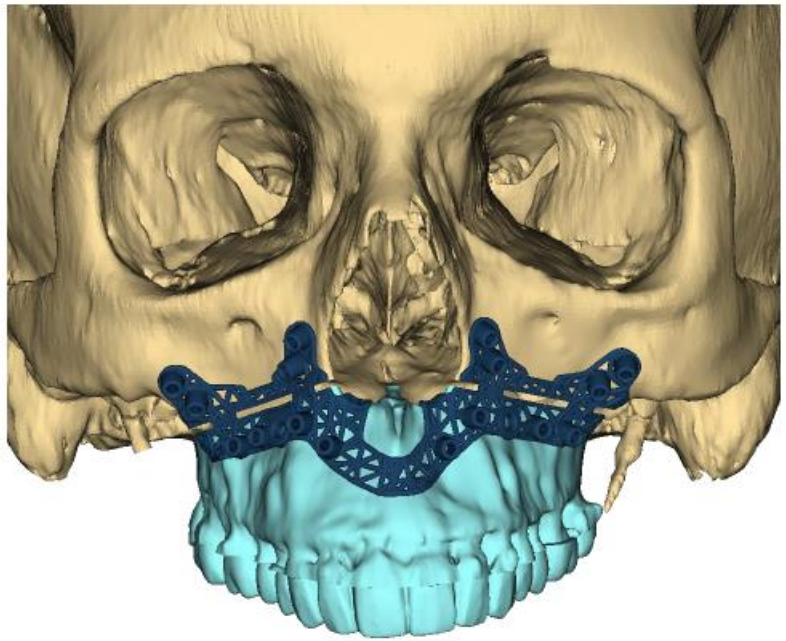


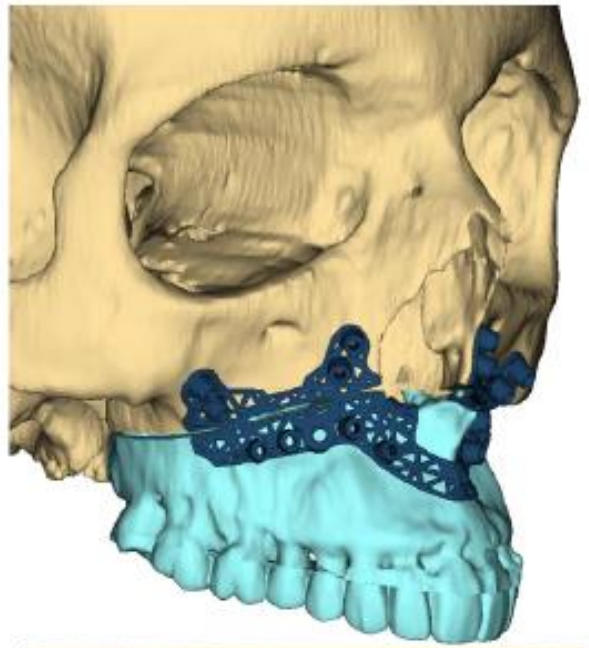
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

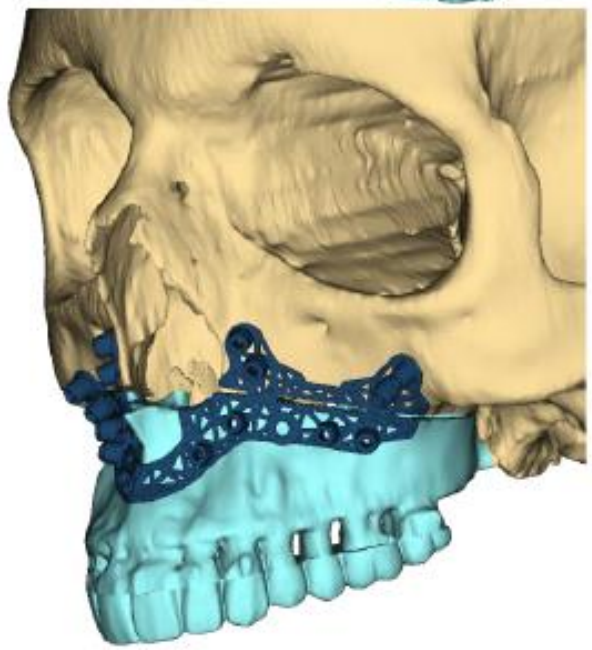
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





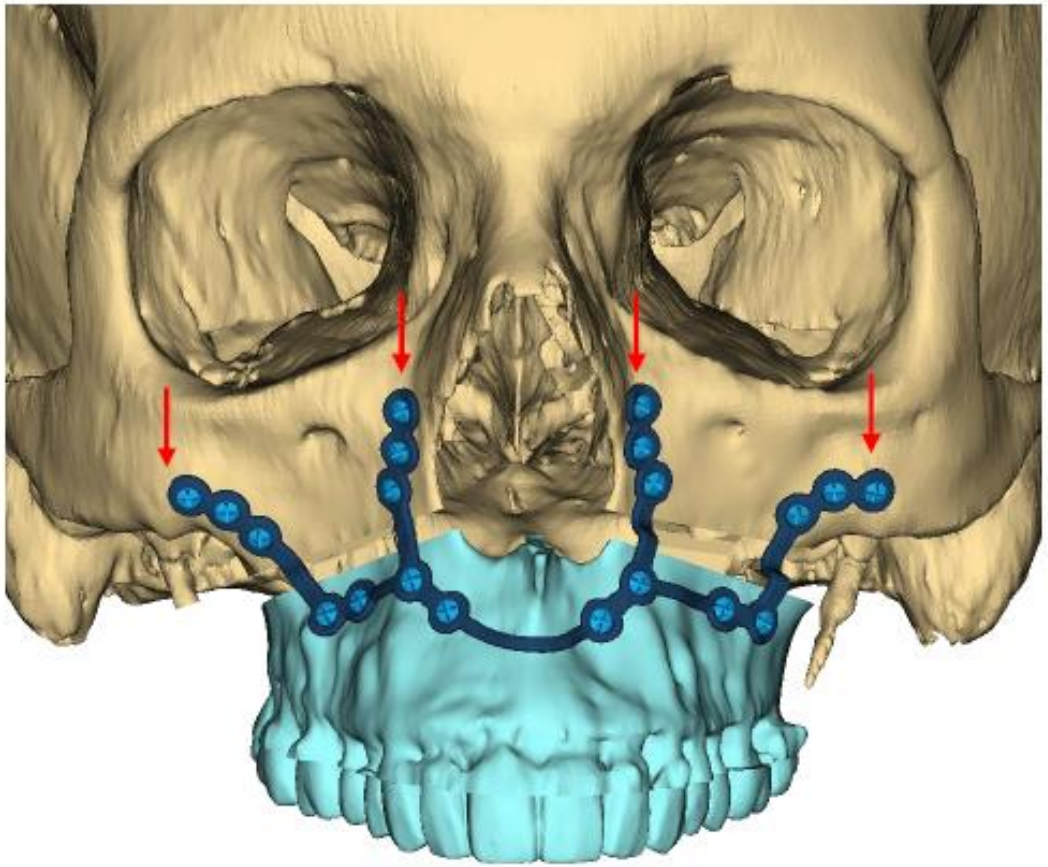


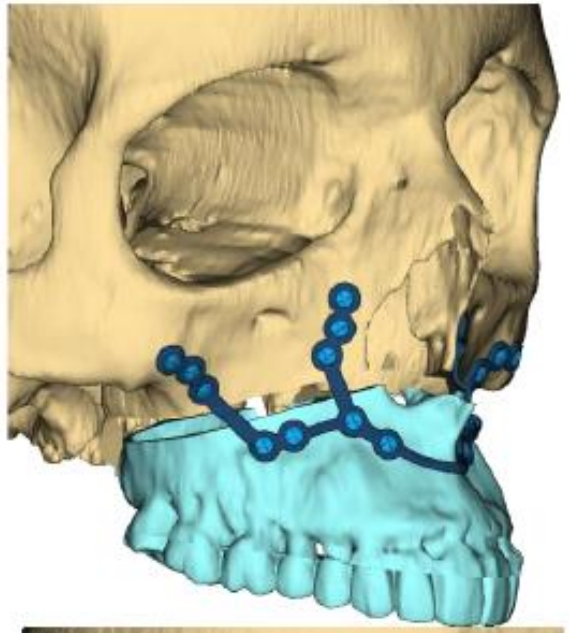
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

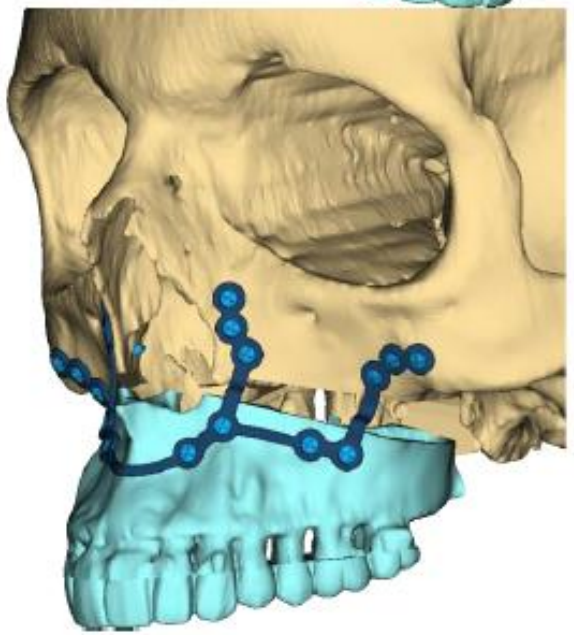
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





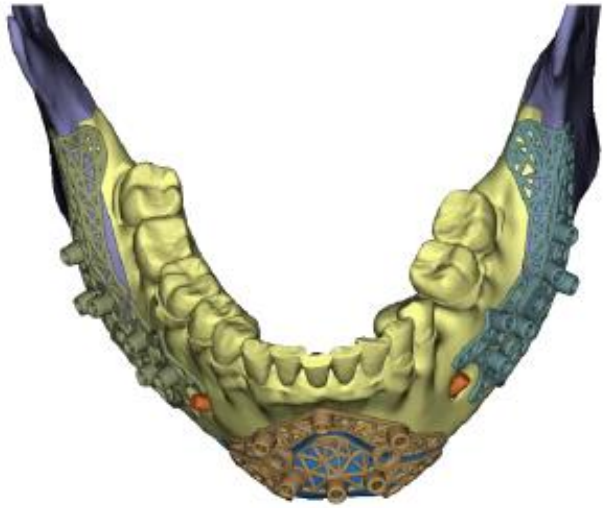


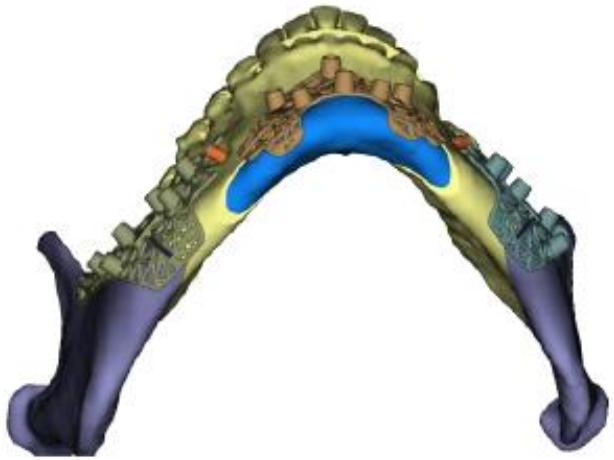
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

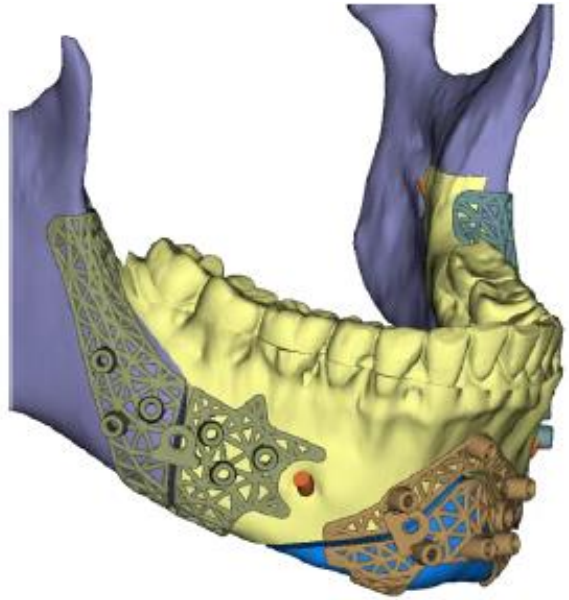
Texas Children's Hospital®

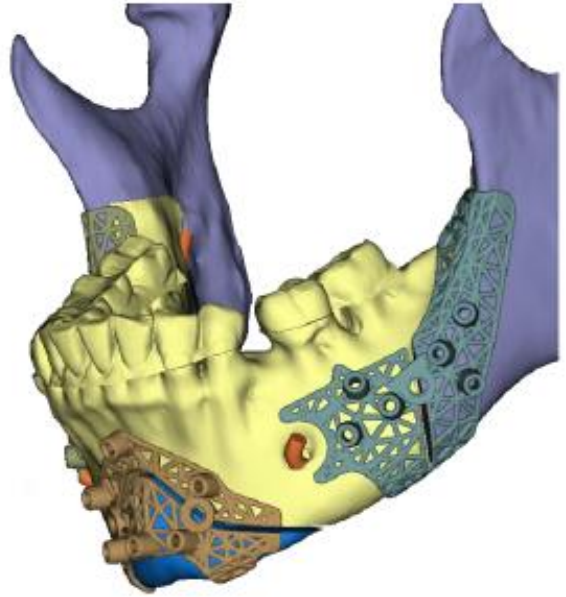
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







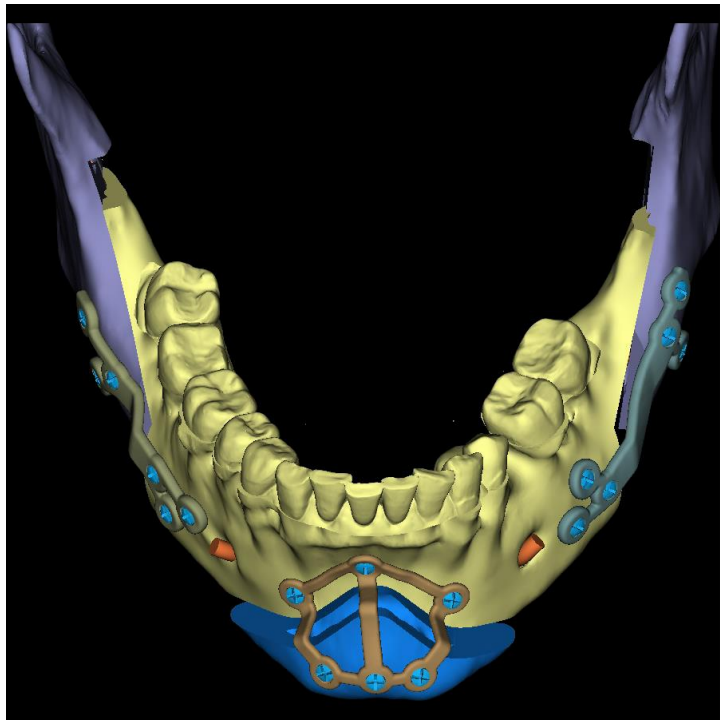


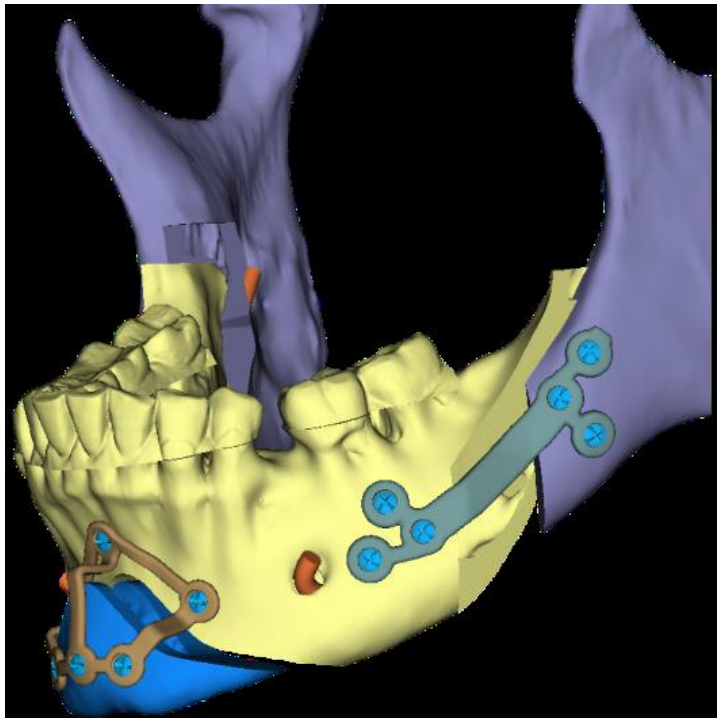
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

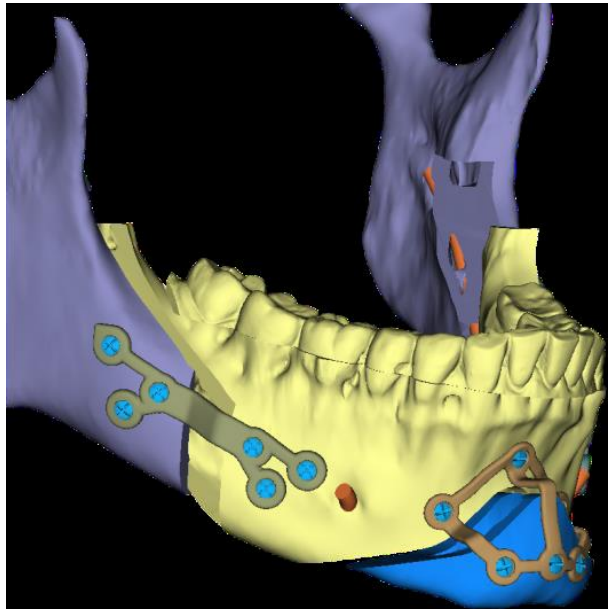
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

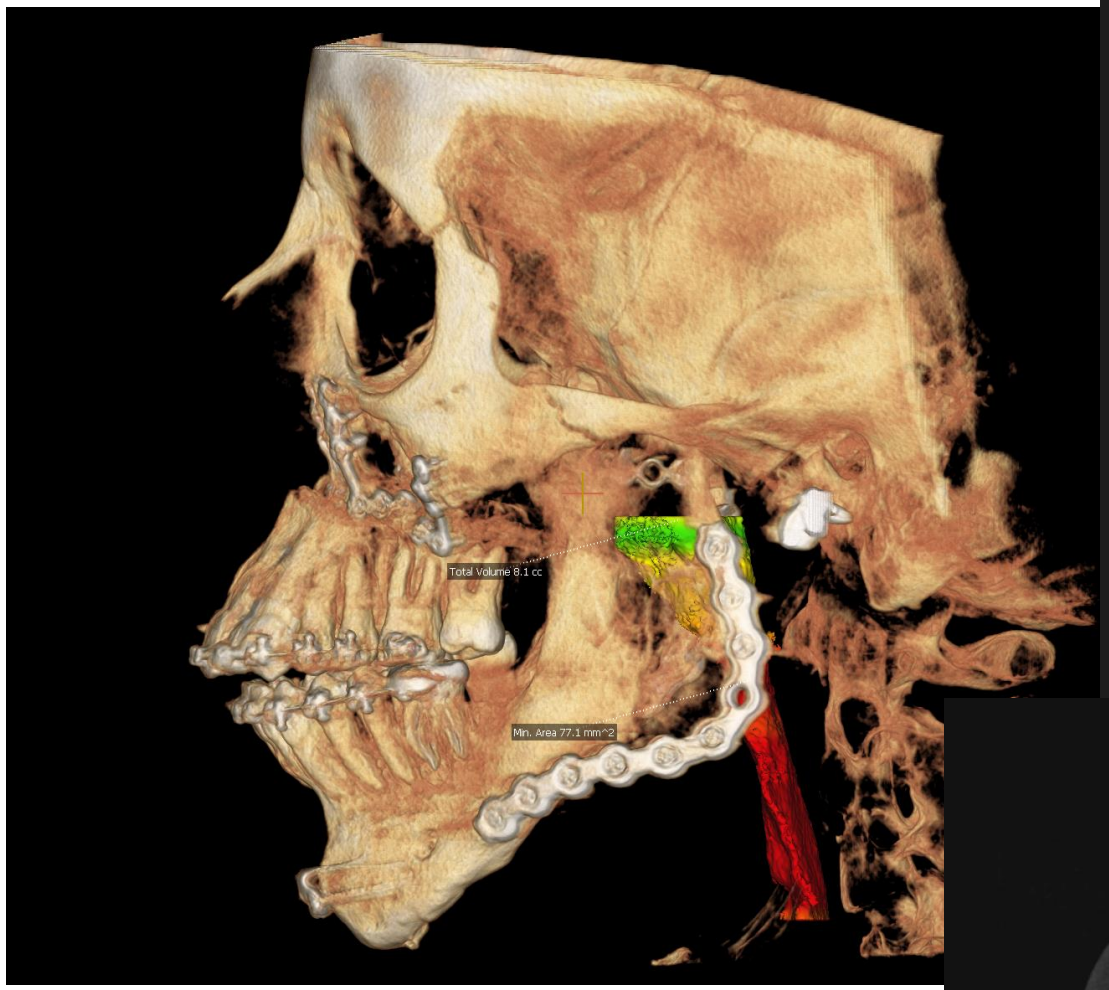
LINKS TO ALL SOCIALS

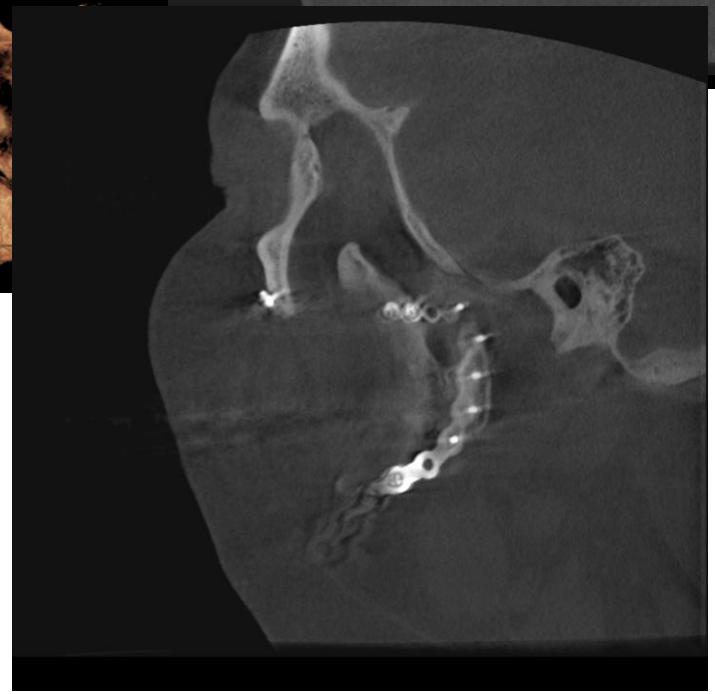
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



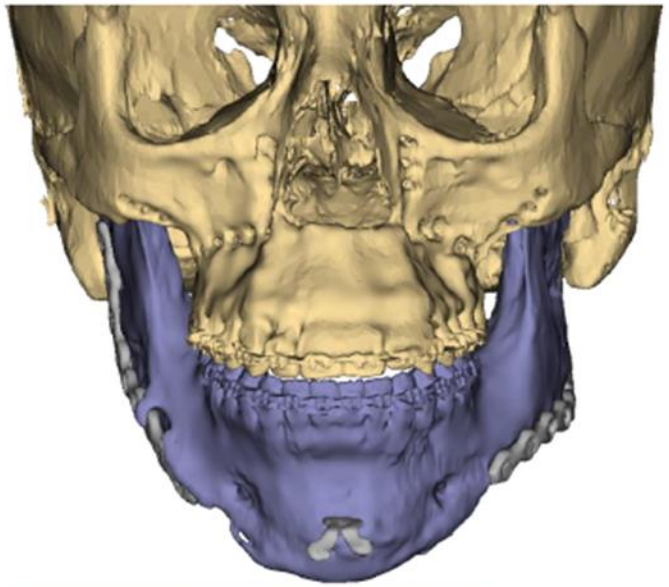


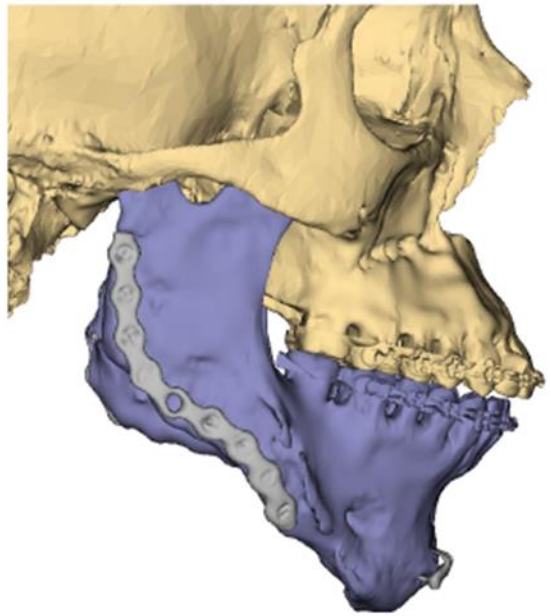
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

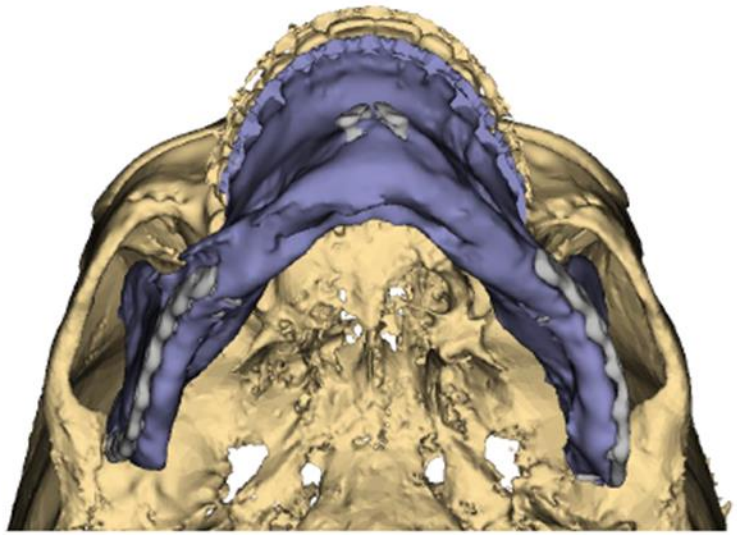
Texas Children's Hospital®

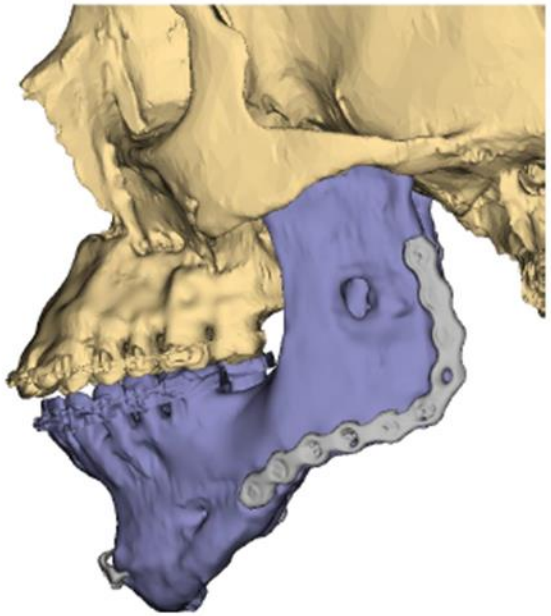
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







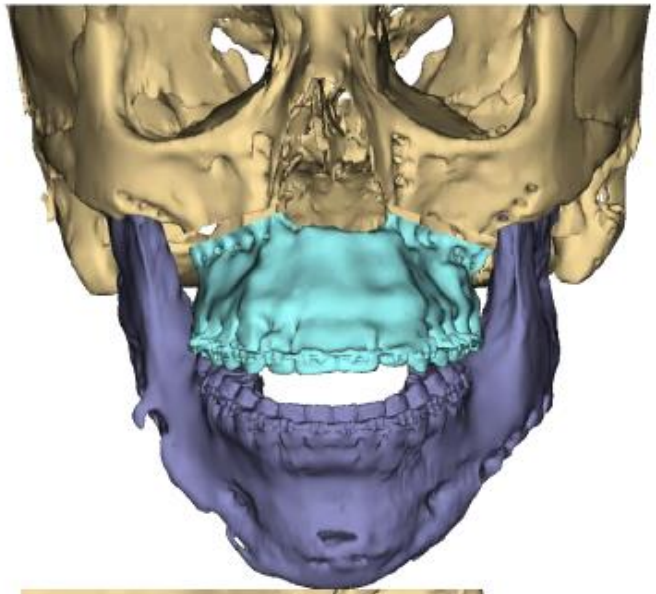


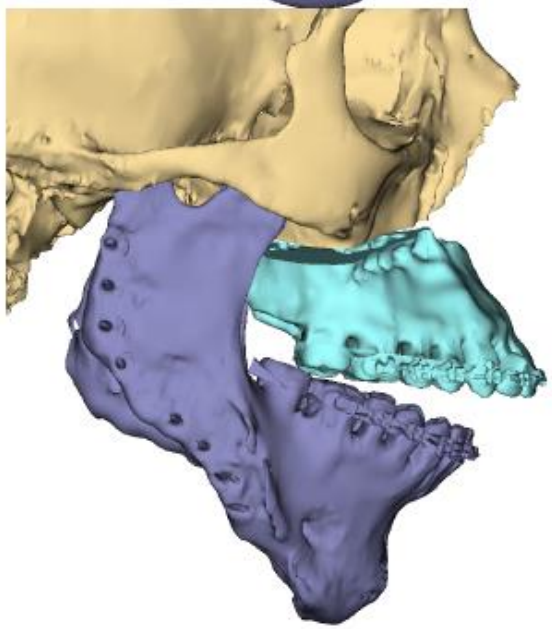
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

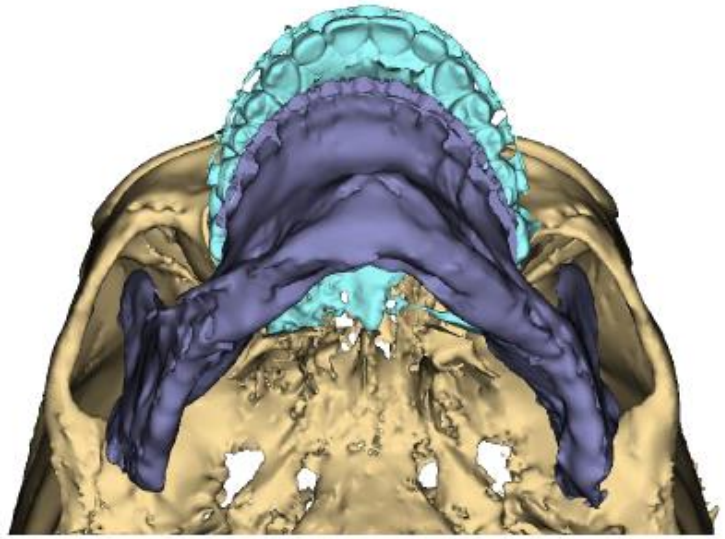
Texas Children's Hospital®

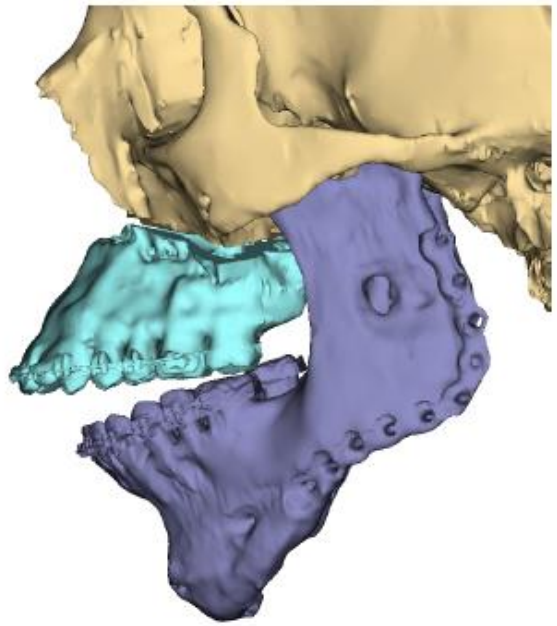
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







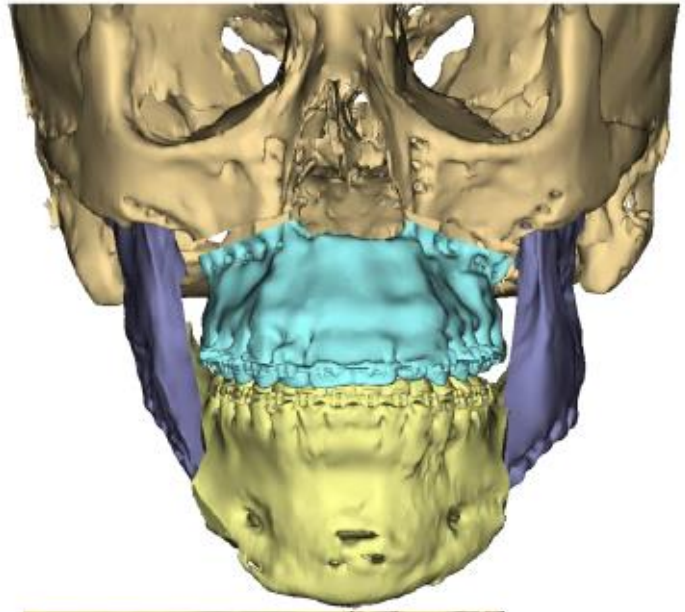


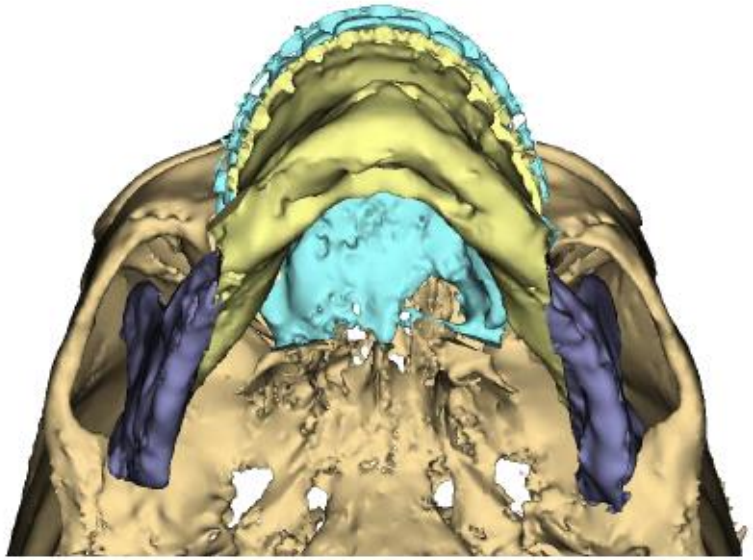
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

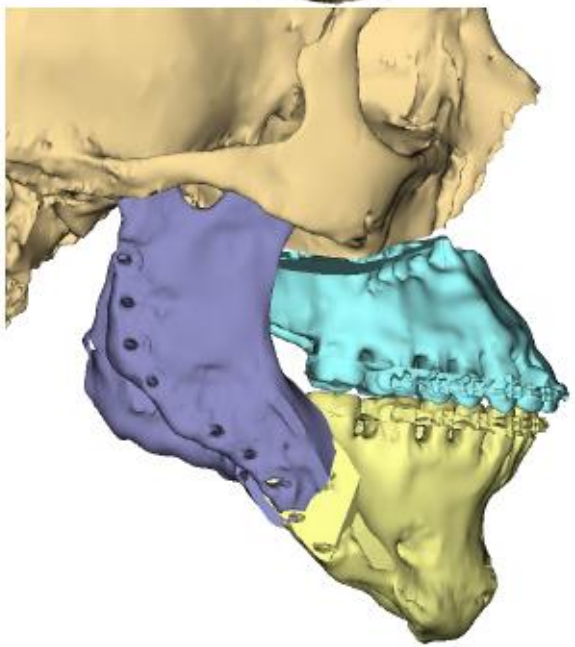
Texas Children's Hospital®

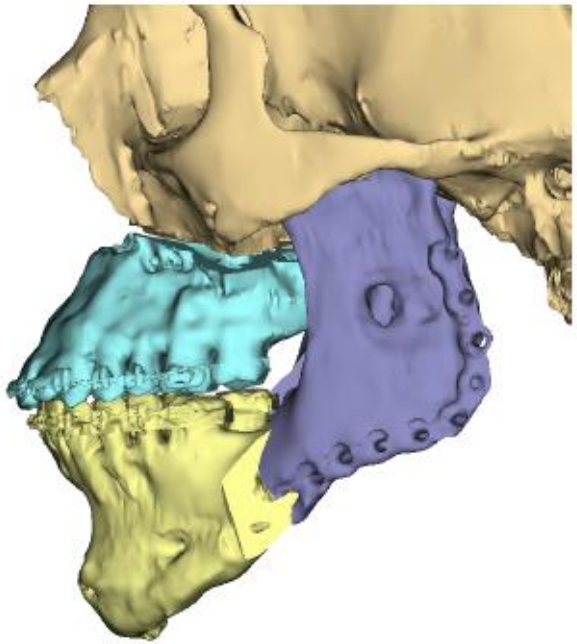
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







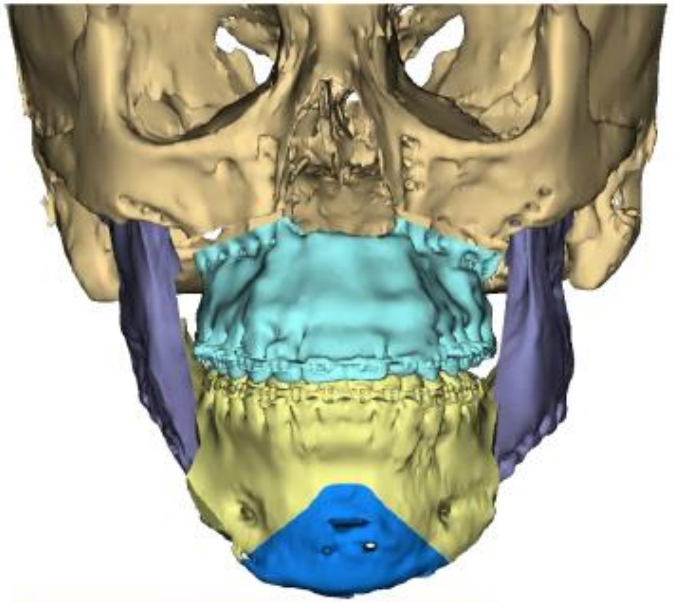


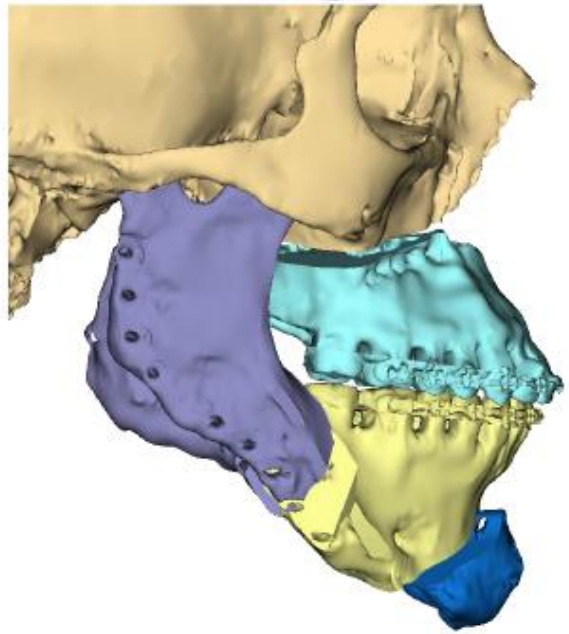
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

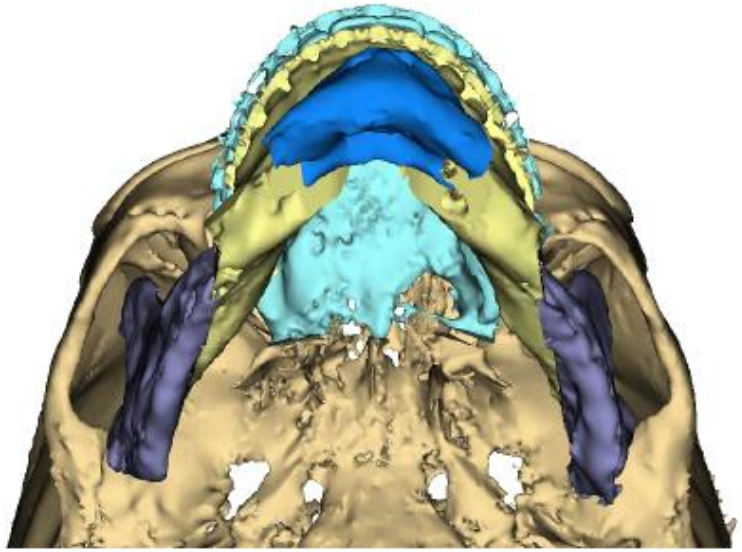
Texas Children's Hospital®

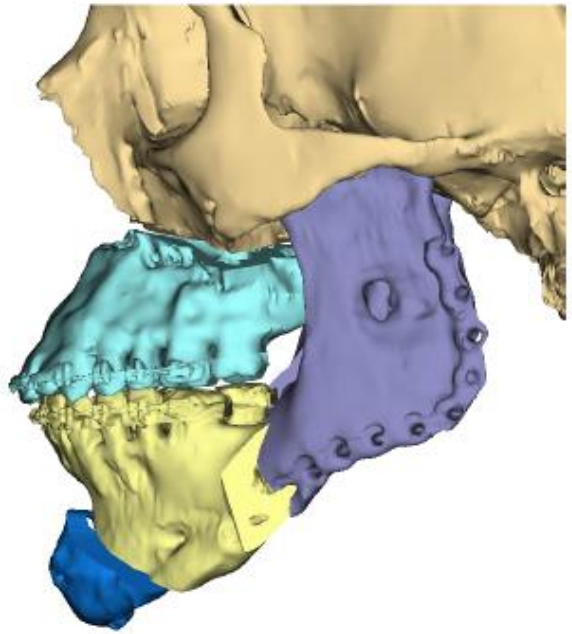
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







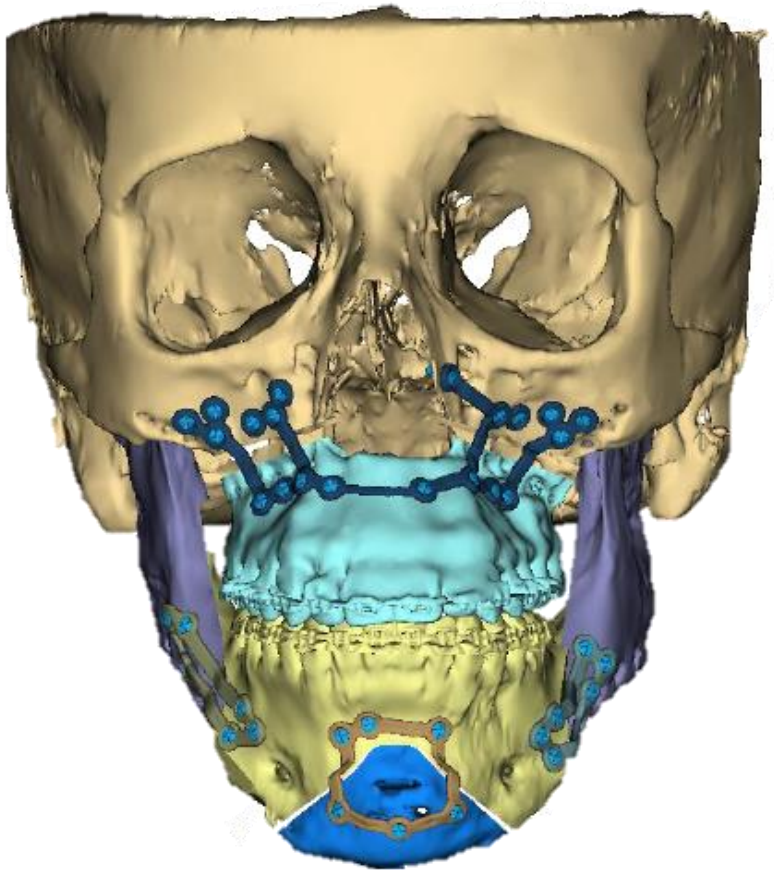


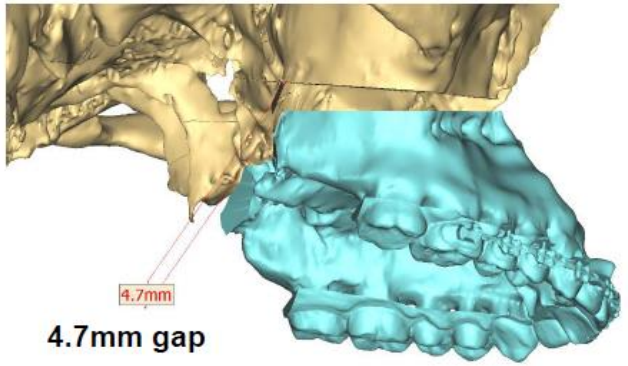
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

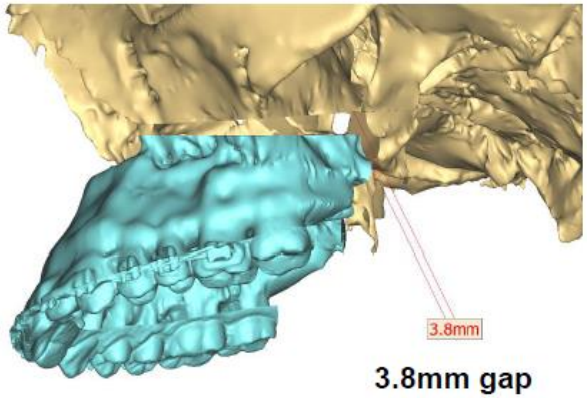
Texas Children's Hospital®

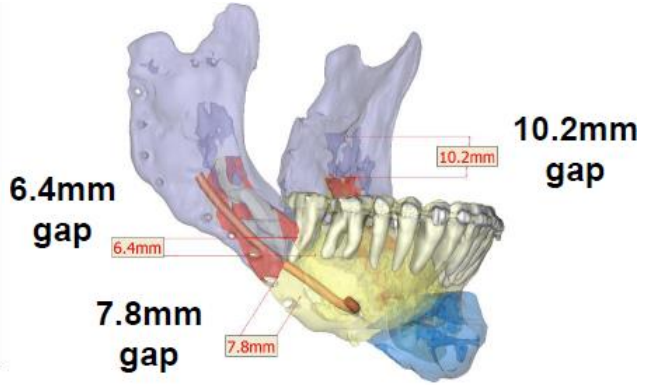
HOUSTON Methodist
LEADING MEDICINE

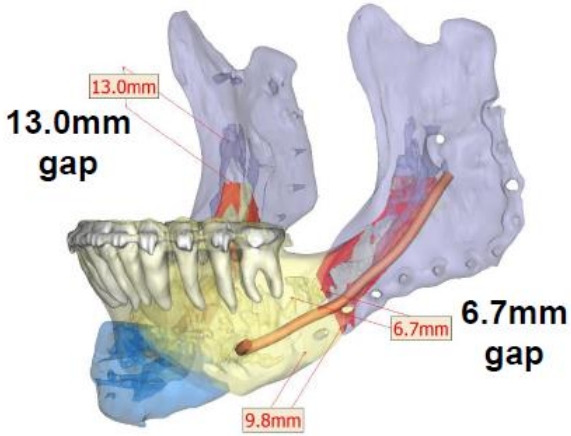
LINKS TO ALL SOCIALS











ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

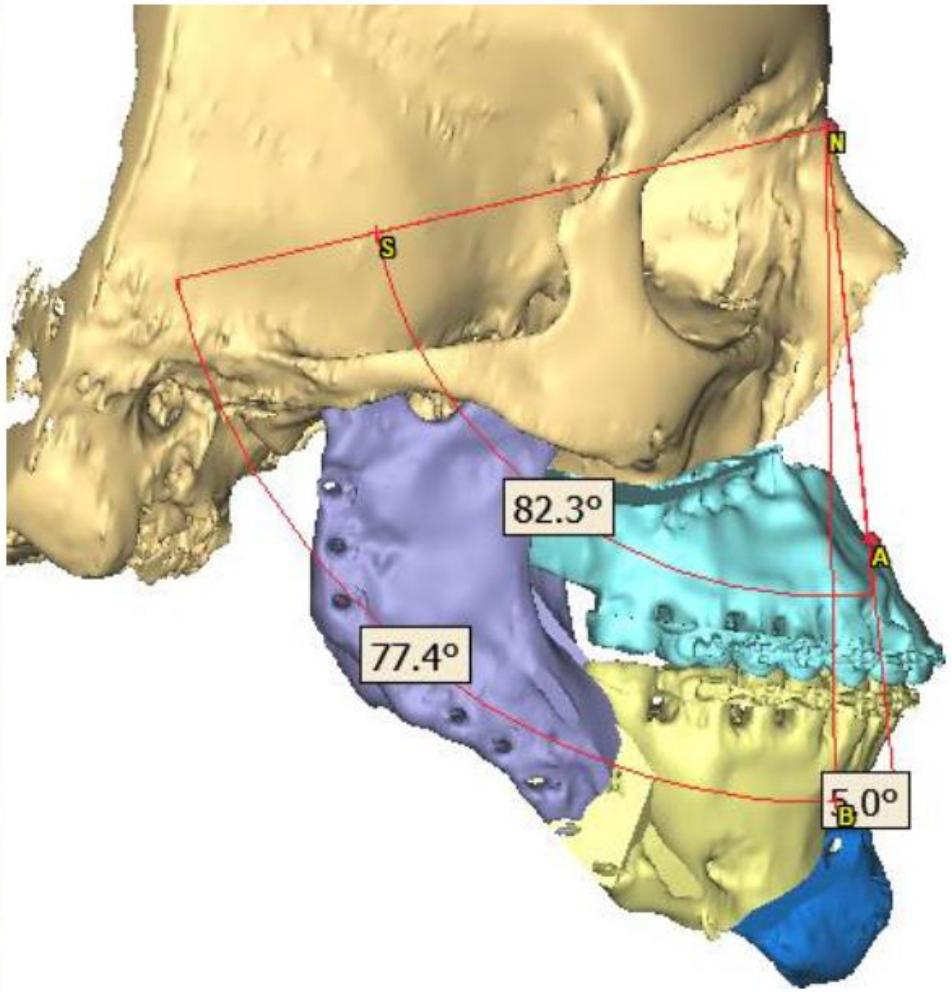
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

Point	Left/Right (mm)		Ant/Post (mm)		Up/Down (mm)	
A	0.2	L	1.6	Ant	1.0	Down
ANS	0.3	L	0.9	Ant	1.3	Down
Maxilla Incisor Midline	0.0	R	2.9	Ant	0.5	Down
Maxilla Canine L	0.2	L	3.4	Ant	1.1	Down
Maxilla Canine R	0.2	L	2.6	Ant	1.1	Down
Maxilla 1st Molar L	0.7	L	3.4	Ant	2.5	Down
Maxilla 1st Molar R	0.7	L	2.1	Ant	2.3	Down
L Lateral Buttress	1.0	L	2.0	Ant	3.1	Down
L Medial Buttress	0.5	L	1.0	Ant	1.9	Down
R Lateral Buttress	0.9	L	0.4	Ant	2.8	Down
R Medial Buttress	0.5	L	0.4	Ant	1.8	Down
B	0.8	L	6.7	Ant	0.3	Down
Pog	0.5	L	16.4	Ant	0.5	Up
Me	0.3	L	18.1	Ant	1.7	Down
Mandible Incisor Midline	1.3	L	3.2	Ant	1.8	Up
Mandible Canine L	1.2	L	2.7	Ant	0.4	Up
Mandible Canine R	1.2	L	3.3	Ant	0.9	Up
Mandible 1st Molar L	1.0	L	2.2	Ant	1.9	Down
Mandible 1st Molar R	0.9	L	2.9	Ant	2.7	Down

Measurement (°)	Pre-Op 3D	Planned 3D	Delta 3D
SNA	80.8	82.3	1.5
SNB	73.4	77.4	4.0
ANB	7.6	5.0	-2.5
Maxillary Occlusal Plane	17.4	7.5	-9.9



ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

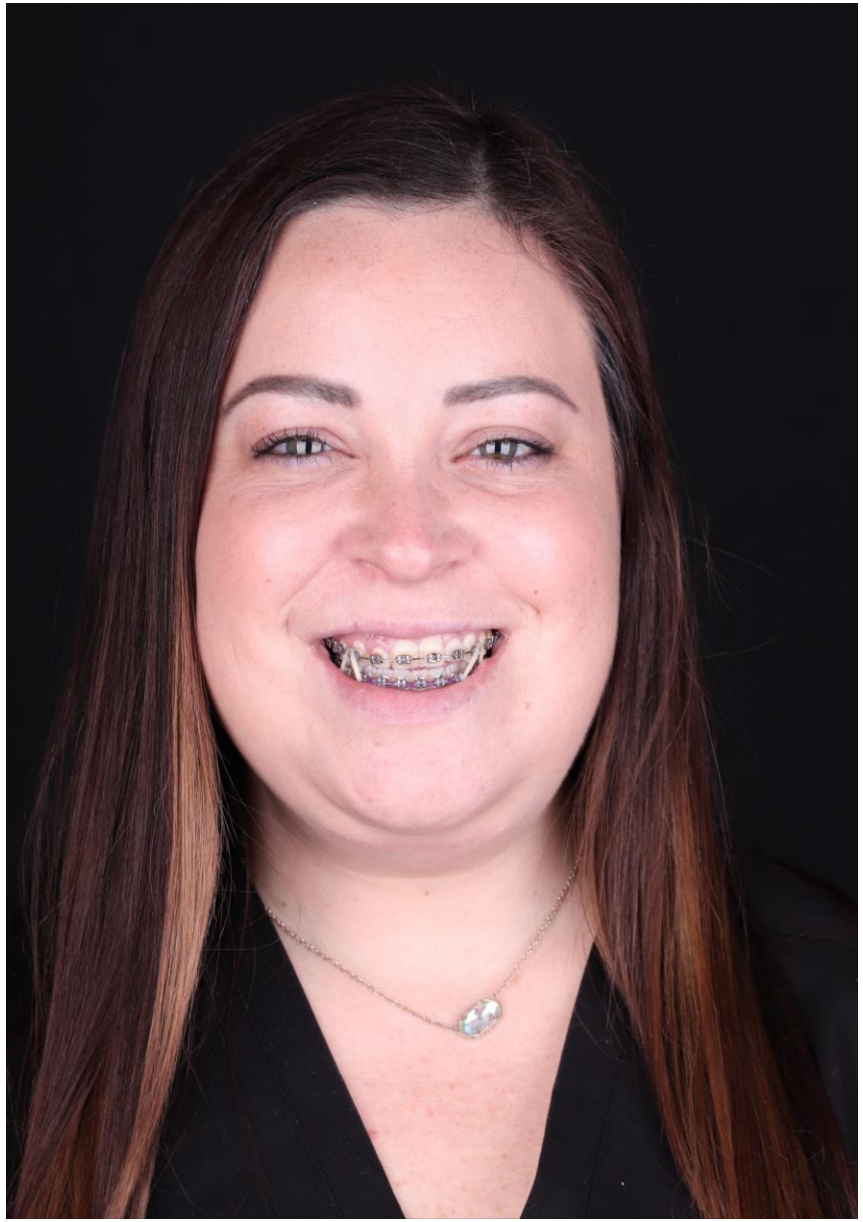
LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

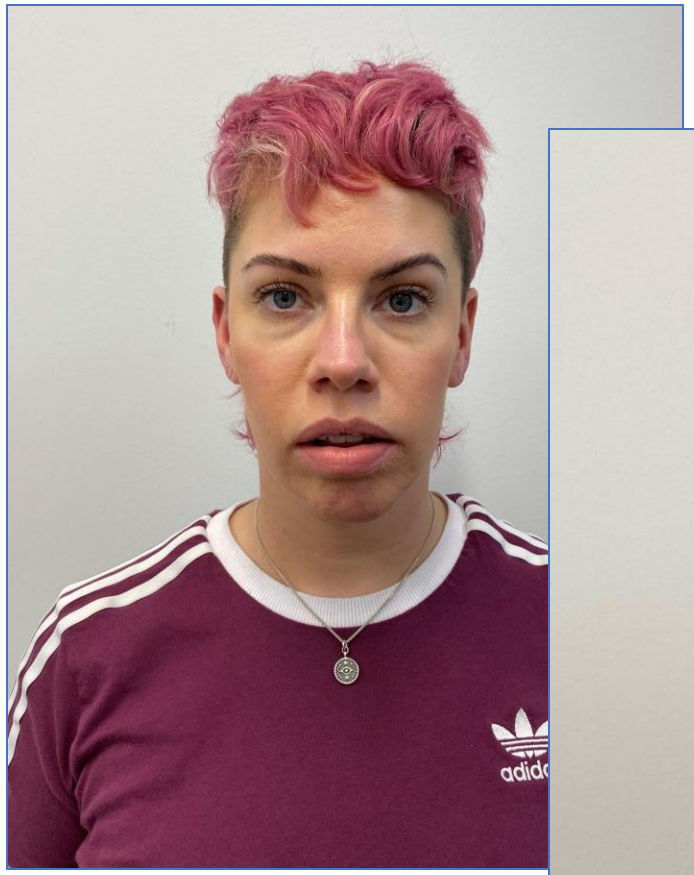


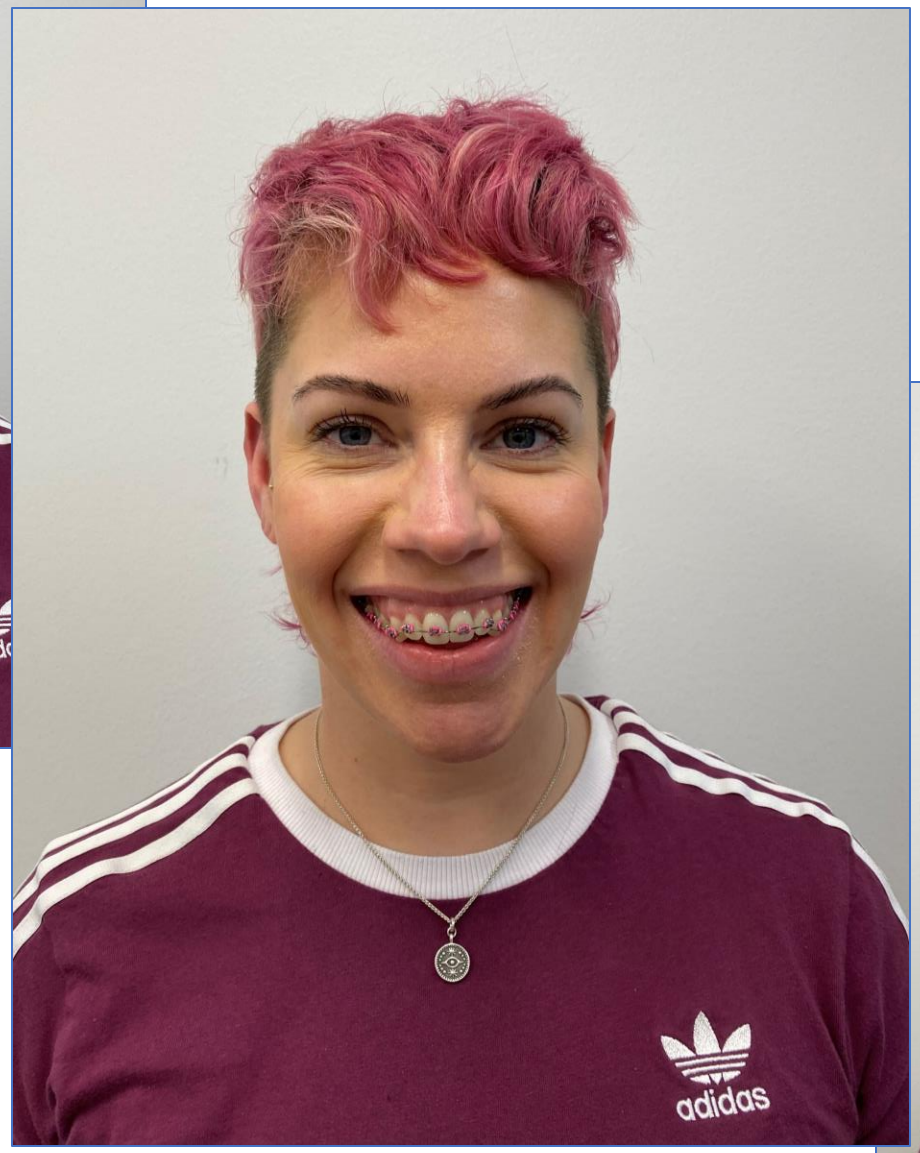
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



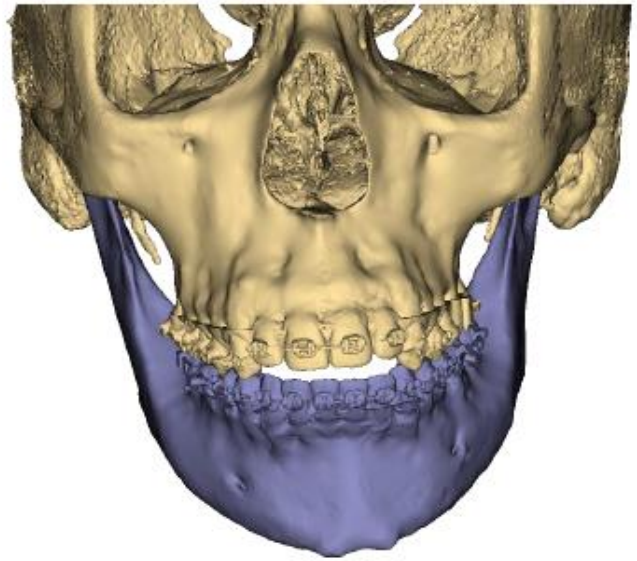


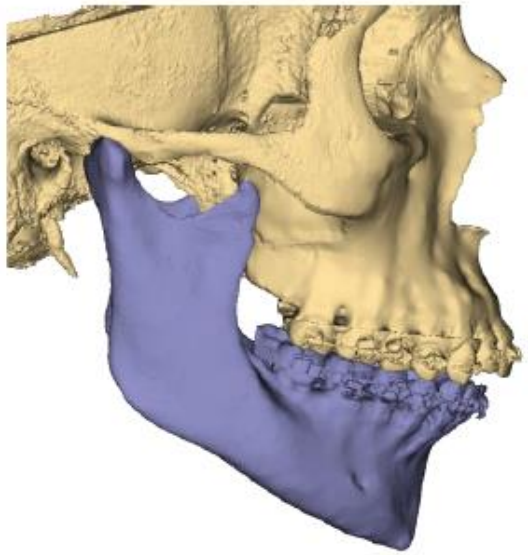
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

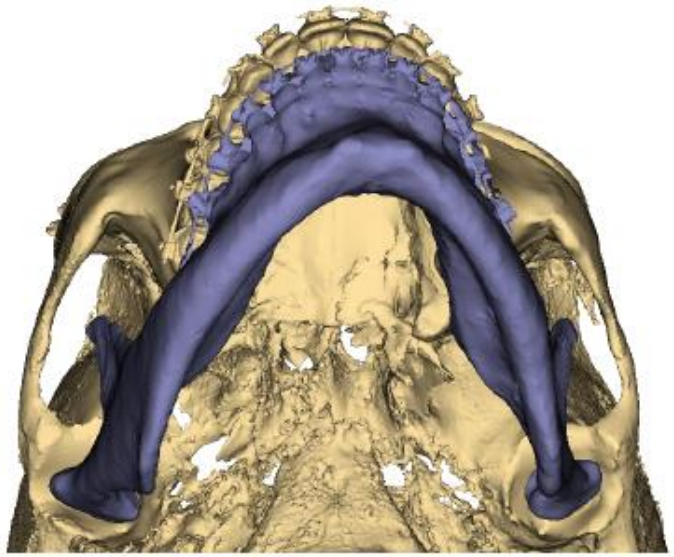
Texas Children's Hospital®

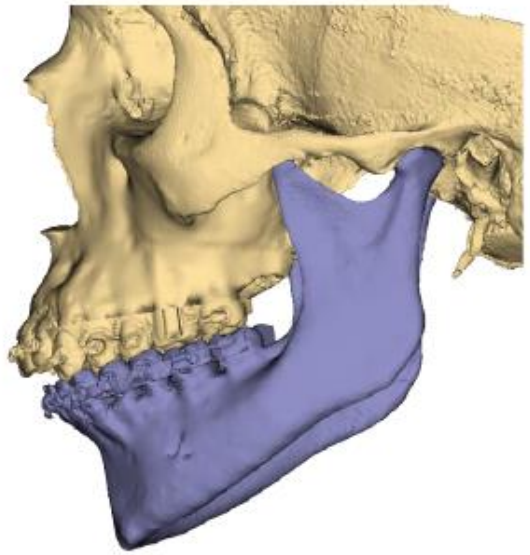
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







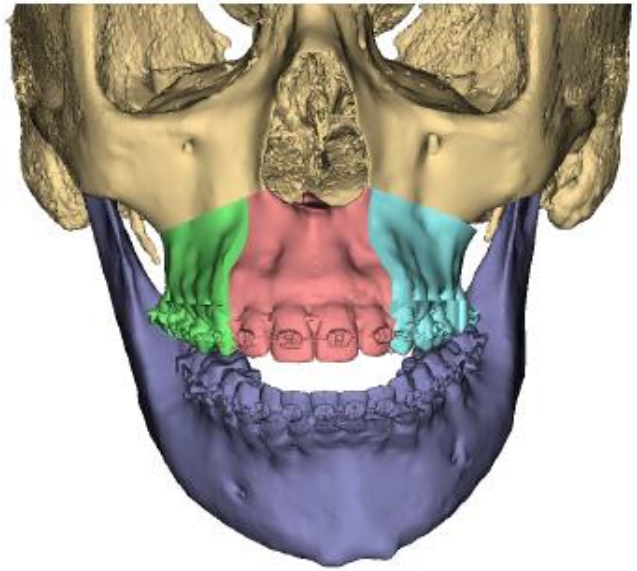


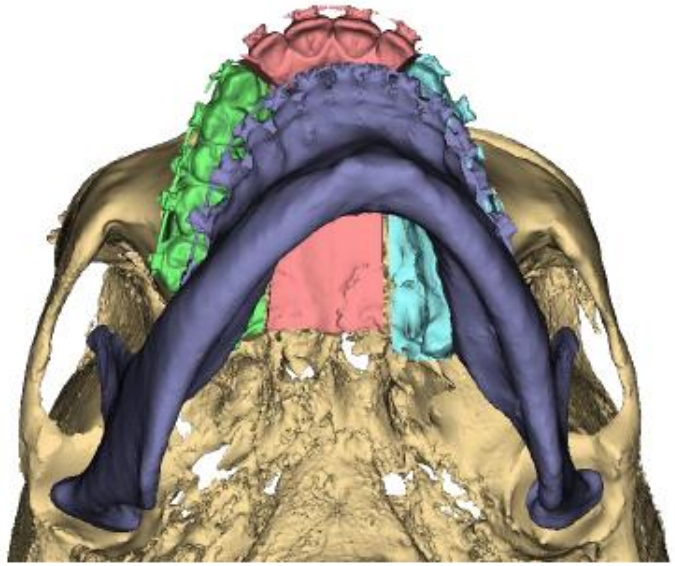
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

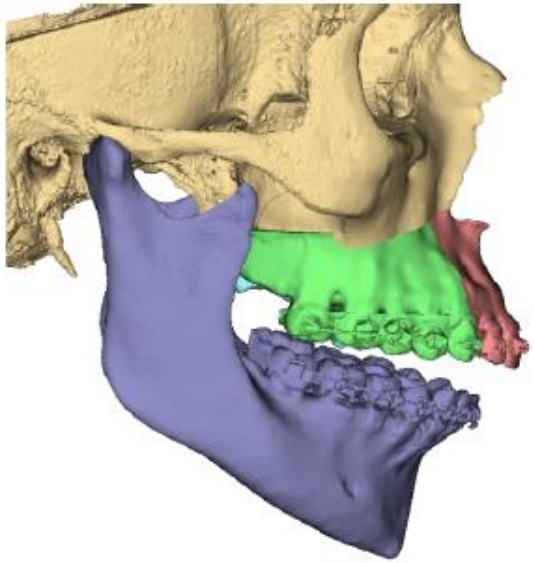
Texas Children's Hospital®

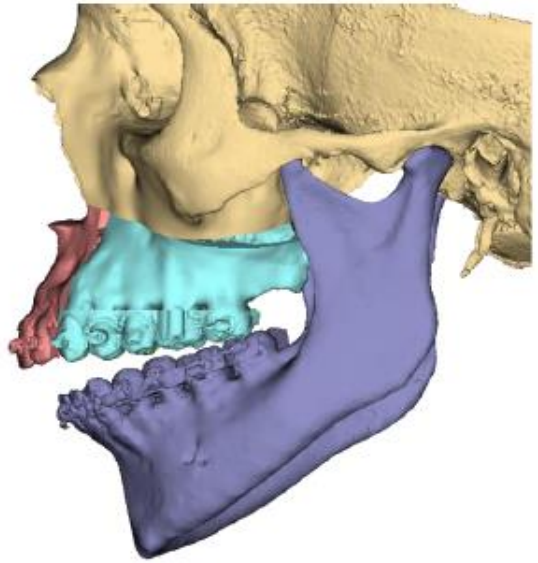
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







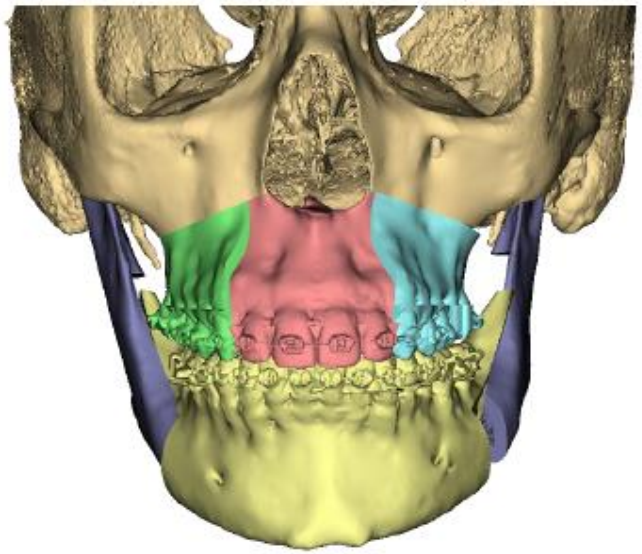


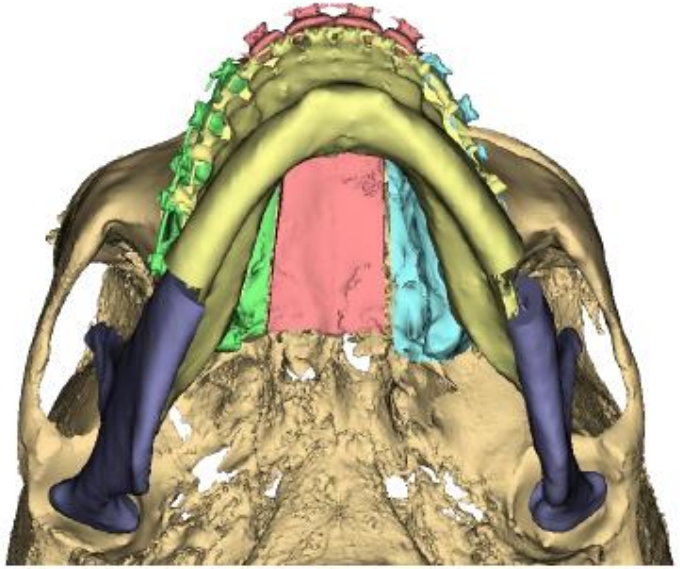
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

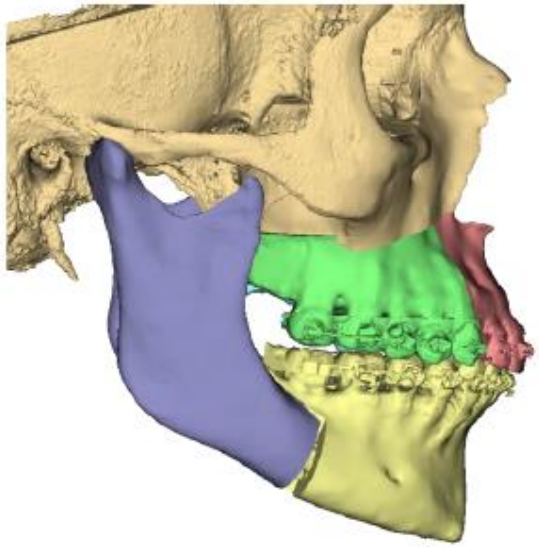
Texas Children's Hospital®

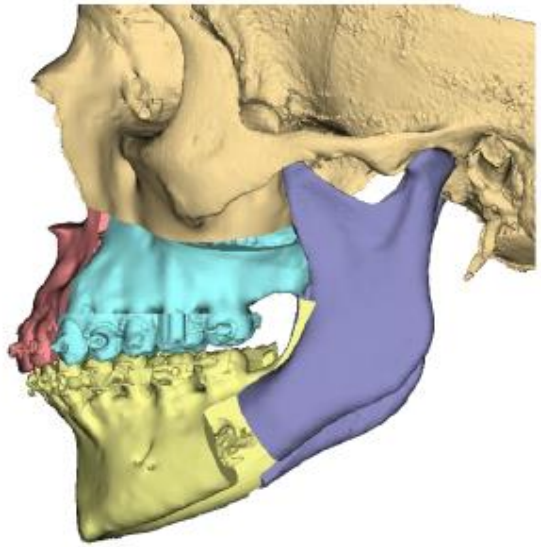
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







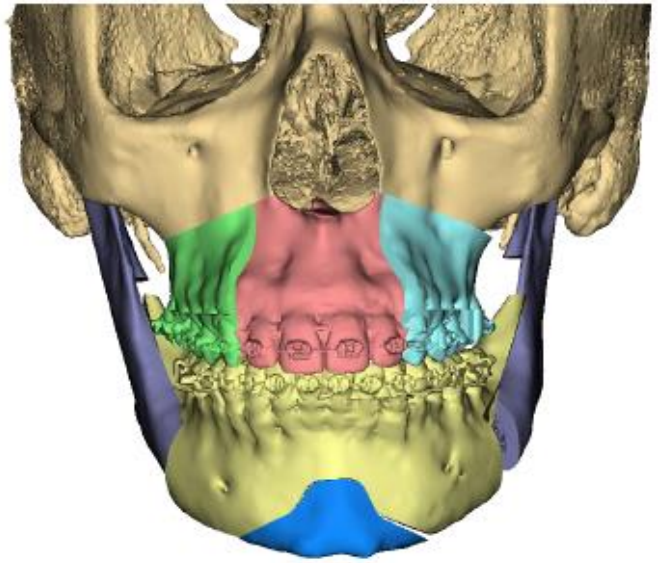


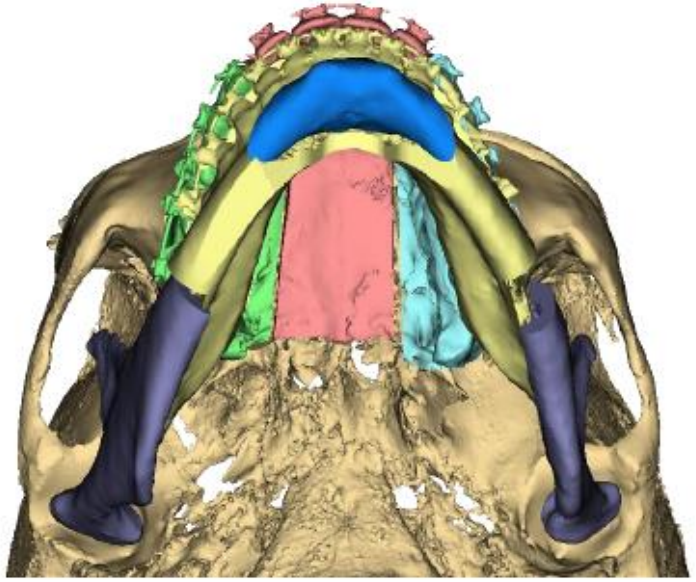
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

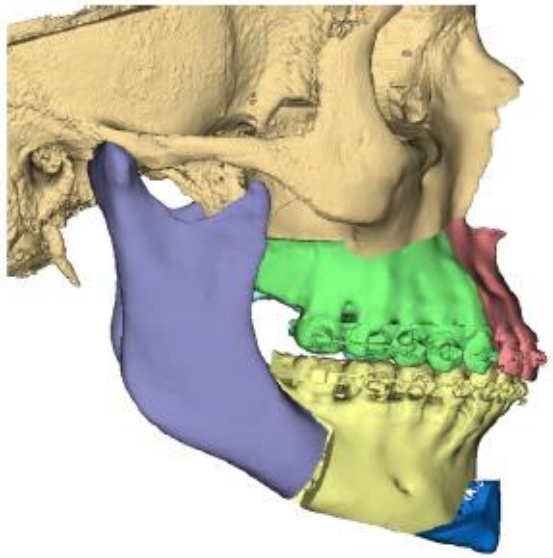
Texas Children's Hospital®

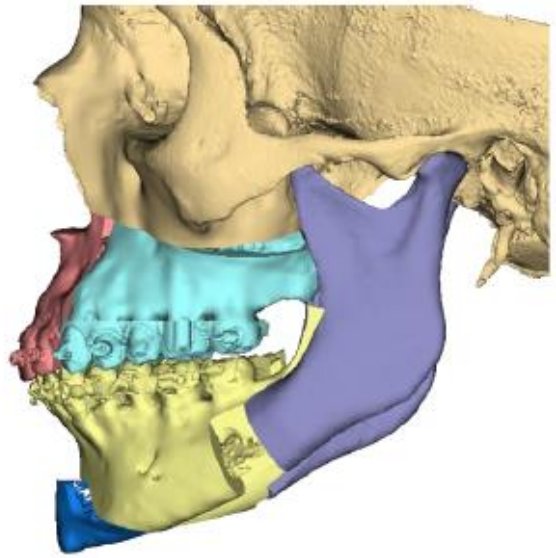
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







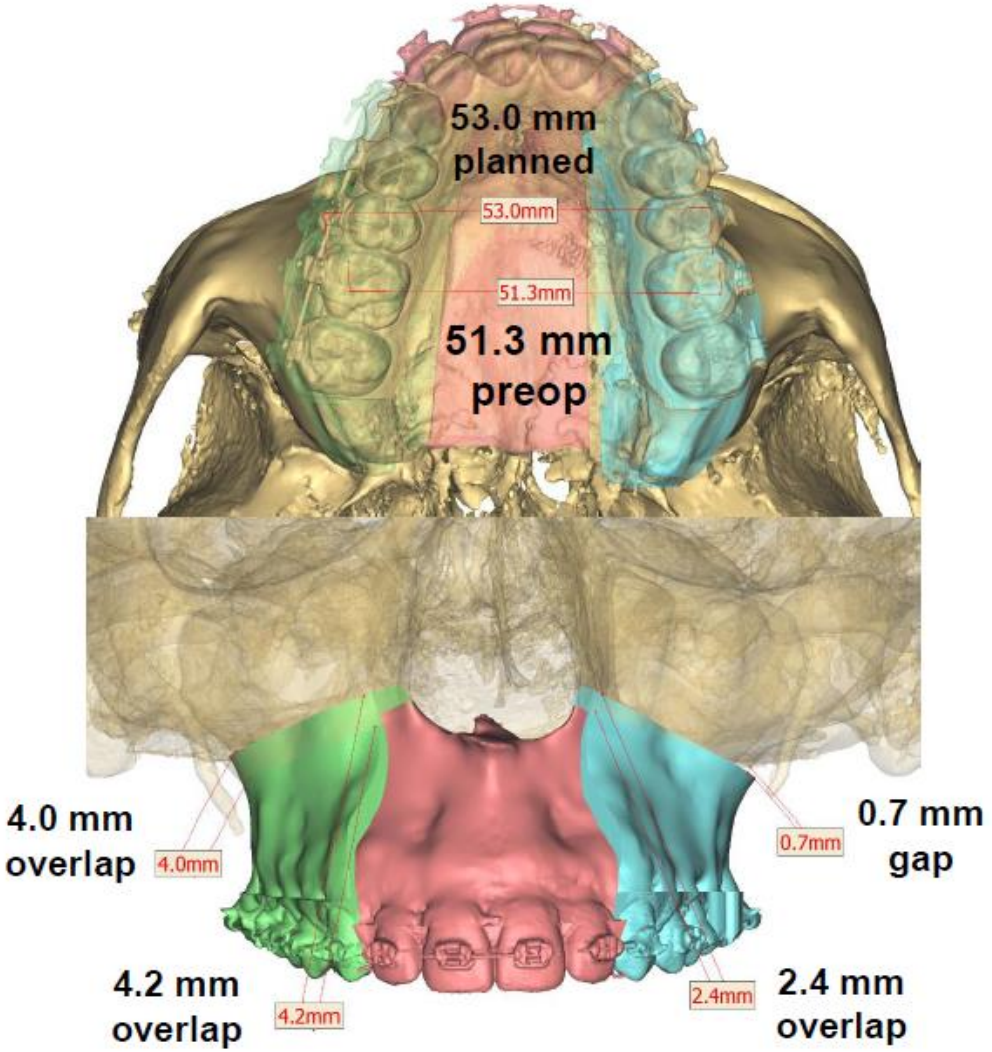


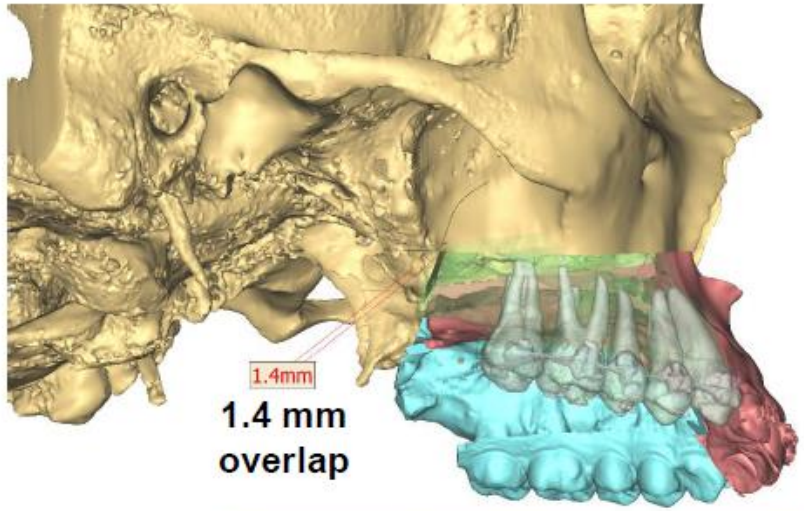
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

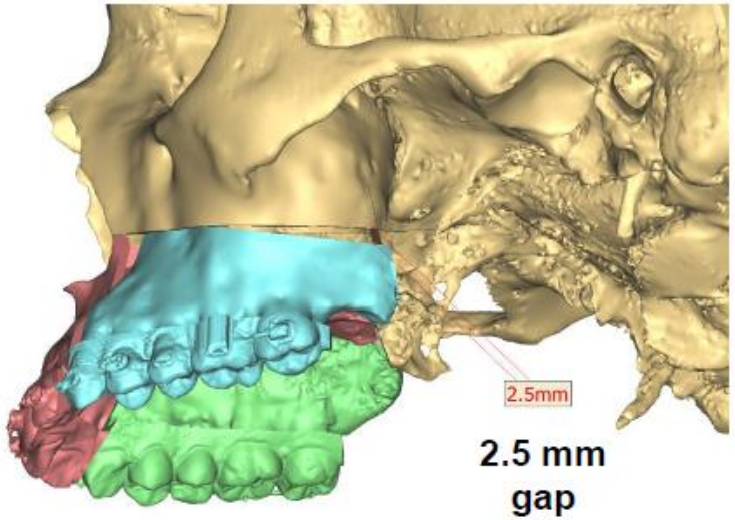
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





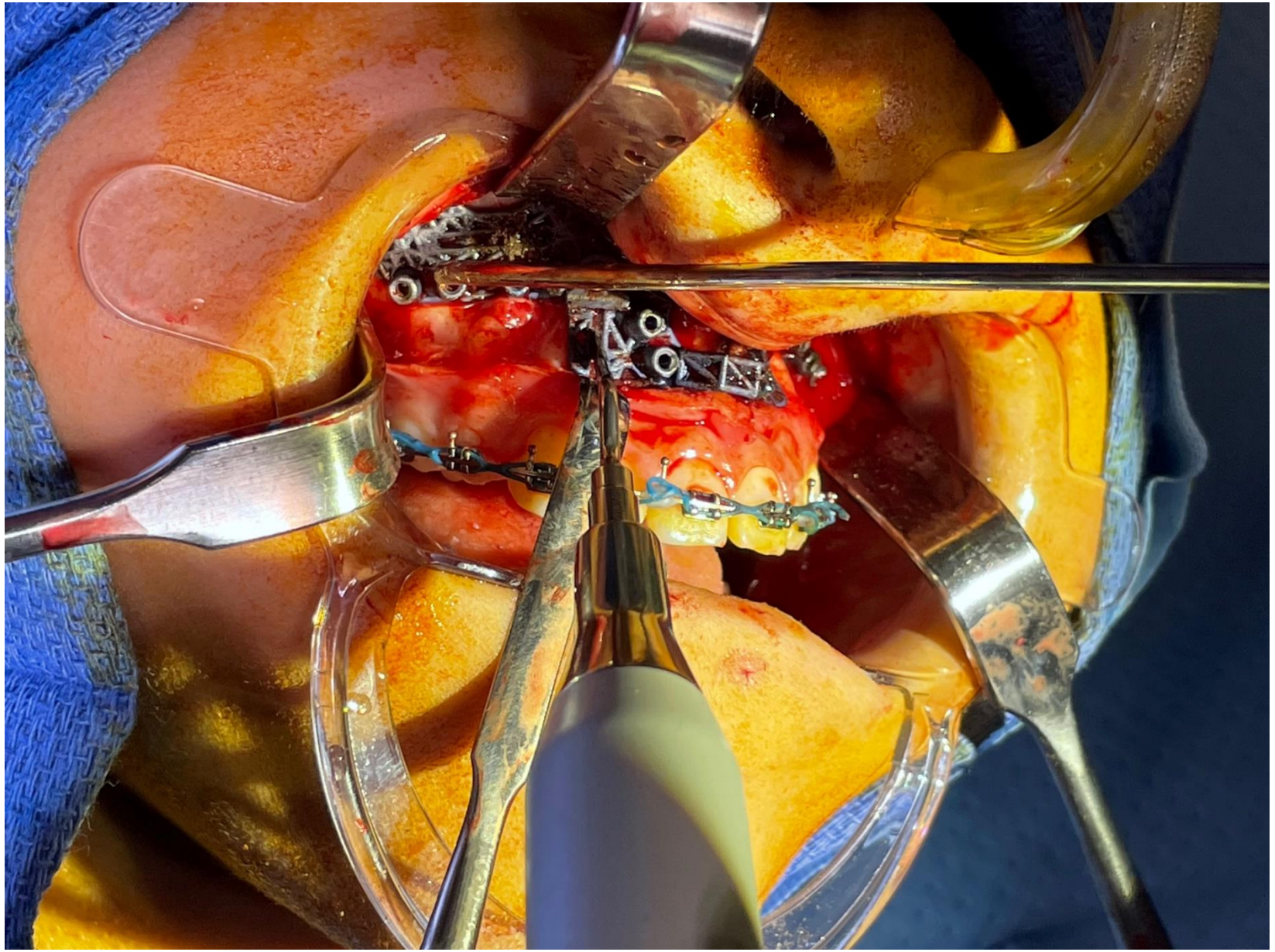


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

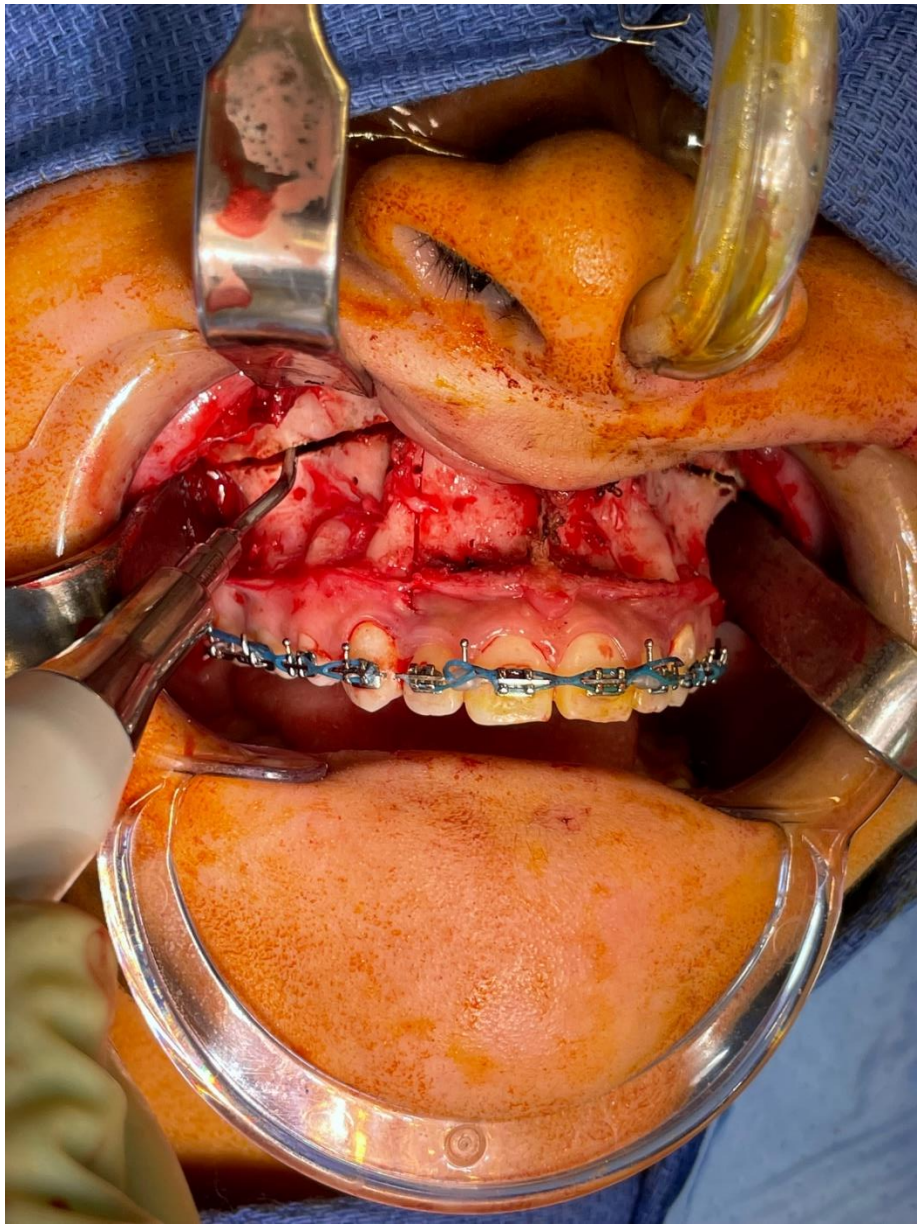


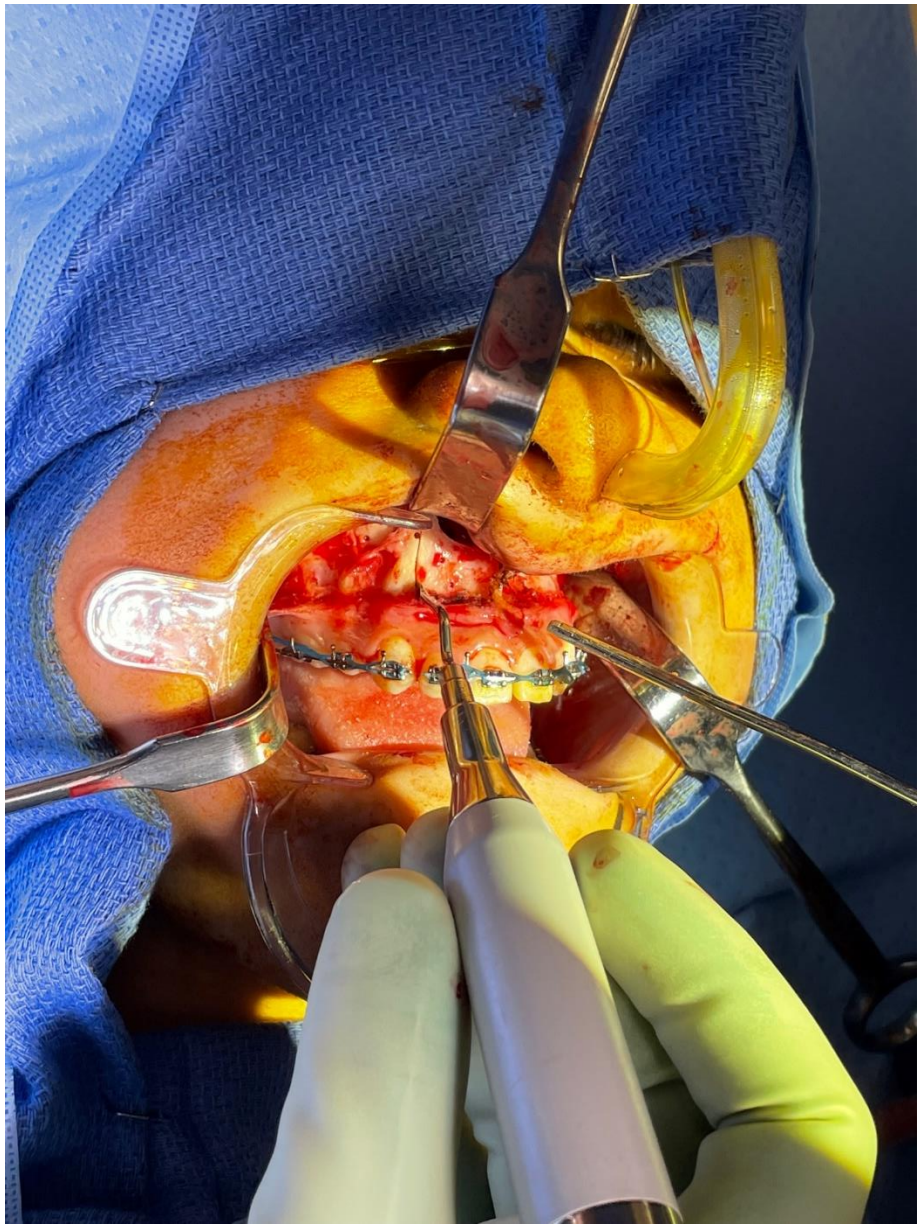
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



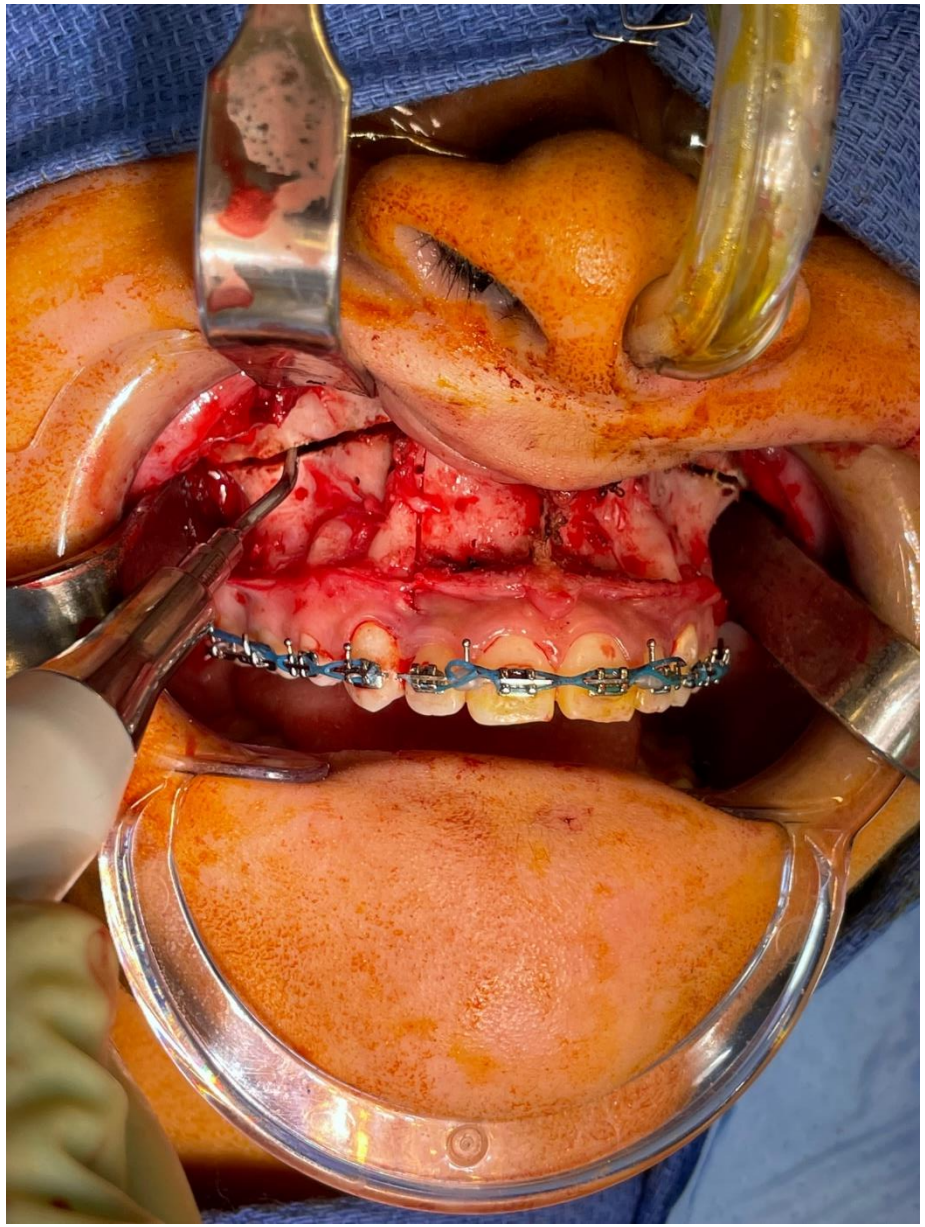


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

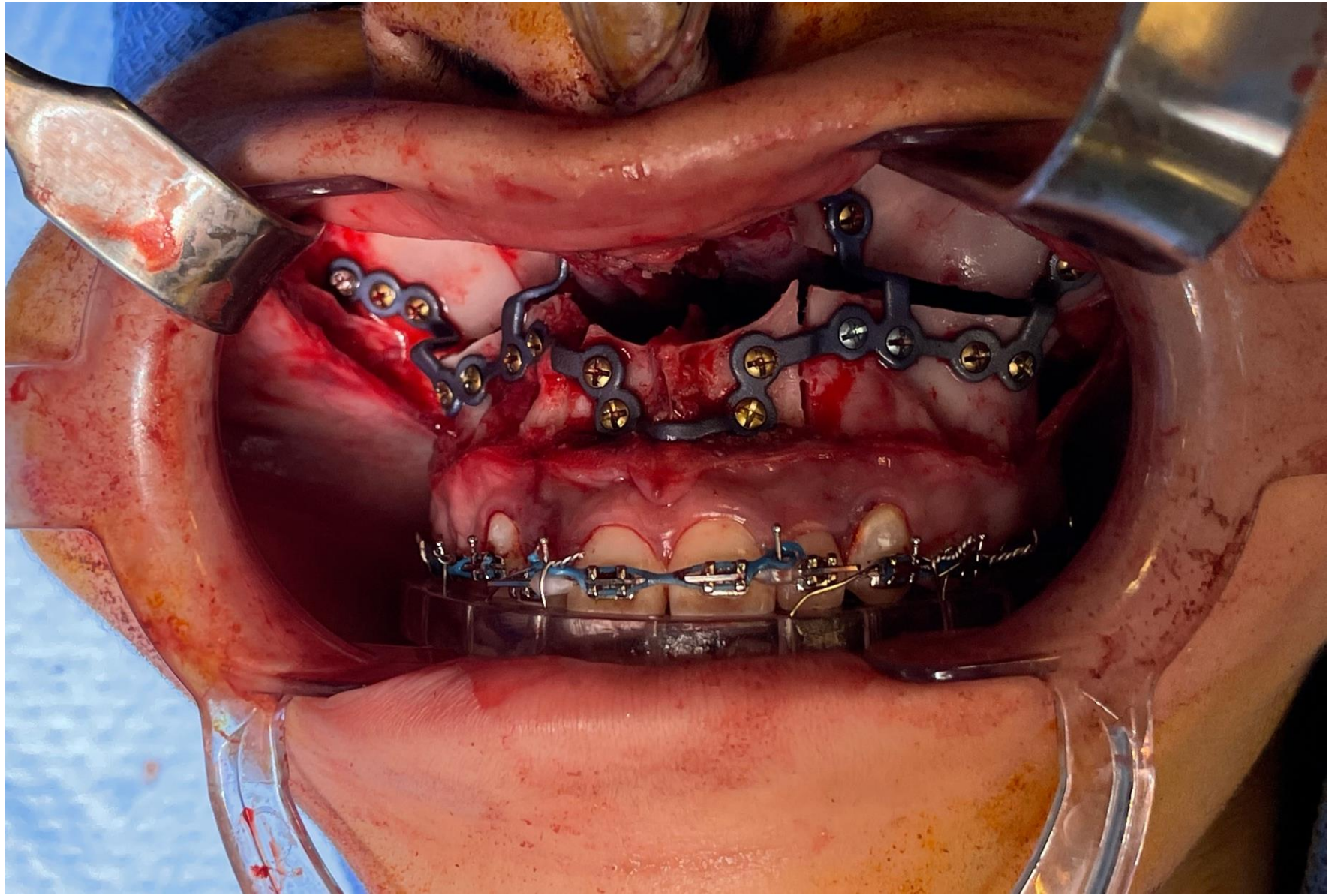


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

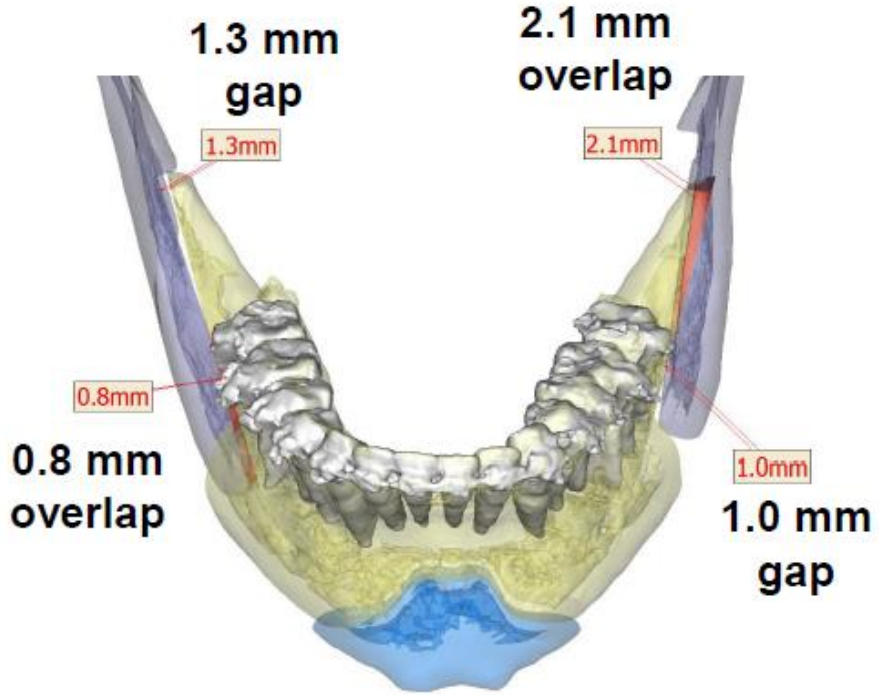


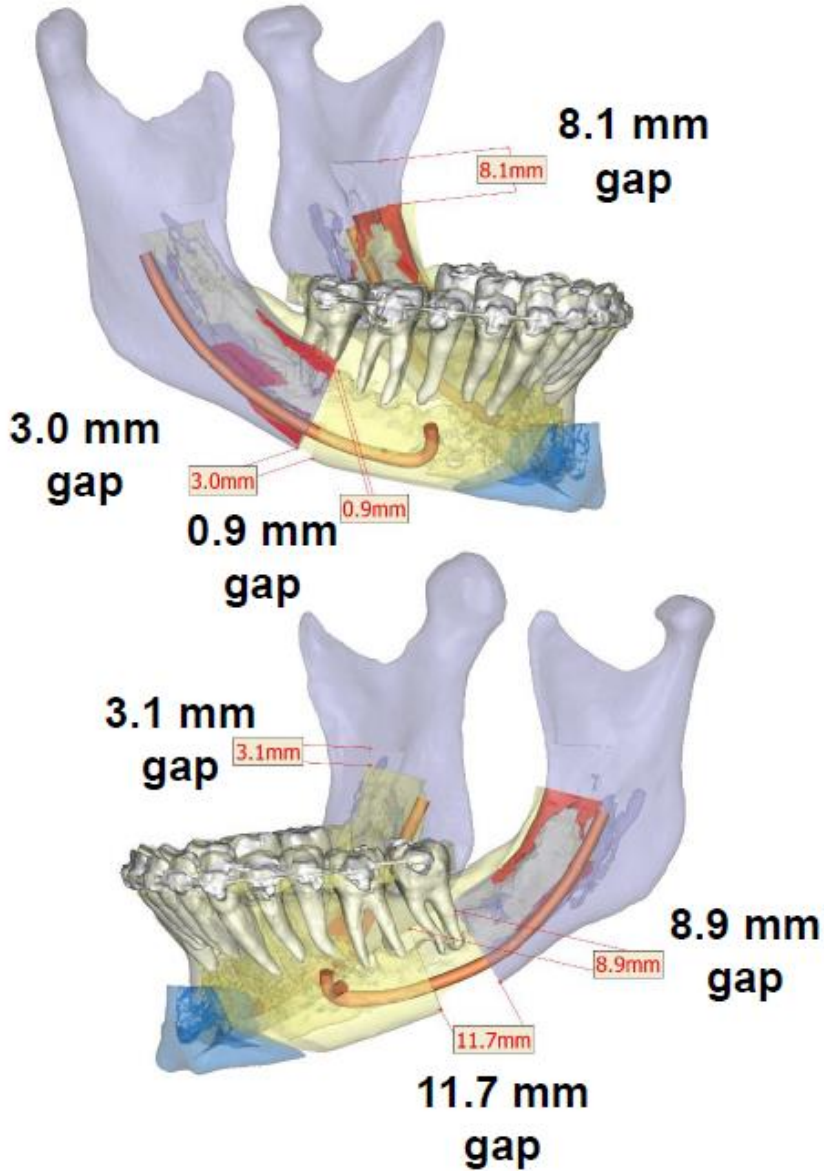
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



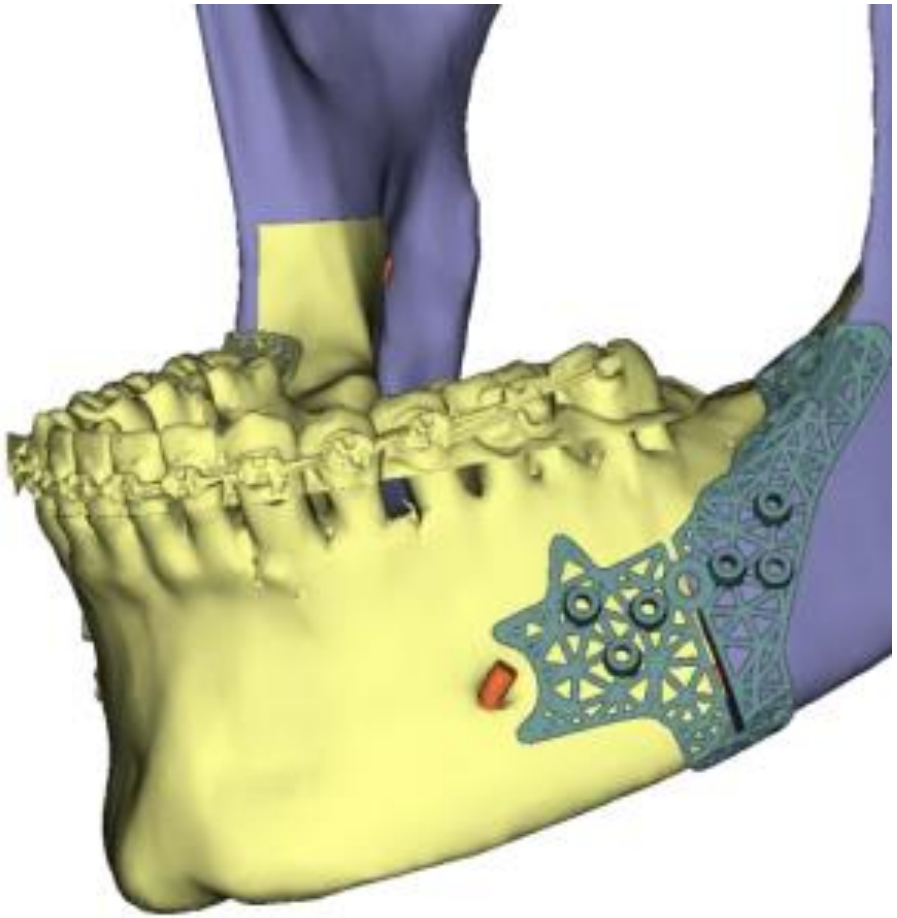


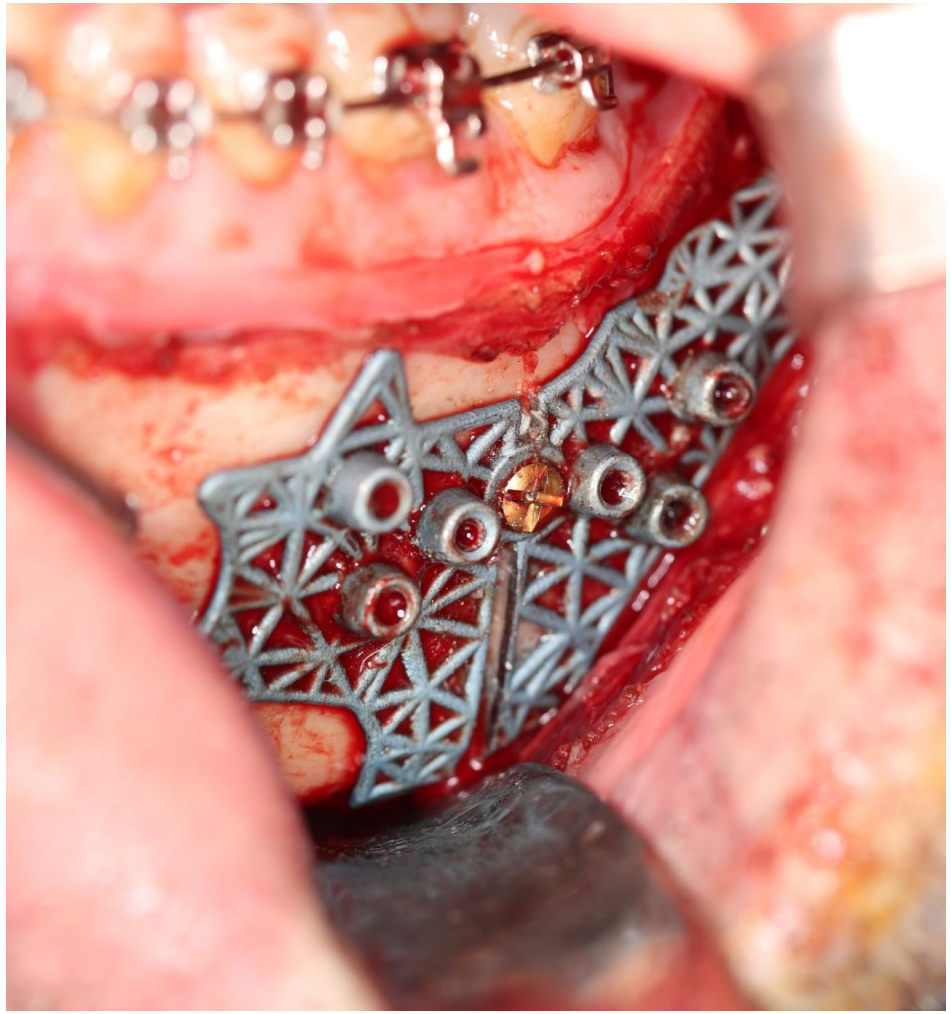
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

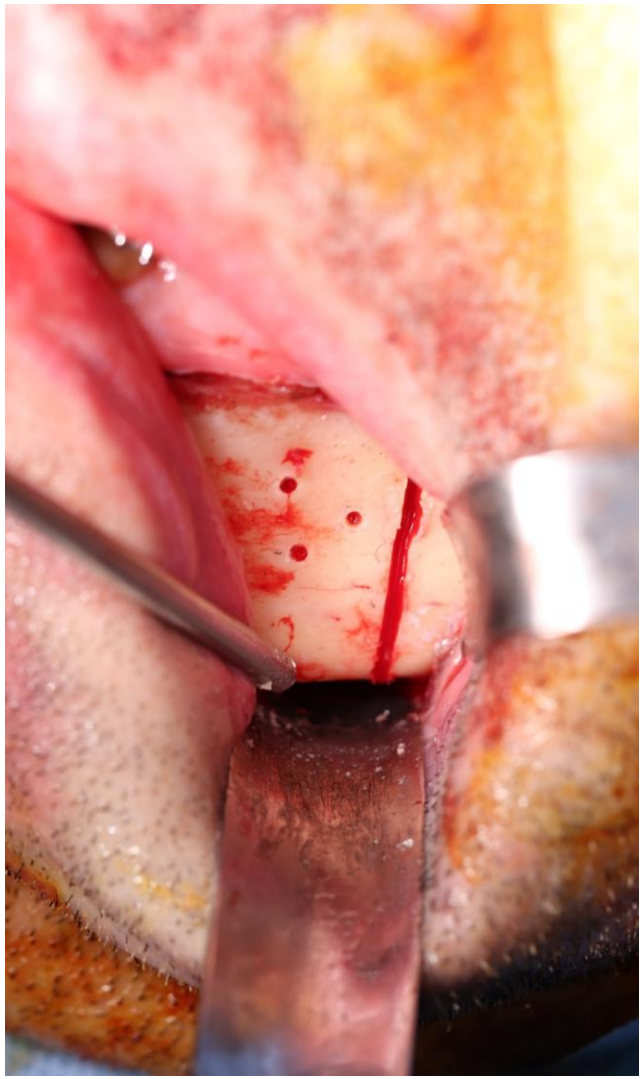
LINKS TO ALL SOCIALS

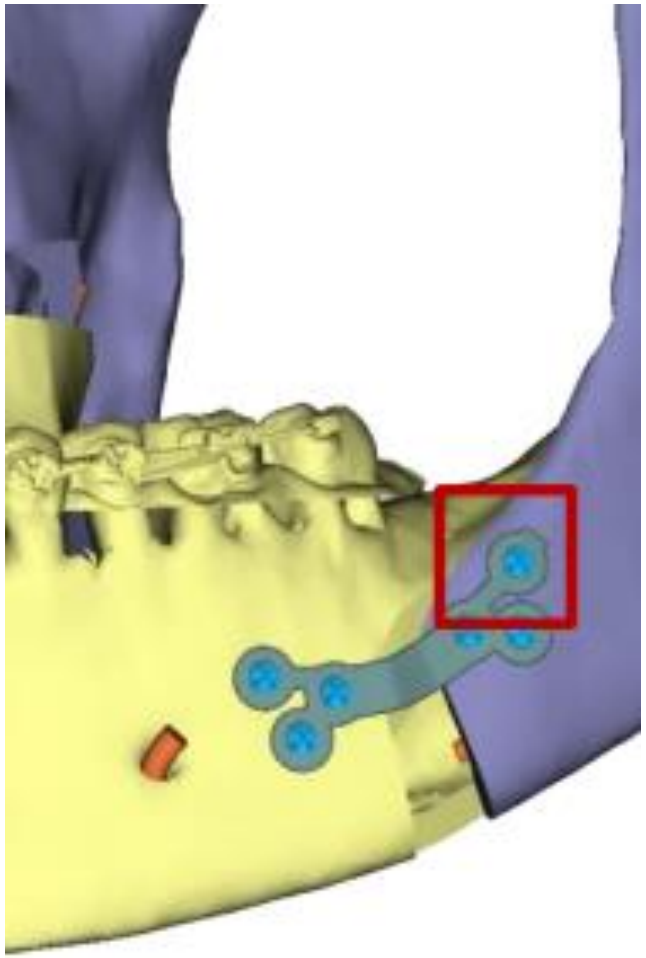
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



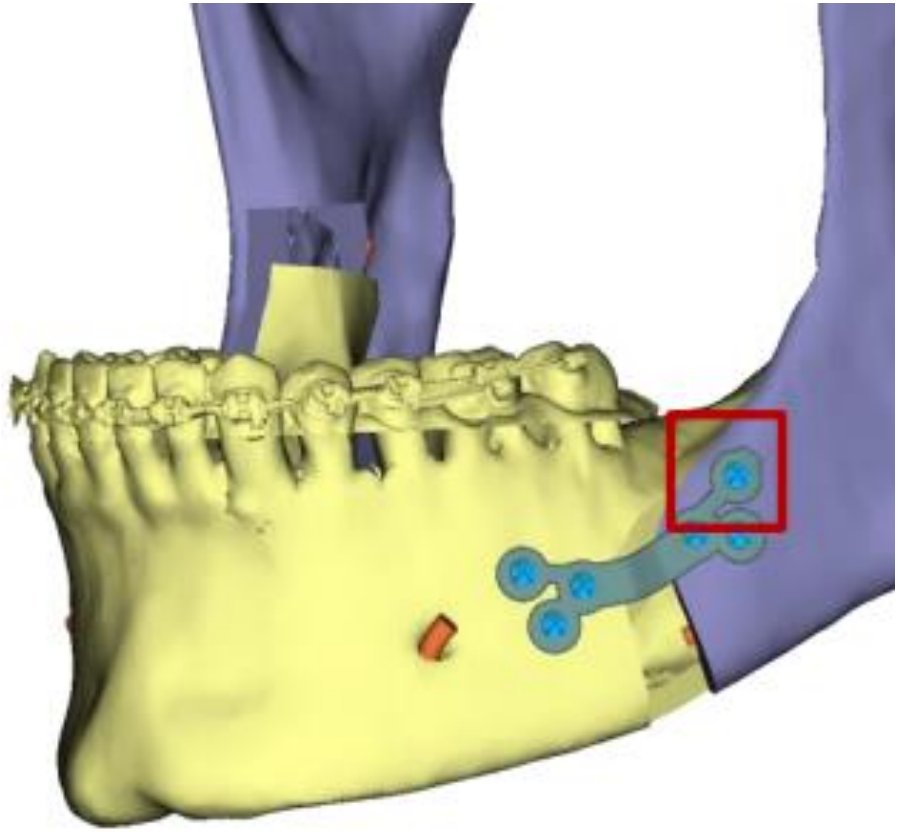


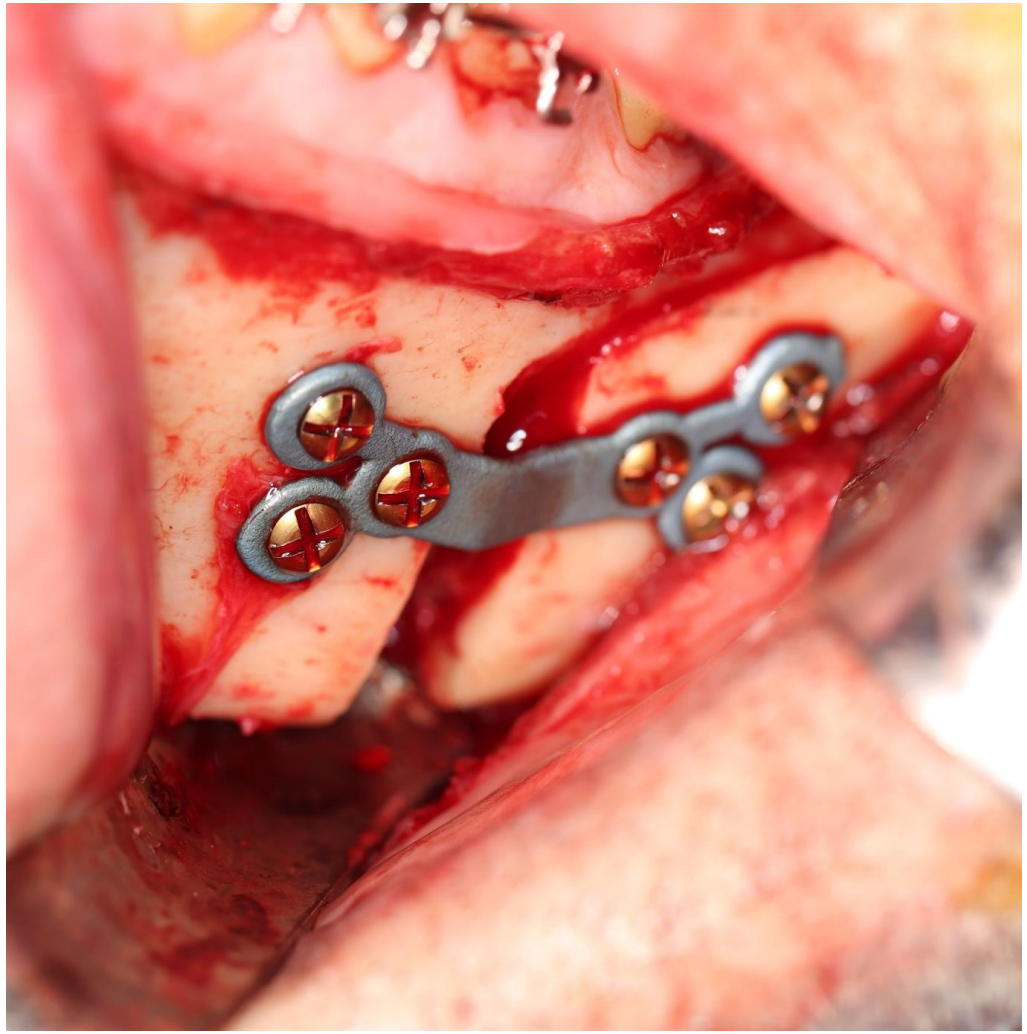
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

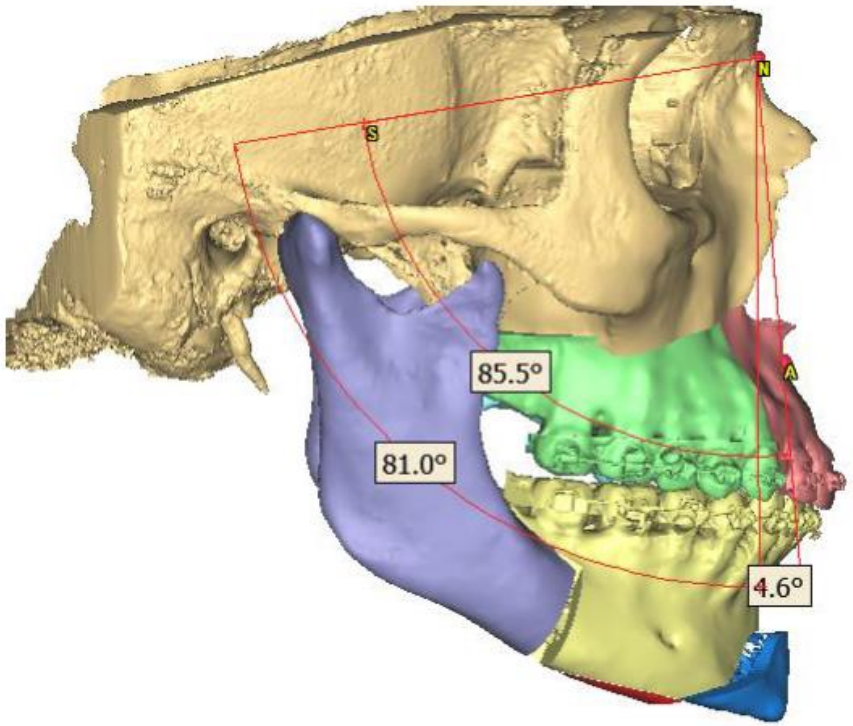
Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

Point	Left/Right (mm)		Ant/Post (mm)		Up/Down (mm)	
A	1.4	R	0.4	Ant	1.2	Up
ANS	1.1	R	0.0	Ant	1.4	Up
Maxilla Incisor Midline	3.0	R	2.0	Ant	1.5	Up
Maxilla Canine L	2.5	R	1.7	Ant	3.4	Up
Maxilla Canine R	3.8	R	0.7	Ant	5.0	Up
Maxilla 1st Molar L	1.1	R	1.5	Ant	0.0	Down
Maxilla 1st Molar R	3.0	R	0.1	Ant	3.5	Up
L Lateral Buttress	0.6	L	1.5	Post	0.9	Down
L Medial Buttress	0.6	R	0.0	Ant	0.2	Up
R Lateral Buttress	1.5	R	2.5	Post	3.6	Up
R Medial Buttress	0.6	R	0.6	Post	1.4	Up
B	5.2	R	7.0	Ant	3.9	Up
Pog	6.1	R	15.2	Ant	3.4	Up
Me	6.5	R	16.1	Ant	2.4	Up
Mandible Incisor Midline	5.0	R	4.3	Ant	5.7	Up
Mandible Canine L	4.3	R	4.8	Ant	3.8	Up
Mandible Canine R	4.4	R	2.9	Ant	5.8	Up
Mandible 1st Molar L	2.5	R	5.1	Ant	0.7	Down
Mandible 1st Molar R	2.6	R	1.7	Ant	2.7	Up

Measurement (°)	Pre-Op 3D	Planned 3D	Delta 3D
SNA	85.0	85.5	0.5
SNB	76.9	81.0	4.1
ANB	8.6	4.6	-3.9
Maxillary Occlusal Plane	8.7	7.7	-1.0



ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

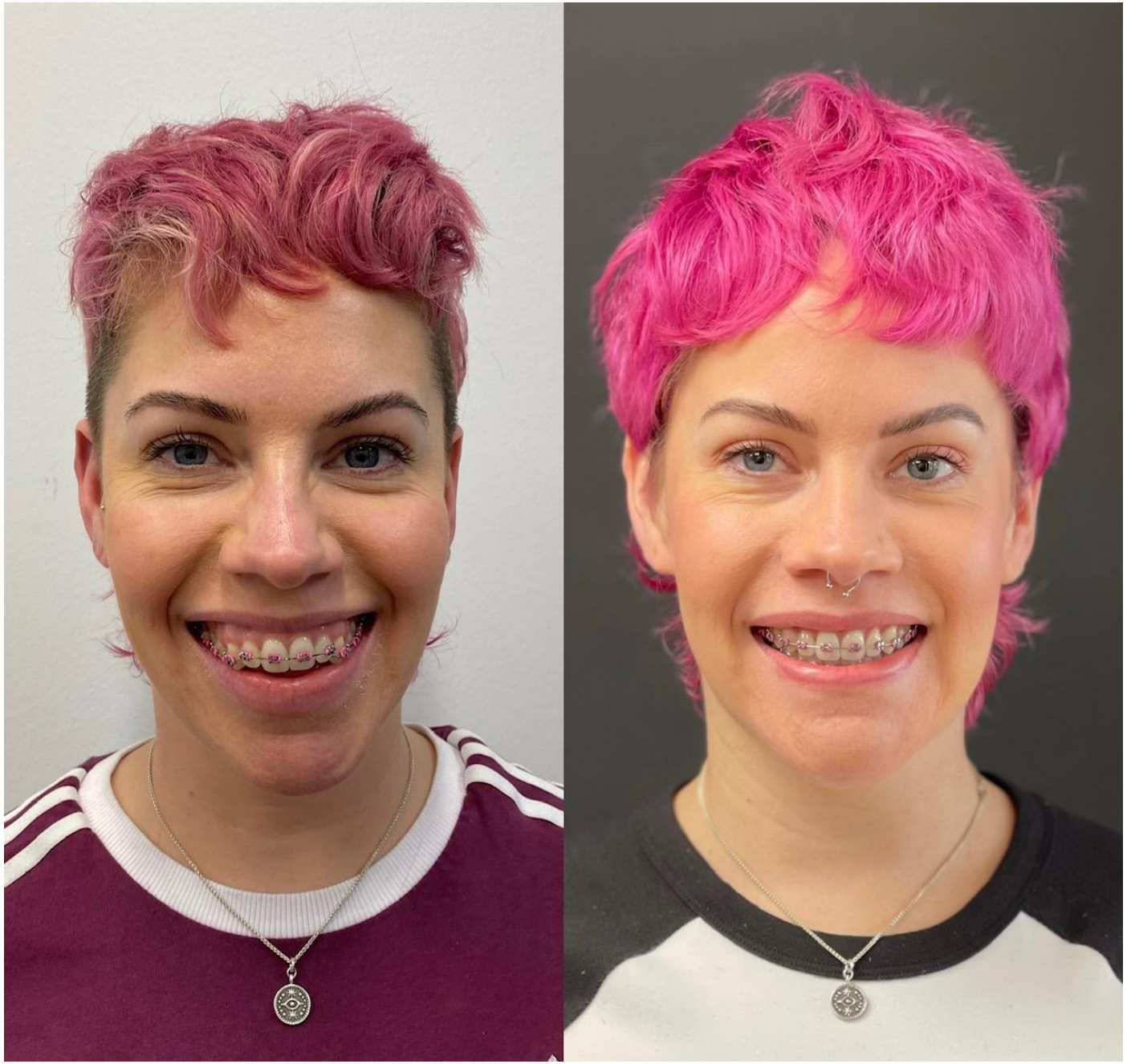
LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

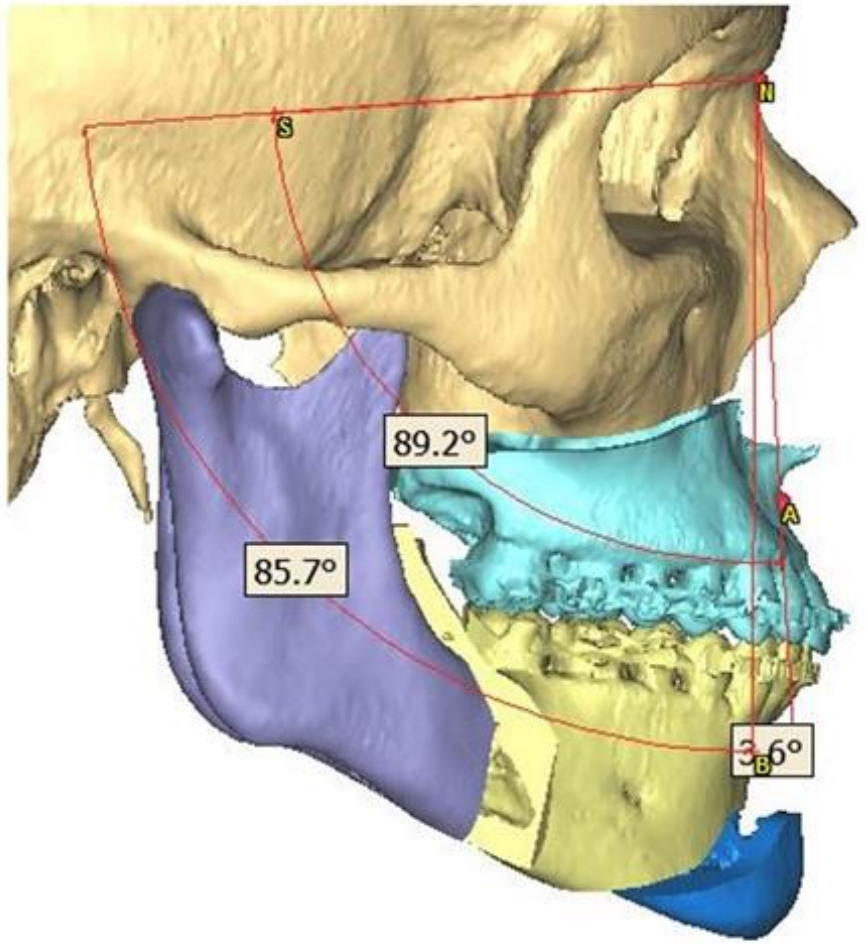
Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

Point	Left/Right (mm)		Ant/Post (mm)		Up/Down (mm)	
A	0.0	L	1.9	Ant	1.3	Down
ANS	0.2	L	1.4	Ant	1.0	Down
Maxilla Incisor Midline	0.5	R	3.0	Ant	1.0	Down
Maxilla Canine L	0.5	R	3.0	Ant	2.0	Down
Maxilla Canine R	0.5	R	2.9	Ant	1.1	Down
Maxilla lst Molar L	0.4	R	2.8	Ant	3.3	Down
Maxilla lst Molar R	0.4	R	2.7	Ant	2.1	Down
L Lateral Buttress	0.2	L	1.5	Ant	3.6	Down
L Medial Buttress	0.4	L	1.1	Ant	1.9	Down
R Lateral Buttress	0.2	L	1.5	Ant	1.8	Down
R Medial Buttress	0.4	L	1.1	Ant	1.3	Down
	2.1	R	12.6	Ant	0.4	Down
Pog	2.5	R	22.7	Ant	1.3	Down
Me	2.4	R	23.3	Ant	1.9	Down
Mandible Incisor Midline	2.0	R	11.0	Ant	0.4	Up
Mandible Canine L	1.7	R	11.3	Ant	0.5	Down
Mandible Canine R	1.7	R	10.3	Ant	0.1	Up
Mandible lst Molar L	0.9	R	11.4	Ant	3.1	Down
Mandible lst Molar R	0.9	R	9.8	Ant	1.9	Down

Measurement (°)	Pre-Op 3D	Planned 3D	Delta 3D
SNA	87.4	89.2	1.7
SNB	78.2	85.7	7.5
ANB	9.2	3.6	-5.6
Maxillary Occlusal Plañe	10.4	7.5	-3

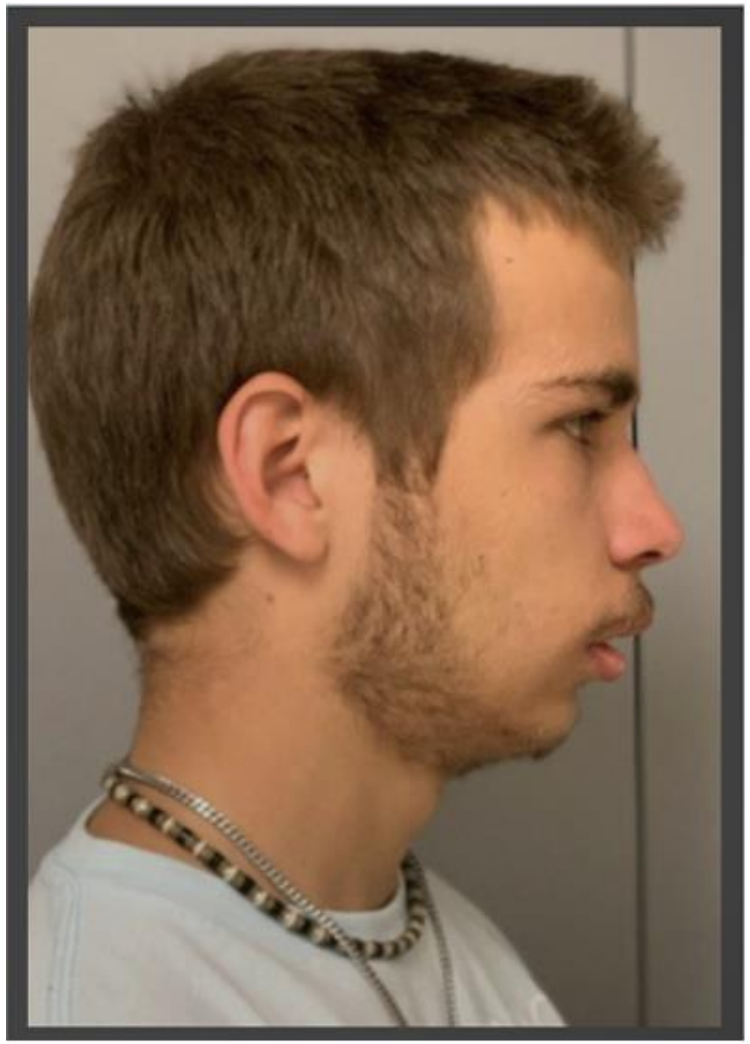


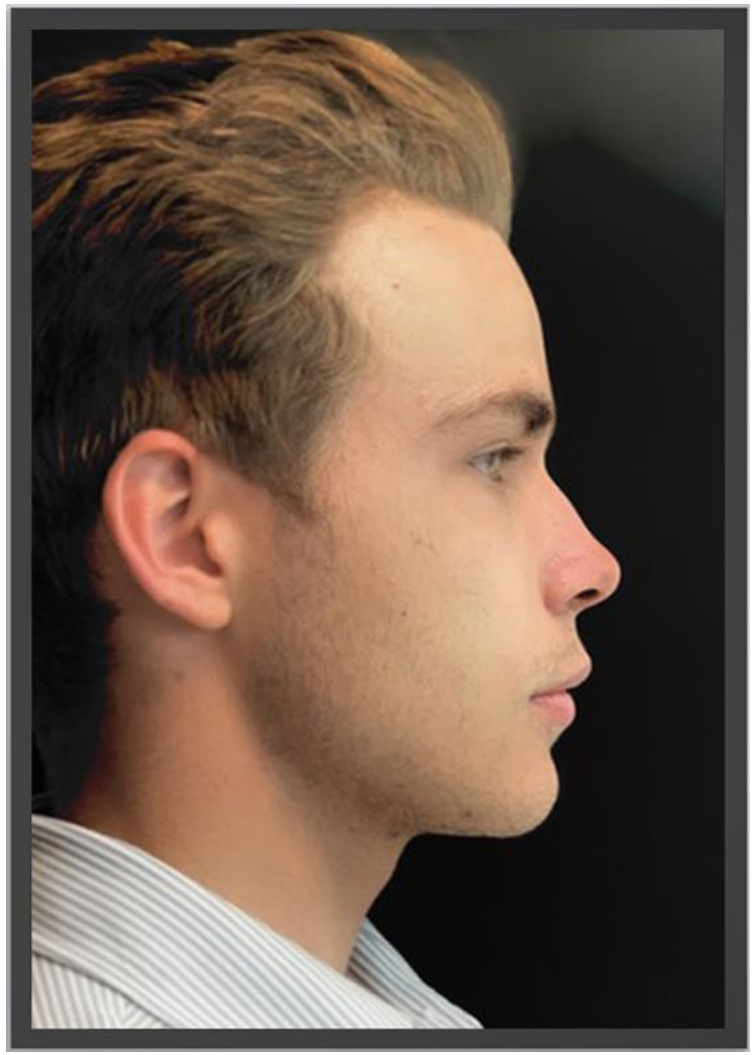
ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



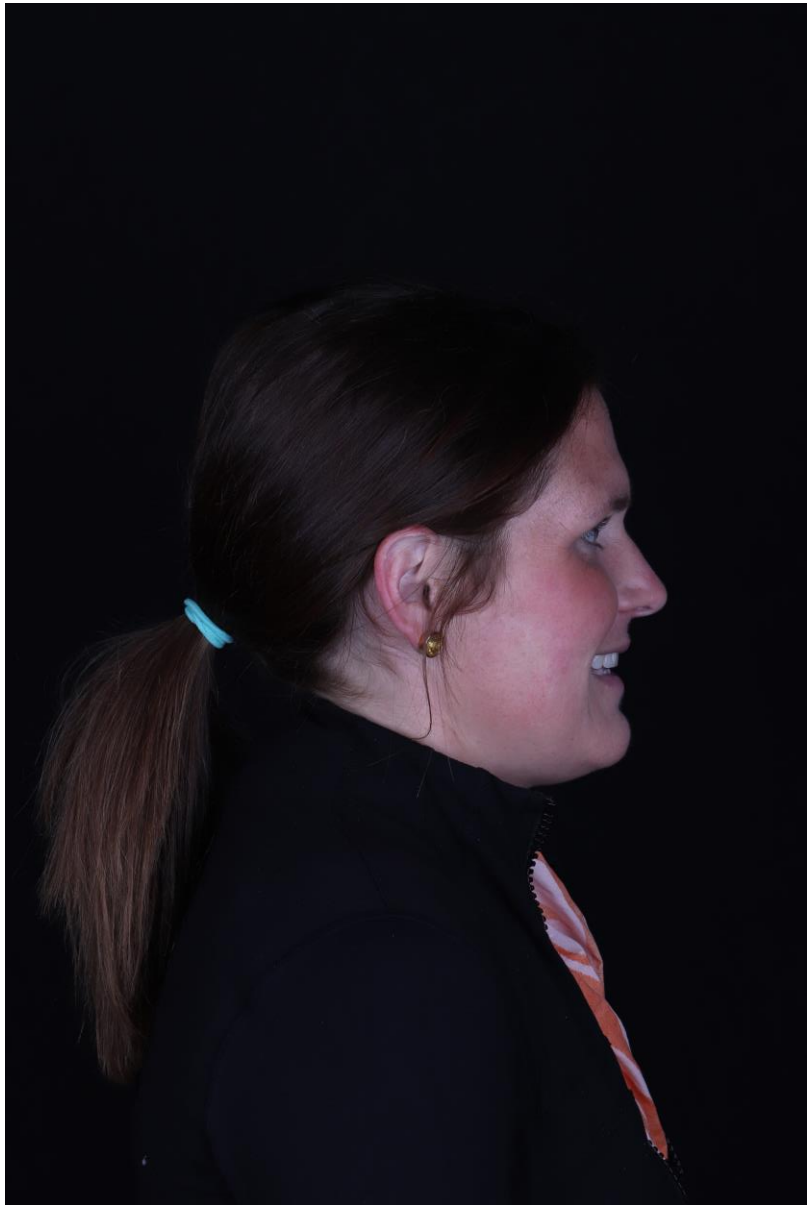


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



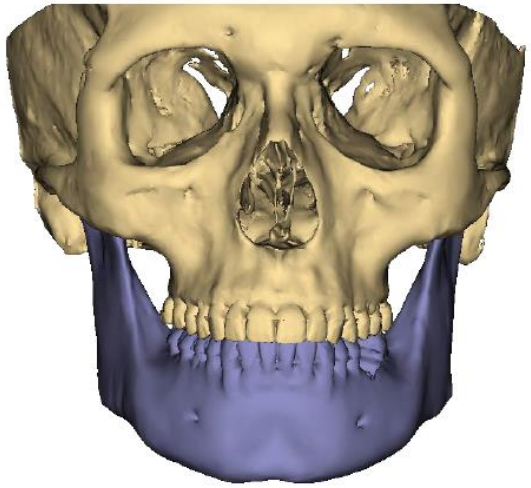
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

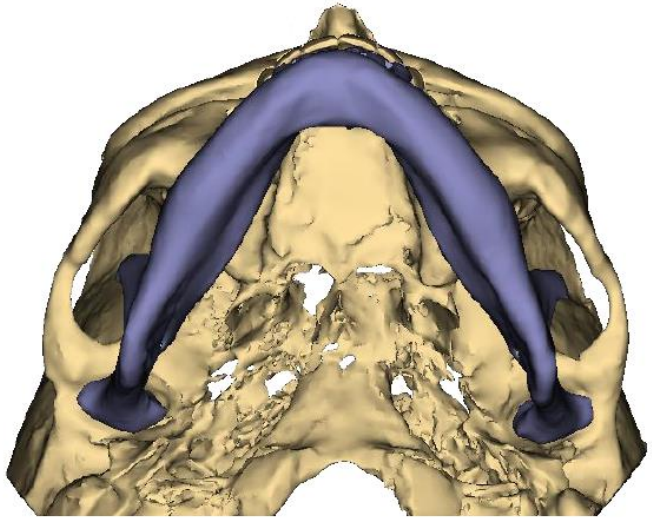
Texas Children's Hospital®

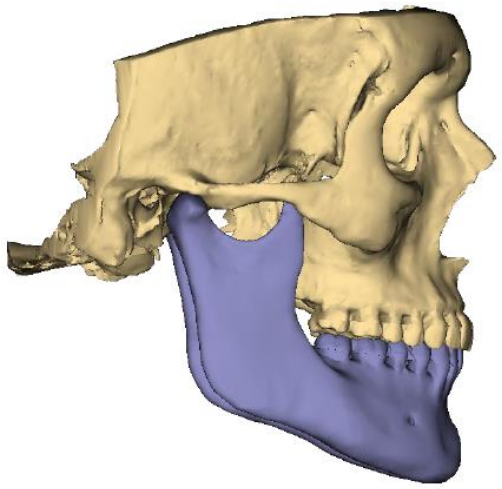
HOUSTON Methodist
LEADING MEDICINE

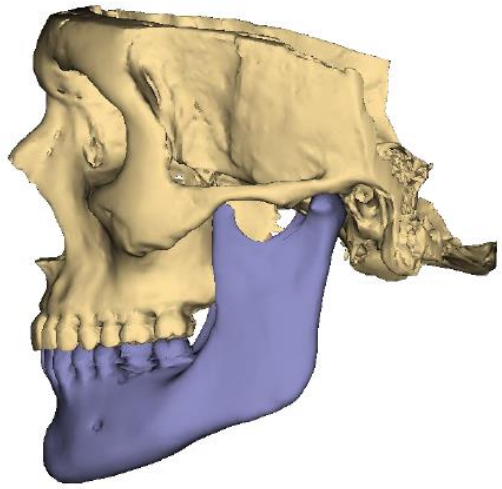
LINKS TO ALL SOCIALS

Surgical Plan: Pre-operative Position









ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

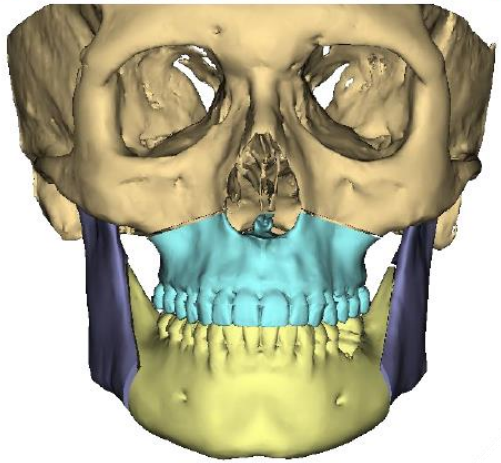
Texas Children's Hospital®

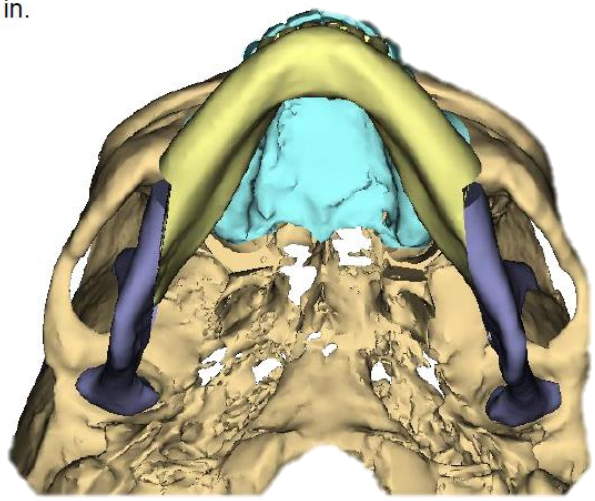
HOUSTON Methodist
LEADING MEDICINE

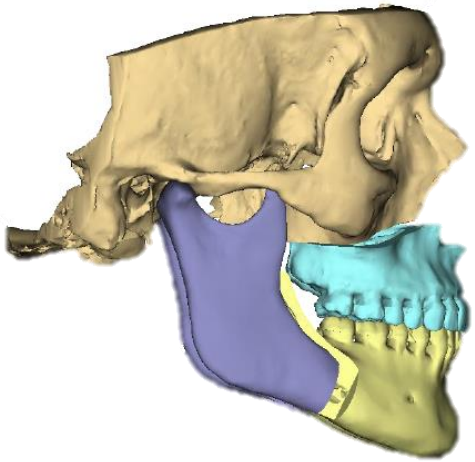
LINKS TO ALL SOCIALS

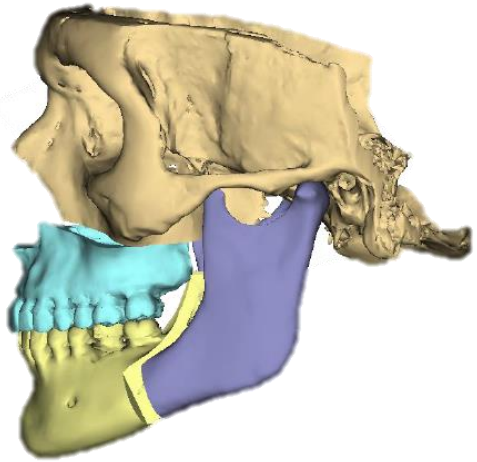
Surgical Plan: Final Position

Mandible moved according to planned maxilla position. Proximal segments rotated in.









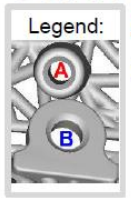
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

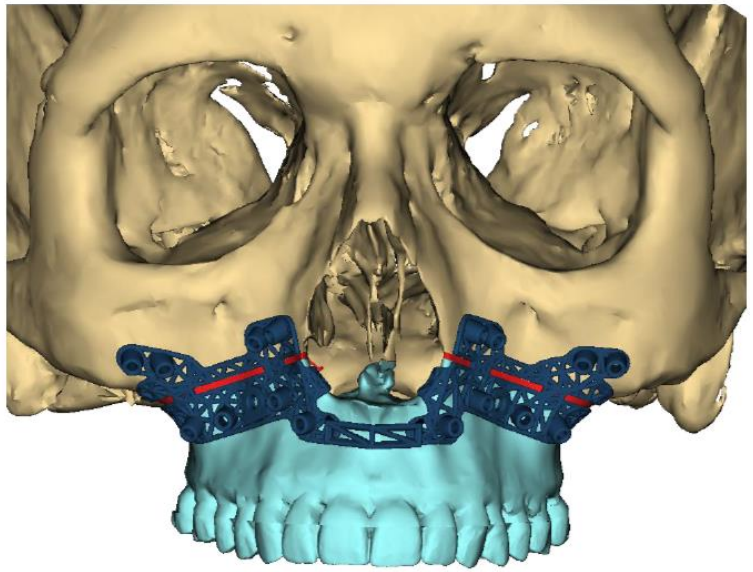
LINKS TO ALL SOCIALS

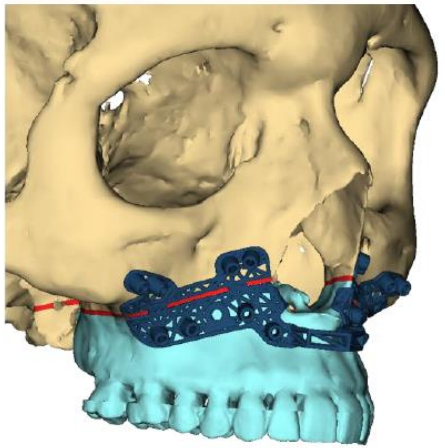
Guide Design: Titanium 3D Printed Guide for Midface

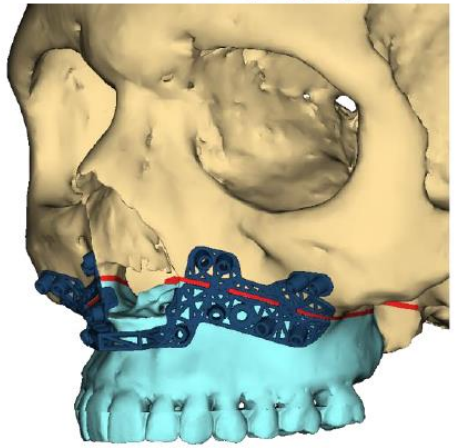


A: Pre-drill cylinders with angulation control: for use with 1.4/1.5 mm DePuy Synthes drill bits → indicated in red

B: Fixation hole (temporary fixation of guide): for use with MatrixORTHOGNATHIC Ø1.85 mm screws → indicated in blue







Resected maxilla

ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

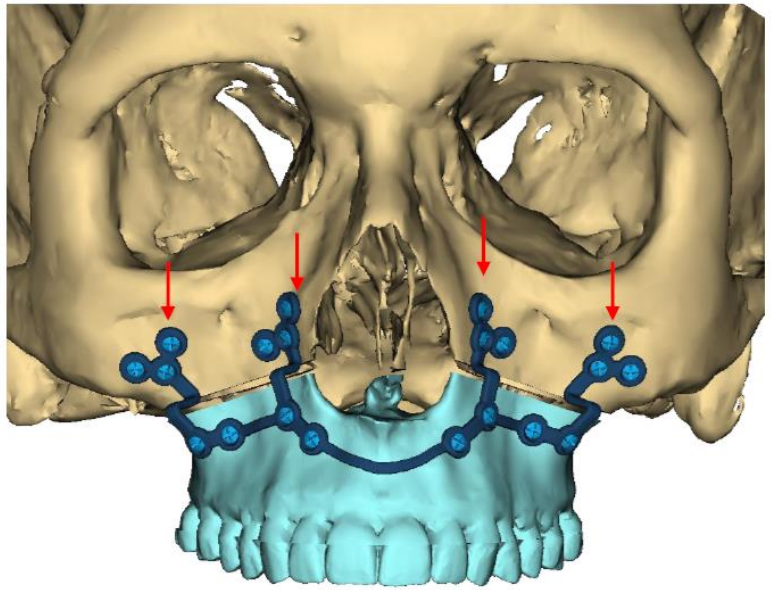
Texas Children's Hospital®

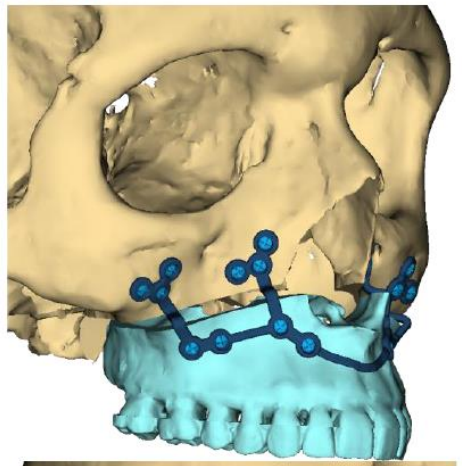
HOUSTON Methodist
LEADING MEDICINE

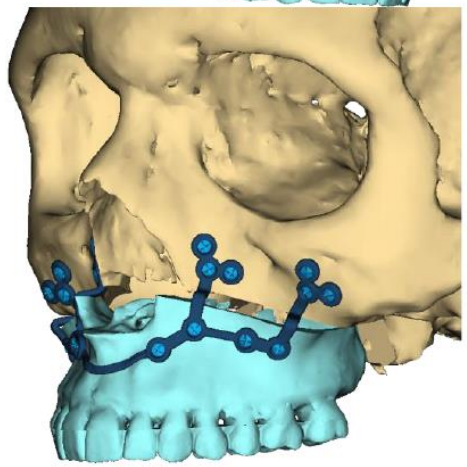
LINKS TO ALL SOCIALS

Implant Design: Titanium 3D Printed Plate for Midface (1.3 mm & 0.8mm ANS)

- Screw hole: for use with MatrixORTHOGNATHIC Ø1.85 mm screws
- Screw pre-drilling guided using surgical guides. Non-Guided screws are indicated with red arrows.







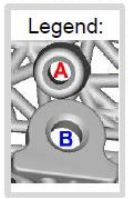
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

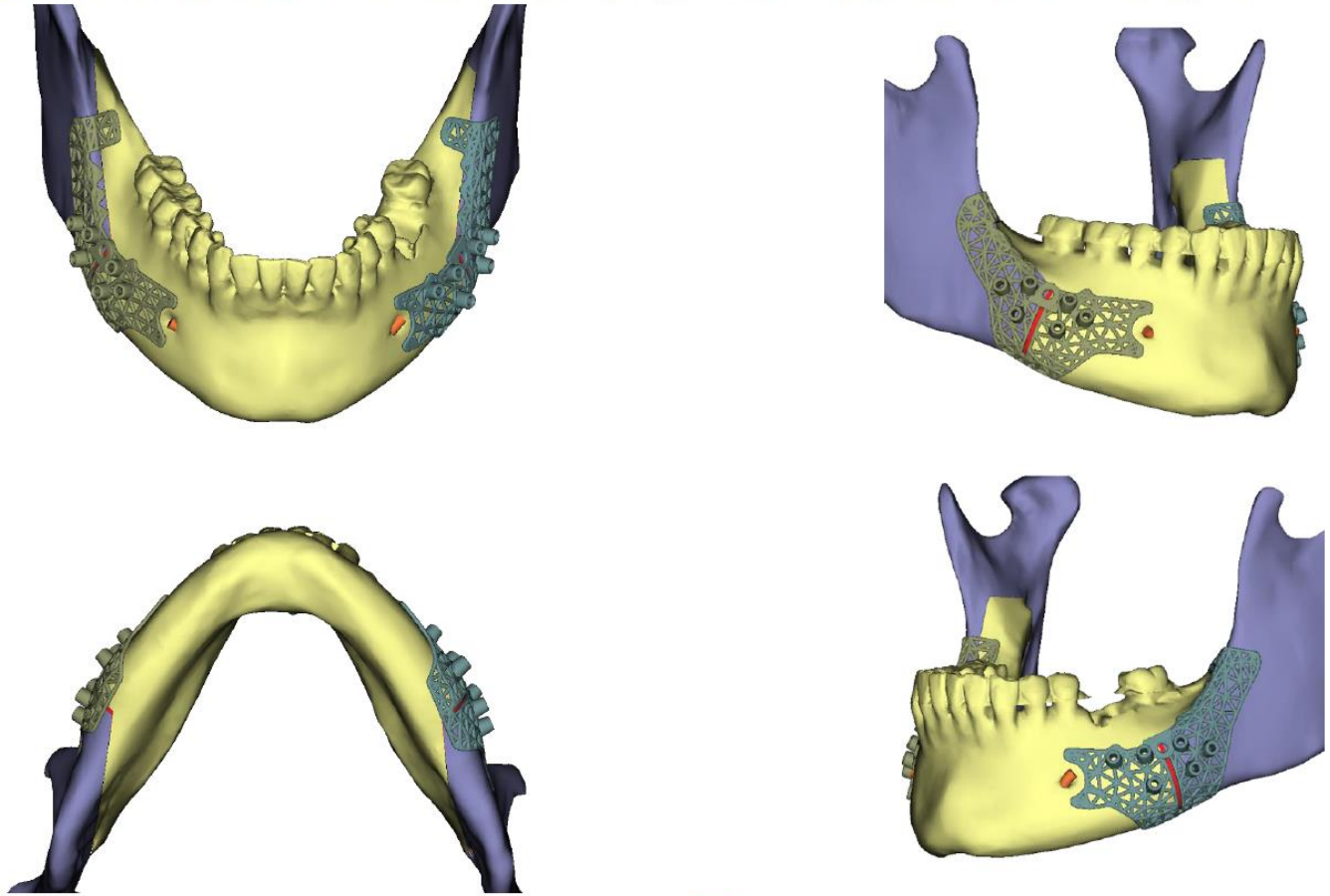
LINKS TO ALL SOCIALS

Guide Design: Titanium 3D Printed Guide for Mandible



A: Pre-drill cylinders with angulation control: for use with 1.4/1.5 mm DePuy Synthes drill bits → indicated in red

B: Fixation hole (temporary fixation of guide): for use with MatrixORTHOGNATHIC Ø1.85 mm screws → indicated in blue



Resected mandible

ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

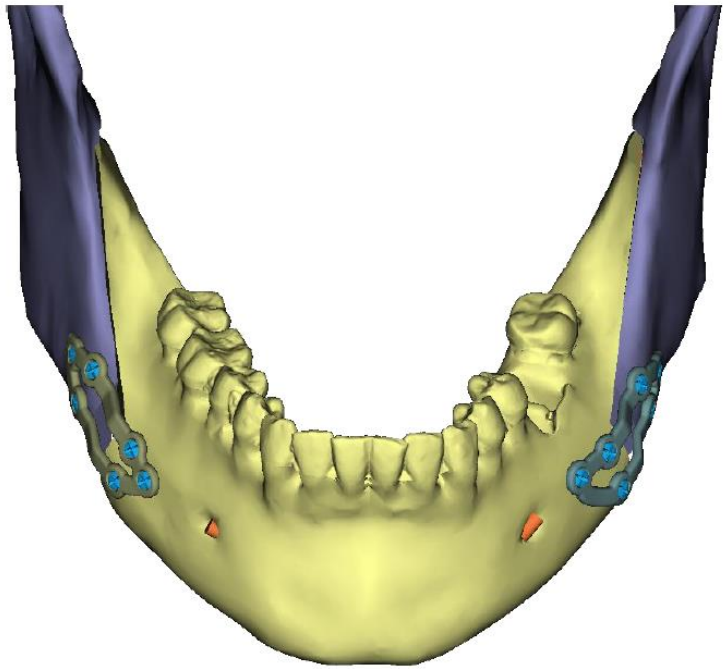
Texas Children's Hospital®

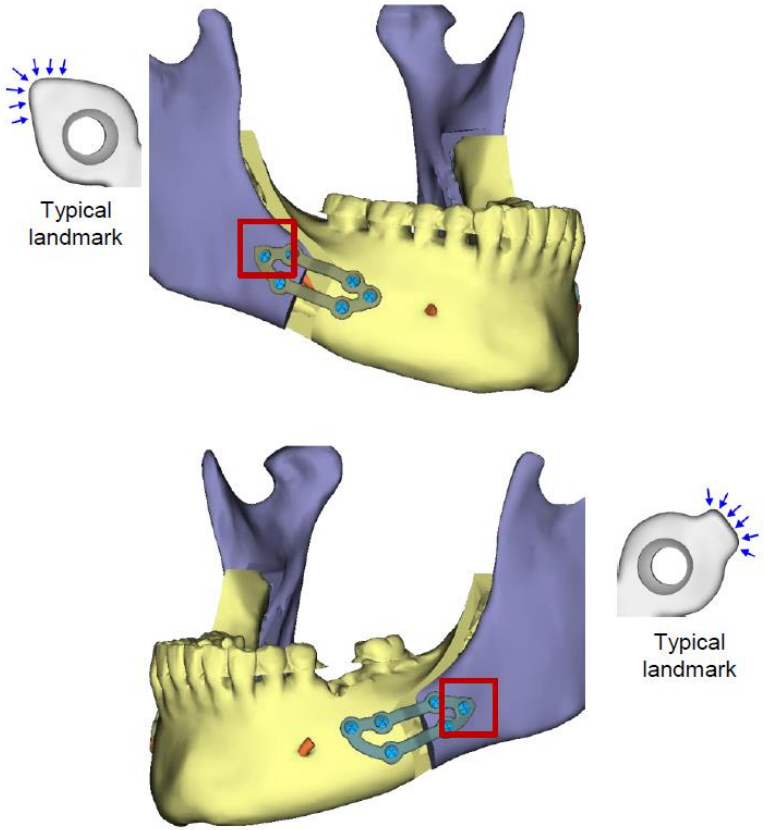
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

Implant Design: Titanium 3D Printed Plate for Mandible, mini (1.3 mm)

- Screw hole: for use with MatrixORTHOGNATHIC Ø1.85 mm screws
- All screw pre-drilling guided using surgical guides.





ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

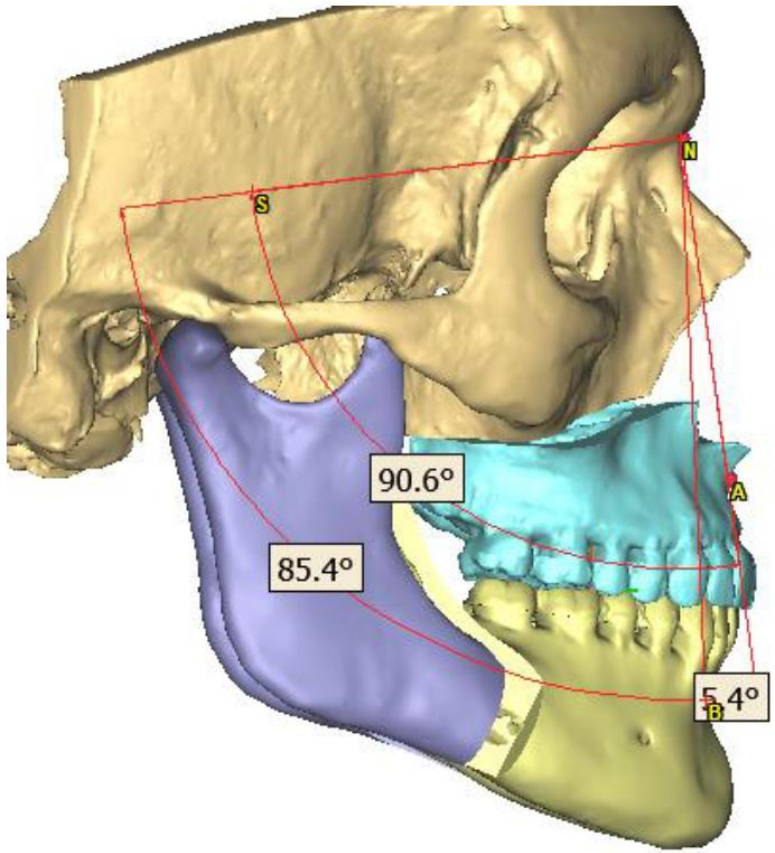
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

Surgical Plan: Cephalometric Analyses

The mandible measurements shown below are referenced from the original position of the mandible, at the time the CT was taken.

Point	Left/Right (mm)		Ant/Post (mm)		Up/Down (mm)	
A	0.3	R	7.7	Ant	1.0	Down
ANS	0.3	R	7.7	Ant	1.0	Down
Maxilla Incisor Midline	0.1	R	7.5	Ant	1.0	Down
Maxilla Canine L	0.1	R	7.5	Ant	0.8	Down
Maxilla Canine R	0.1	R	7.5	Ant	1.1	Down
Maxilla 1st Molar L	0.1	R	7.5	Ant	0.5	Down
Maxilla 1st Molar R	0.1	R	7.5	Ant	1.0	Down
L Lateral Buttress	0.3	R	7.7	Ant	0.4	Down
L Medial Buttress	0.4	R	7.8	Ant	0.8	Down
R Lateral Buttress	0.3	R	7.7	Ant	1.1	Down
R Medial Buttress	0.4	R	7.8	Ant	1.0	Down
B	0.3	R	7.4	Ant	0.9	Down
Pog	0.2	R	7.2	Ant	1.0	Down
Me	0.1	R	7.2	Ant	0.9	Down
Mandible Incisor Midline	0.5	R	7.5	Ant	1.0	Down
Mandible Canine L	0.5	R	7.5	Ant	0.8	Down
Mandible Canine R	0.5	R	7.5	Ant	1.0	Down
Mandible 1st Molar L	0.0	NA	0.0	NA	0.0	NA
Mandible 1st Molar R	0.5	R	7.5	Ant	1.0	Down



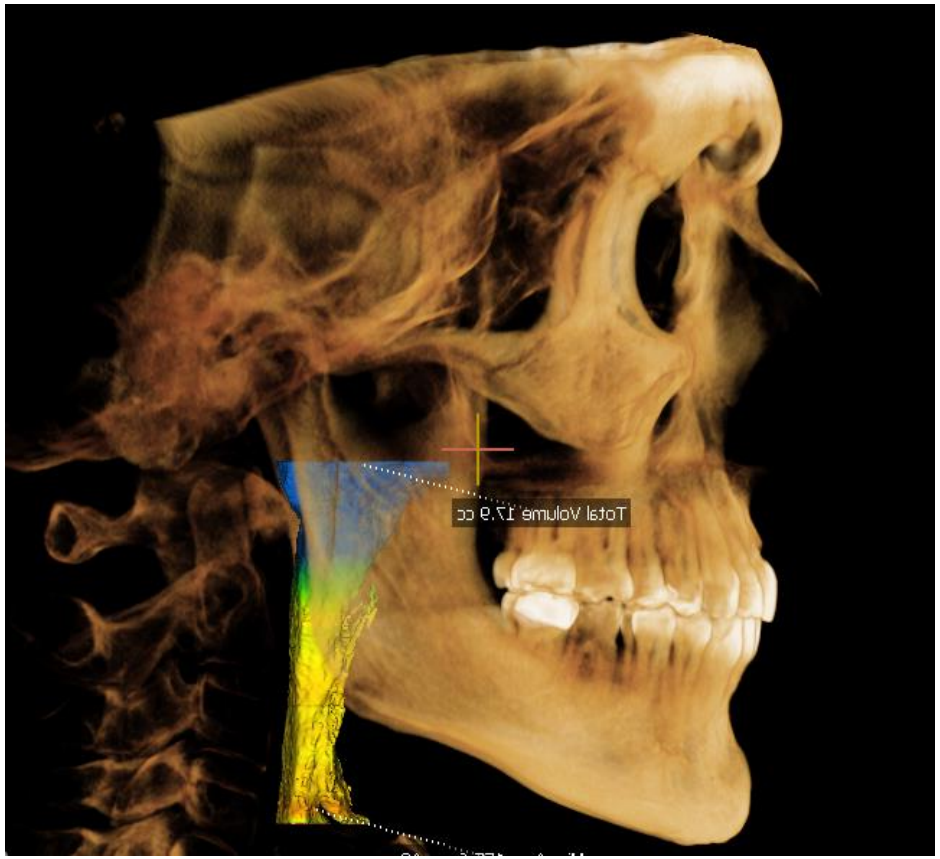
Measurement (°)	Pre-Op 3D	Planned 3D	Delta 3D
SNA	82.7	90.6	8.0
SNB	80.7	85.4	4.7
ANB	2.2	5.4	3.1
Maxillary Occlusal Plane	4.8	5.2	0.4

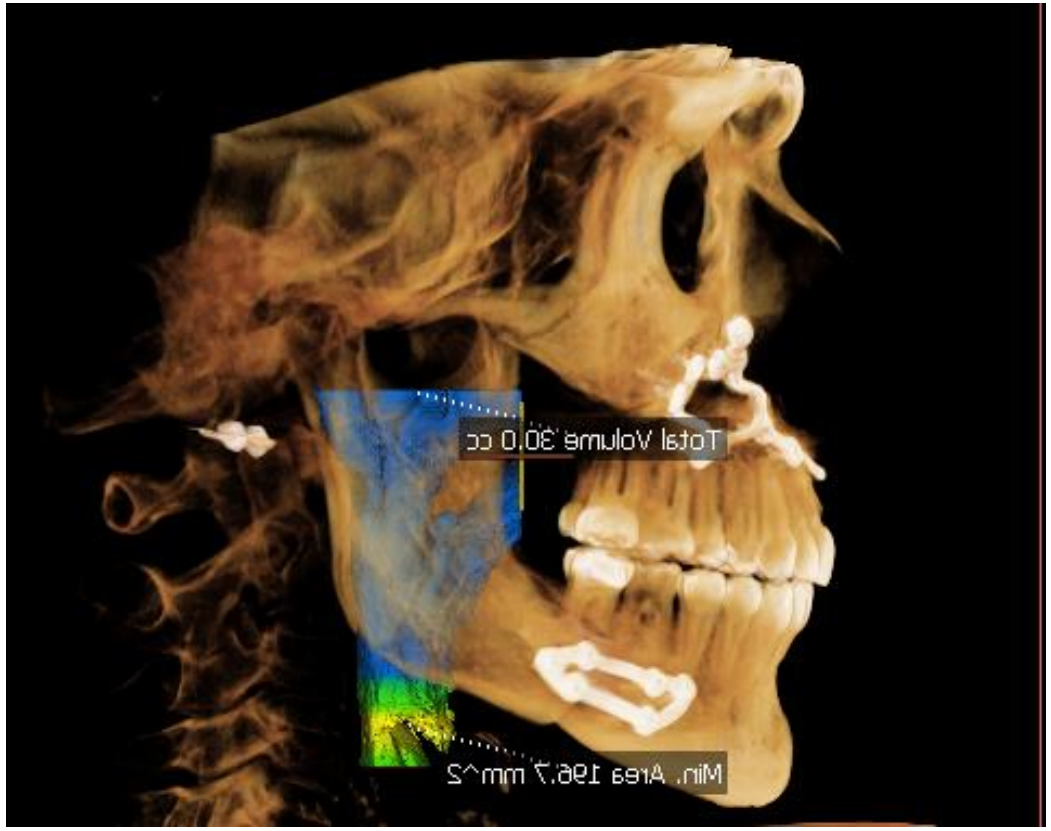
ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



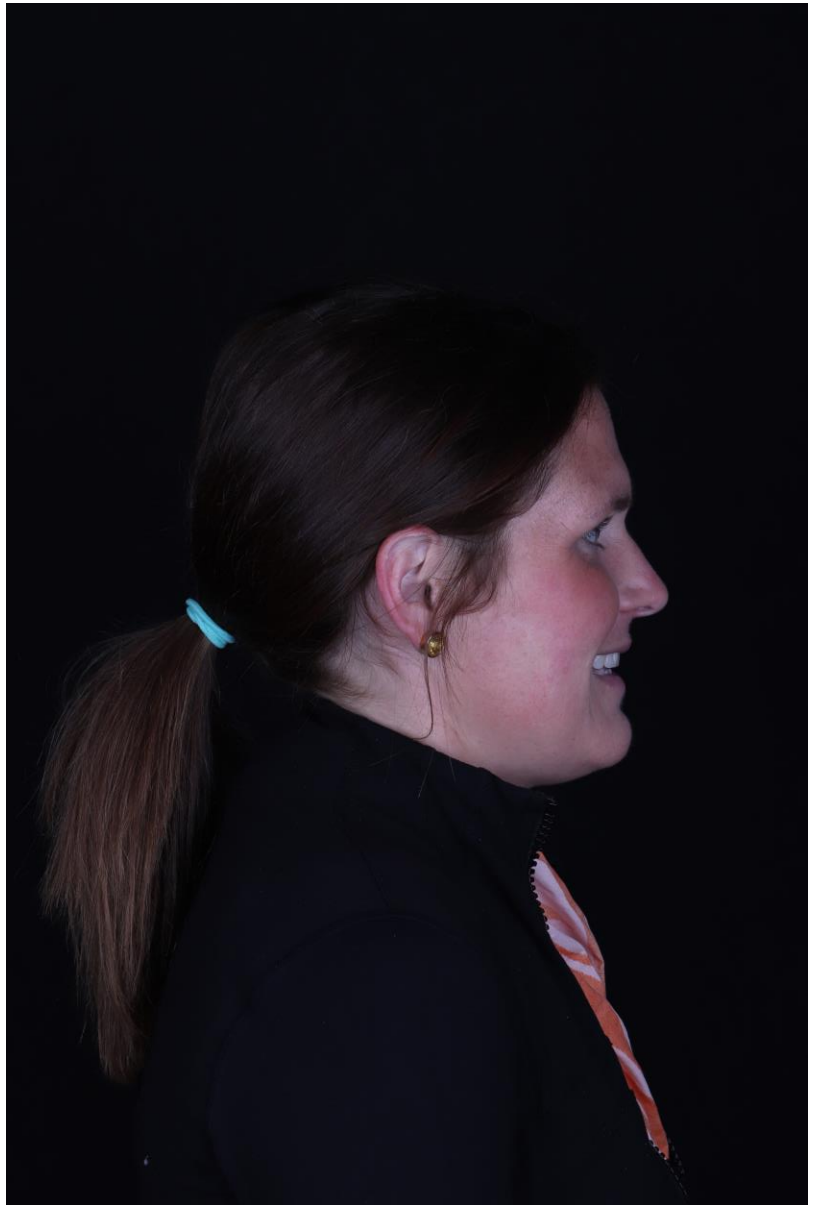


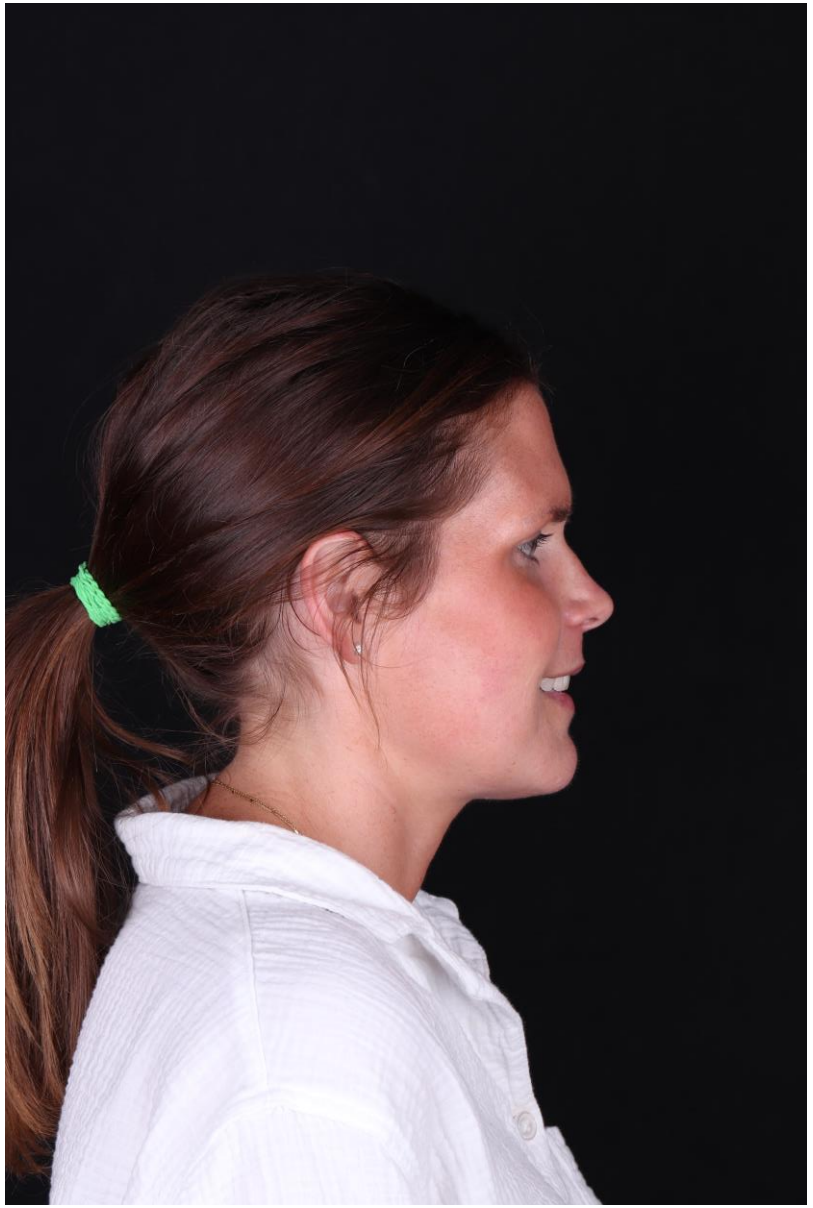
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

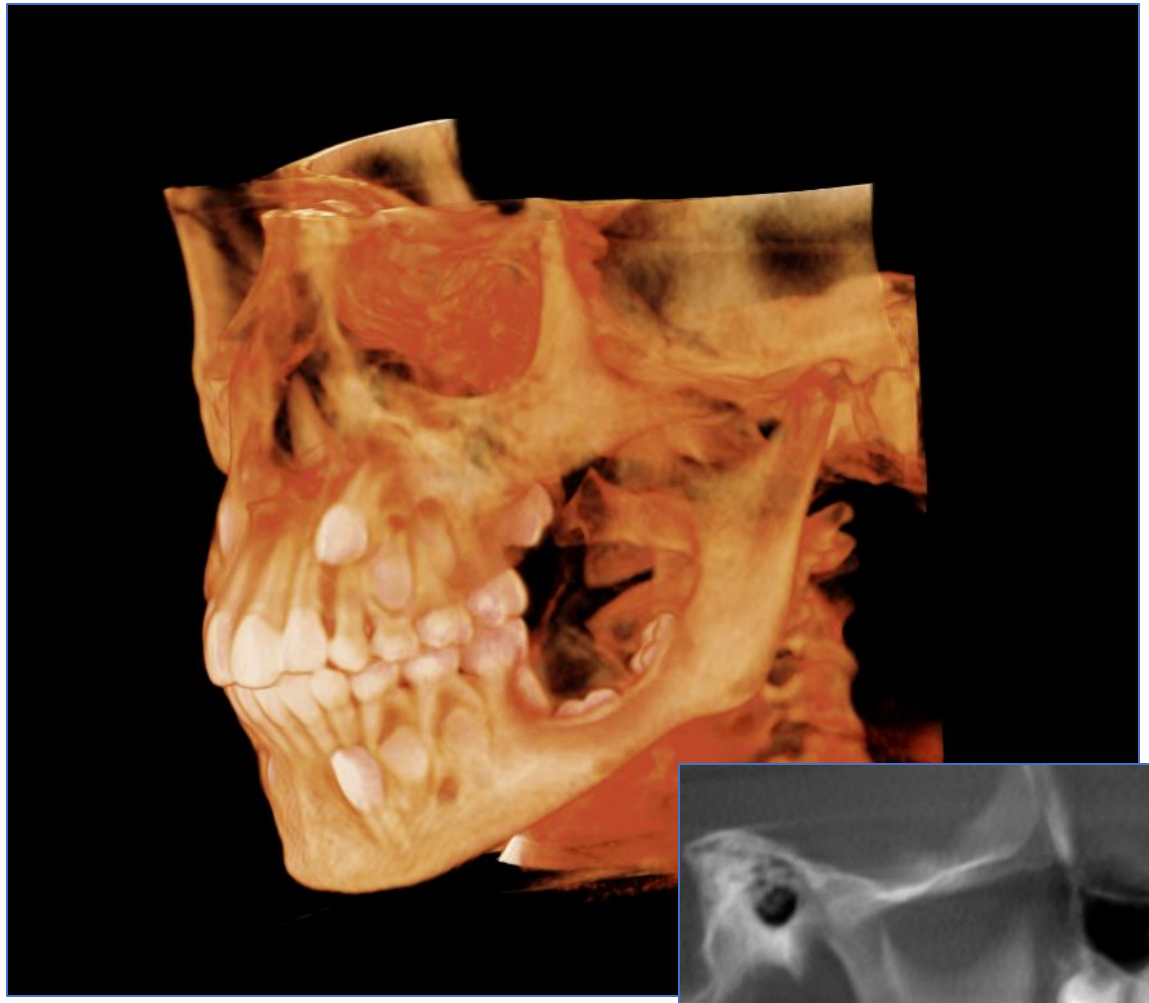
LINKS TO ALL SOCIALS

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

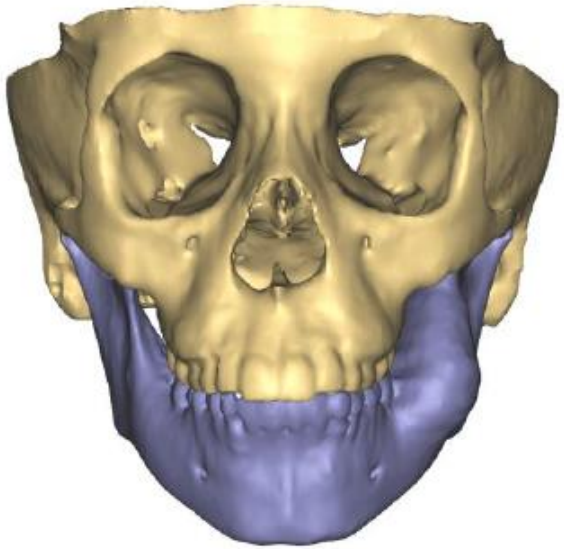


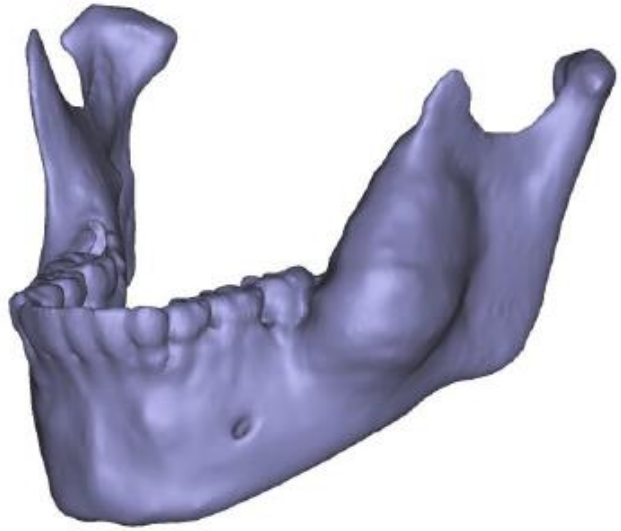
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

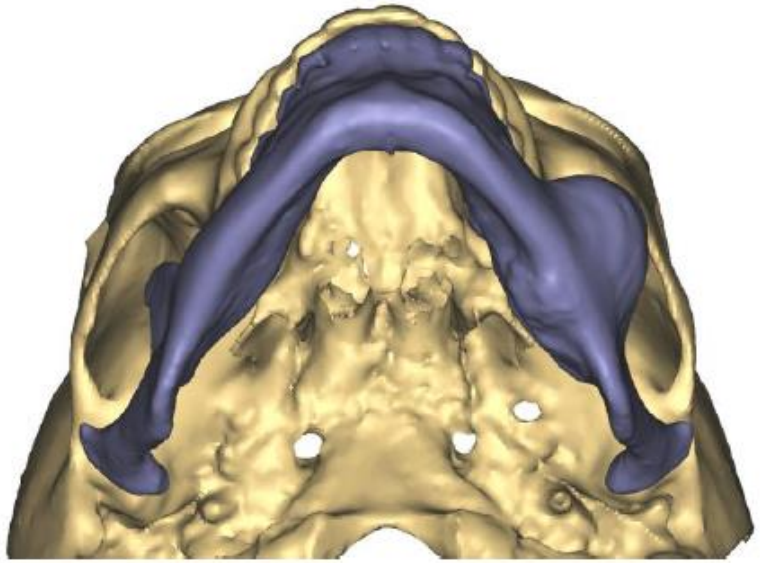
Texas Children's
Hospital®

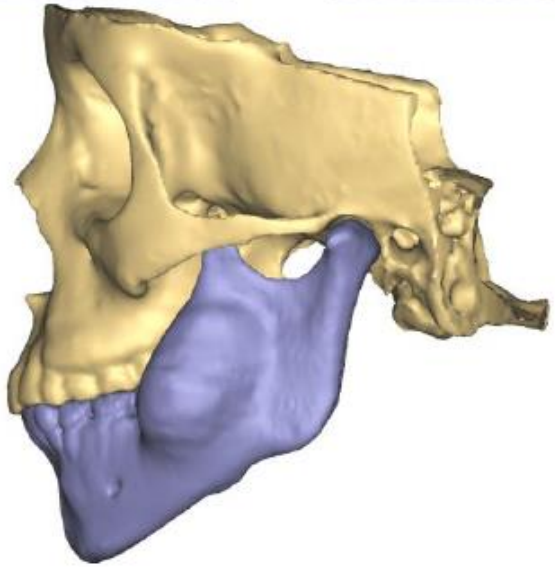
HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







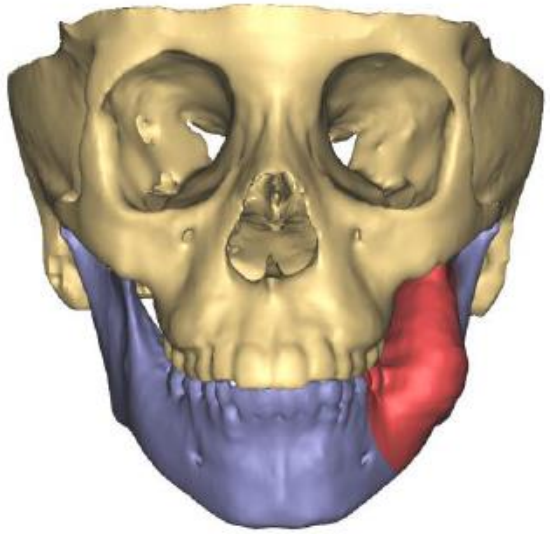


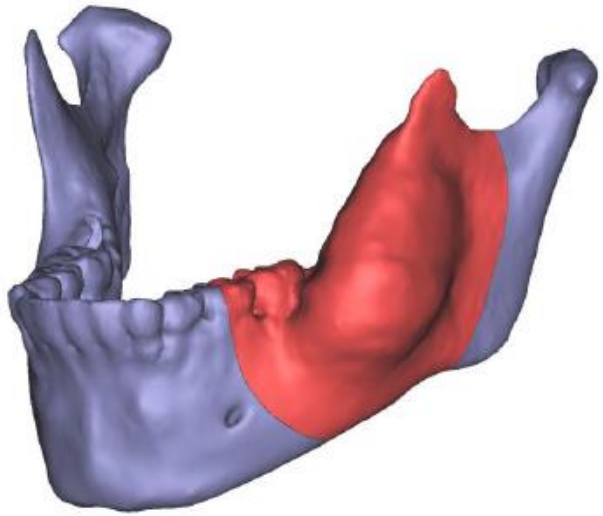
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

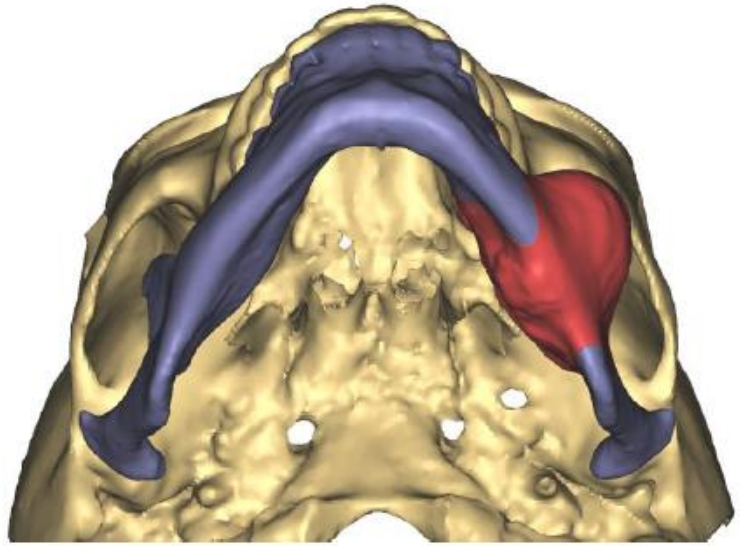
Texas Children's Hospital®

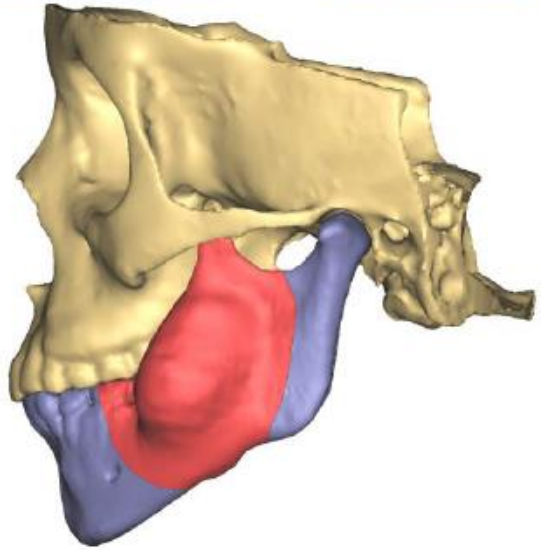
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







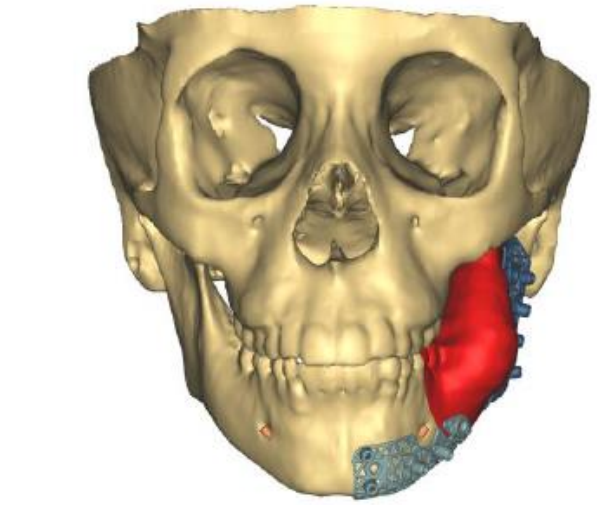


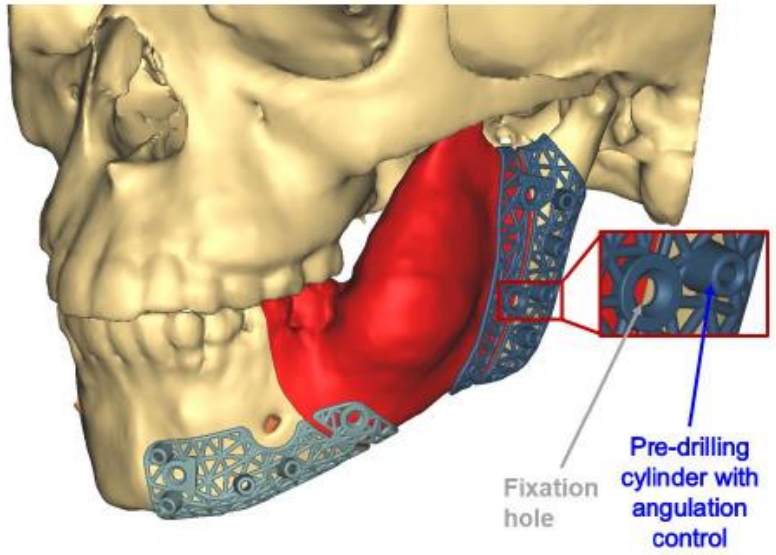
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

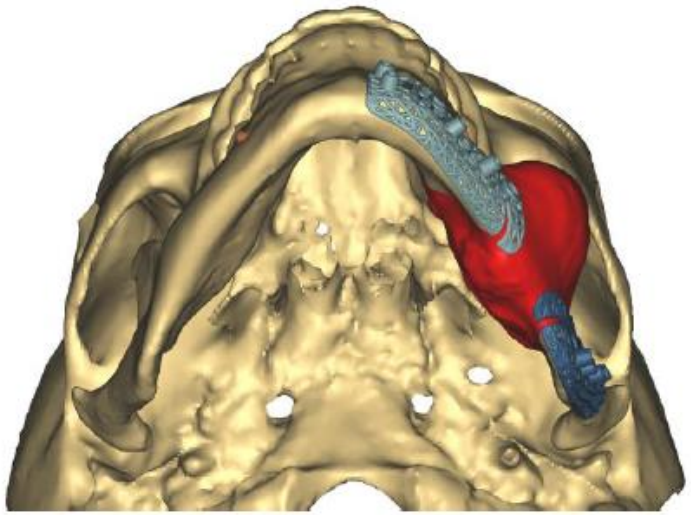
Texas Children's Hospital®

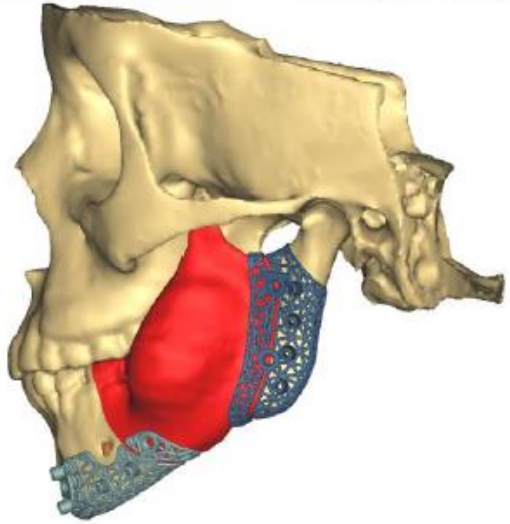
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS









ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

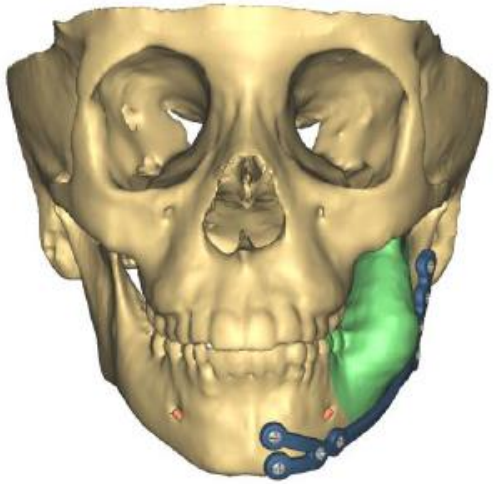
LINKS TO ALL SOCIALS

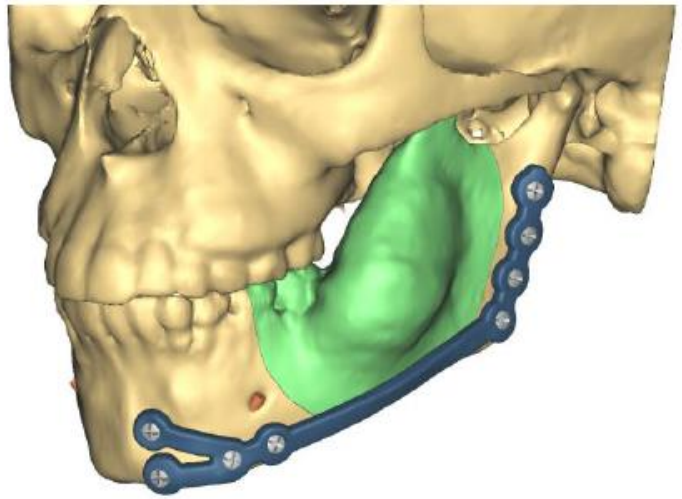
ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

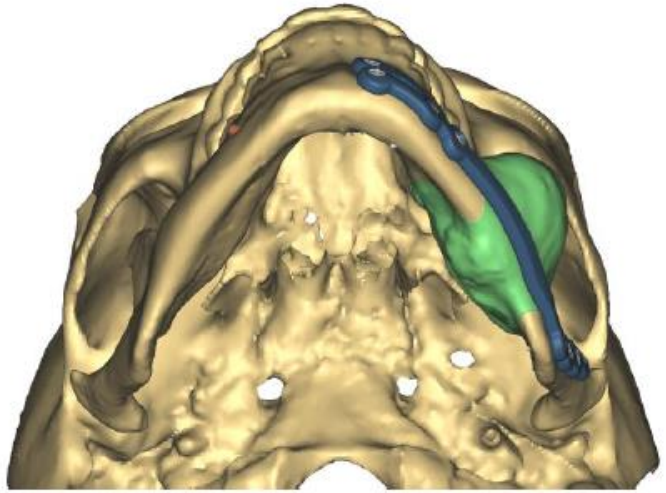
Texas Children's Hospital®

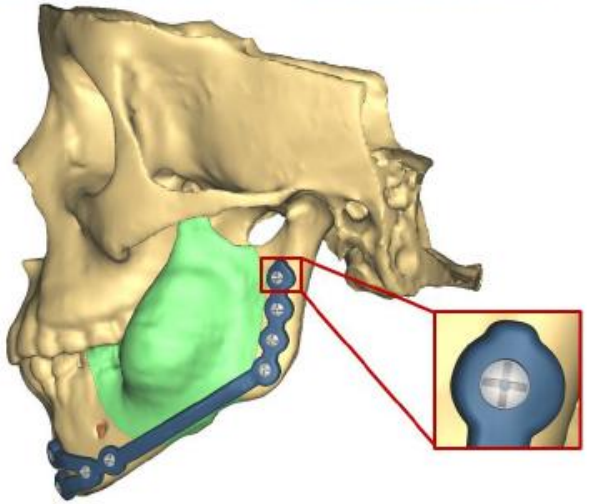
HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS







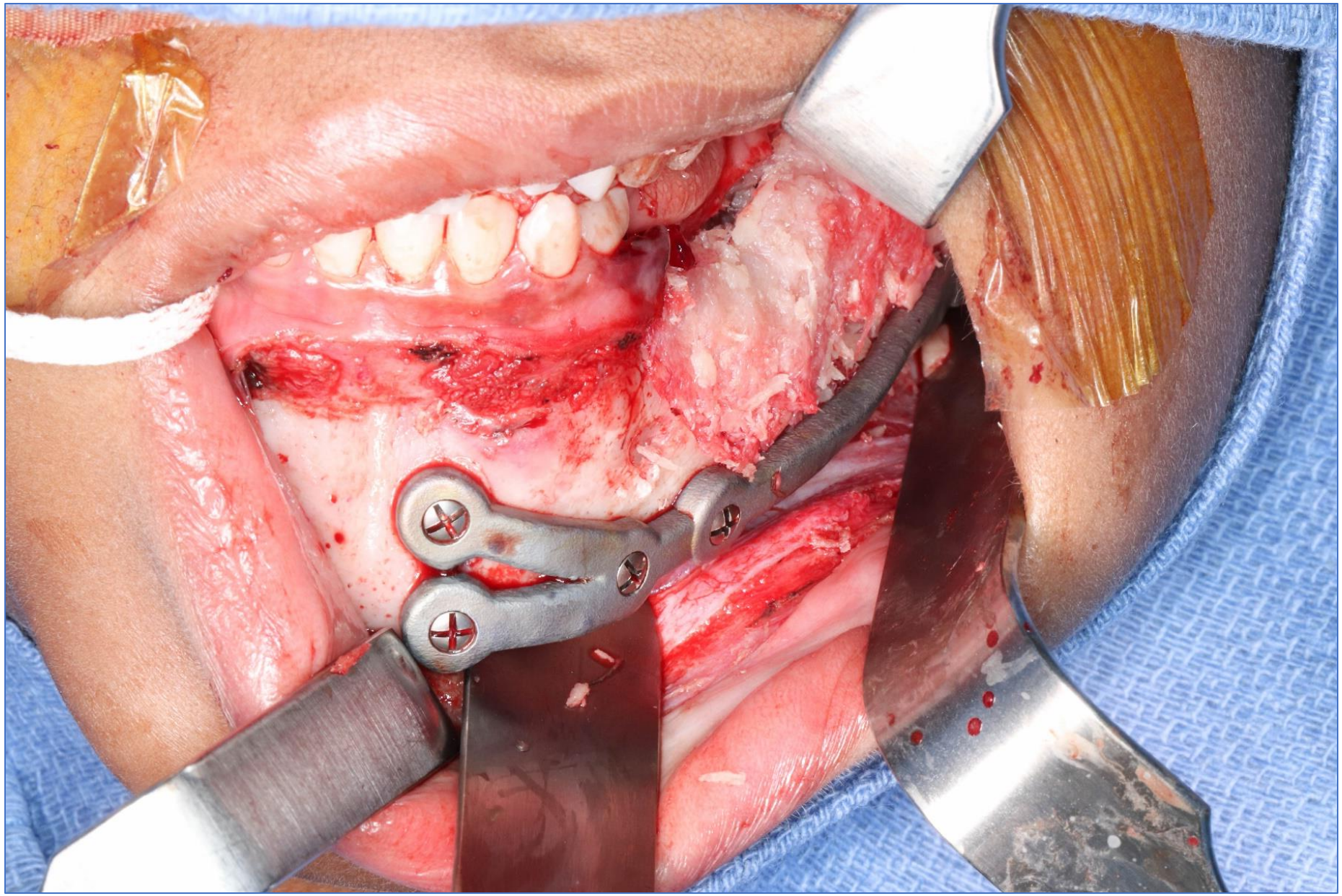


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

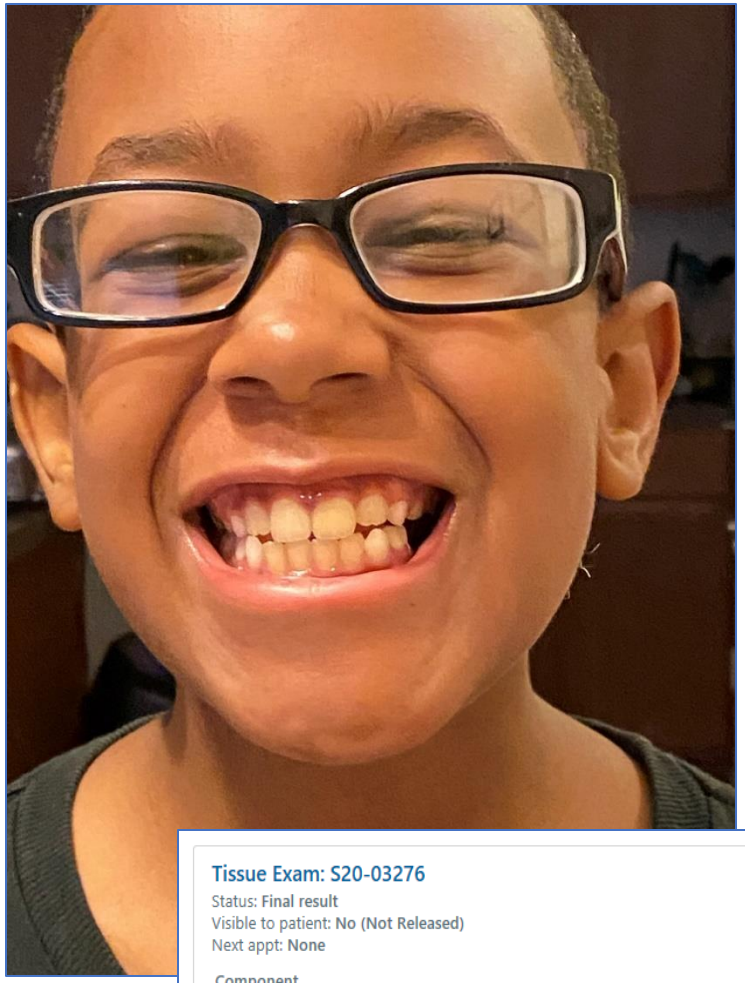


ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS



Tissue Exam: S20-03276

Status: Final result
Visible to patient: No (Not Released)
Next appt: None

Component

Final Diagnosis

Bone, left mandible, excision:
- Features most consistent with juvenile aggressive (active) ossifying fibroma of jaw.
- Closest margin is lateral with tumor at 0.5 mm from the inked margin.

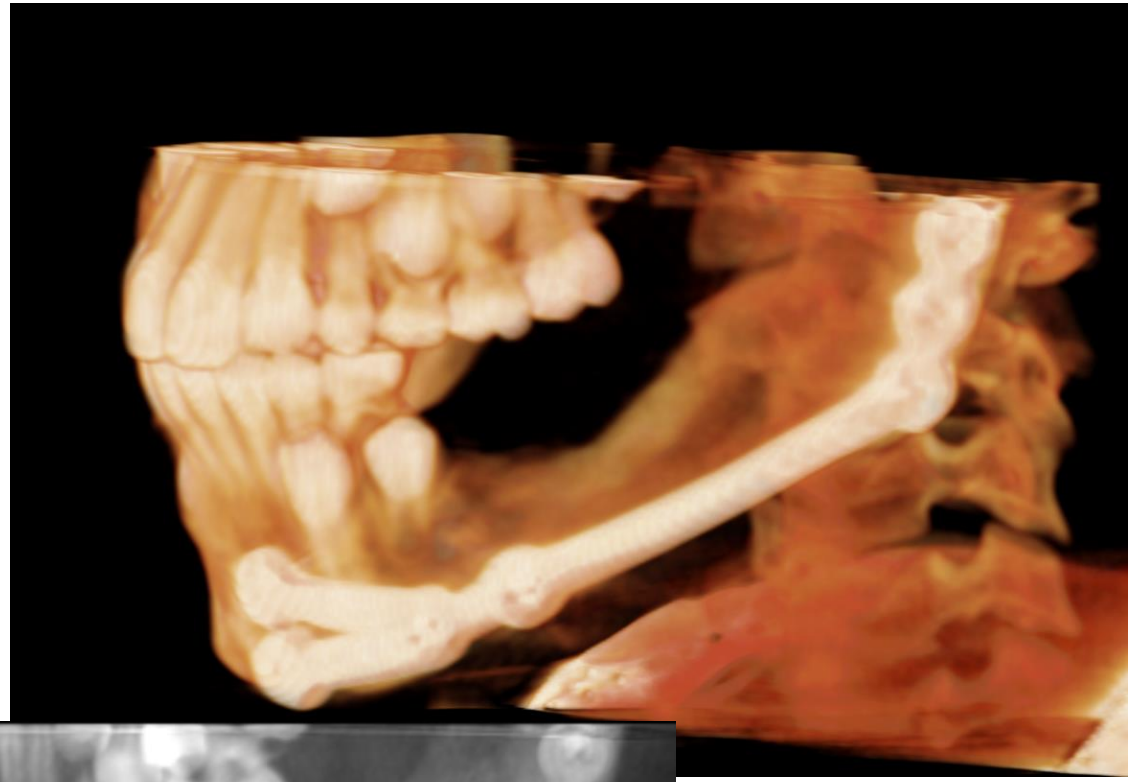
I have reviewed the material described and edited this report.

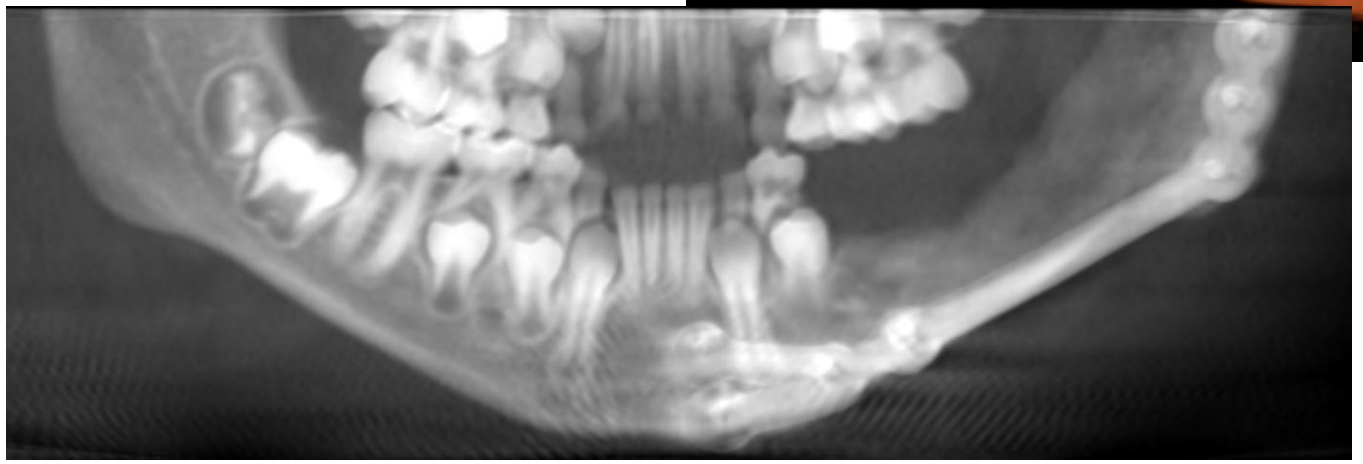
ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS





ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's
Hospital®

HOUSTON
Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

AMERICAN SOCIETY OF MAXILLOFACIAL SURGEONS
American Society of Craniofacial Surgeons

Browse Journal | Journal Info | Stay Connected | Submit Paper

Immediate Mandibular Reconstruction Using a Cellular Bone Allograft Following Tumor Resection in a Pediatric Patient

David M. Alfi, Abdullahi Hassan, Sebastian M. East, more...

Show all authors

First Published November 10, 2021 | Research Article | Check for updates

https://doi.org/10.1177/27325016211057287

Article information

Abstract

Reconstruction of large segmental mandibular defects presents a challenge for oral and maxillofacial surgeons, particularly in the skeletally immature pediatric patient. Autogenous bone graft is historically preferred; however, harvest of autograft requires a second surgical site, risking donor-site complications as well as the potential for long-term complications in the growing child. Here, we present the first known report of a pediatric patient who underwent immediate mandibular reconstruction of a 6.5-cm long segmental defect using a cellular bone allograft (VF-CBA) combined with custom-fabricated guides and plates following tumor resection. The use of VF-CBA, along with the custom guides and plates, eliminated the need for autograft harvest in a child, enabled an entirely intraoral approach, avoiding the creation of a cutaneous scar, and reduced the total operative time, resulting in a fast recovery and improved patient satisfaction. By 7 months

ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

USING THE RIGHT TOOLS

- Faster surgical time
  - Faster recovery
  - Morbidity
  - Avoid Donor Site
- Stronger
  - Avoid hardware failure
  - Supports interpositional graft like ViviGen
- More direct transfer of information
  - Less error
  - Splint-less
- Optimize Movements
  - Not limited by standard designs
  - Confidence in grafting
- Avoiding Complications
  - Unsightly scars
  - Nerve injury
  - Bleeding

ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

I no longer have TMJ symptoms.

I used to get daily migraines & I no longer do.

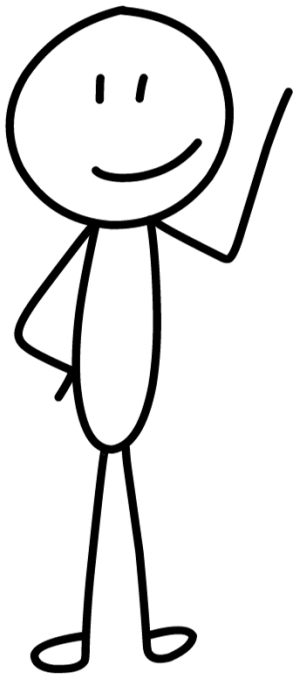
I don't have anxiety anymore, I feel so much more calm.

I no longer have pain opening my mouth or chewing.

I've been a body builder all my life and at 40 i've gained more lean muscle mass 6 months post jaw surgery than I ever could in my career prior to surgery.

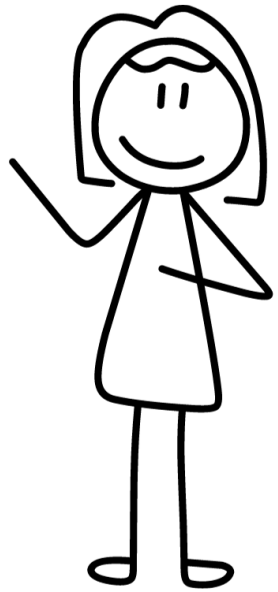
I used to feel foggy all the time and now I feel clear.

I used to have difficult time in high altitudes and at my recent trip to Colorado I had no altitude sickness.



I've lost 40 unwanted pounds just from sleeping and breathing better since jaw surgery & I feel so much healthier.

Running a marathon now is easier than a half a marathon pre surgery.



ALFI
Oral, Dental Implant & Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS

QUESTIONS?

ALFI
Oral, Dental Implant
& Facial Surgery
Texas Medical Center

Texas Children's Hospital®

HOUSTON Methodist
LEADING MEDICINE

LINKS TO ALL SOCIALS