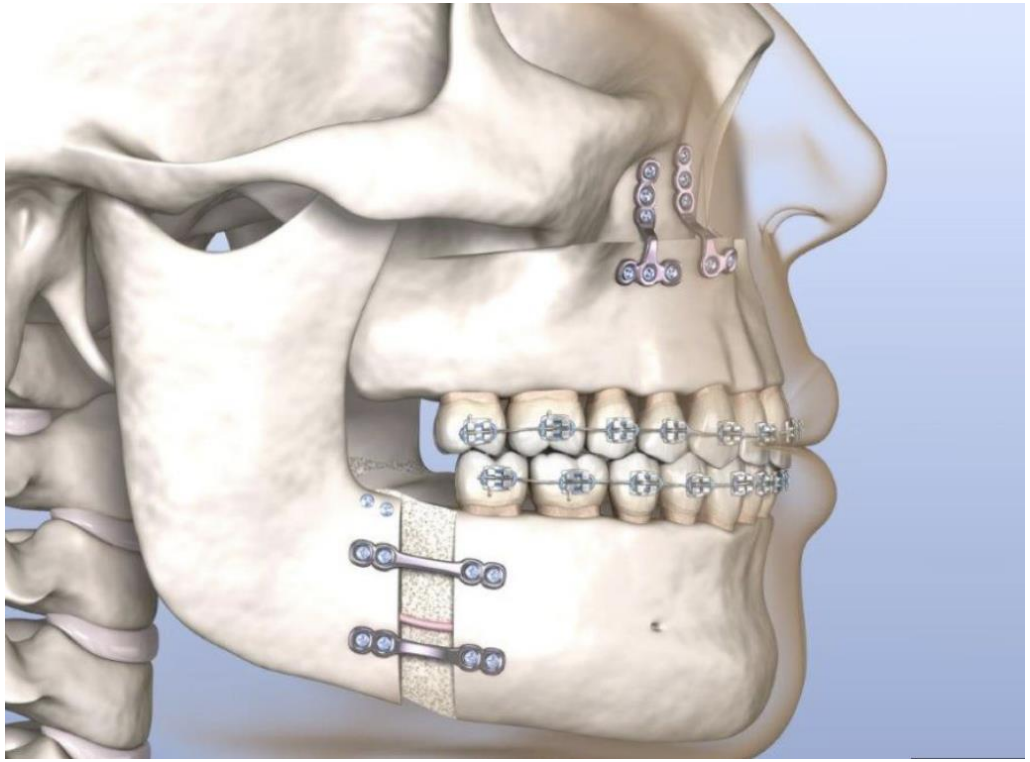
TRATTAMENTO DELLE APNEE NOTTURNE TRAMITE AVANZAMENTO BIMASCELLARE

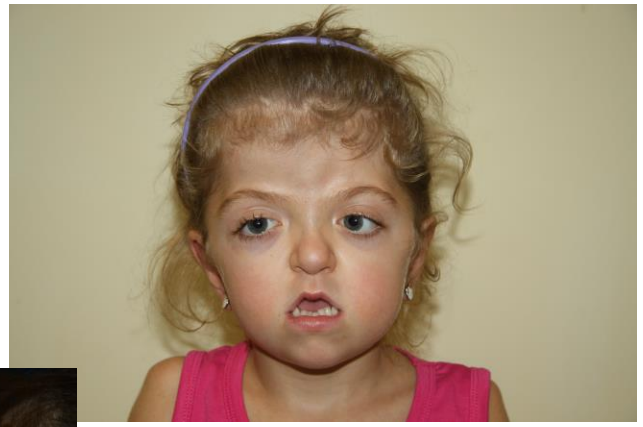


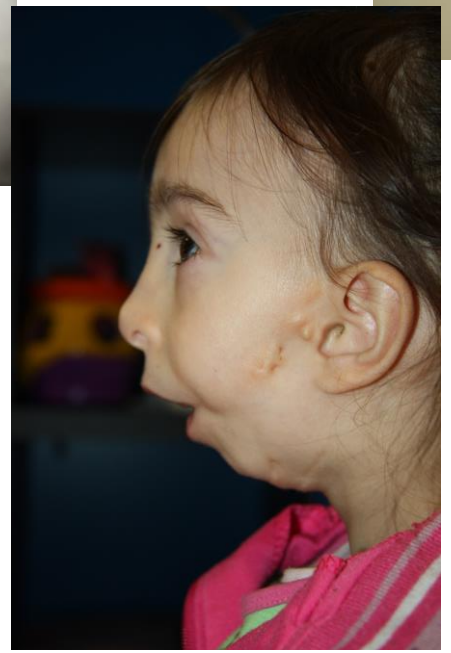
B. Bianchi-F.Laganà-B.Giannì
UOC Chirurgia Maxillo-Facciale e Odontostomatologia
IRCCS Ospedale Policlinico san Martino , Genova

OSPEDALE POLICLINICO SAN MARTINO
Sistema Sanitario Regione Liguria
Istituto di Ricovero e Cura a Carattere Scientifico

Università di Genova

DEFORMITA' CRANIO-MAXILLO-FACCIALI E OSAS





ELSEVIER

International Journal of Pediatric Otorhinolaryngology

Volume 67, Supplement 1, December 2003, Pages S111-S113

OSAS in craniofacial syndromes: an unsolved problem

L.J.Hans Hoeve [a] ✉, Marloes Pijpers [b], Koen F.M. Joosten [b]

DEFORMITA' CRANIO-MAXILLO-FACCIALI E OSAS

Sleep. 1986 Dec;9(4):469-77. doi: 10.1093/sleep/9.4.469.

Obstructive sleep apneic patients have craniomandibular abnormalities

A Jamieson, C Guilleminault, M Partinen, M A Quera-Salva

Dent J (Basel). 2024 Jul 19;12(7):225. doi: 10.3390/dj12070225.

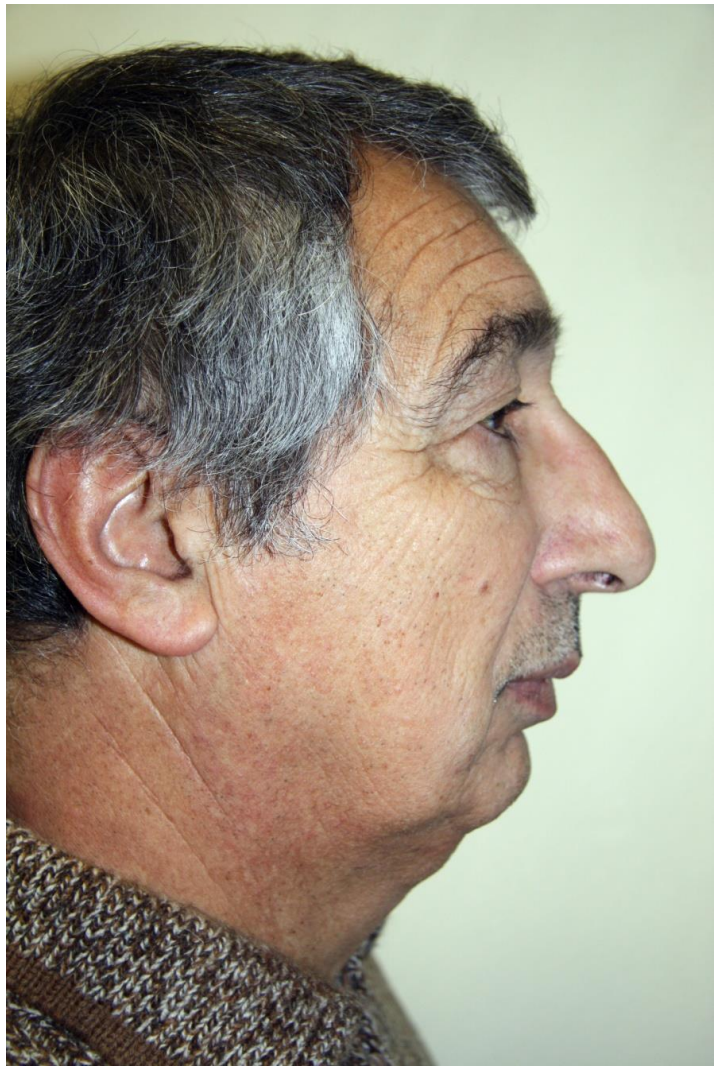
The Incidence of Obstructive Sleep Apnea in Patients with Dento-Skeletal Malformation

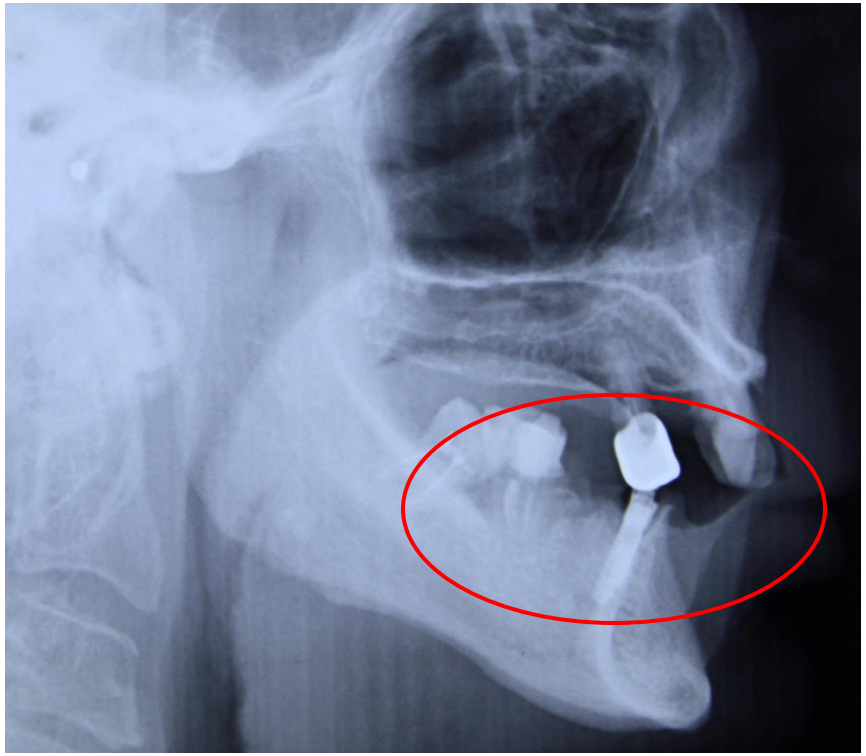
Giuseppe D'Amato [1], Mattia Todaro [2], Gianmarco Saponaro [2], Paolo De Angelis [3], Alessandro Moro [2], Francesca Azzuni [2], Benedetta Capasso [2], Giulio Gasparini [4]

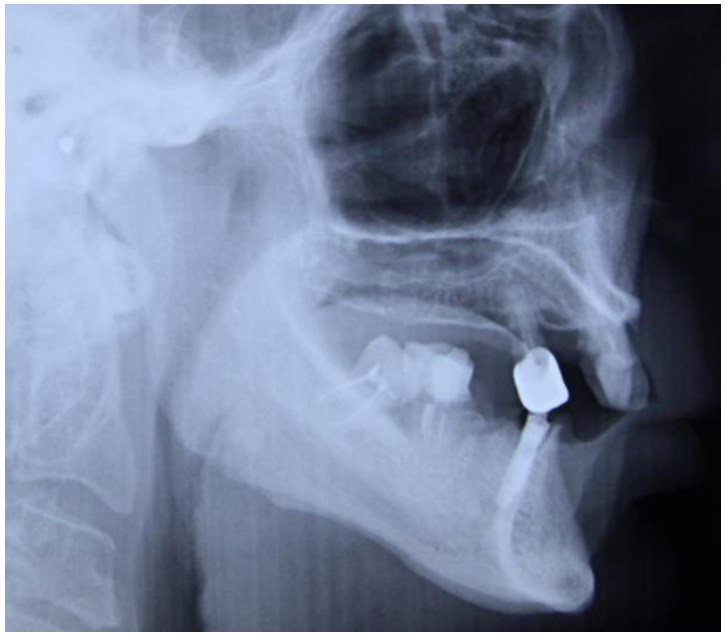
J Pers Med. 2023 Jul 27;13(8):1196. doi: 10.3390/jpm13081196.

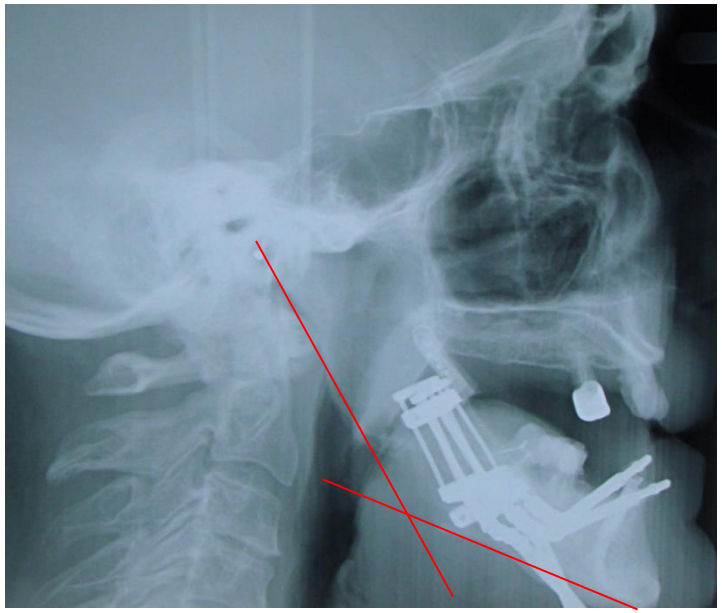
Craniofacial Phenotype in Obstructive Sleep Apnea and Its Impact on Positive Airway Pressure (PAP) Adherence

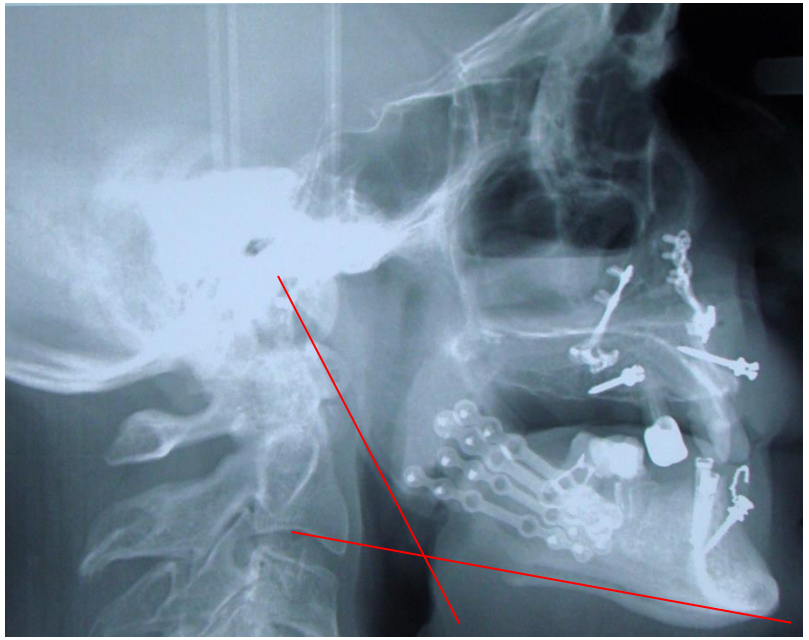
Jae-Seon Park [1], Bin Kwon [2], Hyun-Seok Kang [1], Seong-Jin Yun [1], Sung-Jun Han [2], Yeso Choi [2], Sung-Hun Kang [1], Mi-Yeon Lee [3], Kyung-Chul Lee [1], Seok-Jin Hong [1]

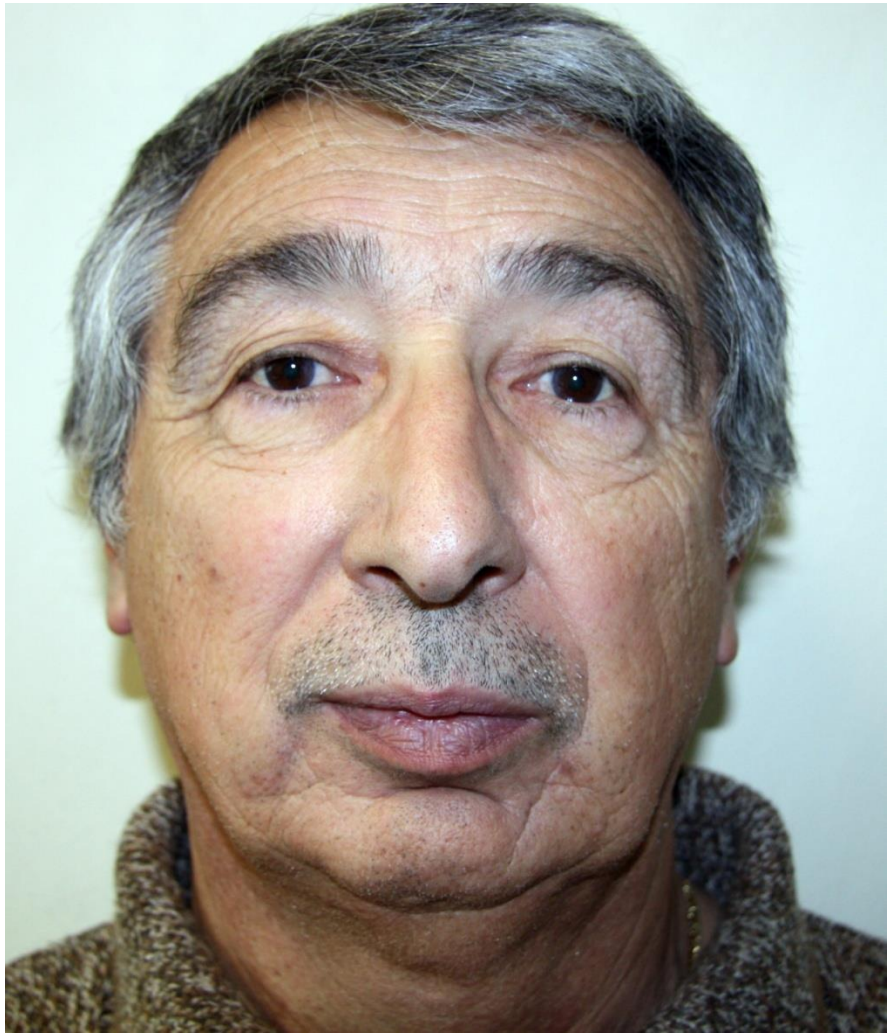


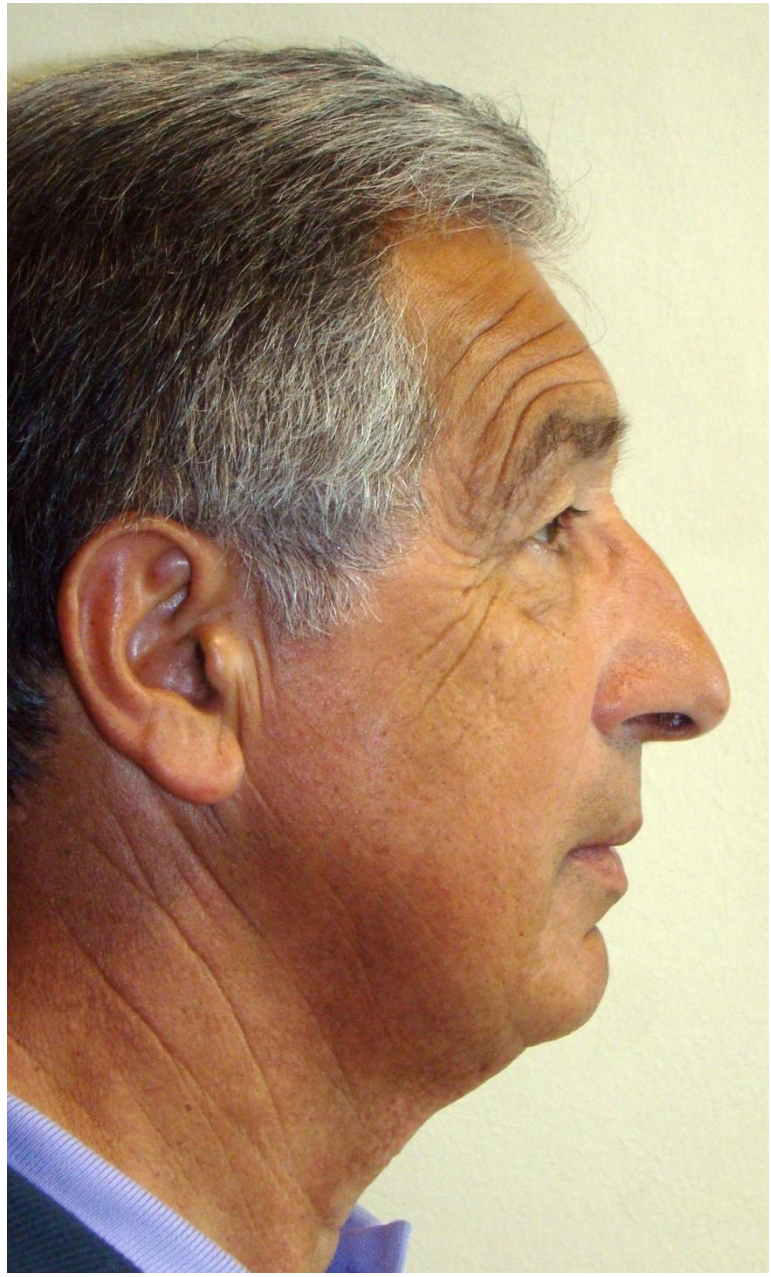


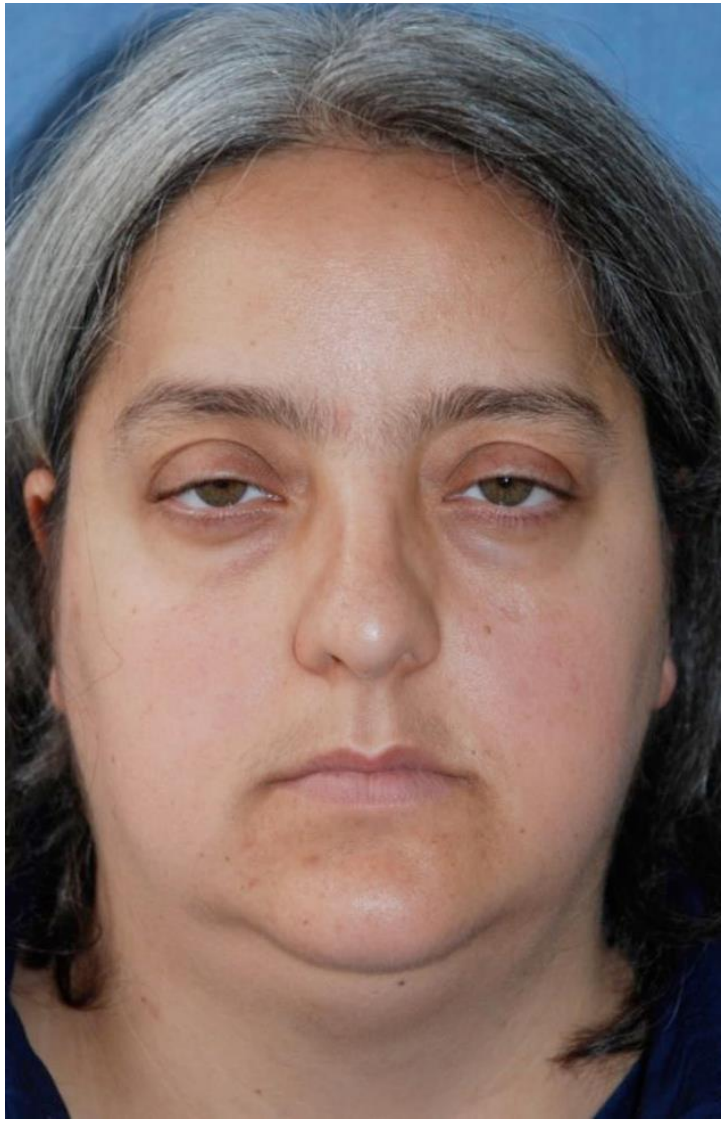


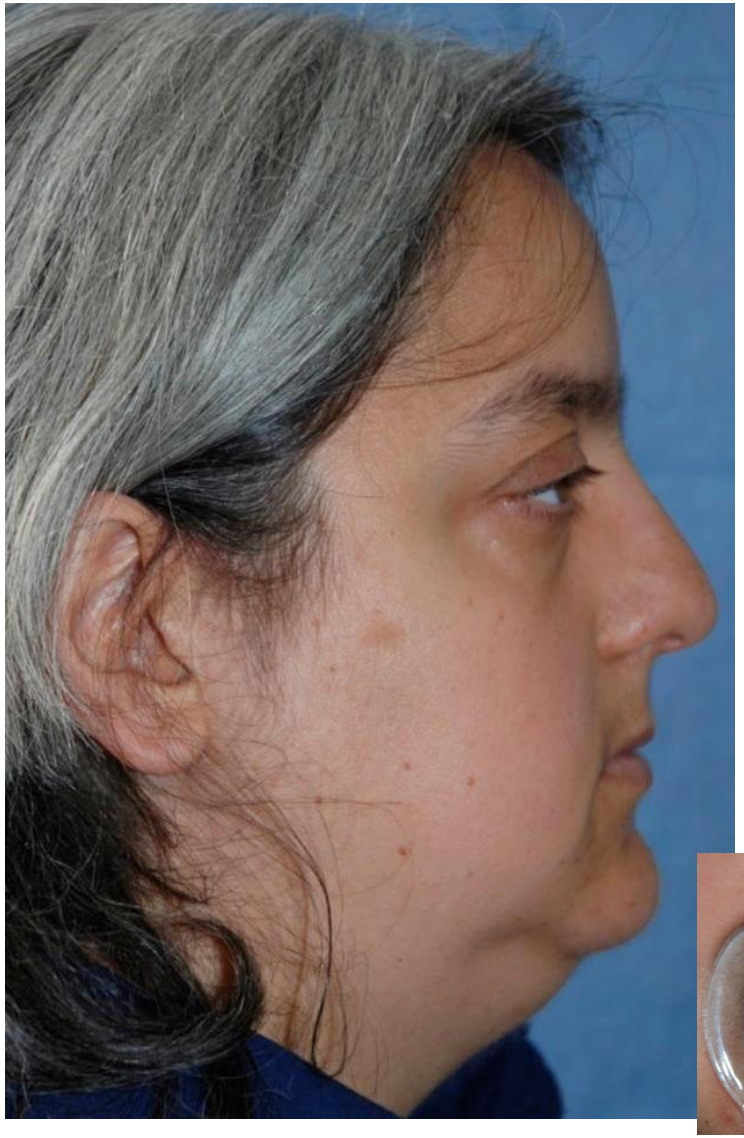




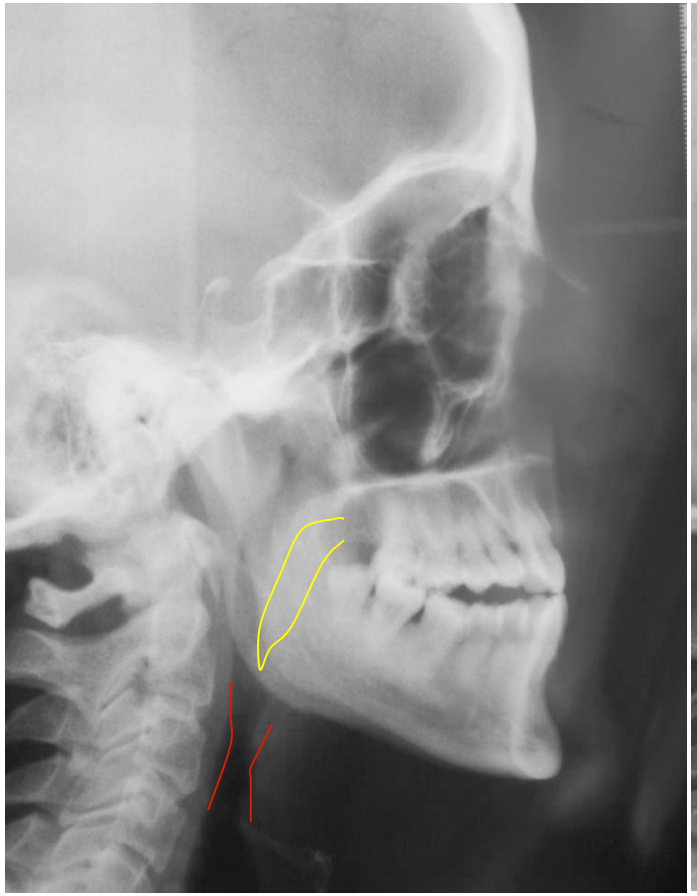


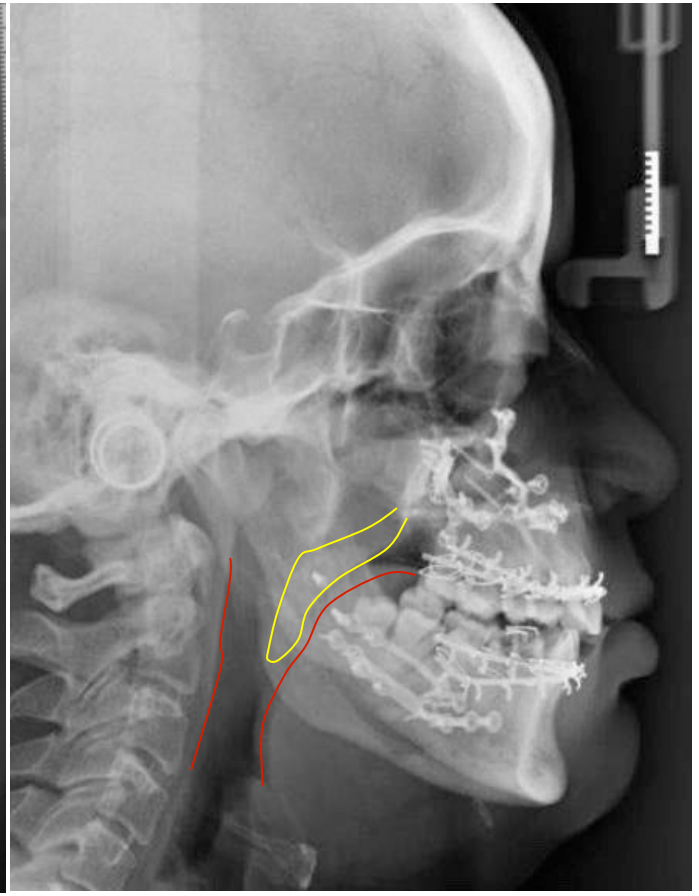






AHI 103
SaO2<90 (%) 12
Min Sao2 (%) 78






29,5
31

AHI 3
SaO2<90 (%) 0
Min Sao2 (%) 90

DEFORMITA' CRANIO-MAXILLO-FACCIALI E OSAS

Eccessivo Sviluppo di lingua e palato molle
(rispetto al volume scheletrico)

Discrepanza fra contenitore e contenuto

Conclusioni

Esito
Monitoraggio cardiorespiratorio complet[illegible] eseguito in [illegible] di base.
Tempo di registrazione di circa 7 ore [illegible] il 40,9% trascorse in posiz[illegible] supina.

Si segnalano numerosi eventi res[illegible]ori notturni, prevalentemente apnee [illegible]uttive.
Indice di apnea/ipopnea di grado [illegible]ve (AHIa di 52,6 eventi/ora). Non pref[illegible]nza posizionale. Posizione non supina sostanzialmente protettiva.
Grave compromissione della satura[illegible]a ossiemoglobinica notturna p[illegible]presenza di desaturazioni fasiche in corrispondenza delgi eventi apnoici.
SpO2 media: 92% Media della desaturazio[illegible] inferiore a 90%: 28,2% Indice di desatuaizione ODI: 52,8 eventi/ora.

Diagnosi

Conclusione: sindrome delle apnee del sonno di grado grave, grave compromissione della saturazione ossiemoglobinica notturna.

Commenti

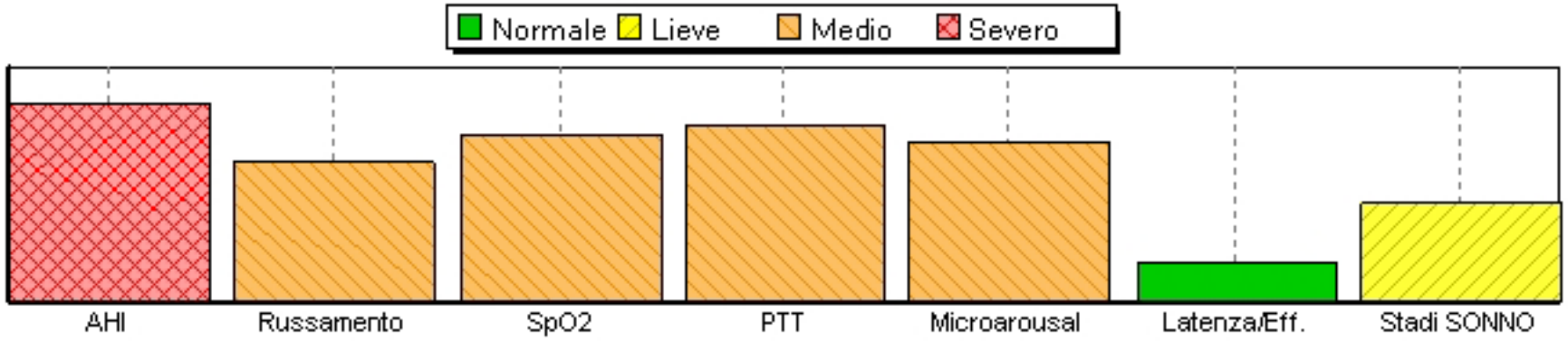
Proseguire percorso per valutare necessità di intervento chirurgico per correzione delle apnee.

Il medico specialista



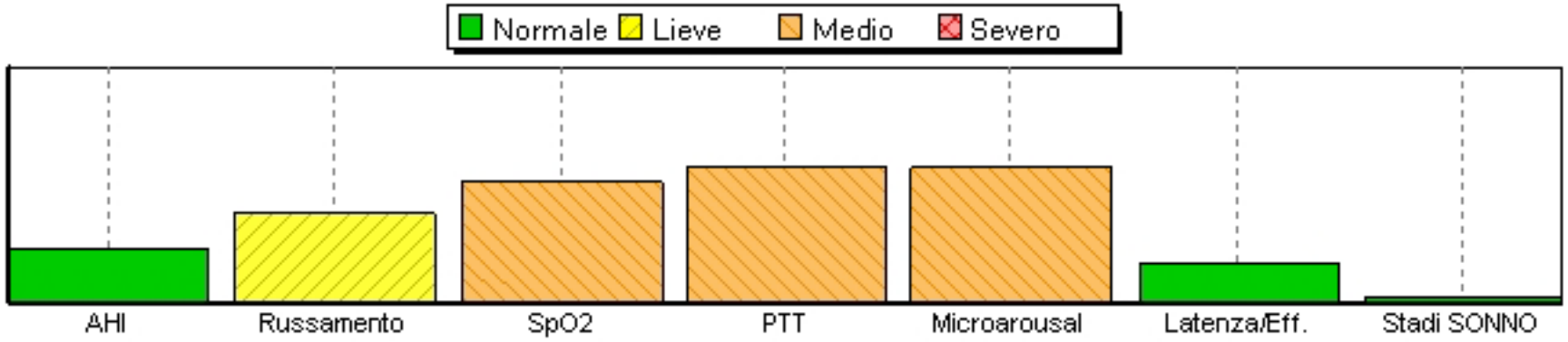



Polisonnografia pre-operatoria
16.03.2015



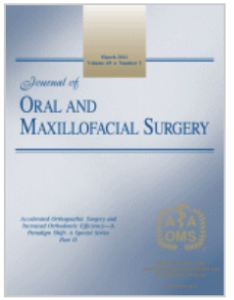
56 **92%**

Polisonnografia post-operatoria
10.06.2016



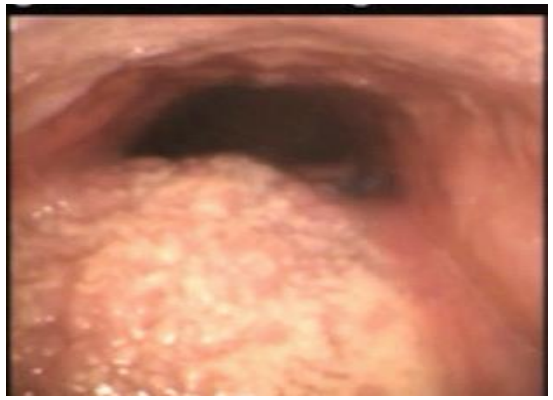
8 **96%**

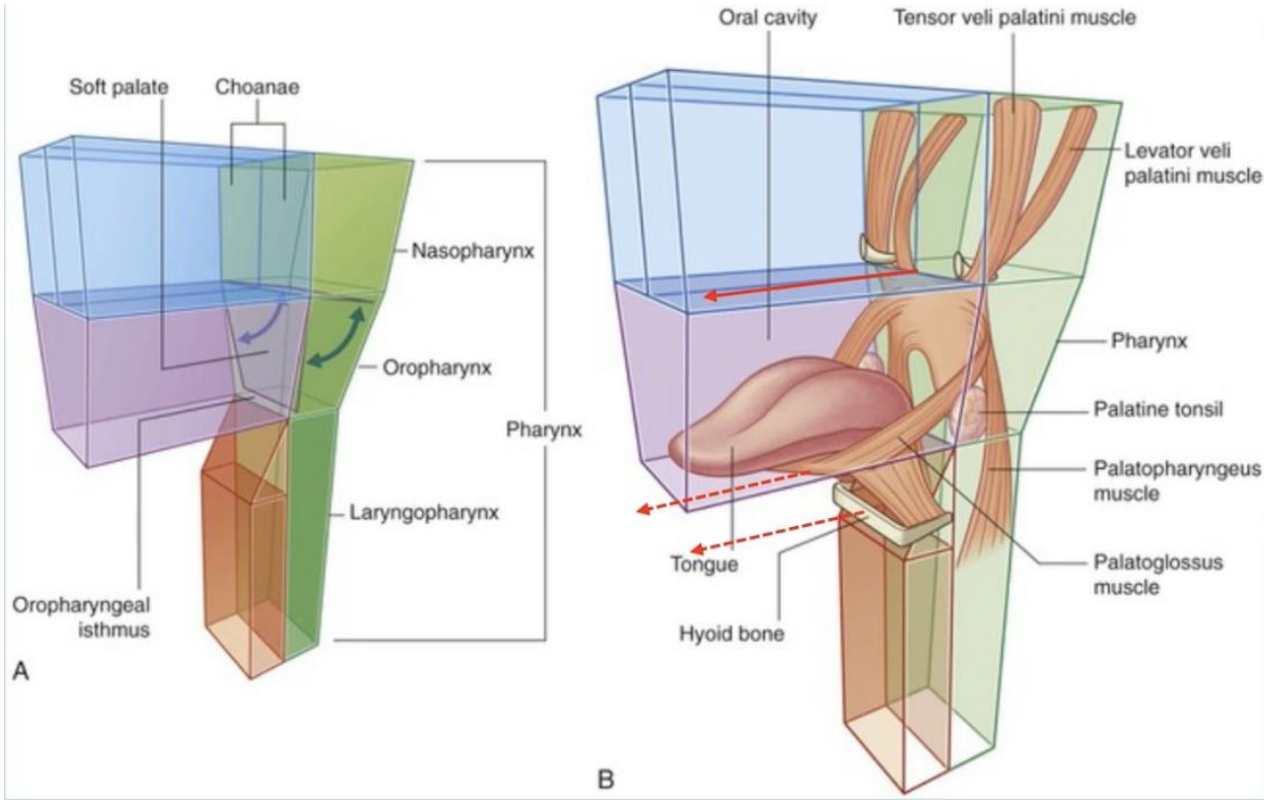
BASIC AND PATIENT-ORIENTED RESEARCH · Volume 69, Issue 3, P877-884, March 2011



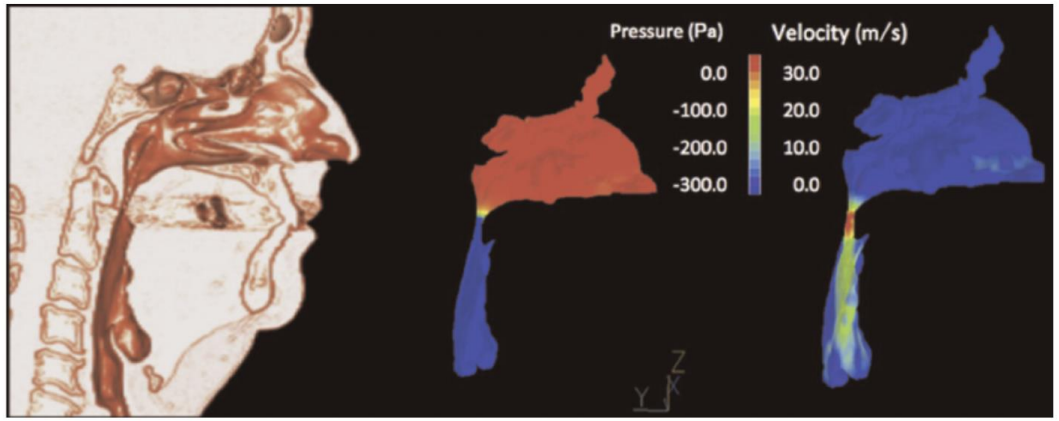
Effect of Maxillomandibular Advancement on Morphology of Velopharyngeal Space

Tetsushi Okushi * · Morio Tonogi † · Takehiro Arisaka ‡ · ... · Shintaro Chiba †† · Gen-Yuki Yamane ‡‡ · Tsuneya Nakajima §§ ... Show more





FLUID DYNAMIC ANALYSIS



Computational fluid dynamics airway modeling before maxillomandibular advancement: velocity of airflow is highest at the retropalatal portion of the airway (. 30 m/s), associated with negative pressure . 300 Pa in the oropharynx during inspiration.

Original Research—Sleep Medicine and Surgery

AMERICAN ACADEMY OF OTOLARYNGOLOGY–HEAD AND NECK SURGERY FOUNDATION

Otolaryngology–
Head and Neck Surgery
2016, Vol. 154(1) 189–195

DOI: 10.1177/0194599815611603
http://otojournal.org
SAGE

Efficacy of Maxillomandibular Advancement Examined with Drug-Induced Sleep Endoscopy and Computational Fluid Dynamics Airflow Modeling

Stanley Yung-Chuan Liu, MD, DDS[1,2], Leh-Kiong Huon, MD[2,3,4], Tomonori Iwasaki, DDS, PhD[5], Audrey Yoon, DDS, MS[2], Robert Riley, MD, DDS[1], Nelson Powell, MD, DDS[1], Carlos Torre, MD[1], and Robson Capasso, MD[1]

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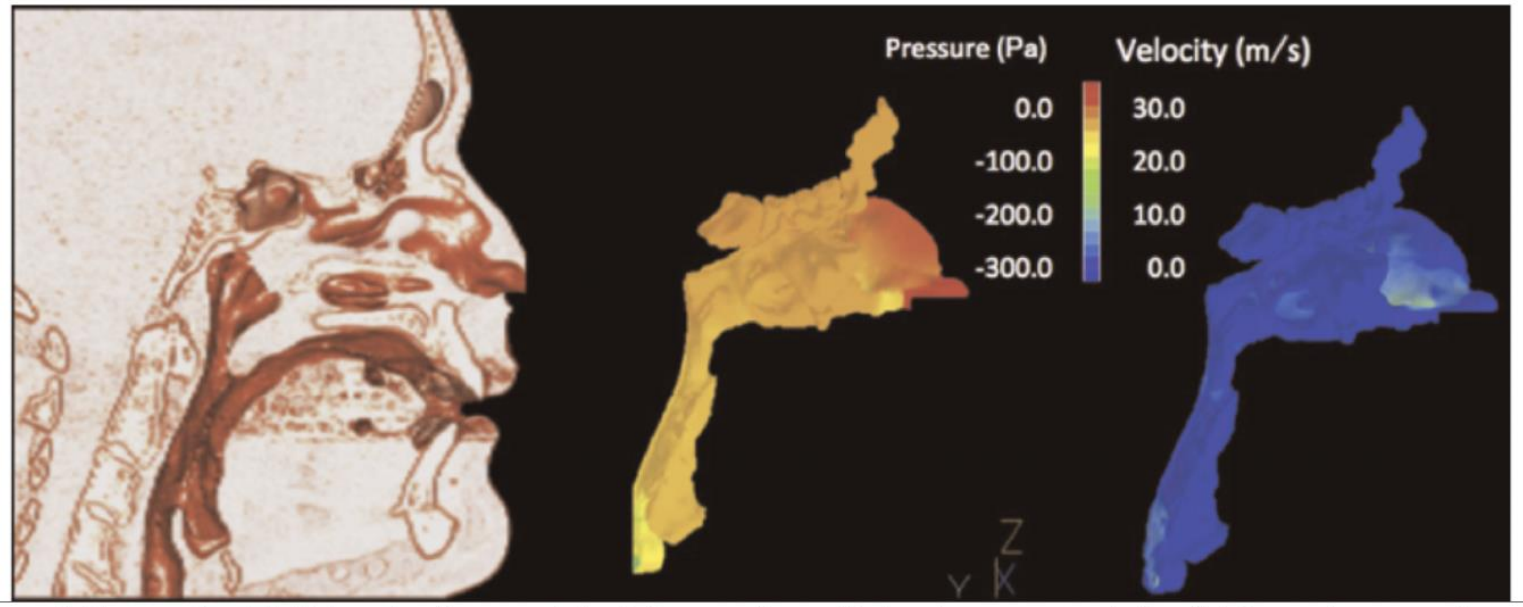
Open Access Review

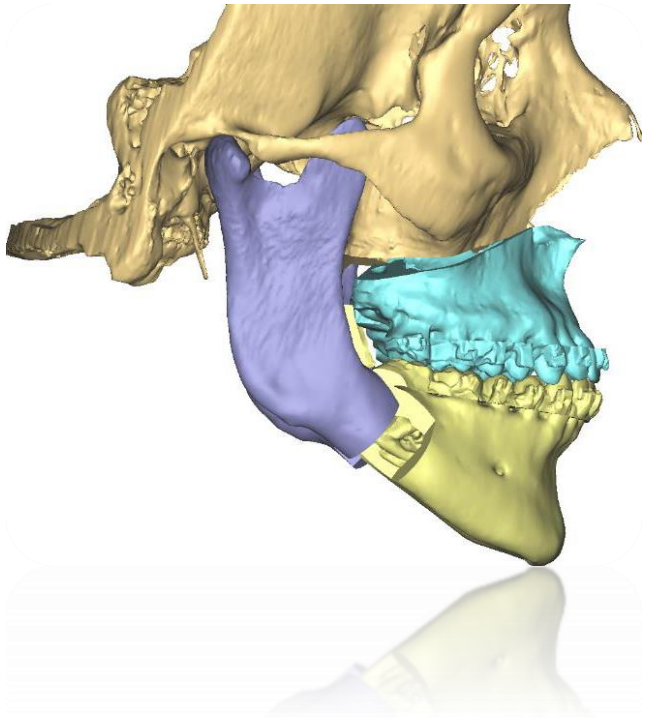
The Impact of Diagnostic Imaging on Obstructive Sleep Apnea: Feedback from a Narrative Review

by Salvatore Lavalle [1,†], Alberto Caranti [2,†], Giannicola Iannella [3], Annalisa Pace [3], Mario Lentini [1,4], Antonino Maniaci [1,4,*], Ruggero Campisi [2], Luigi La Via [5], Caterina Giannitto [6], Edoardo Masiello [7], Claudio Vicini [2] and Daniela Messineo [8]

[1] Department of Medicine and Surgery, University of Enna Kore, 94100 Enna, Italy
[2] Department of Otorhinolaryngology and Audiology, University of Study of Ferrara, 44121 Ferrara, Italy
[3] Otorhinolaryngology Department, Sapienza University of Rome, 00042 Rome, Italy
[4] Surgical Department, Maggiore Hospital, ASP 7, 97100 Ragusa, Italy
[5] Department of Anesthesiology and Intensive Care, Policlinico San Marco, 95123 Catania, Italy
[6] Department of Diagnostic Radiology, IRCCS Humanitas Research Hospital, 20019 Milan, Italy
[7] Department of Radiology, IRCCS San Raffaele Scientific Institute, 20019 Milan, Italy
[8] Department of Radiological Sciences, Oncology and Anatomo-Pathological Science, "Sapienza" University of Rome, 00184 Rome, Italy
* Author to whom correspondence should be addressed.
† These authors contributed equally to this work.



EFFICACIA: META-ANALISI



> Orthod Fr. 2023 Apr 28;94(1):187-201. doi: 10.1684/orthodfr.2023.114.

[Maxillomandibular Advancement for OSA: A 25-year perspective]

[Article in French]

Kasey Li [1], Jon-Erik Holey [2], Christian Guilleminault [3], Philippe Amat

Parametro	Valore
AHI medio pre-operatorio	58 ± 22 eventi/ora
Tasso di successo (AHI < 20)	85,5% (389/455)
Tasso di cura (AHI < 5)	38,5% (175/455)
Successo nei casi RDI elevato	64,7%
Cura nei casi RDI elevato	19,1%

Meta-Analysis > Otolaryngol Head Neck Surg. 2025 Apr;172(4):1142-1154.
doi: 10.1002/ohn.1114. Epub 2025 Jan 7.

Maxillomandibular Advancement Safety and Effectiveness in Obstructive Sleep Apnea: Systematic Review and Meta-Analysis

Angelica Walker [1], Mohamed F Kassir [1], Vineeth Sama [1], Shaun A Nguyen [1], Mohamed Abdelwahab [1 2]

Home | JAMA Otolaryngology–Head & Neck Surgery | Vol. 142, No. 1

Original Investigation

Maxillomandibular Advancement for Treatment of Obstructive Sleep Apnea
A Meta-analysis

Soroush Zaghi, MD[1]; Jon-Erik C. Holty, MD, MS[2]; Victor Certal, MD[3,4] ; et al

FATTORI PROGNOSTICI

GIOVANE ETA' PAZIENTE
INDICE MASSA CORPOREA
GRAVITA' AHI
ENTITA' AVANZAMENTO MASCELLARE
MALATTIE CARDIOVASCOLARI
SEDE OSTRUZIONE(OROFARINGE vs IPOFARINGE)

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Original Investigation

Maxillomandibular Advancement for Treatment of Obstructive Sleep Apnea
A Meta-analysis

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Maxillomandibular Advancement Safety and Effectiveness in Obstructive Sleep Apnea: Systematic Review and Meta-Analysis

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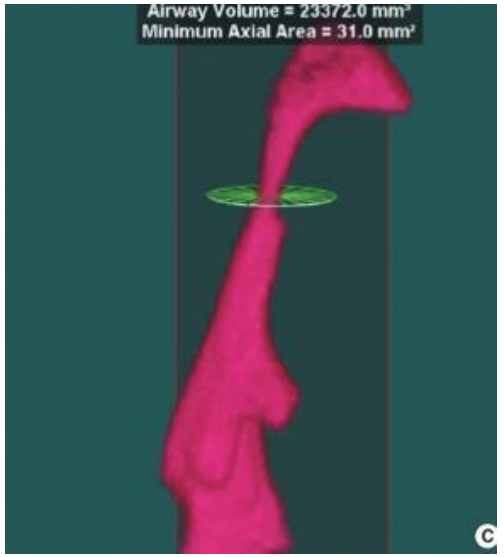
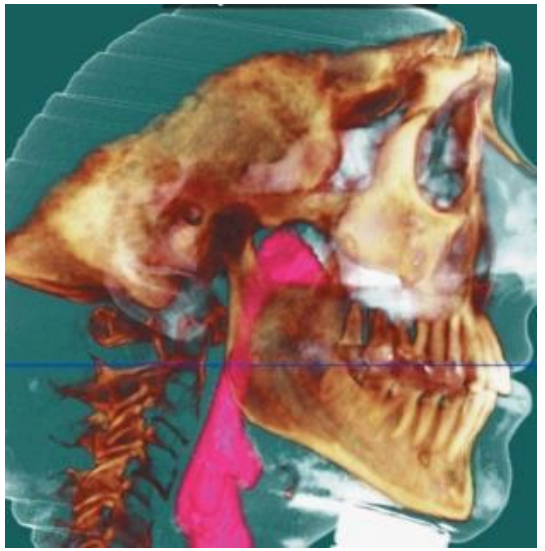
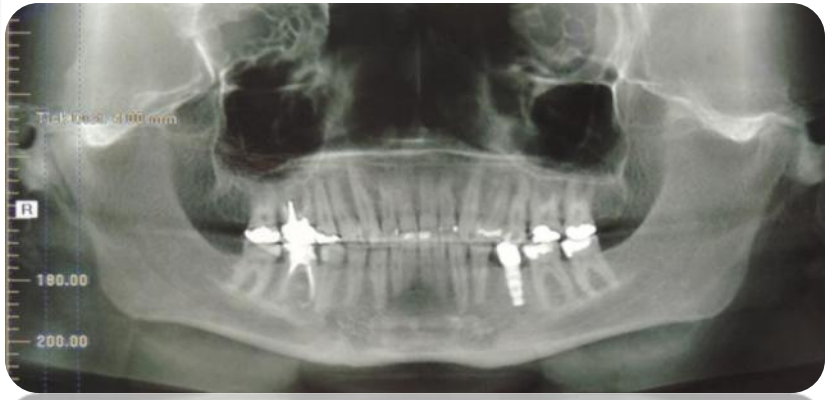
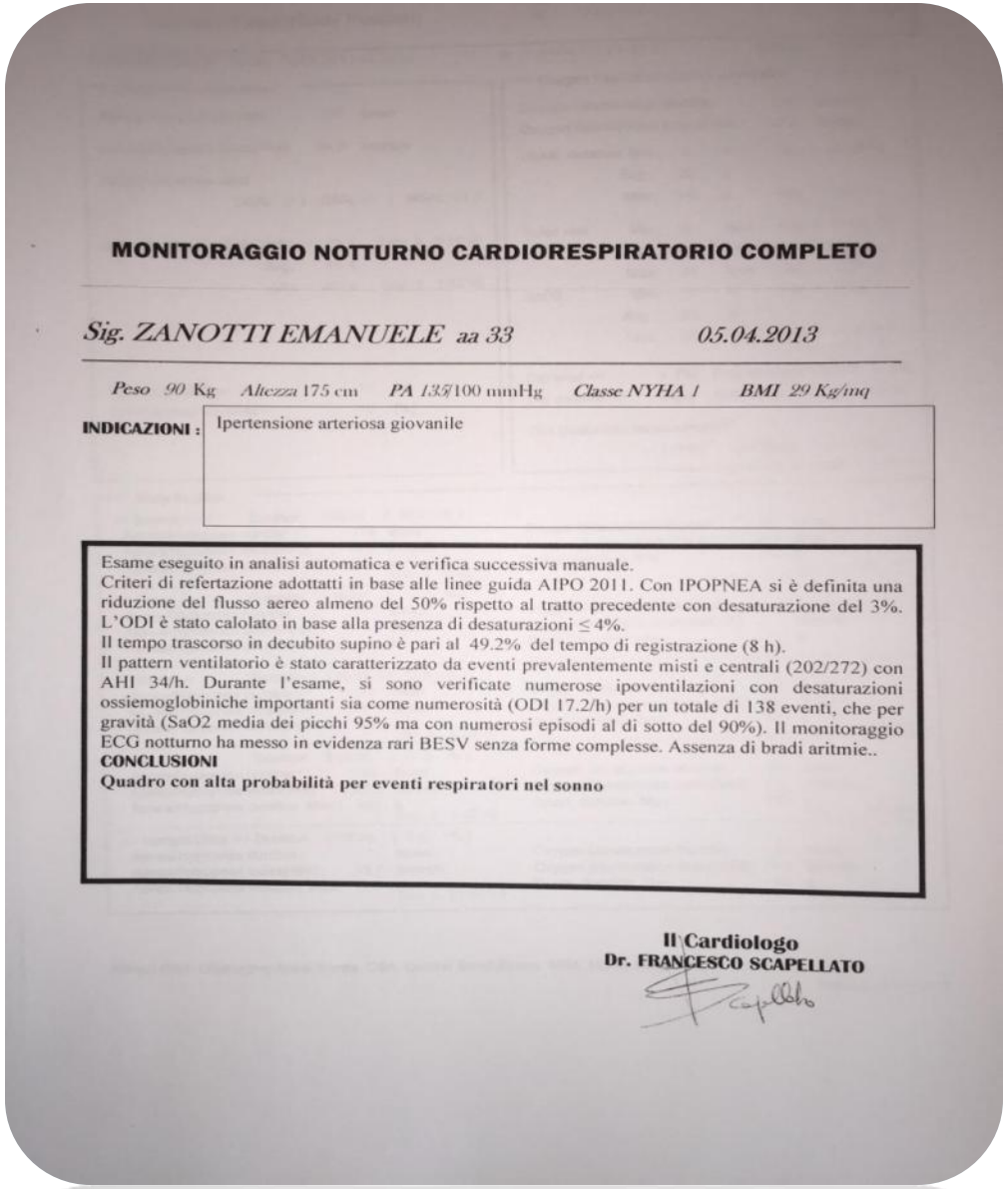
VIRTUAL PLANNING e MMA



- **Studio delle vie aeree e identificazione della sede dell'ostruzione**
- **Precisione nella misurazione avanzamento maxillo-mandibolare**
- **Trattamento tessuti molli (Mylavarapu 2016) vs espansione scheletrica (Resnik 2018)**
- **Evitare possibili complicanze (lesioni radici dentali, nervo alveolare ecc..)**




180.00
200.00



MONITORAGGIO NOTTURNO CARDIORESPIRATORIO COMPLETO

Sig. ZANOTTI EMANUELE aa 33 *05.04.2013*

Peso 90 Kg Altezza 175 cm PA 135/100 mmHg Classe NYHA I BMI 29 Kg/mq

INDICAZIONI : Ipertensione arteriosa giovanile

Esame eseguito in analisi automatica e verifica successiva manuale.
Criteri di refertazione adottatti in base alle linee guida AIPO 2011. Con IPOPNEA si è definita una riduzione del flusso aereo almeno del 50% rispetto al tratto precedente con desaturazione del 3%. L'ODI è stato calolato in base alla presenza di desaturazioni ≤ 4%.
Il tempo trascorso in decubito supino è pari al 49.2% del tempo di registrazione (8 h).
Il pattern ventilatorio è stato caratterizzato da eventi prevalentemente misti e centrali (202/272) con AHI 34/h. Durante l'esame, si sono verificate numerose ipoventilazioni con desaturazioni ossiemoglobiniche importanti sia come numerosità (ODI 17.2/h) per un totale di 138 eventi, che per gravità (SaO2 media dei picchi 95% ma con numerosi episodi al di sotto del 90%). Il monitoraggio ECG notturno ha messo in evidenza rari BESV senza forme complesse. Assenza di bradi aritmie..

CONCLUSIONI

Quadro con alta probabilità per eventi respiratori nel sonno

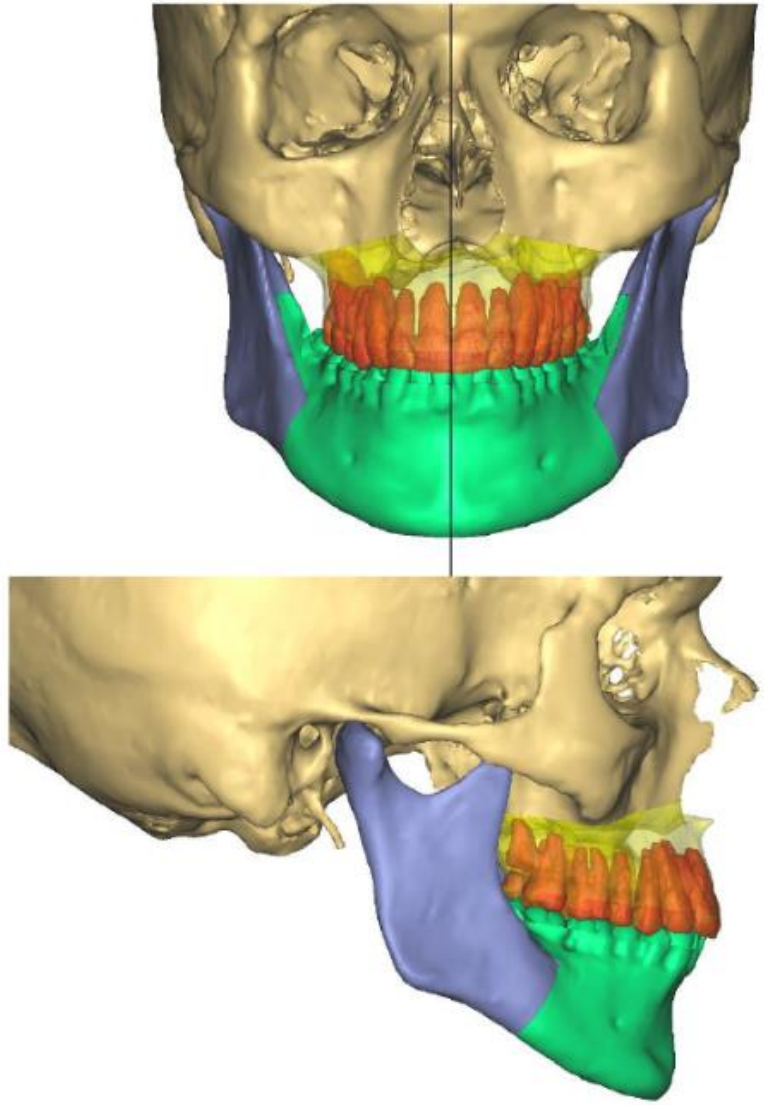
Il Cardiologo
Dr. FRANCESCO SCAPELLATO

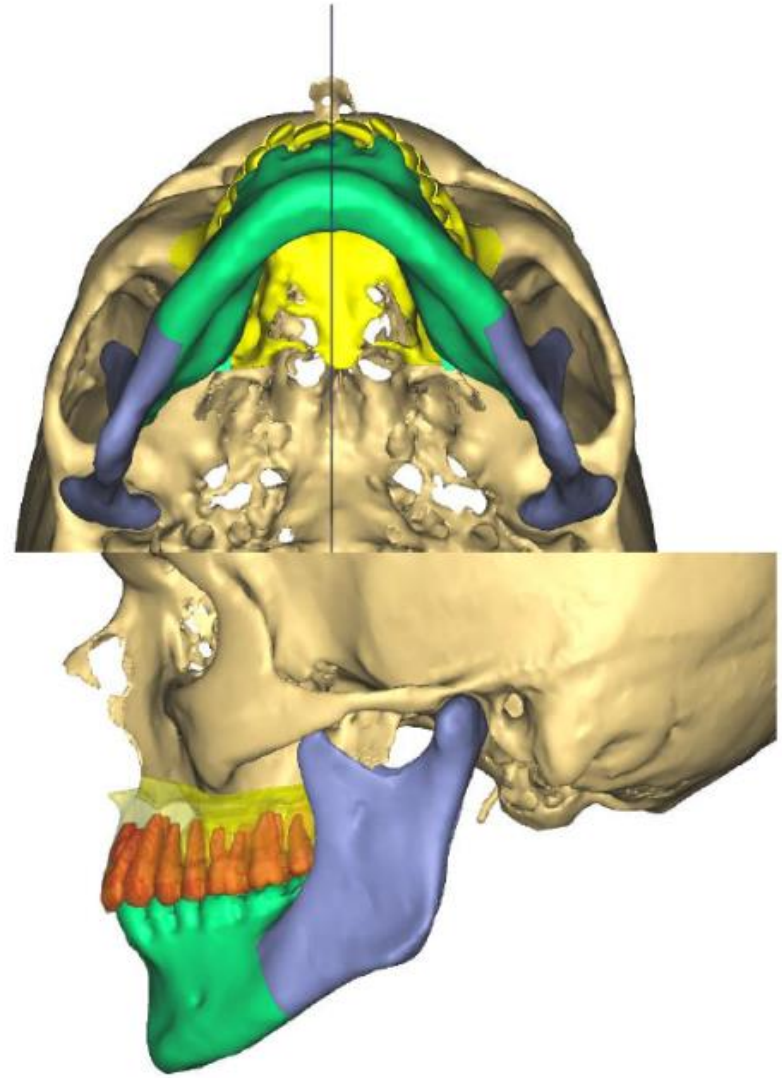
AHI 34/h

O2 Sat (mean): 95%

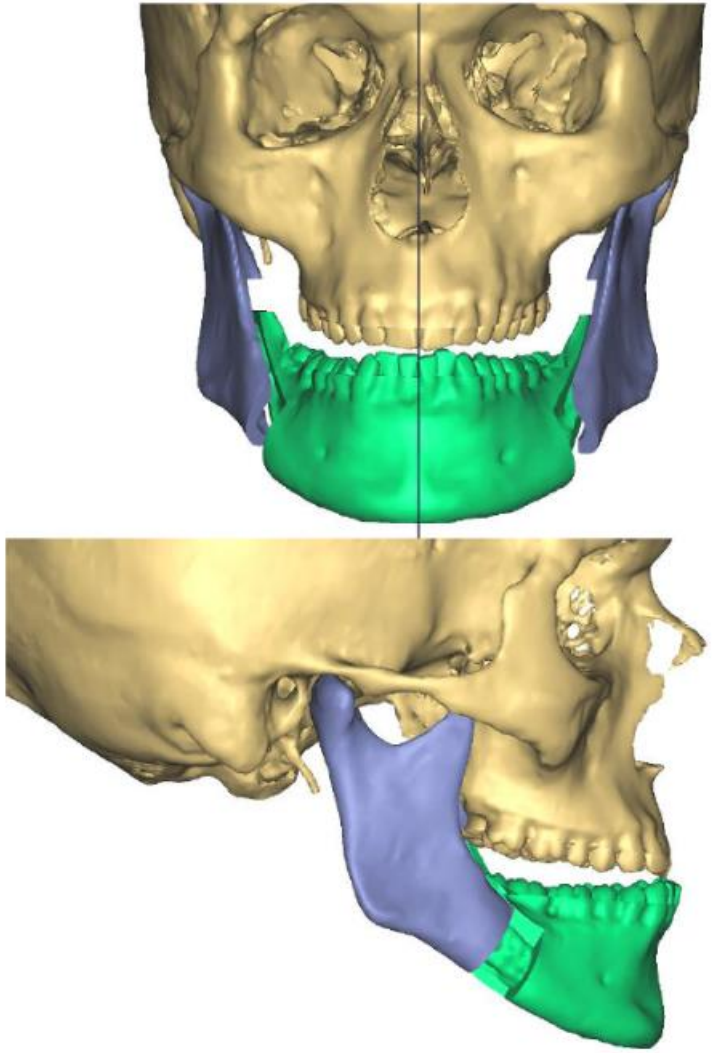
BMI 29 Kg/m2

Surgical Plan: BSSO and LeFort-I osteotomy

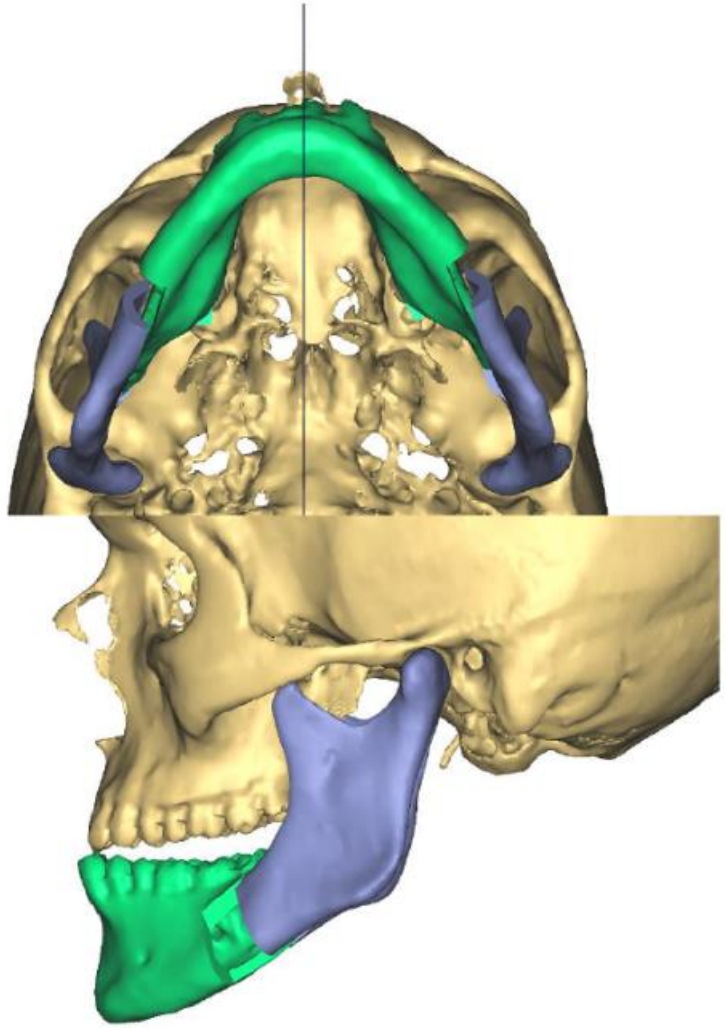


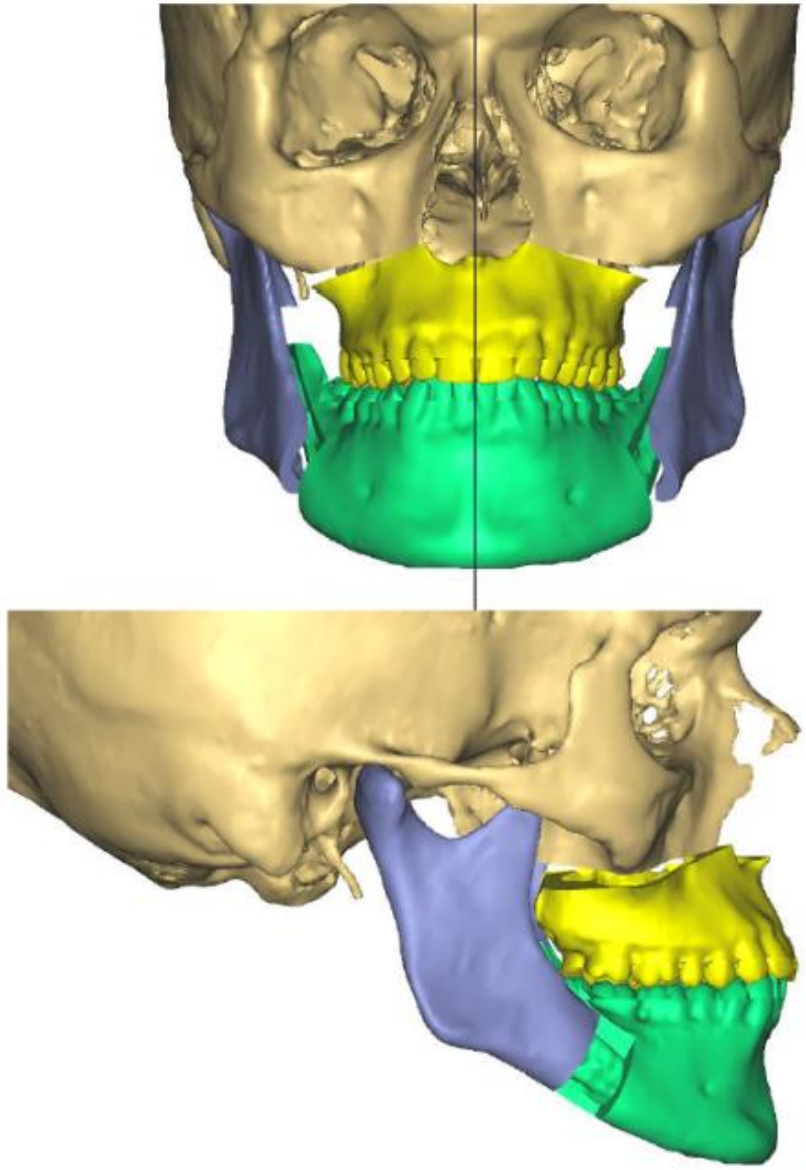


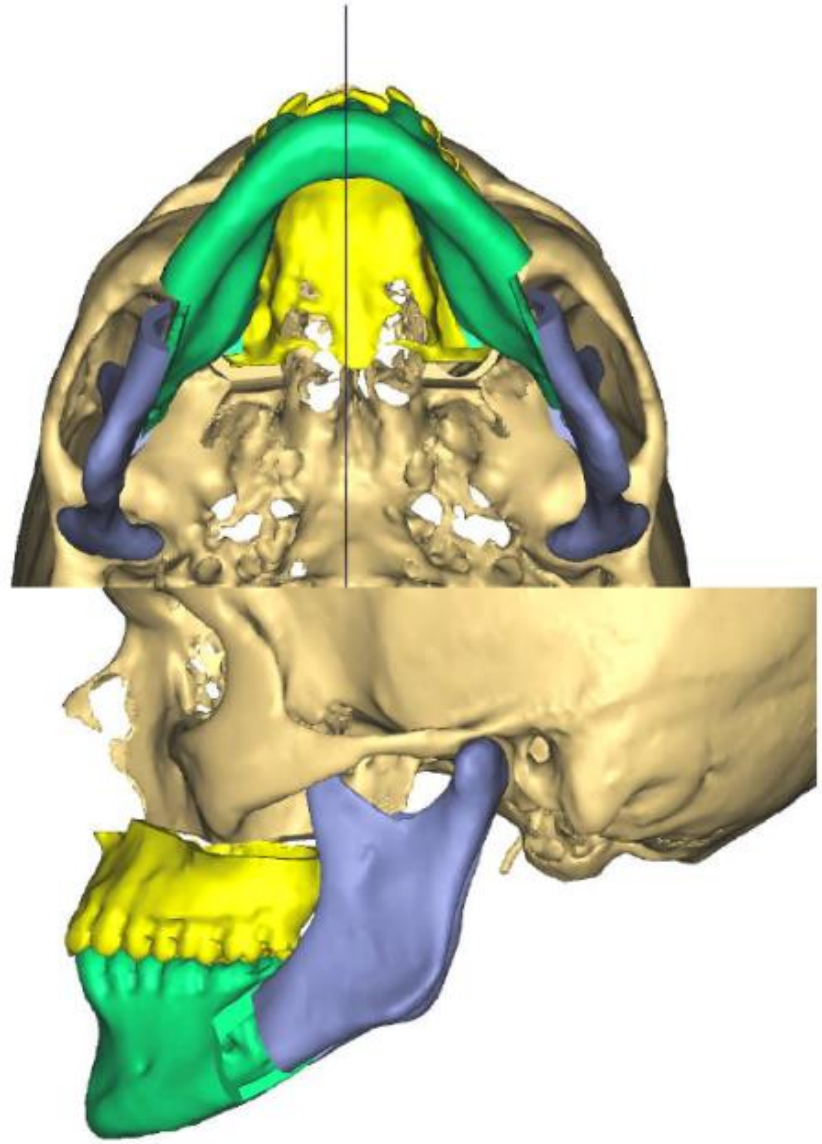
Surgical Plan: Intermediate position (Mandible movement first)



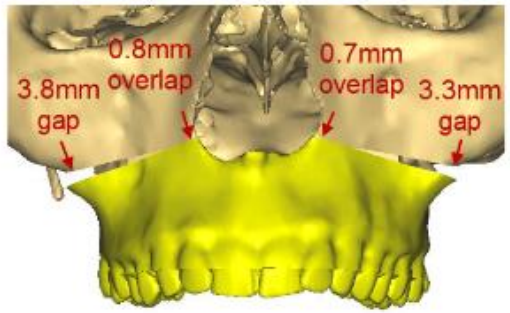
Mandatory in case of maxillo-mandibular counter clock wise rotation

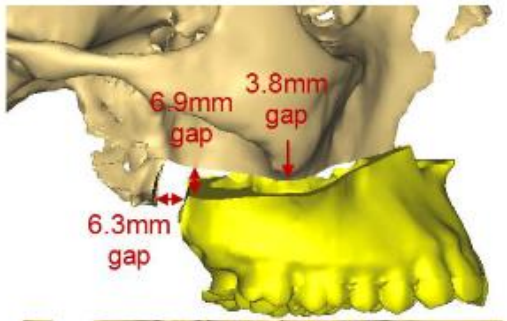


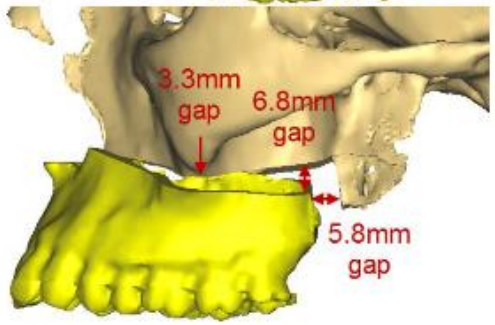




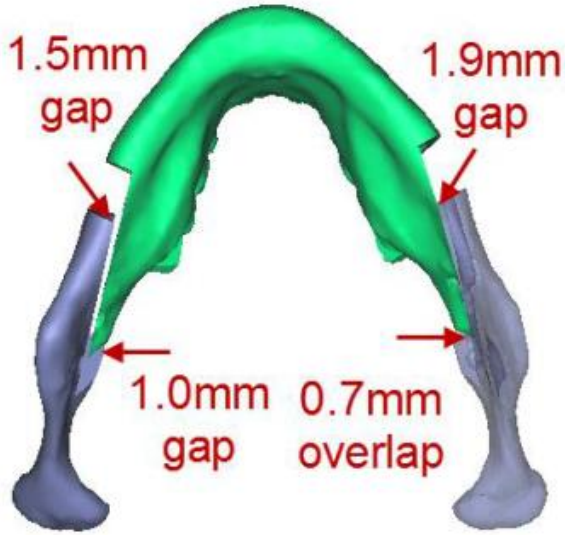
Surgical Plan: Maxilla movement overview

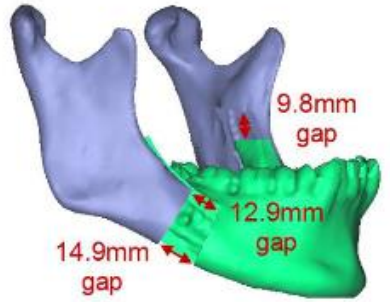


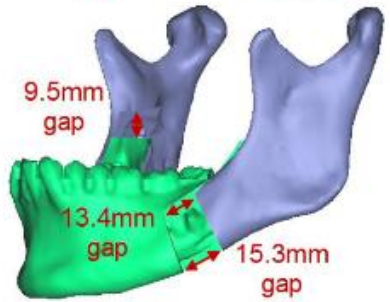


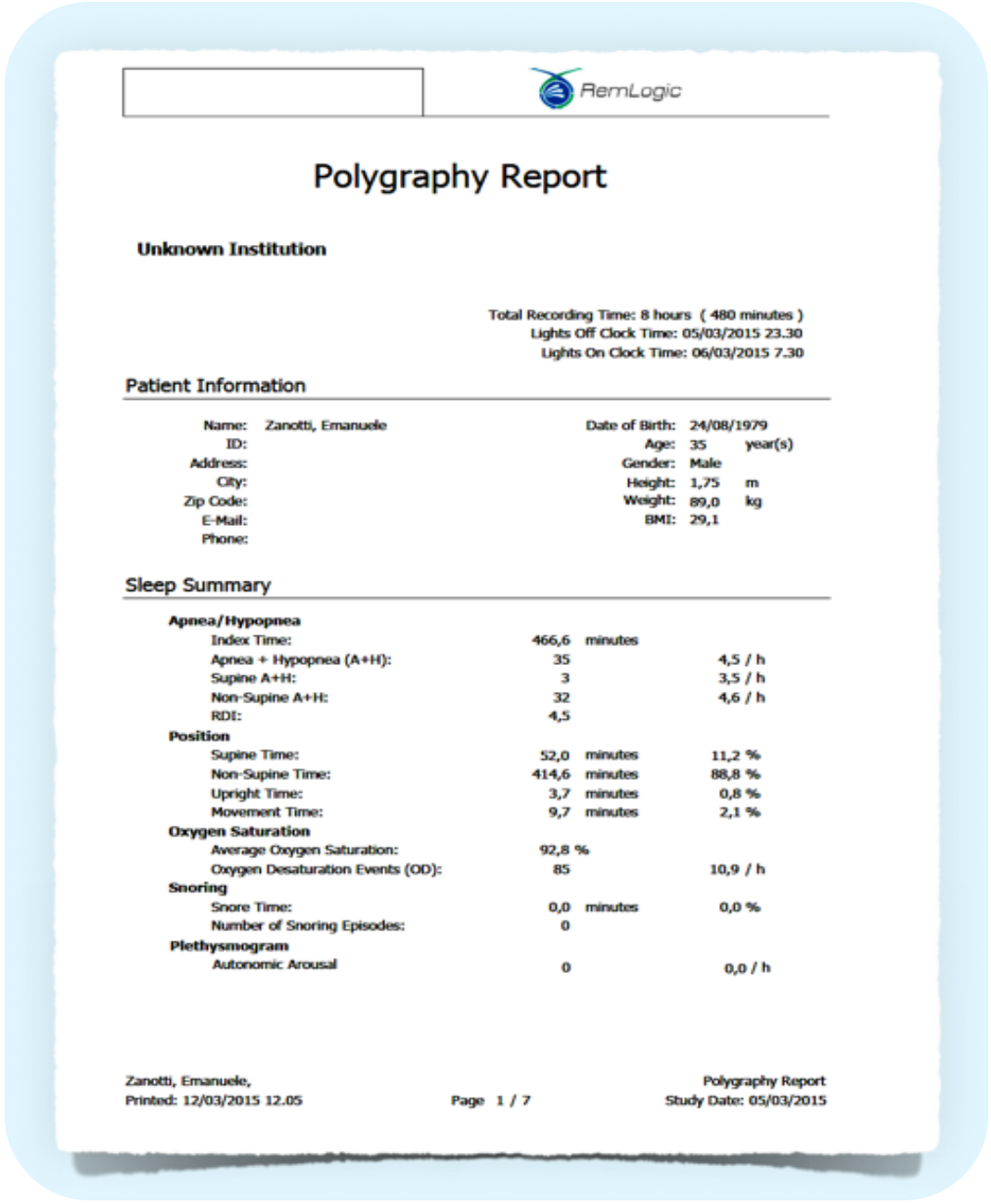


Surgical Plan: Proximal segment overview









RemLogic

Polygraphy Report

Unknown Institution

Total Recording Time: 8 hours (480 minutes)
Lights Off Clock Time: 05/03/2015 23.30
Lights On Clock Time: 06/03/2015 7.30

Patient Information

Name:	Zanotti, Emanuele	Date of Birth:	24/08/1979
ID:		Age:	35 year(s)
Address:		Gender:	Male
City:		Height:	1,75 m
Zip Code:		Weight:	89,0 kg
E-Mail:		BMI:	29,1
Phone:			

Sleep Summary

Apnea/Hypopnea			
Index Time:	466,6	minutes	
Apnea + Hypopnea (A+H):	35		4,5 / h
Supine A+H:	3		3,5 / h
Non-Supine A+H:	32		4,6 / h
RDI:	4,5		
Position			
Supine Time:	52,0	minutes	11,2 %
Non-Supine Time:	414,6	minutes	88,8 %
Upright Time:	3,7	minutes	0,8 %
Movement Time:	9,7	minutes	2,1 %
Oxygen Saturation			
Average Oxygen Saturation:	92,8 %		
Oxygen Desaturation Events (OD):	85		10,9 / h
Snoring			
Snore Time:	0,0	minutes	0,0 %
Number of Snoring Episodes:	0		
Plethysmogram			
Autonomic Arousal	0		0,0 / h

AHI 4,5/h

O2 Sat (mean): 92,8%

ROTAZIONE ANTIORARIA DELLA MANDIBOLA

- **Li & Riley 2013** +48% volume retro-linguale con CCW vs MMA neutra.
- **Giralt-Hernando 2019** correlazione diretta CCW ↔ aumento volume vie aeree.
- **Zaghi 2016** success rate ~85%, cure ~38% con CCW incluso nel piano.

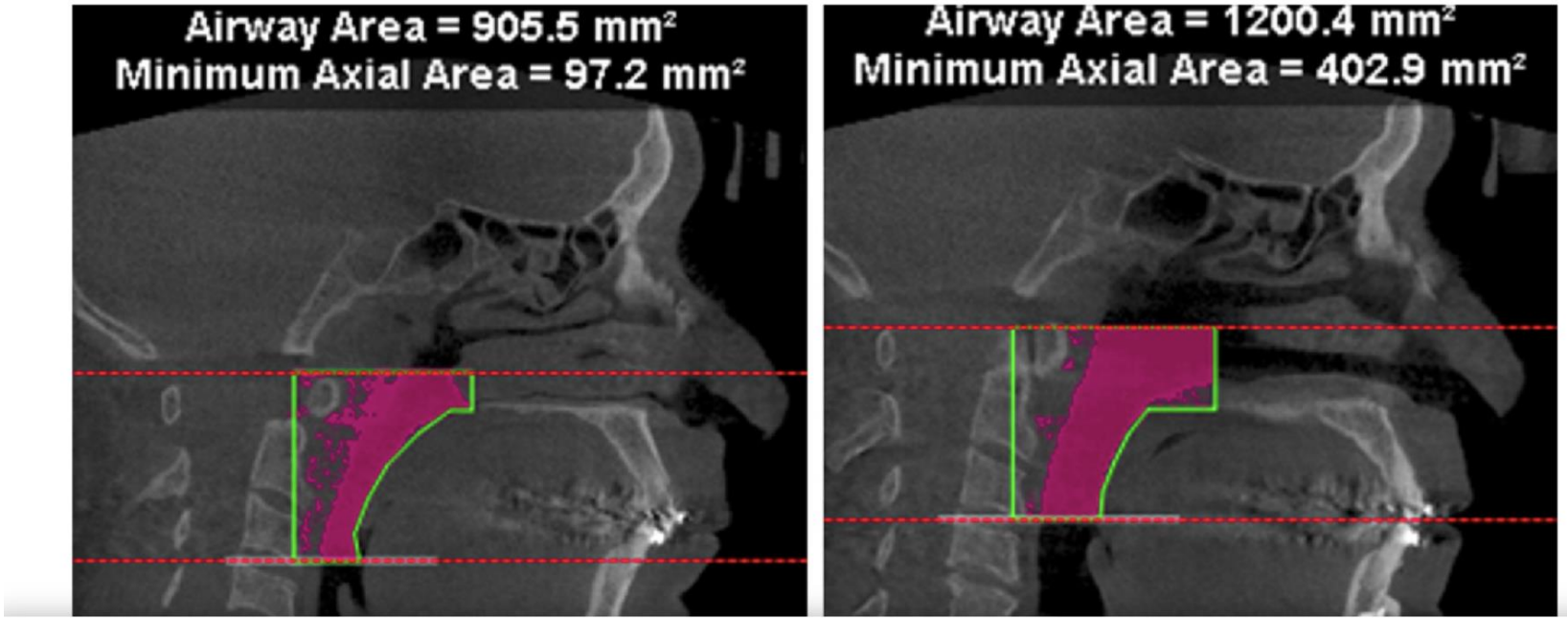


Fig. 2. Anatomic limits used in this analysis to determine volume (VOL), surface area (SA), and minimum axial area (MAA) (preoperative and postoperative).

Published in Oral surgery, oral medicine, oral pathology and oral radiology 2015

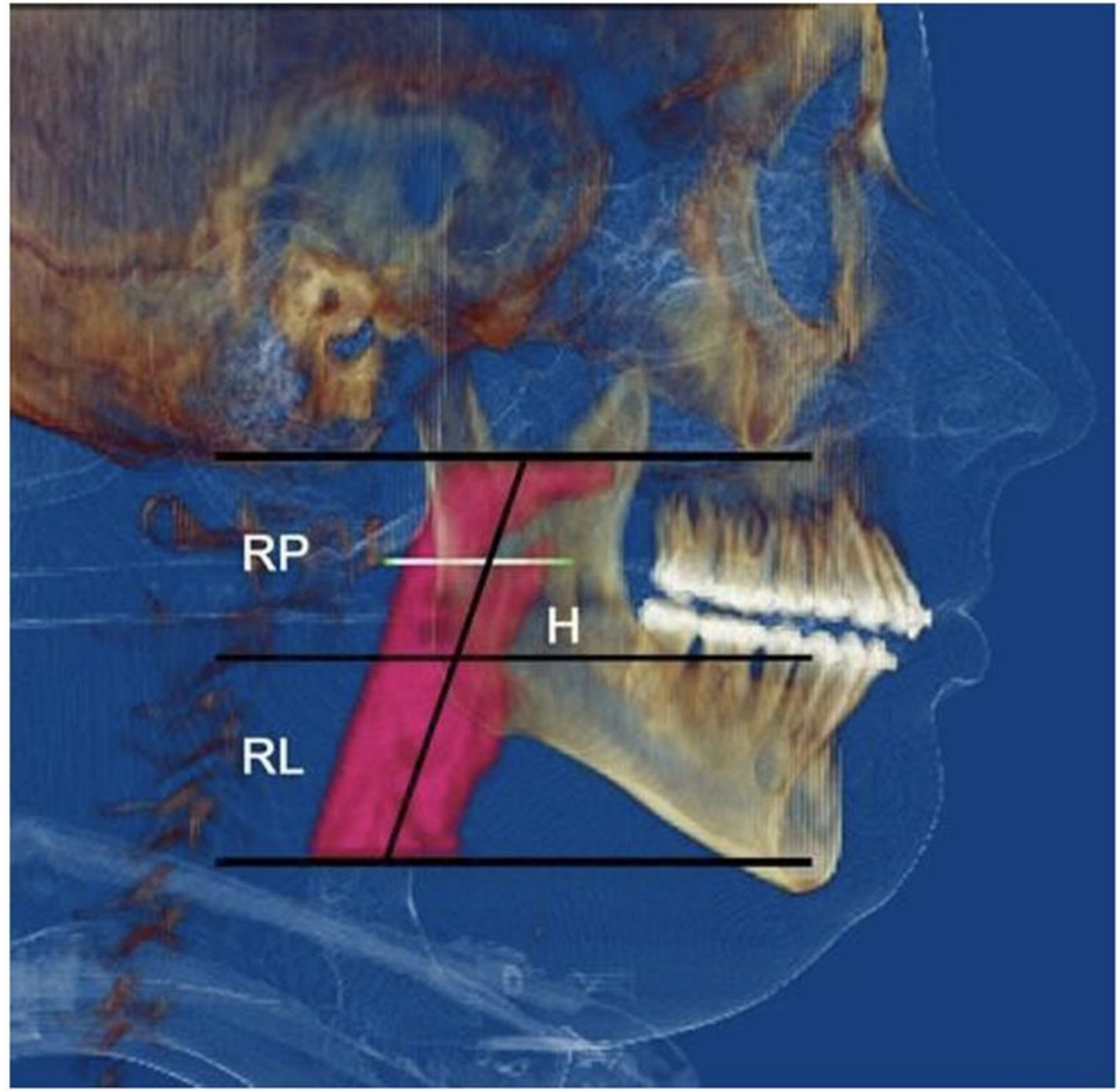
Three-dimensional evaluation of superior airway space after orthognathic surgery with counterclockwise rotation and advancement of the maxillomandibular complex in Class II patients.

Watuse de Sousa Miranda | Vanessa Álvares de Castro Rocha | Késia Lara Dos Santos Marques | A. I. Trindade Neto | C. J. do Prado | D. Zanetta-Barbosa

Impact of counterclockwise rotation of the occlusal plane on the mandibular advancement, pharynx morphology, and polysomnography results in maxillomandibular advancement surgery for the treatment of obstructive sleep apnea patients

Mariana Christino[1] · Pedro Pileggi Vinha[1] · Ana Célia Faria[1] · Denny Marcos Garcia[1] · Francisco Veríssimo de Mello-Filho[1]

Received: 23 August 2020 / Revised: 27 November 2020 / Accepted: 18 December 2020 / Published online: 26 February 2021



Entità dell'avanzamento maxillo-mandibolare e efficacia nel trattamento dell'OSAS

L'efficacia della MMA è proporzionale all'entità dell'avanzamento e al guadagno volumetrico faringeo.

Avanzamento Maxillo-Mandibolare	Riduzione AHI media	Successo (>50% riduzione AHI)	"Cura" (AHI <5)
<6 mm	30–40%	<50%	<10%
6–9 mm	60–75%	65–75%	25–35%
≥10 mm	80–90%	85–95%	40–50%

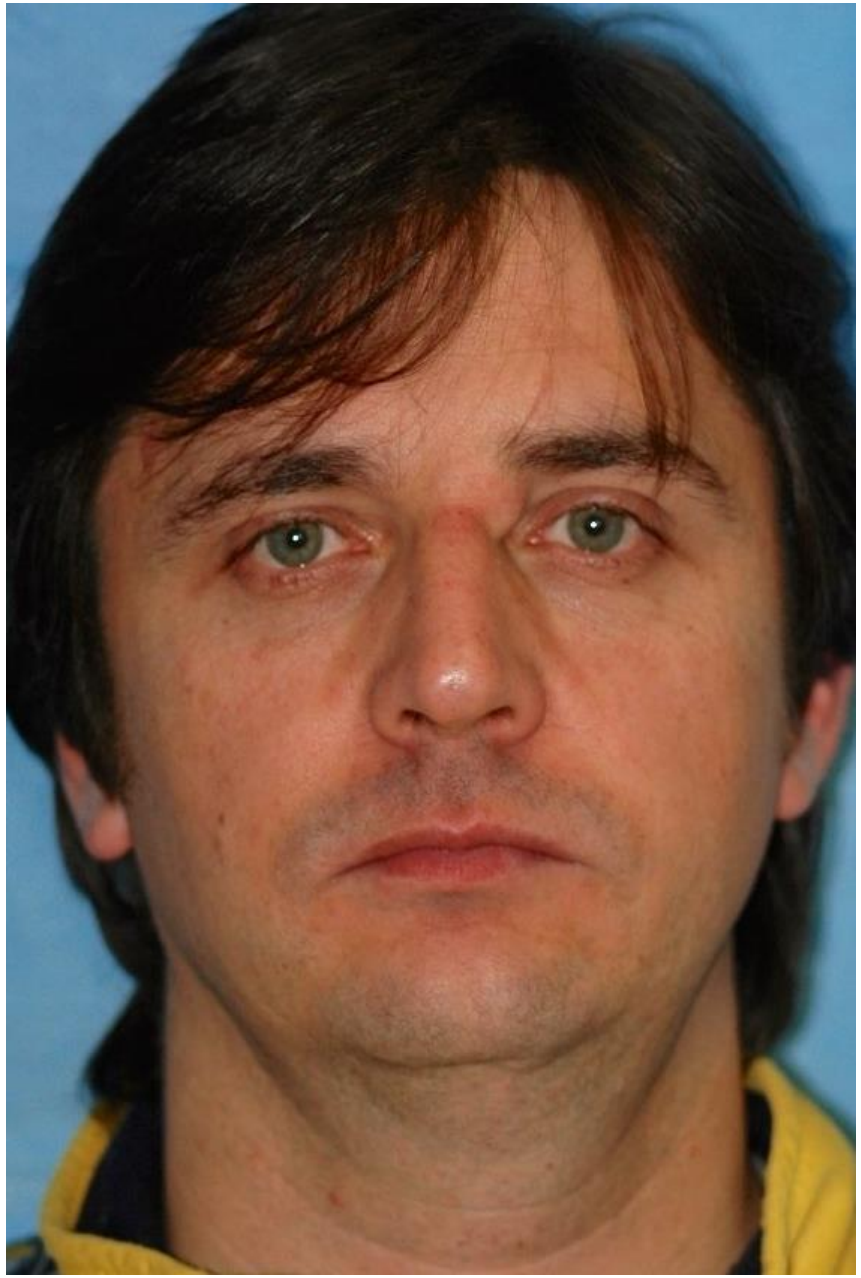
Avanzamento ottimale: 10–12 mm

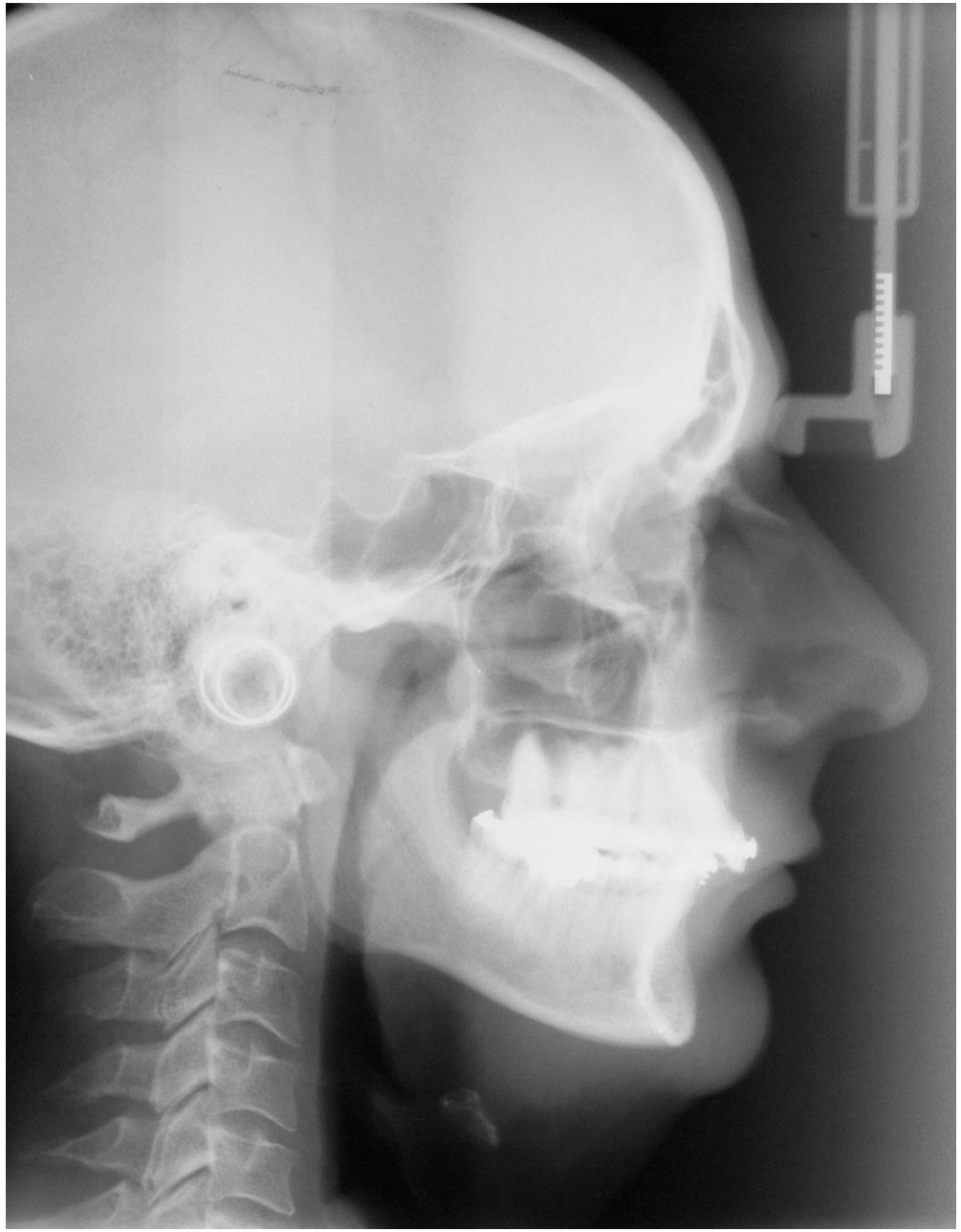
Rotazione counterclockwise incrementa il volume faringeo del 20–30%

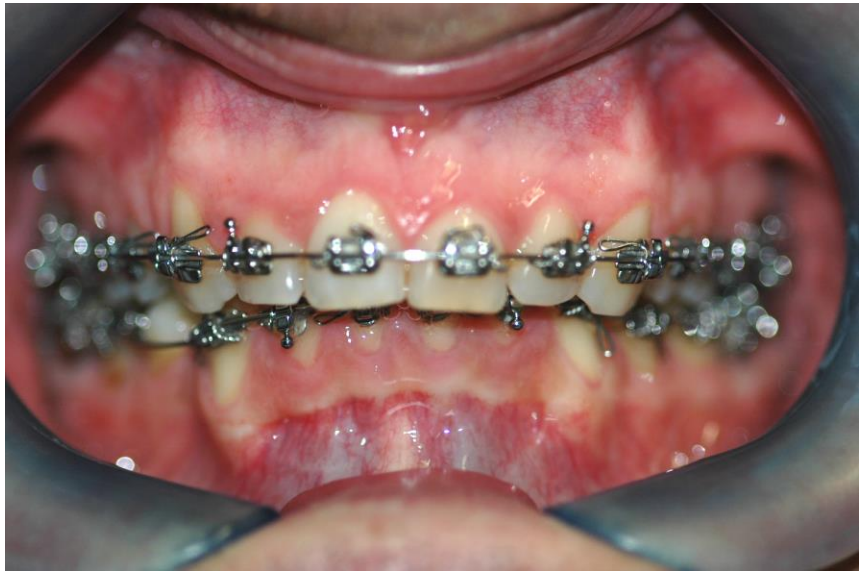
Obiettivo: incremento PAS ≥ 4–6 mm rispetto alla CBCT postoperatoria

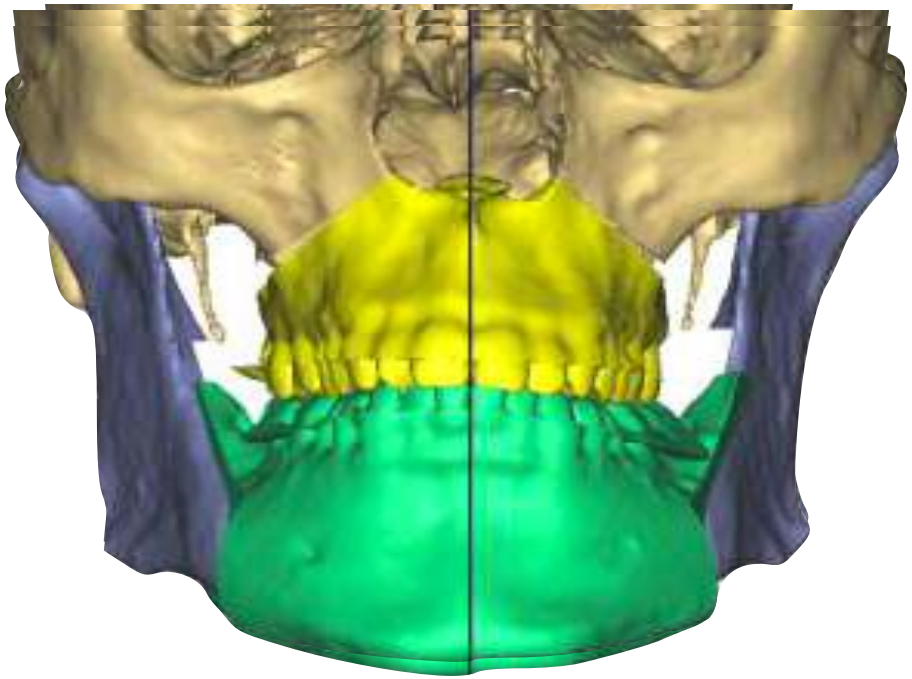
Holty JE & Guilleminault C., Sleep 2010 (metanalisi)
Zaghi S et al., J Oral Maxillofac Surg 2016

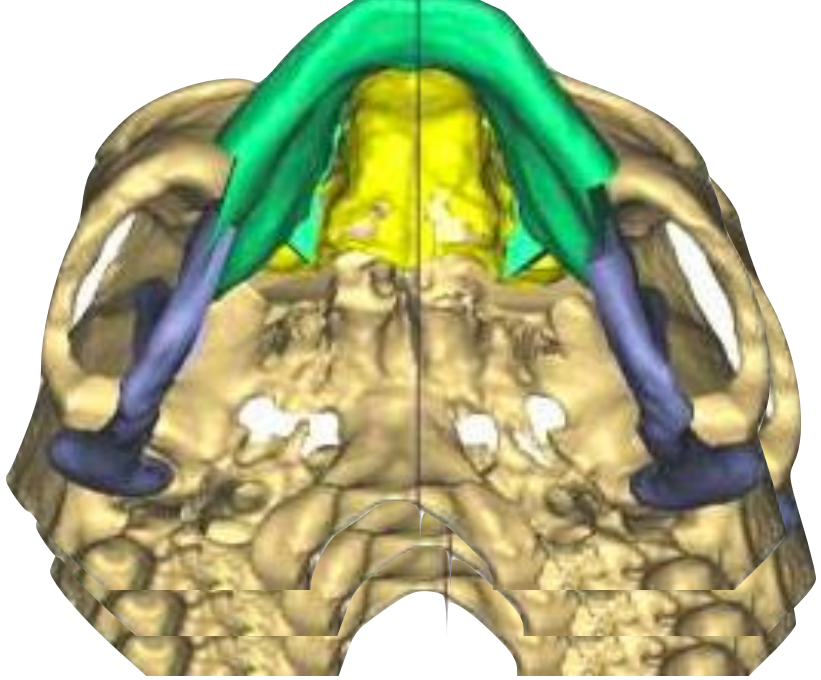
ESTETICA  **FUNZIONE**

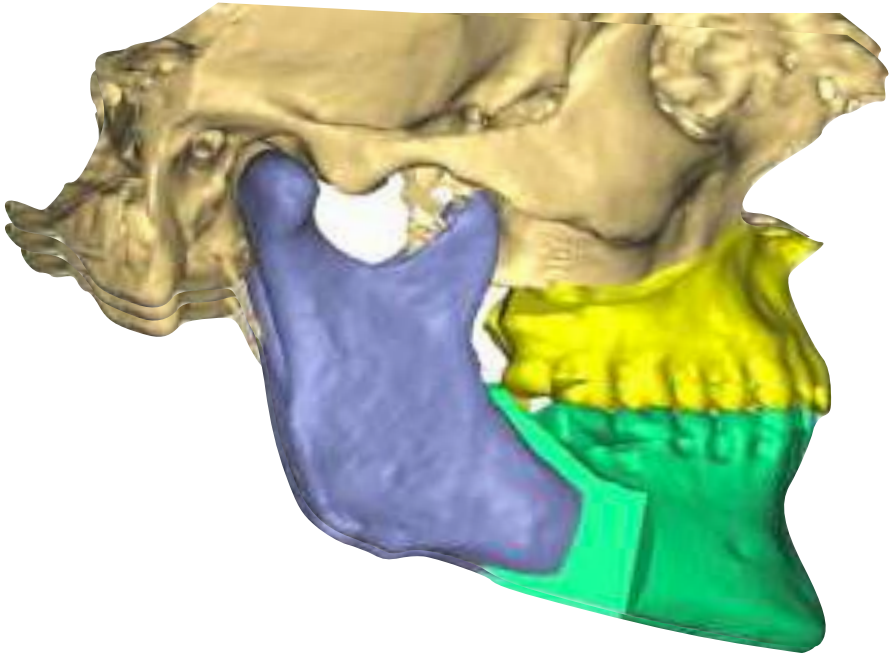


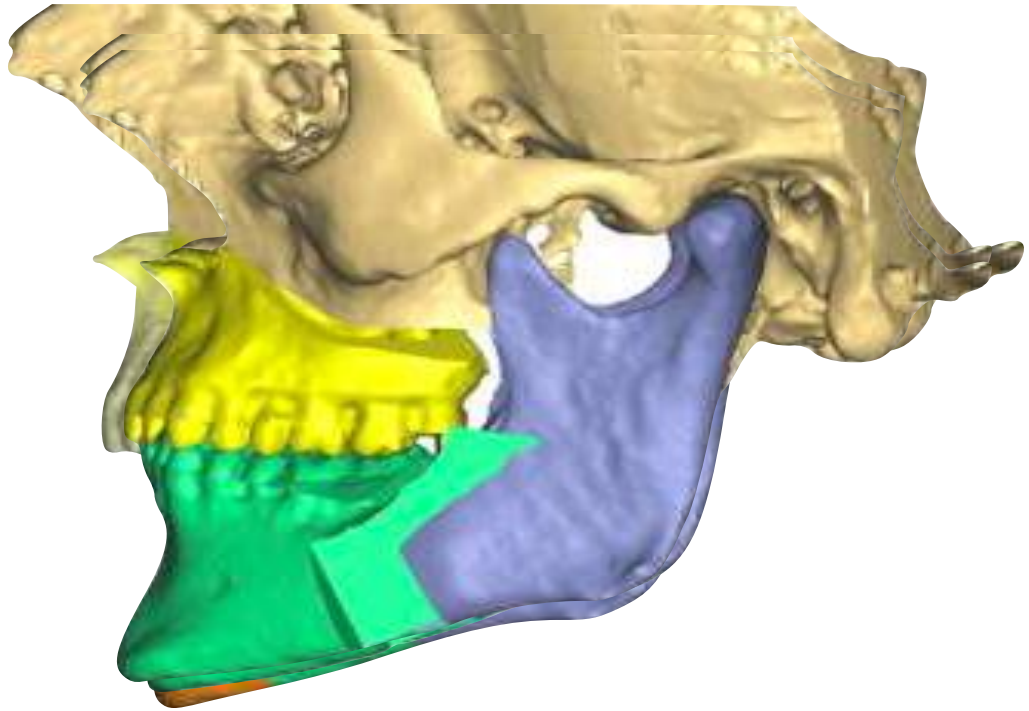


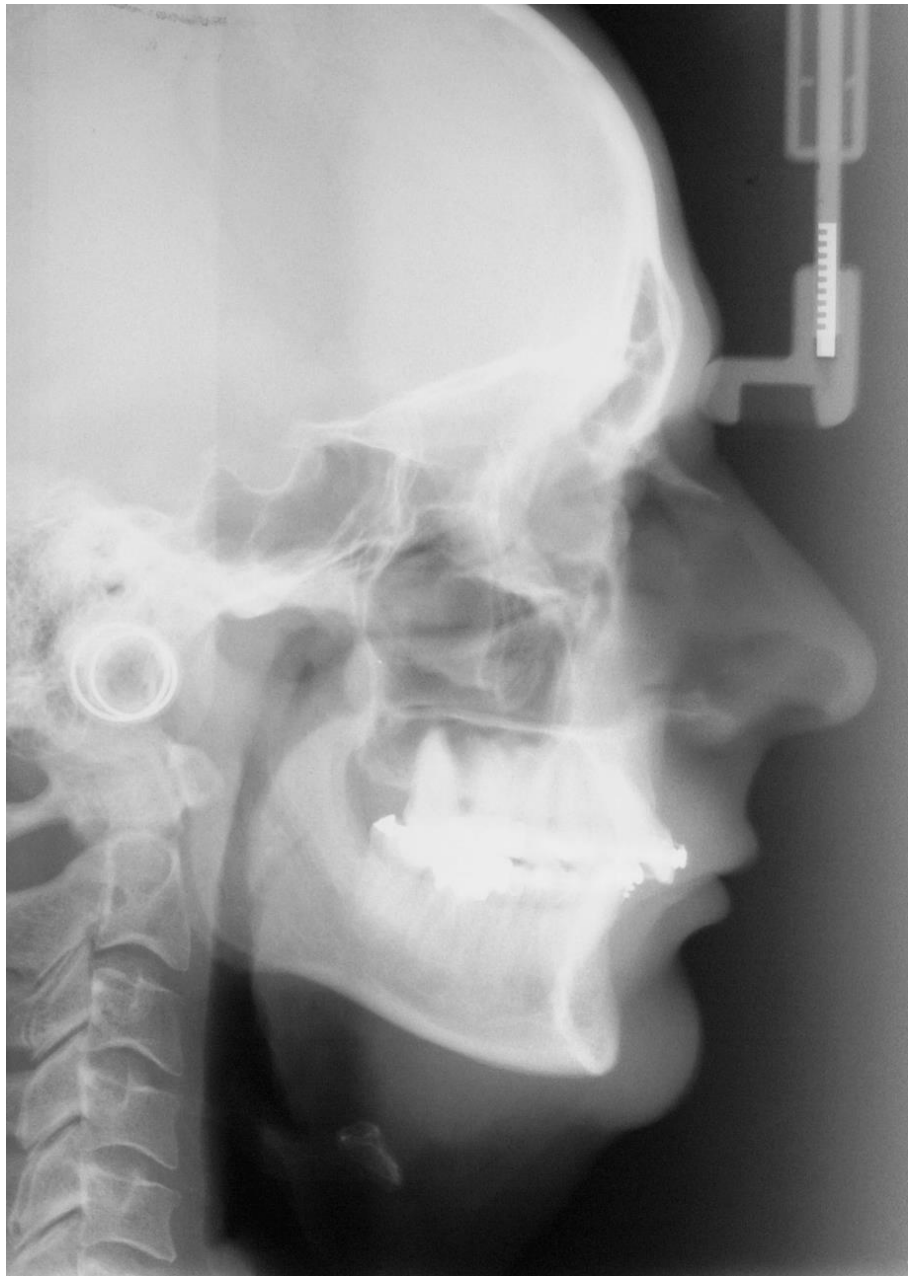


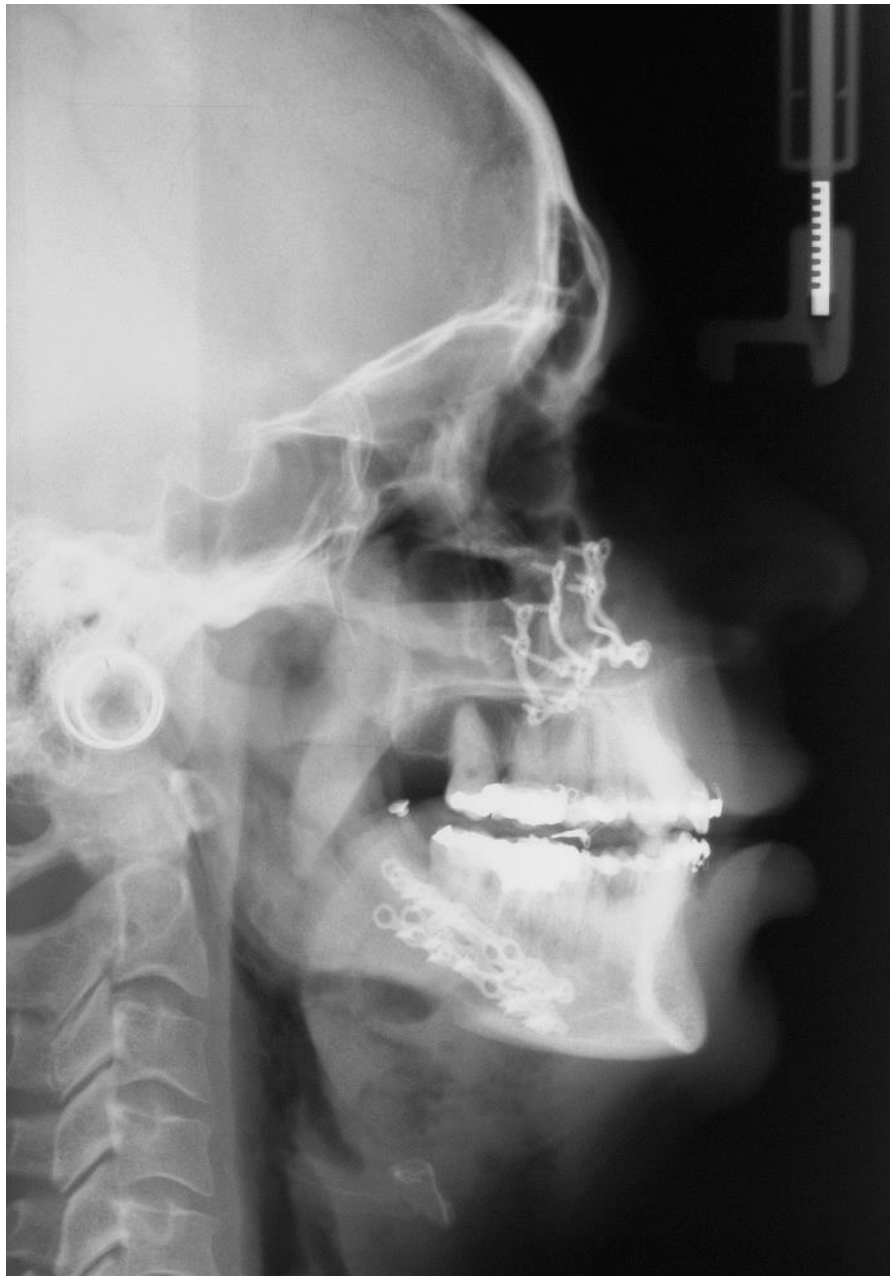


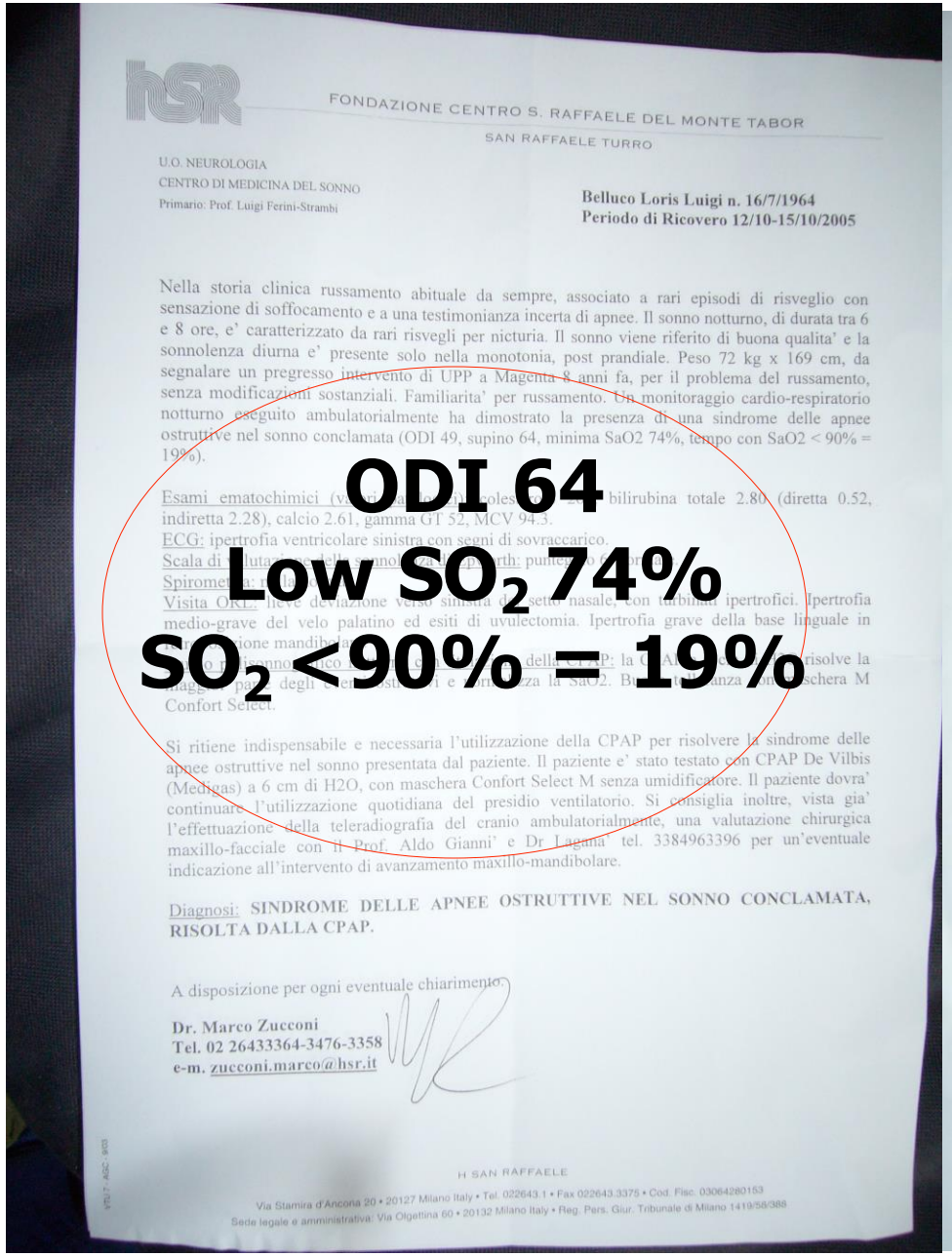












FONDAZIONE CENTRO S. RAFFAELE DEL MONTE TABOR

SAN RAFFAELE TURRO

U.O. NEUROLOGIA
CENTRO DI MEDICINA DEL SONNO
Primario: Prof. Luigi Ferini-Strambi

Belluco Loris Luigi n. 16/7/1964
Periodo di Ricovero 12/10-15/10/2005

Nella storia clinica russamento abituale da sempre, associato a rari episodi di risveglio con sensazione di soffocamento e a una testimonianza incerta di apnee. Il sonno notturno, di durata tra 6 e 8 ore, e' caratterizzato da rari risvegli per nicturia. Il sonno viene riferito di buona qualita' e la sonnolenza diurna e' presente solo nella monotonia, post prandiale. Peso 72 kg x 169 cm, da segnalare un pregresso intervento di UPP a Magenta 8 anni fa, per il problema del russamento, senza modificazioni sostanziali. Familiarita' per russamento. Un monitoraggio cardio-respiratorio notturno eseguito ambulatorialmente ha dimostrato la presenza di una sindrome delle apnee ostruttive nel sonno conclamata (ODI 49, supino 64, minima SaO2 74%, tempo con SaO2 < 90% = 19%).

Esami ematochimici (v[illegible] bilirubina totale 2.80 (diretta 0.52, indiretta 2.28), calcio 2.61, gamma GT 52, MCV 94.3.

ECG: ipertrofia ventricolare sinistra con segni di sovraccarico.

Scala di [illegible]: punti.

Spirome[illegible]

Visita ORL: [illegible] deviazione verso sinistra del setto nasale. Non turbinati ipertrofici. Ipertrofia medio-grave del velo palatino ed esiti di uvulectomia. Ipertrofia grave della base linguale in [illegible] mandib[illegible] della CPAP: la [illegible] risolve la [illegible] degli [illegible] e [illegible] la SaO2. Buona [illegible] con maschera M Confort Select.

Si ritiene indispensabile e necessaria l'utilizzazione della CPAP per risolvere la sindrome delle apnee ostruttive nel sonno presentata dal paziente. Il paziente e' stato testato con CPAP De Vilbis (Medivas) a 6 cm di H2O, con maschera Confort Select M senza umidificatore. Il paziente dovra' continuare l'utilizzazione quotidiana del presidio ventilatorio. Si consiglia inoltre, vista gia' l'effettuazione della teleradiografia del cranio ambulatorialmente, una valutazione chirurgica maxillo-facciale con il Prof. Aldo Gianni' e Dr Lagana' tel. 3384963396 per un'eventuale indicazione all'intervento di avanzamento maxillo-mandibolare.

Diagnosi: **SINDROME DELLE APNEE OSTRUTTIVE NEL SONNO CONCLAMATA, RISOLTA DALLA CPAP.**

A disposizione per ogni eventuale chiarimento.

Dr. Marco Zucconi
Tel. 02 26433364-3476-3358
e-m. zucconi.marco@hsr.it

ODI 64
Low SO_2 74%
SO_2 <90% = 19%

ODI 2.9
Low SO_2 85%
SO_2 <90% = 2,1%

A.O.Civile di Legnano"C.Cantù Abbiategrasso"
Medicina Generale

Medico:
Tecnico:
Tel.: 02 9486312
Email:

Indirizzo: P.zza C. mussi,1
Abbiategrasso
Fax :
Internet:

Dati Paziente

Cognome:	BELLUCO	ID:		Altezza:	170 cm
Nome:	LORIS LUIGI	Crit. 1		Peso:	72,0 kg
Data di	16/07/1964	Crit. 2		BMI:	24,90 kg/m²

Descrizione

	da	a	Durata
Tempo Registrato	23/04/2007 22.00.00	24/04/2007 7.01.00	9.01.00
TIB	23/04/2007 22.00.00	24/04/2007 7.01.00	9.01.00

Analisi Respiratoria

	Numero (Indice)
Ostruttiva	8 (0,9)
Mista	-
Centrale	-
Apnee Totali	8 (0,9)
Ipopnoea	14 (1,6)
Apn.+Ipop.	22 (2,4)
Limitazioni	

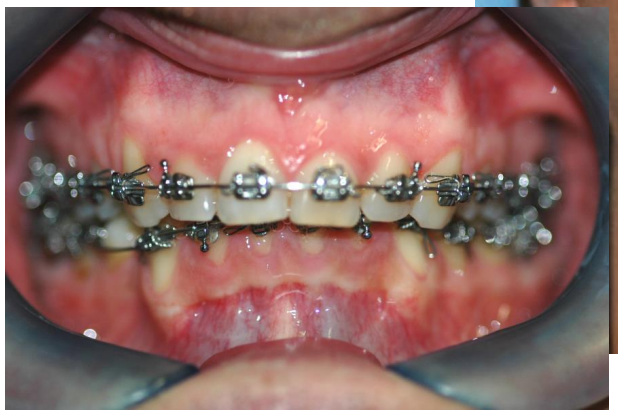
	REM	Non-REM	Sonno
Apnea (I[illegible]	-	-	8 (0,9)
Ipopnoea (Indice)	-	-	14 (1,6)
AHi (/h)	-	-	2,4
[illegible]flusso	-	-	-
[illegible]pnea	-	-	87
Durata Max. Ipopnoea (s)	-	-	104
Durata [illegible] Apn. (s)	-	-	25,0

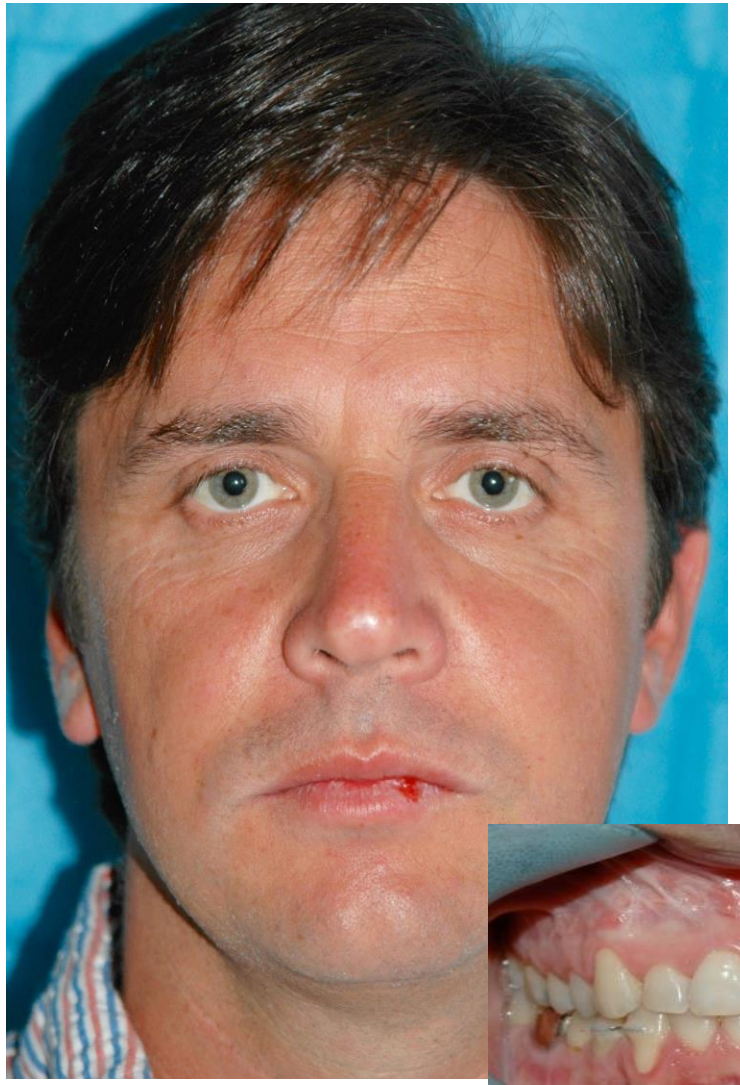
Posizione	Prono	Supino	Sinistra	Destra	Alzato
Frazione Tempo di Sonno (%)	-	84,0	2,3	11,1	2,6
Eventi Totali (Indice)	-	18 (2,4)	-	2 (2,0)	2 (8,5)
Apnee Ostruttive (Indice)	-	5 (0,7)	-	1 (1,0)	2 (8,5)
Apnee Centrale (Indice)	-	-	-	-	-
Apnee Miste (Indice)	-	-	-	-	-
Ipopnoea (Indice)	-	13 (1,7)	-	1 (1,0)	-
Limitazione al Flusso (Indice)	-	-	-	-	-

Saturazione O2

	Numero (Indice)	Tempo
Numero di Desaturazioni	26 (2,9)	
SpO2 Minima (%)	85	23.21.18
Linea-base Saturazione O2	92	
Media SpO2	92	
Numero < 90 %	7	2,1 %
Numero < 80 %	-	-
Maggiore Desaturazione (%)	7	23.21.07
Tempo Medio Desaturazione (s)	39,8	
Desaturazione più lunga (s)	162	02.43.23
Media min. Desaturazione	90	

ESTETICA – OCCLUSIONE - VIE AEREE



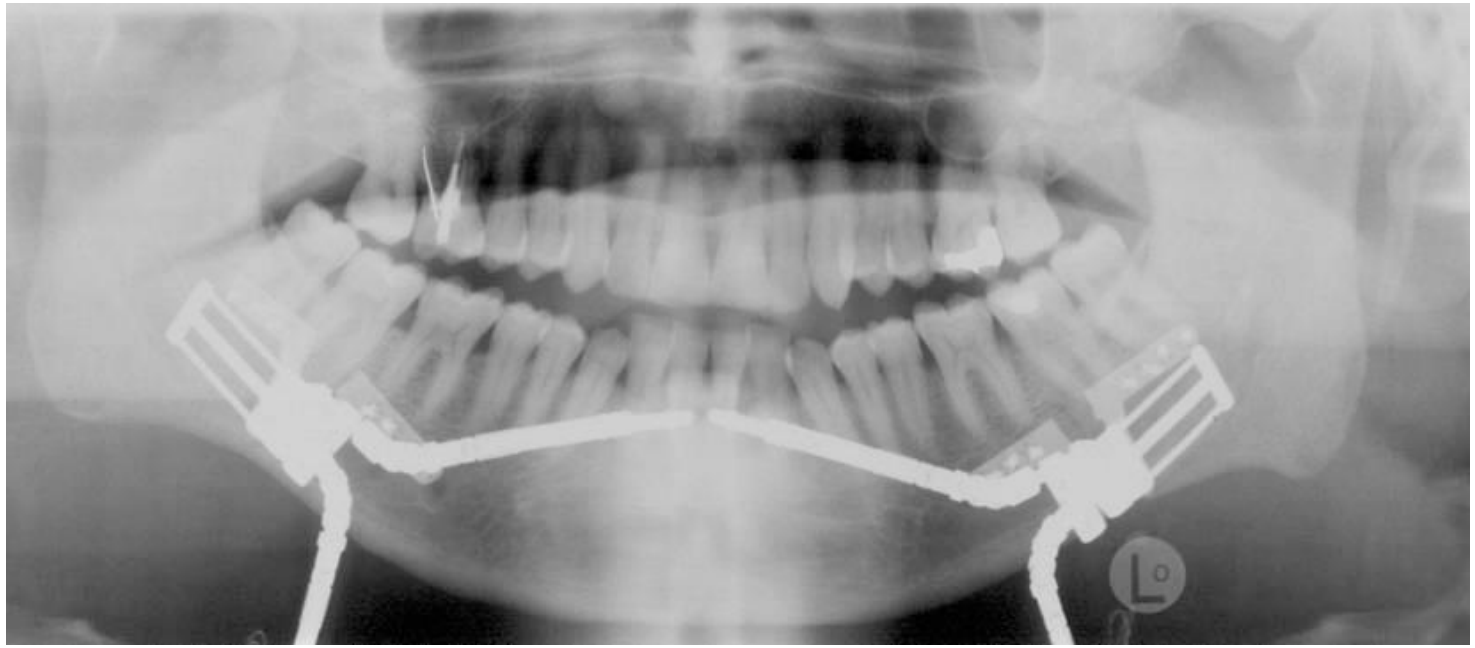


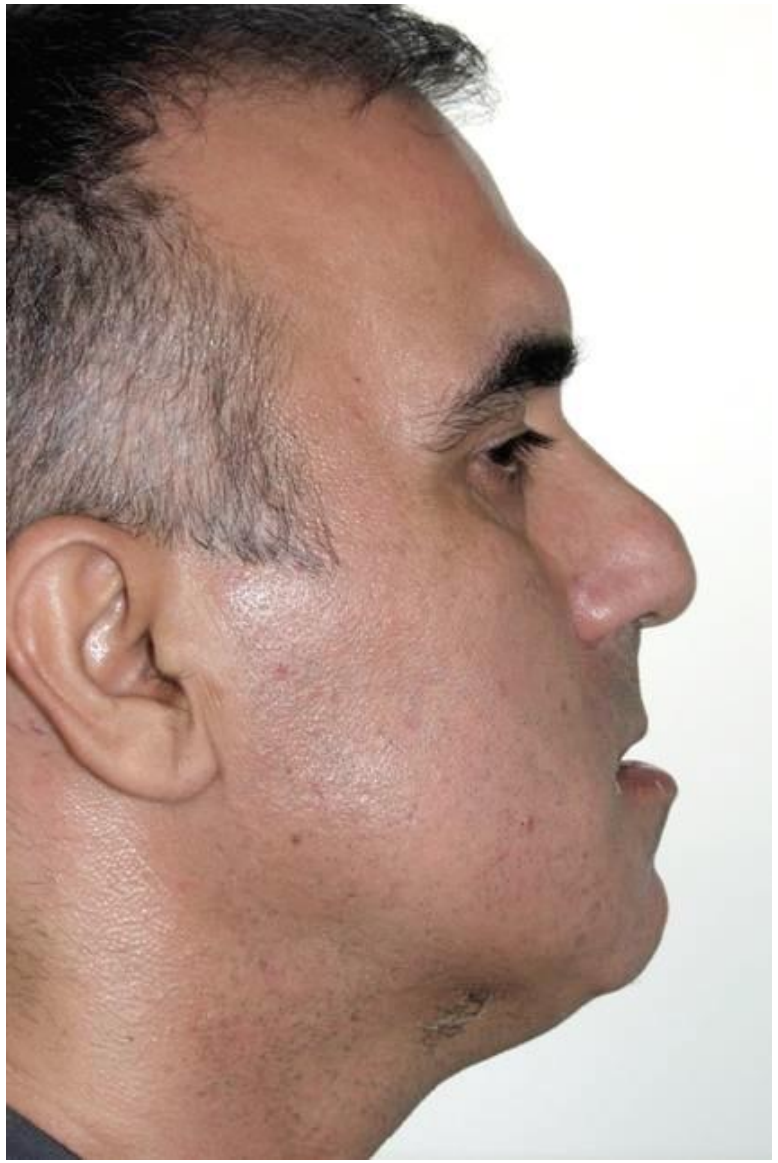
Review > Cureus. 2023 Feb 28;15(2):e35568. doi: 10.7759/cureus.35568.
eCollection 2023 Feb.

Satisfaction With Facial Aesthetic Appearance Following Maxillomandibular Advancement (MMA) for Obstructive Sleep Apnea (OSA): A Meta-Analysis

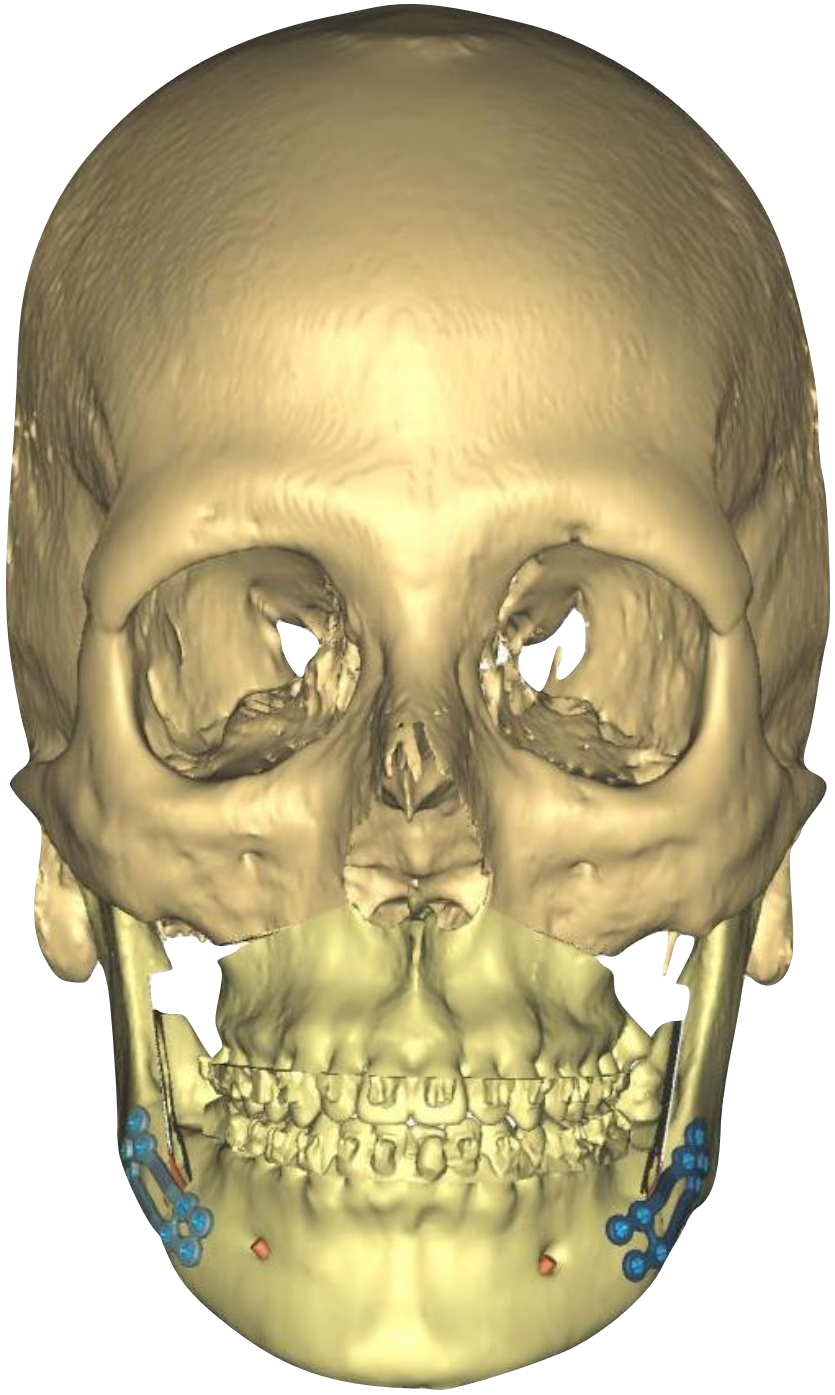
Basem T Jamal [1], Elaf A Ibrahim [2]

RDI=57
ODI=56





RDI pre-op =57
RDI post-op =8



ELSEVIER

Journal of Cranio-Maxillofacial Surgery

Volume 49, Issue 1, January 2021, Pages 1-8

Accuracy of splint vs splintless technique for virtually planned orthognathic surgery: A voxel-based three-dimensional analysis

Lorena Karanxha [a], Diego Rossi [b], Ryo Hamanaka [c d], Aldo Bruno Giannì [a b], Alessandro Baj [a b], Won Moon [d], Massimo Del Fabbro [a e 1], Michele Romano [b 1]

OSAS

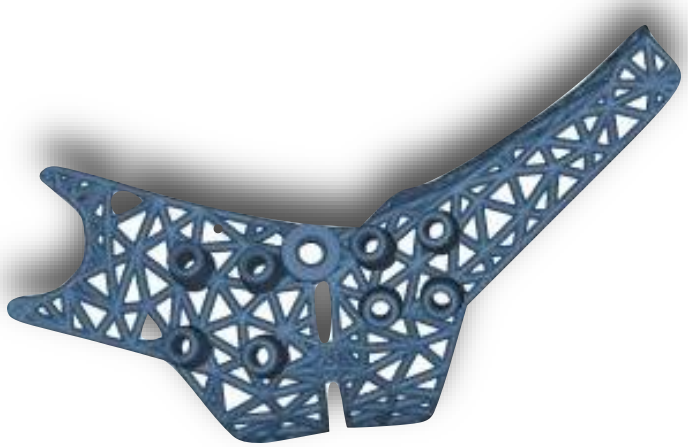
Splintless

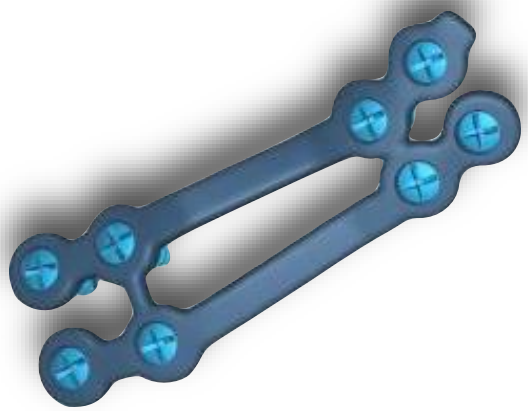
AHI 36

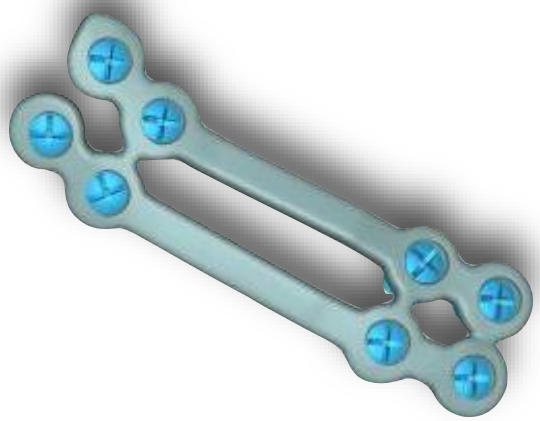
Supine AHI 52

Custom made plate

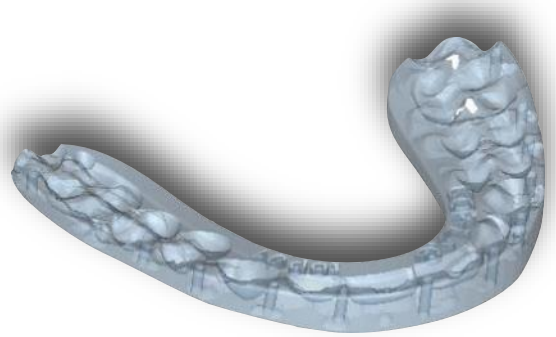
Cutting guide

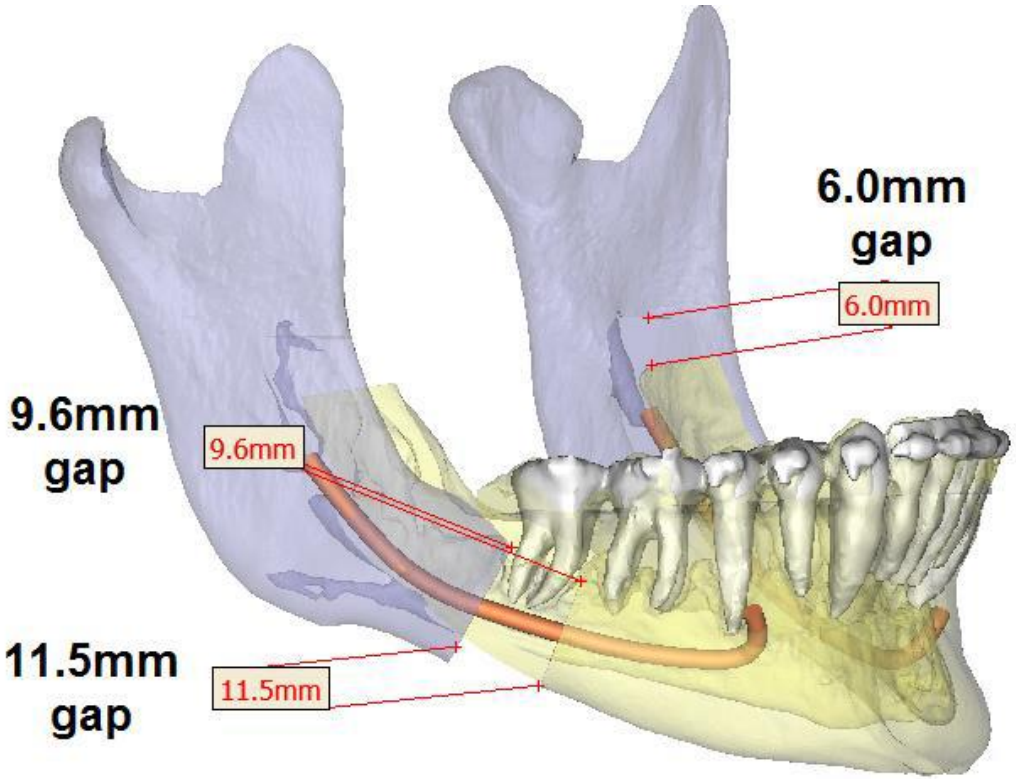




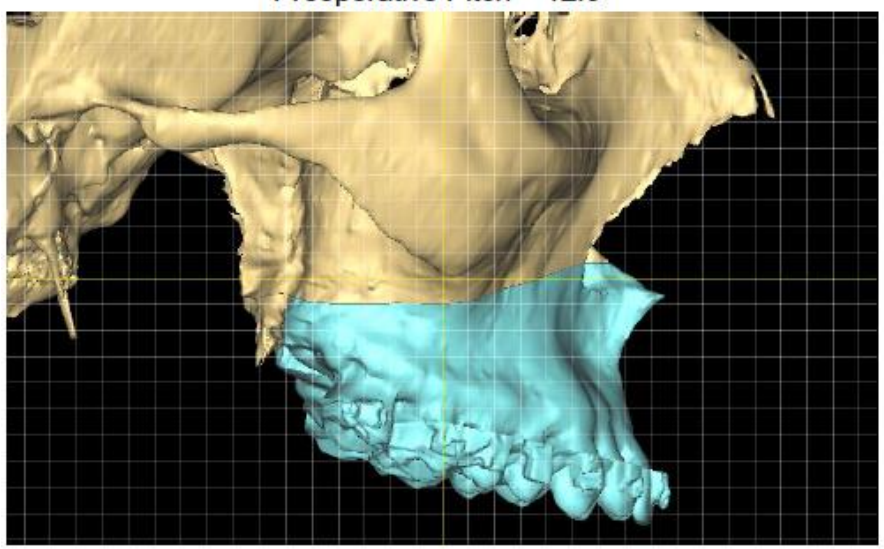


Final splint

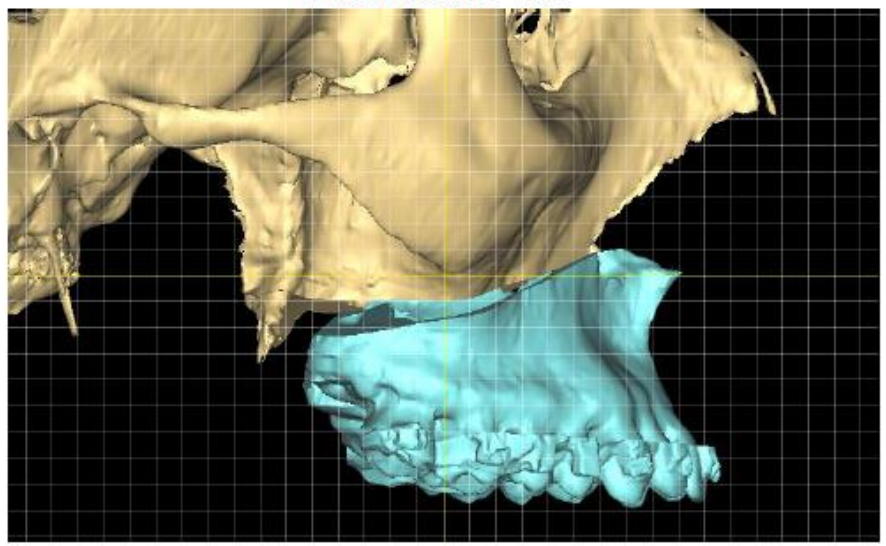




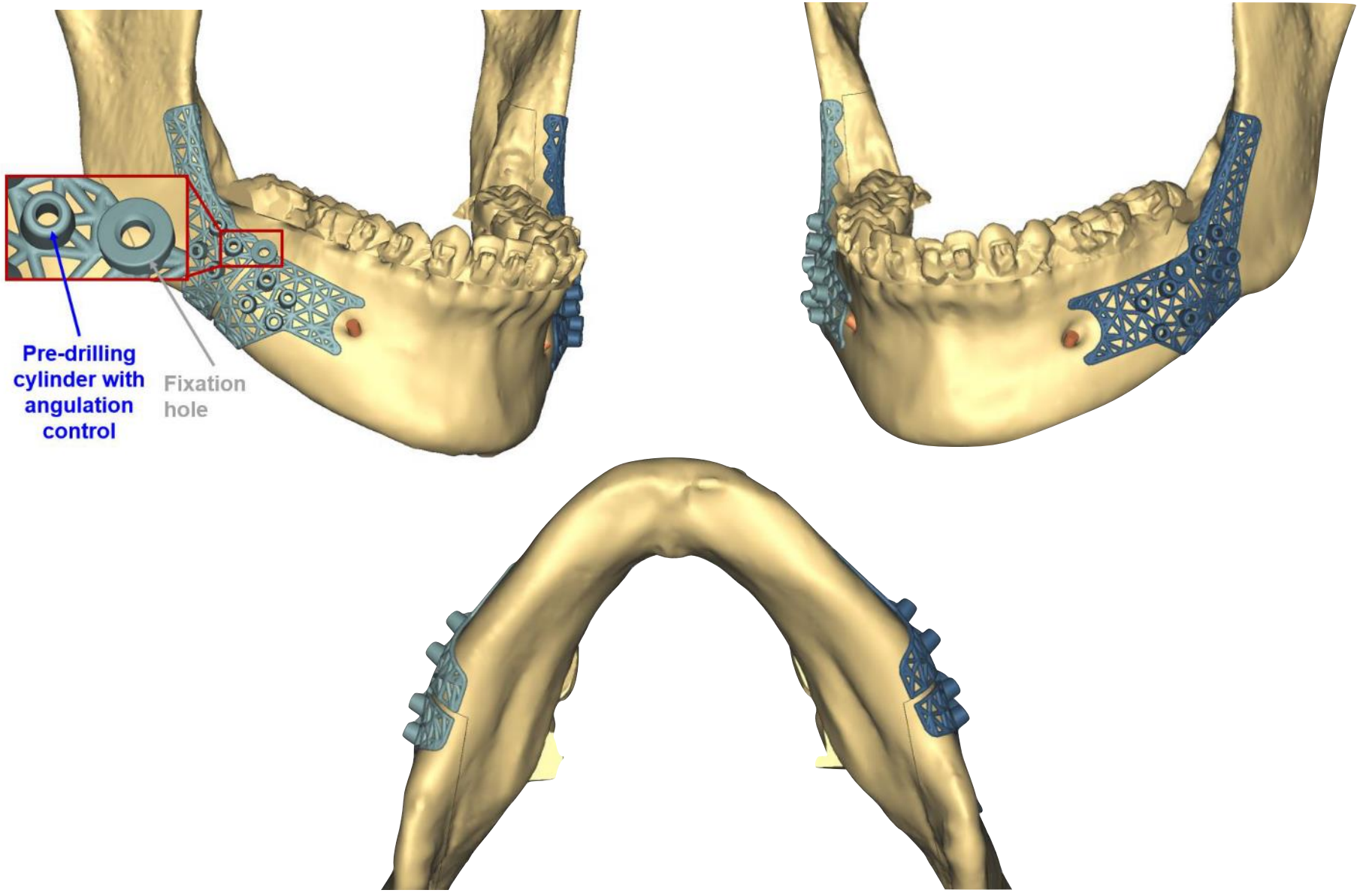
Preoperative Pitch = 12.6°



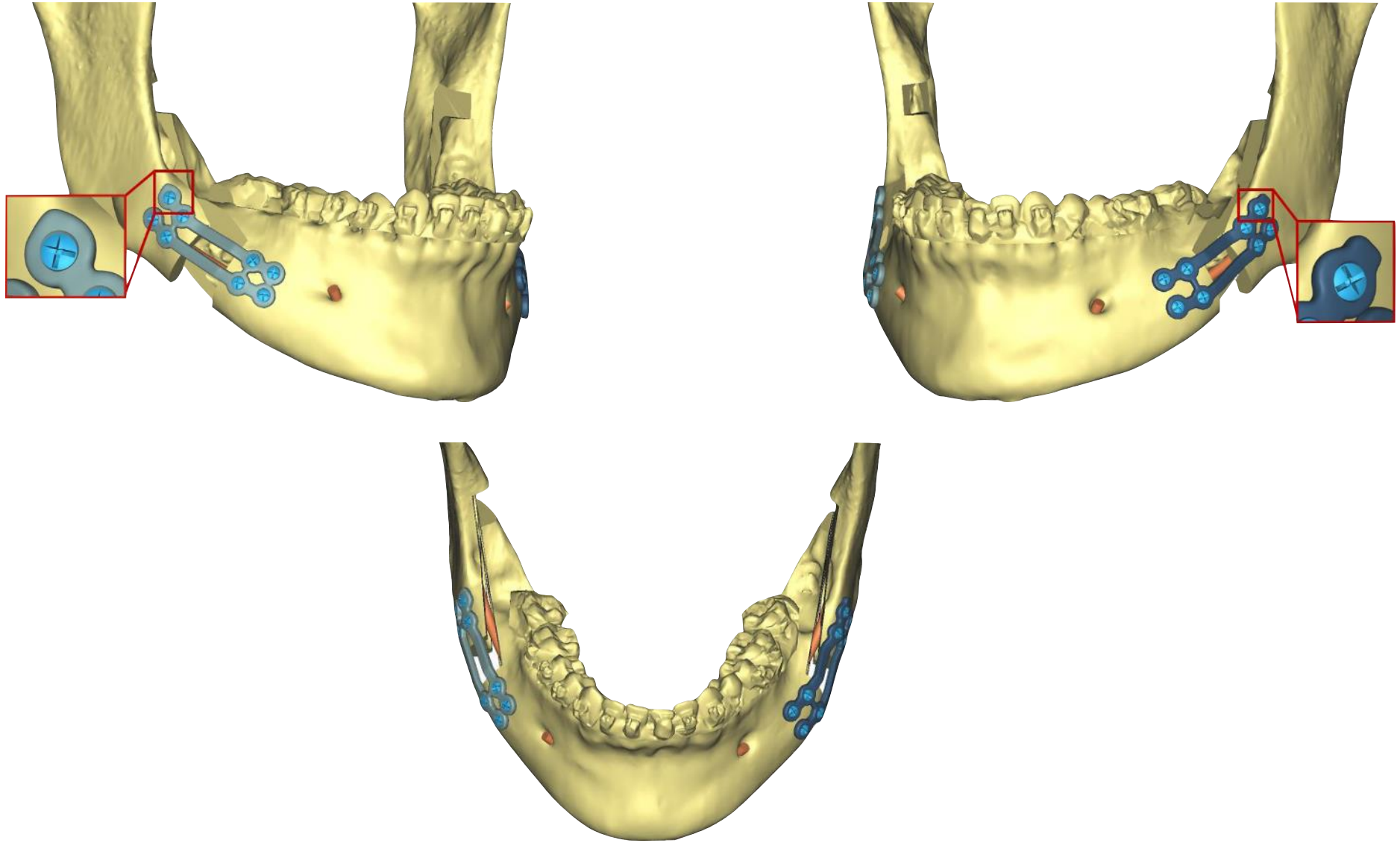
Planned Pitch = 3.1°

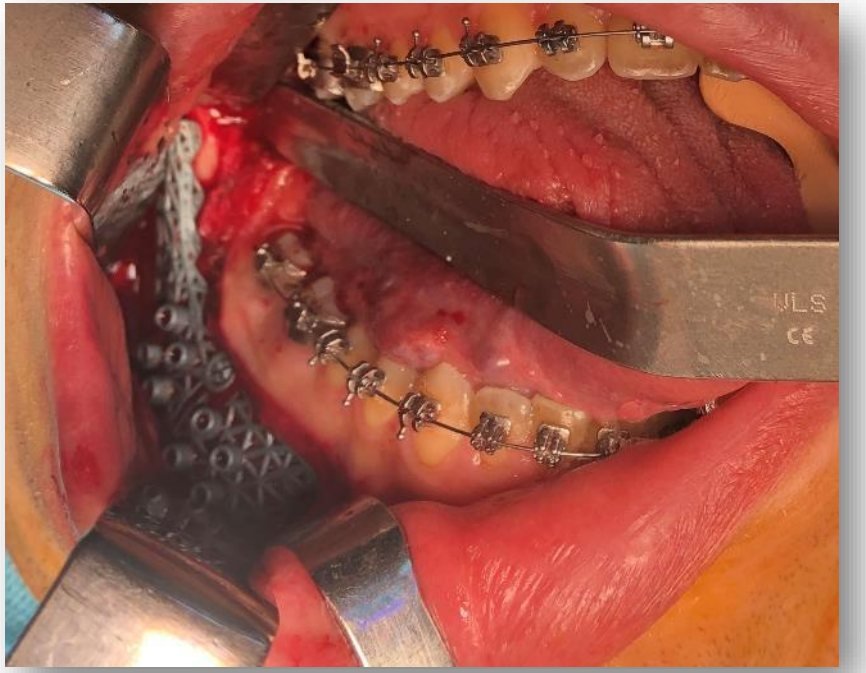


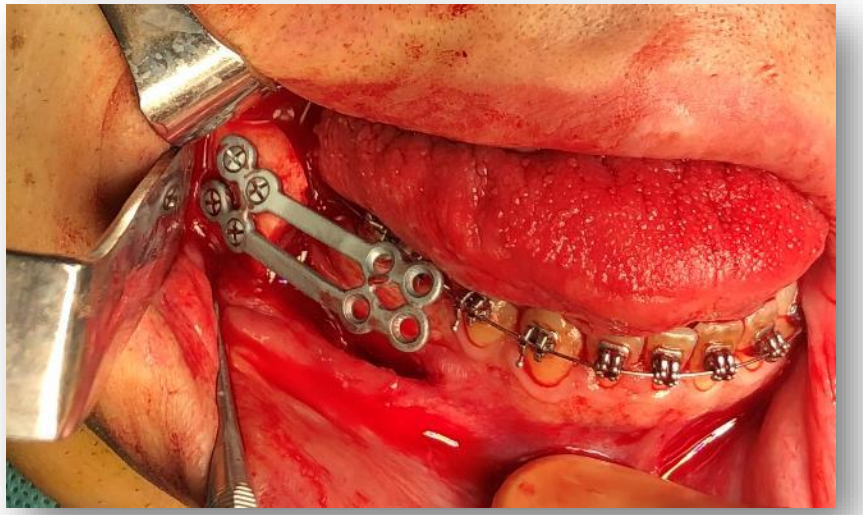
Guide Design

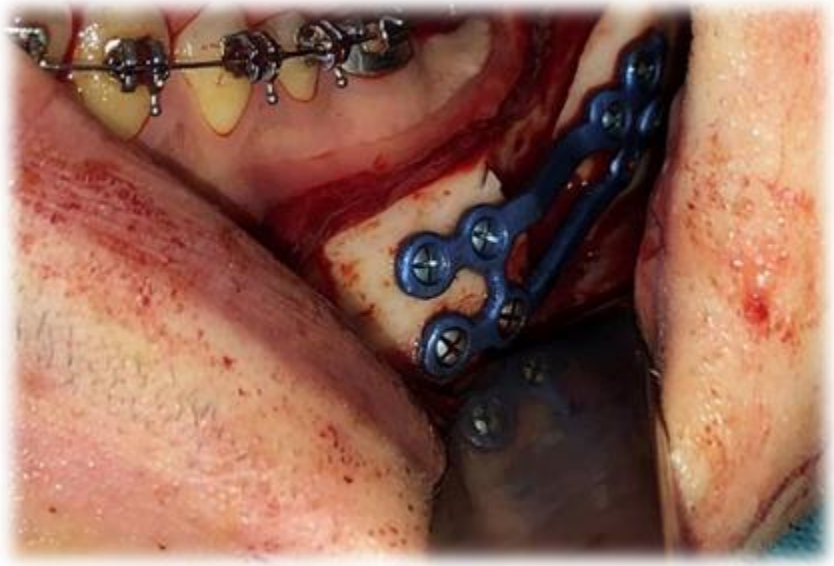


Implant Design





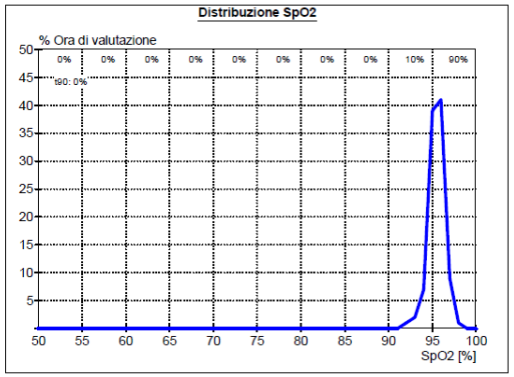




Conclusions Overall, the customized fixation plate system is more accurate than the intermediate CAD/CAM splint for transferring the virtual plan into the operation room

PROSPECTIVE STUDY 16 PATIENTS Journal of Cranio-Maxillo-Facial Surgery 49 (2021) 1-8

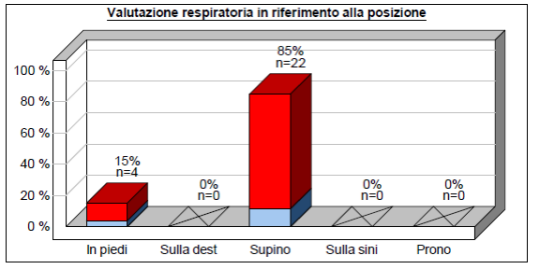
Valutazione di SpO2/pulsazioni	Rilevazioni
Indice di desaturazione ODI [Per ora]	**6**
N. di desaturazioni [n]	41
N. di desaturazioni < 90%: [n]	9
Tempo totale [Min]	21:15
Durata media per ora [Min Per ora]	3:08
Desaturazione minore [%] (05:20:56)	80
Desaturazione più lunga [Min] (03:20:59)	1:35
Durata media [Sec]	31
Desaturazione media [%]	92
Saturazione media [%]	95
Saturazione max [%] (23:25:50)	100
Saturazione min [%] (23:18:17)	51
t90 [%]	0
Pulsazioni min (05:10:18) [1/min]	22
Pulsazioni max (00:50:05) [1/min]	102
Pulsazioni medie [1/min]	53 ± 35
Variazioni pulsazioni [n]	264
Indice variazione pulsazioni [Per ora]	36,4



3.) Valutazione relativa alla posizione

Posizione	In piedi	Sulla destra	Supino	Sulla sinistra	Prono	Totale
Tempo *(Tempo reale specifico)*	24:35 Min *(5 %)*	2:20 Min *(1 %)*	7:03:43 Ore *(92 %)*	8:06 Min *(2 %)*	*12 Sec* *(0 %)*	7:38:56 Ore *(100 %)*
RDT	1:12 Min	0 Sec	11:04 Min	0 Sec	0 Sec	12:16 Min
Apnee [n] *(Apnee[%])*	1 *(25 %)*	0 *(0 %)*	3 *(75 %)*	0 *(0 %)*	*0* *(0 %)*	4 *(100 %)*
Apnea centrale [n]	0	0	0	0	0	0
Apnea ostruttiva [n]	1	0	3	0	0	4
Apnea mista [n]	0	0	0	0	0	0
Ipopnea [n]	3	0	19	0	0	22
AHI (rel. a tempo pos.)	10	0	3	0	0	-
AHI (rel. a tempo tot.)	1	0	3	0	0	4
CSR [n]	0	0	0	0	0	0
Desaturazione [n]	4	0	35	2	0	41
ODI (rel. a tempo pos.)	10	0	5	15	0	-
ODI (rel. a tempo tot.)	1	0	5	0	0	6
Russamento [n]	0	0	1	0	0	1
SI (rel. a tempo pos.)	0	0	0	0	0	-
SI (rel. a tempo tot.)	0	0	0	0	0	0
PLM+LM [n]	0	0	0	0	0	0
PLMI+LMI (rel. a tempo tot.)	0	0	0	0	0	0

AHI supino: AHI non supino 3 : 0



SIG. ALOISI CRISTIAN, 27 anni, fumatore attivo.
Anamnesi farmacologica e patologica mute.
Esame eseguito per controllo in nota sindrome delle apnee notturne a distanza di 5 mesi di intervento di avanzamento

aloisi, cristian, Data di nascita 21.03.1991, Inizia 22.11.2018, 23:00:02

bimascellare. su indicazione del Curante Chirurgo Maxillo Faciale.

Esame eseguito in condizioni basali; tempo di registrazione sufficiente.
Si segnalano isolati eventi respiratori notturni, prevalentemente ipopnee, con indice di apnea/ipopnea di grado lieve (3.
eventi/ora),in assenza di compromissione della saturazione ossiemoglobinica notturna (ODI 6 eventi/ora, sPo2 media
95%; nadir 51 %[dato di verosimile natura artefattuale],).

Tracciato nei limiti della norma.

Marco Mantero

FALLIMENTI E COMPLICANZE

> Orthod Fr. 2022 Dec 1;93(Suppl 1):61-73. doi: 10.1684/orthodfr.2022.88.

Maxillomandibular Advancement for OSA: Serious Complications and Failures

Kasey Li [1], Christian Guilleminault [2]

Affiliations + expand

PMID: 36704949 DOI: 10.1684/orthodfr.2022.88

Abstract

Objective: The focus of this report was to analyze patients who presented for second opinion due to complications and failure following maxillomandibular advancement (MMA) performed elsewhere.

Materials and methods: During a five-year period, 16 patients presented with complications and/or failure of MMA. The indication for treatment was obstructive sleep apnea (OSA). Analysis of treatment records including plane radiography and/or cone beam computed tomography (CBCT), progress photographs and clinical examination were performed.

Results: Complete clinical and imaging records were available in all patients for analysis. Thirteen patients were surgical failures with advancement ranging from -4 to 5 mm. Five of the 13 patients had limited advancement at the initial surgery, and eight patients had hardware failure that required removal with resultant retrodisplacement of the mandible. Due to complications occurring in 11 patients, additional surgery ranging from two to six additional procedures after the initial operation was required. The complications included hardware failure (ten patients) that led to bone segment displacement (eight patients), non-union of the maxilla (two patients), non-union of the mandible (eight patients), chronic facial and/or joint pain (five patients), facial nerve injury (two patients), complete anesthesia of the lip/chin (five patients) and severe malocclusion (four patients).

Conclusions: Although MMA is typically a predictable operation with excellent outcomes, failure of improvement and severe long-term sequelae from surgical complications are possible. Surgical precision with sufficient skeletal advancement for airway improvement and stable skeletal fixation is

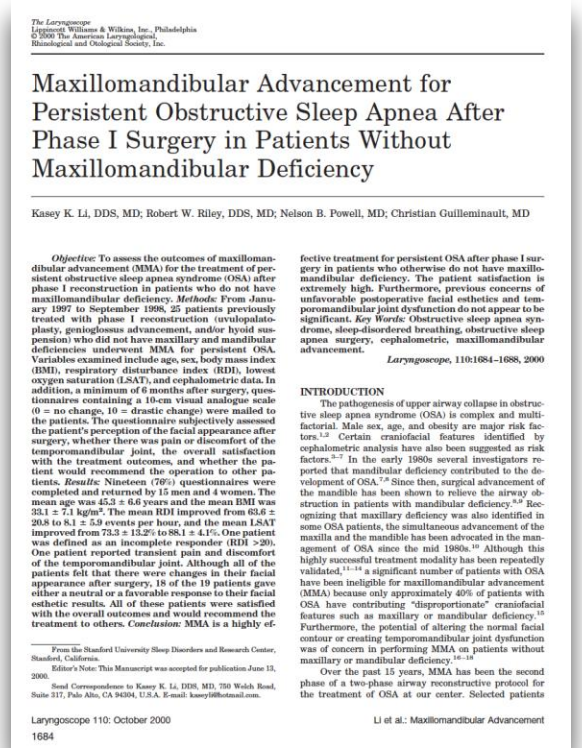
TRANSIENT HYPESTHESIA LOWER LIP 20-30%

INFECTIONS 5%

AIRWAY COMPROMISE PERSISTENCE 10%

MAJOR COMPLICATIONS REQUIRING INTERVENTION <5%

SODDISFAZIONE PAZIENTI



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Maxillomandibular Advancement for Persistent Obstructive Sleep Apnea After Phase I Surgery in Patients Without Maxillomandibular Deficiency

Kasey K. Li, DDS, MD; Robert W. Riley, DDS, MD; Nelson B. Powell, MD; Christian Guilleminault, MD

Objective: To assess the outcomes of maxillomandibular advancement (MMA) for the treatment of persistent obstructive sleep apnea syndrome (OSA) after phase I reconstruction in patients who do not have maxillomandibular deficiency. *Methods:* From January 1997 to September 1998, 25 patients previously treated with phase I reconstruction (uvulopalatoplasty, genioglossus advancement, and/or hyoid suspension) who did not have maxillary and mandibular deficiencies underwent MMA for persistent OSA. Variables examined include age, sex, body mass index (BMI), respiratory disturbance index (RDI), lowest oxygen saturation (LSAT), and cephalometric data. In addition, a minimum of 6 months after surgery, questionnaires containing a 10-cm visual analogue scale (0 = no change, 10 = drastic change) were mailed to the patients. The questionnaire subjectively assessed the patient's perception of the facial appearance after surgery, whether there was pain or discomfort of the temporomandibular joint, the overall satisfaction with the treatment outcomes, and whether the patient would recommend the operation to other patients. *Results:* Nineteen (76%) questionnaires were completed and returned by 15 men and 4 women. The mean age was 45.3 ± 6.6 years and the mean BMI was 33.1 ± 7.1 kg/m². The mean RDI improved from 63.6 ± 20.8 to 8.1 ± 5.9 events per hour, and the mean LSAT improved from 73.3 ± 15.2% to 88.1 ± 4.1%. One patient was defined as an incomplete responder (RDI >20). One patient reported transient pain and discomfort of the temporomandibular joint. Although all of the patients felt that there were changes in their facial appearance after surgery, 18 of the 19 patients gave either a neutral or a favorable response to their facial esthetic results. All of these patients were satisfied with the overall outcomes and would recommend the treatment to others. *Conclusion:* MMA is a highly effective treatment for persistent OSA after phase I surgery in patients who otherwise do not have maxillomandibular deficiency. The patient satisfaction is extremely high. Furthermore, previous concerns of unfavorable postoperative facial esthetics and temporomandibular joint dysfunction do not appear to be significant. *Key Words:* Obstructive sleep apnea syndrome, sleep-disordered breathing, obstructive sleep apnea surgery, cephalometric, maxillomandibular advancement.

Laryngoscope, 110:1684–1688, 2000

INTRODUCTION

The pathogenesis of upper airway collapse in obstructive sleep apnea syndrome (OSA) is complex and multifactorial. Male sex, age, and obesity are major risk factors.[1,2] Certain craniofacial features identified by cephalometric analysis have also been suggested as risk factors.[3–7] In the early 1980s several investigators reported that mandibular deficiency contributed to the development of OSA.[7,8] Since then, surgical advancement of the mandible has been shown to relieve the airway obstruction in patients with mandibular deficiency.[8,9] Recognizing that maxillary deficiency was also identified in some OSA patients, the simultaneous advancement of the maxilla and the mandible has been advocated in the management of OSA since the mid 1980s.[10] Although this highly successful treatment modality has been repeatedly validated,[11–14] a significant number of patients with OSA have been ineligible for maxillomandibular advancement (MMA) because only approximately 40% of patients with OSA have contributing "disproportionate" craniofacial features such as maxillary or mandibular deficiency.[15] Furthermore, the potential of altering the normal facial contour or creating temporomandibular joint dysfunction was of concern in performing MMA on patients without maxillary or mandibular deficiency.[16–18]

Over the past 15 years, MMA has been the second phase of a two-phase airway reconstructive protocol for the treatment of OSA at our center. Selected patients

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Maxillomandibular advancement for the treatment of obstructive sleep apnoea syndrome: a long-term follow-up

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We have demonstrated that patients with persistent OSA after phase I surgery who did not have maxillomandibular deficiency can be successfully treated with MMA.

By using a patient-administered questionnaire, we have also demonstrated that the patient satisfaction is extremely high in that 100% of the patients were satisfied with the overall treatment outcomes and would recommend the operation to others

Review > Cureus. 2023 Feb 28;15(2):e35568. doi: 10.7759/cureus.35568. eCollection 2023 Feb.

Satisfaction With Facial Aesthetic Appearance Following Maxillomandibular Advancement (MMA) for Obstructive Sleep Apnea (OSA): A Meta-Analysis

Basem T Jamal [1], Elaf A Ibrahim [2]

Eur Respir J 2011; 37: 1000–1028
DOI: 10.1183/09031936.00099710

ERS TASK FORCE REPORT

Non-CPAP therapies in obstructive sleep apnoea

W.J. Randerath*, J. Verbraecken*, S. Andreas, G. Bettega, A. Boudewyns, E. Hamans, F. Jalbert, J.R. Paoli, B. Sanner, I. Smith, B.A. Stuck, L. Lacassagne, M. Marklund, J.T. Maurer, J.L. Pepin, A. Valipour, T. Verse and I. Fietze, the European Respiratory Society task force on non-CPAP therapies in sleep apnoea

ABSTRACT: In view of the high prevalence and the relevant impairment of patients with obstructive sleep apnoea syndrome (OSAS) lots of methods are offered which promise definitive cures for or relevant improvement of OSAS.

This report summarises the efficacy of alternative treatment options in OSAS.

An interdisciplinary European Respiratory Society task force evaluated the scientific literature according to the standards of evidence-based medicine.

Evidence supports the use of mandibular advancement devices in mild to moderate OSAS. Maxillomandibular osteotomy seems to be as efficient as continuous positive airway pressure (CPAP) in patients who refuse conservative treatment. Distraction osteogenesis is usefully applied in congenital micrognathia or midface hypoplasia. There is a trend towards improvment after weight reduction. Positional therapy is clearly inferior to CPAP and long-term compliance is poor. Drugs, nasal dilators and apnoea triggered muscle stimulation cannot be recommended as effective treatments of OSAS at the moment. Nasal surgery, radiofrequency tonsil reduction, tongue base surgery, uvulopalatal flap, laser midline glossectomy, tongue suspension and genioglossus advancement cannot be recommended as single interventions. Uvulopalatopharyngoplasty, pillar implants and hyoid suspension should only be considered in selected patients and potential benefits should be weighed against the risk of long-term side-effects. Multilevel surgery is only a salvage procedure for OSA patients.

KEYWORDS: Mandibular advancement devices, maxillomandibular osteotomy, multilevel surgery, neuromuscular stimulation, uvulopalatopharyngoplasty, weight reduction

Since the first description of their application in the early 1980s by SULLIVAN *et al.* [1], continuous positive airway pressure (CPAP) and the more recent developments of automatic positive airway pressure and bilevel therapy have become the standard treatment of obstructive sleep apnoea syndrome (OSAS) [1]. Positive airway pressure has proven to improve symptoms, normalise the risk of traffic and workplace accidents, and reduce the elevated sympathetic activity and risk for cardiovascular morbidities, especially arterial hypertension. Most recently, it has been shown that CPAP normalises mortality in patients with severe OSAS [2, 3].

However, despite the efficacy of CPAP, many patients suffer from local side-effects at the nose or face, or discomfort due to the mask. Moreover, CPAP does not allow for a permanent resolution of respiratory disturbances during sleep, but only suppresses them while using the devices. Therefore, many patients look for more comfortable or curative treatment options. Both conservative and surgical alternative therapeutic approaches have been described. However, there is a need to discuss the scientific evidence for these therapies.

Thus, the European Respiratory Society funded a task force with the aim of screening the scientific

This article has online supplementary material available from www.erj.ersjournals.com

AFFILIATIONS
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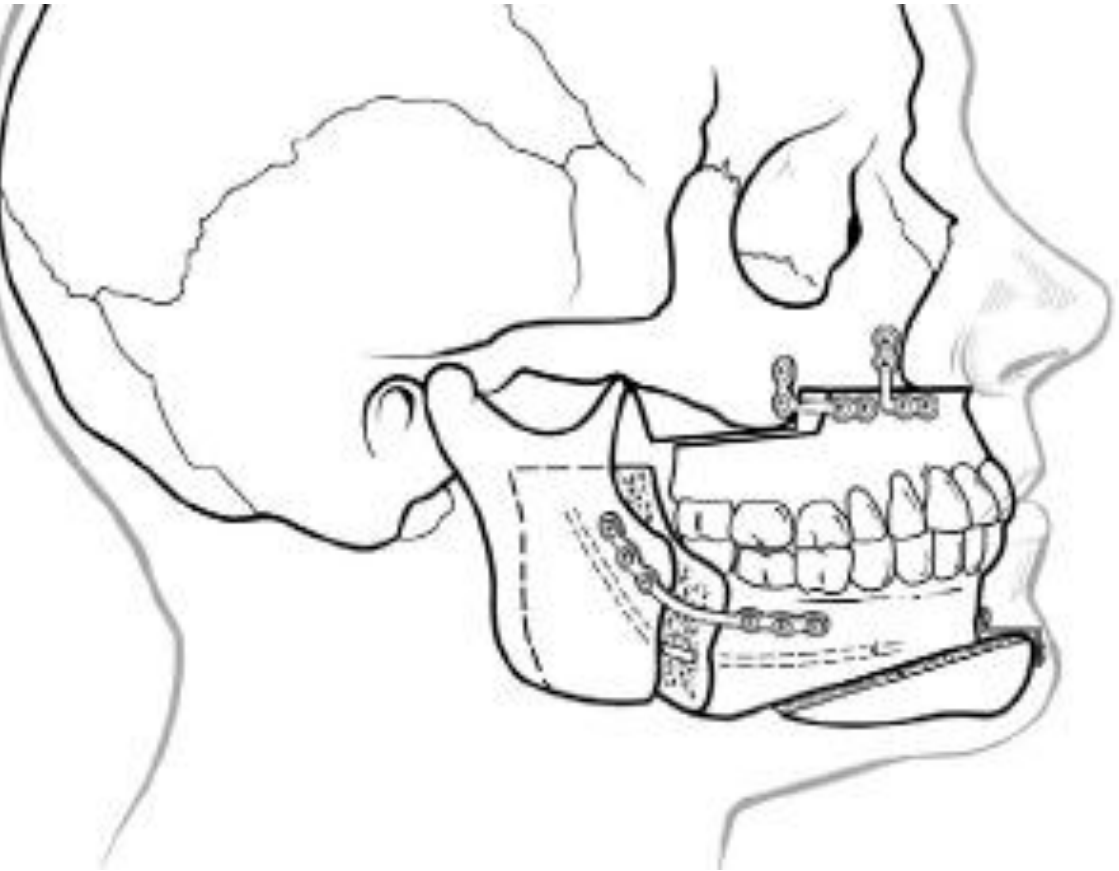
COSTI

Maxillomandibular advancement (MMA) seems to be as efficient as CPAP in patients with OSA who refuse conservative treatment, particularly in a young OSA population without excessive body mass index (BMI) or other comorbidities, and is recommended in this circumstance

The one-time cost of early MMA is probably far less expensive than multiple less successful surgeries or lifetime use of CPAP



TAKE HOME MESSAGE

- **MMA una chirurgia efficace per l'OSAS → riduzione media dell'AHI dell'85–90%.**
- **Il successo dipende da una corretta selezione del paziente (pattern scheletrico, BMI, sede del collasso, compliance).**
- **L'entità dell'avanzamento è cruciale → maggiore avanzamento (≥10 mm) correlato a migliore outcome respiratorio.**
- **Virtual planning 3D e analisi cefalometrica migliorano la predicibilità e la sicurezza chirurgica.**
- **Complicanze generalmente lievi e gestibili: parestesie temporanee, edema, malocclusioni minori.**


GRAZIE!