FELLOW OF DENTAL SLEEP MEDICINE

AUSTRALASIAN sleep ASSOCIATION

Sample detailed case report

Patient X

SYNOPSIS

INTRODUCTION:

This patient was a 64-year-old Caucasian female (16/01/1952) with the chief complaint of snoring. She initially consulted her general medical practitioner regarding her symptoms, who referred her to a sleep physician. After undergoing a sleep study, Mrs X was diagnosed with moderate obstructive sleep apnoea/hypopnea, which was severe in the supine position. Her sleep physician referred her to trial a Mandibular advancement splint (MAS). She presented to me for a consult on 24/08/2020.

CHIEF COMPLAINT:

The patient's chief complaint was snoring which disturbed her partner's sleep. Her partner rates her snoring as moderately loud, rating it 6/10 on a Numerical Rating Scale (NRS). There were no reports of witnessed apnoeic events. She reported waking up with a headache once a week and feeling moderately unrefreshed upon waking most days. Mrs X experiences mild lethargy during the day and occasional drowsiness with sedentary activities during the day and evenings. As a result, she felt her general motivation levels were low. She did not report any mood disturbances.

HISTORY OF PRESENT ILLNESS:

The patient has been aware of her snoring for a number of years, and her partner reported its progressive worsening. However, she did not suspect obstructive sleep apnoea as she was unaware of such a diagnosis prior to her complaint of snoring. She initially trialed home-made positional appliance to reduce her time slept on her back, as her husband noted worse snoring in the supine position. Unfortunately, she was not able to tolerate it for extended periods of time and found it resulted in poorer sleep quality. A lab/hospital-based sleep study was completed on the 6th of July 2020. This revealed an Apnoea- Hypopnoea index (AHI) of 16.6 and the lowest oxygen saturation concentration of 92%. CPAP was initially trialed, but the patient could not tolerate the sensation from positive pressures and found it restrictive as she was unable to move around. Additionally, her husband also found the machine to be loud. After a month of trialing the CPAP, she was non-responsive as she was intolerant of the machine. As such, a mandibular advancement splint was recommended.

PAST MEDICAL HISTORY:

Mrs X weighs 67kg and is 164cm tall, with a BMI of 17.8. She has Wolf-Parkinson-White, hypothyroidism and asthma, which are well controlled pharmacologically. She had a motor vehicle accident (MVA) in 2015, which resulted in C6/C7 compression fracture. A cervical spine fusion was completed. She has resultant chronic left arm and neck pain post-MVA but does not report interferences with sleeping positions as a result of this.

CLINICAL AND RADIOGRAPHIC EXAMINATION:

The patient had the following missing teeth: 21 and 45. There was a Porcelain fused to metal (PFM) bridge from the 12-22 (4 units) aimed to replace the missing 21, and PFM crowns on the 16, 17 and 46. She has completed endodontic treatment on her 16. Her remaining restorative work was in good condition. There were no periodontal pockets (CPITIN 0,1,0, 0,0,0). Mrs X has a Class II div II occlusion with her midline 2mm to the left. Her maximum mouth opening was 42mm, right lateral excursion 8mm, left lateral excursion 8mm and she was able to protrude up to 9mm. There were no masticatory muscles or TMJ tenderness or pain upon palpation or function. There was no clicking, deviation or deflection noted. She had a large tongue, medium sized soft palate, medium sized uvula and had her tonsils present. There were no soft tissue lesions noted.

DIAGNOSIS:

Overnight polysomnogram on the 6th of July 2020 revealed moderate obstructive sleep apnoea/hypopnoea and mild periodic limb movements. Her AHI was 16.6 and had a lowest O2 desaturation of 92%. Her obstructive sleep apnoea was considered to be severe in the supine position and REM sleep, both with an AHI of 38.5.

RATIONALE:

A Somnodent Fusion mandibular advancement appliance was chosen due to its comfort and ease of use. Patient was motivated and capable of understanding its titration mechanism, which allowed her to titrate the appliance independently if necessary and able. It also allowed for vertical movement so patient can breathe through her mouth if required. The acrylic material allowed for any adjustment if the patient was to undergo dental treatment. Her starting treatment position was 5mm out of a possible 9mm (55.5%).

RESULTS:

Patient reports subjective improvements in sleep parameters prior to objective sleep assessment. The success of the appliance was initially compounded by a reduction in compliance due to maxillary teeth tenderness and its interference in her daily life. However, after adjustments, patient was able to cope with the appliance which led to large improvements in subjective symptoms.
Treatment polysomnogram was completed on 24th of January 2021. The treatment sleep study revealed an AHI of 5.5 and lowest O2 desaturation of 94%. Patient did not sleep supine in this sleep study. However, AHI in REM sleep improved from 38.5 to 13.6. She was recommended to continue wearing the appliance nightly at the current treatment position, which was 6.4mm out of 9mm (71.1%)

DISPOSITION:

A treatment sleep study was completed on the 24th of January 2021, which was analyzed by a sleep physician. It confirmed the success of the appliance, with the physician stating there was objective improvement in her AHI, with a reduction from 17 to 6 apnoeas/hypopnoeas per hour of sleep and no significant side effects. Given her improvements in her symptoms (snoring, decreased morning tiredness, daytime somnolence, sleep disturbances) and objective reduction of her AHI, she was recommended to continue utilizing her mandibular advancement appliance to manage her obstructive sleep apnoea. The sleep physician scheduled no further reviews with her.

FOLLOW UP VISITS

Patient DOB: 16/01/1952
Initial consult: 24/08/2020
Appliance insert: 21/09/2020

DOS: 19/10/2020

- Subjective: Patient has a history of moderate obstructive sleep apnoea and presents for her 1 month follow up with the use of her Somnodent Fusion mandibular advancement appliance. Medical history, family history and social remains unchanged. No significant weight change is reported. Patient reports she her snoring is 100% improved with the use of the appliance. Patient awakens feeling refreshed on most days and experiences mild lethargy and occasional drowsiness with sedentary activities during the day and evenings. The main side effect reported maxillary anterior teeth soreness in the morning, which can persist for several hours. Patient reports this interferes with her breakfast and finds this bothersome. She reports avoiding using the appliances some days because of this pain and as such, feels her symptoms of tiredness and lethargy has not completely resolved.
- Objective: General appearance remains unchanged. There was mild bilateral masseter tenderness and no TMJ pain. Maximum mouth opening in increased to 45mm. Right, left and protrusive excursions remain the same (8mm, 8mm and 9mm respectively). Occlusion remained the same and there were no bite changes or teeth mobility. There was no clicking, deviation or deflection noted Intra-orally, no abnormalities were noted in any of the soft tissues. Appliance was titrated at 5.4mm out of a possible 9mm (60%) and was mechanically sound. Maxillary anterior teeth were not tender to percussion or sensitive upon testing.
- Assessment: Snoring reportedly resolved and there were improvements in subjective scores as stated above. Obstructive sleep apnoea has subjectively improved with oral appliance therapy. Confirmation of oral appliance success will need to be objectively tested with a treatment sleep study.
- Plan: Recommended patient to continue wearing the appliance nightly and titrate the appliance bilaterally by 5 turns (0.5mm) on a weekly basis due to her severe sleep apnoea in supine and REM sleep. The anterior maxillary portion of the appliance was

adjusted to better accommodate her maxillary teeth. A follow up was scheduled in 2 months.

DOS: 12/12/2020

- Subjective: Patient has a history of moderate obstructive sleep apnoea and presents for her 3 month follow up with the use of her Somnodent Fusion mandibular advancement appliance. Medical history, family history and social history remains unchanged. No significant weight change was reported. Patient advises she has maintained her 100% improvement in symptoms. Snoring has completely resolved according to her partner and she still awakens feeling refreshed. She does not experience any lethargy. Patient experiences drowsiness with sedentary activities very occasionally during the day and evenings. She still experiences some maxillary anterior teeth soreness upon awaking, but it settles soon after waking and is not bothered by it.
- Objective: General appearance remains unchanged. There was no masticatory muscle pain or but mild left TMJ discomfort. She attributes this to having a recent flare up of neck pain. Maximum mouth opening remained unchanged at 45mm. Right lateral excursion has increased to 10mm and left lateral excursion has increased to 9mm. Protrusion remains the same at 9mm. There was no clicking, deviation or deflection noted. Occlusion has remained the same and there were no bite changes or teeth mobility. Intra-orally, no abnormalities were noted in any of the soft tissues. Appliance is titrated at 6.4mm out of a possible 9mm (71%) and is mechanically sound.
- Assessment: Snoring has reportedly resolved and subjective symptoms have drastically improved as well. Obstructive sleep apnoea has subjectively improved with oral appliance therapy. Confirmation of oral appliance success will need to be objectively tested with a treatment sleep study.
- Plan: Recommended patient to continue wearing the appliance nightly at this treatment position. Patient was referred for a treatment sleep study and a follow up was scheduled in 5 months.

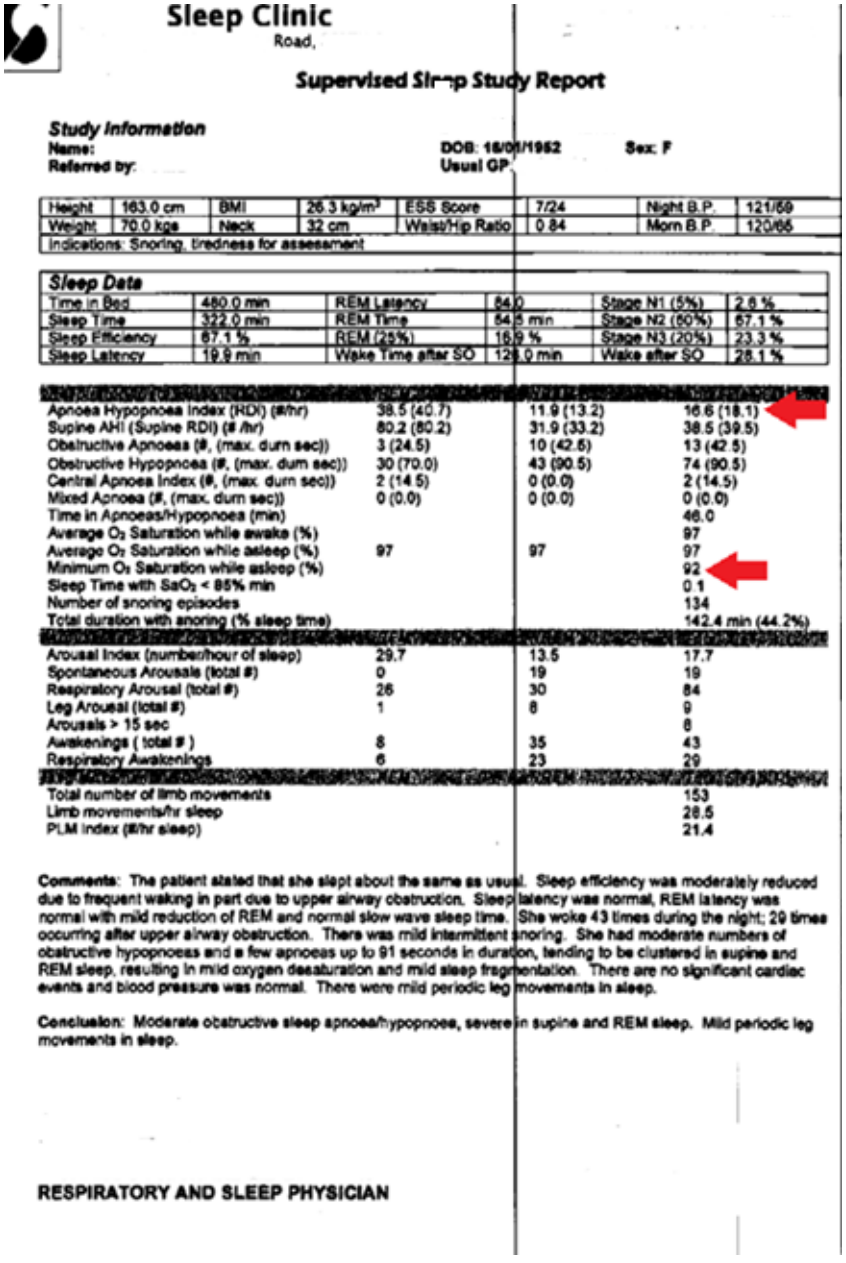
DOS: 22/05/2021

- Subjective: Patient has a history of moderate obstructive sleep apnoea and presents for her 8 month follow up with the use of her Somnodent Fusion mandibular advancement appliance. Medical history, family history and social remains unchanged. No significant weight change is reported. Patient advised a sleep study was completed, which confirmed the success of the appliance. Patient advises she has slightly regressed with her symptoms recently but is mainly due to her role as a caretaker to her young grandchildren on certain days. Her snoring remains resolved and she still awakens refreshed. She experiences some mild lethargy but does not experience drowsiness during the day or evenings. She no longer experiences maxillary anterior teeth soreness upon awaking.
- Objective: General appearance remains unchanged. There was no masticatory muscle or TMJ pain. Maximum mouth opening remained unchanged at 45mm. Right and left lateral excursion has remained at 10mm and 9mm respectively. Protrusion remains the same at 9mm. There was no clicking, deviation or deflection noted. Occlusion has remained the same and there were no bite changes or teeth mobility. Intra-orally, no

abnormalities were noted in any of the soft tissues. Appliance was titrated at 6.4mm out of a possible 9mm (71%) and is mechanically sound.

- Assessment: Obstructive sleep apnoea has improved to an AHI of 6 as confirmed by objective testing, including REM sleep (down to 13.6 from 38.5).
- Plan: Recommended patient to continue wearing the appliance nightly at this treatment position. A follow up was scheduled in 12 months.

PRE-TREATMENT SLEEP STUDY



Sleep Clinic
Road,

Supervised Sleep Study Report

Study Information
Name: **DOB: 18/01/1952** **Sex: F**
Referred by: **Usual GP**

Height	163.0 cm	BMI	26.3 kg/m²	ESS Score	7/24	Night B.P.	121/59
Weight	70.0 kgs	Neck	32 cm	Waist/Hip Ratio	0.84	Morn B.P.	120/66

Indications: Snoring, tiredness for assessment

Sleep Data

Time in Bed	480.0 min	REM Latency	84.0	Stage N1 (5%)	2.6 %
Sleep Time	322.0 min	REM Time	54.5 min	Stage N2 (60%)	67.1 %
Sleep Efficiency	67.1 %	REM (25%)	16.9 %	Stage N3 (20%)	23.3 %
Sleep Latency	19.9 min	Wake Time after SO	128.0 min	Wake after SO	26.1 %

Apnoea Hypopnoea Index (RDI) (#/hr)	38.5 (40.7)	11.9 (13.2)	16.6 (18.1)
Supine AHI (Supine RDI) (# /hr)	80.2 (80.2)	31.9 (33.2)	38.5 (39.5)
Obstructive Apnoeas (#, (max. durn sec))	3 (24.5)	10 (42.5)	13 (42.5)
Obstructive Hypopnoea (#, (max. durn sec))	30 (70.0)	43 (90.5)	74 (90.5)
Central Apnoea Index (#, (max. durn sec))	2 (14.5)	0 (0.0)	2 (14.5)
Mixed Apnoea (#, (max. durn sec))	0 (0.0)	0 (0.0)	0 (0.0)
Time in Apnoeas/Hypopnoea (min)			46.0
Average O_2 Saturation while awake (%)			97
Average O_2 Saturation while asleep (%)	97	97	97
Minimum O_2 Saturation while asleep (%)			92
Sleep Time with SaO_2 < 85% min			0.1
Number of snoring episodes			134
Total duration with snoring (% sleep time)			142.4 min (44.2%)
Arousal Index (number/hour of sleep)	29.7	13.5	17.7
Spontaneous Arousals (total #)	0	19	19
Respiratory Arousal (total #)	26	30	84
Leg Arousal (total #)	1	8	9
Arousals > 15 sec			8
Awakenings (total #)	8	35	43
Respiratory Awakenings	6	23	29
Total number of limb movements			153
Limb movements/hr sleep			28.5
PLM Index (#/hr sleep)			21.4

Comments: The patient stated that she slept about the same as usual. Sleep efficiency was moderately reduced due to frequent waking in part due to upper airway obstruction. Sleep latency was normal, REM latency was normal with mild reduction of REM and normal slow wave sleep time. She woke 43 times during the night; 29 times occurring after upper airway obstruction. There was mild intermittent snoring. She had moderate numbers of obstructive hypopnoeas and a few apnoeas up to 91 seconds in duration, tending to be clustered in supine and REM sleep, resulting in mild oxygen desaturation and mild sleep fragmentation. There are no significant cardiac events and blood pressure was normal. There were mild periodic leg movements in sleep.

Conclusion: Moderate obstructive sleep apnoea/hypopnoea, severe in supine and REM sleep. Mild periodic leg movements in sleep.

RESPIRATORY AND SLEEP PHYSICIAN

POST-TREATMENT SLEEP STUDY

Suite 27, Road

Treatment Sleep Study - MAS Review

Study Information

Name: **DOB**: 16/01/52 **Sex**: F

Referred by: **Usual GP**:

Height	163.0 cm	BMI	27.0 kg/m²	ESS Score	2/24	Night B.P.	124/63
Weight	71.7 kgs	Neck	34 cm	Waist/Hip Ratio	0.78	Morn B.P.	129/64
Indications: Moderate OSA, MAS Efficacy.							

Sleep Data	***Study (2016)***	***REM***	***NREM***	***Current Study***
Sleep Efficiency	67.1 %	-	-	88.1 %
Sleep Latency	84.0 min	-	-	8.0 min
NREM Time	267.5 min	-	-	320.0 min
Slow Wave Sleep Time	75.02 min	-	-	93.5 min
Slow Wave Sleep %	23.3 %	-	-	23.1 %
REM Latency	84.0 min	-	-	70.5
REM Time	54.5 min	-	-	84.0 min
REM %	16.9 %	-	-	20.8 %
Respiratory Data	***Study (2016)***	***REM***	***NREM***	***Current Study***
Apnoea Hypopnoea Index (RDI) (#/hr)	16.6 (18.1)	13.6 (13.6)	3.4 (9.2)	5.5 (10.1)
Supine AHI (Supine RDI) (# /hr)	38.5 (39.5)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Obstructive Apnoeas (#, (max. durn sec))	13 (42.5)	0 (0.0)	0 (0.0)	0 (0.0)
Obstructive Hypopnoea (#, (max. durn sec))	74 (90.5)	19 (54.0)	18 (35.5)	37 (54.0)
Central Apnoea Index (#, (max. durn sec))	2 (14.5)	0 (0.0)	0 (0.0)	0 (0.0)
Mixed Apnoea (#, (max. durn sec))	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Time in Apnoeas/Hypopnoea (min)	46.0	-	-	17.2
Average O_2 Saturation while awake (%)	97	-	-	97
Average O_2 Saturation while asleep (%)	97	98	97	97
Minimum O_2 Saturation while asleep (%)	92			94
Sleep Time with SaO_2 < 85% min	0.1			0.1
Number of snoring episodes	134			134
Total duration w/ snoring (% sleep)	142.4 min			270.8 min
Arousal and Sleep Disturbance Data	***Study (2016)***	***REM***	***NREM***	***Current Study***
Arousal Index (number/hour of sleep)	17.7	9.3	14.3	20.2
Spontaneous Arousals (total #)	19	0	42	42
Respiratory Arousal (total #)	64	13	13	65
Leg Arousal (total #)	9	0	14	16
Arousals > 15 seconds	8	-	-	46
Awakenings (total #)	43	2	18	20
Respiratory Awakenings	29	2	11	13
Leg Movements	***Study (2016)***	***REM***	***NREM***	***Current Study***
Total number of limb movements	153			133
Limb movements/hr sleep	28.5			19.8
PLM index (#/hr sleep)	21.4			18.9

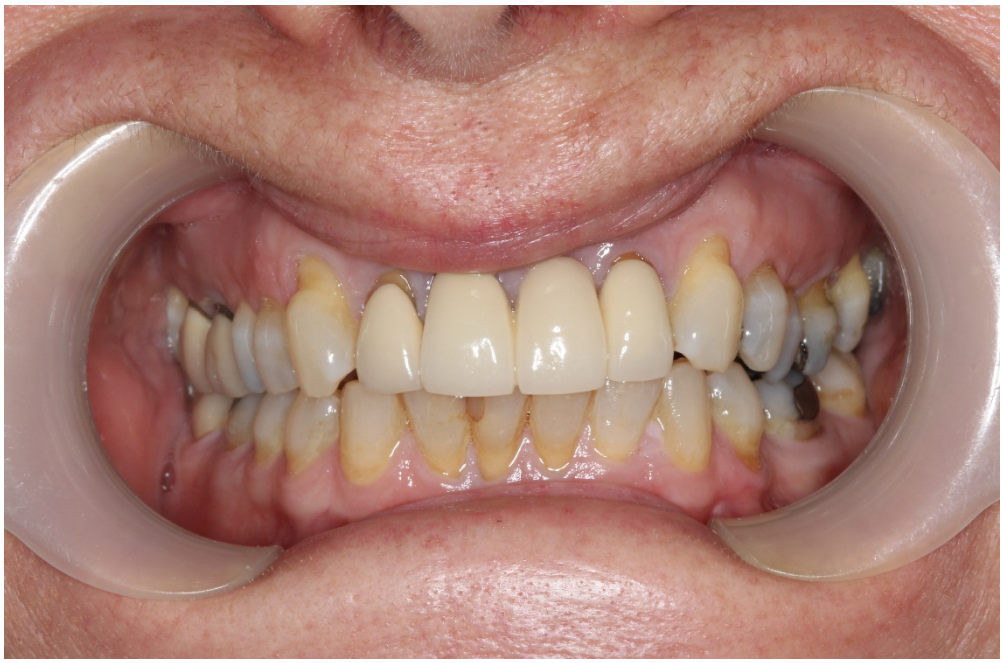
Comments: The patient stated that she slept about the same as usual using the mandibular advancement splint. Compared with the initial diagnostic study there has been significant interval improvement with reduction of AHI from 17 to 6 apnoeas/hypopnoeas per hour of sleep. Oxygen saturation remains within normal range with only borderline sleep fragmentation.

Conclusion: MAS therapy is effective in managing moderate obstructive sleep apnoea/hypopnoea.

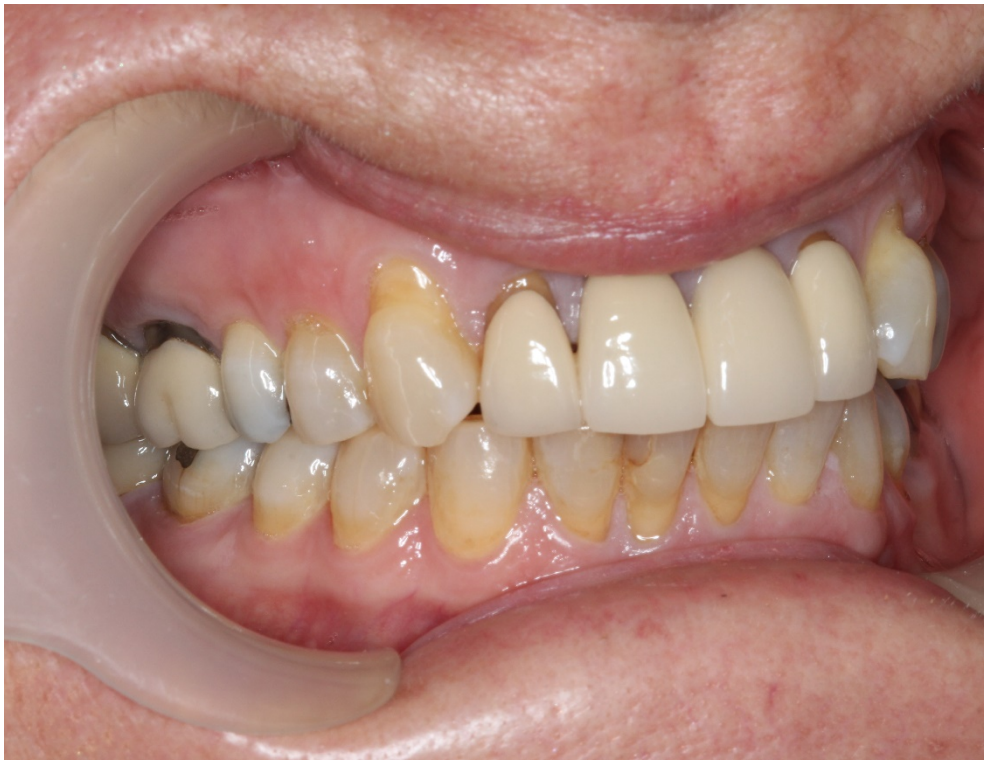
RESPIRATORY AND SLEEP PHYSICIAN

INTRA-ORAL PHOTOS

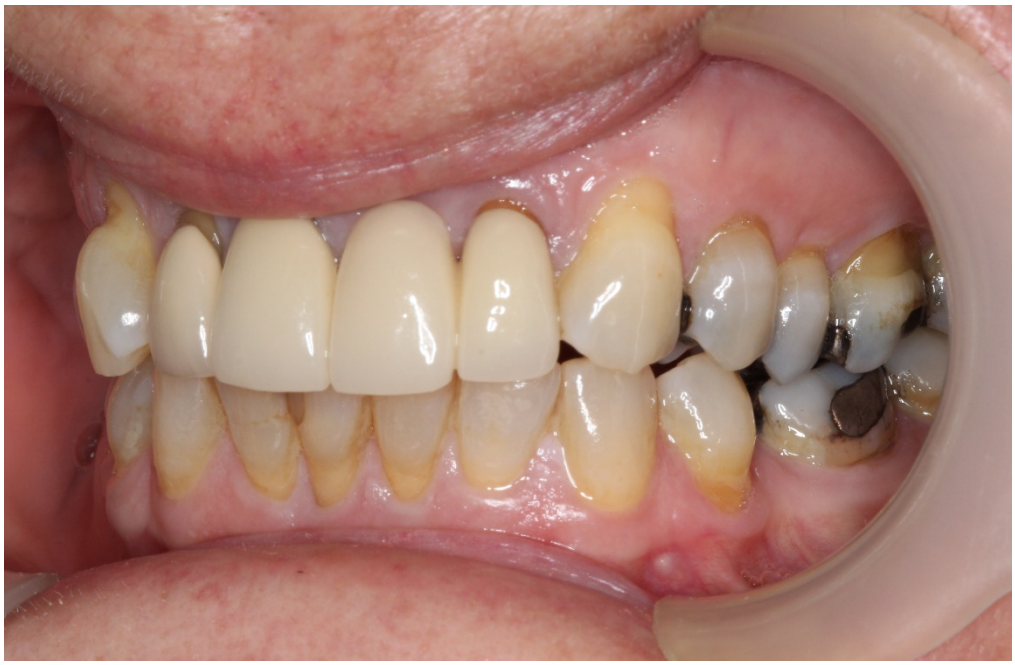
ANTERIOR VIEW in occlusion



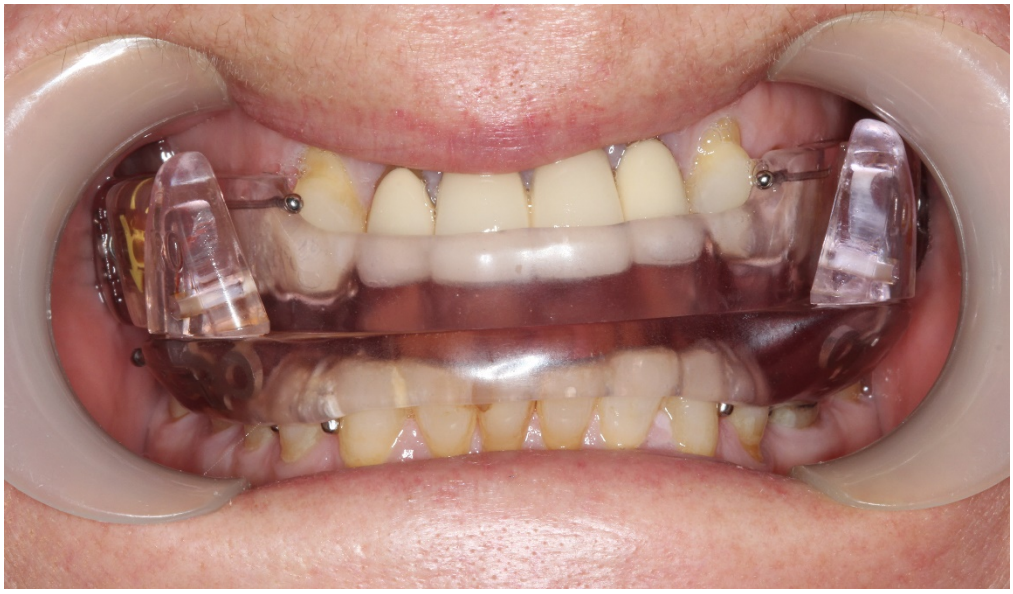
RIGHT LATERAL VIEW in occlusion



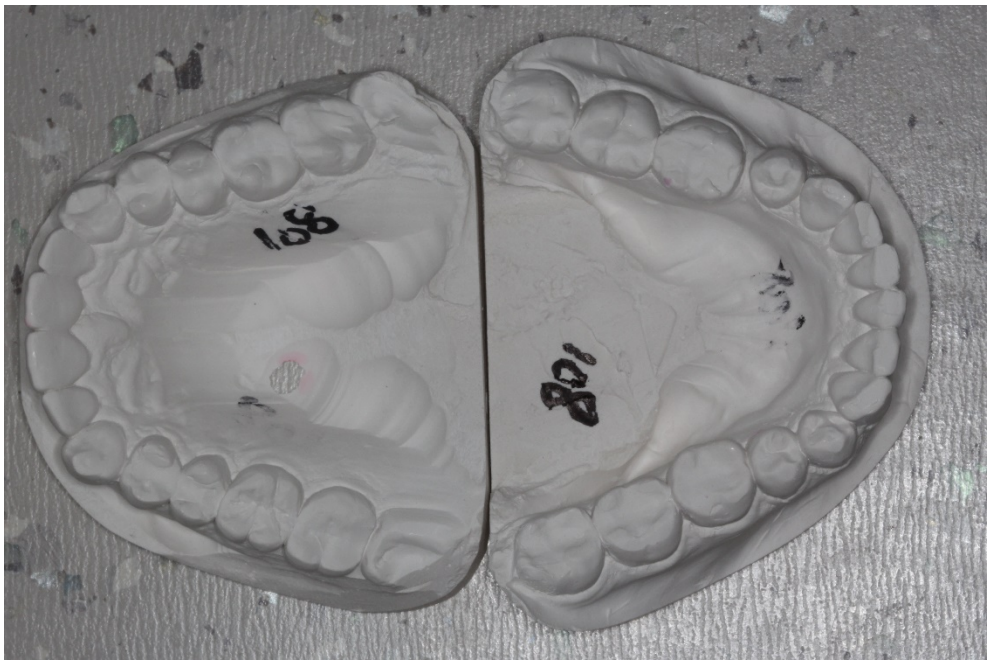
LEFT LATERAL VIEW in occlusion



ANTERIOR VIEW with appliance

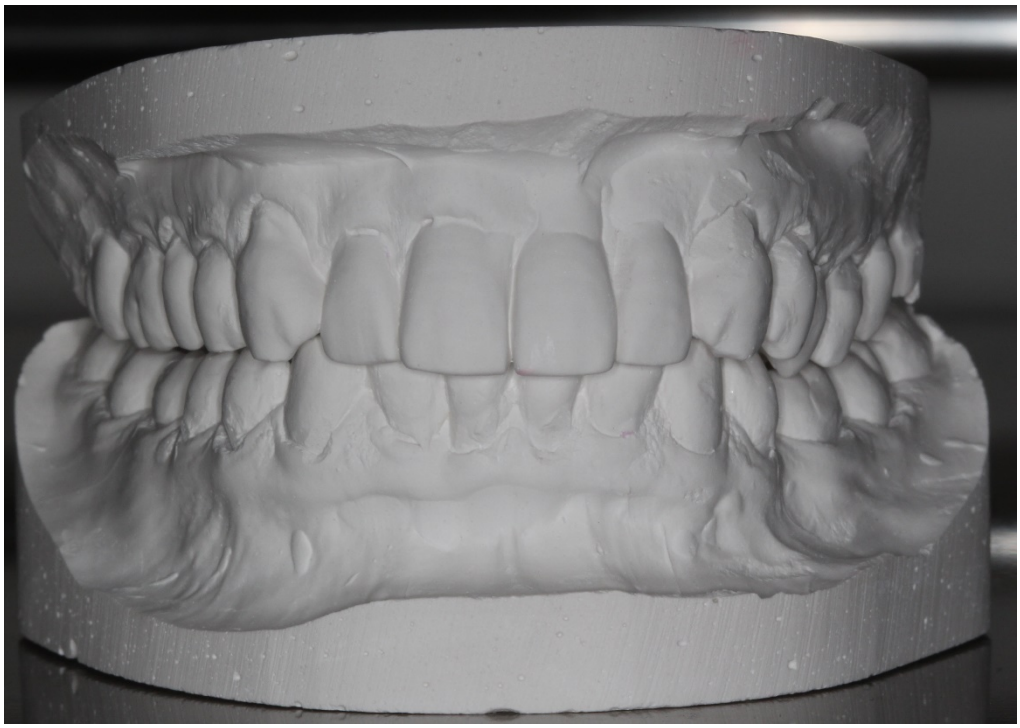


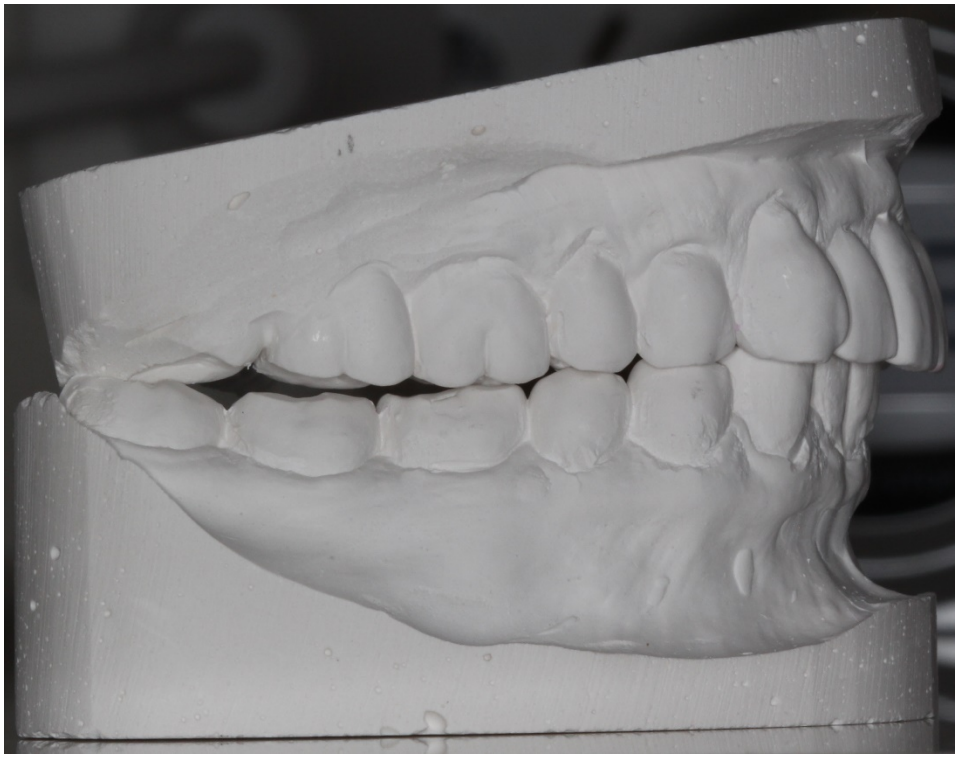
OCCLUSAL VIEW of models



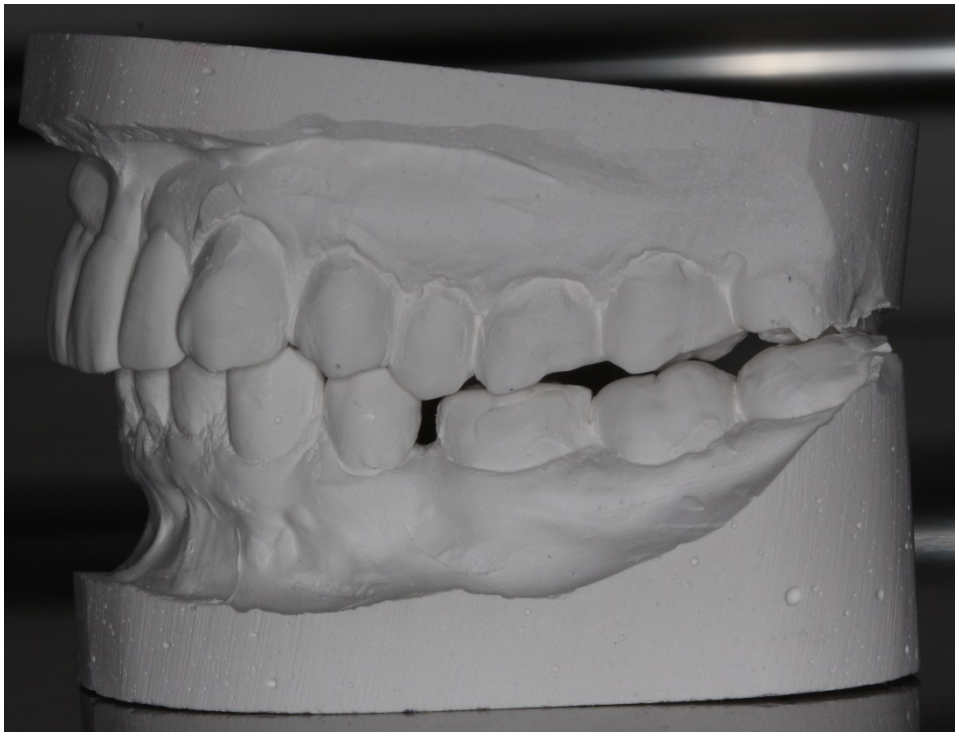
OCCLUSAL VIEW of models with MAS

ANTERIOR VIEW of models

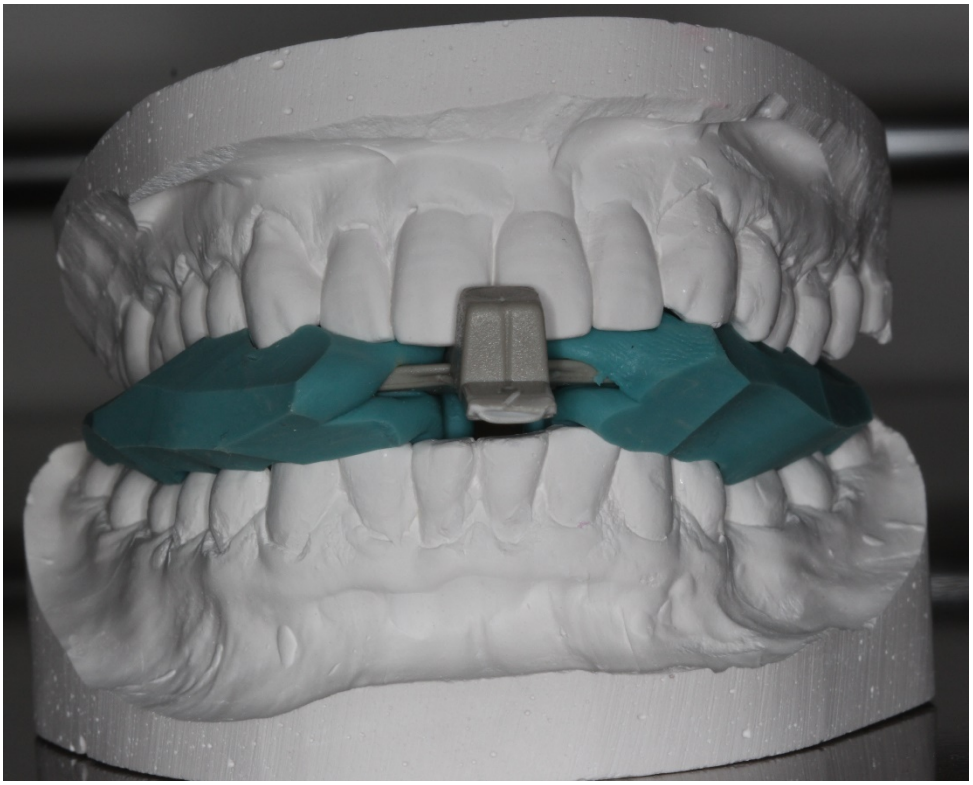




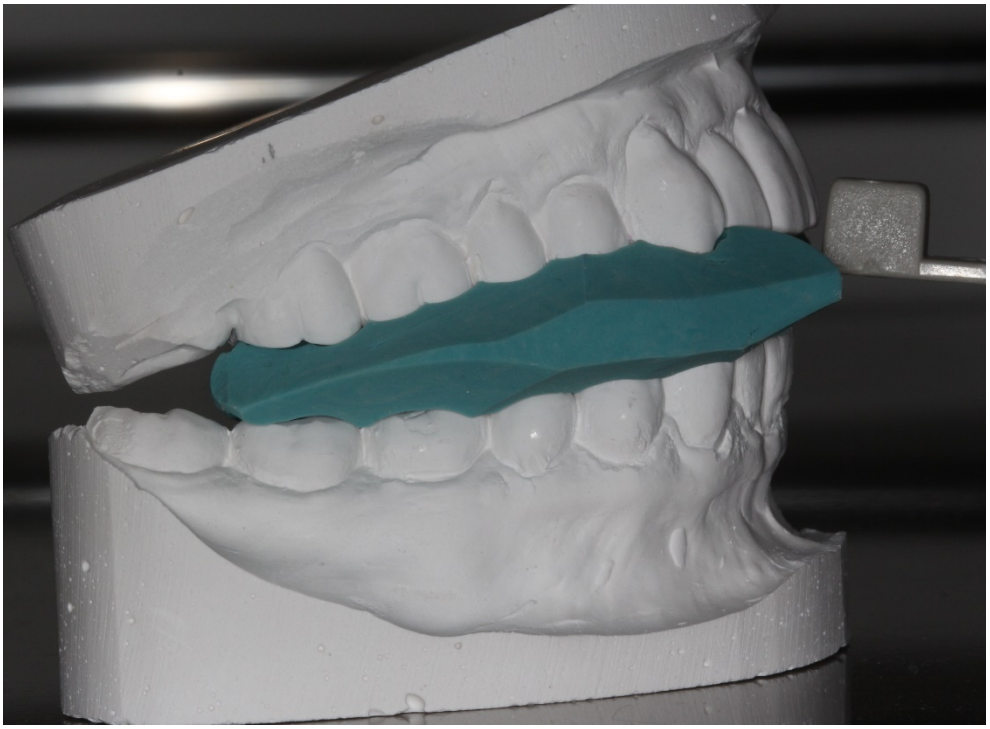
LEFT LATERAL VIEW of models



ANTERIOR VIEW of bite registration



RIGHT LATERAL VIEW of bite registration



LEFT LATERAL VIEW of bite registration