

SNORING – A ROLE FOR THE GDP

PROF AMA JOHAL



SNORING – A ROLE FOR THE GDP

Overall aims:

- Overview of sleep-related breathing disorders (SBD)
- Overview of mandibular advancement splints
- Communicating your role & clinician support



SNORING – A ROLE FOR THE GDP

Specific objectives:

- Understand the **management of sleep-related breathing disorders**
- Understand the role of MAS
- Perform a subjective assessment & examination for a patient presenting in your surgery
- Prescribe a MAS & follow up care.



SLEEP-RELATED BREATHING DISORDERS

- Spectrum of SBD
- Aetiology
- Clinical features
- Diagnosis
- Management

SLEEP-RELATED BREATHING DISORDERS

Simple (non-apnoeic) snoring:

- Snoring is more than a loud noise!
- Anti-social nature
- Evidence that bed **partners have increased risk** of Type II diabetes and cardiovascular disease.



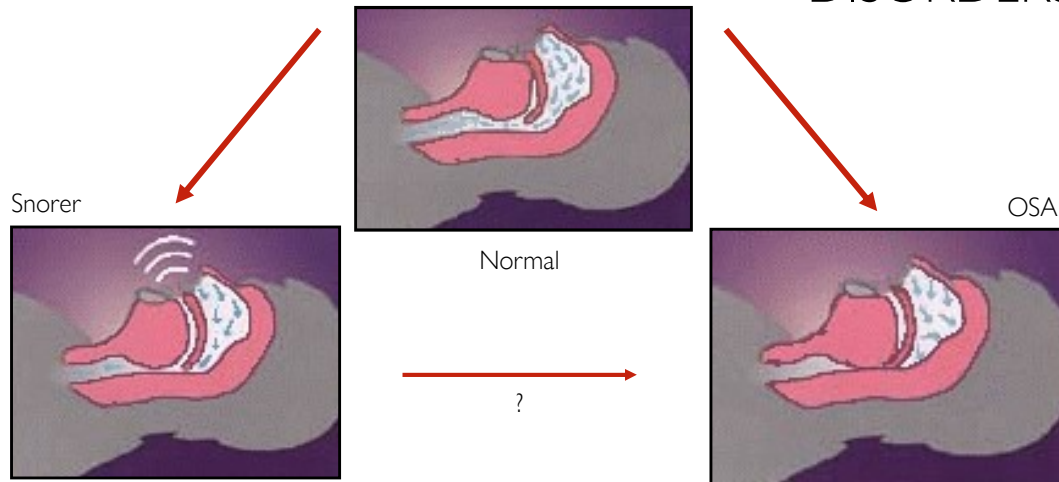
SLEEP-RELATED BREATHING DISORDERS

Obstructive sleep apnoea:

- Potentially life-threatening breathing disorder
- Definition: Apnoea/Hypopnoea (AHI)



SLEEP-RELATED BREATHING DISORDERS



PREVALENCE OF SBD

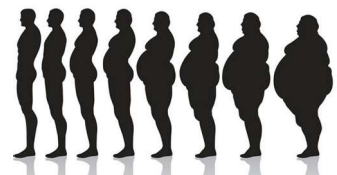
Snoring:

- Habitual/intermittent – 40% of the adult population
- However... "42% of people who snore or whose partner snores have not heard of OSA"

OSA:

Estimated 1.5 million adults (UK), yet up to 85% are undiagnosed, therefore untreated www.blf.org.uk/OSA

- 4 [13 USA] % middle-aged males
- 2 [6 USA] % middle-aged females



GENDER DIFFERENCE

Male : Female > 3:1

Anatomical:

- BMI/neck circumference

Physiological:

- Hormonal influence
- Menopausal change



"Well, Mr Jones, your lab results are fine except your Testosterone levels are a tad high"

AETIOLOGY

Complex and multi-factorial:

- Anatomical features
- Patho-physiological features
- Genetics
- Aggravating factors



ANATOMICAL FACTORS: SKELETAL

- Reduced cranial base length
- Reduced maxillary length
- Reduced mandibular body length
- Reduced inter-maxillary space



ANATOMICAL FACTORS: SOFT TISSUE

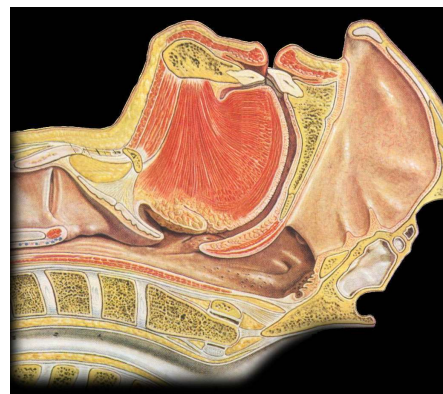
Reduced airway width:

- Velo-pharynx
- Oro-pharynx
- Hypo-pharynx

Tongue

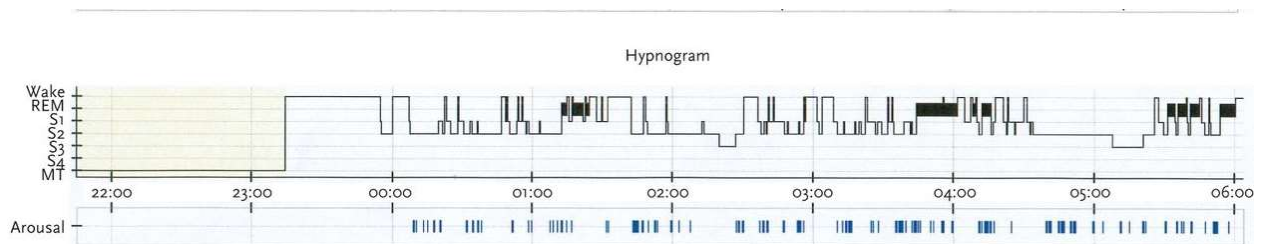
Soft palate

- Enlarged
- Longer



PATHO-PHYSIOLOGICAL FACTORS

Sleep stages: W – N1 – 3 & R

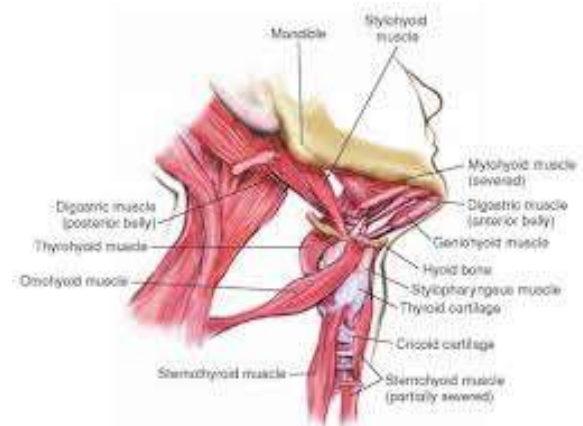


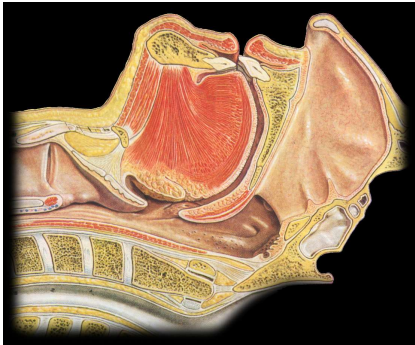
PATHO-PHYSIOLOGICAL FACTORS:

Sleep stages: W – N1 – 3 & R

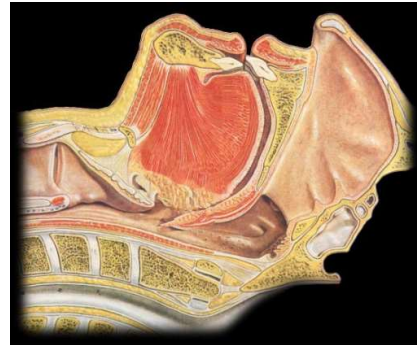
Functional impairment of **upper dilating muscles:**

- Hyoid bone position
- Tongue
- Palatal muscles





Patent airway



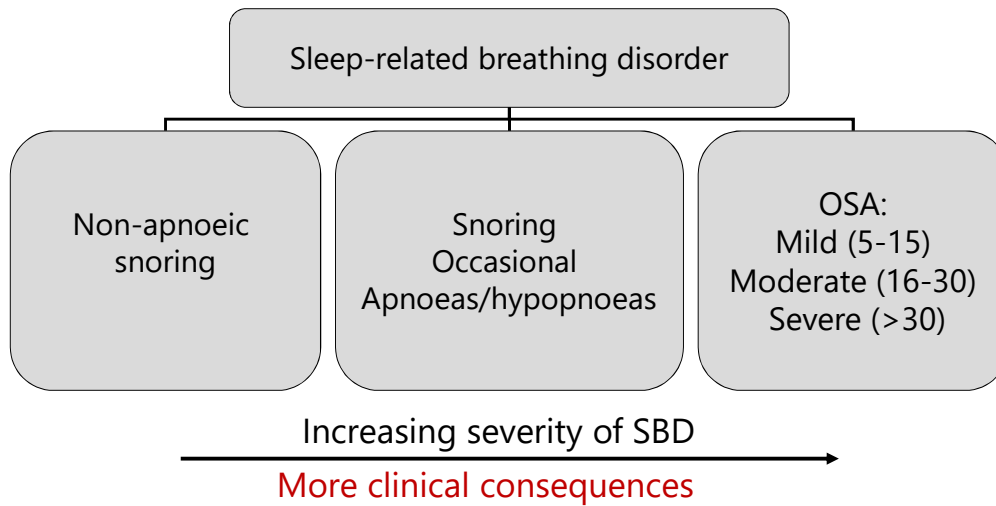
Snoring and/or airway obstruction

AGGRAVATING FACTORS

- Sleeping position
- Alcohol/CNS depressants
- Smoking
- Pre-existing pulmonary disorders
- Obesity (neck circumference/BMI)



SYMPTOMS



NOCTURNAL SYMPTOMS

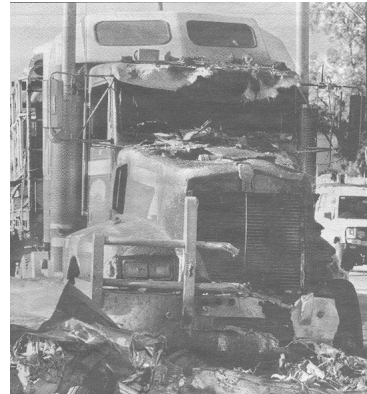
Cardinal symptoms of OSA:

- Snoring
- Snorting/gasping
- Stops breathing
- Involuntary leg movements
- Nocturia

DAYTIME SYMPTOMS

Excessive daytime sleepiness:

- Poor overall performance
- Inability to concentrate
- Poor memory
- Headaches
- Depression



*'Truckie fell asleep
and Killed two.....'*

MEDICAL COMPLICATIONS

Raised blood pressure (risk of heart disease) **>35%** OSA suffers

83% of patients with high BP (take 3 or more drugs) also have OSA!

Increased risk of diabetes

70% of patients suffered from a stroke have OSA.



DIAGNOSIS

- History (including sleeping partner)
- Questionnaires
- Examination
- Special investigations



HISTORY – INCL. SLEEP PARTNER

Patient/partner complaints

General medical health:

- Pre-existing breathing disorders
- Medication
- Cardiac anomalies/hypertension
- Metabolic disorders (diabetes; thyroid)

Previous investigations/treatment.

EPWORTH SLEEPINESS SCALE

How **likely** are you to **doze off or fall asleep** in the following situations (in contrast to feeling just tired)?

Use the scale to choose the most appropriate number for each situation:

0 = Would NEVER doze 2 = MODERATE chance of dozing
1 = SLIGHT chance of dozing 3 = HIGH chance of dozing

Situation	Chance of dozing	
Sitting and reading		< 8 = Normal 10-14 = Mild EDS 15-18 = Moderate EDS > 18 = Severe EDS
Watching TV		
Sitting, inactive in a public place (e.g. a theatre or a meeting)		
As a passenger in a car for an hour without a break		
Lying down to rest in the afternoon when circumstances permit		
Sitting and talking to someone		
Sitting quietly after lunch without alcohol		
In a car, while stopped a few minutes in the traffic		
TOTAL SCORE		

SNORING QUESTIONNAIRE

How would you rate your quality of sleep (tick one box)?

Good ☐ Average ☐ **Poor** ☐

How would you rate the quality of sleep of your partner (the Patient)?

Good ☐ Average ☐ **Poor** ☐

How would you rate the severity of your partner's snoring (tick one box only)?

No snoring ☐ Mild snoring ☐
Moderate snoring ☐ Loud snoring ☐
Very loud snoring ☐

'Impossible to be in the same bed or on same floor - Even then vibrates through the floor & my entire spine!!!!'

Does your partner's snoring disturb your sleep (tick one box only) ?

Never ☐ Hardly ever ☐
Sometimes ☐ Usually ☐
Always ☐

EXAMINATION

ENT examination:

- Identify any physical obstructions

Body Mass Index (BMI):

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{Height}^2 \text{ (metres)}}$$

Neck circumference.



I.O. CLINICAL FEATURES

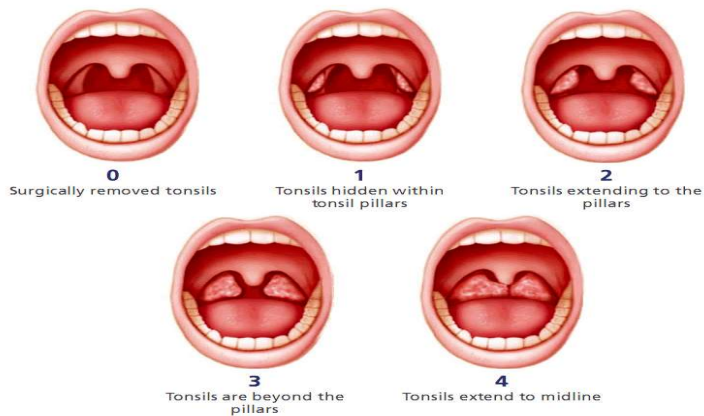
Soft palate and Uvula: elongated/floppy

Mallampati Score



I.O. CLINICAL FEATURES

Tonsillar assessment:



POLYSOMNOGRAPHY (PSG)

- Type, frequency & duration (AHI)
- Oxygen saturation
- Sleep sounds
- Oral and nasal flow
- Brain, heart, muscle and eye activity
- Abdominal & thoracic respiration

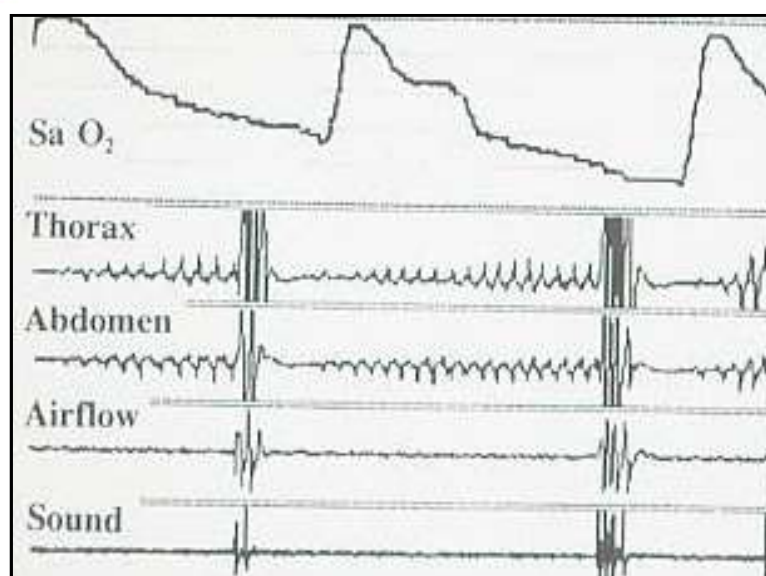
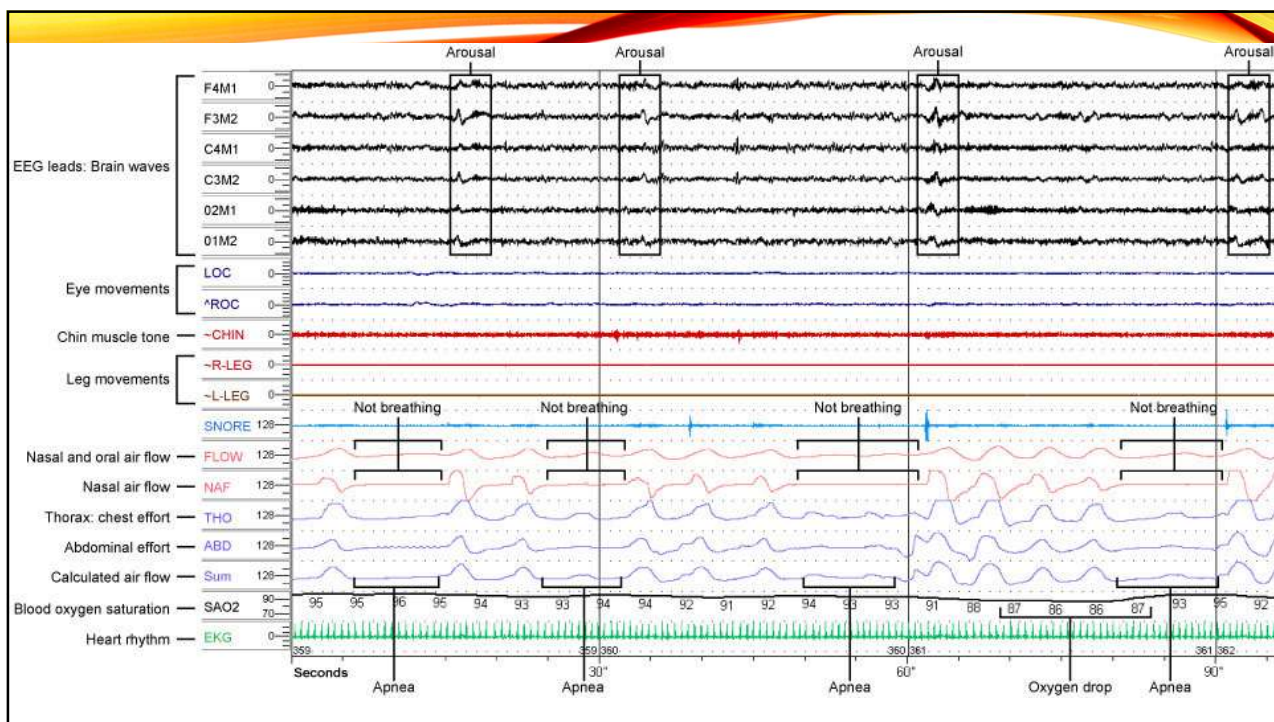
However...





DOMICILIARY SLEEP STUDY







MANAGEMENT OF OSA

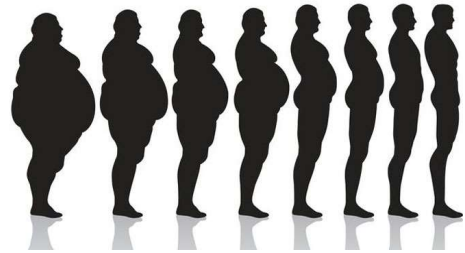
Multi-disciplinary Team Approach:

- Thoracic physician
- ENT surgeon
- Orthodontist/Dentist
- (Oral Surgeon).



NON-SURGICAL THERAPY

- Behavioural modification
- Continuous positive airway pressure (CPAP)
- Intra-oral mandibular advancement splints [MAS].



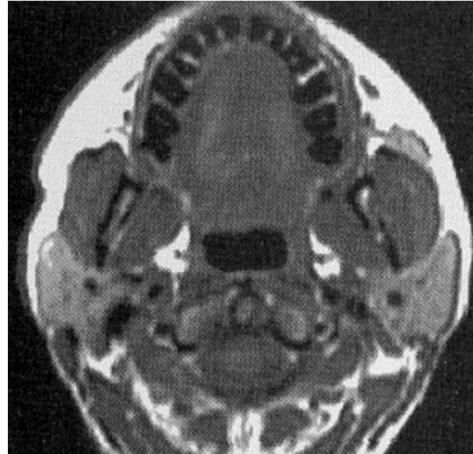
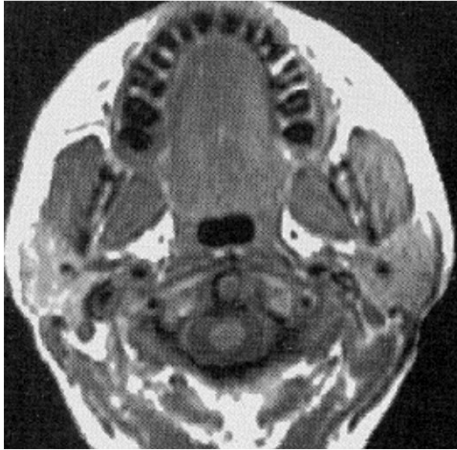
BEHAVIOURAL MODIFICATION

Elimination of **aggravating factors**:

- Weight loss
- Eliminate alcohol and sedatives before sleep
- Quit smoking
- Avoid sleeping on back.



BEHAVIOUR THERAPY



BEHAVIOUR THERAPY



CONTINUOUS POSITIVE AIRWAY PRESSURE [CPAP]

CPAP is 'Gold standard'

Significant reversal of symptoms

Maintains airway patency

To be effective:

- 4 to 6 hours per night
- Seven days a week

Disadvantages!



CONTINUOUS POSITIVE AIRWAY PRESSURE

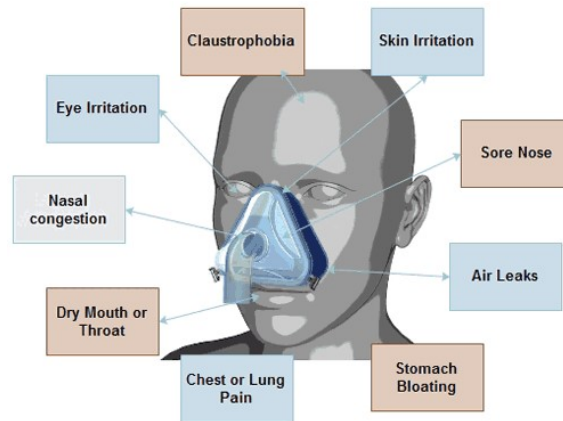


0 cm H₂O



15 cm H₂O

CONTINUOUS POSITIVE AIRWAY PRESSURE [CPAP]

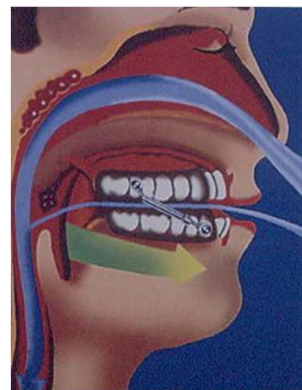


Which One is
Right for You?



MANDIBULAR ADVANCEMENT SPLINTS [MAS]

- Rationale for their use
- Patient selection
- Design features
- Clinical evidence of success
- Advantages
- Disadvantages



SURGICAL THERAPY

- Tracheostomy
- Nasal surgery
- Pharyngeal surgery
- Maxillo-facial surgery
- Tongue base resection.

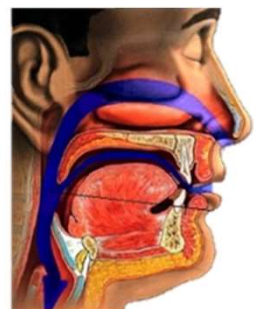
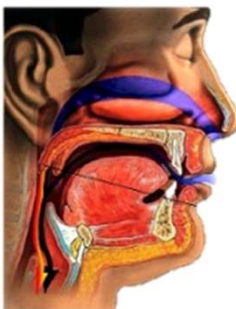


RATIONALE FOR MAXILLO-FACIAL [MANDIBULAR ADVANCEMENT] SURGERY

Anatomical:

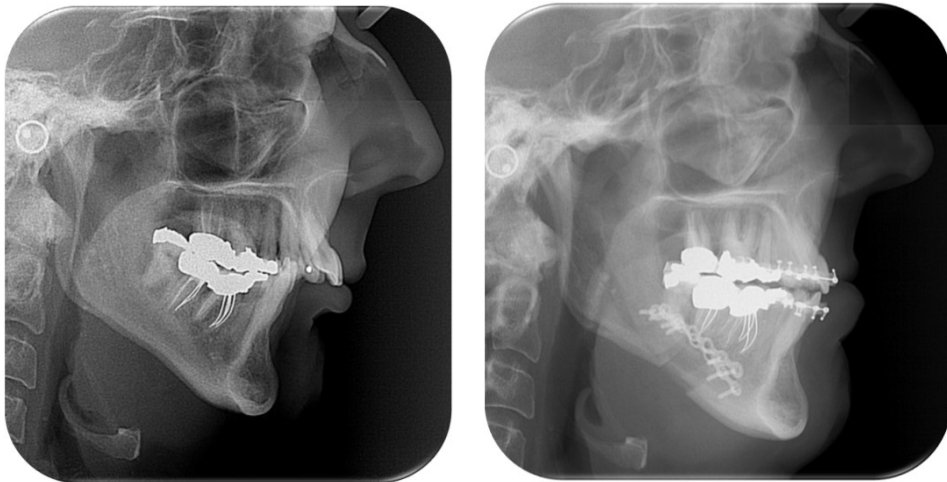
Increase size pharyngeal airway:

- Post-lingual
- Post-palatal (more significant).





RATIONALE FOR MAXILLO-FACIAL [MANDIBULAR ADVANCEMENT] SURGERY



CLINICAL EVIDENCE FOR MAXILLA-FACIAL SURGERY

HOLTY & GUILLEMINAULT SYSTEMATIC REVIEW & META-ANALYSIS, 2010

Most patients reported:

- Improved quality of life & daytime sleepiness
- Improved objective measures @ follow-up (5.3 months)
- Generally safe procedure
- No RCT's (before & after case series design)
- Limited long-term follow-up (significant limitation).

SURGICAL THERAPY FOR SNORING

1. Uvulopalatopharyngoplasty (UPPP)

5-46% successful for snoring BUT...

Haemorrhage, acute respiratory failure; Pain, nasal regurgitation, swallowing problems, speech disturbances.

2. Radiofrequency thermal ablation

3. Laser assisted uvuloplasty (LAUP)

4. Pillar implants

55-90% successful for snoring.





QUESTIONS?



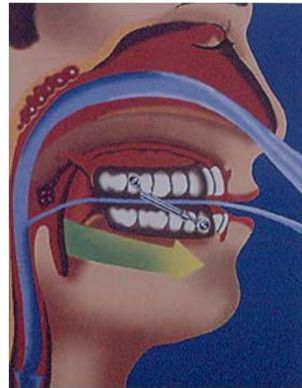
SNORING – A ROLE FOR THE GDP

Specific objectives:

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- Understand the **role of MAS**
- Perform a subjective assessment & examination for a patient presenting in your surgery
- Prescribe a MAS & follow up care.

MANDIBULAR ADVANCEMENT SPLINTS [MAS]

- Rationale for their use
- Patient selection
- Design features
- Clinical evidence of success
- Advantages
- Disadvantages.



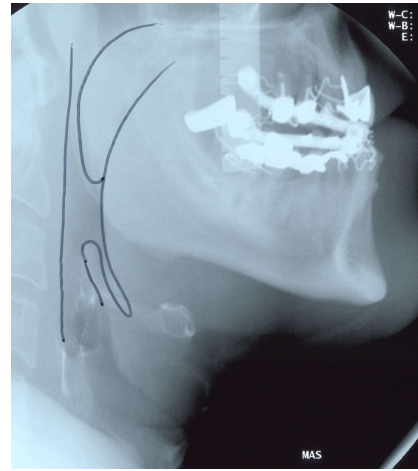
RATIONALE FOR USE

- Anatomical:
 - Increase size pharyngeal airway:
 - Post-lingual
 - Post-palatal
- Reduce airway collapsibility
- Physiological
- Airway visualisation.

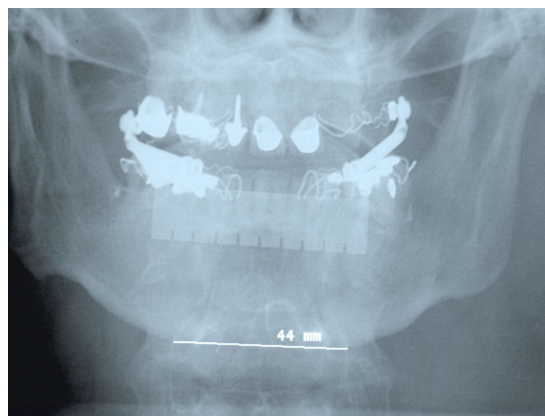
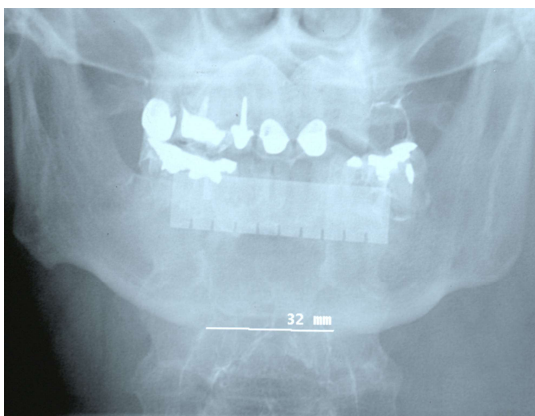


3-D VIDEO FLUOROSCOPY: ANTERO-POSTERIOR

JOHAL ET AL., EUR J ORTHO, 2010



3-D VIDEO FLUOROSCOPY: TRANSVERSE

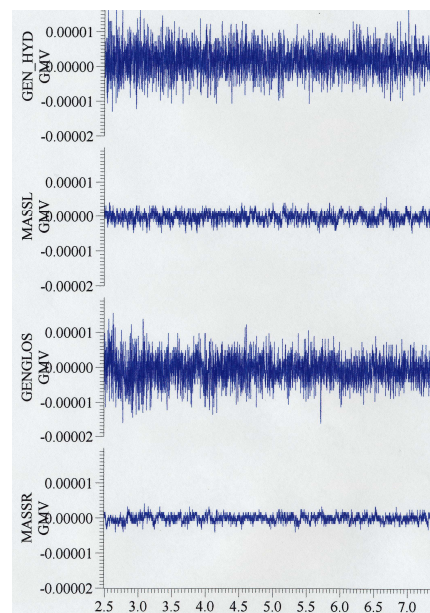
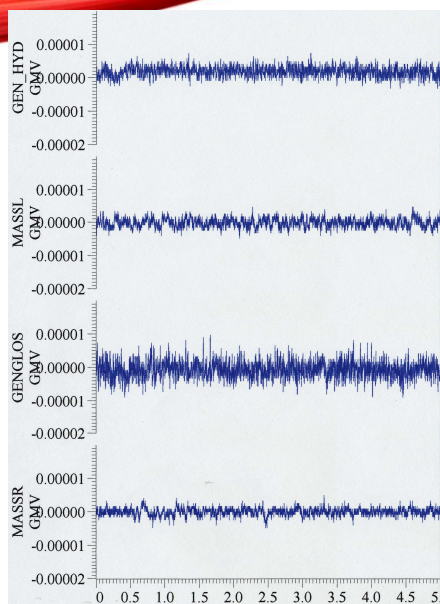


PHYSIOLOGICAL ROLE

JOHAL ET AL., CLIN PHYSIOL FUNC IMAGING, 2006

Aims of this prospective cohort study were to investigate the impact of mandibular advancement splints on:

- Genioglossus muscle (GG) activity
- Geniohyoid muscle (GH) activity
- Masseter muscle (MM) activity.



CONCLUSION

JOHAL ET AL., CLIN PHYSIOL FUNC IMAGING, 2006

- Mandibular advancement splints appear to have a **significant impact** on upper airway dilatory muscle activity
- These findings provide evidence to **support** a possible **physiological role** in their mode of action.



PATIENT SELECTION

SIGN Recommendations of use of MAS (2003):

- Intra-oral devices are an **appropriate** therapy for **snorers** and for patients with **mild OSAHS with normal daytime alertness**.
- Intra-oral devices are an **appropriate alternative** therapy for patients who are unable to tolerate N-CPAP.

PATIENT SELECTION

AASM Recommendations on use of MAS (2015):

- Non-apnoeic snoring
- Mild to moderate OSA – Prefer MAS; intolerant of OR refuse nasal – CPAP
- Severe OSA – ALWAYS nasal-CPAP trial – intolerant of OR refuse it

OR not suitable candidates for surgery.



PATIENT SELECTION DRUG-INDUCED SEDATION ENDOSCOPY [DISE]:

- Pharmacological-induced sleep, with simultaneous airway visualisation
- Dynamic evaluation of the pharyngeal airway
- Simulate mandibular advancement and observe the effect on airway patency & snoring [Johal et al., Eur J O, 2006].





MAS TREATMENT OBJECTIVES

- Snorers: To reduce the snoring to a subjectively acceptable level
- OSA: The resolution of clinical signs and symptoms, with normalization of the AHI and oxyhaemoglobin saturation.



CUSTOM-MADE VS 'OFF THE SHELF'

VANDERVEKEN ET AL., 2007 AJRCCM

- A RCT cross-over trial – SDB
- **AHI** only reduced by custom-made MAS (success rate 60% vs. 31%)
- **Snoring** reduced greater extent by CM device
- One-third patients demonstrated **compliance** (retention) failure with the 'off the shelf' MAS.

CUSTOM-MADE VS 'OFF THE SHELF'

JOHAL ET AL., 2017 JCSM

- Randomised cross-over trial, Subjects confirmed diagnosis of **OSA**
- Randomly assigned to customised MAS or 'off the shelf' OA
- Each treatment arm lasted 3 months [two week wash out period].



RESULTS

JOHAL ET AL., 2017 JCSM

Objective assessment of OSA – **AHI**

	Median AHI
Baseline	13.4
After use of customised MAS	4.0
After use of 'off-the-shelf' MAS	9.6

Complete response 64% vs. 24%

RESULTS

JOHAL ET AL., 2017 JCSM

Subjective [daytime sleepiness] - ESS

	Median AHI
Baseline	11
After use of customised MAS	5
After use of 'off-the-shelf' MAS	7

RESULTS

JOHAL ET AL., 2017 JCSM

Appliance adherence

Mean number of nights per week used	
Customised MAS	7
'Off-the-shelf' OA	3

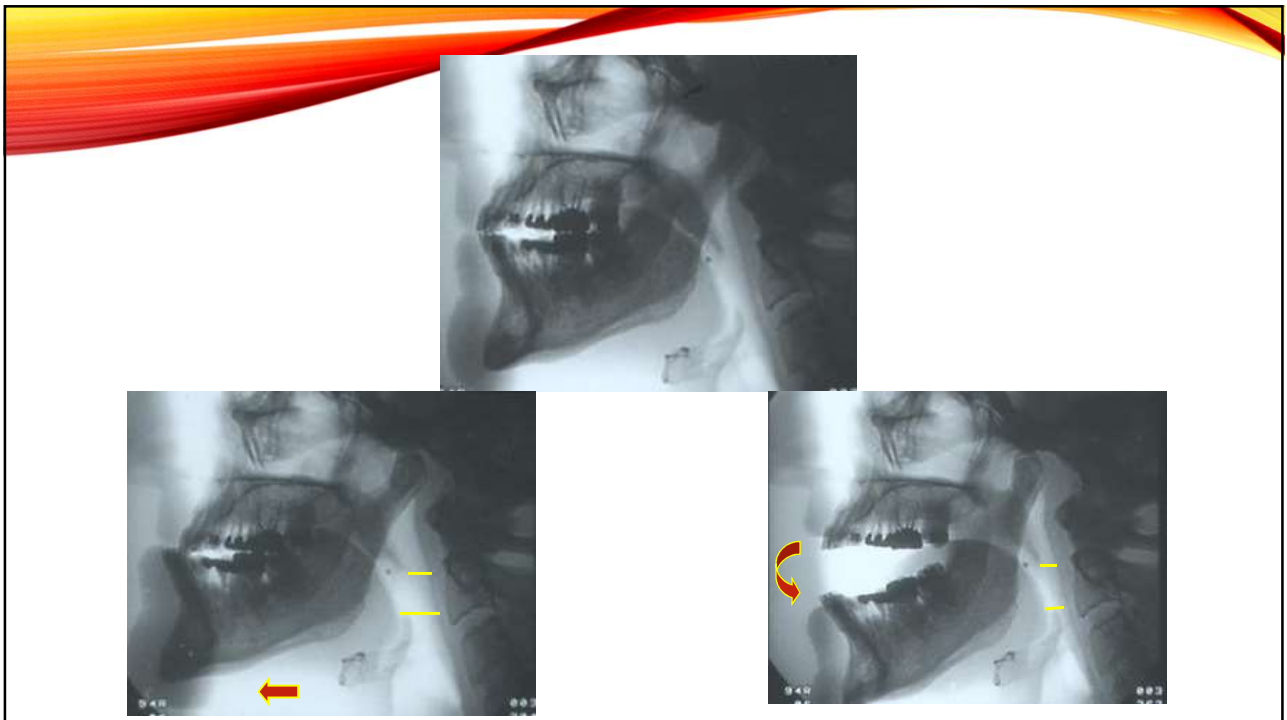
Mean number of hours per night used	
Customised MAS	5
'Off-the-shelf' OA	3

Preference: 21 Custom vs. 1 off-shelf

OPTIMAL DESIGN FEATURES OF MAS

JOHAL & BATTAGEL, 2001 BDJ; JOHAL 2009 DENTAL UPDATE

- Good retention
- Full occlusal coverage
- Self-adjustable – incremental advancement
- Minimal vertical opening
- Minimal chairside time
- Robust (bruxism)
- Clinically proven.



1ST GENERATION APPLIANCES

Vacuum formed splints:

- ✗ Good retention
- ✓ Full occlusal coverage
- ✗ Self-adjustable
- ✗ Minimal vertical opening
- ✓ Minimal chairside time
- ✗ Robust (bruxism)
- ? Clinically proven.



2ND GENERATION APPLIANCES

TheraSnore Zx appliance:

- ✗ Good retention
- ✓ Full occlusal coverage
- ✓ Self-adjustable
- ✗ Minimal vertical opening
- ✗ Minimal chairside time
- ✗ Robust (bruxism)
- ✗ Clinically proven.



2ND GENERATION APPLIANCES

Silensor appliance:

- ✓ Good retention
- ✓ Full occlusal coverage
- ✗ Self-adjustable
- ✗ Minimal vertical opening
- ✗ Minimal chairside time
- ✗ Robust (bruxism)
- ✗ Clinically proven.



2ND GENERATION APPLIANCES

Herbst appliance:

- ✓ Good retention
- ✓ Full occlusal coverage
- ✗ Self-adjustable
- ✓ Minimal vertical opening
- ✗ Minimal chairside time
- ✗ Robust (bruxism)
- ✓ Clinically proven.



3RD GENERATION APPLIANCES

Sleepwell (MDSA):

- ✓ Good retention
- ✓ Full occlusal coverage
- ✓ Self-adjustable
- ? Minimal vertical opening
- ✓ Minimal chairside time
- ✓ Robust (bruxism)
- ✓ Clinically proven.



To engage, advance lower jaw.



Self-adjust for activation, up to 9mm adjustment.

←
R Lateral



→
L Lateral



CLINICAL EVIDENCE: MAS SUCCESS

Cochrane review: Lim et al., 2009:

- Improve subjective sleepiness & indices of SDB over an **inactive** control
- CPAP achieves greater improvement in AHI
- Patients **preferred** OA over CPAP
- OA offered to patients with **mild OSAHS** & those unwilling or unable to tolerate CPAP.

CLINICAL EVIDENCE: MAS SUCCESS

JOHAL ET AL., 2017 JCSM

Study design:

- Prospective, non-randomised controlled clinical trial

Subjects and methods:

- All subjects were diagnosed in a sleep clinic
- 215 consecutively referred subjects for MAS therapy (test group 120; control group 95)
- All test subjects demonstrated favourable SNE findings and received a removable Herbst MAS.

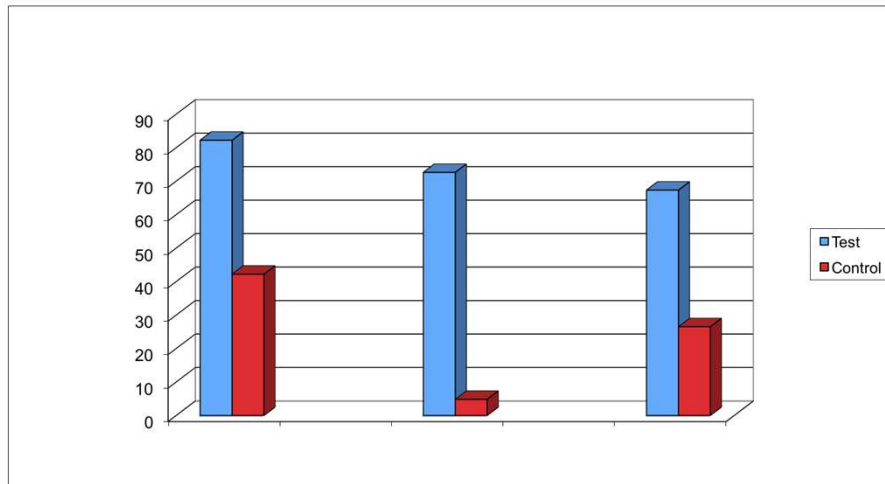
Main outcome measurements:

- Subjective (patient and sleeping partner q's)
- Objective (repeat sleep study with MAS in-situ).



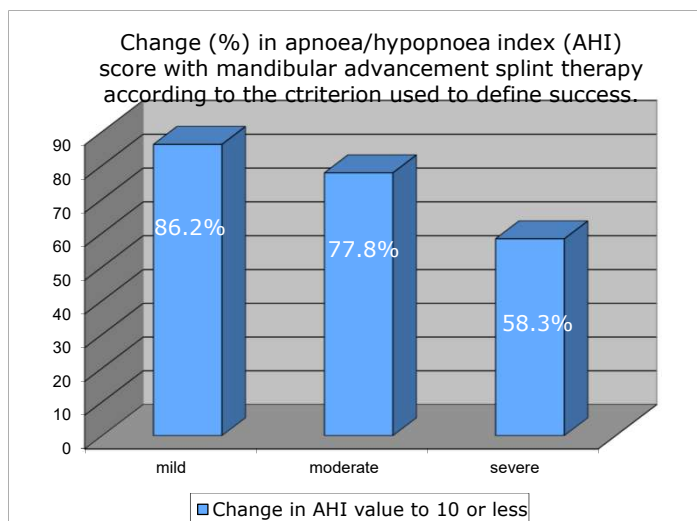
CLINICAL EVIDENCE: MAS SUCCESS

JOHAL ET AL., 2017 JCSM



CLINICAL EVIDENCE: MAS SUCCESS

JOHAL ET AL., 2017 JCSM



RCT OF NASAL-CPAP & MAS IN MILD-MODERATE OSA

Barnes et al. 2004

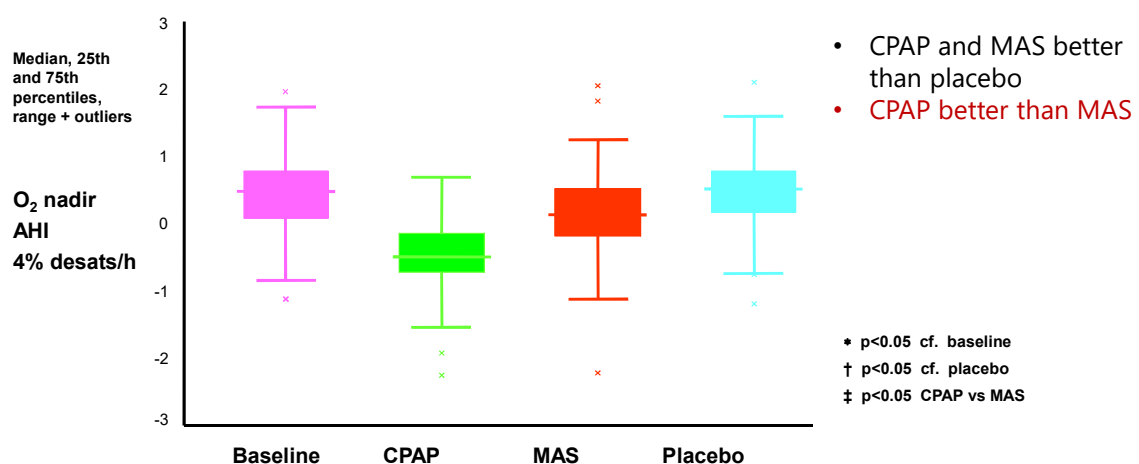
Study design:

- Randomized Controlled Crossover Trial

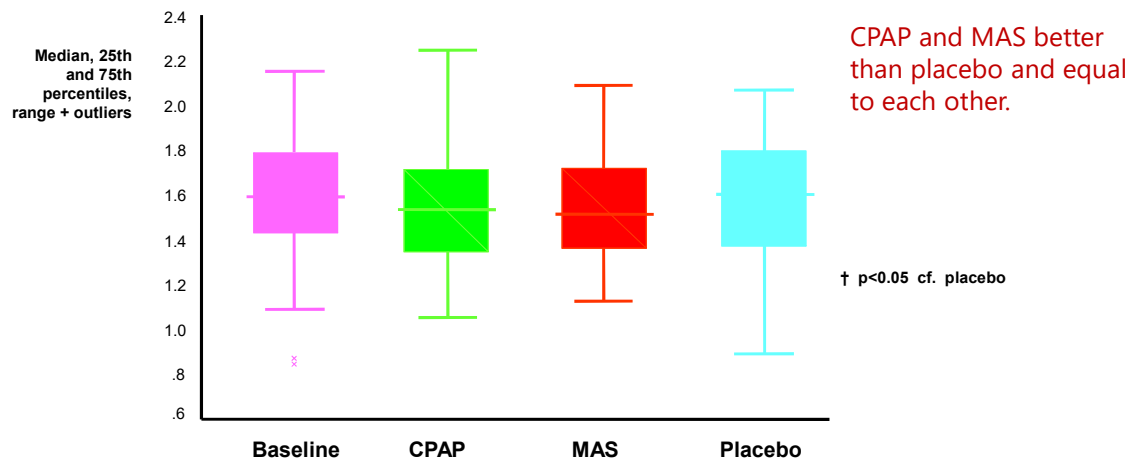
Subjects:

- 80 (114) Sleep Clinic subjects
- 3 months treatment with each of:
CPAP
MAS
Oral Placebo Tablet.

OBJECTIVE OUTCOMES



SLEEPINESS/QOL



CONCLUSIONS

BARNES ET AL., 2004

- CPAP & MAS are effective
- CPAP has greater SDB effect
- MAS improves nocturnal blood pressure pressure dip

ADVANTAGES OF MAS

- Clinically effective in SBD:
 - Snoring
 - AHI / ESS
 - Sleep quality
 - Blood pressure.
- Non-invasive and reversible
- Relatively inexpensive and quiet
- Travel
- Good overall compliance.



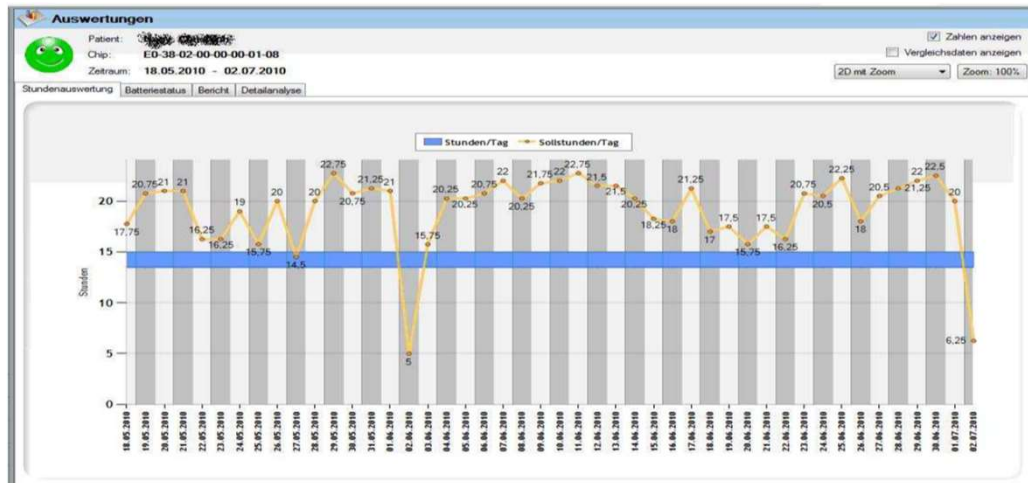
ADHERENCE MONITOR FOR MAS

JOHAL ET AL., 2016



ADHERENCE MONITOR FOR MAS

JOHAL ET AL., 2016



EFFICACY OF MAS IN FAILED CPAP

JOHAL ET AL., JSDM, 2016

Treatment outcomes with MAS therapy in relation to objective and subjective measures (n=42).

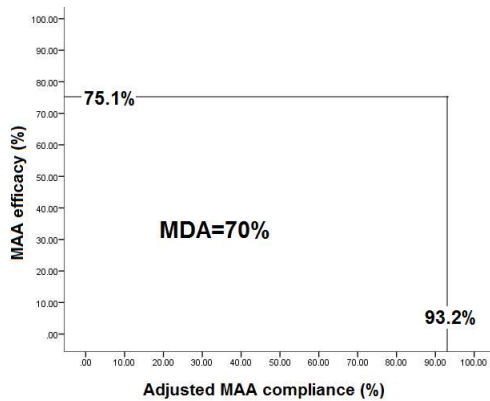
Variable	Pre-treatment	Post-treatment	p Value
Apnoea-hypopnoea index (events/hour)	21.0 (10.3)	4.7 (3.0)	p<0.001
Therapeutic efficacy (%)*		75%	
Mean disease alleviation (%) **		70%	
Epworth sleepiness scale	11.8 (5.1)	7.2 (3.3)	p<0.001



EFFICACY OF MAS IN FAILED CPAP

JOHAL ET AL., JSDM, 2016

Treatment outcome in relation to **MEAN Disease Alleviation** [MDA] as a measure of true therapeutic efficiency c.f. **51%** CPAP [low acceptance].



DISADVANTAGES MAS

Short-term problems:

- [Discomfort in muscles of mastication]
- [Excess salivation/[dry mouth]
- Abnormal bite on awakening.

Potential later complications:

- Changes in occlusion
- [TMJ discomfort]
- [Increase in OSA severity].



DISADVANTAGES MAS

Potential later complications:

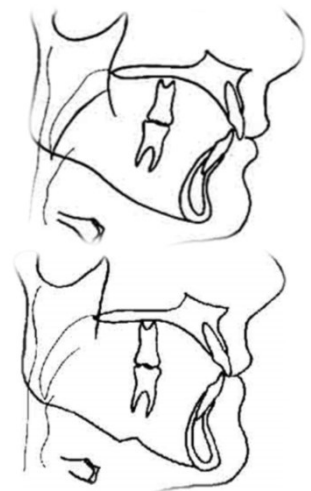
- Changes in occlusion



DISADVANTAGES MAS

Changes in occlusion:

- % change increases to a peak [2-3 yrs]
- Reduction in OB (1.82 mm) & OJ
- Mesial movement lower molar
- Proclination lower incisors (4.9°; 1mm).



CONCLUSIONS

- MAS therapy has a **key role** to play in sleep-related breathing disorders
- Management of **OSA** should focus around a Multidisciplinary team approach
- Appropriate **follow-up** is needed to ensure therapeutic success.



QUESTIONS?

SNORING – A ROLE FOR THE GDP

Specific objectives:

- Understand the management of sleep-related breathing disorders
- Understand the role of MAS
- Perform a **subjective assessment & examination** for a patient presenting in your surgery
- Prescribe a MAS & follow up care.

THE ROLE OF THE HYGIENIST

Risk factors sleep-disordered breathing:

- Epidemiology of SDB
- Symptoms

Role of **screening**:

- History
- Clinical manifestations
- Screening tools.



THE ROLE OF THE HYGIENIST

Risk factors sleep-disordered breathing:

- Epidemiology of SDB
- Symptoms

Role of screening:

- History
- Clinical manifestations
- Screening tools.



THE ROLE OF THE HYGIENIST

Risk factors sleep-disordered breathing:

- Epidemiology of SDB
- Symptoms

Role of screening:

- History
- Clinical manifestations
- Screening tools.



ROLE OF SCREENING

- Estimated **1.5 million adults** in the UK, and yet up to **85%** are undiagnosed, therefore untreated www.blf.org.uk/OSA.
- History [questionnaires]
- Clinical examination.



SCREENING: PRE-TREATMENT HISTORY

Subject demographics: **Male**

Nasal symptoms

General medical health:

- Pre-existing breathing disorders: Asthma [1.7 more likely develop OSA]
- **Cardiac anomalies** [angina, MI]
- **Hypertension**
- **Thyroid disease/Diabetes**
- Medication: Sedatives/antidepressants
- Alcohol consumption (U/week)
- Smoking (per day).



SNORING QUESTIONNAIRE

How would you rate your quality of sleep (tick one box)?

Good ☐ Average ☐ **Poor** ☐

How would you rate the quality of sleep of your partner (the Patient)?

Good ☐ Average ☐ **Poor** ☐

How would you rate the severity of your partner's snoring (tick one box only)?

No snoring ☐ Mild snoring ☐

Moderate snoring ☐ Loud snoring ☐

Very loud snoring ☐

Does your partner's snoring disturb your sleep (tick one box only) ?

Never ☐ Hardly ever ☐

Sometimes ☐ Usually ☐

Always ☐

THE ROLE OF THE HYGIENIST

Risk factors sleep-disordered breathing:

- Epidemiology of SDB
- Symptoms

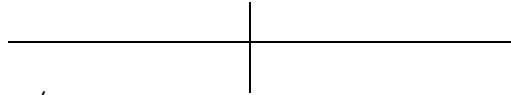
Role of screening:

- History
- Clinical manifestations
- Screening tools.

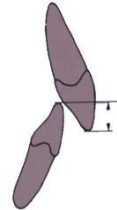


CLINICAL FEATURES

- Teeth present (including crowns &/or bridges):



- Overjet : .../... mm Overbite: .../...mm.
- OH & **Periodontal condition**:
- BPE scores
- Tooth mobility.



I.O. CLINICAL FEATURES

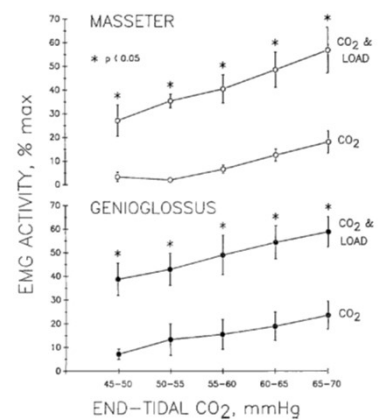
Abfractions

[Non-carious cervical lesions]:

- Increased inspiratory effort results in hypercapnia – increased masseter activation Hollowell et al., 1985 J Appl Physiol.



- Result from high occlusal loads cause stress loading in cervical tooth region.



I.O. CLINICAL FEATURES



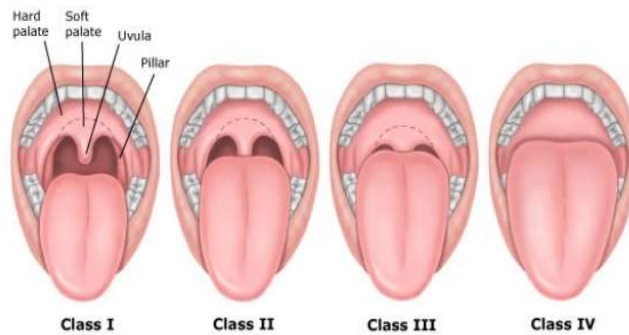
I.O. CLINICAL FEATURES



I.O. CLINICAL FEATURES

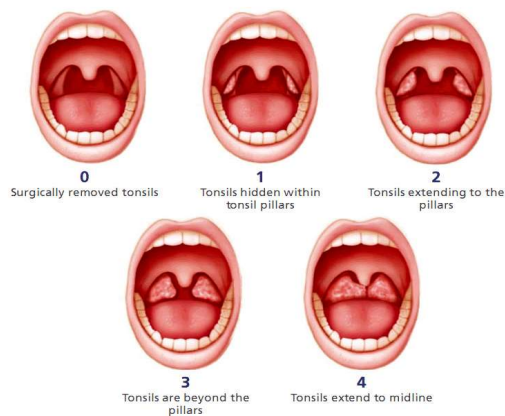
Soft palate and Uvula: elongated/ floppy

Mallampati Score



I.O. CLINICAL FEATURES

Tonsillar assessment:



SCREENING TOOLS

Key understand they are **NOT diagnostic**:

- The primary **purpose of screening** tests is to detect early disease or **risk factors for disease** in large numbers of apparently healthy individuals.
- Higher costs associated with diagnostic test maybe justified to establish diagnosis.
- **Screening tools** are **brief measures** that differentiate child risk. They range from effective questionnaires to examinations

EPWORTH SLEEPINESS SCALE

How **likely** are you to **doze off or fall asleep** in the following situations (in contrast to feeling just tired)?

Use the scale to choose the most appropriate number for each situation:

0 = Would NEVER doze 2 = MODERATE chance of dozing
1 = SLIGHT chance of dozing 3 = HIGH chance of dozing

Situation	Chance of dozing
Sitting and reading	
Watching TV	
Sitting, inactive in a public place (e.g. a theatre or a meeting)	
As a passenger in a car for an hour without a break	
Lying down to rest in the afternoon when circumstances permit	
Sitting and talking to someone	
Sitting quietly after lunch without alcohol	
In a car, while stopped a few minutes in the traffic	
TOTAL SCORE	

< 8 = Normal
10-14 = **Mild EDS**
15-18 = **Moderate EDS**
> 18 = **Severe EDS**

STOP-BANG QUESTIONNAIRE

S: Does the patient **S**nore loudly?

T: Does the patient feel **T**ired?

O: Has someone **O**bserved that the patient stops breathing during sleep?

P: Does the patient have high blood **P**ressure?

STOP
BANG

STOP-BANG QUESTIONNAIRE

B: **B**MI [kg/m²]

>25-30 overweight; >30 = obese

A: **A**ge >50 years risk factor

N: **N**eck circumference >17" [>43cm] risk factor

G: **G**ender – male risk factor

STOP
BANG



QUESTIONS?



SNORING – A ROLE FOR THE GDP

PROF AMA JOHAL



SNORING – A ROLE FOR THE GDP

Specific objectives:

- Understand the management of sleep-related breathing disorders
- Understand the role of MAS
- Perform a **subjective assessment & examination** for a patient presenting in your surgery
- Prescribe a MAS & follow up care.

ROLE OF SCREENING IN SBD

Estimated **1.5 million adults** in the UK, and yet up to **85%** are undiagnosed, therefore untreated
www.blf.org.uk/OSA.

- History [questionnaires]
- Clinical examination
- Screening tools
- Establishing a diagnosis
- Patient care pathway
- Case studies

HISTORY

Questionnaires:

- Pre-treatment history
- Partner-recorded snoring
- Daytime sleepiness

SCREENING: PRE-TREATMENT HISTORY

Subject demographics: **Male**

Nasal symptoms

General medical health:

- Pre-existing breathing disorders: Asthma [1.7 more likely develop OSA]
- **Cardiac anomalies** [angina, MI]
- **Hypertension**
- **Thyroid disease/Diabetes**
- Medication: Sedatives/antidepressants

Alcohol consumption (U/week)

Smoking (per day).



PATIENT/PARTNER'S MAIN COMPLAINT

- | | | | |
|-----------------------|--------------------------|------------------------------|--------------------------|
| Loud Snoring | ☐ | Stops breathing during sleep | ☐ |
| Day-time sleepiness | ☐ | Headaches on awakening | ☐ |
| Wake-up feeling tired | ☐ | Snorting or gasping | ☐ |
| Poor quality of sleep | ☐ | Family members affected | ☐ |
| TMJ problems | ☐ | Sleepiness when driving | ☐ |

Previous treatment in relation to sleep disorder:

- Conservatives regimes/ life style
- Nasal CPAP
- Surgery: Naso-pharyngeal [Maxillo-facial]
- Previous sleep study.

PRE-TREATMENT PARTNER ASSESSMENT

How would you rate your quality of sleep (tick one box)?

Good ☐ Average ☐ Poor ☐

How would you rate the quality of sleep of your partner (the Patient)?

Good ☐ Average ☐ Poor ☐

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Very loud snoring ☐

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Sometimes ☐ Usually ☐

Always ☐

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Situation	Chance of dozing	
Sitting and reading		< 8 = Normal 10-14 = Mild EDS 15-18 = Moderate EDS > 18 = Severe EDS
Watching TV		
Sitting, inactive in a public place (e.g. a theatre or a meeting)		
As a passenger in a car for an hour without a break		
Lying down to rest in the afternoon when circumstances permit		
Sitting and talking to someone		
Sitting quietly after lunch without alcohol		
In a car, while stopped a few minutes in the traffic		
TOTAL SCORE		

ROLE OF SCREENING IN SBD

- History [questionnaires]
- Clinical examination
- Screening tools
- Establishing a diagnosis
- Patient care pathway
- Case studies



EXAMINATION

ENT examination:

1. Identify any physical obstructions

2. Body Mass Index (BMI):

BMI = $\frac{\text{weight (kg)}}{\text{height}^2 \text{ (metres)}}$

(normal 18-25; overweight 26-30; **obese** >30)

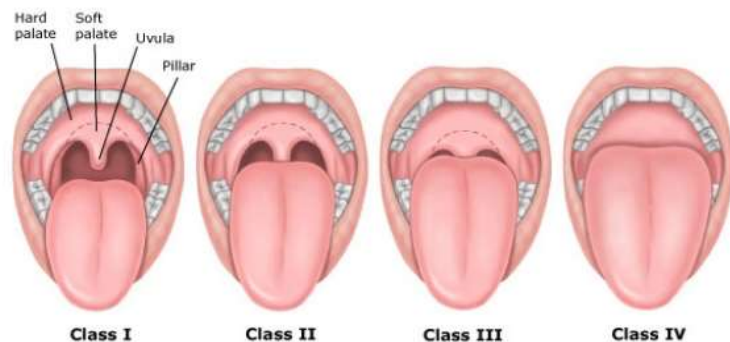
3. Neck circumference:

(>43 cm = **increased risk factor**).



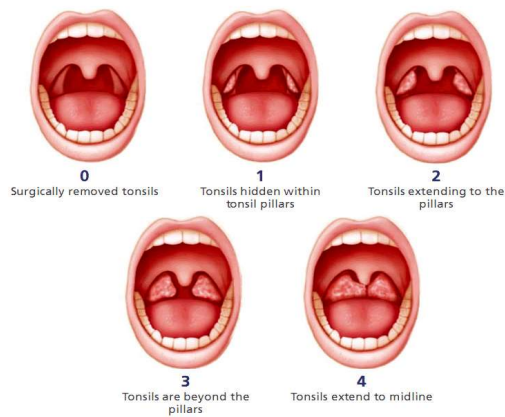
INTER-ORAL EXAMINATION

- **Soft palate and Uvula:** elongated/ floppy
- **Mallampati Score**



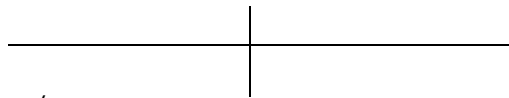
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Tonsillar assessment:

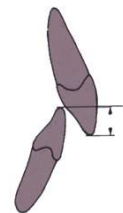


INTER-ORAL EXAMINATION

- Teeth present (including crowns &/or bridges):



- Overjet : .../... mm Overbite: .../...mm.
- OH & Periodontal condition:
- BPE scores
- Tooth mobility.



INTER-ORAL EXAMINATION

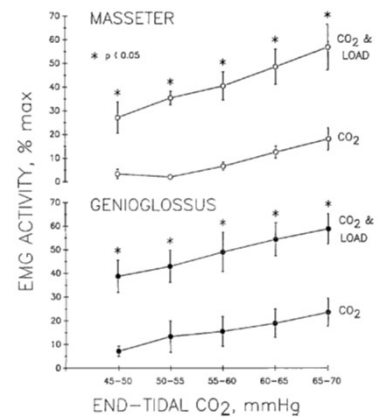
Abfractions

[Non-carious cervical lesions]:

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- Result from high occlusal loads cause stress loading in cervical tooth region.



INTRA-ORAL EXAMINATION



INTRA-ORAL EXAMINATION



TMJ ASSESSMENT

Range of mandibular movements:

- Max opening.....mm
- Max lateral movements Lmm R.....mm
- Max protrusionmm

TMJ function:

- Tenderness to palpation Yes ☐ No ☐
- Pain on mandibular movement Yes ☐ No ☐
- Smooth movement (no sounds or deviation) L / R
- Locking and/or luxation TMJ Yes ☐ No ☐

ROLE OF SCREENING IN SBD

- History [questionnaires]
- Clinical examination
- Screening tools
- Establishing a diagnosis
- Patient care pathway
- Case studies



SCREENING TOOLS

Key understand they are **NOT diagnostic**:

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- Higher costs associated with diagnostic test maybe justified to establish diagnosis.

ADJUSTED NECK CIRCUMFERENCE

W. FLEMONS. N ENG J MED, 2003; 347: 498-504.

Neck size	cm	cm
Hypertension Y/N	If Yes Add 4	
Habitual Snorer Y/N	If Yes Add 3	
Choke or Gasp most nights Y/N	If Yes Add 3	
	TOTAL	

Low risk <43cm; Moderate risk 43-48cm; Severe risk >48cm

STOP-BANG QUESTIONNAIRE

S: Does the patient Snore loudly?

T: Does the patient feel Tired?

O: Has someone Observed that the patient stops breathing during sleep?

P: Does the patient have high blood Pressure?

**STOP
BANG**

STOP-BANG QUESTIONNAIRE

B: BMI [kg/m²]

>25-30 overweight; >30 = obese

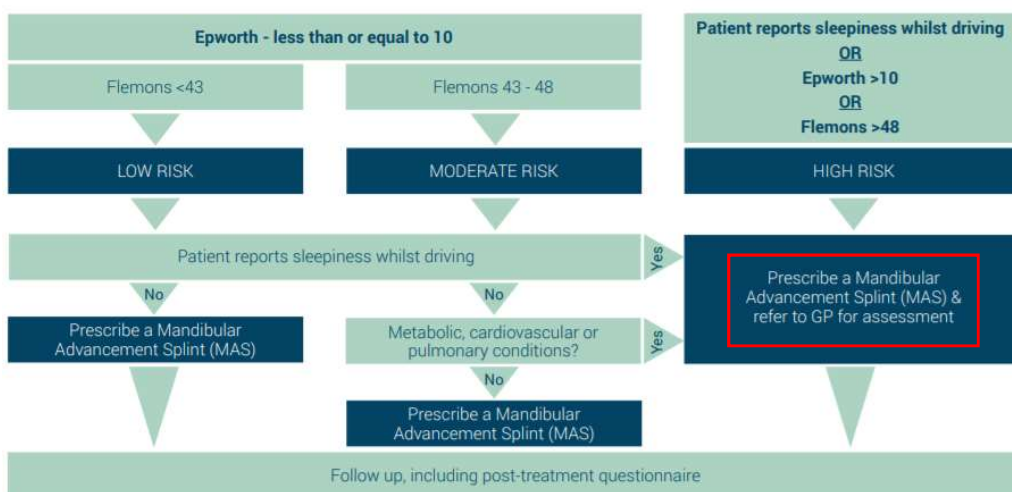
A: Age >50 years risk factor

N: Neck circumference >17" [>43cm] risk factor

G: Gender – male risk factor

**STOP
BANG**

CARE PATHWAY: TO DETERMINE PATIENT'S LEVEL OF OSA RISK



ESTABLISHING A DIAGNOSIS

Epworth sleepiness scale > 10

Sleepiness when driving

Symptoms:

- Loud snoring
- Stop breathing/choke
- Snorting or gasping

Neck circumference.

Refer GP/Sleep Study



DOMICILIARY VS. SLEEP CENTRE SLEEP STUDY



3RD GENERATION MAS: SLEEPWELL



N-CPAP



ROLE OF SCREENING IN SBD

- History [questionnaires]
- Clinical examination
- Screening tools
- Establishing a diagnosis
- Patient care pathway
- Case studies..



PRE-TREATMENT HISTORY

CASE STUDY 1

- 43 year-old Male
- Fit and well
- Drinks <15 units per week
- Smokes 2 cigarettes/day.

PRE-ASSESSMENT MAIN COMPLAINT

CASE STUDY 1

Loud Snoring	☒	Stops breathing during sleep	☒
Day-time sleepiness	☒	Headaches on awakening	☒
Wake-up feeling tired	☒	Snorting or gasping	☒
Poor quality of sleep	☒	Family members affected	☒
TMJ problems	☒	Sleepiness when driving	☒

EPWORTH SLEEPINESS SCALE

CASE STUDY 1

How **likely** are you to **doze off or fall asleep** in the following situations (in contrast to feeling just tired)?

Use the scale to choose the most appropriate number for each situation:

0 =	Would NEVER doze	2 =	MODERATE chance of dozing
1 =	SLIGHT chance of dozing	3 =	HIGH chance of dozing

Situation	Chance of dozing
Sitting and reading	1
Watching TV	3
Sitting, inactive in a public place (e.g. a theatre or a meeting)	0
As a passenger in a car for an hour without a break	0
Lying down to rest in the afternoon when circumstances permit	3
Sitting and talking to someone	0
Sitting quietly after lunch without alcohol	0
In a car, while stopped a few minutes in the traffic	0
TOTAL SCORE	7

PARTNER ASSESSMENT

CASE STUDY 1

How would you rate your quality of sleep (tick one box)?

Good ☐ Average ☐ Poor ☒

How would you rate the quality of sleep of your partner (the Patient)?

Good ☒ Average ☐ Poor ☐

How would you rate the severity of your partner's snoring (tick one box only)?

No snoring ☐ Mild snoring ☐

Moderate snoring ☐ Loud snoring ☐

Very loud snoring ☒

Does your partner's snoring disturb your sleep (tick one box only) ?

Never ☐ Hardly ever ☐

Sometimes ☐ Usually ☐

Always ☒

PRE-TREATMENT EXAMINATION

CASE STUDY 1

• Teeth present
$$\begin{array}{r|l} 765\ 321 & 123\ 567 \\ \hline 765\ 321 & 123\ 567 \end{array}$$

- No signs of Periodontal disease
- No signs or symptoms of TMJ dysfunction
- Neck circumference = 39.

ADJUSTED NEXT CIRCUMFERENCE

CASE STUDY 1

Neck size	cm	39 cm
Hypertension Y/N	If Yes Add 4	0
Habitual Snorer Y/N	If Yes Add 3	3
Choke or Gasp most nights Y/N	If Yes Add 3	0
TOTAL		42

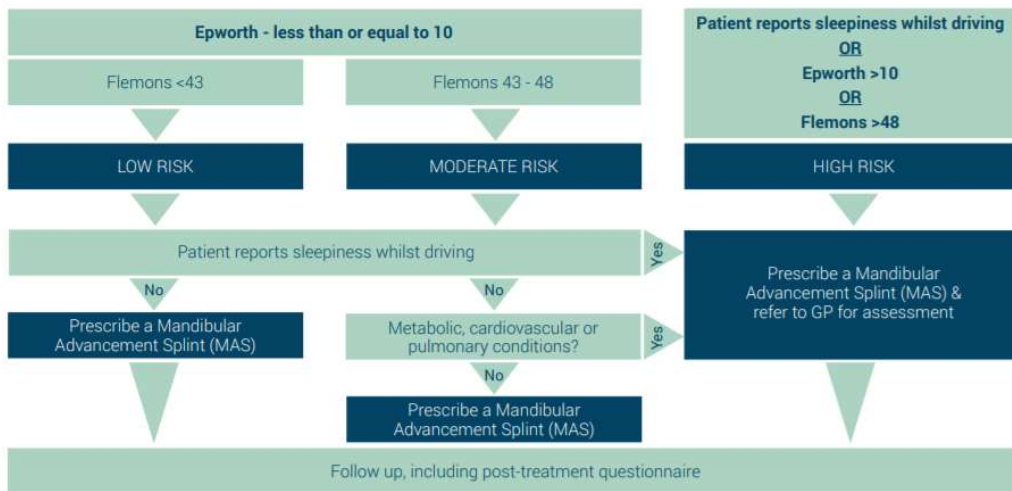
ESTABLISHING A DIAGNOSIS

CASE STUDY 1

Neck circumference	39cm
Epworth sleepiness scale	7
Chronic lung disease	No
Cardiac disease	No
Metabolic disease	No
Sleepiness when driving	No
Adjusted Neck circumference	42

Action ?

CARE PATHWAY: TO DETERMINE PATIENT'S LEVEL OF OSA RISK



PRE-TREATMENT HISTORY

CASE STUDY 2

- 56 year-old Male
- Well controlled hypertensive
- Failed CPAP treatment
- Drinks <15 units per week
- Non-smoker.

PRE-ASSESSMENT MAIN COMPLAINT

CASE STUDY 2

Loud Snoring	☒	Stops breathing during sleep	☒
Day-time sleepiness	☒	Headaches on awakening	☒
Wake-up feeling tired	☒	Snorting or gasping	☒
Poor quality of sleep	☒	Family members affected	☒
TMJ problems	☒	Sleepiness when driving	☒

EPWORTH SLEEPINESS SCALE

CASE STUDY 2

How **likely** are you to **doze off or fall asleep** in the following situations (in contrast to feeling just tired)?

Use the scale to choose the most appropriate number for each situation:

0 =	Would NEVER doze	2 =	MODERATE chance of dozing
1 =	SLIGHT chance of dozing	3 =	HIGH chance of dozing

Situation	Chance of dozing
Sitting and reading	3
Watching TV	3
Sitting, inactive in a public place (e.g. a theatre or a meeting)	3
As a passenger in a car for an hour without a break	3
Lying down to rest in the afternoon when circumstances permit	3
Sitting and talking to someone	0
Sitting quietly after lunch without alcohol	3
In a car, while stopped a few minutes in the traffic	0
TOTAL SCORE	18

PARTNER ASSESSMENT

CASE STUDY 2

How would you rate your quality of sleep (tick one box)?

Good ☐ Average ☐ Poor ☒

How would you rate the quality of sleep of your partner (the Patient)?

Good ☐ Average ☐ Poor ☒

How would you rate the severity of your partner's snoring (tick one box only)?

No snoring ☐ Mild snoring ☐

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Very loud snoring ☒

Does your partner's snoring disturb your sleep (tick one box only) ?

Never ☐ Hardly ever ☐

Sometimes ☐ Usually ☐

Always ☒

PRE-TREATMENT EXAMINATION

CASE STUDY 2

• Teeth present

87 54321	12345 78
87 54321	12345 78

- No signs of Periodontal disease
- No signs or symptoms of TMJ dysfunction
- Neck circumference = 44cm.

ADJUSTED NEXT CIRCUMFERENCE

CASE STUDY 2

Neck size	cm	44 cm
Hypertension Y/N	If Yes Add 4	4
Habitual Snorer Y/N	If Yes Add 3	3
Choke or Gasp most nights Y/N	If Yes Add 3	0
	TOTAL	51

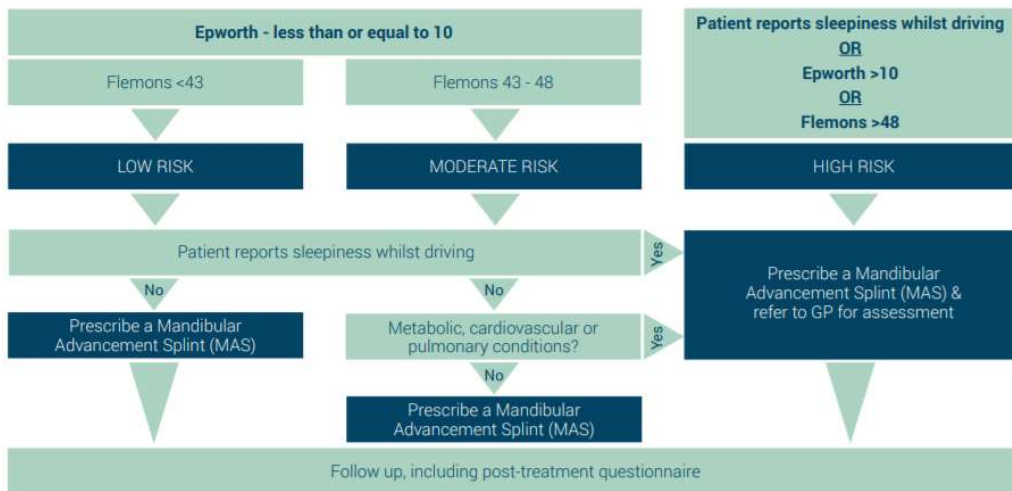
ESTABLISHING A DIAGNOSIS

CASE STUDY 2

Neck circumference	44cm
Epworth sleepiness scale	18
Chronic lung disease	No
Cardiac disease	Yes
Metabolic disease	No
Sleepiness when driving	No
Adjusted Neck circumference	51

Action ?

CARE PATHWAY: TO DETERMINE PATIENT'S LEVEL OF OSA RISK



QUESTIONS?



SNORING – A ROLE FOR THE GDP

Specific objectives:

- Understand the management of sleep-related breathing disorders
- Understand the role of MAS
- Perform a subjective assessment & examination for a patient presenting in your surgery
- Prescribe a MAS & follow up care.



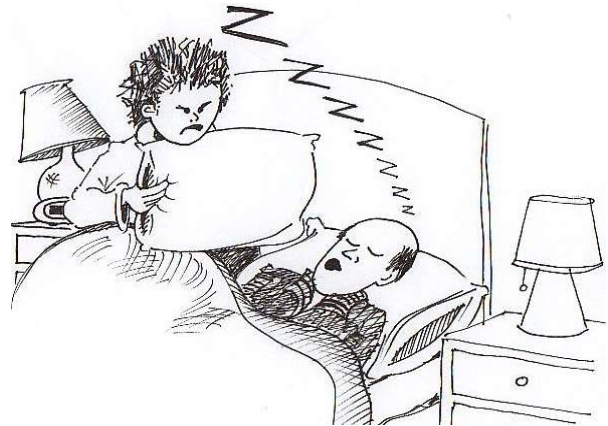
PRACTICAL STEPS TO PROVIDING MAS THERAPY

- Who to treat?
- Defence organisation standpoint
- Patient Information & Consent
- Impressions [& wax-bite construction]
- Fitting Sleepwell & care instructions
- Follow-up.

WHO TO TREAT ?

- Simple (non-apnoeic) snoring
- Range of OSA:
 - In conjunction sleep centres.

Who said snoring is not a health hazard ?



WHY GET INVOLVED?

1. Patient factors:

- Snoring is more than just a noise!
- Profound impact QoL:
- Socially embarrassing
- Family members
- Medical complications.



School playground

NEIL: How do you want to die ?

MELISSA: In my sleep, like my granddad did

- unlike all his screaming passengers.....



WHY GET INVOLVED?

2. Dental Clinicians:

- Working knowledge
- Training and expertise
- Optimally positioned – local service delivery
- Demand EXCEEDS supply!
- Variety of experience.



WHY GET INVOLVED?

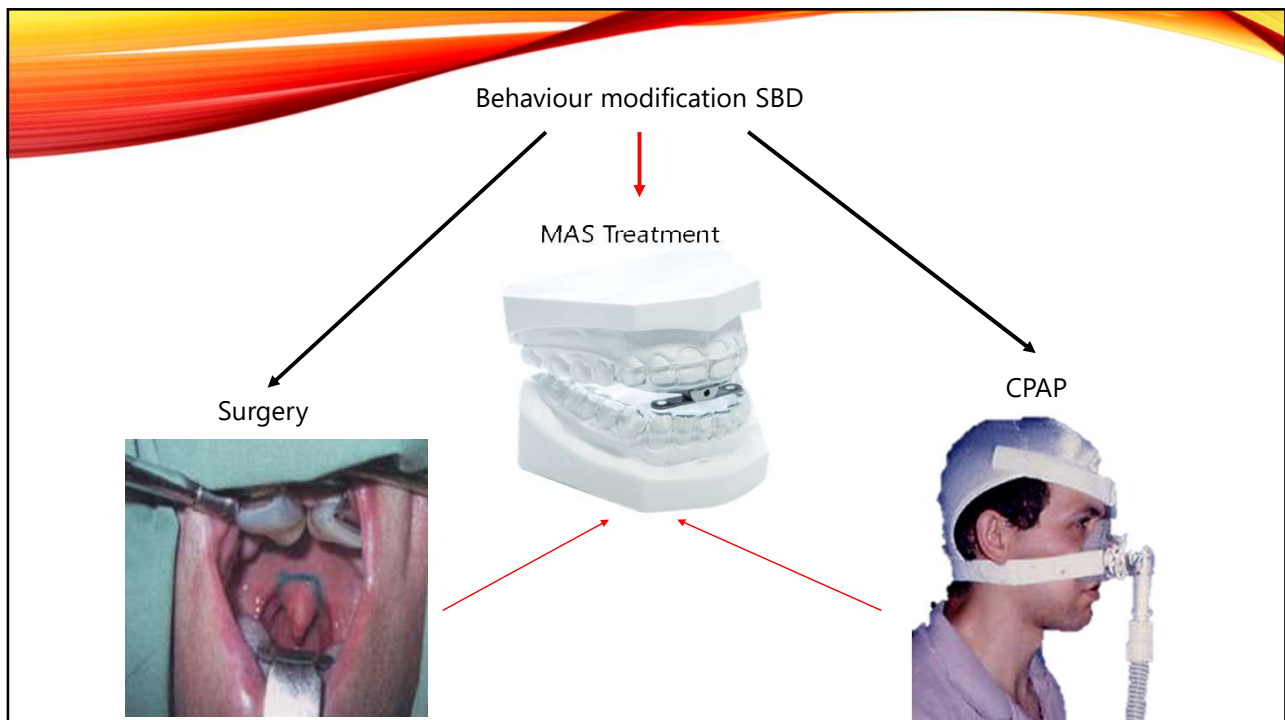
3. Support network – not alone

S4S:

- Dedicated Laboratory & Support
- Comprehensive Care Pathway
- Website support
- Clinician support: E-mail
- British Society Dental Sleep Medicine [BSDSM]
- Local – chest physician/sleep clinic..

'We aim to **enhance** the **quality of life** of those suffering from sleep disorders [SD] through dental sleep medicine':

- Provide Wealth of information on SD.
- Advise on treatment options for the public, patients and healthcare professionals
- We offer dental sleep medicine courses and qualifications info@bsdsm.org.uk.
- **10th & 12th November 2018**



DEFENSE ORGANIZATIONS

DDU:

- S4S course approved
- Demonstrate appropriately trained in technique ✓

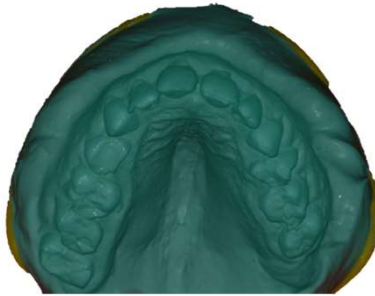
MPS:

- Documented evidence course anti-snoring devices –includes training in appropriate screening ✓
- Assessed signs & symptoms of OSA – documented ✓
- If S&S OSA – referred medical assessment ✓
- Risks/benefits MAS – Documented consent ✓

PATIENT INFORMATION & CONSENT

- Dental appliances have been shown in a number of clinical studies – **EFFECTIVE**
Reduce snoring (70-100%)
- Dental appliance will **not CURE** the disorder, but acts by temporarily repositioning lower jaw
- No **guarantee** equally effective EVERY PATIENT
- Short-term **side-effects** – lesson after a few weeks
- Long-term **side-effects** – Tooth movement
- Undergo an overnight **sleep study** to **diagnose OSA (WRITTEN CONSENT)**

DENTAL IMPRESSIONS (BITE REG)



Key: GOOD impressions

Tip: Lower trays ONLY

LABORATORY INSTRUCTIONS

KEY to success – selecting the right Lab!

- Details of crowns/bridges
- Design details:
- Sleepwell ($\pm$ modifications)
- Other appliance.

PATIENT INSTRUCTIONS

- Insertion and removal

Activation:

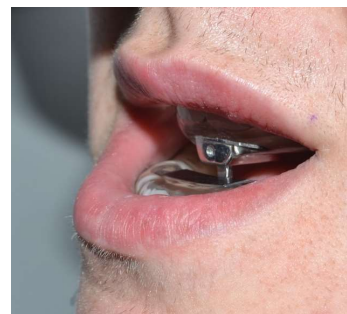
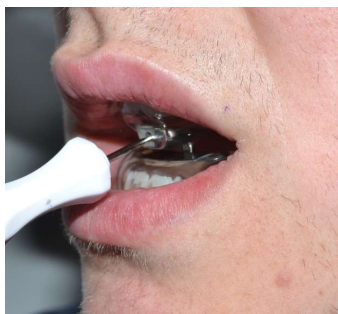
- Wear passive state 2 weeks
- Start 1 turn per week...**UNTIL?**

- Cleaning – NitrAdine tablets

- Possible side-effects

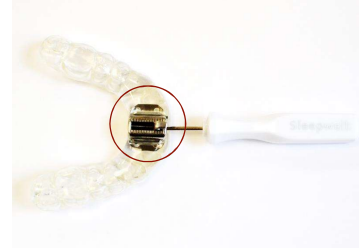
- Follow-up care.

Place over the teeth in each jaw [upper 1st] & press firmly



To engage, advance lower jaw.

Adjust for comfort and maximum benefit n.b **retract** if necessary



Self-adjust for activation – up to **9mm**.

FOLLOW-UP APPOINTMENTS

'Simple' snorers: **2-3 months**

- Partner snoring questionnaire
- Daytime sleepiness (ESS)

OSA: **3 months:**

- Subjective improvement [ESS/Partner Q's]
- Refer for **follow-up sleep study** [OSA].

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QUESTIONS?

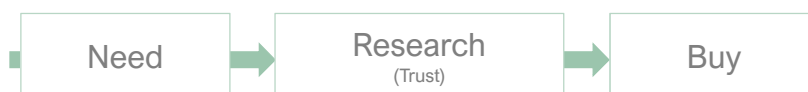


THANK YOU.



SNORING & OSA: MARKETING

- Do a case – build confidence
- Communicate to staff – receptionist prompt sheet
- Communicate to your current patient base
 - New offering
 - Part of regular communications
- Online presence
 - Consumers are online – 65% online research



TO GET YOU STARTED

Marketing packs:

- Patient leaflets
- Posters
- Pre-screening questionnaires
- Digital assets (sent after via email)
- 50% off lab
- DVD offer – educate the whole team

Feedback forms

- **E-Newsletter** – receive the latest news & offers from S4S Dental
- **Find a Provider** – opt in to add your practice to our free online search



FOLLOW UP

Resources including:

- Suggested wording for your website
- Sleepwell images
- Appliance logos
- Letter template to send to GPs
- Presentation slides

Future support

- Skilled technicians on the end of the phone
- Marketing team available
- Social media activity
- Client services team



A photograph of a man and a woman sleeping in a bed. The man is in the foreground, resting his head on his hand, looking tired. The woman is in the background, also sleeping. The room is dimly lit with a bedside lamp.

THANK YOU.

Please remember to complete our feedback forms – we really do value your input.

Safe travels, from all at



S4S
Dental Laboratory