Oral Sleep Appliances

– They Are Not Sexy But They Get The Job Done

Anne M. Scott, D.D.S.

Disclosure/Conflict of Interest

- No personal financial relationships with commercial interests and no bias toward any specific oral appliance or company.
- Currently a member of the American Dental Association and the state and local components.
- Previous member of the American Academy of Dental Sleep Medicine.

Personal Biography

- Dental Hygiene (DH) degree in Florida in 1994.
- Practiced DH in Florida; Okinawa, Japan; California; and New Mexico.
- Masters in DH from UNM in 2005.
- DDS from USC in 2009.
- General Dentistry in ABQ & Tijeras, NM, since 2009, offering:
  - Sedation
    - ✓Nitrous oxide inhalation.
    - ✓Halcion through enteral route.
    - ✓Benzos & Synthetic Opioids through parenteral route.
  - Oral Sleep Appliances.

Presentation Goals

- Pro Et Contra of Oral Sleep Appliances.
- Sleep Disorders
- Signs and Symptoms and Consequences of Snoring/OSA and Bruxism
- Medical and Dental Responsibilities
- Treatment Protocols for Physicians and Dentists
- Treatment of Snoring, Bruxism and OSA
- Types of and Proper Choice of Appliance
- Options for Partial Edentulism and Edentulous Patients
- Combination Therapy with OSA and CPAP.

Pro Et Contra

- Insurance
  - Dental insurances typically do not cover OSAs.
  - Medical insurances will pay if diagnosis by a sleep specialist of mild or moderate sleep apnea and if severe sleep apnea and unable to tolerate CPAP/BiPAP.
- Collaboration
  - Sleep specialist/physician and dentist need to collaborate:
    - ✓ Current polysomnography (PSG) must be available to the dentist for proper documentation and medical insurance coding for financial reimbursement.
- Force
  - Appliances are subject to a great deal of force within the mouth. Most private medical insurance will pay to replace the OSA q3yrs, Medicare will replace q5yrs.

Pro Et Contra

- Durability
  - Appliances should be durable, easy to adjust (titrate by dentist or patient) & repair.
- Customization
  - Option of multiple linings allowing greater customization for patient's needs.
- Warranty
  - Lab warranties are 6 months – 3 years.
- Chief Complaint, Design Considerations
  - CC: Snoring, Bruxism, Obstructive or Central Sleep Apnea.
  - Retention considerations – short clinical crowns, number of teeth per arch, stability of teeth present.

Definitions

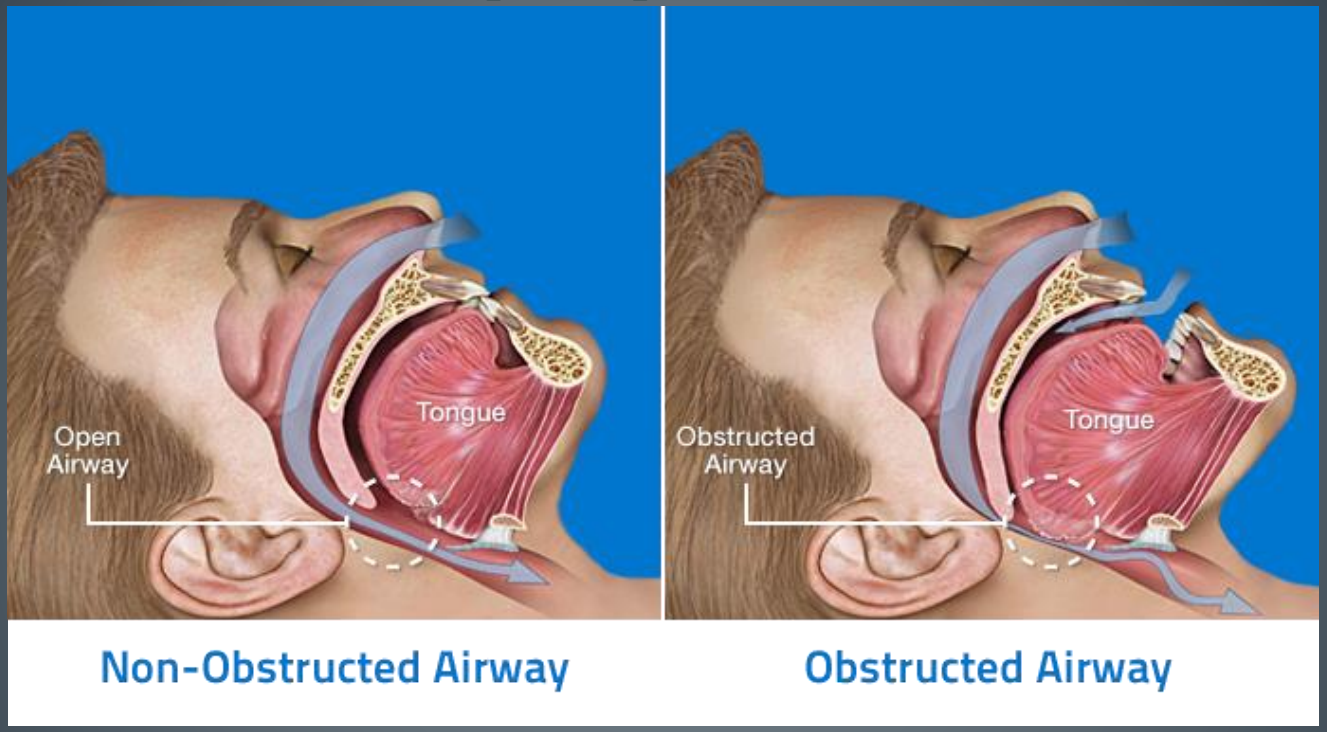
- APNEA
  - Cessation or near cessation of flow (inspiratory flow decreases to < 20%) ≥ 10 seconds.
- HYPOPNEA
  - Continued breathing, but ventilation decreases by 50% for ≥ 10 seconds.
- APNEA-HYPOPNEA INDEX (AHI)
  - Total number of apneas and hypopneas per hour of sleep from PSG.

- Mild Sleep Apnea — AHI ≥ 5 but < 15 per hour
- Moderate Sleep Apnea — AHI ≥ 15 but < 30 per hour
- Severe Sleep Apnea — AHI ≥ 30 per hour

Sleep Disordered Breathing

- Obstructive Sleep Apnea
- Central Sleep Apnea
  - Cessation of ventilation during sleep due to loss of ventilatory drive.
  - ≥ 10 second pauses w/no associated respiratory effort.

Obstructive Sleep Apnea

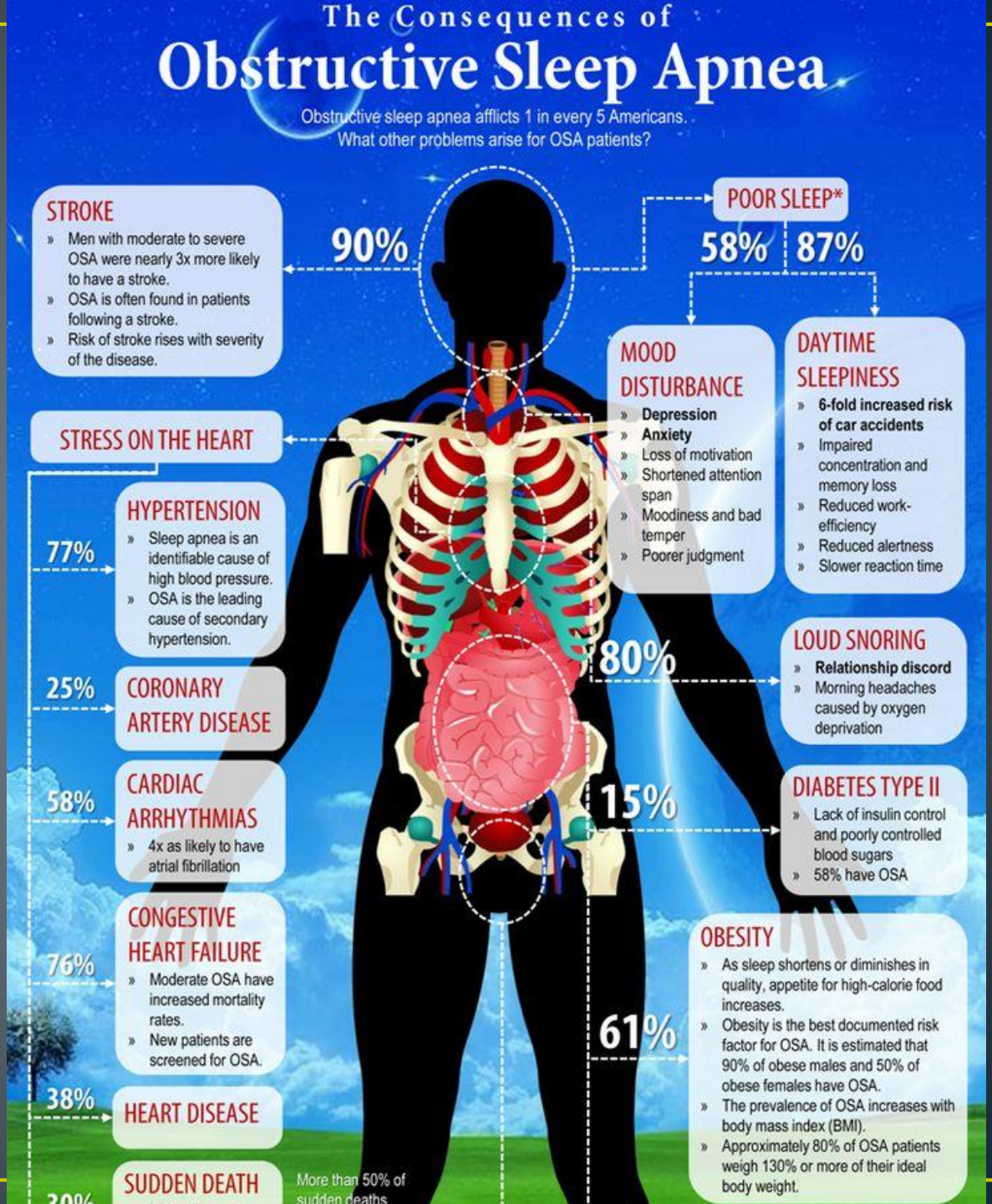


- Sleep disorder characterized by recurrent episodes of narrowing or collapse of pharyngeal airway during sleep despite ongoing breathing efforts – typically unknown by individual
- Often leads to acute derangements in blood gas disturbances.

Causes of OSA

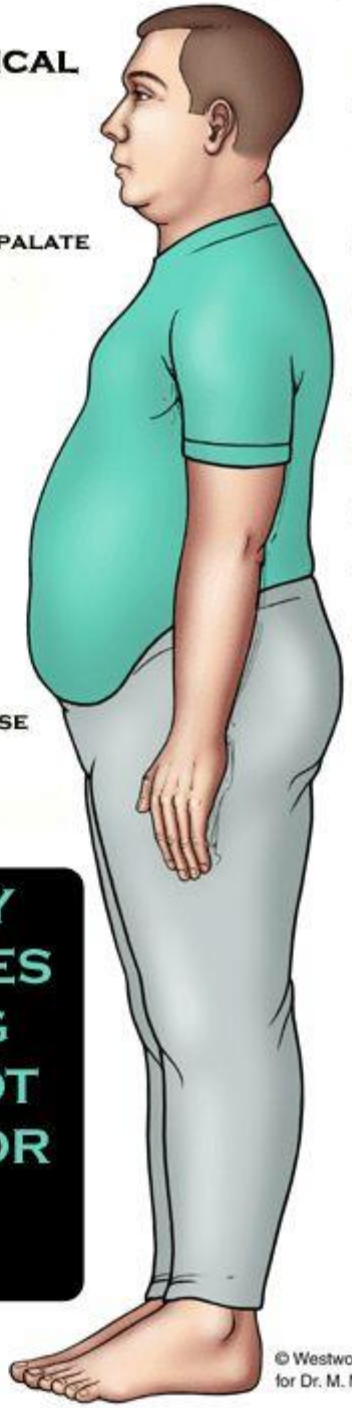
- NASAL
  - Polyps, deviated nasal septum, rhinitis, nasal pack.
- PHARYNGEAL
  - Tumors, enlarged adenoids/palatal or lingual tonsils, retropharyngeal mass, large tongue (myxoedema, acromegaly), micrognatheia, retrognathesia, loss of teeth, and obesity.
- LARYNGEAL
  - Tumors, edema.

Consequences of OSA



Common Physical Findings

1. Enlarged Uvula
2. Hyperplastic soft palate
3. Nasal congestion
4. Nasal polyps
5. Enlarged tonsils
6. Enlarged tongue
7. Small lower jaw
8. Receded chin
9. Neck size > 17"
10. Overweight & obese



Common Signs & Symptoms

1. Snoring
2. Stop breathing at night
3. Excessive daytime sleepiness
4. Morning headache
5. Nighttime gasping
6. Restless sleep
7. Insomnia
8. Nightmares
9. Irritibiity
10. Memory loss
11. Decreased attention and concentration
12. Performance deficiencies
13. Depression
14. Shortness of breath
15. GERD
16. Nocturnia
17. Impotence
18. Poor sleep quality

SURGERY ADDRESSES SNORING AND IS NOT A CURE FOR SLEEP APNEA.

Medical and Dental Responsibilities

- Dental
  - Recognize, question, and refer.
  - Provide support when requested.

- Medical
  - Diagnosis and determine presence and severity of OSD.
  - Epworth Sleepiness Scale and Polysomnography.
  - Treatment with CPAP/BiPAP.

Treatment of OSA

- Physician Options
  - Behavior modification:
    - Weight loss; ↓ alcohol, smoking & sedatives; proper sleep hygiene.
  - CPAP.
  - Surgery:
    - T&A, UPPP, Lingualplasty, Maxillary/Mandibular Advancement.
  - Medications.
  - Oral devices.

Treatment Protocols for Utilizing Oral Appliance Therapy

1. Dentist recognition and referral to patient physician.
2. Referral and assessment to sleep physician.
3. Sleep physician provides written referral & copy of polysomnography report to dentist.
4. Dental assessment if patient ideal candidate for OA therapy and appropriate OA designs available.
5. Informed consent of risks and benefits of OA therapy.
6. Initiation of OA therapy by dentist.
7. Referral back to sleep physician for medical assessment and effectiveness of OA therapy.

Treatment Objectives

- Primary Snoring Patients w/out OSA or upper airway resistance syndrome
  - Reduce snoring to a subjectively acceptable level.

- OSA Patients
  - Resolution of clinical signs and symptoms of OSA and normalization of the AHI and oxyhemoglobin saturation.

Types of Oral Devices for Treating Snoring, Bruxism and OSA

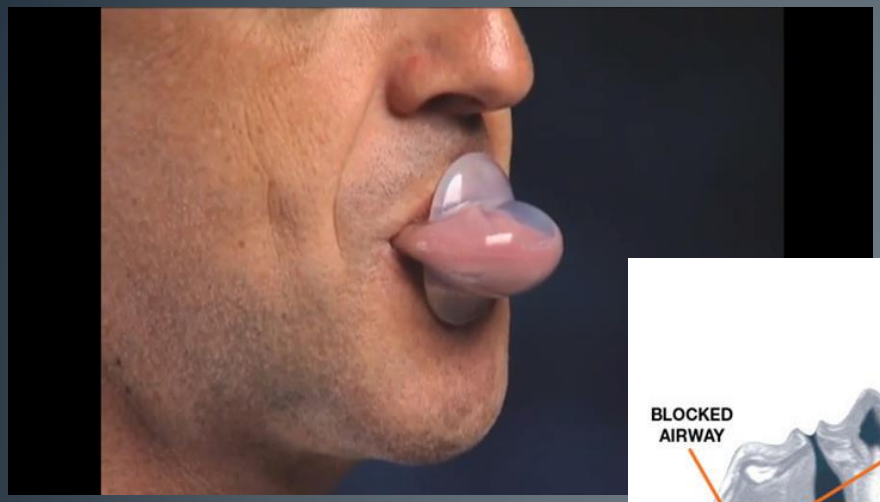
- FDA cleared devices:

  - Tongue retaining devices.
  - Bruxism Devices
  - Palatal lifting devices.
  - Mandibular repositioning devices.

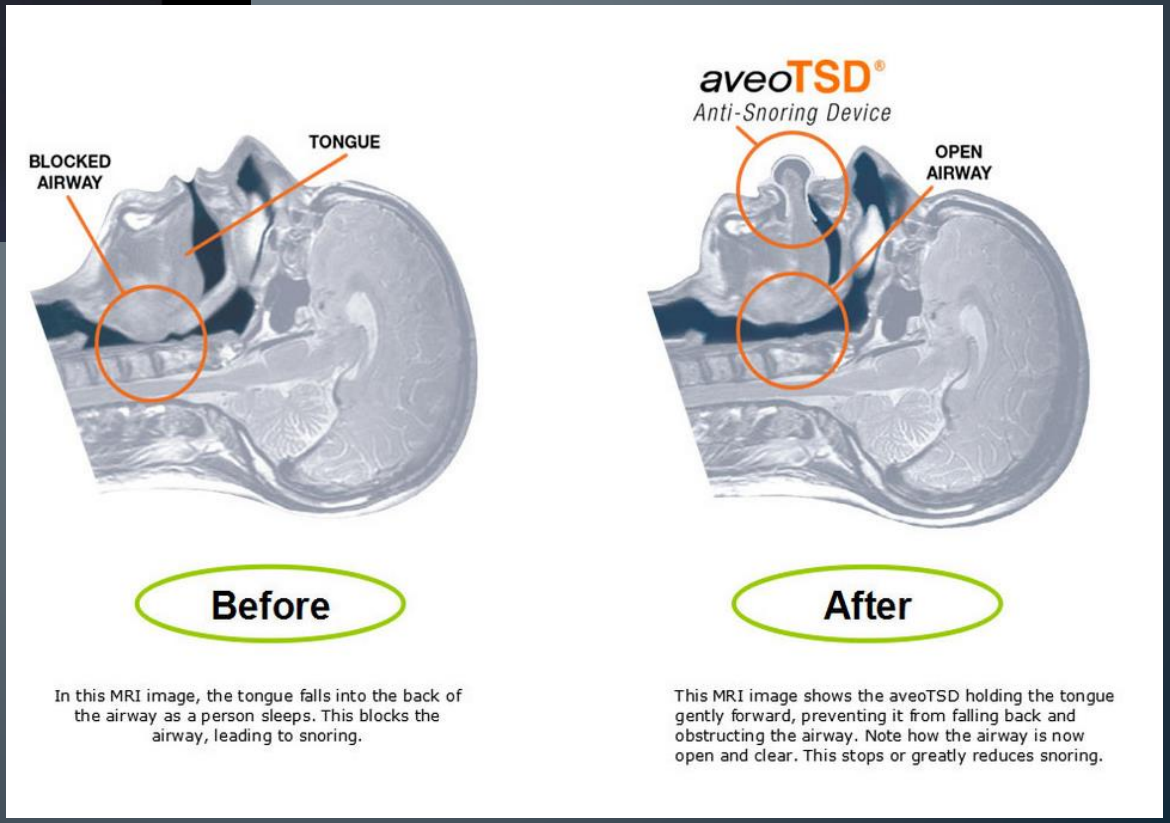
Tongue Retaining Devices

- Mechanism of Action
  - To prevent the tongue from approaching the posterior wall of the pharynx.
  - Tip of tongue is projected into a hollow bulb creating a suction retaining the tongue anteriorly.

Tongue Retaining Devices



aveoTSD®



Indications for Tongue Retaining Devices

- Edentulous patients.
- Potential temporomandibular joint problems.

Problems with TRDs

- Sore tongue.
- Taste alteration.

Other Devices for Primary Snorers

- Any OA used for OSA can also be used for primary snorers
- Cost may be a factor
- Examples: 1) Narval, 2) EMA (Elastic Mandibular Advancement), 3) NTI (Nociceptive Trigeminal Inhibition)

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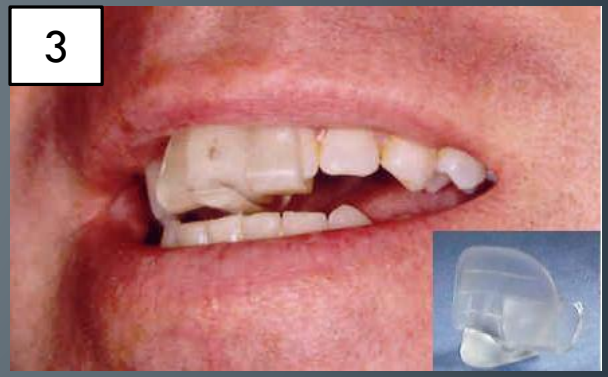

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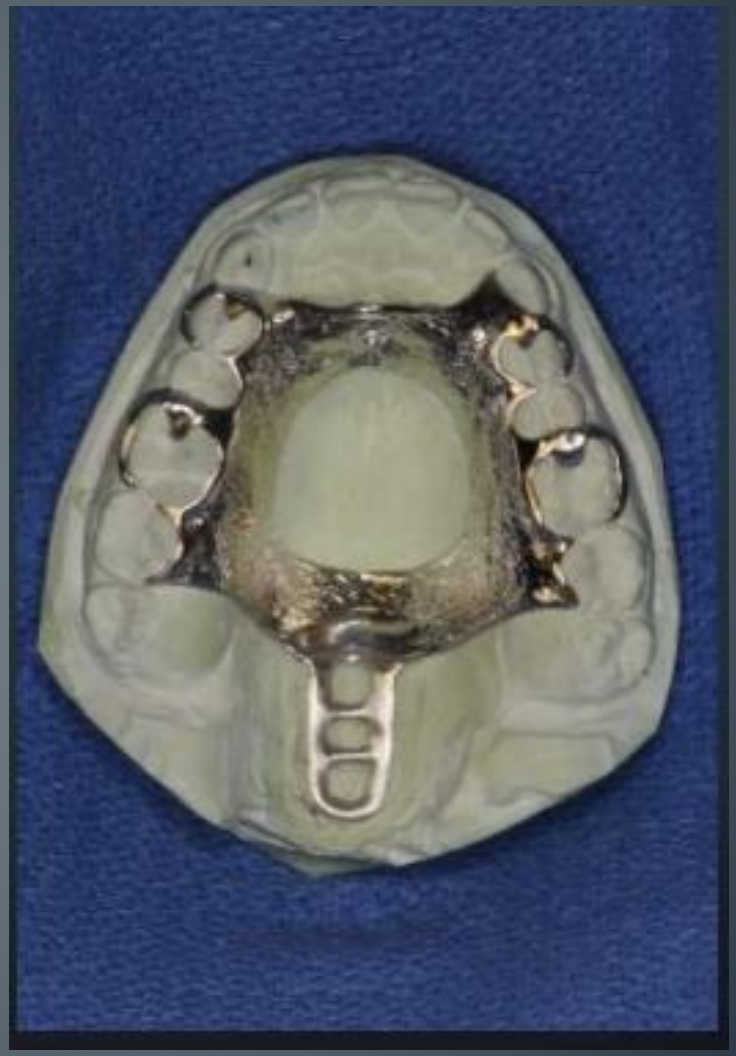
Palatal Lift Device

- A maxillary device.
- Has a distal support to lift the soft palate.
- Need several healthy teeth for retention.
- Not ideal for severe gaggers.



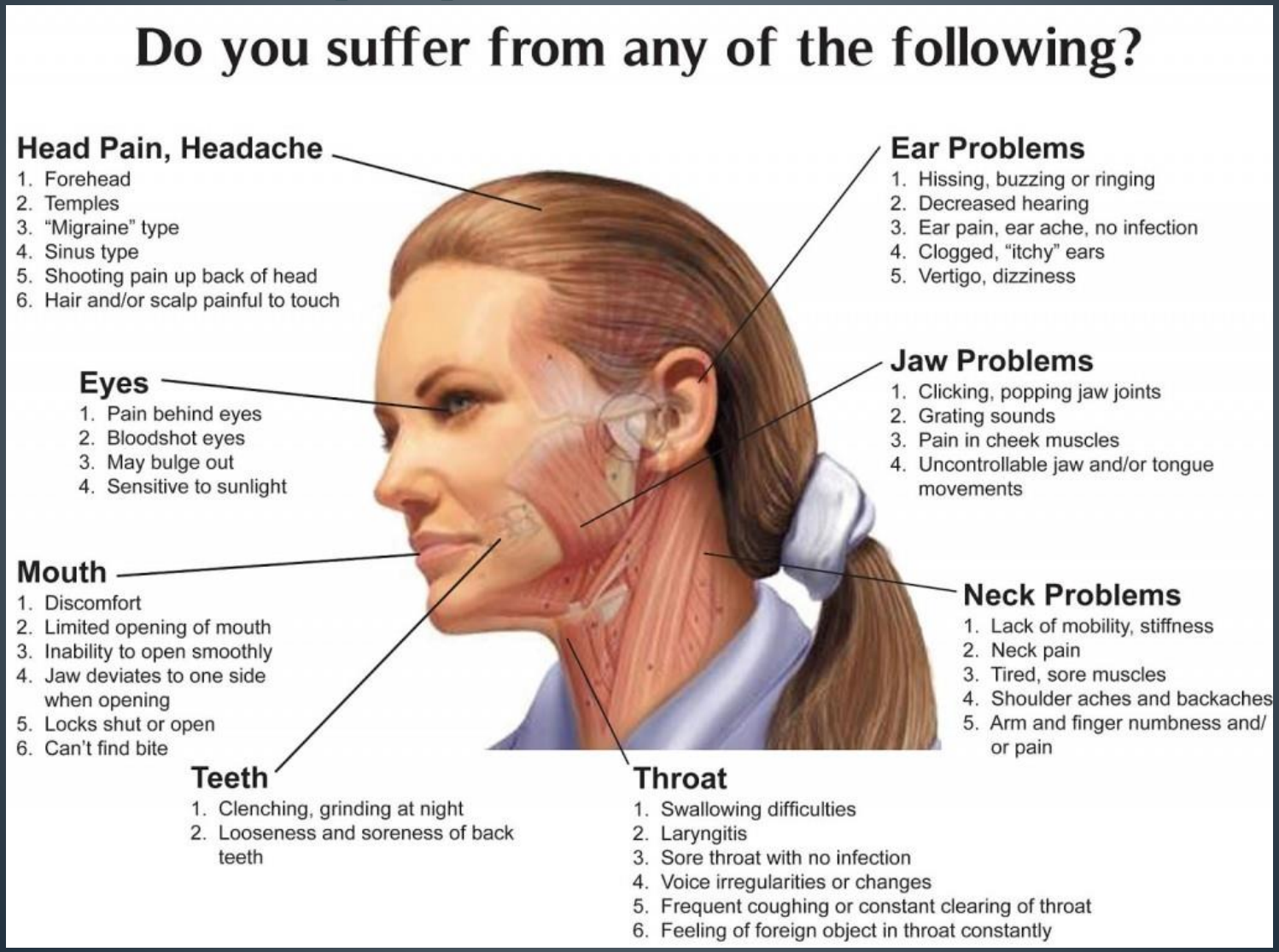
Bruxism

- Can be a sign of OSA.
- Potential temporomandibular joint problems.

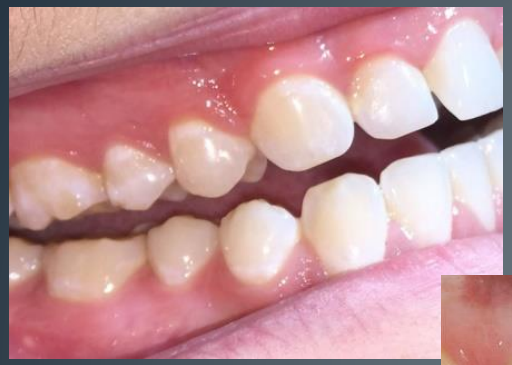
Does not stop grinding but can reduce damage of:

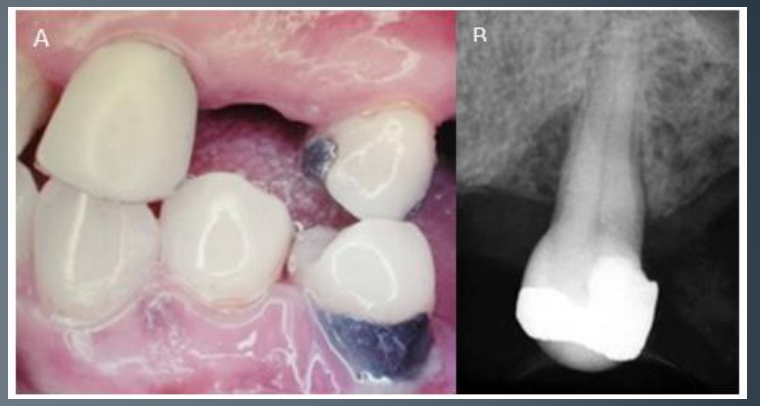
- Broken teeth leading to loss of teeth.
- Root canals.
- Head/earaches and sore muscles of mastication.

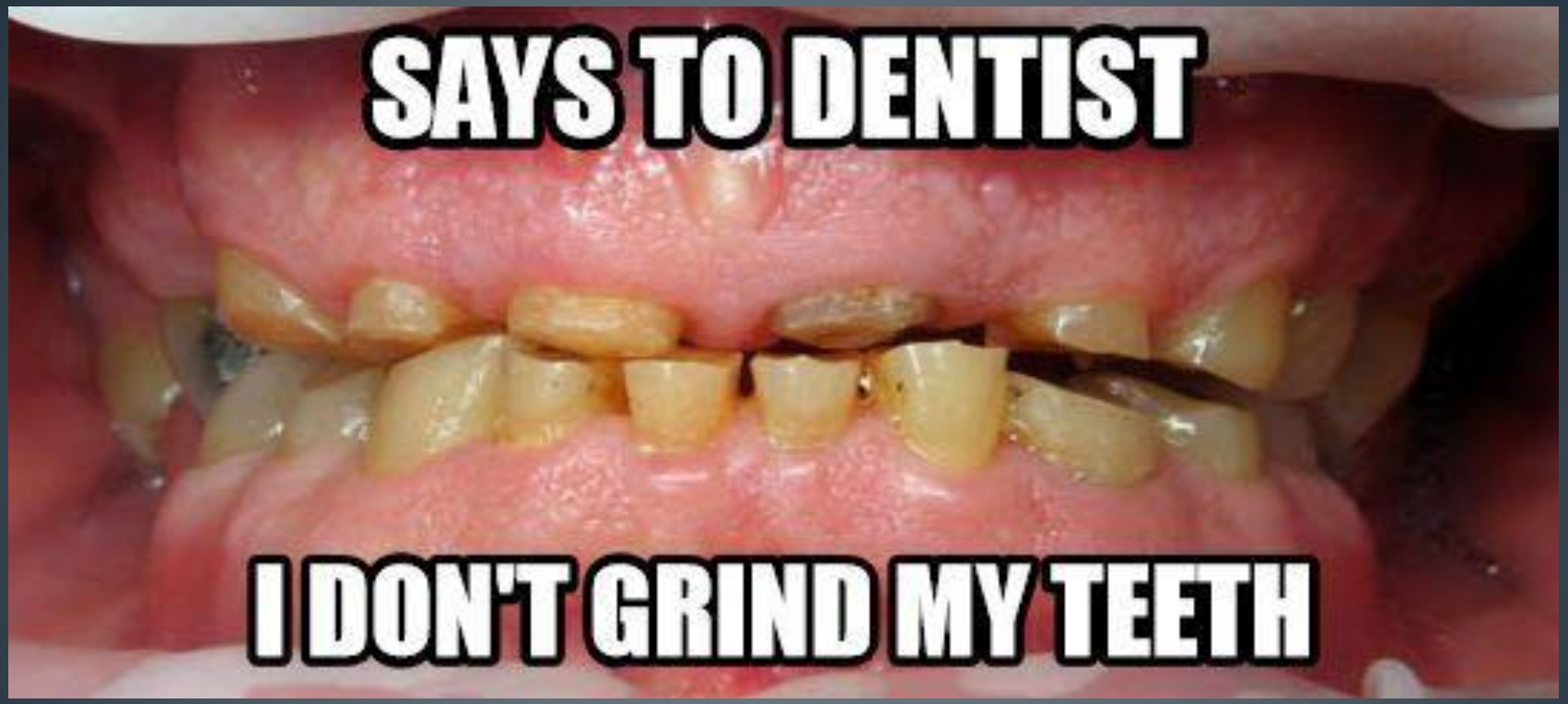
Signs and Symptoms of Bruxism



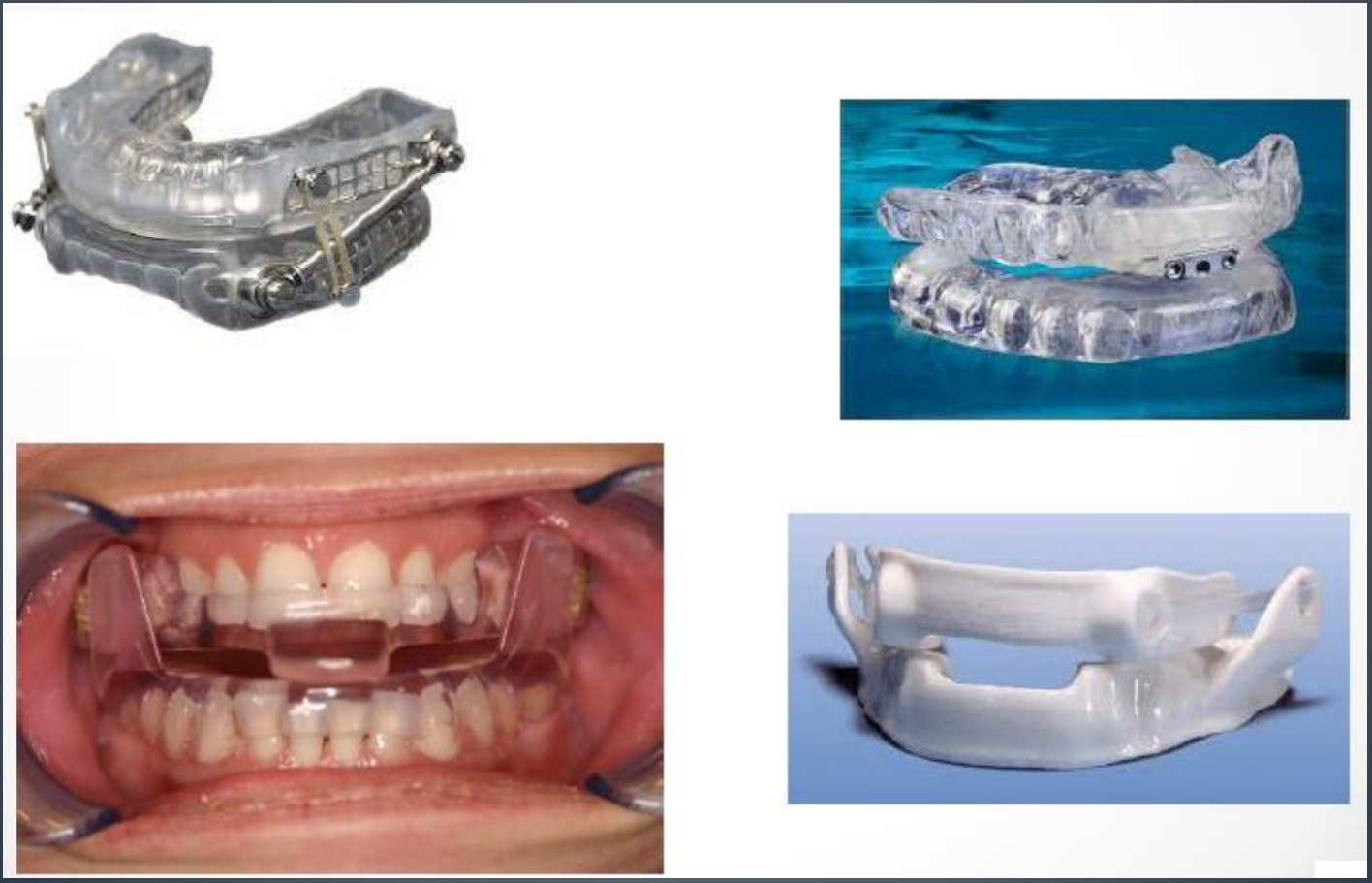
Dental Evidence of Bruxism






SAYS TO DENTIST
I DON'T GRIND MY TEETH

Appliances for Heavy Bruxers



Mandibular Advancement Devices (MADs)

- Mechanism of Action
  - To prevent the tongue from approaching the posterior wall of the pharynx.
  - Maxillary and mandibular teeth are retained in appliance while mandibular jaw is protuded to the ideal position to open the airway.

Dental Considerations for MADs

- Adequate number of healthy teeth.
- Ability to protrude mandibular and open jaw widely w/out significant limitation.

Contraindications

- Moderate to severe TMJ problems.
- Significant bruxism with damage to dentition or periodontium.
- Edentulous patients – however, can be overcome.

Warnings for MADs

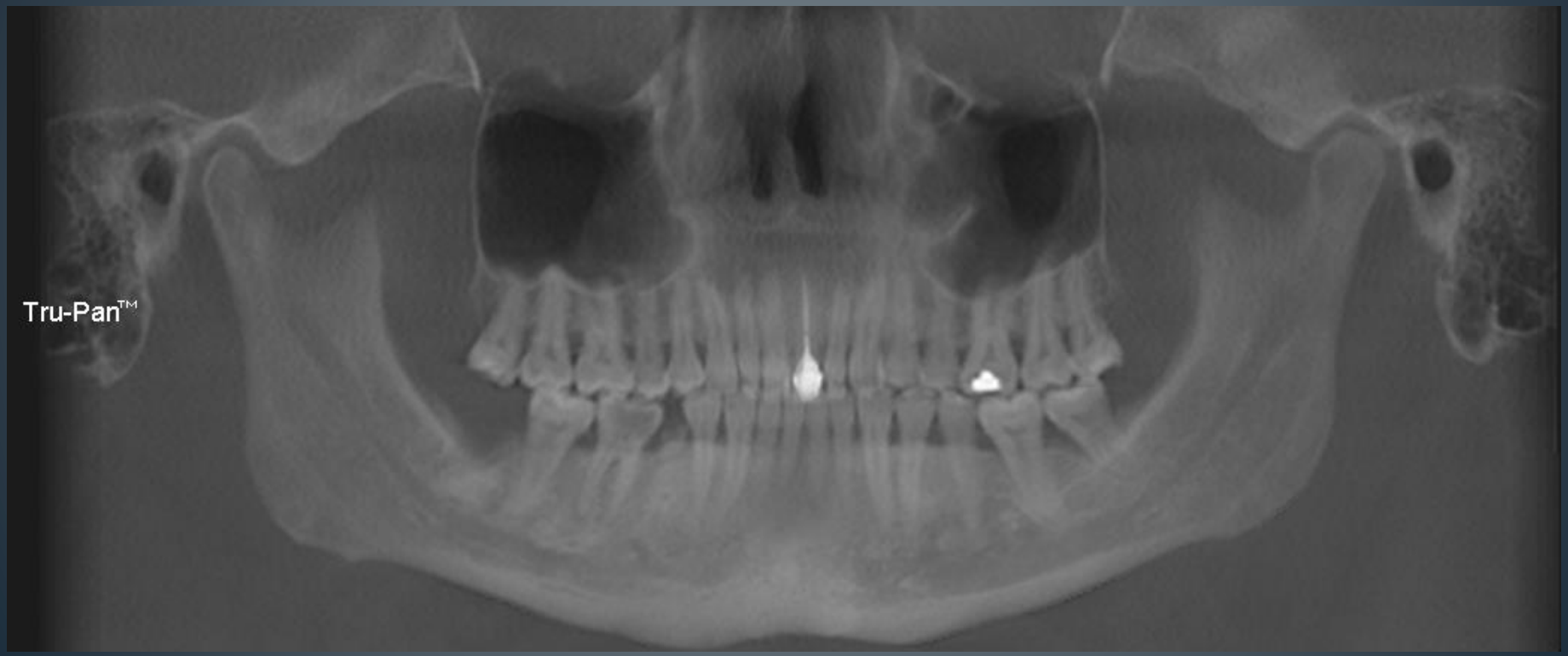
- Tooth movement or changes in dental occlusion.
- Gingival or dental soreness.
- Pain or soreness of the TMJ.
- Obstruction of oral breathing – can be overcome.
- Excessive salivation – initially.

Long Term Use of MADs (3+ years)

- Minor jaw/facial, tooth, muscle pain 40%
- Xerstomia 30%
- Very Satisfied 82%
- Satisfied 15%
- Painless, irreversible change in occlusion 26%

GT, Sohn JW, Hong CN. Treating obstructive sleep apnea and snoring: assessment of an anterior mandibular positioning device. J Am Dent Assoc. 2000;131:763-71.

Stable Teeth for an OA?



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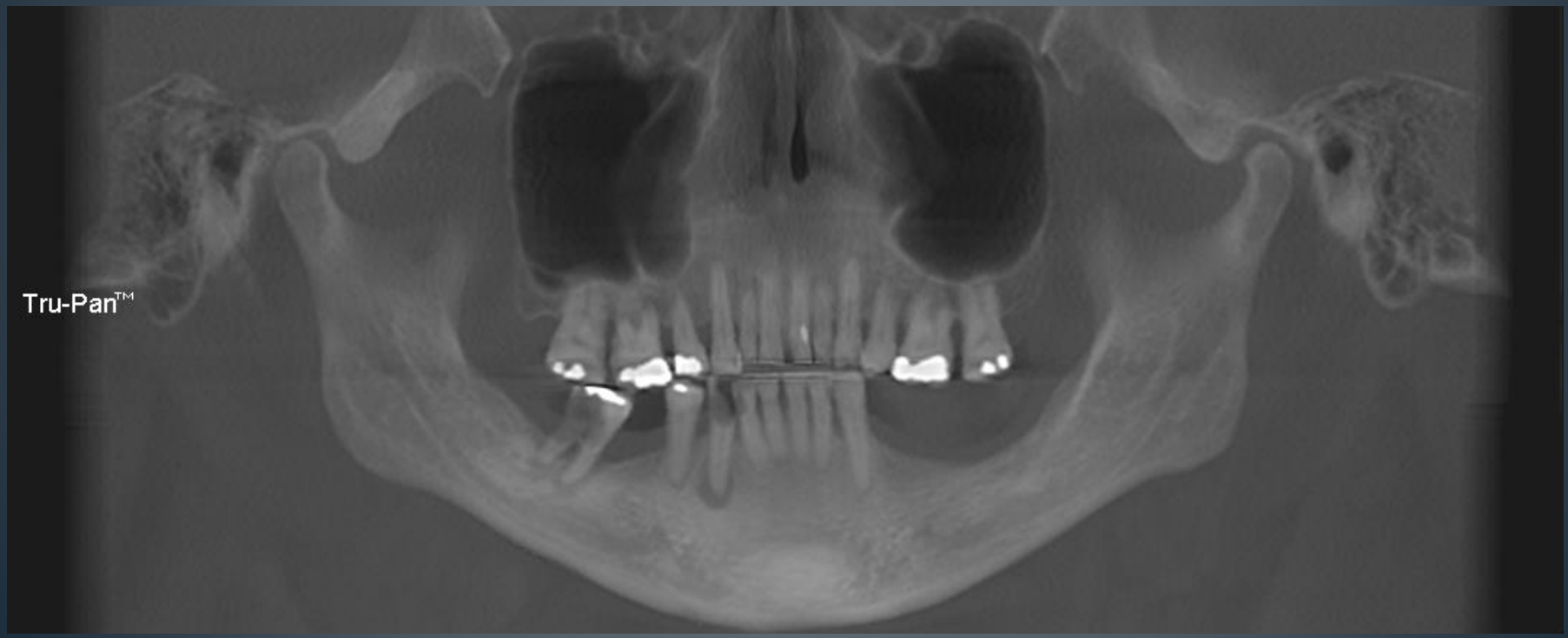
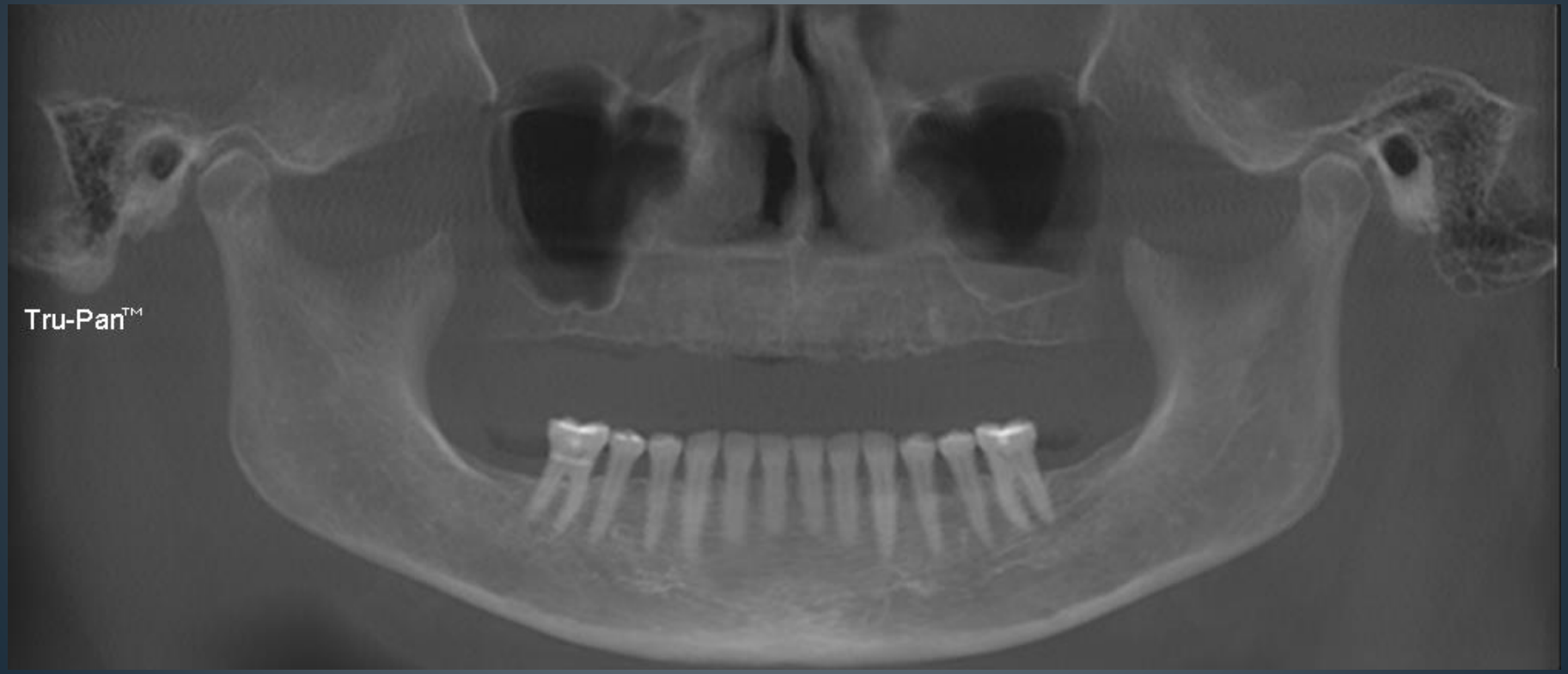


Stable Teeth for an OA?



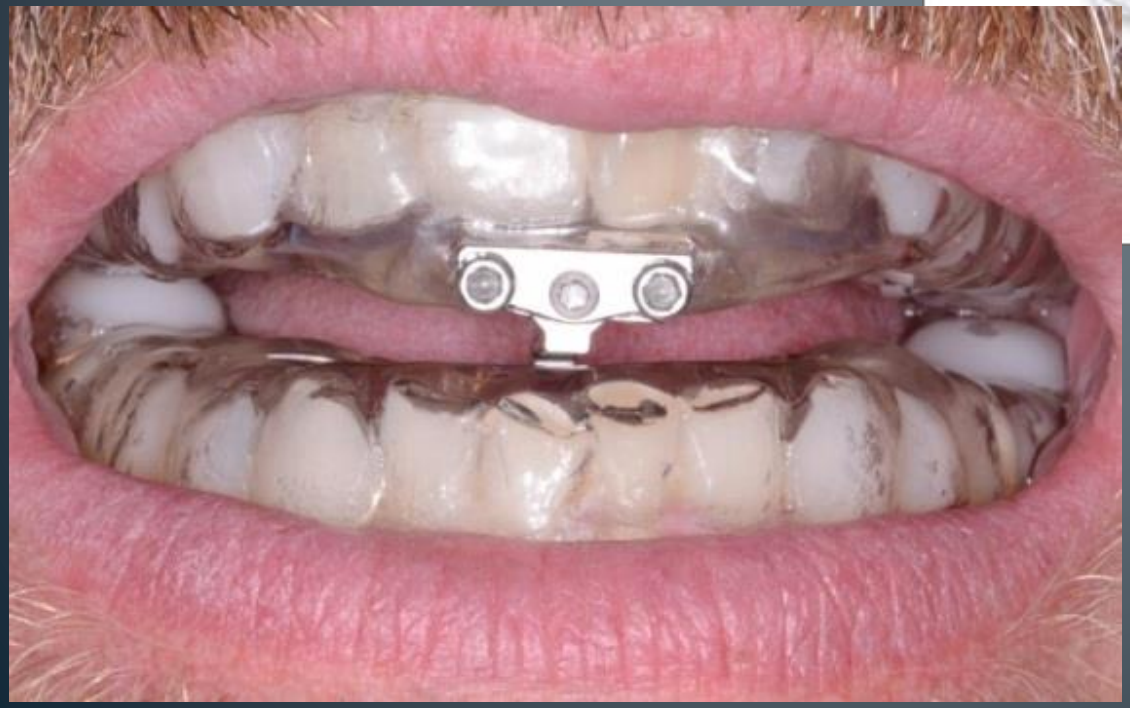
Types of MADs

- Dependent on number of healthy teeth.
- Material allergies can determine type.

TAP3TL & TAP Elite

- Easy to adjust and repair in office; can place soft thermal activated lining
- Protrusion mechanism can be modified to allow for greater, or reduced, protrusive movement w/o sending to lab
- Needs to be retentive – needs adequate clinical crown height & adequate hand strength
- TAP Elite allows lateral movement.

TAP3TL & TAP Elite



Elastic Mandibular Appliance (EMAs)

- Easy to remove and replace elastic band dictating amount of protrusion needed by dentist or patient.
- Needs to be retentive – needs adequate clinical crown height & adequate hand strength.
- EMAs allow some lateral movement.

Dorsal Style Appliances

- SomnoDent, Respire, Dynaflex Dorsal, Adjustable Dorsal
- Can be modified for bruxers by adding posterior stops
- Can be used on a multitude of patients including partially dentate and clinically short crowns
- Easy to adjust for fit – retention is less of a concern
- Requires lab re-set to achieve greater protrusion than initially allowed by appliance ($)

Dorsal Style Appliances

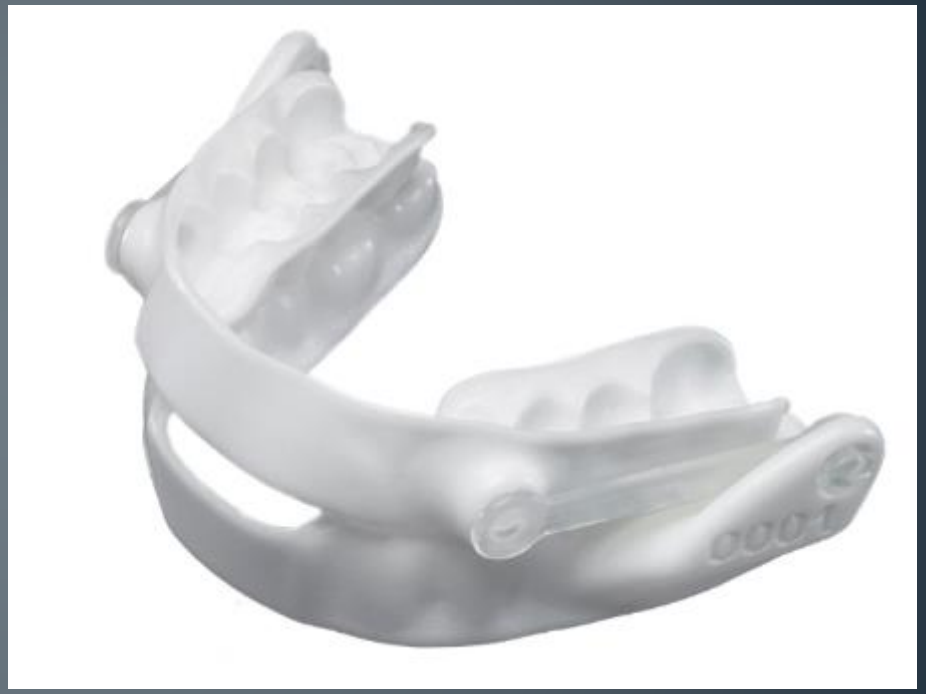
Herbst

- Multiple labs fabricate this appliance
- Can be fabricated of acrylic w/ball clasps for retention or w/a thermal activated lining
- Can be an option for multiple types of patients, but requires molars in 4 quadrants for best retention
- Has two different adjustment mechanisms which can allow for 5mm+ range of protrusive movement

Herbst

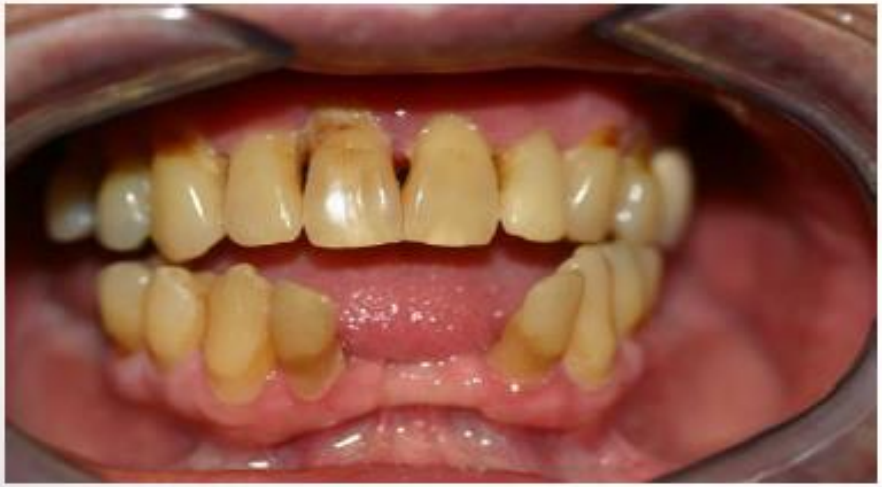
Narval

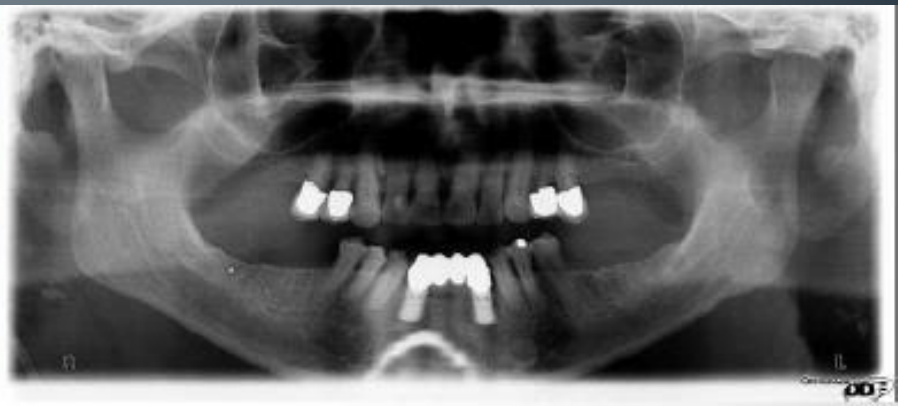
- Allows for greater range of protrusive movement, and the ability to start at a more retruded mandibular position
- CAD/CAM fabrication results in, typically, fewer adjustments on delivery
- 3 year warranty
- Thinner & lightweight, but requires posterior teeth in all 4 quads for adequate retention

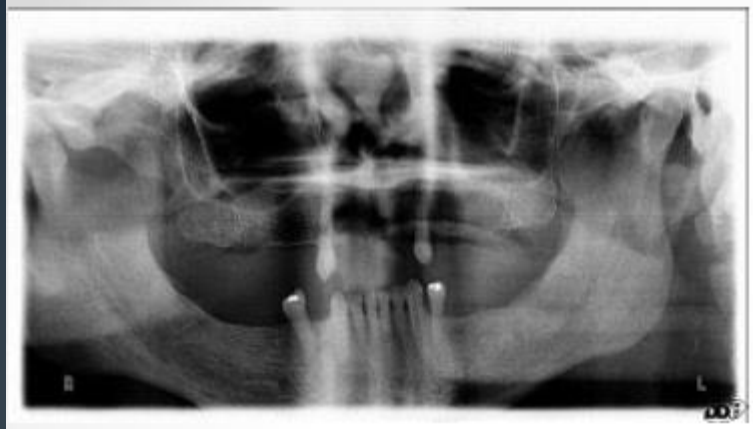


Partially Edentulous

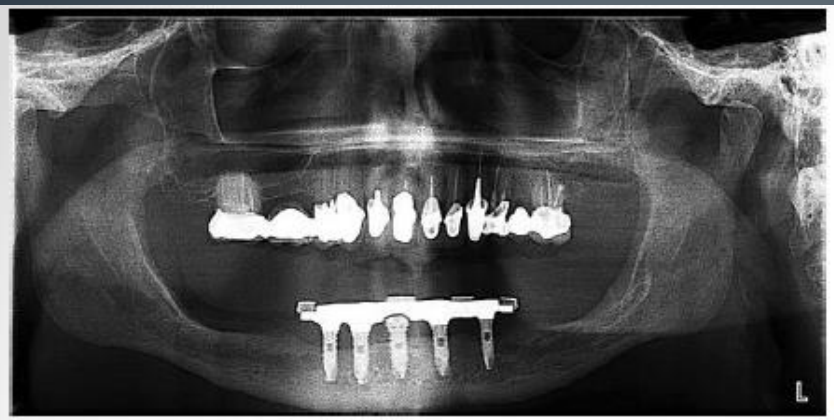
- Most appliances require at least 6-8 stable teeth per arch.
- Typically appliances without the arches affixed to one another (less retention required), unless the patient has posterior teeth.

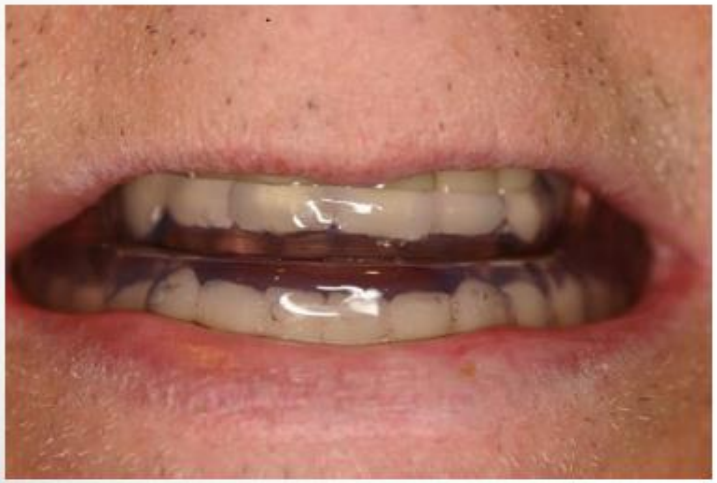






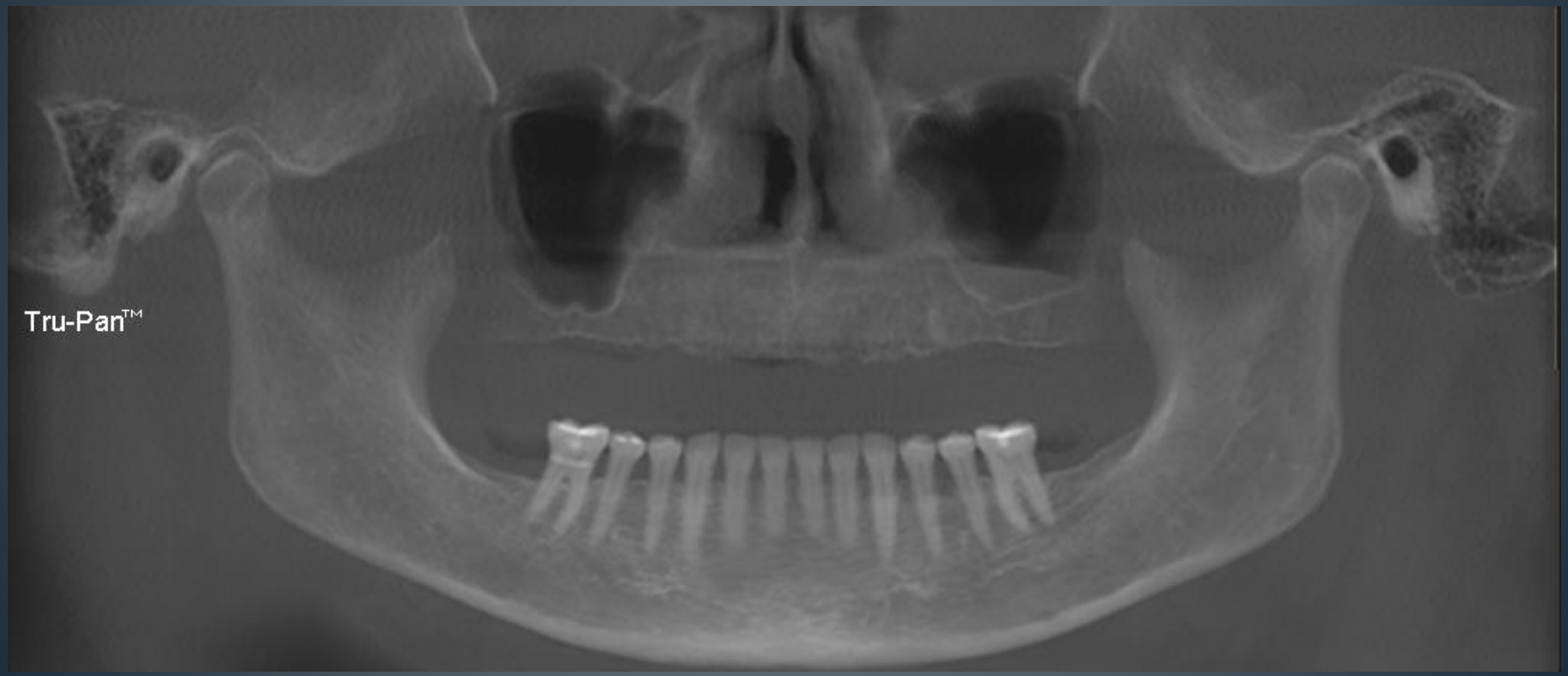
- Appliance can also be fabricated for a patient with a mandibular denture, as long as it is implant retained.

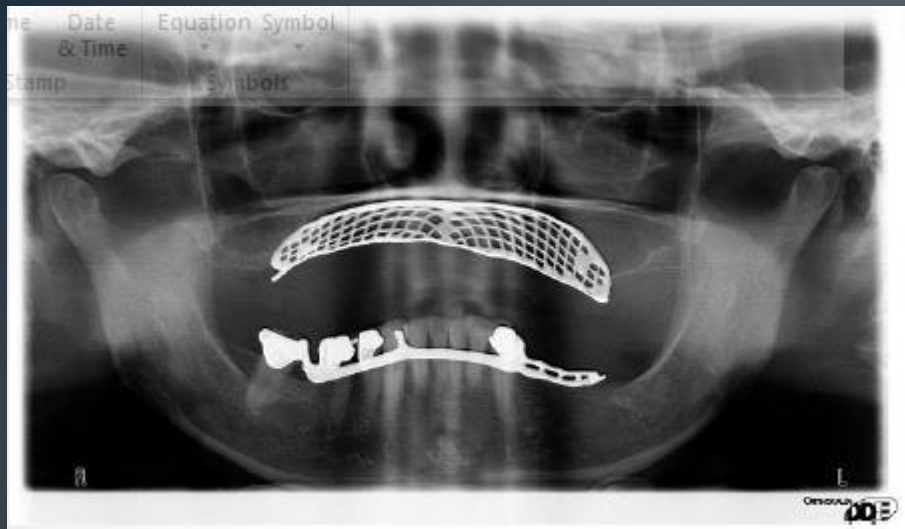


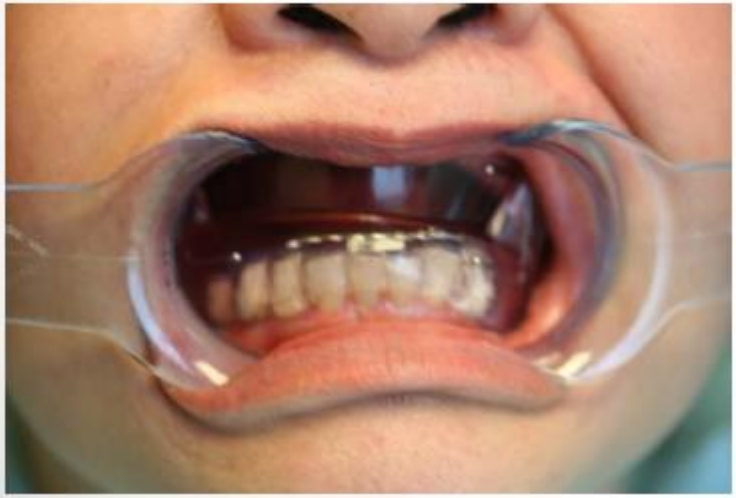


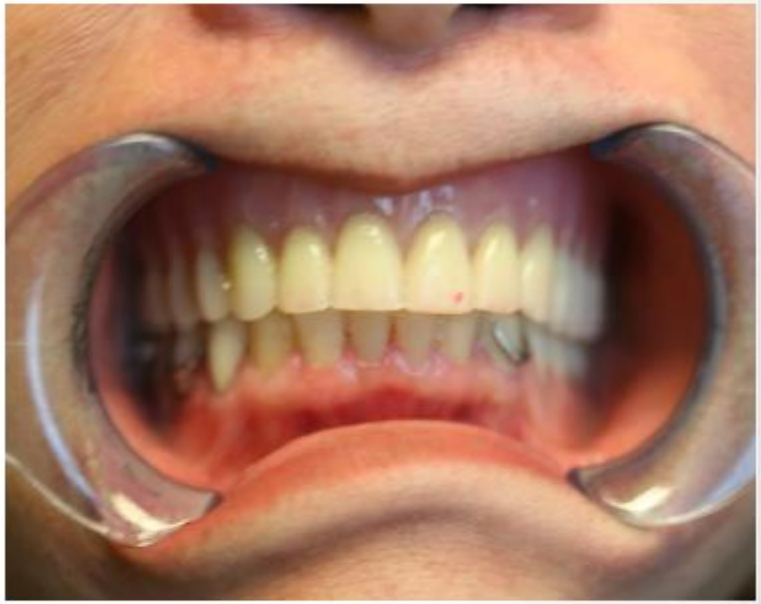
Maxillary Denture Patients

- Several appliances have options for the patient with an edentulous maxillary arch (mandibular arch should ideally have at least 6 teeth)
- Somnodent and Respire
- Dynaflex can be fabricated to a maxillary denture only


Tru-Pan™



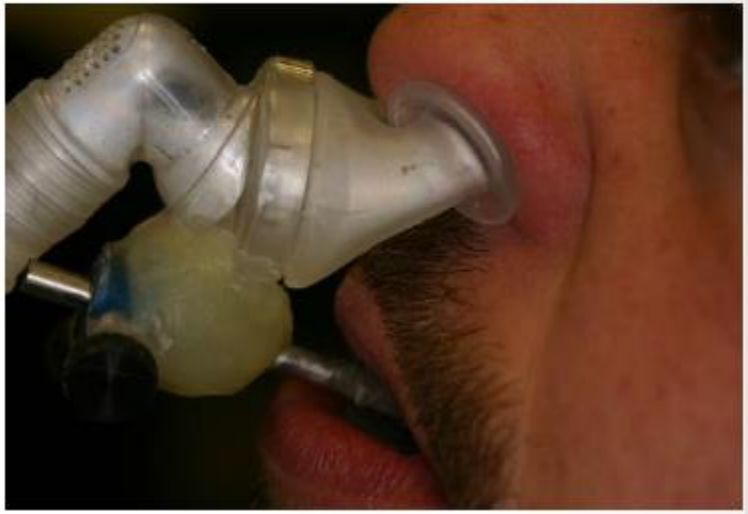




Nickel Allergy

Combination Therapy

- What if OA does not treat the OSA to the level desired by the physician?
- Multiple options including modification of the OA or use of the OA in conjunction with PAP
- TAP 3TL and TAP Elite can be modified into a TAP-PAP
- Dorsal style appliance can be modified with CPAP Pro

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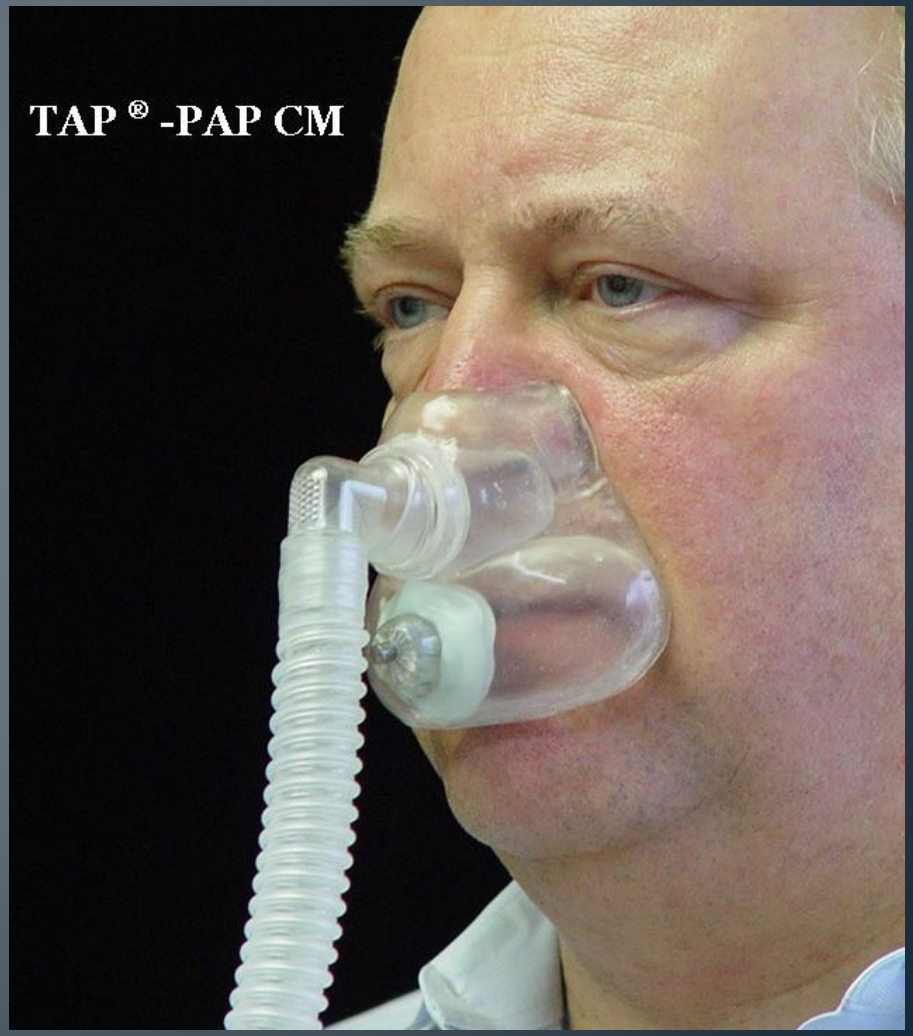
TAP ® -PAP CM

Resources

- http://healthysleep.med.harvard.edu/sleep-apnea/
- AADSM
- To be completed at a later date.