

Interdisciplinary Management of Obstructive Sleep Apnea in the Retrognathic Patient: A Case Study



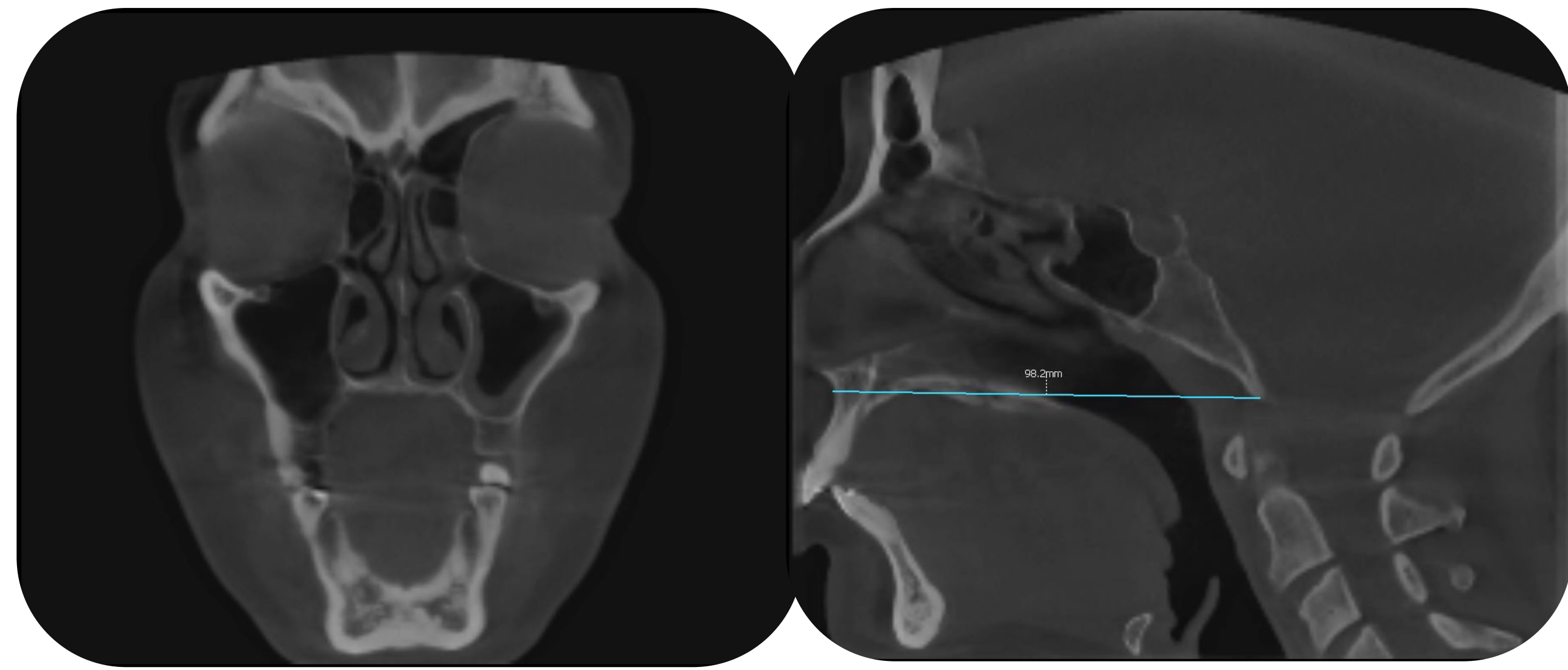
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INTRODUCTION

A retrognathic mandible is a misalignment of the jaw that can lead to various issues, one of which is obstructive sleep apnea (OSA). OSA is a sleep disorder characterized by repetitive instances of partial or complete blockage of the upper airway during sleep, resulting in breathing pauses and disruptions in normal sleep patterns. Retrognathic mandible can contribute to OSA by exacerbating airway narrowing or collapse, which further obstructs the flow of air and compromises normal breathing. The anatomical relationship between the mandible and the airway plays a crucial role in maintaining proper airflow during sleep. A retrognathic mandible can lead to a reduced oral cavity volume and space at the back of the throat, increasing the likelihood of the tongue and soft tissues collapsing into the airway. The obstruction with soft tissue is marked during sleep when muscle tone is reduced. This narrowing of the airway can result in snoring, gasping, or even complete cessation of breathing, all of which are hallmarks of obstructive sleep apnea.

IMPORTANCE OF 3D IMAGING



Mid Face:

- PVA line is 98.2 mm [average length]
- Proclined maxillary incisors from previous orthodontics
- Mildly congested left maxillary and sphenoid sinus

Lower Face:

- Proclined mandibular incisors
- Retrognathic mandible with small ANB angle
- Cervical spine shows forward head posture

PATIENT DEMOGRAPHICS AND HISTORY

Demographics:

- 36 year old female
- Originally presented to Brookdale clinic for comprehensive exam

Medical History: Sickle cell trait, hyperlipidemia, depression. Patient reports chronic fatigue, multiple naps during the day, heavy snoring, and frequent arousals at night.

Medications: Simvastatin, aripiprazole

Dental History:

- Last dental visit 2015
- History of fixed orthodontics as an adolescent, no extractions completed.

Cone Beam Computed Tomography (CBCT) is a valuable tool in the diagnosis and management of OSA. This three-dimensional imaging technique, provides detailed and accurate images of craniofacial structures, allowing clinicians to assess the intricate relationships between the mandible, maxilla, nasal passages, and pharyngeal anatomy, which are usually abnormal in OSA. CBCT aids in identifying anatomical factors that contribute to airway narrowing or collapse during sleep, such as enlarged tonsils, adenoids, and structural irregularities. By providing a comprehensive visualization of these structures, personalized treatment options can be formed and contribute to better patient outcomes.

OSA SCREENING AND DIAGNOSIS

The Lamberg questionnaire is a risk assessment tool used to establish the connection of medical conditions and the likelihood of a sleep disorder, by inquiring into the health of patient's body systems and published comorbid conditions with sleep disordered breathing. The Epworth Sleepiness Scale is a subjective measure that gauges an individual's level of daytime sleepiness, by prompting respondents to rate their likelihood of dozing off in various situations, providing a snapshot of their daytime sleepiness levels. Both tools play crucial roles in the initial assessment and preliminary screening of sleep disorders, facilitating timely referrals for comprehensive sleep studies and appropriate management strategies.

This patient's Lamberg score indicated a high risk of OSA. The Epworth Sleepiness scale was 18/24 indicating that patient is excessively sleepy during the day and should consider seeking medical attention.

4- TRADITIONAL SCREENING QUESTIONS	5- NEUROLOGY	6- DENTISTRY
<input checked="" type="checkbox"/> Do you awaken unrefreshed or feel sleepy during the day due to restless sleep? <input checked="" type="checkbox"/> Is your snoring loud enough to disturb others? <input checked="" type="checkbox"/> Have you been aware of your snoring for a long time? <input checked="" type="checkbox"/> Have you been told your breathing stops while asleep? <input checked="" type="checkbox"/> Do you ever wake yourself from sleep feeling that you are choking? <input type="checkbox"/> Have you ever had a sleep study? <input type="checkbox"/> Have you tried CPAP? (Was the pressure > 10.5 cm? Y/N) <input type="checkbox"/> Is your BMI > 27? Is your neck > 17" for a man, or > 15.5" for a woman?	<input type="checkbox"/> Do you experience numbness, tingling or pain in your feet or hands or head? <input type="checkbox"/> Do you ever experience leg cramps at night? <input type="checkbox"/> Do you ever experience muscle weakness or dizziness or difficulty with coordination? <input type="checkbox"/> Have you ever been diagnosed with Alzheimer's or dementia? <input type="checkbox"/> Have you ever been diagnosed with diabetes or hypothyroidism? <input type="checkbox"/> Have you unexpectedly gained or lost weight lately? <input type="checkbox"/> Have you gone through menopause? Are you on HRT? <input type="checkbox"/> Have you been diagnosed with low testosterone? <input type="checkbox"/> Do you experience repetitive limb movements or jerks in sleep, urges to move legs, night sweats, or leg cramps?	<input checked="" type="checkbox"/> Do you grind your teeth while sleeping? <input type="checkbox"/> Do your front teeth have a worn look? <input type="checkbox"/> Have you had jaw muscles or joint pain, ringing in your ears, vertigo, or dizziness? <input type="checkbox"/> Have you been diagnosed with periodontitis (gum disease)? <input type="checkbox"/> Are your teeth crowded or crooked or jaws misaligned? <input type="checkbox"/> Are you irritable upon waking in the morning? <input checked="" type="checkbox"/> Do you experience insomnia? (falling asleep or maintaining sleep) <input type="checkbox"/> Do you experience depression, PTSD, memory, or concentration problems? <input type="checkbox"/> Do you take medications for any of these conditions?
3- PULMONOLOGY	7- OTOLARYNGOLOGY	11- RHEUMATOLOGY
<input type="checkbox"/> Have you experienced difficulty breathing during the day? <input type="checkbox"/> Do you have shortness of breath, even with mild exertion? <input type="checkbox"/> Have you been diagnosed with COPD, asthma, or pulmonary hypertension? <input type="checkbox"/> Is asthma worse at night? <input type="checkbox"/> Do you have a chronic cough, either dry or productive?	<input checked="" type="checkbox"/> Do you have difficulty breathing through your nose? <input checked="" type="checkbox"/> Do you experience a dry mouth upon awakening? <input checked="" type="checkbox"/> Do you have allergies that make nasal breathing difficult? <input type="checkbox"/> Is postnasal drip a frequent problem?	<input type="checkbox"/> Have you ever been diagnosed with gout? <input type="checkbox"/> Have you ever been diagnosed with rheumatoid arthritis?
8- ENDOCRINOLOGY	9- PSYCHOLOGY & PSYCHIATRY	12- DERMATOLOGY
<input type="checkbox"/> Have you ever been diagnosed with diabetes or hypothyroidism? <input type="checkbox"/> Have you unexpectedly gained or lost weight lately? <input type="checkbox"/> Have you gone through menopause? Are you on HRT? <input type="checkbox"/> Have you been diagnosed with low testosterone? <input type="checkbox"/> Do you experience repetitive limb movements or jerks in sleep, urges to move legs, night sweats, or leg cramps?	<input type="checkbox"/> Do you experience numbness, tingling or pain in your feet or hands or head? <input type="checkbox"/> Do you ever experience leg cramps at night? <input type="checkbox"/> Do you ever experience muscle weakness or dizziness or difficulty with coordination? <input type="checkbox"/> Have you ever been diagnosed with Alzheimer's or dementia? <input type="checkbox"/> Have you ever been diagnosed with diabetes or hypothyroidism? <input type="checkbox"/> Have you unexpectedly gained or lost weight lately? <input type="checkbox"/> Have you gone through menopause? Are you on HRT? <input type="checkbox"/> Have you been diagnosed with low testosterone? <input type="checkbox"/> Do you experience repetitive limb movements or jerks in sleep, urges to move legs, night sweats, or leg cramps?	<input checked="" type="checkbox"/> Do you take medications for any of these conditions?

Polysomnography, is a comprehensive diagnostic tool used to assess and diagnose various sleep disorders, including obstructive sleep apnea (OSA). During a test, a patient's physiological parameters including brain waves, eye movements, oxygen saturation, etc are monitored and recorded while they sleep. In the context of OSA diagnosis, polysomnography helps to identify the frequency and severity of breathing disturbances, snoring, and periods of oxygen desaturation that are characteristic of the disorder. The data collected can accurately diagnose OSA and determining its severity in order to guide treatment approaches.

During the patient's sleep study 4 obstructive apneas and 35 hypopneas were recorded, resulting in an AHI of 7.4/hour of sleep. The longest apneic event was 22 seconds, with mean length at 13.9 seconds per event. Patient's lowest SpO2 was recorded at 90%. Therefore, patient was diagnosed with mild OSA.

TREATMENT

Treatment for obstructive sleep apnea associated with a retrognathic mandible typically involves a multidisciplinary approach. Continuous Positive Airway Pressure (CPAP) therapy, which involves using a machine to deliver a constant flow of air to keep the airway open, is commonly prescribed. In cases where the retrognathic mandible is a significant contributing factor, orthodontic interventions or oral appliances may be recommended. In patients with retrognathic mandibles, they need a protrusive range of 8 mm in order to have high rates of success with an oral appliance to stabilize OSA. Surgical options, such as maxillomandibular advancement to reposition the jaw to a more forward position and enlarging the airway to reduce the risk of airway collapse during sleep, can also be considered.

CONCLUSION

In conclusion, a retrognathic mandible can contribute to obstructive sleep apnea by narrowing the upper airway and increasing the risk of airway collapse during sleep. Early diagnosis and appropriate management, which may involve a combination of therapies, can significantly improve the quality of life for individuals with this condition, mitigating the adverse effects of both retrognathia and obstructive sleep apnea.

CLINICAL EXAM



Vertical Dimension:

- Harmonious facial thirds
- Frankfort mandibular plane angle WNL
- Lip dynamics asymmetrical

Transverse Dimension:

- Symmetrical
- Facial and dental midline coincident
- Mildly canted occlusal plane



Intraoral Exam-

- Mallampati score: Class III
- Missing #14
- Angle's Class II div 1
- Overbite: 50%
- Overjet: 8 mm
- Normal incisor show at rest and smiling

Anterior-Posterior Dimension-

- Profile type: Convex
- Facial Type: Retrognathic
- Tongue position in cricomenal space
- Head thrust position



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