**SLEEP APNEA**

**Defination of Sleep Apnea** - Sleep apnea is a potentially serious sleep disorder in which breathing repeatedly stops and starts. If you snore loudly and feel tired even after a full night's sleep, you might have sleep apnea. The main types of sleep apnea are:

**Types of Sleep Apnea** –

* Obstructive sleep apnea (OSA) - which is the more common form that occurs when throat muscles relax and block the flow of air into the lungs
* Central sleep apnea (CSA) - which occurs when the brain doesn't send proper signals to the muscles that control breathing
* Treatment-emergent central sleep apnea - also known as complex sleep apnea, which happens when someone has OSA — diagnosed with a sleep study — that converts to CSA when receiving therapy for OSA

**Causes of Sleep Apnea** - Sleep apnea happens when the muscles in the back of the throat relax. When the muscles relax, your airway narrows or closes as you breathe in. You can't get enough air, which can lower the oxygen level in your blood. Your brain senses that you can't breathe, and briefly wakes you so that you can reopen your airway. You might snort, choke or gasp. This pattern can repeat itself 5 to 30 times or more each hour, all night. This makes it hard to reach the deep, restful phases of sleep.

**Symptoms of Sleep Apnea** - The most common symptoms of sleep apneas include:

* Loud snoring.
* Episodes in which you stop breathing during sleep — which would be reported by another person.
* Gasping for air during sleep.
* Awakening with a dry mouth.
* Morning headache.
* Difficulty staying asleep, known as insomnia.
* Excessive daytime sleepiness, known as hypersomnia.
* Difficulty paying attention while awake.
* Irritability.

**Treatment of Sleep Apnea** - Possible treatments of Sleep Apnea include:

* Conservative (nonmedical) treatments.
* Positive airway pressure and adaptive ventilation devices.
* Oral appliances (mouthpieces).
* Nerve stimulators.
* Surgery.
* Medications (central sleep apnea only).

**Source Link** – 1) <https://my.clevelandclinic.org/health/diseases/8718-sleep-apnea>

2) [Sleep apnea](https://www.mayoclinic.org/diseases-conditions/sleep-apnea/symptoms-causes/syc-20377631#:~:text=Sleep%20apnea%20is%20a%20potentially,you%20might%20have%20sleep%20apnea.)

Sleep apnea to the following dental findings:

1. **Scalloped borders on the tongue caused by Sleep Apnea** - Sleep apnea may cause to press the tongue down against the teeth to open up the airways. This can lead to a scalloped tongue.

Document Source –

* [https://www.goldenstatedentistry.com/blog/scalloped-tongue-causes-treatment#:~:text=Sleep%20disorders%2C%20such%20as%20sleep,lead%20to%20a%20scalloped%20tongue.](https://www.goldenstatedentistry.com/blog/scalloped-tongue-causes-treatment%23:~:text=Sleep%20disorders%2C%20such%20as%20sleep,lead%20to%20a%20scalloped%20tongue.)
* [https://www.healthline.com/health/scalloped-tongue#\_noHeaderPrefixedContent](https://www.healthline.com/health/scalloped-tongue%23_noHeaderPrefixedContent)
* <https://www.medicalnewstoday.com/articles/scalloped-tongue>
* <https://doctorstevenpark.com/tongue-scalloping-a-simple-marker-for-sleep-apnea>

1. **Elongated uvulas** - An elongated soft palate and enlarged uvula may further compromise the airway. As mentioned previously, decreased muscle tone during sleep also contributes to airway collapse. The base of the tongue is a common site of hypopharyngeal obstruction in sleep apnea.

Document Source :-

* [Swollen Uvula Can Cause Sleep Apnea](https://www.whywesnore.com/blog/the-uvula-can-make-snoring-worse-but-what-is-it-really-for/)
* [What is Obstructive Sleep Apnea (OSA)?](https://www.aastweb.org/blog/what-is-obstructive-sleep-apnea)
* [Enlarged uvula can lead to snoring and obstructive sleep apnea](https://www.belmarrahealth.com/enlarged-uvula-can-lead-to-snoring-and-obstructive-sleep-apnea/)
* [Uvular Edema causes Obstructive Sleep Apnea](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1586864/)
* [The relationship of the Uvular Edema with Obstructive Sleep Apnea](https://pubmed.ncbi.nlm.nih.gov/29524092/)
* [Uvula in Snoring and Obstructive Sleep Apnea - PDF](http://www.remedypublications.com/open-access/uvula-in-snoring-and-obstructive-sleep-apnea-role-and-surgical-5851.pdf)
* [Relationship of Uvular Edema with Sleep Apnea and Uvula Removal Surgery](Relationship%20of%20Uvular%20Edema%20with%20Sleep%20Apnea%20and%20Uvula%20Removal%20Surgery)

1. **Mallampati and tongue position** - High Tongue Position is a Risk Factor for Upper Airway Concentric Collapse in Obstructive Sleep Apnea: Observation Through Sleep Endoscopy. Purpose: Identification of upper airway (UA) obstruction based on pharyngeal factors is important for obstructive sleep apnea (OSA) evaluation.

Document Source:-

* [High Tongue Position is a Risk Factor for Upper Airway Concentric Collapse in Obstructive Sleep Apnea](https://www.dovepress.com/high-tongue-position-is-a-risk-factor-for-upper-airway-concentric-coll-peer-reviewed-fulltext-article-NSS)
* [Mallampati Score and Predicting Sleep Apnea](https://www.sleepfoundation.org/sleep-apnea/mallampati-score)
* [Updated Friedman Staging System for Obstructive Sleep Apnea](https://www.karger.com/Article/Pdf/470859) – PDF
* [Utility of the modified Mallampati grade and Friedman tongue position in the assessment of obstructive sleep apnea](https://jcsm.aasm.org/doi/10.5664/jcsm.8188)
* [Diagnostic value of the Friedman tongue position and Mallampati classification for obstructive sleep apnea: a meta-analysis](https://pubmed.ncbi.nlm.nih.gov/23322629/)

1. **Nasal Valve** - Weak or collapsed sidewalls in the nose can obstruct airflow and cause sleep apnea. Sidewalls can be collapsed all of the time or only when you're inhaling. There are several surgical procedures that can be performed to widen or support your nasal valves: Spreader grafts widen the nasal valve.

Document Source:-

* [The role of the nasal valve in patients with obstructive sleep apnea syndrome](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6502075/)
* [Effect of nasal valve dilation on obstructive sleep apnea](https://pubmed.ncbi.nlm.nih.gov/10988176/)
* [The Effects of Nasal Dilation on Snoring and Obstructive Sleep Apnea](https://jamanetwork.com/journals/jamaotolaryngology/article-abstract/620484)
* [Effect of Nasal-Valve Dilation on Obstructive Sleep Apnea](https://www.sciencedirect.com/science/article/abs/pii/S0012369215364606)
* [High incidence of posterior nasal cavity obstruction in obstructive sleep apnea patients](https://sleep.biomedcentral.com/articles/10.1186/s41606-016-0002-3)
* [The role of nasal valve in the pathogenesis of obstructive sleep apnoea and snoring](https://erj.ersjournals.com/content/30/6/1208)
* [Effect of treating severe nasal obstruction on the severity of obstructive sleep apnoea](https://erj.ersjournals.com/content/25/3/521)
* [Nasal Involvement in Obstructive Sleep Apnea Syndrome](https://www.hindawi.com/journals/ijoto/2014/717419/)
* [Sleep Apnea Surgery for the Nasal Cavities](https://www.pennmedicine.org/for-patients-and-visitors/find-a-program-or-service/sleep-medicine/sleep-apnea-program/obstructive-sleep-apnea-treatment/sleep-apnea-surgery/sleep-apnea-surgery-for-the-nasal-cavities#:~:text=Nasal%20Valve%20Surgery,grafts%20widen%20the%20nasal%20valve)

1. **High palates** - Having a high arched palate could lead to a narrow airway and a sleep breathing disorder like sleep apnea. A narrow maxilla with high arched palate characterizes a phenotype of obstructive sleep apnea (OSA) patients that is associated with increased nasal resistance and posterior tongue displacement. Current maxillary expansion techniques for adults are designed to correct dentofacial deformity.

Document Source:-

* [Distraction Osteogenesis Maxillary Expansion (DOME) for Adult Obstructive Sleep Apnea Patients with High Arched Palate](https://pubmed.ncbi.nlm.nih.gov/28675100/#:~:text=A%20narrow%20maxilla%20with%20high,designed%20to%20correct%20dentofacial%20deformity.)
* [Cranial Problems and High Arched Soft Palate](https://www.soundsleephealth.com/cranial-problems-and-sleep-breathing-disorders/)
* [(DOME) for Adult Obstructive Sleep Apnea Patients with High Arched Palate](https://rachelbarnhartdds.com/wp-content/uploads/2018/09/DOME-FINAL.pdf)
* [The Uniqueness of the Human Airway](https://sleepreviewmag.com/sleep-disorders/breathing-disorders/obstructive-sleep-apnea/the-uniqueness-of-the-human-airway/)
* [Dome Treatment for Adult Obstructive Sleep Apnea Patients with High Arched Palate](http://vivatysons.com/blog/2019/03/31/dome-treatment-for-adult-obstructive-sleep-apnea-patients-with-high-arched-palate/)
* [Distraction Osteogenesis Maxillary Expansion for Obstructive Sleep Apnea Patients with High Arched Palate.](https://stanfordhealthcare.org/publications/454/454598.html)

1. **Altered passive eruption of maxilla related to mouth breathing** –

Document Source:-

* [Dental arch morphology in children with sleep-disordered breathing](https://academic.oup.com/ejo/article/31/2/160/467349)
* [Craniofacial Sleep Medicine: The Important Role of Dental Providers in Detecting and Treating Sleep Disordered Breathing in Children](Craniofacial%20Sleep%20Medicine:%20The%20Important%20Role%20of%20Dental%20Providers%20in%20Detecting%20and%20Treating%20Sleep%20Disordered%20Breathing%20in%20Children)
* [Mouth Breathing and Sleep apnea syndrome](http://srmdentalcollege.ac.in/wp-content/uploads/2021/02/NIRF-MOUTH-BREATHING-min.pdf)
* [Effects of Airway Problems on Maxillary Growth: A Review](https://www.researchgate.net/publication/26814013_Effects_of_Airway_Problems_on_Maxillary_Growth_A_Review)
* [Association between mouth breathing and sleep apnea](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5225794/)
* [The Connection Between Sleep Apnea and Oral Health](https://www.verywellhealth.com/sleep-apnea-and-oral-health-4587690)

1. **Toothache bruxism** - Sleep bruxism is considered a sleep-related movement disorder. People who clench or grind their teeth (brux) during sleep are more likely to have other sleep disorders, such as snoring and pauses in breathing (sleep apnea). Bruxism has many risk factors, including misaligned bite, poor health habits, and stress. Sleep apnea is another risk factor because the pauses in breath can cause episodes of teeth grinding. As a result, one in four teeth grinders also suffers from sleep apnea.

Document Source:-

* [Bruxism (teeth grinding)](https://www.mayoclinic.org/diseases-conditions/bruxism/symptoms-causes/syc-20356095#:~:text=Sleep%20bruxism%20is%20considered%20a,in%20breathing%20(sleep%20apnea).)
* [The Link Between Snoring, Sleep Apnea & Teeth Grinding](https://www.westcountydental.com/blog/2022/03/the-link-between-snoring-sleep-apnea-teeth-grinding/)
* [The Relationship between Sleep Bruxism and Obstructive Sleep Apnea Based on Polysomnographic Findings](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6832407/)
* [Sleep bruxism related to obstructive sleep apnea: the effect of continuous positive airway pressure](https://pubmed.ncbi.nlm.nih.gov/14592147/)
* [The Link Between Sleep Apnea and Teeth Grinding](https://www.sleepfoundation.org/sleep-apnea/link-between-sleep-apnea-and-teeth-grinding)
* [Teeth Grinding & Sleep Apnea](https://www.sleepapnea.org/sleep-health/teeth-grinding-and-sleep-apnea/)
* [The Link Between Sleep Apnea and Your Dentist](https://www.webmd.com/oral-health/features/link-sleep-apnea-dentist)
* [Is sleep apnea causing you to grind your teeth at night?](https://healthysmiledental.com.au/is-sleep-apnea-causing-you-to-grind-your-teeth-at-night/)
* [Is Your Sleep Apnea Causing Teeth Grinding (Bruxism)?](https://espiredental.com/is-your-sleep-apnea-causing-teeth-grinding-bruxism/)