

# Visualizing the Airway in Orthodontics

Three-dimensional imaging with cone beam computed tomography (CBCT) is quickly growing in the field of orthodontics.

Developed with the support of Dr. Robert Norris

In addition to helping orthodontists make more confident diagnoses and offer enhanced treatment for their patients, it takes just two clicks within a CBCT system's software to visualize the airway—and potentially change the patient's life.





## Looking for the 800-Pound Gorilla in the Room

There's a well-known concentration experiment that asks viewers to watch a video and count how many times a basketball is passed back and forth.

The viewer is so focused on the ball that they completely miss a man in a gorilla suit walking casually through the scene. It's a phenomena known as "inattention blindness," and the originator of the test explains it as: "When our attention is focused on one thing, we fail to notice other, unexpected things around us."<sup>1</sup>

The same is true for orthodontists. We're trained to look at teeth, but perhaps we're spending too much time looking at teeth and not enough time looking for the "gorilla," i.e., an underlying cause to what may seem a common occurrence.

### FIND THE "GORILLA"\*



**A**  
Open bite with tongue thrust?  
But why is the tongue anterior?



**B**  
Trouble with spacing; is there a greater underlying cause?



**C**  
Narrow palate, for sure. But where does the tongue sit in this patient's mouth?



**D**  
Obvious wear, but only on the anterior. Why?

<sup>1</sup> Simon D. 2012 Sept. But did you see the gorilla? The problem with inattention blindness. Smithsonian Magazine.

\*[Click here](#) for the answers





In my experience, I've found the airway to be the "gorilla." I've been examining the airway for the past 15 years, encouraging more education and collaboration between the orthodontic and medical community, particularly ENTs.

Though the medical community recognizes serious issues can arise from a constricted airway, particularly obstructive sleep apnea (OSA), most physicians don't take early signs of airway issues seriously. This can make it difficult when referring patients to an ENT for Class III tonsils, for example. Past clinical experience ("These tonsils are enlarged, but I've seen bigger") and issues with insurance are just a few of the reasons medical doctors seem reluctant to address the issue.

As orthodontists, we need to be the leaders in airway visualization, especially as we're in a unique situation to recognize the signs and symptoms in children. Constrictions of the nasal airway and/or pharyngeal airway can affect dental and facial development, but also include significant systemic issues, such as ADHD, bedwetting, narcolepsy and hormonal imbalances, to name just a few. If you're noticing any of the signs below, it's worth considering pharyngeal or nasal obstruction as the root cause.

Pharyngeal Airway Obstruction	Nasal Airway Obstruction (Mouth Breathing)
<ul style="list-style-type: none"> <li>Bruxism/Tooth wear</li> <li>Open bite</li> <li>Anterior spaces</li> <li>Scalloped tongue</li> <li>Abfraction lesions</li> </ul>	<ul style="list-style-type: none"> <li>Narrow maxilla</li> <li>Posterior crossbite</li> <li>High mandibular plane angle</li> <li>Vertical maxillary excess</li> <li>High caries risk</li> <li>Short upper lip</li> </ul>

## Recognizing Dental Signs of Airway Obstruction





## Getting Parents and Referrals to Act

It's one thing to identify airway constriction as an underlying issue. It's another thing to convince parents to act—when a parent brings their child to the orthodontist for overcrowding, they're not expecting to be told they may need a tonsillectomy—and for referrals to follow your recommendation.

That's where documentation comes into play. The tools below help call attention to the airway in a way that parents easily grasp and also builds a better case with referrals for recommended treatment.

### ✓ **CHERVINE PEDIATRIC SLEEP QUESTIONNAIRE (PSQ):<sup>2</sup>**

Ask your patient's parent or caregiver to fill out a sleep questionnaire to include in your referral to the ENT. Eight or more positive answers is nearly as good as a pediatric sleep study. The questionnaire is available across the Internet and can be customized to your practice.

### ✓ **CS AIRWAY MODULE:**

If you have ordered a CBCT scan for your patient, take the extra step of tracing the airway. With the CS Airway module, you can trace the airway in just a few clicks. The module then automatically segments and measures the upper airway, showing constrictions with easy-to-understand color coding.

<sup>2</sup> Chervin RD<sup>1</sup>, Hedger K, Dillon JE, Pituch KJ. 2000 Feb 1. Pediatric sleep questionnaire (PSQ): validity and reliability of scales for sleep-disordered breathing, snoring, sleepiness, and behavioral problems. *Sleep Med.* 1(1):21-32.



## WATCH THIS VIDEO



SEE CS AIRWAY IN ACTION! Click on the image above to watch the video on YouTube.



## LIFE-CHANGING AIRWAY VISUALIZATION

For this patient, all it took was a quick two-click airway visualization to find a constriction of 38 mm<sup>2</sup> at the level of the tonsils.

A cephalometric scan revealed a curved neck which could be compensating for the constriction by trying to open the airway. The patient also had Class III tonsils.

The airway visualization, constriction measurement and all other findings were included in the referral to the ENT with a recommendation for a tonsillectomy.

In my office, we used a miniscrew-assisted rapid palatal expander (MARPE) to widen the maxilla, which eventually widened the patient's airway to 99 mm<sup>2</sup>.

Here are  
the answers!



## HOW DID YOU DO?— Looking for the 800-Pound Gorilla in the Room

### FIND THE “GORILLA”—THE ANSWERS



Many patients with anterior open bites have narrow pharyngeal airway space, often exacerbated by enlarged tonsils. The anterior tongue posture is frequently the body's natural effort to open the pharyngeal airway. Even if we close the open bite, it probably wouldn't be stable unless we addressed the underlying root of the problem: Potential pharyngeal airway constriction.



For years, I just saw spaces. Now, I see that the tongue assuming a more anterior position (“tongue thrust,” “tongue position,” what have you) due to airway pharyngeal constriction. Now we know to ask the questions and look more carefully at the airway space on these kinds of patients.

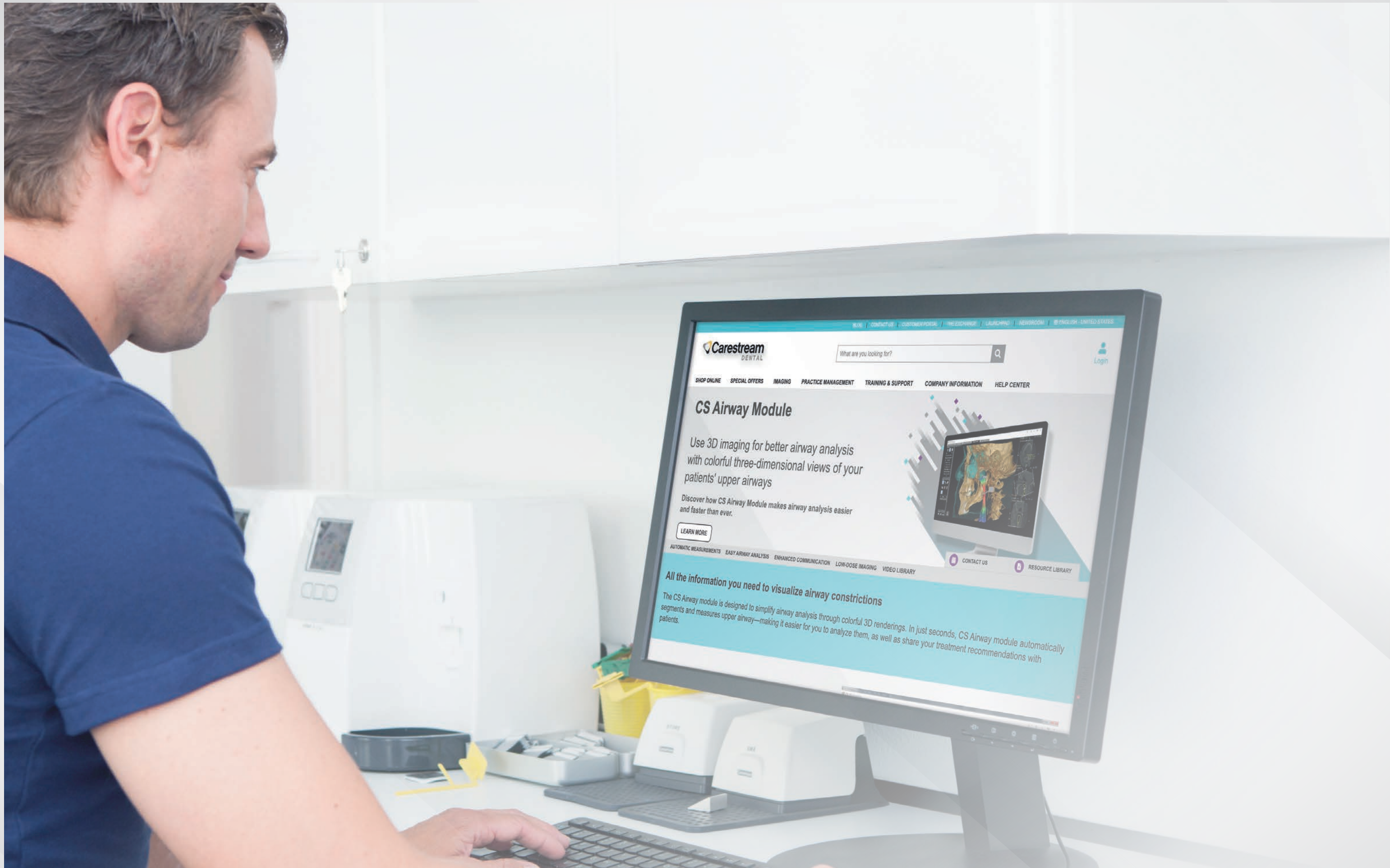


Why is the palate so narrow? The tongue is assuming an inferior position in the mouth, possibly due to a tongue tie or a nasal airway constriction (leading to mouth breathing). The tongue must assume a more inferior position to allow air to pass through the mouth. The palate then never receives the lateral and anterior support of the tongue and it never develops properly.



The patient could be jutting their lower jaw forward into protrusion and then bruxing while going in and out of deeper levels of sleep. If they're constantly going in and out of deep sleep—common with obstructive sleep apnea—than the wear could be more prominent on the anterior.





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## ABOUT DR. ROBERT NORRIS



Dr. Robert "Tito" Norris completed dental school at the University of Texas Health Science Center San Antonio, and did a general practice residency at the Washington DC VA Medical Center, followed by an orthodontic residency at Howard University. He then served three years in the Air Force as an orthodontist in Misawa, Japan, before opening his practice in 1998 in San Antonio.

Norris was board certified in 2003 and has served as a clinical consultant for numerous technology companies along the way.

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