In recent years there has been a lot of talk about central apneas in obstructive sleep apnea (OSA) patients. What are the facts?

What is the true prevalence of central events?

The prevalence of persistent central sleep apnea (CSA) or Complex Sleep Apnea in CPAP patients is around 1.5%.\textsuperscript{1,2}

Research suggests that central apneas are a transient phenomenon that tends to resolve within eight weeks of continuous positive airway pressure (CPAP) treatment, after a period of adaptation to the treatment.\textsuperscript{1,3}

Where do we see central apneas?

CSA is commonly seen in the sleep lab environment during CPAP titration. It is important however, to distinguish between persistent CSA, which may need specific treatment, and CPAP-emergent CSA, a natural titration-related phenomenon, that appears to resolve naturally with time.

What is the evidence to suggest that the prevalence of persistent CSA is so low?

Two studies have been published which report a low incidence of persistent CSA or Complex Sleep Apnea:

- In one study, CSA was examined in a large population (1,286 patients), where the prevalence of CSA was 6.5% during initial CPAP titration.\textsuperscript{1} Following approximately five to six weeks of treatment, only 1.5% of patients had persistent CSA whilst on CPAP. Additionally it is important to note that approximately half of these (0.8%) had CSA before their initial CPAP titration. Therefore, 0.6% is the true prevalence of persistent CPAP-emergent CSA.

- In another study, which included 1,776 patients, 3.1% of patients had central apneas on CPAP titration. When excluding patients with elevated brain natriuretic peptide levels (i.e. an indication of heart failure), this reduced to 1.57% of patients developing unexplained CSA on CPAP titration.\textsuperscript{2}

CPAP-emergent CSA tends to be a natural and transient phenomenon that resolves in the vast majority of patients.

Can we identify, upfront, those who genuinely have an increased risk of CSA?

Yes we can. For the very small group of at-risk patients, there are some known risk factors for CSA.\textsuperscript{1} These risk factors are listed below.

Only 1.5% of CPAP patients have unresolved CSA after ongoing CPAP usage
If we identify those at higher risk of CSA we can simplify patient management

- Systolic Heart Failure
- High Altitudes
- Most Severe OSA
- Opioid Users
**Why do central apneas occur?**

CPAP-emergent central apneic events result from instability of the respiratory control system that is commonly seen in untreated OSA. These events appear to manifest from reversible increases in chemoreflex sensitivity to low to carbon dioxide ($CO_2$). Thus, people with untreated OSA are more likely to respond appropriately to a change in $CO_2$ (physiologically speaking). Therefore there is an increased likelihood of CPAP-emergent central apneas.

In addition, these central apneas are more likely to occur in the transitory phases of sleep as this is when $CO_2$ thresholds are naturally shifting. This is the reason why post-arousal central apneas are common. It is important to stress that following eight weeks of CPAP use these ventilatory abnormalities are no longer evident.\(^a\)

**In summary, OSA patients sometimes demonstrate unstable ventilatory responses, which normalize once the patient has had some time on CPAP.**

### At-a-glance reference table

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<td><strong>1</strong> Javaheri S et al. The prevalence and natural history of complex sleep apnea. Journal of Clinical Sleep Medicine 2009; 5(3): 205-11.</td>
<td>• The prevalence of CPAP-persistent central sleep apnea (CSA) is only about 1.5%</td>
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<td><strong>2</strong> Westhoff M et al. Prevalence and treatment of central sleep apnoea emerging after initiation of continuous positive airway pressure in patients with obstructive sleep apnoea without evidence of heart failure. Sleep Breath 2011. Feb 25 [ahead of print].</td>
<td>• The prevalence of Complex Sleep Apnea or persisting Central Sleep Apnea in patients with OSA and normal brain natriuretic peptide levels who are using CPAP therapy is only 1.57%</td>
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<td><strong>3</strong> Demaika T et al. The significance and outcome of continuous positive airway pressure-related central sleep apnea during split-night sleep studies. Chest 2007; (132): 81-7.</td>
<td>• Central sleep apnea (CSA) events occurring during continuous positive airway pressure (CPAP) titration resolve over time • CSA events are not indicative of subclinical heart failure</td>
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<td><strong>4</strong> Salloum A et al. Increased propensity for central apnea in patients with obstructive sleep apnea. American Journal of Respiratory and Critical Care Medicine 2010; (181): 189-93.</td>
<td>• Ventilatory instability is increased in subjects with OSA and is reversible with the use of CPAP</td>
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