



# Central sleep apnoea syndrome (CSA)

This information sheet from Great Ormond Street Hospital (GOSH) explains the causes, symptoms and treatment of central sleep apnoea syndrome (CSA) and where to get help.

## What is central sleep apnoea syndrome?

Central sleep apnoea (CSA) is a disorder in which there are pauses in breathing while asleep – these are called apnoeas. The body does not make an attempt to breathe during these pauses. A certain number of apnoeic pauses are normal in all infants, children and young people. For individuals diagnosed with CSA, these apnoeas are generally longer and more frequent. CSA occurs when the brain does not send the correct signals to the muscles that control breathing. This differs from obstructive sleep apnoea (OSA) where normal breathing is affected by obstruction in the upper air passage (throat). CSA is less common than OSA.

## What causes central sleep apnoea syndrome?

CSA can be caused by a number of conditions that affect the control centres for breathing in the brain, known as the brainstem. The brainstem is very sensitive to the chemicals in your blood (it is called chemoreception) and particularly to carbon dioxide (CO<sub>2</sub>). If your CO<sub>2</sub> falls too low (when you hyperventilate or after a big sigh, for example) there will be a central apnoea as a result to ensure it rises again. There are different types of CSA and these include:

- Apnoea of Infancy/Apnoea of Prematurity. Babies and young children have prolonged apnoeic pauses or cycles of a few breaths and short pauses repeating regularly over

a period of time usually in sleep. This disorder may be caused by immaturity of the brainstem respiratory control centre or from other medical conditions.

- Central sleep apnoea due to an underlying medical condition affecting the nervous system (either brainstem or nerves going to the muscles). Several medical conditions may lead to CSA including neurological, craniofacial abnormalities, neuromuscular conditions or injury/abnormality of the brainstem.
- Central sleep apnoea due to an underlying medical condition affecting chemoreception: Several medical conditions may lead to CSA including congenital central hypoventilation syndrome (CCHS), cardiac failure, obesity hypoventilation syndrome (OHS) and Prader Willi syndrome, for example.

## What are the signs and symptoms of central sleep apnoea syndrome?

Common signs and symptoms of CSA include:

- Observed episodes of stopped breathing or abnormal breathing patterns during sleep
- Abrupt awakenings accompanied by shortness of breath
- Difficulty staying asleep (insomnia)
- Excessive daytime sleepiness (hypersomnia)
- Difficulty concentrating
- Mood changes
- Morning headaches
- Snoring – although this may not be as prominent as in the presence of OSA



## How is central sleep apnoea syndrome diagnosed?

Breathing difficulties while sleeping can be caused by a variety of medical conditions, so a range of diagnostic tests may be needed to confirm or rule out CSA. Sleep studies are the main method of investigating CSA. A sleep study usually means an overnight stay in a sleep unit, where measurements of the child's breathing during sleep are recorded by technologists/physiologists experienced in working with children. The measurements are recorded using stick-on or wrap-around sensors and include respiratory rate, heart rate, oxygen saturation, chest wall movement, airflow, measurement of CO<sub>2</sub>, video and sound recording. The results are then interpreted by a paediatric sleep consultant, who can make a diagnosis of CSA.

## How is central sleep apnoea syndrome treated?

### ■ **Maturity.**

Apnoea of prematurity/infancy may improve as the child gets older and the respiratory centre matures. It is likely the sleep consultants will check this by organising follow-up sleep studies.

### ■ **Supplemental oxygen.**

Breathing extra oxygen during sleep may help reduce the number of apnoeic pauses and lessen the effects of CSA by improving the oxygen levels in the blood.

### ■ **Bilevel Positive Airway Pressure (BPAP).**

BPAP is a form of breathing assistance using a ventilator device that delivers extra air pressure into the airway via a mask placed on the face. The level of air pressure provided varies on breathing in or breathing out. BPAP can also be set to deliver a breath if there has not been a breath within a certain number of seconds.

### ■ **Medications.**

It is possible that medication may be available to help stimulate breathing in patients with CSA.

### ■ **Surgical.**

If the brainstem is affected by either an abnormality or a compression from the skull, such as in Chiari malformation, surgical options may be available.

## What happens next?

If your child has been diagnosed with CSA and has been treated or if it was decided to wait and follow progress, a follow-up sleep study will be arranged. This enables the medical professionals to assess if CSA has been successfully treated or if an alternative treatment is needed.

## Further information and support

The **British Lung Foundation** offers support and advice to anyone affected by a breathing condition. Call their helpline on 03000 030 555 from Monday to Friday from 9am to 5pm or visit their website at [www.blf.org.uk](http://www.blf.org.uk).

The **Sleep Apnoea Trust** website ([www.sleep-apnoea-trust.org](http://www.sleep-apnoea-trust.org)) contains information about all types of sleep apnoea.