

# SLEEP APNOEA AND DYSFUNCTIONAL BREATHING

## The link missed by the Sleep Study industry.

By Roger Price

Respiratory Physiologist

I would like to commence by stating that there is no doubt in my mind that Sleep Apnoea exists and is a valid and extremely debilitating condition.

I also agree that in certain cases it is possible to achieve a remarkable turn-around through the use of a CPAP or BiPAP machine.

In just on 10 years of treating people with asthma, chronic snoring and sleep apnoea, I have however reached the conclusion that these conditions are very often incorrectly diagnosed and inappropriately treated.

It was confirmed in March 2007, at the Annual Conference of the Australian New Zealand Thoracic Society, that asthma was being grossly misdiagnosed and incorrectly treated with inhaled medication.

By the same token the snoring industry has been over prescribing and dispensing splint devices which do little to remedy the situation, and some of the major players have quietly disappeared.

The actual statistics on the successful patient compliance with CPAP are difficult to obtain as it is in the interests of the industry to overstate the effectiveness. They 'fail' to take into account those machines that have been prescribed, purchased, trialled and then left lying about in a cupboard because the user just cannot tolerate the device.

According to our in-house records less than 16% of the people that we see are able to use CPAP effectively.

The complaints and reasons include the following:

- Not feeling that much better in the morning to warrant the trauma of the machine.
- Requirement to sleep on their backs due to masks leaking when turning.
- Pressure marks on face due to tightness of mask to prevent leaking.
- Allergic reaction to materials in masks.
- Mask leaks and noise disturbing sleep and partner's sleep.
- Machine noise during the night.
- Feeling of claustrophobia and 'drowning' when using machine.
- Emotional and aesthetic objections to being attached to a machine through the night.

It is my considered opinion, having successfully treated hundreds of people who have been diagnosed with **SEVERE OBSTRUCTIVE SLEEP APNOEA**, that this diagnosis is incorrect in a high percentage of the cases.

Firstly the majority do NOT fit the profile of the typical OSA patient.

Secondly the conclusion reached at the end of the sleep study was less than confident and CPAP was recommended almost as a catch-all solution.

Finally there was much emphasis placed on oxygen saturation levels ( $\text{SaO}_2$ ) and the fact that these improved dramatically during CPAP usage.

Central Sleep Apnoea (CSA) was virtually ruled out in the majority of the cases and referred to as a standard component of OSA.

If one considers the physiology and biochemistry associated with breathing, several significant factors appear.

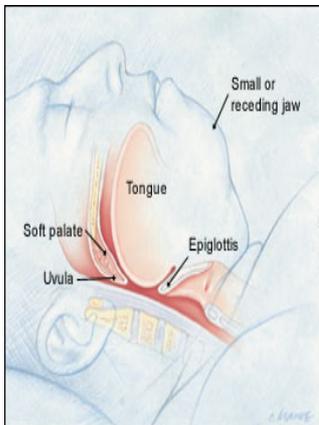
There are two major factors which trigger the breathing response:

1. The pH of the blood, more specifically the movement towards pH7.8 and alkalosis.
2. The hypoxic drive to breathe created by reduction of oxygen to the brain.

What appears to be totally ignored, relative to the above, is the fact that both of these mechanisms are controlled and regulated by the levels of  $\text{CO}_2$  in the body. ANY mechanism that regulates breathing and increases  $\text{CO}_2$  levels will automatically reduce the incidence of apnoeas using the following well known facts:

- A.  $\text{CO}_2$  combines with water to produce Carbonic Acid which is used to buffer the alkaline blood back to the correct pH.
- B. The return to pH 7.35 then allows the oxy-haemoglobin bond to dissolve and release  $\text{O}_2$  to the body's cells.

None of the above has anything to do with the collapse of soft palate, occlusion of the airway by the tongue or uvula or any of the other reasons usually given as the cause for apnoea.



The Law of Gravity makes it obvious to anyone that lying on one's back will cause the tongue, uvula, soft palate and epiglottis to fall backwards and occlude the airway, whereas lying on one's side will not have the same effect.

Air does not require a lot of space to be able to move, and provided that the rate and volume are correct and there is no inflammation or congestion present, there are very few cases which require the "air splint" provided by the positive pressure of the air generated by the CPAP machine.

It is interesting that the majority of people who have had sleep studies done report that they were on their backs the major part of the night.

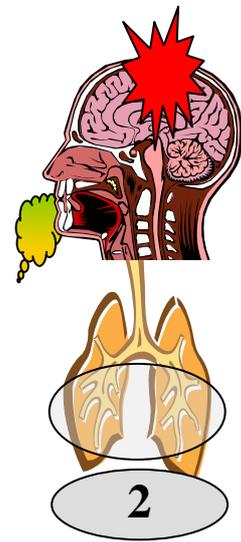
This might be the reason why so many cases of "Obstructive" sleep apnoea were reported.

So if we look graphically at what happens when a person snores heavily, breathes heavily and sleeps with an open mouth, the following diagram makes sense.

Mouth breathing causes three immediate problems.

- a. It lowers  $\text{CO}_2$  levels in the lungs.
- b. It lowers  $\text{CO}_2$  concentration in the blood.
- c. It restricts  $\text{O}_2$  flow to the brain and other tissues.

1. Blood pH rises towards the alkaline limit and an alert is sent to the brain
2. The brain stops the diaphragm from working, halting breathing and allowing CO<sub>2</sub> levels to rise again.
3. The moment the pH is restored and O<sub>2</sub> flows again, the brain tells the diaphragm to start to move and the next breath is allowed.
4. This breath is usually a Gasp, a Snort or other form of dysfunctional breathing which again lowers the CO<sub>2</sub> levels and the whole cycle starts all over again.



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The way to avoid this from happening is to retrain the breathing pattern so that it follows the description of Normal Breathing:

**NORMAL BREATHING** is described as:

- 8 – 10 breaths per minute
- 4 – 5 litres of air per minute
- In and Out through the nose
- Diaphragm movement ONLY, when at rest
- NO upper chest movement
- No audible sounds – breathing should be silent.

If one looks at the effect of a CPAP machine it is not difficult to see how in many cases it actually works by default.

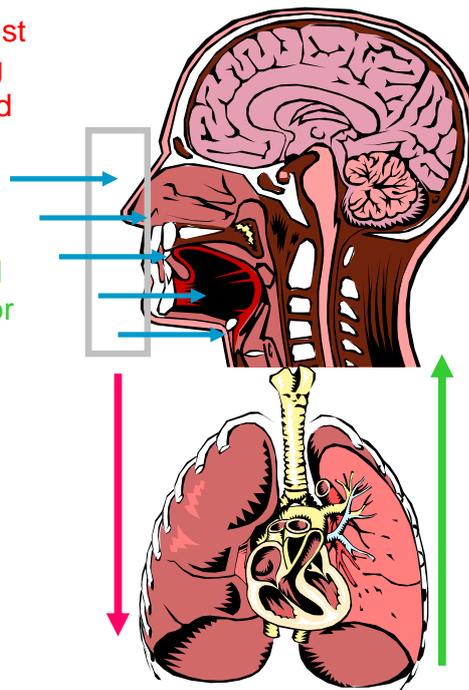
The benefit does not come from creating an air cushion or splint and lifting the tissues that have collapsed into the throat making breathing impossible.

What it does is shown in the following diagram:

By being forced to breathe against a positive pressure the breathing rate will automatically reduce and the mouth will be kept closed by the machine, mask or other device.

Once this happens the CO<sub>2</sub> level will rise immediately and allow for the production of carbonic acid which will keep the blood pH at the correct level. The brain no longer 'sees' a danger so the apnoea is "cured".

It is quite possible to achieve the same result by restoring breathing to normal using a set of simple exercises,



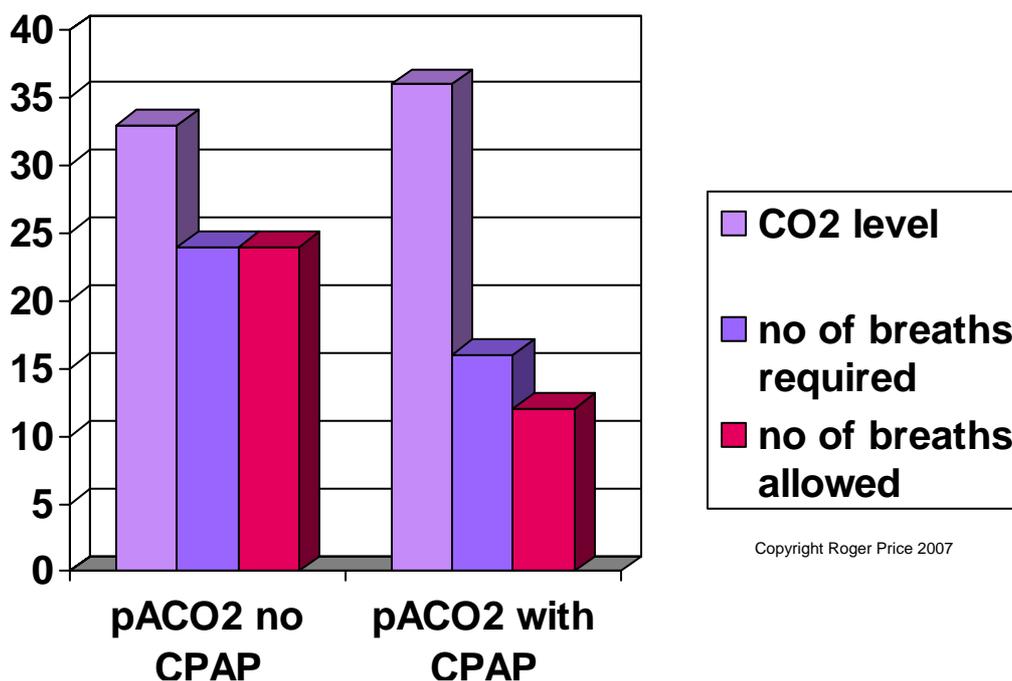
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This has been demonstrated to doctors, sleep specialists, technicians and other interested parties numerous times, but has been studiously ignored.

There just seems to be a stumbling block in getting away from the focus on SaO<sub>2</sub> as the problem and realising that it is in reality low CO<sub>2</sub> that is the cause of this low oxygen saturation.

The major reason why people reject CPAP in such large numbers is that it is too harsh too quickly, and doesn't give the brain time to readjust to the new breathing rate.

This is explained in the following diagrams



In the graph on the left the person is breathing dysfunctionally due to a low PaCO<sub>2</sub>.

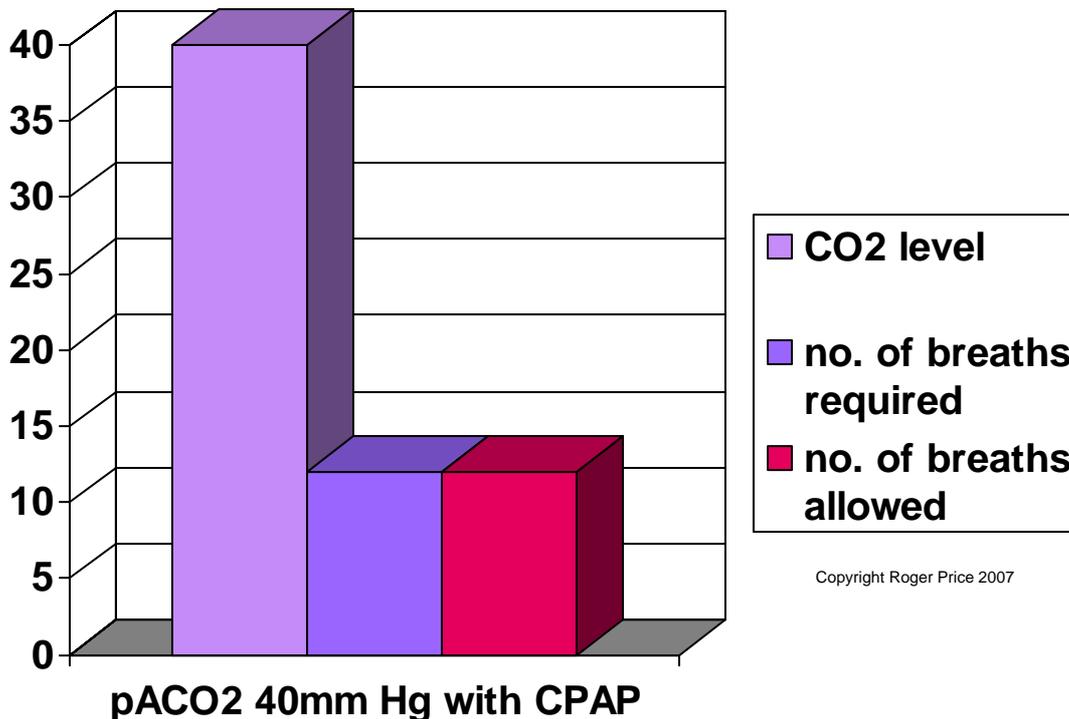
The higher rate and volume of breathing results in snoring, frequent deep breaths and disturbed sleep but this is 'comfortable' as there is no restriction on the breathing rate or volume.

As soon as the CPAP is applied, the PaCO<sub>2</sub> is increased, the breathing rate is mechanically reduced but the brain still wants to breathe at the higher rate – hence the discomfort, panic and feeling of 'drowning'.

Even the more modern and sophisticated machines which 'adjust' to the patient's breathing rate cause this problem as the 'splint pressure' is often higher than can be comfortably tolerated.

In order to minimise this response it is necessary to reduce the rate at which the brain 'wants' to breathe so that the application of the mechanical rhythm will not cause discomfort.

In those cases of genuine OSA, patients who have been taught to retrain their breathing pattern have reported much greater comfort and a higher success rate once they have been through a Breathing Retraining program.



In this diagram the number of breaths desired corresponds with the number of breaths 'allowed' by the CPAP and there is little discomfort, other than the normal issues of leaking and shifting masks.

This is where the anomaly of the whole situation is exposed.

Once people have been trained to breathe normally, their CO<sub>2</sub> levels are correct and allow for the correct rate and volume of breathing. This results in the correct pH of blood and the correct release of oxygen from the haemoglobin to the brain and other tissues.

**There are no longer apnoeas and normal sleep patterns resume.**

**CPAP is no longer needed as it was not required in the first place.**

Thousands of patients have regained normal sleeping patterns, stopped snoring, no longer have sleep apnoea and/or restless leg syndrome or periodic limb movement, by learning this simple way of retraining breathing back to the way it was designed to be.

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**DISCLOSURE:** Roger Price is a Respiratory Physiologist in private practice and is an Assistant Professor in the Faculty of Health Sciences and Medicine at Bond University Queensland. He has no commercial links with any organisation in the sleep industry and he trains individual patients as well as Respiratory Therapists in the Breathing Retraining technique.