

Breathing easy with Oventus



OVENTUS™

ESTABLISHED: 2012

CLINICAL DIRECTOR: DR CHRIS HART

Based in Brisbane, medical device company Oventus Medical, has developed the O₂Vent to bring relief to millions of people with sleep-disordered breathing and nasal obstruction.

oventus.com.au



RESEARCH TEAM LEADER:
STEFAN GULIZIA

VPTN member facility, Lab22, provides Australian organisations access to an innovation centre of metallic AM (3D printing) equipment. This technology delivers high efficiency and productivity gains for industry to use for their own production purposes.

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TROUBLE WITH SLEEPING

Although sleep disorders cost the Australian economy more than \$5.1 billion a year in healthcare and indirect costs, it's the reduction in quality of life that is estimated to cost \$31.4 billion a year.¹

Characterised by an interruption to breathing while sleeping, sleep apnoea is thought to be a contributor to heart disease, diabetes, high blood pressure and traffic accidents. Sleep apnoea is one of Australia's most prevalent sleeping disorders with an estimated 9% of women and 25% of men clinically symptomatic.² An increase in obesity rates and an ageing population are contributing to the continuing rise of sleep apnoea and other sleeping disorders across the country.

Dr Chris Hart, an experienced dentist from Queensland and a sufferer of sleep apnoea, realised his patients were also sufferers who simply needed an easier way to deliver air to the throat whilst avoiding obstructions from the soft palate, nose and tongue.



SOLVING SLEEPLESS NIGHTS



↑ First 3D prototype

After building an acrylic model of his idea, Dr Hart shared his prototype with the team at CSIRO's 3D printing laboratory, Lab 22, based in Clayton Victoria.

Stefan Gulizia, Research Team Leader at CSIRO, took on the project lead role. He and his team optimised the design and the materials used to create a prototype from titanium making the device half its original volume.



↑ Dr Chris Hart, Oventus

Dr Hart's oral device company Oventus and CSIRO's Lab 22 set to work in solving much needed breathing assistance to increase the airflow to the lungs during sleep. The patented air inlet port with inbuilt airways delivers a stream of air that keeps airways open at the back of the mouth.

CAD files and CSIRO's world class Arcam Electron Beam Melting additive manufacturing technology was used to develop the first titanium prototype of the O₂Vent.



"Stage 1 was to take a mouth mould from a patient, CT scan it, combine it with a data set that can be modified for individual mouth anatomy and make a 3D printed titanium prototype. It can be further tailored to an individual's mouth using a medical-grade plastic coating for comfort. The mouth is as complex a piece of anatomy as a fingerprint. Everyone is different, so I wanted to build an airway platform that could be customised to an individual's mouth."

Dr Chris Hart, Oventus



"This is where CSIRO and the facilities in the VPTN can support industry the most – by offering expertise such as engineering skills for software development, metallurgy, design and 3D printing."

Stefan Gulizia, CSIRO

ABOUT THE VPTN

Established in 2009, the Victorian Platform Technologies Network (VPTN) plays a key role in connecting publicly-funded facilities in Victoria with industry and researchers. Through its online services – **ARIN and PlatformConnect** – VPTN is unique in offering a centralised, open and cross-institutional network of over 160 platform technologies across more than 30 institutions. VPTN is realising its vision by linking innovation with technology and expertise in biological, materials, engineering, physical, chemical, food, sports, information, nano, design and mathematical sciences. The VPTN is an initiative supported by the Victorian Government, Biomedical Research Victoria and Monash University. Discover more at platformtechnologies.org

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GUARANTEED RELIEF



↑ O₂Vent

Using CAD software each device was created from a 3D drawing of the patient's mouth and bite. Then using 3D printing technology a custom-made medical grade mouthguard was manufactured from titanium.

In clinical trials, the O₂Vent was found to be more effective than other oral appliances, showing a 50 to 90% reduction severity of sleep apnoea in 75% of patients.³

The O₂Vent offers patients an easy, convenient, safe and transportable everyday use solution to sleep apnoea. Registered with the Therapeutic Goods Administration (TGA) in Australia, O₂Vent is successful in treating OSA where snoring is either eliminated or significantly reduced in 100% of patients – including people who had nasal obstruction.

The device is now available from \$1,390 with rebates under dental available through Australian private health insurance.

FDA APPROVED

In April 2016, Oventus received clearance from the US Food & Drug Administration (FDA) for Oventus Clearway Device (OVENT, rebranded as O₂Vent). This validates Oventus' technology as it prepares for distribution throughout international markets.⁴

"The recent clinical data strongly supports O₂Vent and its superior performance and clearly demonstrates its effectiveness in treating a range of sleep disorders. It also improves oxygen levels for patients," says Dr Hart.



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1 Sleep Health Foundation, 2016. *Re-awakening Australia*. [online] [Sleephealthfoundation.org.au](http://www.sleephealthfoundation.org.au/public-information/special-reports/reawakening-the-nation.html). Available at: <http://www.sleephealthfoundation.org.au/public-information/special-reports/reawakening-the-nation.html> [Accessed 11 Apr. 2016]

2 Snore Australia, 2016. *Obstructive sleep apnoea*. [online] [Snoreaustralia.com.au](http://www.snoreaustralia.com.au/obstructive-sleep-apnoea.php). Available at: <http://www.snoreaustralia.com.au/obstructive-sleep-apnoea.php> [Accessed 11 Apr. 2016].

3 CSIRO, 2016. *Putting sleep apnoea to bed with 3D mouthguard – CSIRO* [online] Available at: <http://www.csiro.au/en/Research/MF/Areas/Metals/Lab22/Mouthguard>

4 Life Scientist Staff, 2016. *3D-printed sleep apnoea device cleared by FDA* [online] Available at: <http://www.lifescientist.com.au/content/biotechnology/article/3d-printed-sleep-apnoea-device-cleared-by-fda-443274529>

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