



OBSTRUCTIVE SLEEP APNEA CPAP AND COVID-19

and other respiratory sleep-related disorders (sleep-related hypoventilation, sleep-related hypoxemia, central sleep apnea syndrome) treated by positive pressure devices (continuous positive airway pressure-CPAP, automatic positive airway pressure-APAP, bi-level, advanced ventilation).

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Québec CANADA, September 14, 2020



CAUTION :

The present document is by no means a substitute for a medical advice, nor does it opposes issued recommendations and directives from the Quebec Health and Social Services Ministry, the Institut National de Santé Publique du Québec and Health Canada. Furthermore, anyone residing outside the province of Quebec should abide to guidelines issued by their respective government, state, or country.

The following document is based on available scientific information. Information is in constant evolution. Researchers and scientists have sometimes divergent opinions. Scientific literature concerning COVID-19 are on a fast tract for publication with shortened peer-review processes and simpler statistical analysis in than normally published articles further increasing uncertainty. The best, most solid available evidence is presented. Controversial issues will be addressed to facilitate decisions. Means to decrease risks to a person undergoing treatments as well as to his entourage will also be explained. The content of this information is general and may not apply to certain patients. It should not be an alternative to your doctor's clinical judgment who has full knowledge of your medical history, the medications you are taking, as well your own state of health. This information is aimed at shedding light in this present public health emerging situation and is offered also in French. By downloading or reading this document, you agree to consult a doctor or a licensed health practitioner for any questions or alterations regarding your treatments.

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Obstructive sleep apnea syndrome is a frequent condition and it is considered that 80% of those afflicted are not yet diagnosed. It can easily be diagnosed and treated, much to an individual's health benefit notwithstanding the benefits to the bed partner, the family, the work environment and the society.

Untreated obstructive sleep apnea can increase the risks of complications such as high blood pressure, depression or depressed mood, heart attack (myocardial infarction), irregular heartbeats, particularly atrial fibrillation, paralysis (strokes), road traffic accidents, work-related accidents, as well as mortality in the general population.

Untreated obstructive sleep apnea leads to more complications in case of hospitalization. Recovery from other medical conditions is often jeopardized in presence of untreated obstructive sleep apnea. A greater likelihood of complications related to surgery and anesthesia has also been observed.

Obstructive sleep apnea negatively impacts sleep-related quality of life, the energy level, the daytime well-being and the quality of sleep of the concerned individuals as well as their families and has work consequences. Let us bear in mind that untreated obstructive sleep apnea leads to a heavier burden on our healthcare system (JCSM, 2020, Wickwire).

Despite the potential seriousness of obstructive sleep apnea, the impact of the condition on a given individual varies tremendously. Indeed, symptoms could be of different intensity with variable repercussions. Even though we are dealing with similar sleep-related breathing issues, this is not to say that all patients fall in the same category. The scope of the obstructive sleep apnea syndrome is very wide and whether it is associated or not with other sleep-related breathing disorder or not, or medical conditions may also impact its severity and treatment. All breathing issues during sleep are not obstructive sleep apnea syndrome. **Hypoventilation during sleep** (excessively slow breathing throughout the night impairing expulsion of CO₂), **Hypoxemia during sleep** (impaired oxygen intake mostly due to diseased lungs yet preserved CO₂ expulsion), **Central Sleep Apnea syndrome** (abnormal brain control of breathing due to brain issues or severe heart failure mostly) might also be treated with one type of positive airway pressure or another, thus, some of the information herein may be relevant to these group of patients too.

Obstructive sleep apnea is a neuro-respiratory disease which could lead to **inflammation** (swelling), **blood clots** in the lungs and legs (pulmonary embolism and thrombophlebitis). It is also associated to an increased risk of **aspiration pneumonia**.

Similarly, and of concern, COVID-19 is leading in some individuals to out-of-control **inflammation** (cytokine storm), out-of-control diffuse **blood clotting** and respiratory failure (inability to breathe) due to **pneumonia**, inflammation, and clotting. Untreated, undiagnosed obstructive sleep apnea is suspected of worsening the body's response to COVID-19.

When left untreated, OSA decreases our defence mechanisms against infections much in the same way as deliberately cutting our sleeping hours. If we cannot bank on sleeping reserves, we must avoid cutting on our sleep requirements and be sure to respect our body's needs.

Growing medical literature, including on microbiota, are establishing links between inflammation and several health conditions encountered in the general population, particularly among those showing signs of obstructive sleep apnea. We tend to believe that an inflammatory component exists in atherosclerotic cardiac disease (heart attack and angina), asthma, inflammatory bowel disease, depression, diabetes, obesity, certain chronic intestinal conditions as well as in obstructive sleep apnea syndrome. The increasing number of these conditions and the fact that they are not properly controlled or treated are contributing factors towards more inflammation. Inflammation linked to obstructive sleep apnea is thus part of the inflammation process.

Obstructive sleep apnea is easily treatable and decreases inflammation.

Nutrition also plays an important role in inflammation. We should stop eating ...and favor nourishing our body. Each mouthful is important. Inflammation increases minutes after consuming chips or French fries. It is then advisable to stay away from trans fat (bacon, lard, shortening, hydrogenated oil, chips, French fries etc.), fast-release sugars (anything with a sugary taste), complex sugars (all starchy food: bread, rice, cookies, crackers, and pasta in particular), and favor vegetables and proteins (fish, eggs, legumes, nuts, poultry, dairy products, meat). Health is earned one mouthful at a time.

This new virus is part of a well-known family of viruses, namely the coronaviruses responsible for the common cold. This new version of the virus is much more aggressive with an easier transmission, affects both the nose and throat like a cold in addition to potentially spreading to the lungs where it causes pneumonia. The new coronavirus has been named SARS-CoV-2 (Severe Acute Respiratory Syndrome with Corona virus number 2; number 1 being linked to a former episode identified in Toronto among other places in 2003). It is less deadly than the SARS-CoV1 (2003) or the Middle East Respiratory Syndrome Coronavirus, MERS-CoV, first detected in 2012. This new virus SARS-CoV-2 may cause a disease coined COVID-19 – Corona virus, year 2019.

SARS-CoV2 has some serious repercussions on some individuals, whereas roughly 80% of individuals exhibit symptoms of a simple cold or are simply symptom-free. Children may only come up with a runny nose with no reason to distrust; yet they could spread the disease to their surrounding, including their grandparents who are more vulnerable, as well as their parents. There is controversy on whether children are as much at risk for the infection and whether they may infect as much as adults. Most of the studies restricted throat swabs only to symptomatic children whereas when they are infected, they mostly do not exhibit symptoms. Yet we know that infected adults with no symptoms spread the disease. Younger children seem to be less likely to spread the disease if infected though older children seem to spread as much as adults.

We have 2 properly designed studies to answer whether children are at risk to be infected just as the adults are. In the Iceland study, younger children carried the virus half as often as older children or adults (NEJM Gudbjartsson 2020). Among children who had travelled or had been exposed with a known infected individual irrespective of the child's respiratory symptoms, 1 child among 14 (7%) among those under 10 and 1 child among 7 (14%) above 10 years old carried the virus, similar to the 1 in 7 (13%) adults who had travelled or were exposed. In the 2nd study, Chinese children were just as much at risk to be infected as adults once exposed to a case, irrespective of age, estimated at 1 in 14 (7%) (Lancet infectious Disease Q Bi 2020 Epidemiology and transmission of COVID-19 in 391 cases and their 1286 of their close contacts in Shenzhen, China: a retrospective cohort study). Though the numbers may seem different, they do confirm that children do get infected.

Children are considered less likely to develop the most severe forms of the infection but are not always spared. Children with serious medical conditions are especially at heightened risk of severe COVID-19. Children may also manifest with unusual patterns of disease like red spots on the skin. There is an increase of a rare condition, Kawasaki disease, a disease of inflamed arteries that is currently suspected to be a late manifestation of a COVID-19 subclinical (subtle) infection, pediatric multisystem inflammatory syndrome with COVID toes, macrophage activation syndrome (a cytokine storm syndrome, an uncontrolled inflammation) CMAJ 2020. doi: 10.1503/cmaj.201600; early-released September 9, 2020 H Tam, Pediatric inflammatory multisystem syndrome temporally associated with COVID-19 a spectrum of disease with many names.

On the question whether children may spread the disease as much as adults, for the longest part of this epidemic, it was though they were not spreading disease. In a German study, limited to those with respiratory symptoms suspected to be COVID-19 (Jones, Mühlmann, Drosten et al An analysis of SARS-CoV-2 viral load by patient age, 2020), the concentration of the virus (viral load) was just as intense among children as among adults, raising the question whether they may spread the disease or not. On the one hand, if they don't cough as much, it decreases potentially the spread in addition to the fact that the volume of air in their lungs is smaller decreasing the spread of disease. On the other hand, as children, they may sing, shout and are more likely to hug their friends, be hugged and not respect social distancing hence increasing the potential to spread the disease. Adding to the uncertainty is the fact that schools have been closed in almost all countries limiting the data available. So, we do not know how much children may contribute to the dissemination of the disease but there are all reasons to believe that, as for other respiratory viral infections, they do, likely to a lesser degree than adults in the younger ones.

In order to limit the spread of the disease, even with mild symptoms; it is of the utmost importance for everyone to respect guidelines established by the health authorities. Anyone exhibiting symptoms that could be due to COVID-19 must stay in isolation for a period of 14 days and get in touch with authorities by dialing 1 877 644-4545 and follow their instructions.

Individuals free of respiratory symptoms are invited to restrict public contacts, remain quarantined when indicated, and respect guidelines established by the Public Health Authorities. Those free of respiratory symptoms who need to go for grocery or work outside their home, should cover their mouth and nose with a home-made mask, a bandana or piece of cloth or a procedure mask (dentist/surgeon mask) from the moment they exit their home until returning except to eat. In addition, all hygiene measures (frequent handwashing, coughing/sneezing in the elbow, not touching their face) must be applied. All those measures should continue to be applied until a vaccine is made available and has been received by a high proportion of the population or when authorities lift these requirements. Wearing a home-made mask helps decrease the likelihood of catching the disease as well as spreading the disease if you have it with or without symptoms yet.

This is something you can do and should do. Protect yourself. Protect everyone else too. Wear a mask. For more information on how to make your own masks, please check the information on the CDC website under Cloth face masks <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html>

Traveling has been and remains a major risk factor. In the initial phase of the pandemic, travellers in general and travellers to Asia, Europe, USA as the disease spread were most at risk, whether travelling by plane, boat, car or else. At the moment, as traveling has been largely reduced, this does not account for a large proportion of cases anymore but as crossing borders eventually resumes, it may again be responsible for a large number of cases. In fact, the mere visit to an airport or train station is likely to be a significant risk factor with no requirements to take the plane. The sociosanitary conditions in which you live could be a risk factor. Data must be corrected for population density and are available on CBC website

<https://www.cbc.ca/news/canada/montreal/numbers-covid-19-coronavirus-quebec-april-1-1.5518397>.

Living in a **high-density city** is higher risk than living in the country.

Living in a **high-density dwelling** (like apartment towers with shared elevators and spaces) is higher risk than low-density dwelling (single home).

Sharing a dormitory or sleeping area like university students, firemen, military personal and seasonal farming workers do, increases time of exposure and likelihood of catching the virus.

As everyone is now aware, the highest chances of having an infection was among those **living in CHSLD** both due to their medical conditions that lead to living there as well as to the shared ventilation, shared caregivers, and shared spaces where they spend most of the day unfortunately facilitating spread of disease. To a lesser degree in **private senior homes**, there is an increase probability of infection and severe infections for the same reasons. Those living in CHSLD and private senior homes account for 80% of the COVID-19-related death toll.

Being a **healthcare worker**, especially if personal protective measures fail is associated with an increased chance of the disease. Healthcare workers account for 20% of all cases (Montreal Gazette, May 13, 2020, Jason Magder).

Living in the **same household** as an individual known to have COVID-19 is associated with 1 in 9 (11%) chance of being infected (Qifang Bi Lancet infectious Disease Q Bi 2020 Epidemiology and transmission of COVID-19 in 391 cases and their 1286 of their close contacts in Shenzhen, China: a retrospective cohort study. From the same study, **spending much time** with an infected individual carries a 1 chance out of 8 (13%) of being infected too. **Sharing a meal** with an infected individual is associated with 1 chance out of 11 (9%) of developing the infection.

Pollution and respiratory irritants from wildfires as currently occurring on the Western American Coast have not yet been studied as risk factors for COVID but are known to cause airway inflammation, likely increasing vulnerability to the virus.

Smoking whether cigarette, cigar, sheesha, pot increases the chance of infection.

You may decrease smoking. For more information, contact Tobacco free Quebec

<https://tobaccofreequebec.ca/iqitnow/registration/step1>

You may decrease secondary smoke for those sharing the same dwelling.



Risk factors for severe COVID-19

Persons most at risk to encounter severe complications have been identified by the Institut national d'excellence en santé et en services sociaux (INESSS, the scientific committee of the department of Health). According to the March 27, 2020 document, they have been identified as:

- Persons of all ages suffering respiratory system diseases
- Persons of all ages suffering from cardiovascular diseases
- Persons of all ages suffering from high blood pressure
- Persons with a disrupted immune system
- Persons over the age of 65

The CDC and the High Council of Public Health (France) have been targeting other groups as well. As a rule, the sicker an individual with numerous out of control conditions prior to being infected by SARS-CoV-2, the greater are the challenges once the infection has been detected.

As of now, obstructive sleep apnea has been the subject of only one research paper demonstrating a 3 fold-increase in severe infection and an increased early mortality (CORONADO study 2020) among diabetic patients.

In the general population, obstructive sleep apnea has been linked to high blood pressure, atherosclerotic cardiac disease, (angina, heart attack), diabetes and obesity and is often encountered in people over the age of 65. Those are the same risk factors for more severe COVID-19. It is expected— without any established proof up to date — that obstructive sleep apnea increases the risk of more serious infections not only among individuals with diabetes but in the general population.

Two drugs were discussed early in the pandemic as some argued that could increase the severity of the infection. Concerning NSAID, at the moment, we do not have proofs of worsened outcome if using it and the experts recommend continuing your treatment (see section on Fever). The angiotensin-converting enzyme inhibitors (ACEi) was discussed at length. Those are used mainly for treating high blood pressure, diabetes related kidney problems and heart failure. Here again, the experts now are asking NOT to dismiss this important medication because of absence of clearly incriminating data. If you take those medication and have concerns, talk to your physician.

Age, regardless of the state of health is a risk factor for more severe infection. Even if the risk is lower in young adults and children, the risk is still present.

Individuals exhibiting one of 3 chronic diseases (diabetes, cardiovascular disease, or chronic lung disease) were 6 times more likely to require hospitalisation for COVID-19 complications. A little under half (45%) of those with one of those 3 chronic diseases required hospitalisation compared to one in 12 (7.8%) among those with none of the 3 chronic conditions (CDC MMWR Weekly / June 19, 2020 / 69(24);759–765. Death occurred 12 times more frequently among those with at least one of those 3 conditions (19.5%) compared to those with none (1.6%). So, poorer chronic health status is a risk factor, but even healthy individuals may struggle with the virus. Obstructive sleep apnea was not considered in that study.

Is obstructive sleep apnea a risk factor for COVID-19 and for a more severe form of COVID-19?



Obstructive sleep apnea might be at increased risk of infection if not treated because uncontrolled inflammation in the airway decreases defense mechanisms and increases micro-aspiration. However, there are **no published data on OSA as a risk factor for the infection.**

Obstructive sleep apnea patients often share the increased risk factors for a more severe form of COVID-19 namely, they are more likely to be **obese** (Body mass index above 30, calculate your body mass index at https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmi-m.htm), to have **diabetes, cardiovascular disease, and chronic lung disease** than those without OSA therefore, one would suspect an increase in severity of the infection. However, there are no published data except for a single study in a diabetic French population of hospitalized patients.

In the CORONADO study (Cariou, Diabetologia 2020 Aug;63(8):1500-1515. doi: 10.1007/s00125-020-05180-x. Epub 2020 May 29), among 1307 diabetic individuals (88% type 2, mean age of 70) hospitalized for COVID-19, a third required Intensive Care Unit admission and 11% were deceased at 7 days. Obstructive sleep apnea was associated with an increase in death at 7 days by 3-fold. Age and obstructive sleep apnea were the 2 strongest predictors of early death. In that study, **obstructive sleep apnea and not body mass index** (an indirect measure of obesity) **was predictive of a poor outcome.** This is to stress that the multiple other studies that considered only Body Mass Index as a risk factor for severe COVID-19 but which did not look for obstructive sleep apnea per se, might just have missed the point that it is not the mere increase in fatty tissues but the hidden obstructive sleep apnea that is the culprit.



The onset of fever in a COVID-19 situation is a defence mechanism against the infection. Its absence in other respiratory infections is a bad sign. Given that there is no specific treatment against the virus, one must wonder whether attempting to lower the fever as soon as it appears is preferable to letting the body's natural defence mechanisms take over.

The younger an adult with healthy heart, lungs, brain, and kidneys the better he can tolerate a high temperature.

We could consider lowering it down as needed without totally eradicating it.

Fluids and minerals loss could be compensated by taking tomato juice or soup; both of which have good mineral contents. As water loss is the main factor in weight loss, it is advisable to step on the scale and aim at maintaining a stable weight.

Pre-existing health conditions in some individuals may call for rapid intervention in lowering their temperature (Figure1). In such cases it is preferable to use ice (head, neck, armpits, groins), a fresh bath or yet, acetaminophen (like atasol, tylenol).

Early in the pandemic, there were calls to specifically, avoid nonsteroidal anti-inflammatory drugs NSAID (advil, motrin, aspirine, anaprox, naprosyn etc.) to lower the temperature if possible but this has been called in question and there is no clear guidance to be provided at this moment. NSAID are known to potentially cause kidney complications and that it could be an issue among the most severe cases. Those taking chronically aspirine (salicylate) or NSAID for cardiovascular prevention, arthritis, chronic pain, migraine or other chronic conditions should not discontinue their medication. The World Health Organization declared that there was no evidence of increased mortality among those COVID-19 who took some NSAID (Giollo A, Adami G, Gatti D, et al Coronavirus disease 19 (Covid-19) and non-steroidal anti-inflammatory drugs (NSAID) *Annals of the Rheumatic Diseases* Published Online First: 22 April 2020. doi: 10.1136/annrheumdis-2020-217598).

Replacement of fluids and minerals loss because of fever must be done cautiously in individuals suffering from advanced stages of cardiac or kidney disease.

To know your weight when you are in your best of shape and to be able to maintain it rather constant is of paramount importance as well as being aware of your existing shortness of breath and swelling of your feet. Keeping the right balance as we do not want to over compensate for loss of fluids and minerals and end up with shortness of breath and swelling of ankles and feet; yet at the same time, we do not want to be dehydrated and dizzy.

If you experience fever and suspect having COVID- 19 you must contact public health at 1 877 644-4545 and state your medical condition. Get in contact with your family doctor or your specialists as needed.

Balancing benefits and harms of fever

This is a non exhaustive list of medical conditions where attempting to lower the temperature is most likely beneficial than detrimental. Discussion with your physicians is encouraged.

- Heart failure, especially if more advanced
- Atherosclerotic cardiovascular disease
- Febrile convulsion
- Epilepsy
- Predisposition to falling blood pressure when standing up (orthostatic hypotension)
- Postural Orthostatic Tachycardia Syndrome
- At risk of falls as a result of low blood pressure
- Poor health
- Regularly emerging problems when temperature has risen in the past.

In brief,

Obstructive sleep apnea:

- Is a pro-inflammatory condition
- Facilitates aspiration pneumonias
- Facilitates blood clots
- Often targets older individuals
- Is often related to chronic conditions known to increase the chance of more severe infection leaving the individuals at a greater risk of a severe infection.

Because of lack of published literature, we are unable to state whether obstructive sleep apnea alters the risk of severe infection except among those with diabetes, but it is unlikely to be beneficial.

Treatment of obstructive sleep apnea decreases inflammation, notwithstanding other benefits, while serious complications arising from COVID-19 are linked to out of control pulmonary inflammation.

We are even further away from knowing whether treating obstructive sleep apnea may alter the risk of getting the infection; and whether we may improve the outcome. However, it is unlikely that putting an end to the treatment would benefit in anyway the patient himself.

On March 26, 2020; the sub-departmental committee of the Quebec's Health and Social services, under the presidency of Dr Diane Poirier published its technical procedure guide with regards to hospitalized patients. It reads (free translation): " Patients with pathologies in need of chronic use of a CPAP or of a non invasive ventilation should have access to these essential therapies in spite of the pandemic. These patients should ideally be taken care of in negative pressure facilities independently of their COVID-19 status. Use of the device and wearing a mask is highly recommended. "

If you are already under treatment with CPAP, APAP, bi-level or home ventilator; be it for obstructive sleep apnea, central sleep apnea, obesity-hypoventilation syndrome, neuromuscular disease etc., you therefore shall ideally continue with your treatment even in a hospital environment in the event of a hospitalization, whether or not you are exhibiting signs of SARS-CoV-2.

Strict measures should be implemented to protect caregivers. Positive pressure therapy has the potential to contaminate the surrounding air (airborne transmission). When healthcare workers strictly always adhere to protective measures, the risk of developing the infection from patients with COVID-19 using CPAP or a ventilator is very low. The risk is much higher when taking care of yet undiagnosed COVID-19 cases without proper protection. Modifications to your device is a possibility, with a new exhaust set up, or a different device. You might be directed to a special unit with better engineering including outward air flow (negative pressure). If your condition is such that positive pressure therapy may be discontinued for a short period, the hospital doctor may judge there is more potential harm to the personnel of you using it than temporary harms to you from not using it. It is all based on clinical judgement.

Keep in mind that the balance of benefits and harms is not the same in the hospital environment where you have not shared the same space and air for several days compared to at home or even in the working environment that are close to a home environment where you might be sharing some eating and sleeping space for several days (firemen, military staff, agricultural workers, etc).

Mitigation measures for untreated whether proven or not yet proven OSAS



We encourage all who are suspecting having OSAS or any sleep-related respiratory disorder to seek proper diagnosis and management. Early during the COVID-19 pandemic, there were severe restrictions on testing. Most of those restrictions have now been lifted but could be re-instated based on the local situation.

While waiting for those tests or if unable to tolerate or access any therapy, here are some mitigation measures that might decrease the severity of the breathing challenges at night which may also decrease somewhat your symptoms.

1. Avoid sleeping on your back or raise the bed's headboard. This can be achieved with a positional belt or inclined pillows available at Côté Santé.
2. Some individuals may draw health benefits by treating their allergies — even outside the allergy season — with over-the-counter drugs such as nasal corticosteroids and antihistamines.
3. Avoid respiratory irritants (chimney fire, perfumes, strong cleaning products, cigarettes, dust, etc).
4. Try an external nasal dilator (such as Breathe Right, available in drug stores without a prescription) which could diminish somewhat the severity.
5. Avoid alcohol, sleeping pills, narcotics, and muscle relaxants which have the potential to increase obstructive sleep apnea, excessively slow down your breathing (hypoventilation) while the narcotics may in addition create central sleep apnea.
6. If possible, carry on with your efforts in losing excess body fat and gaining muscle mass. Stop eating....feed yourself ! Get moving! Sleep! Be healthy and Happy!
7. If you wish to lose weight; reduce your food portions, avoid sugars and starchy food (bread, pasta, potatoes, etc.). Concentrate on eating vegetables and proteins (nuts, poultry, fish, eggs, legumes, meat). You will feel more alert and less sleepy by reducing your sugar and starchy food intake.

Côté Santé has resumed its sleep testing services, treatment protocols and regular yearly follow up with protocols and procedures all revised to the new reality. It had remained open for emergency situations during the 1st wave and hope to be able to continue to serve the population in the coming months.

We wish you inflammation free, restful nights and healthy days.

Obstructive sleep apnea mitigation measures are within your reach.

DIFFERENTS SCENARIOS	OSA with positive pressure	Non OSA sleep-breathing issues on CPAP or ventilator or bi-level	OSAS treated with an oral appliance	Proven OSAS but not treated	OSAS suspected but not yet proven
No COVID symptoms	SITUATION 1 PAGE 13	SITUATION 2 PAGE 14	SITUATION 3 PAGE 15	SITUATION 4 PAGE 16	SITUATION 5 PAGE 17
With COVID symptoms	SITUATION 6 PAGES 18-19	SITUATION 7 PAGES 18-19	SITUATION 8 PAGE 20	SITUATION 9 PAGE 21	SITUATION 10 PAGE 22

These scenarios apply to all chronic respiratory conditions with chronic use of positive pressure at home; be it CPAP, APAP, bi-level or ventilator. To lighten the present document and because it is the most frequent indication of treatment by positive pressure; the terms obstructive sleep apnea syndrome OSAS and CPAP will be used.



WHAT TO DO IN A COVID-19 SITUATION?

SITUATION 1



I HAVE OBSTRUCTIVE SLEEP APNEA SYNDROME, I am symptom free from COVID-19 and I am treated with positive pressure therapy.

You are free from symptoms such as new coughing, fever, new shortness of breath, new intense fatigue and are not experiencing a loss of smell suggesting COVID-19.

If you are already treated.....Congratulations!
Continue your treatment with your positive pressure.

Using CPAP should be continued. Pay close attention in properly adjusting the mask or replacing it in the event of persistent leaks. After a six-month period, the mask's silicone loses its flexibility and becomes a breeding ground for bacteria. It is time to get a new one.

A mask that is too tight is not efficient. It can be a cause of discomfort that could lead to increase leakage. Facial masks can also lower the mandible, thus causing a blockage of the airways that we are trying so hard to maintain free.

It is then advisable to maintain a minimal tightness to prevent leakage. If this is not possible, then consider getting another mask, a different size or try to get the best use of the one you already have.

If you have a facial mask or another type of mask, it is preferable to stick to the facial to minimize and manage any present leakage. Côté Santé is open for replacing masks and shall there be another shut down, will continue to address those priorities. Continue to abide by the public health recommendations.

In the event that you have both a positive pressure and an orthosis (oral appliance, not a mouth guard for grinding) that are equally effective at relieving your symptoms, some may argue the orthosis shall be preferred as there is no possible aerosolization of the virus with the latter in the unlikely event that you are harbouring the virus and have no symptom.

In the unlikely event that you would be symptom free but yet infected with the virus, it is unknown whether continuing your CPAP increases significantly the spread of the virus to the household as they are already exposed by eating, laughing, living with you, spending already a large number of hours with you. I believe the extrarisk is low and certainly not worth discontinuing this beneficial therapy for 2 or 3 years or until an effective control of the pandemic is attained. I believe that stopping for such a prolonged period, will be associated with more harm for the individuals, his family, and society through impaired work (absenteeism, presenteeism, accidents, disability), increased motor vehicle accident, more depressed mood and depression, more Post Traumatic Stress Disorder, poorer quality of life with sleepiness and poor energy, poorer quality of sleep, impaired neurocognitive functions, more new high blood pressure, worse high blood pressure control, health care utilization, etc. Finally, among the most severe patients, there could be more cardiovascular complications and even death from untreated sleep apnea syndrome.

We wish you inflammation free and restful nights as well as healthful days.

SITUATION 2



I have a positive airway device (home ventilator, Bi-level, CPAP, APAP) for sleep-related hypoventilation, sleep-related hypoxemia, central sleep apnea with or without obstructive sleep apnea.

You are symptoms free of symptoms such as new onset of coughing, fever, new shortness of breath, intense fatigue, and are not experiencing a loss of smell suggesting COVID-19.

If you are already treated.....Congratulations!

You might have a central neurological condition, a neuromuscular disease, advanced heart failure, deformed ribs (kyphoscoliosis), obesity impairing breathing, narcotics or other substances impairing your breathing while asleep or advanced underlying breathing issues with respiratory failure that lead to a different diagnosis of sleep-related breathing disorder than obstructive sleep apnea.

Your therapy should not be discontinued unless to transit to an ICU ventilator device which has more capabilities to support acutely impaired lungs or to have a device with filters on the exhaust port to protect the personnel.

SITUATION 3



I HAVE OBSTRUCTIVE SLEEP APNEA; I am COVID-19 symptoms free and I'm being treated by a mandibular advancement orthesis.

You are symptoms free of symptoms such as new onset of coughing, fever, new shortness of breath, intense fatigue, and are not experiencing a loss of smell suggesting COVID-19.

If you are already treated.....Congratulations!

Continue your treatment with a mandibular advancement orthesis.

If you alternate between the orthesis and a positive pressure treatment, it is best to favor orthesis if equally beneficial and tolerated.

If you most use both simultaneously, continue both treatments together and read Situation 1 for recommendations. Continue to abide by the public health recommendations.

We wish you inflammation free and restful nights as well as healthy days.

SITUATION 4



I SUFFER FROM OBSTRUCTIVE SLEEP APNEA SYNDROME; I am COVID-19 symptom free but I'm not yet treated!

You are symptom free from a new coughing, fever, new shortness of breath, new intense fatigue, and are not experiencing a loss of smell suggesting COVID-19.

You could be concerned by this situation if you have undergone a surgery for snoring or for obstructive sleep apnea (throat-UPPP, bariatric surgery, maxillo-facial surgery) and that no subsequent test has been performed to show the disappearance of the obstructive sleep apnea especially if you still have symptoms. This situation could also apply to an individual who has recently, or not so long ago, undergone a test for whom positive pressure, orthesis or surgery were demonstrated to be inefficient.

If you already have some positive pressure equipment, you should reattempt therapy. But first, it likely needs to be readjusted and a new mask might be required. If you decide to first use the device as it was adjusted and experience discomfort, it is most likely due its inappropriate adjustments to today's conditions, or the silicon of the mask has worn off. Contact us to find out if you are eligible for Tandem© protocol titration. Meanwhile, please apply the mitigation measures.

If you already have an orthesis; try using it. Your dentition may have undergone changes and as such, advancement could be greater than the original intention. Dental offices are open. Get in touch with the dentist responsible for having adjusted the orthesis in order to find out if a readjustment could be done and make sure to have the adjustment validated in a medically supervised sleep lab.

Call us if you are not being treated and wish to initiate treatment. We will help navigate the different steps to improve chances of a successful personalized treatment.

Mitigation measures with regards to obstructive sleep apnea are within your reach.

SITUATION 5



I suspect I may suffer from obstructive sleep apnea, but I have yet to be tested. I am COVID-19 symptoms free.

You are symptoms free of such as new coughing, fever, new shortness of breath, new intense fatigue, and are not experiencing a loss of smell suggesting COVID-19.

I am not yet under treatment. May I use a friend's old device?

In the context of a non established diagnosis, we do NOT recommend using an inadequately disinfected device adjusted for someone else. Prior to treating a patient, the doctor must diagnose the disease in order to justify a treatment. Using an inadequately disinfected device designed for someone else could put you at risk for an infection. Furthermore, it is unlikely that the mask's adjustment and the pressure would fit you. It is comparable to picking a pair of glasses at random from a huge bin and expect them to be safe for driving....or yet, select a pair of booths at random and expect they would be fit for climbing Everest....If you decide to be treated, you deserve to be well treated and to have the best chance of success.

If you suspect suffering from obstructive sleep apnea, that your present condition exposes you to a greater risk of infection linked to COVID-19, that you have significant apnea symptoms; or yet, someone has noticed frequent interruptions in your respiration, contact Côté Santé. We will collect some data and could then communicate with your doctor to have a prescription. Even in the 1st peak of COVID-19, we remained open, investigated and treated those meeting emergency care criteria while using mitigation measures among the others until we could test and treat everyone.

Continue to abide by the public health recommendations.

We wish you inflammation free and restful nights as well as healthful days.

If you are treated by positive pressure and you have symptoms such as a new coughing, fever, a new shortness of breath, extreme fatigue or a sudden loss of smell, call 1 877 644 4545 to find out if you have contacted COVID-19.

https://cdn-contenu.quebec.ca/cdn-contenu/sante/documents/Problemes_de_sante/19-210-30FA_Guide-autosoins_francais.pdf?1584985897

All respiratory infections, including COVID-19, call for hand and respiratory hygiene to avoid transmission.

If you suspect having contracted COVID-19, you must isolate yourself from other persons living under the same roof. Retire to your bedroom and keep the door close. Now is maybe the time to have your partner ...sleep on the couch. If you have COVID-19, the people near you are already at risk of catching the infection though, the transmission is far from being for certain. As mentioned previously, living in the same household as an individual known to have COVID-19 is associated with 1 in 9 (11%) chance of being infected (Qifang Bi Lancet infectious Disease Q Bi 2020). What is not known is how those numbers are changed if a COVID-19 positive household member sleeps with a CPAP. The risk is likely increased for those sharing the bed, the bedroom, the common in-house spaces, and finally the shared spaces in the building, in decreasing order. However, the magnitude of the increase is not known and quite frankly, nobody is looking into it. The impact on others will depend on whether efforts are made to limit spread (washing hands, surfaces, respiratory etiquette), the viral load (how concentrated the virus in the airway), the volume and force of the coughing-speaking but also on the vulnerability of other individuals.

In a study most quoted (ERJ 2019 Hui) using smoke to look at dispersion of particles at the highest levels of CPAP pressure while using different masks, leaks could account for air borne particles travelling 30 cm with nasal masks compared to negligible displacement of particles while using a facial mask. So, no leak with proper fitting facial mask seemed safe whereas nasal mask allowed dispersion at a distance often present when sharing a bed. Lower levels of pressure will cause lesser dispersion. With bi-level devices (commonly known by the brand name BiPAP © rather than by its bi-level generic name); – depending on the simulation model – particles will travel for about 1 meter depending on the size of the room, humidity, temperature and ventilation.

Using a mask with a good seal is therefore of paramount importance.

Nasal and nostrils masks are more comfortable and less cumbersome, yet leakage is greater than with facial mask.

The situation is worse for mouth breathers as this is problematic in a COVID -19 context.

Facial masks would be a favorable choice for its sealing quality but we still have very little data and it is unknown if this smoke model is representative of the reality.

Having a mask with a good seal is important.

Given a choice, choose a properly fitting facial mask over others. Eur Resp Rev Ferioli 2020

If your mask leaks from all over, it is time to get another one or change brand. Check online on how to adequately adjust your mask, and if the problem persists, get in touch with your caregiver, Côté Santé, for a remote session. We could go over the mask attachment or you could order a replacement.

Transmission is not only by air but mostly by touching objects. It is unclear whether being treated by positive pressure increases the risk for people already living with you. The situation is different for health care workers who would take care of you in the event of hospitalization.

As added precautions, especially in presence of vulnerable individuals, it is advisable to increase home social distancing when using positive pressure (APAP, CPAP, BiPAP, bi-level, ventilator, servo-ventilator, etc.), by keeping the bedroom door closed 24 h / 24, except for bathroom needs and passing plates.

Once you are trough with the device, close the pressure first, THEN remove the mask so that your germs do not get airborne.

If you cough in the mask, wipe the mucus with a cleaning wipe that you will then discard in the garbage.

Before opening the door of the bedroom, weather permitting, ventilate your room from an outside window for 10 minutes and close the bedroom door while outside your room in an effort to limit the spread of the virus.

In an ideal context, you should be the lone user of your own bathroom.

Imperatively, you do not share hand towels, face clothe or bath towels with others. All shared common spaces should be cleaned once you have left the area.

If you must share the same sleeping spaces, you will have to weigh the benefits with regards to your treatment by bearing in mind your health status prior to the onset of your treatment, other conditions, and the severity of abnormal oxygen as observed in your test as well as the possible risks and vulnerability of people living with you. A consultation with a doctor should be a must, yet there will be no clear or universal answer.

Identify your mask, tube, humidifier and compressor with your name and phone number. Keep a copy of pressure data in your CPAP bag (a copy of the prescription or the latest download would be fine). If you hold a copy of your sleep test, insert it along with the prescription in your device's bag. It is possible for the pressures to be modified in the event of a hospital admission. This is normal. You will eventually return to your former pressures. This will require a prescription to remodify the pressures. It is also possible for exhaust port to be modified to add filters while in hospital.

CPAP or its bi-level cousin has been used successfully to treat the first COVID-19 infected Chinese admitted in intensive care unit, even if obstructive sleep apnea was not an issue (JAMA Huang, Feb 7, 2020). It helps day and nighttime breathing and oxygenation in a properly supervised setting.

Given that some may be advocating for temporarily suspending the treatment during an active infection from COVID-19 (something we have never suggested with influenza or any respiratory infections), we must bear in mind the risks involved in interrupting the therapy in a patient's particular case and consider measures to minimize the extent of such an interruption (refer to section concerning mitigation measures). An interruption could be considered in cases where several persons or vulnerable individuals share the same restrictive quarters without the possibility of having access to isolation to one room in an individual with the mildest sleep apnea abnormalities and the mildest manifestations. It is imperative to get a medical advice. Balancing the risks and benefits is difficult.

Stay zen. Sleeping is part of the treatment.

Rest!

SITUATION 8



I suffer from obstructive sleep apnea, I am treated by orthosis and I have COVID-19 symptoms.

If you have symptoms such as coughing, fever, shortness of breath, extreme fatigue or a sudden loss of smell, call 1 877 644 4545 to find out if you have contacted COVID-19.

https://cdn-contenu.quebec.ca/cdn-contenu/sante/documents/Problemes_de_sante/19-210-30FA_Guide-autosoins_francais.pdf?1584985897

All respiratory infections, including COVID-19, call for hand and respiratory hygiene to decrease transmission.

If you suspect being infected by COVID-19, you must isolate yourself from other people living under the same roof. Continue your treatment with a mandibular advancement orthosis and follow guidelines established by public health.

Stay zen. Sleeping is part of the treatment.
Rest!

SITUATION 9



I have obstructive sleep apnea, I am not being treated, and I have COVID-19 symptoms.

If you have symptoms such as coughing, fever, shortness of breath, call 1 877 644 4545 to find out if you have contacted COVID-19.

<https://santemontreal.qc.ca/population/coronavirus-covid-19/>

All respiratory infections, including COVID-19, call for hand and respiratory hygiene in order to avoid transmission.

If you suspect being infected by COVID-19, you must isolate yourself from other people living under the same roof and follow guidelines established by public health.

You could follow mitigation measures for obstructive sleep apnea.

Be aware that once a COVID -19 infected individual is admitted in intensive care, it is possible that he could be treated with a CPAP, or its bi-level cousin or yet with a ventilator, even if obstructive sleep apnea is not an issue; as was the case with the first infected individuals. (JAMA Huang, Feb 7, 2020).

Rest assure that these devices will take care of all obstructive sleep apnea issues. Infection is a priority. Share any doubts with your caregivers.

Stay zen. Sleeping is part of the treatment.

Côté Santé will be there for you once the infection is over. Meanwhile be sure to rest!

SITUATION 10



It is suspected that I may have obstructive sleep apnea, I am not treated, and I now have COVID-19 symptoms!

If you have symptoms such as coughing, fever, shortness of breath, call 1 877 644 4545 to find out if you have contacted COVID-19.

https://cdn-contenu.quebec.ca/cdn-contenu/sante/documents/Problemes_de_sante/19-210-30FA_Guide-autosoins_fra_ncais.pdf?1584985897

All respiratory infections, including COVID-19, call for hand and respiratory hygiene to decrease transmission.

If you suspect being infected by COVID-19, you must isolate yourself from other people living under the same roof and follow guidelines established by public health.

You could follow mitigation measures for obstructive sleep apnea.

Be aware that once a COVID -19 infected individual is admitted in intensive care, it is possible that he could be treated with a CPAP, or its bi-level cousin or a ventilator, irrespective of obstructive sleep apnea; as was the case with the first infected individuals. (JAMA Huang, Feb 7, 2020).

Rest assure that these devices will take care of all obstructive sleep apnea issues as well as other sleep-related breathing issues. The infection is the priority. Share any doubts with your physician and caregivers.

Stay zen. Sleeping is part of the treatment.

Côté Santé will be there for you once the infection is over. Meanwhile be sure to rest!

Besides the established general guidelines concerning the general public, some additional specific recommendations apply to individuals suffering from obstructive sleep apnea:

1) See that you benefit from sufficient sleep.

Sleep in itself acts as an anti-inflammatory agent. It keeps our defences up against infections and is essential in our recovery from diseases. Sleep is an essential, basic need, more so than eating and drinking. Allow yourself to sleep.

2) Diligently continue your treatment for obstructive sleep apnea.

You will benefit from treatment for obstructive sleep apnea. It improves sleep, stabilizes mood, decreases inflammation and stabilizes blood pressure. According to a report on the first cases in China (JAMA Huang, Feb 7, 2020); 40% of patients admitted in intensive care with a severe case of COVID-19 were treated with positive pressure (CPAP or bi-level).

3) Maintain a good hygiene.

It is important to wash your hands before and after installing your device. Clean your face before putting on the mask. Avoid touching your face, mouth, eyes and nose.

4) Protect your device and equipment from others around you.

Identify your equipment with your name. If you are hospitalized; bring your mask, your tubing, as well as your electrical wires and compressor. Keep your equipment away from other people's coughing and fingers.

5) Clean and do the upkeep of your equipment.

If you cough in your mask, make sure that you clean it yourself. Wipe it off first to get rid of the bulk of the secretions, then wash it in soapy warm water (dishwashing soap) each day. Also, wash the tubing and the humidifier daily. Check on the integrity of your mask and tubing.

6) Filter

Upkeep of filters varies depending on manufactures.

How to stay healthy and prevent infection while using positive pressure? 2/2



Resmed: standard filters must be hand-cleaned weekly and discarded every 3 months. Hypo allergenic filters must be discarded every month.

Respironics-Philips: grey foam filters are washable weekly. Dry them well before re-inserting. White filters are disposable monthly. Dark blue filters are washable weekly. Dry them well before re-inserting. Pale blue filters are disposable monthly.

Fisher&Paykel: all their devices have disposable filters after a maximum 3-month regular use.

It is strongly recommended to replace filters after a COVID-19 episode.

This information is for references only, and is by no means a substitute for your doctor's judgement and recommendations. This information is based upon the best information available as of September 14, 2020 and is subject to change without notice

You are advised – no cause for undue panic – to take this pandemic seriously. We are committed to your well-being and we hope that this information is helpful. Follow the guidelines established by public health, the government and your doctor with regards to your specific situation.

Côté Santé continues to offer COVID-adapted care to the population by means of teleconsultation, teletitration, home testing and other respiratory cares such as home oxygen therapy and nebulized devices. Call us any time by dialing 1 855 246-9393.

Going back to the September 11 attack, individuals that were probably suffering from untreated obstructive sleep apnea were most likely to develop Post Traumatic Syndrome Disorder (PTSD). Previously documented obstructive sleep worsened in general. In those not previously symptomatic of obstructive sleep apnea, symptoms of obstructive sleep apnea newly occurred; particularly those suffering from Post Traumatic Stress Disorder, PTSD. Up to 70% of Post Traumatic Stress Disorder sufferers have obstructive sleep apnea syndrome.

One of the cardinal symptom of PTSD is nightmare which is a sleep-related phenomenon.

Undergoing treatment for PTSD without addressing OSA is a non sense.

Treating obstructive sleep apnea promotes better sleep, reduces nightmares frequency and emotional intensity, and reduces the symptom of Post Traumatic Stress Disorder.

Dr Bonnie Henry, director of British Columbia's Public Health confided that she developed PTSD following the 2003 SARS outbreak (many came up with it following social isolation, by being sick or by losing a loved one) and that the same symptoms reappeared with the upsurge of COVID-19. She was formerly director of Ontario Public Health when SARS emerged in 2003.

If you are experiencing nightmares, share your concerns with a loved one. If persisting nightmares deter you from going to bed or sleeping, bring this document to your doctor.

If you have reasons to believe that you are suffering from obstructive sleep apnea or that obstructive sleep apnea has worsen following COVID-19, we can help you.

Several avenues are to be considered with medication or without medication in addition to undergoing obstructive sleep apnea treatments.

You are not alone. Côté Santé can help you.

Our medical specialist in Respiratory Medicine, certified in Sleep Medicine benefits from a 10-year experience in treating sleep disorders related to Post Traumatic Stress Disorder.

TOGETHER
LET'S PROTECT OURSELVES
AGAINST COVID-19



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