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REVIEW

# Symptoms of the COVID-19 in ENT

## Síntomas de la COVID-19 en ORL

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**ABSTRACT**

**Introduction:** we are currently facing a global pandemic of great impact due to the rapid spread of a novel coronavirus, SARS-CoV-2, the causative agent of COVID-19. It is important to highlight that some of the symptoms included in the clinical presentation of the disease involve the ear, nasal cavity and sinuses, and pharynx—areas within the scope of the otolaryngology (ENT) specialist.
**Objective:** to characterize the main otolaryngological symptoms of COVID-19.
**Method:** a literature review was conducted, consulting original articles, case reports, and systematic reviews available in open-access, peer-reviewed academic publications from the last five years. Databases reviewed included ScieELO, Regmed, Dialnet, Mayoclinic, among others. Search terms included COVID-19 symptoms in ENT as well as their English translations.
**Results:** the clinical presentation of COVID-19 is very broad and includes a wide variety of symptoms that overlap with other diseases. Among these, symptoms affecting the ears, nasal cavity and sinuses, and pharynx stand out, which fall within the field of the ENT specialist. Examples include loss of taste, loss of smell, and sore throat.
**Conclusions:** in the context of the COVID-19 pandemic, consultations related to alterations in smell and taste have increased significantly, often appearing without other accompanying symptoms, thus becoming a form of presentation of the disease. Additionally, we find catarrhal symptoms such as rhinorrhea and sore throat, which—with distinguishable and specific characteristics—could serve as warning signs of the presence of SARS-CoV-2 in the body.

**Keywords:** Ageusia; Anosmia; COVID-19; Pandemic; Hearing Loss; Symptoms.

**RESUMEN**

**Introducción:** nos enfrentamos actualmente a una pandemia mundial de gran impacto, como resultado de la rápida propagación de un nuevo coronavirus, SARS-CoV-2, causante de la enfermedad COVID-19. Se hace preciso resaltar que algunos de los síntomas que engloba el cuadro clínico de la enfermedad se corresponden con afectaciones del oído, cavidad y fosas nasales, y faringe; que competen la actuación del especialista en ORL.
**Objetivo:** caracterizar los principales síntomas otorrinolaringológicos de la COVID-19.
**Método:** se realizó una revisión bibliográfica consultando artículos originales, reportes de caso y revisiones sistemáticas de acceso abierto en publicaciones académicas revisadas por pares, de los últimos 5 años. Se revisaron las bases de dato de ScieELO, Regmed, Dialnet, Mayoclinic, entre otras. Los términos de búsqueda incluyeron síntomas de la COVID-19 en ORL así como su traducción al inglés.

**Resultados:** el cuadro clínico de la COVID-19 es muy florido e incluye gran variedad de síntomas comunes a otras enfermedades. Entre estos síntomas destacan los que afectan a oídos, cavidad y fosas nasales y faringe que competen la actuación del especialista en ORL. Son ejemplo de estos síntomas la pérdida del gusto, del olfato y el dolor de garganta.
**Conclusiones:** en el contexto de la pandemia por COVID-19 han aumentado considerablemente las consultas por alteraciones en el olfato y el gusto muchas veces sin otros síntomas acompañantes como forma de presentación de la pandemia, además encontramos síntomas catarrales como la rinorrea y el dolor de garganta que, con características distinguibles y propias podía alertarnos sobre la presencia del SARS-CoV-2 en el organismo.

**Palabras clave:** Ageusia; Anosmia; COVID-19; Pandemia; Perdida De La Audición; Síntomas.

## INTRODUCTION

At the end of 2019, in Wuhan, capital of Hubei province, China, a new coronavirus, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), was considered the etiology of many pneumonia cases. In February 2020, the latest disease caused by the SARS-CoV-2 virus was officially named Coronavirus Disease 2019 (COVID-19) by the World Health Organization (WHO). This virus is part of the Nidovirales order and Coronaviridae family, with a single-stranded RNA genome. Coronaviruses mainly infect birds and mammals, but can infect humans and cause diseases ranging from the common cold to severe acute respiratory syndrome.[1]

Two coronaviruses are known (SARS-CoV, which was discovered in 2002, and Middle East Respiratory Syndrome (MERS-CoV), found in 2012), which have been capable of producing severe respiratory illnesses with significant epidemics. The SARS-CoV virus contains a glycoprotein in its envelope that binds to its cellular receptor, the angiotensin-converting enzyme 2 (ACE2) receptor, while MERS-CoV binds to dipeptidyl peptidase 4 (DPP4). After fusing with the cell membrane, the viral RNA genome is released into the cytoplasm and initiates the viral genome replication process.[1]

A person can contract COVID-19 through contact with someone infected with the virus. The disease spreads mainly from person to person through droplets expelled from an infected person's nose or mouth when they cough, sneeze, or talk. These droplets are relatively heavy, do not travel very far, and fall quickly to the ground. A person can get COVID-19 if they inhale droplets from an infected person. That is why staying at least 1 meter away from others is essential. These droplets can land on objects and surfaces around the person, such as tables, doorknobs, and railings, so that other people can become infected if they touch these objects or surfaces and then touch their eyes, nose, or mouth. That is why it is essential to wash your hands frequently with soap and water or an alcohol-based hand sanitizer.[2]

The main way COVID-19 spreads is through respiratory droplets expelled by someone who coughs or has other symptoms such as fever or tiredness. Many people with COVID-19 have only mild symptoms. This is particularly true in the early stages of the disease. It is possible to catch it from someone who only has a mild cough and does not feel ill.[2]

According to some reports, people without symptoms can transmit the virus. It is not yet known how often this happens. The WHO is monitoring ongoing research on this issue and will continue to report on findings as they become available.[2]

The high potential for human-to-human transmission of SARS-CoV-2 led to a rapid epidemic in China and the subsequent global pandemic.[3]

The most common symptoms of COVID-19 are fever, dry cough, and tiredness. Other less common symptoms affecting some patients include aches and pains, nasal congestion, headache, conjunctivitis, sore throat, diarrhea, loss of taste or smell, and skin rashes or color changes in the fingers or toes. These symptoms are usually mild and start gradually. Some infected people have only very mild symptoms.[4]

Most people (around 80 %) recover from the disease without needing hospital treatment. Around 1 in 5 people who contract COVID-19 end up becoming seriously ill and experience breathing difficulties. Older people and those with underlying medical conditions such as high blood pressure, heart or lung problems, diabetes, or cancer are more likely to become seriously ill. However, anyone can contract COVID-19 and become seriously ill. People of any age who have a fever or cough, difficulty breathing, chest pain or tightness, or difficulty speaking or moving should seek medical attention immediately. It is recommended that a healthcare professional or medical center be called first to refer the patient to the appropriate healthcare facility.[4]

While some Western or traditional medicine solutions or home remedies may provide comfort and relieve mild symptoms of COVID-19, no medicines have been shown to prevent or cure this disease. The WHO does not recommend self-medication with medication, including antibiotics, to prevent or cure COVID-19. The WHO is coordinating efforts to develop vaccines and drugs to prevent and treat COVID-19 and will continue to provide

updated information as research results become available.[5]

The most effective ways to protect yourself and others from COVID-19 are:[6]

- Wash your hands thoroughly and frequently, or use alcohol-based hand sanitizers or other antiseptic liquids.
- Avoid touching your eyes, mouth, and nose.
- Cover your mouth with your bent elbow or a tissue. If you use a tissue, throw it away immediately after use and wash your hands.
- Maintain a distance of at least one meter from other people.
- Use medical masks to prevent the spread.

As described above and given the relevance of the issue, the high incidence and prevalence of COVID-19 globally and specifically in our country, it is essential to highlight that some of the symptoms included in the clinical picture of the disease correspond to conditions affecting the ear, nasal cavity and sinuses, and pharynx, which are the domain of ENT specialists. The high frequency of such conditions has prompted this study, which addresses the scientific question: What symptoms characterize the presence of COVID-19 in otolaryngology? The objective is to describe the main otorhinolaryngological symptoms of COVID-19, thus establishing a bibliographic basis for the study and preparation not only of ENT specialists but also of general practitioners, contributing to the early detection of these symptoms as a precursor to the disease, treatment, and rehabilitation. A total of 23 bibliographies were consulted to achieve this goal.

**Objective:** To characterize the main otorhinolaryngological symptoms of COVID-19.

## METHOD

A literature review was conducted from August 2 to 10, 2021. Original articles, case reports, and systematic reviews were reviewed in open-access, peer-reviewed academic publications from the last five years, with no geographical or language restrictions. The ScieELO, Regmed, and Dialnet databases were reviewed.

The search terms included “Symptoms of COVID-19 in ENT” and its translation into Spanish: “Síntomas de COVID-19 en ORL.”

## DEVELOPMENT

COVID-19 has many symptoms. Researchers have found important biomarkers and identified seven groups of them, which will help develop vaccine candidates and treat the disease.[4]

The results of their research reveal that specific symptoms appear to be linked to others, so scientists established seven groups:[4]

1. Flu-like symptoms (with fever, chills, fatigue, and cough)
2. Catarrhal symptoms (with runny nose, sneezing, sore throat, and nasal congestion)
3. Joint and muscle pain
4. Eye and mucous membrane infections
5. Lung problems (with pneumonia and breathing difficulties)
6. Intestinal problems (including diarrhea, dizziness, and headache)
7. Loss of taste and smell, and other symptoms

In this paper, we will focus only on the symptoms of the disease relevant to otolaryngology without neglecting the other symptoms, which are necessary for all healthcare personnel to know.

### Cold symptoms

During the first few days, the infection is concentrated in the mouth, larynx, nose, and throat, which is why those infected have a “very high” capacity to spread the infection during the early stages of the disease. However, according to this study, it is also possible to establish the point at which patients are no longer contagious. Patients are no longer contagious when tests are taken from the nasopharyngeal area, and fluids expelled when coughing show less than 100 000 copies of the virus genome.[7]

The high viral load in the pharynx immediately after the first symptoms appear suggests that COVID-19 patients are infectious very early, possibly even before they realize they are sick.[7]

At the same time, the infectiousness of COVID-19 patients appears to depend on the viral load in the pharynx or lungs. This is essential in deciding when a patient can be discharged as soon as possible in the event of bed shortages and the associated time pressure.[7]

According to comparative studies linking nasopharyngeal viral load and therefore transmissibility with the presence or absence of symptoms in carrier patients, it was concluded that the new coronavirus can multiply in the pharynx without reaching the lungs and is therefore very easily transmissible in the absence of symptoms or the presence of mild symptoms.[7]

The COVID-19 pandemic is in its second wave and has already infected a large number of people in our country. With the cold weather comes the first colds and flu. Their symptoms (sore throat, nasal congestion, and fever) can be confused with those of coronavirus, which may cause concern among the population and lead to medical consultations.[8]

A report by the World Health Organization includes sore throat among the symptoms that coronavirus patients may experience. The data from this study show that only 13,9 % of those affected present this symptom, but it may indicate the virus's presence in our body.[8]

*What symptoms do the flu and coronavirus share?*

Influenza and COVID-19 viruses cause respiratory illnesses, so some of their most characteristic symptoms are similar: fever, cough, fatigue, difficulty breathing, sore throat, nasal mucus, muscle pain, and headache.[9]

If a sore or itchy throat is not accompanied by fever, cough, or shortness of breath, it may not be related to the coronavirus. Sore throat is an uncommon symptom in COVID-19 patients and is usually preceded by a dry cough. It may present with irritation, redness of the throat and tonsils, and pain when swallowing.[9]

A person with a cold has a stuffy nose and sneezing, and may have a low fever and cough. The common cold symptoms are easily distinguished because they are much milder than those of COVID-19 and begin more gradually.[9]

Symptom complex for each condition:[10]

- COVID-19: Fever, dry cough, difficulty breathing, fatigue, runny nose, diarrhea, loss of smell, sore throat.
- Flu: Fever, cough, mucus, sneezing, vomiting, diarrhea, muscle pain.
- Cold: Cough, nasal congestion, sneezing, sore throat, throat discomfort.

In other words, the new coronavirus causes symptoms considerably different from those of a person with a viral cold or flu.[10]

In addition to sore throat, there have been reports of varying severity of smell and taste disorders (anosmia and ageusia) in a high percentage of patients with COVID-19. These are explained below.

**Loss of smell or anosmia without nasal obstruction**

Smell, considered the most primitive of the senses, can relate, prevent, alert, remember, and generate different sensations. A smell is defined as a special impression perceived through the sense of smell, which derives from the action of certain chemicals on the olfactory system. The olfactory system has peripheral subdivisions (olfactory neuroepithelium and nerve fascicles) and central subdivisions (olfactory bulb and its central connections). The olfactory neuroepithelium is located in the roof of each nasal cavity, specifically in the cribriform plate. It represents the main olfactory receptor organ and is related to the first cranial nerve.[11]

The perception of aromas results from a combination of the activation of smell by odoriferous components released in the nasopharynx, taste, and somatosensory sensations such as texture, heat, and cold, the latter mediated by activation of the trigeminal nerve.[11]

Many patients with olfactory dysfunction report a decrease in taste perception. This is because most tastes are odors that ascend via the retronasal route to the olfactory epithelium.[11]

Olfactory pathology is a fairly common condition in the general population and can be quantitative (anosmia/hyposmia) or qualitative (parosmia/phantosmia).[11]

Several symptoms of COVID-19 are already known to the vast majority: fever, cough, pneumonia, mild respiratory distress, rhinorrhea, nasal obstruction, and respiratory deterioration. Patients who develop pulmonary deterioration may even require admission to the ICU. There is another symptom that has a significant impact on patients' quality of life and occurs in a large number of cases: loss of smell and taste. These can occur separately or simultaneously, but the most important is anosmia, or total loss of smell.[12]

Specifically, according to the latest studies, up to 88 % of patients with COVID-19 experience a loss of smell and taste. Most of these patients (80 %) will spontaneously recover their sense of smell and taste over time. For those who do not recover their sense of smell or do not recover it entirely, there is currently only one option: olfactory training.[12]

In some cases (10 %), hyposmia or partial loss of smell begins even before general symptoms appear.[12]

Loss of smell or anosmia can occur not only due to COVID-19 but also due to various other causes. On the one hand, the most common cause of loss of smell is viral infections of the upper respiratory system: common cold, sinusitis, bronchitis, etc. Another common cause of anosmia is chronic inflammation of the nose and sinuses: allergic rhinitis, chronic rhinosinusitis, etc. Finally, the last cause of loss of smell is head trauma, which causes significant damage to the neuroepithelium and the olfactory bulb.[12]

The loss of smell that can accompany coronavirus is unique and very different from what someone with a bad cold or flu might experience. When COVID-19 patients lose sense of smell, it tends to be sudden and severe. And

they don't usually have a stuffy nose or a runny nose. Most people with coronavirus can still breathe freely.[12]

A recent study by Harvard Medical School has shown that the key to the loss of smell and taste in COVID-19 is that the SARS-CoV-2 virus infects nerve cells in the nasal cavity (glial cells), not neurons. Olfactory sensory neurons do not express the gene that encodes the ACE2 receptor protein, which the coronavirus uses to enter cells. However, it is expressed in the support cells of the olfactory sensory neurons, the glial cells, as well as in specific populations of stem cells and blood vessel cells.[13]

In summary, the new coronavirus causes anosmia in patients not by directly infecting neurons but by affecting the function of support cells.

It is unlikely that the loss of smell and taste caused by COVID-19 will be permanent. Furthermore, research suggests there is little likelihood that SARS-CoV-2 will cause severe and permanent damage to the olfactory neural circuits. Once COVID-19 has passed and the infection has cleared, "olfactory neurons do not appear to need to be replaced or rebuilt from scratch".[14]

Degrees of smell loss: Smell loss can be measured based on severity. The scale for measuring it ranges from 0 to 10. From 0 to 3 is considered mild smell loss; from 3 to 7, moderate; and from 7 to 10, severe smell loss. Mild or moderate smell disorders (0 to 7) are known as hyposmia. Severe or total loss of smell (7 to 10) is known as anosmia.[15]

In patients with COVID-19, it has been found that 1 in 5 recover their sense of smell within a week of the onset of symptoms—a third recover within one to two weeks. Finally, 1 in 5 will take two to four weeks to recover their sense of smell after COVID-19.[15]

Most patients (80 %) who have lost their sense of smell due to COVID-19 recover within a maximum of one month. However, they continue to experience a slight percentage of smell loss or hyposmia. We refer to this type of smell loss as "long-term".[15]

Diagnosis: Patients who have lost their sense of smell with COVID-19 should undergo olfactometry to quantify the loss of smell and see how much of their sense of smell remains. Olfactometry is a test that measures the sense of smell and, therefore, the loss of smell. It consists of a test in which the patient must detect, identify, and remember a series of smells. Based on their responses and comparing the results with the national average, a score defines the level of hyposmia (mild, moderate, severe) or anosmia. 15Treatment: There is currently no medical treatment available for the loss of smell caused by COVID-19. We are only managing spontaneous recovery over time. However, there are tools available that can help these patients regain their sense of smell.[15]

For this reason, we must wait and see how these patients evolve to apply the only treatment currently available, olfactory training.[15]

Olfactory training consists of exercises to teach a patient who has suffered a loss of smell to recognize smells again. Using a selection of recognizable smells associated with direct images, the patient trains their sense of smell and olfactory memory. The process is based on the brain's ability to identify, store, and remember smells, relating them to sight and hearing.[15]

Olfactory training should be done twice daily (morning and evening) for at least three months. After this time, a new olfactometry test is performed to see how much benefit this training has provided. The training can be continued if the patient does not recover from the smell.[15]

Management of patients with Covid-19-related smell loss: once the SARS-CoV-2 infection has cleared and the patient has not regained their sense of smell, they should see their doctor and undergo a thorough examination consisting of: nasal endoscopy, to ensure that there is no endonasal disorder associated with the smell loss. Once this has been ruled out, an MRI scan of the olfactory bulb will be performed to see if there is any atrophy. Next, an olfactometry test will be performed, providing precise results on the patient's sense of smell and helping us offer the appropriate treatment for each case.[15]

**Loss of taste or ageusia**

Another distinguishing feature of the disease is that it causes a "total" loss of taste. In other words, the coronavirus does not simply reduce the ability to distinguish flavors by affecting the sense of smell, researchers explain in the journal Rhinology.[16]

Coronavirus patients with loss of taste cannot differentiate between bitter and sweet. Experts suspect this is because SARS-CoV-2 affects the nerve cells directly involved in smell and taste.[16]

The Spanish Society of Otorhinolaryngology and Head and Neck Surgery (Seorl-CCC) recommends including the recent onset of smell and taste disorders (anosmia, hyposmia, ageusia, or dysgeusia) and pharyngeal pain (also odynophagia), with no other apparent cause, as symptoms suggestive of infection with the new coronavirus SRS-CoV-2, which causes COVID-19. It also urges people to take the appropriate isolation measures and undergo diagnostic testing to prevent the spread of the virus by patients with few symptoms.[17]

**Hearing loss**

There is no scientific evidence of this new virus (SARS-CoV-2) in the ear. However, there is evidence of

other types of respiratory viruses (including other coronaviruses) in the middle ear during an upper respiratory infection.[18]

Respiratory viruses such as respiratory syncytial virus (RSV) and influenza virus have been linked to the development of outer ear infections, specifically bullous myringitis, which presents with intense and sudden ear pain.[18]

The inner ear can be affected by various viruses (from respiratory tract or gastrointestinal infections) that cause inflammation of the vestibular nerve, known as vestibular neuritis, which manifests clinically with vertigo, nausea, vomiting, and instability. These symptoms have not been reported in COVID-19-positive patients, nor has there been an increase in consultations for the symptoms above.[18]

*Is it possible to lose your hearing from COVID-19?*

Some viral infections have been linked to hearing loss, causing sudden sensorineural hearing loss. This is triggered by inflammation in the cochlea or auditory nerve caused by the viral infection.[19]

In line with the above, we can highlight that in severe cases of SARS-CoV-2 infection, there is an exaggerated inflammatory response and microthrombotic phenomena, which could affect the microcirculation of the inner ear. In addition, it has been suggested that this virus could affect the brain stem, where part of the auditory pathway is located, which may contribute to hearing loss.[19]

A team of researchers from the Johns Hopkins School of Medicine found evidence that the coronavirus can also infect the ear and the mastoid bone, located in the skull just behind the ear, in postmortem patients, making it impossible to detect the presence or degree of hearing loss.[20]

This is not the first research on coronavirus in the ears. One study found that COVID-19 caused acute otitis media in some adults, an infection that causes the area behind the eardrum to become inflamed and infected. Another study of 20 asymptomatic patients found that their hearing abilities worsened after overcoming the disease. Despite all of the above, studies currently do not prove these hypotheses.[20]

*What precautions should I take if I have any hearing loss?*

There are numerous hearing protection measures, especially those related to the intake of potentially ototoxic medications (substances that have a temporary or permanent harmful effect on the inner ear), which could affect hearing.[21]

Various medications have been included in treating COVID-19 infection, most of which are not ototoic.[21]

In patients with known hearing loss, each case should be assessed individually, taking into account the risk-benefit ratio of the treatment prescribed, and each patient should be monitored, especially if the symptom worsens or appear.[21]

**COVID-19 and tinnitus**

Tinnitus, noises, or ringing in the ears and head that some people hear can worsen when they contract COVID-19, according to a study, which indicates that some patients began to experience this problem after becoming infected.[22]

Research published in Frontiers in Public Health indicates that tinnitus worsened in 40 % of people who showed symptoms of COVID-19.[22] Although the study focused on people who had previously suffered from these noises, "a small number" of participants reported that they began to notice them after developing coronavirus symptoms.[22]

The social situation caused by the pandemic, from uncertainty to changes in habits or noisier homes due to lockdowns, also hurts those suffering from tinnitus.[22]

Thus, "a large proportion of people" felt that their tinnitus worsened with social distancing measures to help control the spread of the virus, which have led to significant changes in routines and lifestyle.[22]

The study indicates that fear of infection, financial concerns, loneliness, and sleep problems have made this problem more bothersome for 32 % of people.[22] According to those affected, certain external factors also contributed, such as an increase in video calls, noisier home environments, home schooling, and increased consumption of coffee and alcohol.[22]

**Consequences of the COVID-19 lockdown on the voice:**

The vocal cords are a muscle we have to exercise; we do this without realizing it when we speak. If we remain silent all day because we live alone, we risk them atrophying and coming out of lockdown with less voice.[23]

This is because the muscle in our vocal cords loses tone (muscular dysphonia). It is therefore essential to do everything possible to get used to hearing our voice out loud, especially if we live alone, in whatever way is most comfortable for us: you can talk, read aloud, or even sing around the house if you feel like it. This will help us maintain the tone of our vocal cords.[23]

If we live alone, we must get used to hearing our voice out loud to maintain the tone of our vocal cords and prevent them from atrophying.[23]

For some people, the fear, anxiety, and stress of confinement can dry out their throat and leave them without a voice. They cannot avoid it. Remember to hydrate your throat frequently by drinking fluids to prevent this problem.[23]

There may also be cases of people who lose their voice when they panic. When they overcome it, their vocal cords loosen up and their voice returns to normal.[23]

## CONCLUSIONS

After a thorough review of the evidence published to date, we can conclude that in the context of the COVID-19 pandemic, there has been a significant increase in consultations for alterations in smell and taste, often without other accompanying symptoms, as a form of presentation of the pandemic. In addition to these symptoms, we find catarrhal symptoms such as rhinorrhea and sore throat, which, with distinctive and unique characteristics, could alert us to the presence of SARS-CoV-2 in the body. There is also a notable association between hearing loss and infection with the virus, but this correlation has not yet been fully demonstrated. Therefore, otolaryngologists play an essential role in helping patients suffering from such disorders by recommending management and rehabilitation. These specialists are particularly at risk of contracting the disease, so it is necessary to take extreme precautions at this time, as the most effective measure to prevent infection continues to be prevention.

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None.

## CONFLICT OF INTEREST

None.

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