

## Risks and Complications in Viral Infections

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### Introduction

Viral infections are common diagnoses in dental and maxillofacial consultations, both in adult and pediatric patients. There are multiple infectious agents, which will vary their clinical characteristics on occasions, and on others it will be complex for the professional to carry out a differential diagnosis due to the similarity of the lesions.

There are conditions that occur sporadically in certain geographical regions and seasons of the year. Treatments can be differentiated in certain situations, but in most cases these nosological entities are faced with antivirals in the prodromal periods and in most cases the therapy is symptomatic. At present, what I call a pandemic of antimicrobial resistance has been triggered, given by the erroneous prescriptions of antibiotics in cases where there was no justified scientific indication; this is the case of viral diseases.

The professional must do everything necessary to reach a diagnosis as accurate as possible, rely on complementary studies, and be oriented towards the main clinical characteristics of these diseases. To avoid the unnecessary and iatrogenic prescription of drugs, just to avoid the so-called "superinfections". Of course in the medical sciences the words always and never are dangerous, since nothing is so absolute in living beings. There may be cases of patients who, due to their immunocompromised systemic state, or due to being decompensated from an underlying disease, have infected the lesions caused by the virus and to avoid other complications, it is decided to insert an antimicrobial into the drug treatment. These cases are not the ones that predominate and in most of the patients that are applied, it is that the initial phase has already passed where the antiviral had a true curative action.

In this chapter we will address the main viral lesions that produce different damages to the oral and maxillofacial complex, emphasizing the main risks and complications that can occur.

### *Herpes virus*

#### *Herpes simplex*

Herpes simplex is a viral-type inflammatory infectious disease, characterized by the appearance of skin lesions formed by small vesicles grouped in clusters and surrounded by a red halo.

It is caused by the herpes simplex virus, or herpes hominis virus, type I (HSV-1) that affects the face, lips, mouth, and upper part of the body, and type II (HSV-2) that occurs more frequently on the genitals. and lower body. Cases have been diagnosed with type II in the oral cavity and vice versa, given by the sexual habits of the individuals. Type I is only responsible for approximately 5 to 10 % of genital herpes, although both viruses can be transmitted through sexual contact. It is normal for a crossover of type 1 and type 2 infections to occur during oral-genital sexual contact [1, 2].

Up to now, there is no one hundred percent efficient treatment for this nosological entity. However, various forms of treatment are available to reduce symptoms and speed up the healing process of the lesions, after which the virus will persist in a latent form in the body until the reappearance of the next active episode.

It occurs in the oral cavity in a primary, secondary or recurrent way. Primary herpetic gingivostomatitis commonly occurs in children or young adults and may be followed by frequent recurrences. In the primary episode, the virus becomes latent in the trigeminal ganglion. Recurrent herpes occurs at any age, whether intraoral or extraoral.

In general, primary herpes simplex type I infections are asymptomatic. The symptoms frequently occur in young children (1 to 5 years of age) and affect the oral and gingival mucosa, the incubation period is short (about 3 to 5 days, with a range of 2 to 12 days) and the symptoms last two to three weeks [1, 2, 3].

The main symptoms, risks and complications in the oropharyngeal complex are evidenced as:

- Burning sensation, itching and color change of the mucosa or affected skin.
- Fever.
- Pain in oropharynx.
- Painful blisters and pimples filled with fluid in the labial region, or in other oral and maxillofacial areas.
- Vesicular lesions. (View Figure 1)
- Small blisters that fuse to form one long blister.
- Ulcerative lesions.
- Yellow scabs that form on the blisters at the beginning of the healing phase.
- Edema.
- Gingivostomatitis.
- Cervical lymphadenopathy.
- Anorexy.
- Asthenia.
- Gingivitis.
- Pharyngitis.
- Tonsillitis.
- If it occurs in the woman in the first months of pregnancy, it increases the risk of miscarriage and can infect the fetus.
- Recurrences when the patient is immunosuppressed, due to stress, heat stroke, etc.



**Figure 1:** Patient diagnosed with herpes simplex type one in which the first lesion detected was in the form of a vesicle on the palate. Courtesy of Dr. Otto Aleman Miranda.

When the disease is recurrent, it is characterized by a group of vesicles whose most common location is the edge of the lip (See Figure 2). The pain is intense at first, but it fades in four to five days. The lesions progress through the pustular to crusting stages and heal without scarring usually in 8 to 10 days. The lesions may recur at variable intervals in the same location. The frequency of recurrences varies widely between people [3, 4].



**Figure 2:** Patients with collagen disease with herpetic lesions in the lower labial region. Courtesy of Dr. Otto Aleman Miranda.



**Figure 3:** Patients with collagen disease with herpetic lesions in the upper labial region that were first separated and then joined to form a single larger lesion. Courtesy of Dr. Otto Aleman Miranda.

### **Mode of contagion**

The herpes simplex virus can be found in and released from ulcers, but between outbreaks the virus can also be released from skin that appears unaffected or has no ulceration.

The initial oral herpes infection usually occurs in childhood and is not classified as a sexually transmitted disease. 80 % of the adult population is a candidate for carrying HSV-1 and may have acquired it in a non-sexual way.

It is an infection that manifests itself after long periods of time after infection, up to 24 months, if it was sexual. In case of being non-sexual, up to 18 months after contracting the virus.

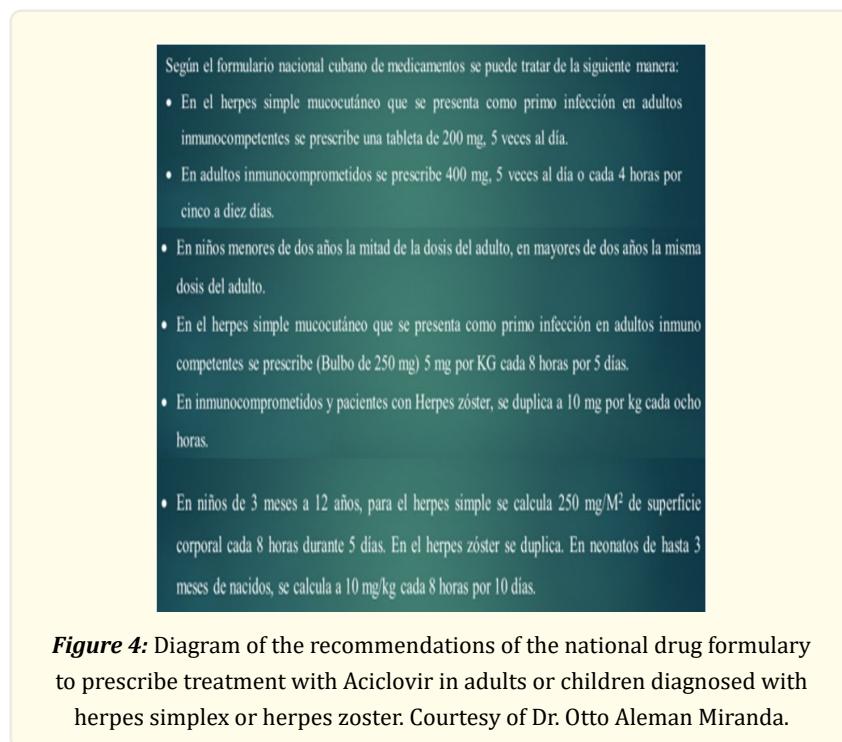
### Treatment

As mentioned above, there is no treatment that completely eliminates this infection from the body, since once the virus is established, it will always remain inactive in the affected individual with occasional outbreaks. There are medicines that can reduce how often herpetic episodes appear, how long they last, and how much damage they cause [1, 2, 4].

It is recommended:

- Keep affected tissues dry and clean.
- Contact as little as possible with the lesions.
- Extreme hygienic measures.
- Avoid kissing other people from the time the first symptoms appear until the rashes have completely healed.
- Separate the personal utensils of the person affected.
- Avoid physical exertion and excessive exposure to the sun.
- Provide children with refreshing foods that are not salty or acidic.
- In localized and small lesions in the initial acute period, topical Acyclovir can be applied.

The Cuban national drug formulary offers good recommendations for the specific treatment of these lesions, when a more powerful therapeutic is needed, so to speak. (View Figure 4)



### *Herpes zoster*

Varicella-zoster virus (VZV) is a human herpesvirus and has the peculiarity of being the causative agent of two different diseases: chickenpox, which occurs during primary infection, generally during childhood, and herpes zoster (HZ), which results of virus reactivation.

Once the chickenpox subsides, the virus is never eradicated from the host, since it remains latent in the sensory ganglia of the dorsal roots, which can be reactivated when there is an immunodeficiency in the affected person and gives rise to herpes zoster. The disease and its transmission are perpetuated in humans thanks to the fact that the immune system does not eliminate it and the ease of contagion in the active state. Colloquially, the HZ is known as shingles or culebrina, fire of San Antonio [5, 6, 7].

This disease affects dissimilar regions of the organism, where the orofacial complex is greatly injured, and within this the lips, mouth and eyes are among the most affected. (see Figures)

It is recognized as a neuropathy, which affects the peripheral nerves with or without skin manifestations, being diagnosed mainly in the elderly and immunocompromised.



**Figure 5:** Patient with herpes zoster in the oral cavity.  
Courtesy of Dr. Otto Aleman Miranda.

It is characterized by the formation of small painful ring-shaped blisters grouped along a dermatome, which can affect mucous membranes and skin.

Among the most important clinical characteristics are highlighted.

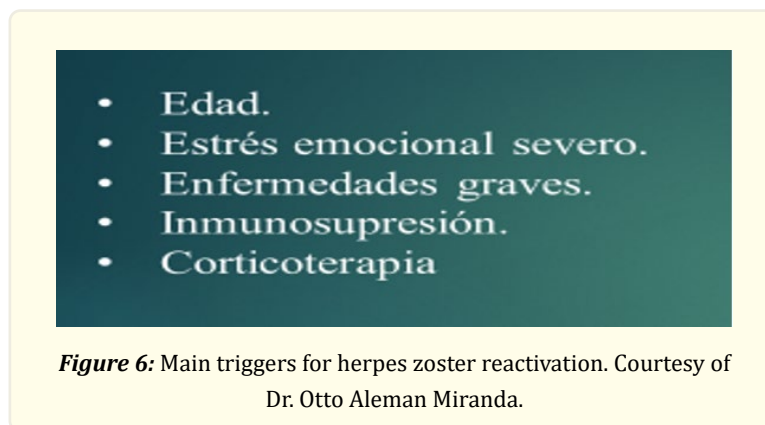
- Pain, patients describe it as; (sharp, stinging, stinging).
- Formation of vesicles in the mucosa and skin.
- Facial lesions are generally unilateral and follow the distribution of the maxillary and/or mandibular branch of the trigeminal nerve.
- Patients older than 55 years mainly.
- In patients with decompensated or uncontrolled chronic diseases.
- Immunocompromised.
- More in white-skinned patients.
- Photosensitivity.
- Fever.
- Asthenia, which can last one or several days.

- Itching, burning and pain that can become extreme, all in the area of the affected nerve, where the rash will appear.
- Skin rash.
- Usually no more than three metameres are affected.
- The contents of the vesicles can be hemorrhagic (bloody), and burst within 7 to 10 days.

The lesions are contagious by direct contact in the acute phase, during the first week, and can be passed from one person to another. It is important to make it clear that if VZV is transmitted from an individual with HZ to another who has never had contact with the virus, the condition that it produces is chickenpox.

It is essential to have been exposed to varicella zoster to be able to present HZ later, this cannot be a doubt for the professional. When a patient with these characteristics is presented and during the interrogation, he clearly and confidently specifies that he has never suffered from chickenpox, since a difference must be made with other vesicular blistering diseases or with contact dermatitis, impetigo, cellulitis, bites or dermatitis herpetiformis, contact with poison sumac and poison ivy [5, 6, 7].

The highest percentage of affected individuals was in contact with VZV during childhood, even if it was in a subclinical form. Generally, the immune system keeps the virus inactive. When any immune imbalance occurs, whatever the cause (See image), the virus reactivates and replicates in neurons, and forms new viruses that circulate along the axon to the area of skin innervated by that ganglion (dermatome). The characteristic pain of herpes zoster is caused by irritation of sensory fibers in the infected nerve [8].



**Figure 6:** Main triggers for herpes zoster reactivation. Courtesy of Dr. Otto Aleman Miranda.

The disease has four fundamental phases:

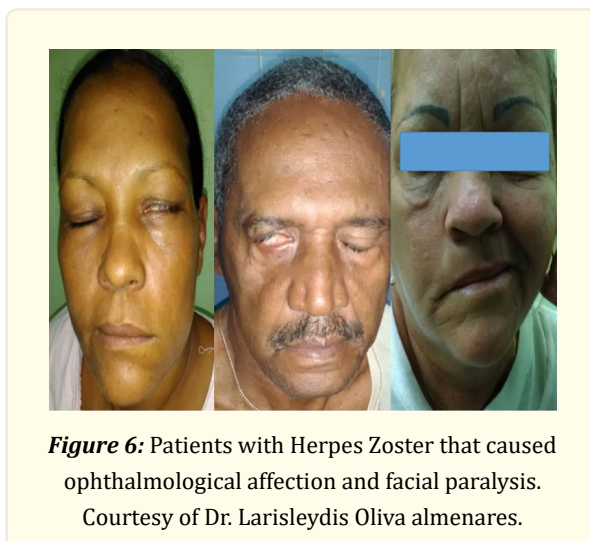
- Prodromal phase.
- Bullous phase.
- Healing phase.
- Post-herpetic phase.

The virus is not spread through breathing, coughing, or casual contact. Therefore, the disease is only contagious in the bullous phase.

The diagnosis of this pathological entity is eminently clinical. In case of doubt, there are a series of complementary tests. Fluid samples can be taken from the vesicles, in which VZV-infected cells have a highly elongated and darkened cell nucleus. A viral culture from a fresh lesion or microscopic examination of the base of the blister, called a Tzanck preparation, can be done. In the complete blood count, there may be leukocytosis as an indirect sign of infection, and elevation of antibodies against VZV.

There are multiple risks and complications of this disease (See Figures), in the following box we compile the main and most frequent ones. (See box)

Main risks and complications of herpes zoster in the orofacial complex
Post herpetic neuralgia.
Ophthalmological condition (ophthalmoplegia, ptosis, retinal necrosis, mucopurulent conjunctivitis, episcleritis, keratitis, anterior uveitis or blindness).
Facial paralysis.
Palsy of the cranial nerves III, IV and VI.
Respiratory failure due to diaphragmatic paralysis, in case of involvement of the vagus nerve or X cranial nerve.
Post herpetic scars.
Hearing loss.
Encephalitis (it is rare due to HZ, but it is serious and is considered an emergency).
Aseptic meningitis, cranial neuropathies, polyneuropathies, or myelitis.
Necrotic herpes zoster (with deep, necrotic ulcers, which can lead to bacterial superinfection).
Spread to other organs (lungs, kidneys, or brain).
Ramsay Hunt syndrome.

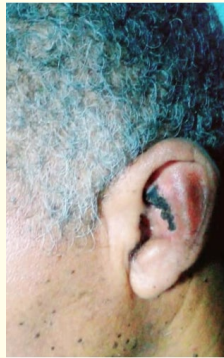


### Ramsay Hunt syndrome

Due to the characteristics of this complication, we decided to describe it briefly. Varicella zoster virus reactivation product is present in the geniculate ganglion of the facial nerve, but due to its adjacency with other neurosensory structures, its clinical characteristics may vary. Its classic signs and symptoms include ear pain, vesicles, and peripheral facial palsy [8, 9].

In most cases it is not necessary to carry out microbiological laboratory studies, achieving the diagnosis with the clinic. Once the syndrome is diagnosed, it is essential to start combined treatment of antivirals with steroids in the first 72 hours to obtain better results and minimize sequelae. Adjuvant medications are added to this therapy to alleviate painful and inflammatory symptoms.

The prevention of this syndrome is carried out with the available vaccines or with immunoglobulin, in order to avoid acute discomfort and severe consequences that can alter the quality of life of patients. Currently there is no curative treatment, nor is it possible to eliminate the virus from the body. However, there are treatments that can alleviate the symptoms, and reduce the duration and severity of the process [8, 9].



**Figure 7:** Patient with Herpes Zoster in the auricular region. Courtesy of Dr. Otto Aleman Miranda.



**Figure 8:** Patient with paralysis that causes deviation of the lower lip due to a Herpes Zoster sequel. Courtesy of Dr. Otto Aleman Miranda.



**Figure 9:** Patient with Herpes Zoster in the auricular region. Courtesy of Dr. Otto Aleman Miranda.





**Figure 10:** Patient with Herpes Zoster that caused Ramsay Hunt syndrome. Courtesy of Dr. Larisleydis Oliva almenares.

### *Cytomegalovirus*

Cytomegalovirus (CMV) is a form of Herpes virus; in humans it is known as Human herpes virus 5 (HHV-5). Its name is due to the increase in morphological volume suffered by infected cells.

- Las úlceras orales causadas por CMV pueden aparecer sobre cualquier superficie mucosa y presentan áreas necróticas con un halo blanco por lo que pueden ser confundidas con úlceras aftosas.
- Periodontitis ulcerativa necrotizante.
- Linfoma.
- Tiene afinidad por las glándulas salivales.
- Constituye una afección muy peligrosa y dañina para los fetos.
- Hipertermia.
- Hepatitis.

**Figure 11:** Some of the main clinical features of cytomegalovirus. Courtesy of Dr. Otto Aleman Miranda.

Among its clinical manifestations are (See Figure 11):

In addition, patients with highly variable lesions in the oral cavity have been observed, such as whitish thrush-like plaques on the mucosa of the gums, lesions reminiscent of hypertrophic candidiasis on the tongue, as well as adherent bloody crusts in areas adjacent to the uvula. There have been cases of patients with ulcers with a granulomatous or exophytic appearance (see Figure 12), approximately 2.0 cm in diameter and more, with irregular edges and a clean surface [10].

Sometimes it is necessary to make a differential diagnosis with other lesions such as herpes simplex, histoplasmosis, major thrush, and even with squamous cell carcinoma, etc. [11, 12].



**Figure 12:** Female patient who underwent removal of a benign lesion in the labial region, and in the histopathological study a squamous cell carcinoma was evidenced, but an exaggerated growth was also observed in the morphology of the cells, for which complementary studies were carried out that lead to think a malignant transformation by infection with CMV. Courtesy of Dr. Otto Aleman Miranda.

Among its complications are:

- Sudden rash” or “infantile roseola”. It typically affects childhood.
- Infectious mononucleosis not associated with Epstein Barr virus.
- Malignant transformation of the lesions.
- In the oral cavity it appears mainly as ulcers on the palate followed by keratinized gingiva, and may even affect the alveolar bone.
- Affection of the central nervous system.
- Damage to organs and systems (eyes, lungs, liver, esophagus, stomach, intestines, brain).
- Serious neurosensory sequelae for babies.
- Sensorineural hearing loss.
- Sensorineural deafness.
- Alteration of neurodevelopment.
- Within the ultrasound alterations in pregnancy, the following are mentioned: oligohydramnios or polyhydramnios, fetal hydrops, pleural or pericardial effusion, hepatosplenomegaly, intestinal hyperechogenicity, and alterations at the CNS level, among which are microcephaly, ventriculomegaly, cortical development alterations , white matter, neuronal migration, intracranial calcifications, periventricular hyperechogenicity, intraventricular synechia, cerebellar hypoplasia and dysgenesis of the corpus callosum [13, 14].
- Severe thrombocytopenia.
- Disseminated intravascular coagulation.
- Secondary bacterial infections.
- Psychomotor retardation.
- Cerebral palsy.
- Hypotonia.
- Epilepsy.
- Visual problems.
- Dental alterations.
- Language and learning delay.
- Chorioretinitis.

CMV transmission occurs from person to person. The infection requires close or sexual contact (sperm), it can also be transmitted by breast milk, mucous membranes with infectious body fluids such as urine, saliva, oropharyngeal and endocervical secretions, tears, blood splashes, by transplanted organs and rarely by blood transfusion. Although the virus is not highly contagious, it can be transmitted through personal effects [14, 15].

Infection with this virus is easy to prevent, because it is usually transmitted through bodily fluids by contact with the hands and then with the nose and mouth. Therefore, by maintaining adequate personal hygiene of the hands, it is effectively possible to eliminate the virus from this area, thus avoiding contagion. CMV infection without symptoms is common in children; as a result, it is common not to isolate individuals known to be infected.

That is why in the biosafety chapter so much emphasis is placed on the care that the professional must have, since there may be a risk of infection when caring for a sick patient with this nosological entity.

### Diagnosis

Most CMV infections go undiagnosed because the virus usually produces few or no symptoms and tends to reactivate intermittently without symptoms. In the following box we mention some variants of non-clinical diagnosis. (see box)

Some variants of diagnostic methods
Detection of CMV DNA or antigens.
Urine culture in infants.
In immunocompromised patients, a biopsy is usually requested.
Serological tests.
Laboratory tests (Torch Profile for IgG and IgM)
Qualitative and quantitative tests

CMV infection should be suspected in patients:

- Newborns with systemic disease
- Has symptoms of mononucleosis, but tests negative for Epstein Barr virus.
- Shows signs of hepatitis, but tests negative for hepatitis A, B, and C viruses.
- Healthy people with pseudo mononucleoside syndromes.
- Immunocompromised patients with gastrointestinal, central nervous system, or retinal symptoms.

### Treatment

No treatment is usually necessary, as most infections clear up on their own. But in complex or severe cases, antivirals should be indicated, it is recommended that the therapy be discussed in a multidisciplinary team, mainly in pediatric patients [14, 15, 16].

### Epstein-Barr virus

The Epstein-Barr Virus (EBV) belongs to the family Herpesviridae, subfamily Gammaherpesvirinae, genus Lymphocryptovirus. There are at least two types of EBV: EBV-1 and EBV-2 (also known as types A and B). They are characterized, like other members of the Herpesviridae family, by their ability to remain in a latent state inside the human body [17, 18].

This nosological entity, affects more than 90 % of the adult population worldwide, is usually transmitted by oral secretions or blood, producing an infection known as Infectious Mononucleosis (kissing disease).

There are also studies that support the carcinogenic potential of this virus in epithelial cancer; as well as the evidence that it can infect and replicate within the cells of the squamous epithelium, which demonstrates the importance of studying this viral group and associated lesions. Expression of a latent membrane oncoprotein 1 (PLM-1) can induce oncogenic transformation of B lymphocytes and the appearance of lymphoproliferative disorders.

It has been linked to dissimilar tumors, among which the following stand out:

- Nasopharyngeal carcinoma.
- Burkitt's lymphoma.
- Hodgkin lymphoma.
- Non-Hodgkin lymphomas.
- Lymphoepitheliomas.
- Salivary gland carcinomas.

EBV is classified as a group 1 carcinogen. In addition, it has been associated with potentially malignant lesions such as hairy leukoplakia, representing advanced stages of immunosuppression, mainly HIV infection, as well as with oral lichen planus.

It has been detected more frequently in patients with chronic periodontal disease and aggressive periodontal disease than in patients with gingivitis or periodontally healthy patients.

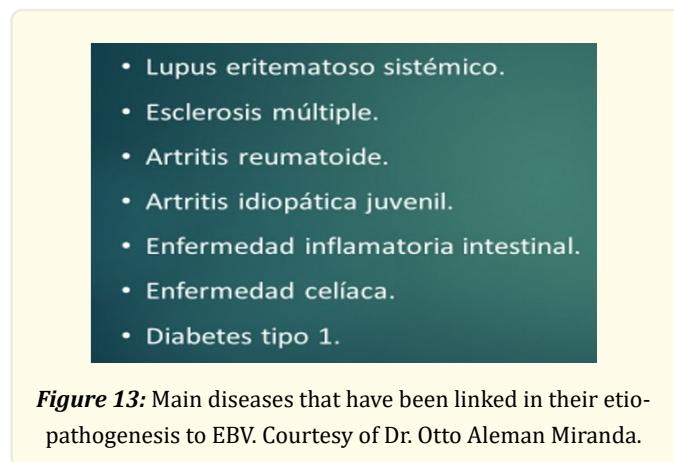
Two subtypes are recognized so far: EBV-1 and EBV-2, which have genetic differences with their nuclear antigens. Due to the great heterogeneity and variability found in the LMP1 protein of the virus, variants associated with certain diseases or with specific geographical regions have been described [19, 20].

As mentioned, the disease that most causes this virus is infectious mononucleosis (INM) which in turn has multiple complications such as those presented in the following box.

EBV and NIM complications
Fever
Severe, painful, exudative pharyngitis
Splenomegaly
Hepatomegaly
Erythematous lesions
Anemia
Hepatitis
Affected white blood cells
Spleen rupture
Airway obstruction
Brain and spinal cord conditions
Heart disease
Periorbital edema and palatal petechiae
Less commonly maculopapular rashes
Rarely jaundice
Lymph nodes in anterior and posterior cervical, pharyngeal, or paratracheal chains
Encephalitis
Seizures,
Guillain Barre syndrome
Peripheral neuropathy
Viral meningitis

Myelitis
Cranial nerve palsies
Psychosis
Cerebellar dysfunction
Mild transient granulocytopenia or thrombocytopenia
Fulminant infection

Apart from all the possible complications or sequelae that EBV can cause, it is linked to the etiopathogenesis of several diseases that in turn can be dangerous for the affections. (View Figure 13)



In pregnant women, the main complications and risks are abortions, stillbirths, malformations, intrauterine growth retardation, prematurity and sequelae from chronic postnatal infection.

The diagnosis of this disease is made with the clinic supported by laboratory tests with non-specific hematological and specific serological tests.

There is no specific or one hundred percent effective treatment. Therapy is recommended according to the signs and symptoms, as well as rest, not exposing yourself excessively to the sun, staying hydrated and eating healthy [19].

### *Coxsackie virus*

#### *Herpangina*

Herpangina is a febrile disease produced by the coxsackie virus in any of its variants, although it is known that other enteroviruses also have an influence in some cases. The infection causes vesicular and ulcerative lesions in the oropharyngeal mucosa. (View Figure 14)

This disease usually occurs in an epidemic form, affecting mainly infants and children. Among its clinical characteristics are evidenced:

- Fever.
- Odynophagia.
- Headache.
- Anorexy.

- Cervical pain.
- Vomiting.
- Blisters or ulcers in the oral cavity and oropharynx.

Once the disease has established and the symptoms have started, multiple greyish vesicles measuring between 1 and 2 mm in diameter are detected, they transform into superficial ulcers after twenty-four hours. Their predominant location is in the tonsillar pillars, but they can also be found in the soft palate, tonsils, uvula, tongue, or floor of the mouth [20, 21].



**Figure 14:** Patient with ulcerative lesions on the floor of the mouth with a diagnosis of Herpangina. Courtesy of Dr. Otto Alemán miranda.

The diagnosis is made in most cases clinically, after a detailed questioning and physical examination of the patient. It is not a mistake to rely on hematological laboratory tests, as well as on the patient's medical history, if he has it. In this way, the professional will be able to identify the disease and rule out other alterations with similar characteristics. The symptoms disappear in the course of a week, creating the sick immunity for this condition.

The treatment is symptomatic, it will vary depending on the clinic that the patient presents.

### **Hand-mouth-foot syndrome**

Mouth-hand-foot disease (enteroviral vesicular stomatitis with rash) is caused by Coxsackie virus, a member of the Picornaviridae family of enteroviruses.

Among its clinical characteristics and main complications are:

- High hyperthermia of sudden onset [22, 23].
- Asthenia.
- Anorexy.
- Odynophagia.
- Oral pain.
- Abdominal pain, associated with respiratory symptoms.
- Pharyngitis.
- Grayish vesicular bullous or papulovesicular lesions in the oropharynx and buccal mucosa, 1 to 2 millimeters in diameter, covered by a yellowish pseudomembrane, surrounded by an erythematous halo with an evolution of 7 to 10 days. It can present in the form of a vesicular rash in other regions such as upper and lower limbs, as well as in the buttocks or diaper region in babies.

- Maculopapular skin eruption that rapidly evolves into gray vesicles of 3 to 7 mm, surrounded by a red halo of oval, linear or crescent shape [22, 23].
- Encephalitis and edema with pulmonary hemorrhage.
- Dehydration.
- Loss of fingernails and toenails.
- Viral meningitis.
- Paralysis
- Death of infants.

In general, the disease is limited in course, lasts no more than one week, with low morbidity. It mainly affects children under 10 years of age, and young adults. It usually occurs in outbreaks that affect groups of children in schools, sports centers, etc. It is diagnosed mainly by the clinic and the epidemiological characteristics of those affected. The treatment is symptomatic, it will vary depending on the clinic that the patient presents [24, 25, 26].

### *Acute lymphonodular pharyngitis*

Infection caused by the Coxsackie A virus (subtype 10) consisting of yellow or white papules surrounded by an erythematous zone confined to the lymphoid tissues of the oropharynx and nasopharynx.

Its clinical features are:

- Lesions in the form of white or yellowish raised papules or nodules that do not ulcerate.
- Multiple lesions that are surrounded by an erythematous halo.
- Typical locations are the oropharynx. (View Figure 15)
- Hyperthermia.
- Headache.
- Anorexy.
- Odynophagia.
- Cervical adenopathies.
- Lesions range from 3 to 6 mm and resolve in 8 to 10 days.
- It occurs as an endemic outbreak among school-age children in the summer and fall [27].



**Figure 15:** Patient diagnosed with acute lymphonodular pharyngitis. Courtesy of Dr. Otto Aleman Miranda.

Its differential diagnosis is that these lesions consist of nodules or papules without presenting the typical vesicles or ulcerations that are usually observed in herpangina or other viral lesions. The reservoir of this virus is in humans themselves, direct contact in the acute phase is the main mechanism of contagion. The diagnosis is through the clinic and complementary laboratory tests.

Several types of coxsackie virus have been isolated acting at the same time and can cause severe complications when they spread, some of which are mentioned below:

- Coxsackie virus carditis.
- Hepatomegaly.
- Dyspnea.
- Meningitis.
- Pancreatitis.
- Orchitis.

Treatment as in other viral lesions depends on the symptoms of the sick patient, and the general state of the same.

### *Togavirus*

#### *Rubiola*

Rubiola is a virus of the Togavirus (Rubivirus) family, which is generally characterized by the presence of a diffuse maculopapular rash and fever despite its mildness. Clinically, the patient may present general malaise, retroauricular lymphadenopathies, muscle pain, among other manifestations that can even make diagnosis difficult, such as rash, since it can appear in other entities such as dengue fever, herpes, measles, among others. others.

Within the laboratory results, a decrease in the number of leukocytes in the blood and an abnormally low number of platelets can be found, so that hemorrhagic manifestations may be present, although they are not very frequent [28].

To date, it is a human virus, common in childhood, which is transmitted by contact with the nasopharyngeal secretions of people infected with the virus, by speaking, coughing, sneezing, or by direct contact with them. All of this makes it a contagious disease. It is an unstable, thermolabile virus, inactive by chemical agents and changes in pH, in addition to being sensitive to ultraviolet light.

The incubation period is between 13 and 23 days, so its transmissibility period begins 7 days before and can extend to at least 4 days after the clinical appearance of the rashes.

There is also the so-called Congenital Rubiola Syndrome, which would be acquired by the mother in the early stages of pregnancy, which is why the baby would be affected, causing affectations such as congenital heart disease, auditory, eye, endocrine system affectations, even in the oral cavity such as dental deformities, malocclusion, enamel hypoplasia, cleft palate, salivary gland disorders among others.

There is no specific treatment to treat the virus, so it will depend on the symptoms that each particular case presents, despite the existing vaccine, the danger of appearance is always present.

Due to all of the aforementioned, we can assess this entity as a risk disease for stomatology personnel, due to the possibility of contagion that exists when working directly with oro-nasal fluids [29].

### *Paramyxovirus*

#### *Measles*

Measles has been one of the most visible infectious and contagious diseases in history, since its discovery dates back to the 10th century, by Rhazes, a Persian doctor, who followed in the footsteps of the study of the disease by Yahudi, a famous Hebrew physician



who had lived 300 years before him. It is produced by an RNA virus belonging to the Paramyxovirus group. Epidemiologically it is a virus where the human being constitutes its only host. It is an acute, viral infectious disease that can appear during childhood and in young adults.

It is extremely contagious and is transmitted from person to person through the respiratory route. It has an incubation period of 10 days, after which the prodromal period begins, characterized by fever, malaise, conjunctivitis, rhinorrhea, and photophobia.

The clinical picture is visible once the prodromal period has elapsed, estimated at 5-7 days. It is characterized by rash lesions in the retroauricular region, face, and neck, which then spread to the trunk and extremities. The confluent maculopapular rash spares the palms and soles of the hands and feet. It may be associated with high fever and a cough reflex, conjunctivitis with severe tearing and a transverse marginal line of conjunctival injection parallel to the lower eyelids, rhinitis, pharyngitis and tracheitis [30].

The characteristic lesion in the oral cavity is köplik's spots, developed in the early stages of infection. These are whitish punctate lesions surrounded by an erythematous halo, which can sometimes be grouped together locally in the buccal mucosa. They are characterized as a pathognomonic sign of measles, although they are not always present. You can also find gingivitis, superinfection by *Candida Albicans* among other oral manifestations.

Its diagnosis is generally clinical, although sometimes a serological analysis of antibodies may be needed, specifically IgM, even PCR analysis of oral smears has been described. Other diseases such as Rubella, Herpesvirus, Cytomegalovirus infection, Epstein-Barr virus infection can be differentiated. Arboviruses: dengue, chikungunya, zika, mayaro. Others: Staphylococemia, Kawasaki disease, erythema multiforme, leptospirosis. Miscellaneous: Allergic reaction, Gianotti Crosti syndrome.

Treatment is symptomatic, with prevention being effective with the triple viral vaccine (measles, rubella and mumps), synthesized from attenuated viruses and prescribed at 15 months of life with a booster at 4 years of age and in the oral cavity. 0.12% chlorhexidine rinses may be used in conjunction with a bland diet and oral hygiene [31, 32, 33].

All these elements constitute risk factors to take into account when treating each of our patients, in order to protect them and us as health professionals [34].

### ***Epidemic parotitis***

Mumps is a disease caused by a virus from the Paramyxoviridae family, Rubulavirus genus. Over the years it has received different names such as: parotid external angina, parotitis maligna polymorpha, sialadenitis psyetica, watery angina, mumps, etc.

It is characterized by inflammation of one or more of the salivary glands, usually the parotid gland, accompanied by fever. Clinically, the patient may present headaches, a feeling of malaise, muscle pain, anorexia, and fever long before the involvement of the glands is visible. Once the infection is established, reddening of the oral salivary ducts and the buccal mucosa can be seen, inflammation of the retromolar, masseteric, and glandular spaces, making it evident that it is impossible to speak, chew, and swallow [34].

Transmission can be by direct contact with the saliva of an infected person or by the spread of saliva droplets or aerosols. Even asymptomatic people can spread the virus, making it highly contagious, but to a lesser extent than measles or chickenpox.

The virus can be detected in saliva from 7 days before to 9 days after illness onset and in urine from 6 days before to 15 days after symptom onset. Its diagnosis is exclusively clinical in most cases, although it should be confirmed by laboratory methods (serology, PCR, throat culture, and urine) [35].

It has an incubation period, which is between 16 and 18 days, and can even go up to 25 days, which makes all people who have not had the disease and even those who have already been affected susceptible. It can create epidemic outbreaks despite being frequent in children and young people [36, 37].

Among the complications that can occur are meningitis, encephalitis, unilateral orchitis, even pancreatitis, so the differential diagnosis should be made with a parotid lithiasis, a parotid tumor, among others.

The most effective preventive measure to deal with this disease is vaccination, where a live attenuated virus vaccine is used that produces detectable antibody levels in more than 90 % of vaccinated children [38, 39].

Treatment is usually symptomatic accompanied by general measures such as isolation, among others.

The means of protection in our specialty must become the fundamental pillar of our work, since they are the only way to avoid the direct and indirect transmission of these infectious-contagious diseases.

### *Human papilloma virus*

Human papillomavirus (HPV) belongs to the papillomaviridae family and replicates in the nucleus of squamous epithelial cells. There are more than 200 types identified and they are generally classified as high, medium and low risk according to their oncogenic capacity. Of these, more than 24 types can affect the oral cavity, which is why their study in Stomatology is necessary, since they can cause benign and malignant lesions, genetic instabilities, premalignant lesions such as leukoplakia or lichen planus, among others [40, 41].

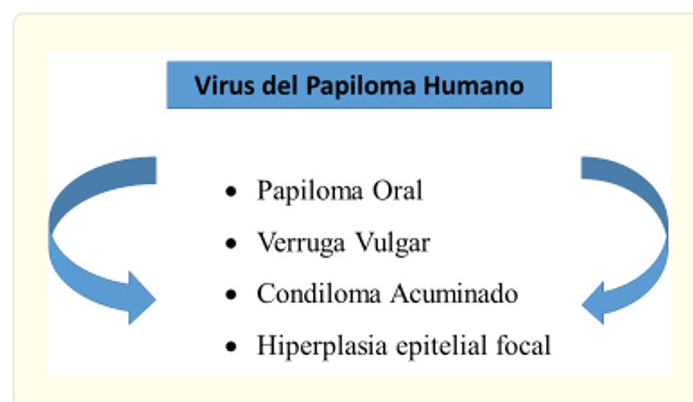
It is generally recognized as a sexually transmitted disease, although it can also be acquired through the blood, perinatally, by transplacental infection, by amniotic fluid, by autoinoculation of the virus, and some authors even raise the possibility of transmission through saliva.

Sometimes they can be asymptomatic or subclinical, and go unnoticed. In some patients it may be transitory since the immune system itself fights it and in others it may become chronic. Thus, some papillomaviruses infect the cervical mucosa, others the laryngeal mucosa, others the external genitalia, and still others the oral mucosa [42, 43].

Clinically, multiple, asymptomatic lesions can be found, in a variety of ways, either papular or cauliflower in appearance, with variable sizes and a color that can range from white to pinkish, depending on the keratinization of the tissues. In potentially malignant lesions they can present multiple characteristics. In other words, by way of summary, verrucous, hyperplastic, and even papillomatous lesions can be observed, either on the skin or mucous membranes.

To treat them, it is necessary to carry out a good clinical examination accompanied by laboratory tests that help you reach an accurate diagnosis and thus an appropriate treatment for each case [44, 45].

Within this group of lesions there are some that have been directly related to this virus. (see Figure 16)



### **Oral papilloma**

Oral papilloma is one of the most frequent oral epithelial lesions found in the oral cavity, caused by HPV. It is a benign lesion that generally affects children and adults, although it has seen a certain inclination for people between 30 and 50 years of age [46].

Clinically it has a very similar appearance to cauliflower, with exophistic growth, finger-like surface, and a sessile base. Its coloring will depend on the degree of keratinization. In general, they are solitary, asymptomatic lesions, with a variable size, which can grow rapidly and can be spread by direct contact. (view Figure 17)



**Figure 17:** Patient diagnosed with oral papilloma.  
Courtesy of Dr. Arelis Rabelo Castillo.

Within the localization sites are the tongue, the soft palate, the uvula, the vermillion among others. It can also present a flat shape, so a biopsy is important in these cases, since it must be differentiated histologically from oral squamous cell carcinoma due to its clinical resemblance [45, 46, 47].

### **Common wart**

Many HPV subtypes are capable of causing common warts. It is an injury that usually appears in childhood.

Clinically they are benign lesions, elevated with the appearance of firm nodules in addition to presenting characteristics of papillomatous projections on the surface. It can appear on the skin, in areas of the hands and fingers, on the face and scalp, in perioral regions, although some authors suggest that they are not very frequent in the oral mucosa, but that, if they do, they can be seen in the mucosa of the mouth, the lips, the tongue and are generally caused by inoculation of the virus from skin lesions as they are highly contagious. They are generally solitary lesions, although they can appear multiple times.

When they are in the oral cavity, they are called Oral Vulgar Wart (VVB), and they can be found anywhere, even in the gums, so another form of contagion at this level would be due to inadequate sterilization of medical-surgical instruments, so the care by health personnel is never too much.

Histologically they present an overgrowth of normal squamous epithelium and the pattern may mimic that of cutaneous warts.

The differential diagnosis must be carried out with all the lesions caused by this virus and the treatment would be based on surgical removal in its entirety.

### *Condyloma acuminata*

Condyloma acuminata (CA) is defined as one of the most frequent sexually transmitted diseases, caused by human papillomavirus infection.

They are lesions that can appear in the oral cavity, with a nodular, papillomatous appearance with a sessile or pedunculated base, soft consistency and a blunt surface similar to cauliflower. Its size can vary and its form of contagion is venereal or by auto-inoculation. They can measure from 1 to 3 cm in diameter and be single or multiple. They can be observed more frequently in the mucosa of the lips, back of the tongue, labial commissures, among others [46, 47].

They can appear on the oral mucosa and in the anogenital region. In the histological sample there are lesions of stratified squamous epithelium with acanthosis and scant parakeratosis. The histopathological study has a fundamental role in the diagnosis, since this type of lesion can have a high degree of recurrence.

Treatment focuses on surgical removal of the lesions. Some authors also suggest that cryosurgery and laser can be used as alternative methods [47].

### *Focal epithelial hyperplasia*

Focal epithelial hyperplasia or also known as Heck's disease is a benign pathology characterized by multiple, well-defined lesions, which present as papules or plaques of the same color as the oral mucosa. It affects lips, lateral margin of the tongue, as well as the buccal mucosa. Its growth is generally slow, being able to reach an approximate size of 5 and up to 10mm.

It generally affects the pediatric population, although some cases are known in adults [48, 49].

Clinically they can show multiple papules that are commonly found affecting the oral mucosa, with a smooth surface, although sometimes it can be rough, of the same color as the adjacent mucosa, sessile base, and the lesions are usually asymptomatic.

Histologically, it is characterized by the formation of parakeratin layers and extensive acanthosis, and the presence of mitoid cells or bodies is also frequent.

When talking about treatment in this disease, it must be evaluated that it normally has a tendency to spontaneous regression, which has already been described previously by other authors. So the main objective will be to eliminate the lesion [48, 49].

Knowledge of each of the lesions that can appear in the oral cavity is of the utmost importance for the stomatologist, since it will help and guide them in decision-making and procedures with each of their patients, trying to minimize the risks. and complications that may come with it.

### *Retrovirus*

#### *Human Immunodeficiency Virus.*

Oral infectious diseases affect people infected with HIV during all stages of this entity. Often these patients present diseases of the oral complex that precede any other manifestation. That is why Stomatologists can be the first to recognize these signs and symptoms, which are common and include new presentations of opportunistic diseases recognized as such. Carefully taken medical history, detailed examination of the oral cavity are important parts of the application of the clinical method, as well as physical examination and diagnosis that require appropriate investigative techniques [50, 51, 52].

Early recognition, diagnosis, and treatment of oral lesions associated with HIV infection can reduce morbidity. Currently, thanks to the development of antiretroviral treatments, and specifically, after the advent of highly active antiretroviral treatments (HAART), the prevalence of oral lesions associated with HIV is gradually decreasing. On the other hand, the increase in life expectancy of these

patients is conditioning a greater presence of HIV-infected patients in our consultations. It is therefore essential that professionals achieve a permanent update and improvement in this health situation and that students can from their professional training achieve a deep preparation in this subject; To achieve this, they must be able to count on updated bibliographies containing these manifestations that allow continuous updating in the diagnosis and treatment of these pathological processes [50, 51, 52]. (View Figure 18)



**Figure 18:** Seropositive patient with antiretroviral treatment with complicated external otitis. Courtesy of Dr. Frank Mondelo Tamayo.

The necessary permanent preparation in this subject justifies the realization of this research, for which we declare the need for preparation and updating of students and stomatologists of the Stomatology career in the physiopathogenesis and oral manifestations of HIV/AIDS-related oral and dental infections.

Some oral manifestations in the HIV-infected child [50, 51, 52].

- Candidiasis.
- Recurrent herpetic stomatitis.
- Recurrent bacterial infections.
- Herpes simplex.
- Herpes zoster.

#### **General clinical manifestations of HIV infection in children.**

The similarity between HIV infection in adults and children is notorious, but there are fundamental peculiarities in children, such as: the incubation period is shorter, the spectrum of the disease is clearly different, the immunological manifestations are different and the prognosis is much worse [53].

Immunological alterations in children are characterized by a high susceptibility to infections by encapsulated bacteria, apparently due to the immaturity of the system at birth, since the disease must be considered congenital. The alterations in humoral immunity can be earlier than those of cellular immunity. Some HIV-infected children have marked hypogammaglobulin; in them the disease tends to

have a particularly rapid and aggressive evolution and the specific antibodies against HIV may be negative.

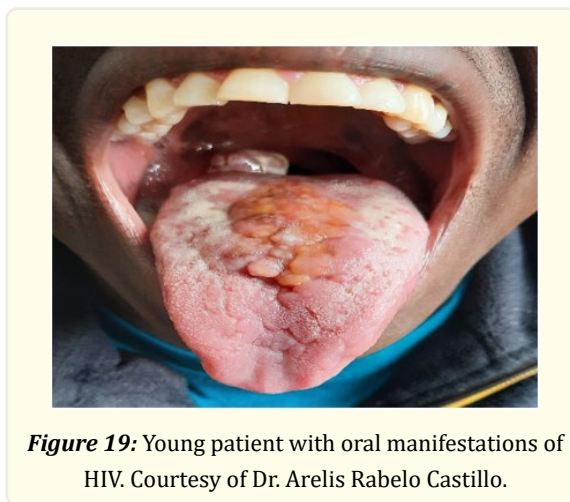
Infected infants between the third and sixth month present with generalized lymphadenopathy, hepatosplenomegaly, stagnation underweight, seborrheic dermatitis, unexplained fever, prolonged diarrhea, and profuse sweating; all these specific clinical pictures can be accompanied by persistent oral candidiasis [50, 51, 52].

Lymphadenopathy, which is the most common manifestation, is generally associated with hypergammaglobulinemia. They may suffer from the full range of common childhood bacterial infections, such as common childhood bacterial diseases, such as common pathogenic bacterial diseases such as Salmonella, staphylococcus aureus, pneumococcus, haemophilus influenzae, meningococcus pseudomonas. Otitis media and sinusitis are common. Infected infants are susceptible to severe viral infections, with potential for dissemination and prolonged isolation; the risk of spreading herpes simplex, cytomegalovirus, and varicella-zoster is marked.

The most serious and frequent opportunistic infection in children is Pneumocystis carinii pneumonia; its evolution is early and its prognosis is terrible; there is also another lung condition that can compromise the evolution of almost half of children infected with HIV: lymphoid interstitial pneumonia, which is exceptional in adults.

In children, a high percentage has neurological involvement; This complication, called AIDS encephalopathy, is associated with mental retardation, pyramidalism, impaired muscle tone, ataxia, and pseudobulbar palsy. The clinical manifestations of encephalopathy can be variable, accompanied or not by the indicated complications, and its evolution can be rapid and progressive, or static [50, 51, 52].

In HIV-infected children, other manifestations have been described, such as renal, cardiovascular, and hematological complications, as well as malignant neoplasms, including Kaposi's sarcoma and lymphomas, but their occurrence is rare. In some series of studies, different embryopathic syndromes have been reported [53]. (view Figure 19)



**Figure 19:** Young patient with oral manifestations of HIV. Courtesy of Dr. Arelis Rabelo Castillo.

#### ***Manifestations in the oral complex of the child infected with HIV.***

The most common pediatric alterations in the oral complex due to HIV infection are candidiasis and EGS; hairy leukoplakia has been found in seropositive children, but with a low prevalence, other viral manifestations, such as herpes simplex (HSV), for example, can be found more frequently than in the general child population, but are more widespread and they tend to take all the mucosa; Occasionally the presence of the herpes zoster virus has been reported in a cutaneous disseminated form in seropositive children, which can also affect the oral cavity with equal aggressiveness.

Despite how effective antiretroviral therapy (ART) is by consecutively increasing the CD4 T lymphocyte count, complete immune recovery of oral epithelial cells cannot be achieved, so a degree of susceptibility to the infectious agents and the toxic effects of antiretroviral drugs [50, 51, 52].

The diagnosis of HIV infection must be through a set of medical opinions and the dentist is the fundamental part, since the clinical examination of the oral cavity can confirm in a certain way the presence of lesions associated with it, taking into account that our priority is always the care of oral health and our professionals.

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