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Main Infectious Diseases in Pediatric Dental Clinic

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Preventive Dentistry in Partial Fulfilment of the
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Certification of the Supervisor

I certify that this project entitled " **Main Infectious Diseases in Pediatric Dental Clinic** " was prepared by the fifth-year student **Hawraa Salman Omran** under my supervision at the College of Dentistry/University of Baghdad in partial fulfilment of the graduation requirements for the bachelor's degree in Dentistry.

Supervisor Signature
Lecturer Juman D. Al-Khayoun

Dedication

To the one who brought us out of the darkness into the light... To the first one who defended the woman and gave her rights at a time when the female was buried and she was still alive... To the one who advised us to diligently seek knowledge... To the city of knowledge... Our Nobel Prophet Muhammad (PBUH)

To all martyrs and people of my injured country Iraq with love.

To my family particularly, to my parents for their love and support throughout my life.

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List of abbreviations

BCG	Bacillus Calmette-Guérin
CoVs	Coronaviruses
HAV	Hepatitis A virus
HBsAg	Hepatitis B antigen
HBV	Hepatitis B virus
HCAI	Healthcare associated infection
HCV	Hepatitis C virus
HCC	Hepatocellular carcinoma
HDV	Hepatitis D virus
HEV	Hepatitis E virus
HIV	Human immunodeficiency virus
HZ	Herpes zoster
LTBI	Latent tuberculosis infection
MERS	Middle East respiratory syndrome
PHN	Post herpetic neuralgia
PT	Prothrombin time
PTB	Positive tuberculosis
TB	Tuberculosis

VZV	varicella-zoster virus
WHO	World Health Organization

INTRODUCTION:

Transmission of infection of various diseases such as COVID-19, tuberculosis(TB), human immunodeficiency virus(HIV), Hepatitis chicken pox, smallpox and, measles. in the dental practice might happen via infected needle prick, direct blood contact, saliva, and indirect contact with contaminated operative instruments or environmental surfaces which can be prevented through the standard precautions adopted(Kareem et al., 2022).

Infection control are the cornerstone of infection prevention and control programs, especially healthcare-associated infection (HCAI), because of their importance in reducing mortality and morbidity for patients and protecting health care workers(Omer, 2023; Saleh, 2023).

Given these facts, Several actions must be applied to reduce the risks in dental practices: cleaning, disinfection, sterilization, hand hygiene practices and use of personal protective equipment such as gloves, face masks, wearing protective eyewear and head covering, disposable gowns for surgery using high-volume suction , rubber dam, preoperative mouth rinses, immunization, prevention and handling of occupational hazards(Ali et al., 2020).

Ideally, in waiting room patients with infectious diseases would be placed apart from other patients. Children's toys and books should be cleaned frequently. Any patients particularly vulnerable to infection, such as immunocompromised children, should not wait in the waiting room at all, but be moved to separate areas. Tissues should always be available in waiting rooms and posters should indicate good coughing and sneezing behaviours and etiquette(shaw, 2019).

The aim is to control infections caused by patient exposure to pathogenic microorganisms or transmitted to the dentist or laboratory staff via occupational exposure(Calap et al., 2019).

1 Coronavirus Disease

1.1 Epidemiology and transmission:

Coronaviruses (CoVs) cause respiratory and digestive diseases in humans and other animals, and are responsible for several emerging diseases. The severe acute respiratory syndrome SARS-COV-1 outbreak in 2002–2003 resulted in 8,422 human cases and 916 deaths in 33 countries. In 2012, Middle East respiratory syndrome (MERS) emerged, and over time has resulted in over 2,500 human cases and 866 deaths in 27 countries(Bonilauri et al., 2021).

Coronavirus Disease 2019 (COVID-19) SARS-COV-2 has posed a medical emergency and a global crisis rapidly, from having first emerged in December 2019. On 11th March 2020, it was declared a pandemic by the World Health Organization (WHO). By 6th April 2020, globally, there were more than 1.2 million confirmed cases of COVID-19 and 67,000 deaths across 209 countries, areas, or territories according to WHO updates(Aleem et al., 2023).

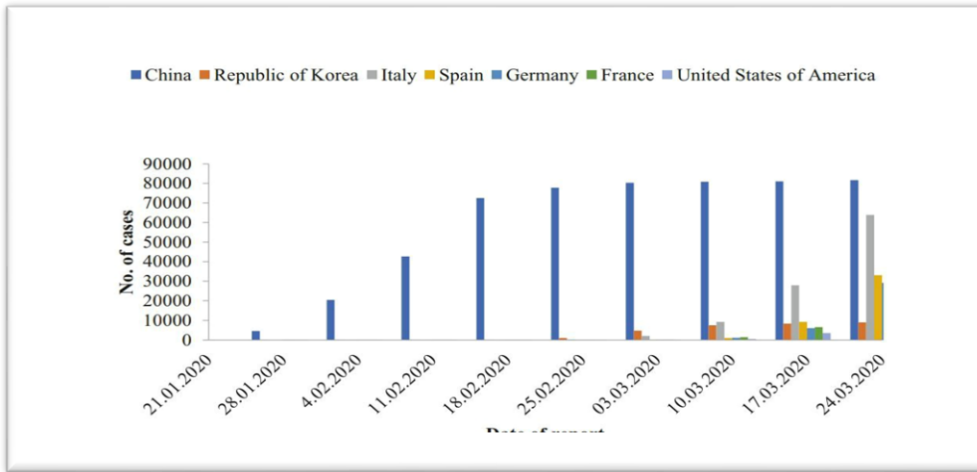


Figure1: Week-wise data of reported number of cases in some majorly affected countries (from January 21, 2020, to March 24, 2020). (Data taken from WHO situation reports).

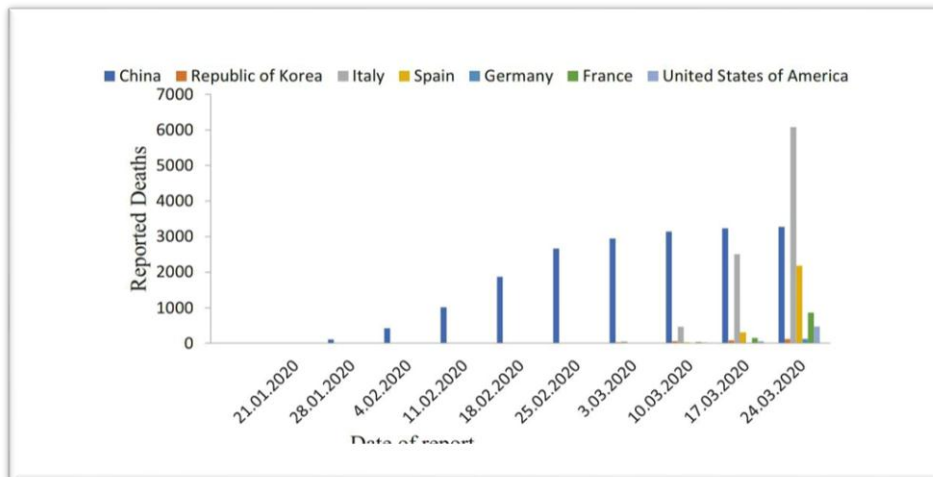


Fig.2: Week-wise data of reported death cases in some majorly affected countries (from January 21, 2020, to March 24, 2020). (Data taken from WHO situation reports).

China, Spain, Italy, and France all faced an explosion of cases and deaths as shown in (figure 1 and 2) above. Investigations proved that the first transmission of the virus to human hosts occurred probably in southern China in Guangdong province, from zoonotic reservoirs, including bats and raccoon dogs the latter two of which are sold in exotic animal markets(Saxena, 2020).

The virus is thought to spread mainly from person-to-person such as between people who are in close contact with one another (within about 6 feet), through respiratory droplets produced when an infected person coughs or sneezes, these droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. It may be possible that a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes(Bonilauri et al., 2021).

It has been observed that elderly individuals and those with medical co-morbidities are maximally affected. In children and adolescents, coronavirus infection has low mortality as well as the severity of symptoms are less. Children and adolescents with immunocompromised state, malnutrition, medical co-morbidities and poor hygiene are at higher risk of contracting coronavirus infection(Bloom et al., 2023).

1.1.2 Signs and symptoms:

As it mentioned in (figure 3) the common symptoms of COVID-19 include fever, chills, headache, sore throat, nasal congestion, malaise, myalgia, body aches, nausea, vomiting and cough, and a proportion of patients may develop shortness of breath and other symptoms. In more severe cases, the infection can cause pneumonia, acute respiratory distress syndrome, organ failure, and death(Padda, 2023; Parmar, 2023).

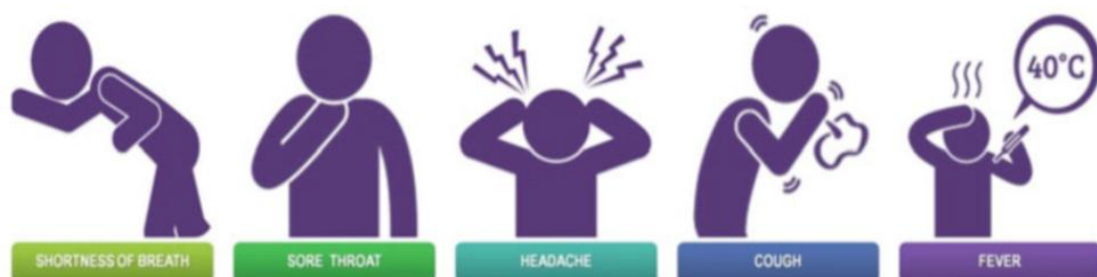


Fig.3: Typical symptoms of COVID-19(Saxena 2020).

Reported illnesses have ranged from mild symptoms to severe illness and death for confirmed coronavirus disease 2019 (COVID-19) cases. The symptoms may appear 2-14 days after exposure. Suspected patients get diagnosed by collecting various specimens, including nasopharyngeal or oropharyngeal swabs, nasopharyngeal or oropharyngeal aspirates or washes, bronchoalveolar lavage, sputum, tracheal aspirates, and blood(Aleem et al., 2023).

1.1.3 Management:

The two mRNA vaccines, Pfizer and Moderna, authorized by the U.S. Food and Drug Administration (FDA) and recommended by the Centers for Disease Control and Prevention (CDC), are very safe and very good at preventing serious or fatal cases of COVID-19. The risk of serious side effects associated with these vaccines is very small(Maragakis, 2022: Kelen, 2022).

Public health measures are clearly important to reduce its transmission such as:

- 1- covering of nose/mouth when coughing or sneezing, use of FFP3 or N95 mask.
- 2- Use of tissues to contain respiratory secretions and dispose of these in nearest waste receptacle.
- 3-frequent hand washing, if soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol hygiene, as it mentioned in fig.4



Figure 4: Personal protective measures to prevent COVID-19 infection(Saxena 2020).

In dental clinic for both suspected or confirmed COVID-19 cases requiring urgent dental care it is necessary, if possible, to leave them for the end of the service shift and promote terminal disinfection after care to avoid contaminating others. For conditions such as tooth pain and/or swelling, pharmacological management in the form of antibiotics and/or analgesics may be an alternative(Bloom et al., 2023).

Aerosol-generating procedures, such as the use of ultrasonic instruments, should be avoided or minimized as much as possible. Furthermore, rubber dam, face shields, gowns are essential .When the procedure is complete, all instruments should be sterilized carefully(Aiuto et al., 2020).

2 Tuberculosis(TB)

2.1 Epidemiology and transmission:

Tuberculosis (TB) is an ancient human disease that has affected mankind for more than 4,000 years. It is a chronic disease caused by *Mycobacterium tuberculosis* which mainly affects the lungs, making pulmonary disease the most common presentation (Amadori et al., 2020).

However, TB is a multi-systemic disease, The organ systems most commonly affected includes the respiratory system, the gastrointestinal system, the lymphoreticular system, the skin, the central nervous system, the musculoskeletal system, the reproductive system, and the liver(Andersen et al., 2020).

Infected individuals are classified as either having latent tuberculosis infection (LTBI), an asymptomatic clinical state that is not transmissible, or active TB disease, characterized by the presence of clinical symptoms arising from infection that can occur in multiple organs(Ball, 2017; Kiazzyk, 2017).

It is the first infectious disease declared by the World Health Organization (WHO) as a global health emergency. The World Health Organization (WHO) estimates that there are almost 13.7 million people living with tuberculosis and that the disease kills more young people and adults than any other infectious disease in the world(Aharmim et al., 2013).

Globally, it was estimated in 2007 that there were 9.27 million incident cases of TB. Asia and Africa alone constitute 86% of all cases. Bangladesh ranked the 6th highest for the burden of TB among 22 high-

burden countries in 2007, with 353,000 new cases, 70,000 deaths, and an incidence of 223/100,000 people per year(Zaman, 2010).

One untreated infectious tuberculosis patient is likely to infect 10 to 15 persons annually(Aharmim et al., 2013).

Ahmed et al.(2018) found that this disease occurs through two pathways, transmission or reactivation of latent infection. Several previous retrospective studies described the presence of seasonal pattern in positive TB incidence. Some of them reported that the highest incidence was seen during late spring or early summer. This may suggest that the infection is peak in winter taking into account the period of disease appearance and diagnosis. The reason behind seasonality is still unknown. However, there are two hypotheses explaining it:

1-Vitamin D deficiency hypothesis which considered as immune regulator factor that improves immunity. Subsequently, decreased exposure to the sun during winter months may lead to vitamin deficiency which might increase the likelihood for endogenous reactivation of positive TB latent infection(Lalvani et al., 2000).

2-The other hypothesis declared that increased PTB incidence might result from increase transmission rather than activation during wintertime indoor crowding conditions(Frieden et al., 2004).

Another risk to get infected with TB is HIV infection. The immune system that is weakened by HIV cannot effectively control the TB bacillus and thus, people living with HIV often develop TB(Chita et al., 2007).

However, about TB transmission Müller (2016) found:

1-TB is an airborne disease. People get infected by inhaling the TB bacillus (*Mycobacterium tuberculosis*). Because of the speed that tubercle

bacilli have when they are being coughed up, they get catapulted into the air, and easily reach another person standing one or two meters away.

2-TB bacilli can also be transmitted by dust. Once coughed out by a person with TB, the bacilli can survive up to six months outside the body if they are protected from direct sunlight.

3-A rare form of transmission is the ingestion (swallowing) of unpasteurized milk from an infected animal – in this case the person becomes infected with *Mycobacterium bovis*.

4-Usually TB cannot be transmitted from a pregnant mother to her baby, because it does not cross the placenta. A rare exception is miliary TB. when the TB bacilli might break through the placenta to the fetus.

Bacillus Calmette-Guérin (BCG) is the live attenuated vaccine form of *Mycobacterium bovis* used to prevent tuberculosis and other mycobacterial infections. It is the most widely administered vaccine and usually a part of the routine newborn immunization schedule(Momodu et al., 2022).

2.2 Signs and symptoms:

Latent TB doesn't have symptoms. A skin or blood test can tell if patient have it. Signs of active TB disease include: cough that lasts more than 3 weeks, Chest pain, Coughing up blood, Feeling tired all the time, Night sweats, Chills, Fever, Loss of appetite and Weight loss(Swiner, 2022).

2.3 Oral complications and manifestations:

Painful, deep irregular ulcer on the dorsum of the tongue, the palate, lips, buccal mucosa and gingiva. Granular, nodular or leukoplakic mucosal lesions. Cervical and submandibular lymph node infections. Osteomyelitis when the infection extends to the bone as shown in (figure 5-6). Rifampin can cause leukopenia, hemolytic anemia and

thrombocytopenia resulting in increased incidence of infection, delayed healing and gingival bleeding(Little et al., 2018).

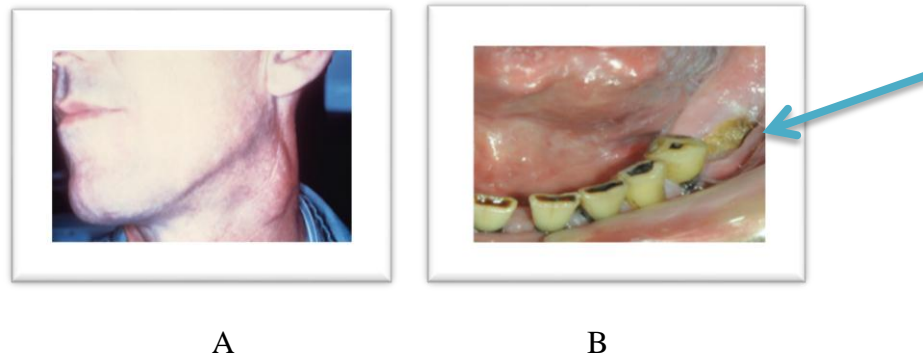


Figure 5: A- Cervical lymph node infection, B- Osteomyelitis (Little et al., 2018).

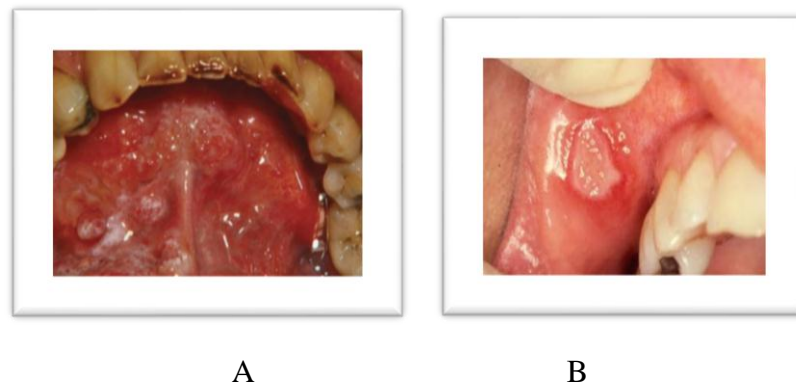


Fig.6: A- leukoplakic mucosal lesion, B- Ulcer in buccal mucosa(Challacombe et al., 2021).

2.4 Dental management:

All patients should be treated as though they are potentially infected and standard precautions for infection control should be strictly followed, such as wearing gloves, masks ,gown, and protective eyewear. When the procedure is complete, all instruments should be sterilized carefully(Aiuto et al., 2020).

Ultrasonic scaling is obviously associated with increased air contamination levels so should be avoided(Dahiya et al., 2015).

In health care workers, the efficacy of BCG vaccination is not definite(Momodu et al., 2022).

Isoniazid, Rifampin and Pyrazinamide can cause hepatotoxicity so Acetaminophen containing drugs should be avoided. If patient with clinically active sputum-positive TB, Consult with the physician before treatment and perform urgent care only(Little et al., 2018).

3 Human immunodeficiency virus(HIV)

3.1 Epidemiology and transmission:

Many of the almost 2 million HIV infections that occurred globally in the last year occurred among adolescents and young people, particularly those from East and Southern Africa and within key populations. Adolescents are disproportionately affected by HIV worldwide. In 2016, 260 000 adolescents between 15 and 24 years were infected with HIV, with 44% more infections amongst young women than their male counterparts(Bekkerb et al., 2018).

HIV is transmitted by exposure to HIV-infected bodily fluids or tissues by blood and blood products can contain the virus, way of unprotected sex, re-using drug-injecting equipment and vertical transmission from mother-to-child during pregnancy or birth. male-to-male sex remains the dominant mode of transmission(Baker et al., 2012).

HIV is found in blood, seminal fluid, vaginal secretions, tears, breast milk, cerebrospinal fluid, amniotic fluid, and urine. Blood, semen, and vaginal secretions are the main fluids that have been shown to be associated with transmission of the virus. This virus can transmit through saliva From providing pre-masticated food from HIV-infected parents to infants(Little et al., 2018).

Baker et al.(2012) found HIV is present in saliva, however it is not considered a risk factor for transmission because of the low levels of HIV and endogenous antiviral factors present in saliva. There is no evidence that HIV can be transmitted by contact with tears, sweat, urine or feces.

3.2 Signs and symptom:

The incubation period of AIDs is variable from 11-14 years. Currently, patients with HIV that is being treated can live comfortable lives with few complications for many years(Little *et al.*, 2018).

Early symptoms of HIV develop in 50 to 90 percent of people who are infected, usually beginning two to four weeks after exposure to HIV. The most common body-wide signs and symptoms of acute HIV include fever, sore throat, headache, and muscle and joint pain. These symptoms last approximately two weeks(Hirsch et al., 2021).

3.3 Oral manifestation:

These oral lesions can be one of the early signs of HIV infection and occur commonly (30%–80%) in infected patients, include candidiasis, Viral infections(herpetic stomatitis, orofacial zoster , cytomegalovirus, epstein barr virus and papilloma virus). Bacterial infections(klebsiella pneumoniae and, enterobactria), Hairy leukoplakia, Tumors(kaposi's sarcoma), Squamous cell carcinoma, lymphadenopathy (cervical lymphadenopathy is the most common head and neck manifestation of HIV), Salivary gland disease(Parotitis, Sjogren syndrome) and periodontitis as shown in (figure 7-8)(Little et al., 2018).



A

B

C

Figure 7: A -Cytomegalovirus ulcer, B- Necrotizing ulcerative periodontitis, C- Candidiasis(Challacombe et al., 2021).



A

B

C

Figure 8: A- Hairy leukoplakia, B- Cervical lymphadenopathy, C- Kaposi sarcoma(Little et al., 2018).

3.4 Management:

The course of the disease may be modified to some degree by drugs like ZIDOVUDINE and treatment of infection(Little et al., 2018).

Standard precautions for infection control should be strictly followed, such as wearing gloves, masks ,gown, and protective eyeware. when the procedure is complete, all instruments should be sterilized carefully(Aiuto et al., 2020).

Ultrasonic scaling is obviously associated with increased air contamination levels so should be avoided(Dahiya et al., 2015).

Asymptomatic patient may receive all indicated dental treatment (CD4+cell count more than 400). While symptomatic patient(CD4+cell

count lower than 200 and or neutrophil count lower than 500/cubic mm) have increased susceptibility to opportunistic infection and need prophylactic drugs for invasive procedure. Any source of oral or dental infection should be eliminated. Patient with sever thrombocytopenia below 50000/cubic mm ,may required special measures (platelet replacement) before any surgical treatment including scaling & polishing(Little et al., 2018).

4 Viral hepatitis

4.1 Epidemiology and transmission:

Hepatitis is defined as inflammation of the liver that can result from a variety of causes such as heavy alcohol use, autoimmune, drugs, or toxins. However, the most frequent cause of hepatitis is due to a viral infection and is referred to as viral hepatitis(Metha, 2022; Reddivar, 2022).

Viral hepatitis remains a major public health problem throughout the world. Viral hepatitis is a collective term describing liver inflammation or hepatitis caused by a group of several different viruses(Locarnini et al., 2014).

There are 5 distinctive types of hepatitis viruses; A, B, C, D and E, they all target the liver. The clinical manifestations of the five forms of viral hepatitis are quite similar, and the diseases can be distinguished from each other only by serologic assays(Little et al., 2018).

In the United States, the most common types of viral hepatitis are Hepatitis A, Hepatitis B, and Hepatitis C. The other types of viral hepatitis are hepatitis D and E and are less frequently encountered. Based on the etiology of hepatitis, the severity can range from mild and self-

limiting to severe illness requiring liver transplantation(Metha, 2022; Reddivar, 2022).

Hepatitis A virus (HAV) infects 1–90% or more of the human population, and it varies according to the socioeconomic, sanitary, and public health infrastructure of each country. The availability of safe and effective inactivated vaccines has significantly reduced the transmission of HAV in the developed world, but these vaccines are expensive to produce and may not confer lifelong immunity(Locarnini et al, 2014).

Hepatitis E virus (HEV) is the most common cause of viral hepatitis in the world. It is estimated that millions of people are infected every year, resulting in tens of thousands of deaths. However, these estimates do not include industrialized regions and are based on studies which employ assays now known to have inferior sensitivity. As such, this is likely to represent a massive underestimate of the true global burden of disease. In the developing world, HEV causes large outbreaks and presents a significant public-health problem(Dalton, 2019; Webb, 2019)

Hepatitis A virus (HAV) and hepatitis E virus (HEV) are forms of *infectious hepatitis*; they are spread largely by the fecal–oral route, are associated with poor sanitary conditions, are highly contagious, occur in outbreaks as well as sporadically, and cause self-limited hepatitis only(Little et al., 2018).

Hepatitis B virus (HBV) infection is a major global health problems leading to severe liver disease such as cirrhosis and hepatocellular carcinoma (HCC). It is transmitted by sexual, parenteral and vertical route(Kim, 2016; Song, 2016).

Hepatitis B virus has infected one-third of the world population, with between 350 and 400 million carriers of the virus(Locarnini et al., 2014).

Chronic hepatitis develops in approximately 2% to 7% of adults with hepatitis B (Little et al., 2018).

Hepatitis C virus (HCV), is estimated to have infected 150–200 million people, and is the most serious infection due to high chronic infection rate. Only 15% of patients infected with this virus recover completely and 85% develop chronic infection which increases the risk for cirrhosis, carcinoma and liver failure. No vaccine is available for this virus(Locarnini et al., 2014).

Hepatitis D virus (HDV) requires the hepatitis B surface antigen (HBsAg) of the hepatitis B virus (HBV) for its assembly, release, and transmission. HDV is highly pathogenic, causing the least common, but most severe, form of chronic viral hepatitis at all ages(Farci, 2018; Niro, 2018).

Hepatitis B virus (HBV), hepatitis C virus (HCV), and hepatitis D virus (HDV) are forms of *serum hepatitis*, are spread largely by parenteral routes and less commonly by intimate or sexual exposure, and are not highly contagious. They are capable of leading to chronic infection and, ultimately, to cirrhosis and hepatocellular carcinoma(Little et al., 2018).

Hepatitis G is a newly discovered virus and its virology is not clearly understood and its known to be transmitted via blood(Metha, 2022; Reddivar, 2022).

4.2 Signs and symptoms:

Liang(2009) found Clinical presentations of viral hepatitis can be different in every individual depending on the type of virus causing the infection. Patients can be entirely asymptomatic or only mildly symptomatic at presentation. Typically patients with viral hepatitis go through 4 phases:

-Phase 1 (viral replication phase) - Patients are usually asymptomatic in this phase, and laboratory studies are positive for markers of hepatitis.

-Phase 2 (prodromal phase) - Patients in this phase usually present with anorexia, nausea, vomiting, malaise, pruritus, urticaria, arthralgias, and fatigue.

-Phase 3 (icteric phase) - Patients in this phase present with dark-colored urine and pale-colored stool. Some patients develop jaundice and right upper quadrant pain with liver enlargement.

-Phase 4 (convalescent phase) - Patients typically start noticing the resolution of symptoms.

4.3 Oral manifestation:

Oral clinical manifestations can be observed, such as bleeding disorders, and xerostomia. The most frequent manifestations mostly affect the oral region in the form of lichen planus, xerostomia, Sjögren's syndrome, petechiae, angular cheilitis and sialadenitis as shown in (figure 9-10) (Gambhir et al., 2021).

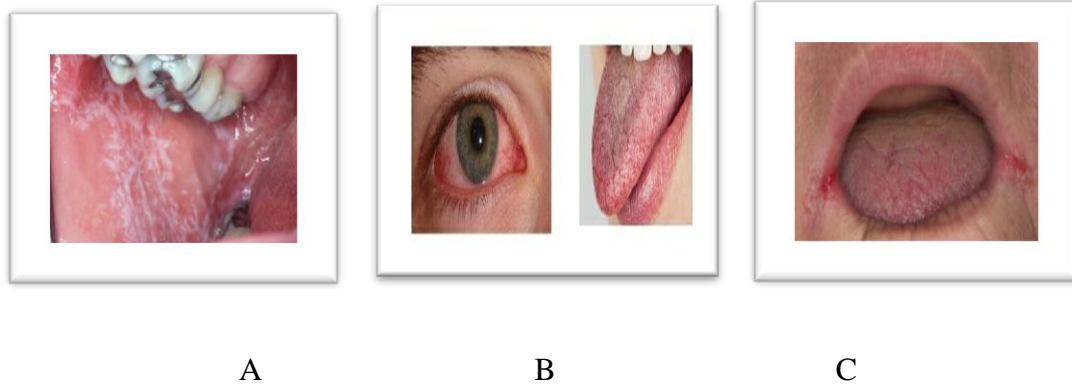


Figure 9: A- Lichen planus, B- Sjögren's syndrome, C-Angular cheilitis(Challacombe et al., 2021).

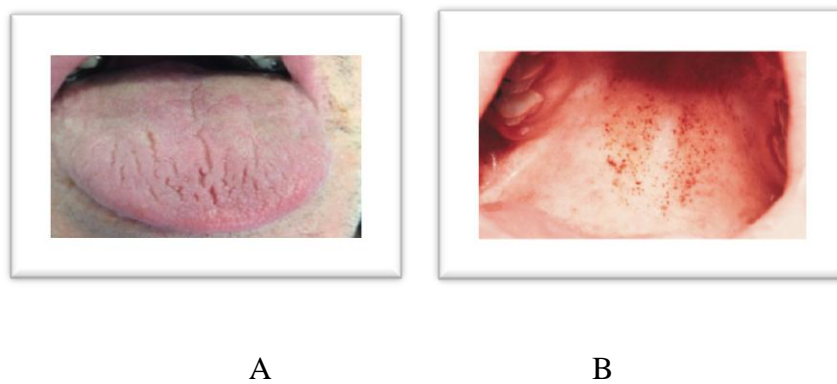


Figure 10: A-Xerostomia, B-Palatal petechiae (Little *et al.*, 2018).

4.4 Dental management:

All patients with viral hepatitis must be managed as though they are potentially infectious, so standard precautions for infection control should be implemented and It is recommended that all dental health care workers should receive vaccination against HBV and implement standard precautions during the care of all dental patients. Patients with active hepatitis Should be referred for medical treatment, only urgent dental treatment should be provided with strict adherence to standard precautions of infection control and preferably in isolated operatory(Little et al., 2018).

Blood is very often found in the aerosols produced by the dental equipments such as an ultrasonic scaler or other high-speed equipments. Ultrasonic scaling is obviously associated with increased air contamination levels so should be avoided(Dahiya et al., 2015).

Drugs that are metabolized in liver should be avoided. If surgery is necessary prothrombin time (PT) and bleeding time should be obtained (Gambhir et al., 2021).

Table1: Drugs that are metabolized in liver(Little et al., 2018).

Local anesthetics	Analgesics	Antibiotics
Lidocaine(Xylocaine)	Aspirin	Ampicillin
Mepivacaine(Carbocaine)	Acetaminophen	Tetracycline
Prilocaine(Citanest)	codeine	Metronidazole
Bupivacaine(Marcaine)	Meperidin(Demerol)	Vancomycin
	Ibuprofen(Motrin)	

Little et al.(2018) found In case of percutaneous exposure through needle stick or puncture wound contaminated with blood from an individual who is HBsAg, the risk of infection may approach 30%. If the exposed is vaccinated, a test to evaluate Anti-HBsAg should be done:

- If inadequate levels→ HB immunoglobulin + vaccine booster should be administered.
- If adequate levels→ nothing further is required.
- If the exposed is not vaccinated→ HB immunoglobulin + initiation of vaccination is recommended.
- For HCV; no post exposure protocol or vaccine is available.

5 ChickenPox

5.1 Epidemiology and transmission:

Chickenpox or varicella is a contagious disease caused by the varicella-zoster virus (VZV). The virus is responsible for chickenpox (usually primary infection) and herpes zoster or shingles (following reactivation of latent infection)(Ayoade, 2022; Kumar, 2022).

It is a mild self-limiting infection, but it is also highly contagious and can cause severe complications among high-risk group of individuals. It is usually a childhood infection providing lifelong immunity, but adults without varicella history are also susceptible to infection. High-risk group of individuals is more likely to develop serious complications (Al-Turab, 2018; Chehadeh, 2018).

Infection caused by VZV, specifically the resurgent clinical infection herpes zoster (HZ), is prevalent and increasing. It often affects older men and women and those in immunocompromised states and usually manifests as a painful cutaneous rash. A prompt treatment can ameliorate the intensity and duration of this infection(Kasabwala, 2018; Wise, 2018).

Transmission happens through direct contact between people through coughing or sneezing, or by air. A person can also get chickenpox if they come in contact with fluid either from someone's chickenpox or shingles blister(Balingit, 2021; Brazier, 2021).

The varicella vaccine was introduced in 1995 and has resulted in a significant decrease in the number of cases and complications. It prevents about 70% to 90% of infections and 95% of severe disease. Routine

immunization of children is recommended. Immunization within three days of exposure may still improve outcomes in children(Kasabwala, 2018; Wise, 2018).

1.5.2 Signs and symptoms:

Herpes zoster causes significant suffering owing to acute and chronic pain or post herpetic neuralgia (PHN). Varicella-zoster virus-induced neuronal destruction and inflammation causes the principal problems of pain, interference with activities of daily living, and reduced quality of life in older adults (Schmader, 2016).

Chickenpox results in a skin rash that forms small, itchy blisters, which scabs over. It typically starts on the chest, back, and face then spreads as it shows in the following (figure 11). It is accompanied by fever, fatigue, pharyngitis, and headaches which usually last five to seven days(Ayoade, 2022; Kumar, 2022).



Figure 11: Blisters of chicken pox(Ayoade, 2022; Kumar, 2022).

Complications include pneumonia, myocarditis, hepatitis, brain inflammation, and bacterial skin infections. The disease is more severe in adults than in children. Symptoms begin 10 to 21 days after exposure, but the average incubation period is about two weeks(Challacombe et al., 2021).

5.3 Oral manifestation:

As it shows in the following (figure 12) that in some cases, the rash may spread to the mucous membranes in the mouth. Chickenpox sores in the mouth, however, don't look like the chickenpox blisters on the body. These sores look like raised bumps that last about a day. They then transform into ulcers that are shallow and yellow or gray in color. They also don't crust over(Frothingham, 2018;Gill, 2018).



Figure 12: Chicken pox sores in oral cavity(Frothingham, 2018;Gill, 2018).

5.4 Management:

Management of oral lesions of varicella and herpes zoster infection is directed toward pain control (particularly, the prevention of postherpetic neuralgia) and definitive treatment to minimize the risk for dissemination, particularly in immunocompromised patients. Aspirin use, especially in children with VZV infection or influenza, may be associated with the development of Reye syndrome, which is potentially fatal, and is contraindicated characterized by fatty degeneration of the liver and encephalopathy. Ibuprofen is the preferred analgesic, as well as Acyclovir(antiviral medication) (Challacombe et al., 2021).

Dental patients are high-risk patients relative to their potential to transmit as well as acquire an infectious disease. An equal concern has

been exhibited for cross-contamination and disease transmission from patient to patient. appreciative standards of Dental Infection Control and Occupational Safety must be followed by the dental team for patient and dental healthcare safety(Geiger et al., 2022).

Dental personnel were required to wear gloves, masks ,gown, and protective eyeware. when the procedure is complete, all instruments should be sterilized carefully(Aiuto et al., 2020).

6 Small pox

6.1 Epidemiology and transmission:

Smallpox is a member of the viral family poxvirus, genus orthopoxvirus, and species variola virus(Kennedy et al., 2016).

Transmission occurs through airborne respiratory droplet secretions or direct contact with lesions or contaminated fomites. Infectious viral particles are released from sloughing of oropharyngeal lesions and resultant aerosolization of viral particles. Transmission can occur from the onset of lesions until all crusts have sloughed. Airborne transmission in hospital and laboratory settings has been described, and smallpox requires enhanced infection control and isolation precautions(Milton, 2012).

6.2 Signs and symptoms:

Clinical manifestations of smallpox begin with high fever, chills, abdominal pain and vomiting, headache and backache. The emergence of skin lesions begins on the forearms or face and then spreads to the rest of the body, with palms and soles frequently involved. Lesions are most numerous on the extremities and face(Simonsen, 2022; Snowden, 2022).

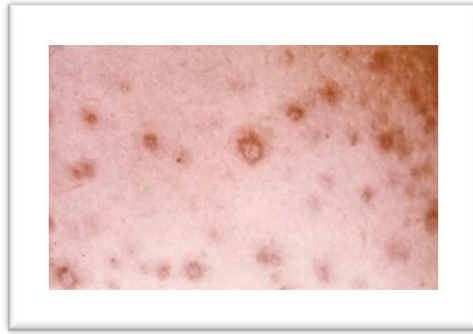


Figure 13: Lesions of small pox(Poland et al., 2016).

6.3 Dental management:

Several actions must be applied to reduce the risks in dental practices: cleaning, disinfection, sterilization, hand hygiene practices and use of personal protective equipment such as gloves, face masks, wearing protective eyewear and head covering, disposable gowns for surgery using high-volume suction , rubber dam, preoperative mouth rinses, immunization, prevention and handling of occupational hazards(Ali et al., 2020).

7 Measles

7.1 Epidemiology and transmission:

Measles, also known as rubeola, is a preventable, highly contagious, acute febrile viral illness. It remains an important cause of global mortality and morbidity, particularly in the regions of Africa and Southeast Asia. It accounts for about 100,000 deaths annually despite the availability of an effective vaccine(Bester, 2016).

The causative organism is the measles virus, a member of the Paramyxoviridae family and Morbillivirus genus(Duprex et al., 2016).

The inhaled virus from the exposed droplets initially infects the respiratory tract's lymphocytes, dendritic cells, and alveolar

macrophages. It then spreads to the adjacent lymphoid tissue and disseminates throughout the bloodstream resulting in viremia and spreading to distant organs(Kondamudi, 2022; Waymack, 2022).

7.2 Signs and symptoms:

The incubation period lasts about 10–14 days, then the fever appears up to over 40 °C accompanied with cough, coryza, and conjunctivitis. Pathognomonic for this pathology are Koplik spots, which occur the day before the onset of the rash and persist for 2 or 3 days. Koplik spots appear as bluish-white lesions, slightly raised by 2–3 mm, on a reddened base and are identifiable on the oral mucosa at the level of the first molar as shown in (figure 14) (Antonello et al., 2022).

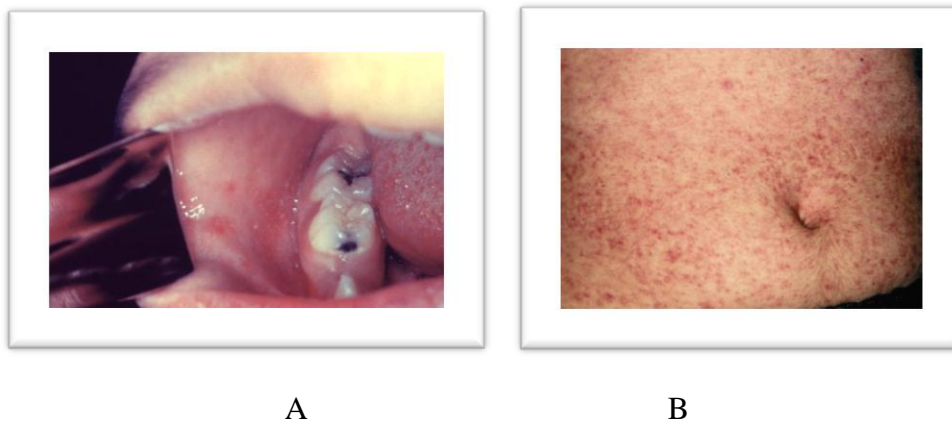


Figure14: A- “Koplik spots” on the mucosa of the cheek, B- Measles(Kondamudi, 2022; Waymack, 2022).

7.3 Dental management:

Several actions must be applied to reduce the risks in dental practices: cleaning, disinfection, sterilization, hand hygiene practices and use of personal protective equipment such as gloves, face masks, wearing protective eyewear and head covering, disposable gowns for surgery using high-volume suction , rubber dam, preoperative mouth rinses,

immunization, prevention and handling of occupational hazards(Ali et al., 2020).

8 Head lice

8.1 Epidemiology and transmission:

Pediculosis (louse infestation) is a parasitic insect affects hundreds of millions of people worldwide each year and has been reported in all countries and within all socioeconomic classes. The three varieties that are parasitic to humans are *Pediculus humanus capitis* (head louse), *Pthirus pubis* (crab louse), and *Pediculus humanus* (body louse). Head lice cross all socioeconomic barriers, whereas body lice more commonly affect homeless and displaced populations(Bragg, 2022; Wills, 2022).

Head lice infestation is associated with limited morbidity but causes a high level of anxiety among caregivers of school-aged children and adolescents result in ostracized from their schools, friends, and other social event. It is important for medical providers to educate affected individuals that head lice are neither a health hazard nor a sign of poor hygiene and are not responsible for the spread of any disease(Melnick et al.,2022).

The head louse is a tiny, grayish-white insect. Female head lice typically live for about one month and lay 7 to 10 eggs (called nits) per day. The eggs are attached to the base of a hair, near the scalp. The eggs hatch after about eight days. After the eggs hatch, the egg cases become easier to see. Since the eggs are firmly attached to the hair, they move away from the scalp as the hair grows(Goldstein, 2022).

Transmission mainly occurs through physical head-to-head contact and is highly influenced by the population density of potential

host. Therefore, households composed of a large number of children and living in densely populated municipalities present a higher prevalence of infestation. Schools, refugee camps, jails, orphanages, and any type of overcrowding favors the spread of head lice(Al-anbaki et al., 2021).

Head lice do not jump or fly they can only crawl, and they cannot spread from person to person by attaching to pets. Direct contact with the hair of a person with lice (hair to hair contact) is thought to be the most common method of spreading head lice. The degree to which contact with objects used by people with head lice, such as clothing, bedding, combs, or brushes, contributes to the spread of head lice is unclear(Goldstein, 2022).

Lice found on combs are likely to be injured or dead. In one study, live lice were found on only 4% of pillowcases used by infested persons. Thus, the major focus of control activities should be to reduce the number of lice on an individual's head and to lessen the risks of head-to-head contact. Head lice are specific to humans and cannot be transferred between humans and pets(Melnick et al.,2022).

Al-anbaki et al.(2012) found that transmission is not at all dependent on the socioeconomic status of individuals, but the magnitude of lice infestation and the related household management are directly influenced by financial resources, access to treatment, and the availability of proper information.

8.2 Signs and symptoms:

The primary complaint of is pruritus. On physical examination, the diagnosis is confirmed by visualization of at least one louse on visual inspection. Misdiagnosis is common. Finding only nits on examination is not sufficient to confirm a current infestation, as nits can stay on hair for

months after successful treatment. Dandruff, hair spray debris, and dirt particles can be confused with nits as false positives(Bragg, 2022; Wills, 2022).

The louse feeds by injecting small amounts of saliva, which has vasodilatory and anticoagulative properties, into the scalp, allowing the louse to suck tiny amounts of blood every few hours. Pruritus results from sensitization to components of the saliva. With a first case of head lice, pruritus may not develop for 4 to 6 weeks, because it takes that amount of time for sensitization to occur(Melnick et al.,2022).

8.3 Management:

Permethrin is a medication used in the management and treatment of scabies and pediculosis. It is in the synthetic neurotoxic pyrethroid class of medicine. It targets eggs, lice, and mites via working on sodium transport across neuronal membranes in arthropods, causing depolarization. This results in respiratory paralysis of the affected arthropod(Juergens, 2022; Nanda, 2022).

Oral ivermectin is an option for the treatment of head lice infestation, especially in individuals who have experienced a treatment failure. Published evidence from clinical trials indicates that oral ivermectin is as effective as currently available topical treatments(Kousi et al., 2018).

In dental clinic, using full barrier techniques including masks, gloves and eye glasses. Head caps should be used for both dentist and patient to control infections transmitted to the dentist or laboratory staff via occupational exposure. When the procedure is complete, all instruments should be sterilized carefully(Little et al., 2018).

Conclusion:

A dental clinic can be a source of a multiple type of infections transmission , so the dentist should be aware about infection control measures. To protect his/her self and other dental staff and patients. Wear mask, gown, head cap, gloves.

Before high-level disinfection or sterilization, instruments should be cleaned to remove debris. Cleaning may be accomplished by a thorough scrubbing with soap and water or a detergent, or by using a mechanical device (e.g., an ultrasonic cleaner). Persons involved in cleaning and decontam- inating instruments should wear heavy-duty rubber gloves to prevent hand injuries. Metal and heat-stable dental instruments should be routinely sterilized between use by steam under pressure (autoclaving), or dry heat.

Always obtain a thorough medical history. Include specific questions about medications, current illnesses, hepatitis, recurrent illnesses, unintentional weight loss, lymphadenopathy, oral soft tissue lesions, or other infections.

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