IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Breathing Through The Decision: When To Postpone Dental Care For Kids With Respiratory Infections?

Dr. Samridhhi Jain [1] Dr Uma Palaniappan[1] Dr Rangeeth B N [2]

[1.] Post Graduate, Department of Pediatric Dentistry, Thai Moogambigai Dental College and Hospital. Dr MGR Educational and Research Institute, Deemed to be University.

[2.] Professor, Department of Pediatric Dentistry Thai Moogambigai Dental College and Hospital. Dr MGR Educational and Research Institute, Deemed to be University.

ABSTRACT

Pediatric dental care presents unique challenges when children are experiencing respiratory infections. Respiratory illnesses, such as the common cold, flu, or more severe conditions like pneumonia, can significantly affect a child's immune response and overall health, prompting important considerations for dental treatment. This article explores the critical factors that influence the decision to proceed with or postpone dental procedures for children suffering from respiratory tract infections. We review the physiological effects of respiratory infections on the oral cavity and discuss the potential risks of conducting dental treatments during active illness, including increased infection risk, respiratory distress, and complications related to anesthesia. Additionally, we highlight guidelines and best practices for pediatric dentists in evaluating the severity of the infection, the type of dental procedure required, and the child's overall health. Ultimately, the article aims to provide a comprehensive approach for dental professionals and parents in making informed decisions about timing dental care for children with respiratory infections. By balancing the need for timely treatment with the risks of exacerbating health issues, dental practitioners can ensure safe and effective care for their young patients.

KEY WORDS: Oral Micro Eco System, Respiratory Disease, Oral Health.

INTRODUCTION

The human microbiome is a complex ecosystem of microorganisms that inhabit various parts of the body, including the oral cavity. Often overlooked in discussions of respiratory health, the oral microbiome plays a significant role in influencing the balance of bacteria, viruses, and fungi in the upper respiratory tract. Emerging research has highlighted the intricate link between oral health and respiratory diseases, suggesting that the mouth is not only a site for the development of dental conditions like cavities and gum disease but also a gateway for infections and inflammation in the lungs and airways.

Oral bacteria can travel from the mouth to the respiratory system through the act of swallowing or inhalation, potentially contributing to a range of respiratory conditions, from the common cold to more serious chronic diseases like pneumonia, chronic obstructive pulmonary disease (COPD), and even conditions like aspiration pneumonia. Conversely, respiratory diseases may also alter the composition of the oral microbiome, creating a vicious cycle where each condition exacerbates the other.[1] The upper respiratory tract being in continuity to the oral cavity makes the mouth a possible reservoir for respiratory pathogens. On one hand, an imbalance in the oral microbiome can trigger both oral and respiratory diseases; on the other hand, oral and respiratory conditions can further exacerbate the disruption of the oral microbiome.[2]

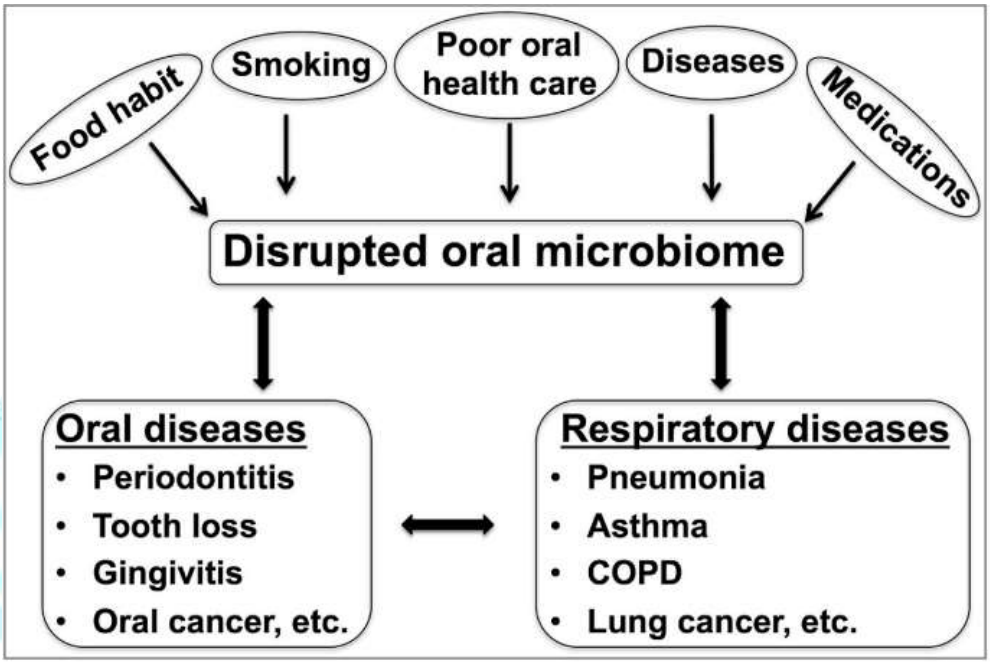

Image source from : Pathak et al- A schematic diagram illustrating a cyclical relationship between the oral microbiome, oral health conditions, and respiratory diseases.

ACUTE RESPIRATORY INFECTIONS IN CHILDREN

Acute respiratory infections (ARIs) are categorized into upper respiratory tract infections (URIs) and lower respiratory tract infections (LRIs). The upper respiratory tract includes the airways extending from the nostrils to the vocal cords in the larynx, as well as the paranasal sinuses and middle ear. The lower respiratory tract encompasses the continuation of the airways from the trachea and bronchi down to the bronchioles and alveoli. ARIs are not limited to the respiratory system and can have widespread effects due to the potential spread of infection or microbial toxins, inflammation, and impaired lung function.[3]

Upper Respiratory tract infections:

Upper respiratory infections (URIs) are the most prevalent infectious diseases. They encompass conditions such as rhinitis (common cold), sinusitis, otitis media, acute pharyngitis or tonsillopharyngitis, epiglottitis, and laryngitis—of which otitis media and pharyngitis are associated with more serious complications, including hearing loss and acute rheumatic fever, respectively.[4]

Lower Respiratory tract infections:

The common LRIs in children are pneumonia and bronchiolitis. The respiratory rate is a valuable clinical sign for diagnosing acute LRI in children who are coughing and breathing rapidly. The presence of lower chest wall indrawing identifies more severe disease. [5]

ASPIRATION OF ORAL BACTERIA

The simplest example of the oral-lung connection is the aspiration of bacteria directly into the lungs, leading to disease. There is considerable overlap between common oral bacteria and those found in the lungs. It has traditionally been understood that the aspiration of oral secretions can result in pneumonia, pulmonary abscesses, or empyema. Early microbiological research identified several anaerobic oral bacteria, including *Bacteroides*, *Fusobacterium*, *Peptostreptococcus*, and *Prevotella*, as being associated with these pulmonary conditions.[6] The exact mechanisms by which aspiration of bacteria leads to infection in some individuals and not others are not fully understood. It is likely the result of a combination of factors, including the frequency and volume of aspirated material, the effectiveness of airway and lung clearance processes, underlying health conditions, the individual's immune response, bacterial virulence, and the extent of dysbiosis in the lung microbiome.[7]

DENTAL CONSIDERATIONS DURING RESPIRATORY INFECTIONS

Chronic Obstructive Pulmonary Disease:

Chronic obstructive pulmonary disease (COPD) is an umbrella term for respiratory conditions characterized by chronic airway obstruction that is not fully reversible. Patients with COPD may experience a decline in respiratory function during dental procedures, and several precautions are therefore necessary. It is recommended to treat such patients in an upright position. The use of rubber dams may also need to be adjusted, as some patients may report feelings of suffocation. Specialized clinics can provide oxygen therapy and staff trained in its administration. Medications such as hypnotics, narcotics, antihistamines, and anticholinergics should be avoided. If the patient is on corticosteroids, additional supplements might be required.[8] For individuals taking theophylline, macrolide antibiotics like erythromycin and clarithromycin should be avoided. General anesthesia in an outpatient setting is strictly contraindicated. Additionally, patients with COPD, especially those hospitalized, are at increased risk for respiratory infections due to aspiration of microorganisms, particularly when periodontal health is compromised. The teeth and gums can act as a source of bacterial reservoirs for respiratory infections.[9]

Asthma

Asthma is a respiratory condition characterized by reversible, widespread narrowing or constriction of the peripheral airways, heightened sensitivity to various triggers, and often, signs or laboratory evidence of an allergic reaction. It is a common disorder, particularly affecting children, with a prevalence rate of 5-6%. More than half of those affected are between 5 and 15 years old. Asthma can be classified into allergic and non-allergic types. Allergic (or extrinsic) asthma is typically associated with a family history of asthma and elevated serum IgE levels. Medications used to manage asthma have been linked to various oral health issues, including xerostomia (dry mouth), oropharyngeal candidiasis, and an increased risk of dental caries, particularly due to the use of inhaled β-agonists.[10] Children with chronic health conditions requiring long-term medication are at a heightened risk for developing caries as a side effect of their treatment. The presence of bacteria such as *Lactobacilli* and *Streptococcus mutans* contributes to caries formation. Regular dental checkups and fluoride treatments are recommended for these individuals. Elective dental procedures should be performed on asthmatic patients who are asymptomatic or whose condition is well-controlled. The critical moments of dental treatment in which an asthma attack can be triggered are immediately after local anesthetic injection and those maneuvers that cause stress – such as extractions, surgery, or dental pulp removal in endodontic procedures.[11]

DRUGS TO BE AVOIDED IN ASTHMATIC PATIENTS
Drugs containing aspirin (10-28% of all asthmatics may not tolerate the latter)(2).
Nonsteroidal antiinflammatory drugs (patients with intrinsic asthma).
Macrolide antibiotics in patients treated with theophylline. The serum methylxanthines levels (theophylline) may be increased.
Opiates: these can cause respiratory depression and histamine release.
Local anesthetics: use solutions without adrenalin or levonordefrin, due to the sulfite preservative contents.
If the patient is receiving prolonged systemic corticosteroid treatment, supplements may be needed (prior to dental procedures that might cause stress).

CORONA VIRUS

Coronavirus (CoV) is derived from the Latin word 'corona', meaning 'crown'. It is responsible for a spectrum of human respiratory infections, ranging from mild colds to severe respiratory distress syndrome. The current novel CoV strain, known as severe acute respiratory syndrome (SARS)-CoV-2 and coronavirus disease 2019 (COVID-19), poses a significant emerging global health threat. CoVs are RNA viruses within the subfamily *Coronavirinae*, belonging to the family *Coronaviridae* and the order *Nidovirales* (with 'nido' meaning 'nest' in Latin). Human-to-human transmission typically occurs through direct contact, respiratory droplets, and airborne aerosols, particularly during medical procedures. Common modes of transmission include coughing, sneezing, inhalation of droplets, and contact with mucous membranes in the mouth, nose, and eyes. The virus can also be shed from the respiratory tract, saliva, feces, and urine, creating additional avenues for transmission.(12)

Among healthcare workers, dentists and dental staff are at a heightened risk of exposure to airborne pathogens like SARS-CoV-2, as they are frequently in close contact with droplets and aerosols generated during certain dental procedures. Transmission can occur through inhalation of droplets and aerosols from an infected individual or by direct contact with oral fluids, mucous membranes, or contaminated instruments and surfaces.

The American Dental Association (ADA) and many European dental organizations recommend prescreening patients before their dental appointments, limiting the number of patients in the waiting area, measuring the temperatures of both staff and patients, enforcing strict hand hygiene and sanitization protocols, providing hand sanitizers for patients, disinfecting surfaces, ensuring proper personal protective equipment (PPE) for the dental team, using disposable shoe covers for patients, and implementing the use of UV lamps and air purifiers, as well as high-efficiency suction systems during procedures.(13)

PULMONARY TUBERCULOSIS

Tuberculosis (TB) is a contagious disease caused by *Mycobacterium tuberculosis*. While TB primarily affects the lungs, it can also impact other areas of the body. It is transmitted from person to person via the air when individuals with active TB cough, sneeze, or release respiratory fluids into the air. TB presents significant concerns for oral healthcare due to its mode of transmission, the rise of drug-resistant strains, and the emergence of new risk factors for the disease.

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. While TB primarily affects the lungs, it can also impact other organs. It is transmitted from person to person through the air when individuals infected with TB cough, sneeze, or expel respiratory fluids into the air. TB presents a significant challenge for oral healthcare due to its mode of transmission, the emergence of drug-resistant strains, and the increasing presence of new risk factors.(14) In cases of active TB, emergency dental care options may be limited, with the most feasible treatment often being local anesthesia. Providing treatment under conscious sedation or general anesthesia for a patient with active pulmonary TB can be complex, as these patients may be severely ill, malnourished, anemic, and suffering from bronchiectasis and compromised lung function. It is recommended to

schedule high-risk cases for infection at the end of the surgical list to reduce the risk of cross-contamination. If this is not possible, the Hospital Infection Society advises allowing a minimum of 15 minutes in a well-ventilated operating theatre between procedures. In cases where conscious sedation is necessary, further consultation with the infection control team and anesthesiologists is advised. Considerations should include the potential for respiratory depression, the need for increased oxygen support, and the possibility of drug interactions with TB treatments.(15)

INFECTION CONTROL IN A DENTAL SETUP

It is always advised to do emergency treatment rather than elective dental procedure during a respiratory tract infection. Infection control in the dental clinic is crucial, especially when treating children with respiratory infections. These infections, such as the common cold, influenza, or more severe conditions like COVID-19, increase the risk of cross-contamination. Since dental procedures often involve close contact with the respiratory tract, it's important to follow strict protocols to protect both patients and dental professionals. Here's a summary of key infection control practices to follow in dental clinics when treating children with respiratory infections:

1. Patient Screening and Triage

- Pre-appointment Screening:
    - Contact parents or guardians before the appointment to screen for symptoms of respiratory infections (fever, cough, runny nose, sore throat).
    - Instruct families to reschedule if the child shows symptoms of illness or if they have been exposed to COVID-19 or other contagious respiratory infections.
- Symptom Check on Arrival:
    - Perform temperature checks and ask patients or guardians about any signs of respiratory infections, including symptoms like coughing, sneezing, or shortness of breath.
    - Ensure children are not displaying symptoms of active respiratory illness before proceeding with any treatment.

2. Personal Protective Equipment (PPE)

- For Dental Professionals:
    - Masks: Use N95 respirators (or FFP2/FFP3 masks) when treating children with suspected or confirmed respiratory infections. Surgical masks may be acceptable for non-aerosol procedures, but N95 or higher-level masks are necessary for aerosol-generating procedures (e.g., ultrasonic scaling, use of high-speed handpieces).
    - Eye Protection: Use face shields or goggles to protect from splashes or droplets.
    - Gloves and Gowns: Wear disposable gloves and protective gowns to prevent direct contact with respiratory fluids.
    - Head and Foot Covers: Consider wearing disposable head covers and shoe covers to further reduce contamination.

3. Hand Hygiene

- Frequent Hand Washing: Ensure that all staff members wash their hands thoroughly with soap and water for at least 20 seconds or use alcohol-based hand sanitizer before and after patient contact.
- Hand Sanitizer Availability: Provide hand sanitizers for patients and guardians in the waiting area, as well as throughout the clinic, particularly after any coughing or sneezing.

4. Respiratory Hygiene

- Masks for Patients: Ensure that children and their guardians wear masks when they are in the dental clinic, especially if they have symptoms of a respiratory infection. Surgical masks or cloth masks are recommended for children who are old enough to tolerate them.
- Coughing Etiquette: Encourage children and accompanying adults to cover their mouth and nose with tissues or the inside of their elbow when coughing or sneezing, and dispose of tissues immediately in a waste container.
- Disposable Barriers: Consider using disposable barriers, such as patient bibs, to minimize surface contamination during treatment.

5. Aerosol-Generating Procedures (AGPs)

- Minimize Aerosol Production: Avoid unnecessary aerosol-generating procedures (e.g., using high-speed drills, air-water syringes, ultrasonic scalers) in children with respiratory infections. If possible, perform non-aerosol procedures such as manual scaling, hand instrumentation, and atraumatic restorative techniques (ART).
- High-Efficiency Air Filtration: Use high-efficiency particulate air (HEPA) filters or air purifiers with UV light in the treatment area to reduce airborne contaminants.
- Rubber Dams and Isolation: Use rubber dams and high-volume suction to reduce the spread of aerosols and to isolate the working area as much as possible.[16]

6. Clinic Environment

- Ventilation: Ensure that the dental office has proper ventilation, either through natural ventilation (windows) or mechanical ventilation systems that bring in fresh air and remove contaminated air.
- Disinfection of Surfaces: Disinfect all surfaces that may come in contact with respiratory fluids, including dental chairs, countertops, doorknobs, and light switches, between each patient using an EPA-approved disinfectant.
- Waiting Room Protocols: Keep the waiting area clean and ensure that social distancing is maintained. If possible, reduce the number of patients in the waiting room to minimize exposure. Disinfect chairs, toys, and other frequently touched objects after each use.

7. Instrument Sterilization and Waste Management

- Proper Sterilization: All instruments should be sterilized according to standard protocols. Use autoclaves or other sterilization methods approved by health authorities.
- Single-Use Items: Use single-use items (e.g., suction tips, gloves, face masks) when possible. Dispose of them properly after each use.
- Proper Waste Disposal: Ensure that contaminated waste (e.g., tissues, masks, gloves) is disposed of in lined, covered waste bins that are properly sealed.

8. Patient Flow Management

- Appointment Scheduling: Schedule respiratory infection cases at the end of the day or in dedicated time slots to minimize exposure of other patients.
- Limiting Escorts: Limit the number of people accompanying the patient to only one adult, if possible, and ensure that they follow all safety protocols.

- Telemedicine Options: For non-urgent cases, consider offering telemedicine consultations to evaluate whether in-person visits are necessary.

9. Post-Treatment Monitoring and Communication

- Post-Treatment Instructions: Advise parents to monitor for any signs of worsening illness in children after the appointment and follow up if needed.
- Stay Updated on Guidelines: Regularly review and update infection control protocols based on local health authorities' guidance, particularly as the situation with respiratory infections (like COVID-19) evolves.

By maintaining rigorous infection control protocols, dental professionals can safely treat children with respiratory infections while minimizing the risk of cross-contamination. Adhering to these procedures ensures the protection of both patients and healthcare workers in the clinic.[17]

CONCLUSION

In conclusion, the decision to postpone or proceed with dental care for children with respiratory infections requires careful consideration of the child's overall health, the severity of the infection, and the potential risk of spreading pathogens. Dental professionals must prioritize patient safety by assessing the type of respiratory infection, the need for urgent dental treatment, and the ability to implement appropriate infection control measures. In many cases, elective dental procedures should be deferred until the child has recovered to reduce the risk of complications and ensure a safe treatment environment. By following evidence-based guidelines and maintaining open communication with parents, dental practitioners can make informed decisions that protect both their young patients and the healthcare team.

Before treatment	Establish previous history of TB exposure medical treatment and follow-up, and any prophylactic therapy May need physician consult if poor history or unclear treatment Patient with history of positive tuberculin test and without signs/symptoms of active tuberculosis
During treatment	Patients with active TB • Dental emergencies only • Controlled environment (protective gear/respirator, pressurized air flow)
During treatment	Patients with signs and symptoms suggestive of TB • Dental emergencies only • Consider referral for medical evaluation and workup to rule out TB • Protective gear (respirator mask) Patients with a history of TB • Routine dental treatment (after establishing that the patient has been adequately treated and followed and there are no signs and symptoms of active disease) Patients with a positive tuberculin test with no history of TB and no signs or symptoms of active disease • Routine dental treatment • Consult with physician if there is any question of the presence of active disease
After treatment	No specific precautions

REFERENCES

1. Dong J, Li W, Wang Q, Chen J, Zu Y, Zhou X, Guo Q. Relationships between oral microecosystem and respiratory diseases. Front Mol Biosci. 2022;8:718222.
2. Pathak JL, Yan Y, Zhang Q, Wang L, Ge L. The role of oral microbiome in respiratory health and diseases. *J Oral Microbiol*. 2020;12(1):1770051.
3. Williams SE, Gessner BD**.** Epidemiology of Acute Respiratory Infections in Children: Focus on Pneumonia. *Curr Opin Infect Dis*. 2018;31(3):281-287.
4. Pillai R, Peltola V, Virtanen M. Acute respiratory tract infections in children: a review of current concepts and challenges in diagnosis and treatment. *J Paediatr Child Health*. 2016;52(7): 687-695.
5. Nair H, Nokes DJ, Gessner BD, Global burden of acute lower respiratory infections due to respiratory syncytial virus in young children: a systematic review and meta-analysis. *Lancet*. 2010;375(9725):1545-1555.
6. Bartlett JG. How important are anaerobic bacteria in aspiration pneumonia. Infect Dis Clin North Am 2013;27(1):149-155
7. Wu BG, Segal LN. The lung microbiome and its role in pneumonia. Clin Chest Med 2018;39(4):677-689
8. Gershengorn HB, Ngo J, Aghababian R**,** Dental considerations for patients with chronic obstructive pulmonary disease. *J Am Dent Assoc*. 2015;146(10):757-764.
9. Solano E, Guzmán M, Rodríguez J, Oral care and prevention in patients with chronic obstructive pulmonary disease: A review. *J Clin Periodontol*. 2018;45(7):730-737.

10. Macek MD, Eaton KA, Edelstein BL. The impact of asthma on oral health in children: A review. *Pediatr Dent*. 2014;36(6):489-493.
11. Griffiths M, Mason M, Kullberg J, The oral health of children with asthma: A review of the literature. *J Clin Pediatr Dent*. 2017;41(6):441-449.
12. Goriuc A, Sandu D, Tatarciuc M, Luchian I. The impact of the COVID-19 pandemic on dentistry and dental education: A narrative review. *Int J Environ Res Public Health*. 2022;19(5):2537.
13. Umakanthan S, Sahu P, Ranade AV, Bukelo MM, Rao JS, Abrahao-Machado LF, et al. Origin, transmission, diagnosis, and management of coronavirus disease 2019 (COVID-19). *Postgrad Med J*. 2020;96(1143):1-7.
14. Gaur, S., & Agarwal, A. (2019). Tuberculosis in children: Current status and management strategies. *Pediatric Reviews*, 40(6), 281-287.
15. Khan, A., & Malik, A. (2020). Tuberculosis in pediatric patients: Oral health implications and dental management. *International Journal of Pediatric Dentistry*, 30(3), 278-285.
16. Sokhandan, M. A., & Zarei, M. (2020). Infection control practices for dental clinics during the COVID-19 pandemic: A review of the current guidelines and recommendations. *Journal of Dental Research, Dental Clinics, Dental Prospects*, 14(4), 176-181.
17. Fung, M. C., & Crozier, C. A. (2021). Dental infection control and its impact on pediatric dental practices during viral respiratory infections. *Pediatric Dentistry*, 43(1), 12-20.