

Prevention of Dental Caries in Patients with Pulmonary Tuberculosis

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Article History	Abstract
Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 24 Nov 2023	<i>Tuberculosis remains a significant public health concern worldwide, with approximately 8 million new cases being reported every year. In the past decade, there has been a worsening of the epidemiological situation surrounding tuberculosis, characterized by increased incidence and more severe disease progression. One of the factors contributing to this situation in our country is the change in the method of detection. With a reduction in preventive fluorographic screenings of the population, over 50% of tuberculosis cases are now diagnosed based on patient self-referral to general healthcare institutions. This often leads to delayed diagnosis of the disease. Late detection is associated with an increased burden of tuberculosis and comorbidities, including dental pathology, which further impairs the quality of mechanical food processing. Previous studies have shown that dental diseases among patients with pulmonary tuberculosis are widespread and tend to worsen, leading to tooth loss and complicating the course of the tuberculosis process.</i>
CC License CC-BY-NC-SA 4.0	Keywords: Tuberculosis, self-referral, general healthcare, factors contributing.

1. Introduction

One of the factors contributing to the effectiveness of tuberculosis treatment is adequate nutrition, which depends not only on the composition of food but also on its processing within the oral cavity. The main objective of this study is to investigate the prevalence and characteristics of dental caries development and clinical course among patients with pulmonary tuberculosis. Understanding and addressing the modern treatment and prevention of dental caries in this population can contribute to improving the effectiveness of anti-tuberculosis therapy, enhancing quality of life, and restoring work capacity. Additionally, the study will also consider the impact of anti-tuberculosis medications on the oral mucosa, including in children.

The results of previous studies confirm that dental diseases in patients with all forms of pulmonary tuberculosis (pulmonary and extrapulmonary) are characterized by a high prevalence and a tendency to progress, which leads to the deterioration of the oral microbiota and can result in tooth loss, complicating the course of the tuberculosis process. In the last decade, there has been a worsening epidemiological situation regarding tuberculosis. Tuberculosis often coexists with comorbidities, including dental pathology. It has been convincingly proven that patients with pulmonary tuberculosis experience more severe clinical manifestations of dental caries, characterized by multiple lesions of the hard tissues of the teeth and an acute course. The provision of dental care to this category of patients remains relevant and understudied. On the other hand, deteriorating living conditions, the COVID-19 epidemic, and population migration from regions traditionally affected by tuberculosis have contributed to the worsening of the epidemiological situation. Tuberculosis is one of the most serious diseases affecting humans, which has seen a sharp increase in prevalence in the last decade. The main consequence of the worsening epidemiological situation among the adult population is the increased number of children newly infected with tuberculosis.

In the functional studies of the microcirculation of the mucous membrane of the denture bed in patients with active tuberculosis in Russia, a sharp decrease in its intensity was first established, which contributes to tissue trophism impairment and non-easy atrophy. Therefore, non-removable dental prostheses or removable prostheses with a shortened base are preferred [1]. Patients with tuberculosis of the maxillofacial area receive treatment in specialized phthisiatric healthcare institutions. General treatment should be complemented by local measures, including oral cavity hygiene and sanitation,

ulcer care, and wound dressing. Surgical interventions are performed strictly based on indications, specifically when there is a clinical effect of anti-tuberculosis treatment and limited local involvement in the oral cavity and bone tissue. Intraosseous foci are opened, granulations are removed, sequestra are extracted, fistulas are excised, ulcers are sutured, or their edges are freshened for tissue healing by secondary intention under a tampon of iodoform gauze. Teeth with tuberculosis involvement of the periodontium are always extracted. After clinical recovery with full efficacy of the main course of treatment and local therapeutic measures, the patient should remain under observation for 2 years [2]. It is necessary to consider the development of dentistry not only as a science but also from the perspective of material and technical resources, which is currently important. After obtaining the initial research results and studying the works of colleagues who have previously explored this problem, a new algorithm of a dentist's activities with updated approaches to the treatment of dental diseases and oral cavity management depending on the form of tuberculosis and treatment regimen can be developed.

We should not forget about the pathophysiology and clinical development of tuberculosis not only in adults but also in children, as tooth formation begins at an early age. The first stage of the disease is tuberculosis infection or conversion - the first positive tuberculin test in a practically healthy child (without symptoms of intoxication and local changes). Conversion of tuberculin tests is rarely accompanied by clinical symptoms, and the manifestation of infection may be limited to non-specific changes and functional disturbances without leading to local tuberculosis. The development of tuberculosis is influenced not only by the peculiarities of the biological development of the child's organism but also by numerous external factors: unsatisfactory living conditions, nutrition, hygiene, etc. Many of these factors can lead to the development of oral diseases in children. However, the risk factors for the development of dental diseases in children during the period of primary tuberculosis infection have not been studied before. The influence of tuberculosis infection on the state of the oral cavity in children with favorable biological history and good living conditions has not been studied. The role of local immunity in the oral cavity in the development of tooth decay, periodontal diseases, and mucous membranes is known [3, 8]. However, the interaction between general and local (oral) reactivity of the body in children during the period of primary tuberculosis infection has not been investigated. The influence of the duration of the disease, treatment, and degree of dental caries activity on the state of the local immunity of the oral cavity in children has not been studied, which emphasizes the importance of studying the problem of the relationship between primary tuberculosis infection and the state of the oral cavity in children.

During the literature review of previous scientific research and the activities of phthisiatric departments on childhood tuberculosis, it was found that preschool children in the period of primary tuberculosis infection have a higher prevalence of dental diseases compared to children who have not had a positive tuberculin skin test in their medical history. The majority of children in the period of primary tuberculosis infection have unfavorable medical and biological histories and socio-economic living conditions. Tuberculosis infection increases the risk of developing tooth decay in preschool children, both with unfavorable and favorable medical and biological histories, as well as socio-economic living conditions. In preschool children in the period of primary tuberculosis infection, immune deficiency in the oral cavity develops against the background of pronounced changes in the body's immune reactivity. Immune disturbances depend on the duration of tuberculosis infection, treatment, and the degree of activity of dental caries in the child.

It is important not to forget the main fact - the main characteristic is the contact of the dentist with tuberculosis patients, which requires compliance with infection control rules and preventive measures both personally and in the workplace. Dental treatment for patients with active tuberculosis should be carried out after consultation with pulmonologists (treating doctors) to determine the patient's level of infection and bacterial shedding. Extra-pulmonary forms of tuberculosis, such as tuberculosis of the bones and joints, are not highly infectious, although they are a serious condition. As protective measures, it is recommended that patients provide chest X-ray results and negative sputum microscopy or GeneXpert results when visiting a dentist. The main principles of work in all dental institutions should be cleanliness, sterility, and disinfection. The hygiene condition of any medical institution is primarily determined by the personnel working in it. However, training of dental clinic staff in adhering to hygiene practices is given less attention. Despite the advancements in modern medicine, cross-infections continue to pose serious problems. Uncontrolled and uncritical use of antibiotics in dental practice and chemotherapy drugs has led to the emergence of multidrug-resistant strains of microorganisms, which have found their place in the hospital environment and pose a constant source of danger to both patients and staff.

When treating a patient with active tuberculosis, special infection control procedures should always be followed. Additionally, additional measures to reduce the risk of infection should also be implemented. Dental treatment for patients with active tuberculosis should be limited to essential procedures only, such as treating acute facial or oral infections, acute pulpitis, trauma, or bleeding. These procedures should be completed as quickly as possible.

Dental treatment should be carried out in an operating room equipped with effective air filtration systems on the external side of the building, and high-volume suction to minimize any aerosolization that may occur when using turbine drills. It is preferable to treat patients with active tuberculosis in specialized facilities equipped for this purpose. Portable suction devices should not be used as they can potentially spread airborne particles contaminated with the tuberculosis bacteria. The use of rubber dams may be helpful in reducing aerosol contamination, but if the patient is coughing, their usage may be restricted. Clinicians may choose to wear long-sleeved gowns for added protection against contamination, and these gowns can either be autoclaved or disposed of after use. Gloves should have cuffs and be worn under the cuffs of clothing. Protective eyewear, caps, or other appropriate protective gear should also be worn to protect the eyes. After treatment, all instruments should be collected, cleaned, and prepared for sterilization. Steam sterilization under pressure is the preferred method of sterilization.

4. Conclusion

In modern conditions, it is extremely important to provide qualified dental care to socially significant groups of the population, including children who have been diagnosed with tuberculosis. Optimal treatment start dates must be established to ensure that dental treatment can be provided. For infiltrative tuberculosis of the lungs, treatment should begin 1.5-2 months after diagnosis, and for disseminated tuberculosis, treatment should commence 2-4 months after starting tuberculosis treatment. Dental treatment should be initiated after obtaining permission from the attending pulmonologist, who determines whether there are any mycobacteria in the patient's sputum, as well as whether the patient's body temperature has normalized. According to literature, patients with pulmonary tuberculosis often exhibit various manifestations of active TB disease in the oral cavity, which significantly complicates the work of the dental provider in a pulmonary institution.

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