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Case Report

Diagnosis of Congenital Syphilis through Detection of Dental Abnormalities: Case Report

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Abstract

Characterised as a vertically transmitted infection, congenital syphilis is a major public health problem, associated with high perinatal morbidity and mortality and long-lasting systemic sequelae. Transplacental transmission of *Treponema pallidum* can result in a wide spectrum of clinical manifestations, ranging from asymptomatic cases to severe multisystemic alterations involving the integumentary system, bones, central nervous system, and dental structures. Among these manifestations, the dental anomalies typical of congenital syphilis stand out: mulberry molars and barrel-shaped central incisors. In this perspective, the dental surgeon plays an important role in the diagnosis of congenital syphilis, referring the patient to an infectious disease physician for the appropriate management of other systemic manifestations. The purpose of this article is to present a case of an adolescent patient with mulberry molars. The patient underwent serological tests for syphilis, confirming the diagnostic hypothesis. The etiological, diagnostic and therapeutic aspects were discussed, as well as the role of the dental surgeon in the early detection of oral manifestations of systemic diseases.

Keywords: *Congenital Syphilis; Hutchinson's teeth; Tooth Diseases; Oral Pathology; Oral Diagnosis.*

Introduction

Syphilis is a major public health problem, associated with high perinatal morbidity and mortality and long-lasting systemic sequelae. It is not restricted to the present day, but is an ancient infection closely related to the social history and vulnerability of different populations. Paleopathological evidence and biological anthropology studies indicate that forms of treponematoses may have affected human populations much earlier than previously thought, suggesting that *Treponema pallidum* has been circulating among humans for centuries, with variations in the pattern of clinical presentation over time[1-3].

According to the World Health Organisation (WHO), syphilis is a sexually transmitted infection of great global relevance, with millions of new cases each year, particularly in low- and middle-income countries, where socio-cultural limitations are determining factors in public health. Deficiencies in treatment, screening, and health surveillance contribute to the persistence of the disease, in addition to favouring the emergence of strains with possible changes in sensitivity to antimicrobials[4].

In Brazil, the epidemiological situation is cause for concern. In June 2025, 369,468 cases of acquired syphilis were reported, 87,326 cases in pregnant women and 41,683 cases of congenital syphilis, reflecting a significant increase in the detection of this condition in different regions of the country[5]. These figures highlight failures in prevention and prenatal care, since congenital syphilis is a preventable condition when there is timely diagnosis and treatment of the pregnant woman and her partner[5,6].

The increase in syphilis cases is influenced by various factors, such as changes in sexual networks, reduced condom use, synergistic interactions with HIV, and social determinants such as migration, stigma, and poverty. Similarly, the widespread distribution of prophylactic drugs such as pre-exposure prophylaxis (PrEP) for HIV can influence or even mask perceptions about syphilis prevention[2,6]. In some groups, the use of PrEP can lead to a relativisation of the risk of other sexually transmitted infections (STIs). Protection against HIV can create a false sense of security, i.e., it reduces the adoption of additional preventive measures, such as regular condom use[6].

Transplacental transmission of *Treponema pallidum* can result in a wide spectrum of clinical manifestations, ranging from asymptomatic cases to severe multisystemic alterations involving the integumentary system, bones, central nervous system, and dental structures. Among these manifestations, dental anomalies stand out as pathognomonic signs of congenital syphilis: mulberry molars and barrel-shaped central incisors[1,6,7]. From this perspective, the dental surgeon plays an important role in the diagnosis of congenital syphilis, referring the patient to an infectious disease physician for the appropriate management of other systemic manifestations. The purpose of this article is to present a case of an adolescent patient with a mulberry molar. The patient underwent serological tests for syphilis, confirming the diagnostic hypothesis.

Case Report

An Afrodescendent female patient, 16-years-old, attended the clinic complaining of the need for orthodontic treatment.

Clinically, malocclusion was observed, with dental crowding in the lower arch and absence of the lower right premolar (Figure 1). The first lower right molar had a mulberry appearance, with nodular formations on its irregular cusps. The middle third was larger in relation to the occlusal surface (Figure 2). No other stomatological changes were observed.

Radiographically, changes in crown shape and root size were observed (Figure 3).

Considering the diagnostic hypothesis of congenital syphilis, the medical history of the mother and adolescent was meticulously investigated. No changes or habits that could lead to a diagnosis of syphilis were found.

The patient and her mother were referred to an infectious disease physician. VDRL and FTA-Abs tests were performed, with a positive diagnosis for congenital syphilis. Both are being monitored by the infectious disease physician.

Both patients (mother and adolescent) have been undergoing dental evaluation for 14 years, with no signs of dental manifestations.

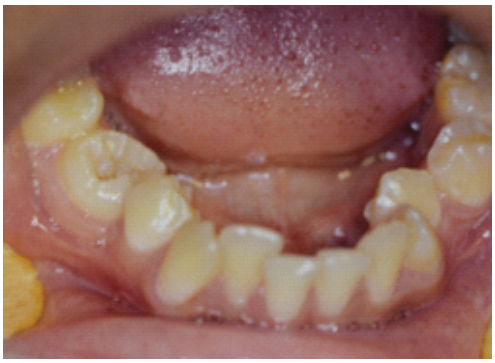

Figure 1. Occlusal view of the mandible.

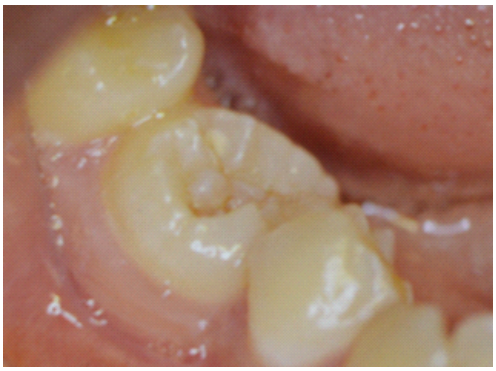

Figure 2. Occlusal view of the first lower right molar.

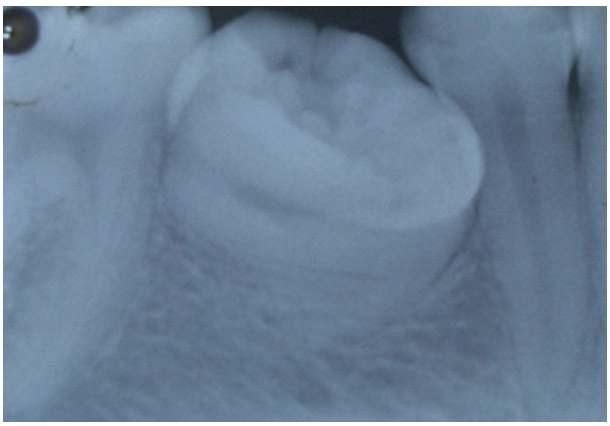

Figure 3. Radiographic aspects of the first lower right molar.

Discussion

Etiology

Congenital syphilis is a chronic bacterial infection caused by *Treponema pallidum*, transmitted transplacentally during pregnancy. The bacterium reaches the maternal circulation and crosses the trophoblastic and endothelial layers of the placenta, especially when the barrier is immature or compromised, allowing the infectious agent to enter the fetal circulation[1,3,6-8]. The contamination becomes systemic, with tropism for multiple tissues, such as skin, bones, liver, spleen, and central nervous system. The interaction between the immature immune response of the fetus and bacterial aggression sustains a persistent inflammatory process, responsible for early clinical changes, as well as for the late manifestations typical of congenital syphilis, including characteristic dental anomalies[3,8-10].

Defects in the development of enamel or dentine result from infection by *Treponema pallidum*, which acts on odontogenesis and amelogenesis. Bacterial invasion of the tooth germ inhibits and destroys ameloblasts and odontoblasts, causing changes. However, the changes can be variable and depend on the stage of tooth formation. If the infection occurs after the final stage of enamel maturation, for example, hypoplastic enamel defects may occur[3,8,10].

Treponema pallidum is a microaerophilic spirochete that is extremely sensitive to environmental conditions and cannot survive for long periods outside the host. Transmission, in most cases, occurs through direct sexual contact with active lesions on mucous membranes or skin, which have a high spirochete load, or through blood contact with an infected individual. Untreated or inadequately treated maternal infection during pregnancy is the main source of fetal exposure, reinforcing the importance of screening and appropriate management of sexual partners[1,8,9].

Although less common, the literature describes additional forms of transmission, including untested blood transfusions, occupational accidents with contaminated biological material, and shared use of needles or other sharp instruments in socially vulnerable contexts. These routes do not constitute the main form of syphilis acquisition in the general population, but they are relevant in specific groups and reinforce the need for strict biosafety measures and serological screening of donors[1,2,6].

Classification

Acquired syphilis is classified into distinct clinical stages, which represent different phases of infection and immune response patterns. Primary syphilis is generally characterised by the presence of a hard chancre at the site of inoculation. The secondary stage presents with disseminated systemic and mucocutaneous manifestations. The latent phase corresponds to the asymptomatic period in which the infection remains active but without apparent clinical signs. In tertiary syphilis, potentially serious late complications occur, such as gummatous lesions and cardiovascular, neurological, and bone involvement[1,2,9].

Congenital syphilis, in turn, can be classified into early and late forms, depending on the age at which clinical changes manifest. The early form comprises signs observed up to the first two years of life, such as mucocutaneous lesions, hepatosplenomegaly, anaemia, thrombocytopenia, and pulmonary involvement. The late form includes permanent structural changes, including pathognomonic dental anomalies, bone deformities, eye changes, and Hutchinson's triad, consisting of screwdriver or barrel-shaped upper central incisors, interstitial keratitis, and sensorineural deafness[1,9-11].

Diagnosis

Confirmation of the disease is based on serological tests, which should be performed on both the pregnant woman and the exposed newborn. An integrated interpretation of the clinical picture, gestational history, and results of non-treponemal and treponemal tests is essential to establish the diagnosis of congenital syphilis and define the therapeutic approach. In general, test positivity tends to decrease over time in adequately treated children, while persistent or elevated titres suggest active infection or reinfection[1,2,9].

Serological tests for syphilis fall into two broad categories: non-treponemal and treponemal. Non-treponemal tests, such as VDRL and RPR, detect antibodies directed against cardiolipin antigens released as a result of cell damage induced by infection. These are quantitative tests, useful for monitoring response to treatment, since their titres tend to decrease after adequate therapy and increase in the event of therapeutic failure or reinfection[9]. Treponemal tests, such as FTA-ABS, TPHA, TPPA, and EIA, detect specific antibodies against components of *Treponema pallidum*. They have greater specificity and remain reactive in many cases for life, being used to confirm the diagnosis and differentiate true results from false positives observed in non-treponemal tests[2,9].

In addition to laboratory methods, the dental and bone involvement observed in congenital syphilis gives the dental surgeon an important role in the diagnostic suspicion. Typical dental anomalies, when recognised during clinical and radiographic examination, as observed in this report, lead to the hypothesis of congenital infection in patients who often do not have clear prenatal records or maternal therapeutic history, reinforcing the importance of thorough evaluation of oral structures[1,6,10,11].

The screwdriver or barrel-shaped upper central incisors - called Hutchinson's incisors - have reduced mesiodistal width at the incisal edge, with a conical shape and central notch. The first permanent molars, in turn, may exhibit hypoplastic cusps, with an irregular surface and a mulberry-like appearance[1,7,10]. These dental changes do not manifest in the deciduous dentition, becoming evident only with the eruption of the permanent dentition, reinforcing the need for longitudinal follow-up of these patients throughout childhood and adolescence[1,3,6,7,9].

Lesions in the oral mucosa in congenital syphilis result from chronic inflammation triggered by the presence of *Treponema pallidum* in the tissues, associated with the host's immune response. They may include mucosal plaques, symptomatic ulcerations, radiating fissures in the corners of the mouth, and areas of diffuse erythema, often associated with concomitant systemic changes. These manifestations may mimic other infectious or inflammatory diseases. Thus, the role of the dental surgeon is enhanced in the early evaluation of lesions and stomatological manifestations of syphilis[3,6,8-11].

Radiographically, anomalies in the shape, size and mineralisation pattern of the dental crowns and roots should be evaluated, in addition to possible structural changes in the maxillary bones. The presence of linear hypoplasia, deformed crowns, short roots or open apices in permanent teeth, associated with a history of congenital exposure to syphilis, strengthens the diagnostic hypothesis. In some cases, bone changes compatible with previous inflammatory or scarring processes may be observed, suggesting broader involvement of the craniofacial skeleton[3,8,11].

Treatment

The treatment of syphilis requires individualised assessment, with definition of the stage of the disease and the risk of systemic involvement, in order to select the appropriate therapeutic regimen. Benzathine penicillin remains the drug of choice for most situations, whether in pregnant women or children, with specific regimens for primary, secondary, latent and late syphilis. In cases of penicillin allergy, therapeutic alternatives or desensitisation protocols should be evaluated, especially in pregnant women, given the potential impact of therapeutic failure on treatment[1,2,6,7,10].

It is essential to monitor both the mother and child serologically, with serial monitoring of non-treponemal test titres to assess response to treatment and detect early signs of reinfection or treatment failure. Failure to perform adequate follow-up increases the risk of maintaining the infection and the occurrence of late sequelae in the child, such as the dental, bone, and neurological changes previously described[2,9,10].

In addition to antibiotic therapy, the management of congenital syphilis includes comprehensive care measures, such as screening sexual partners, providing sexual and reproductive health counselling, and strengthening quality prenatal care strategies. Multidisciplinary follow-up, involving paediatrics, infectious diseases, ophthalmology, otorhinolaryngology, and dentistry, among other specialties, seeks to reduce the impact of the infection's sequelae on growth, development, and quality of life, preventing systemic complications and permanent anatomical deformities[8,9].

Dental treatment

From a dental perspective, patients with congenital syphilis require a carefully structured treatment plan that simultaneously considers functional restoration, aesthetic rehabilitation, and the prevention of further structural loss. Typical dental anomalies, such as extensive enamel hypoplasia, coronary deformities and high susceptibility to caries, require early restorative treatment, with careful selection of materials and adhesive techniques capable of providing adequate mechanical resistance in structurally compromised substrates[8,10,11].

In cases of severe enamel hypoplasia or extensive loss of tooth structure, indirect restorative procedures such as crowns or veneers may be necessary, combined with the use of high-performance adhesive materials, in order to restore anatomy, chewing function and smile aesthetics. Regular topical application of fluoride, strict oral hygiene instruction, and periodic follow-up are essential to reduce the incidence of caries and fractures in already fragile teeth, promoting the preservation of remaining structures and the prevention of new structural changes[3,11].

Attention and clinical management of patients with syphilis

Care for patients infected with syphilis requires a comprehensive approach, including biosafety measures, detection of risk factors, and promotion of preventive behaviours. In dental practice, strict adherence to infection control protocols, combined with obtaining a detailed medical history and constantly updating serological status, contributes to reducing the risk of transmission in a clinical setting. At the same time, it facilitates the identification of vulnerable individuals, guiding their appropriate referral to reference services[1,9].

Coordination between the various levels of healthcare plays a central role in the management of congenital syphilis. The integration between primary care units, specialised services, hospitals and diagnostic centres allows for more effective screening of pregnant women, surveillance of cases in children, management of complications and support for families. This coordinated network facilitates longitudinal follow-up and the sharing of relevant clinical information, resulting in more effective care and better support for the complex demands associated with the infection[10].

The role of the dental surgeon goes beyond identifying oral lesions or dental anomalies compatible with congenital syphilis. It is up to this professional to provide health education, informing patients and guardians about forms of transmission, the importance of proper treatment, and the need for clinical and laboratory follow-up. In addition, it is up to the dental surgeon to plan and perform functional and aesthetic rehabilitation, especially in cases where structural anomalies compromise chewing, phonation, and aesthetics, with a direct impact on self-esteem and quality of life. It is also recommended that the dental surgeon be familiar with the main pharmacological protocols, assisting the medical team in guiding patients and emphasising the importance of adherence to treatment. Early diagnosis and treatment prevent the disease from progressing to late stages[2,3,6,8].

Finally, dental surgeons must remain vigilant regarding the possibility of recurrence or reinfection in previously treated individuals, as well as recognise signs of other systemic conditions that may coexist in vulnerable patients. Integrated action with physicians and other health professionals, in an interdisciplinary approach, is essential to ensure comprehensive care, addressing not only dental needs but also the psychosocial and overall health aspects of patients with a history of congenital syphilis[2,3,8].

Conclusions

The clinical and radiographic characteristics of pathognomonic dental anomalies in patients may lead to suspicion of congenital syphilis. When stomatological changes are present, the family medical history should be investigated. The dental surgeon should refer the patient to an infectious disease physician for evaluation of systemic changes, followed by laboratory tests. From this perspective, the dental surgeon plays an important role not only in the possibility of early diagnosis, but also in maintaining the oral and systemic health of infected patients.

Conflicts of Interest

Tha authors declare no conflicts of interest.

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