

AGE-RELATED FEATURES OF THE ORAL MUCOSA AND THEIR ROLE IN THE PATHOGENESIS OF ORAL CANDIDIASIS IN NEWBORNS

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Abstract. Oral candidiasis is one of the most common infectious diseases of the oral cavity in newborns. The high susceptibility of neonates to fungal infections is largely associated with the anatomical and physiological immaturity of the oral mucosa, insufficient development of local immune defense mechanisms, and the instability of the oral microbiome during the neonatal period. The present article reviews age-related characteristics of the oral mucosa in newborns and analyzes their role in the pathogenesis of oral candidiasis. Particular attention is paid to the structural features of the epithelium, vascularization, barrier function, local immunity, and microbial colonization of the oral cavity. The findings indicate that the immaturity of oral tissues and protective mechanisms creates favorable conditions for colonization and proliferation of *Candida* species. Understanding these age-related features is essential for improving preventive measures, early diagnosis, and comprehensive treatment of oral candidiasis in newborns.

Keywords: newborns, oral candidiasis, oral mucosa, neonatal period, *Candida albicans*, local immunity, pediatric dentistry, oral microbiome, risk factors.

Introduction. Oral candidiasis remains a significant clinical problem in neonatology and pediatric dentistry. The disease is caused primarily by opportunistic fungi of the genus *Candida*, particularly *Candida albicans*, which may become pathogenic under conditions of impaired host defense. Newborn infants are especially vulnerable due to the immaturity of their immune system and the unique structural characteristics of the oral mucosa.

The oral cavity serves as the first barrier against microbial invasion. However, during the neonatal period, the oral mucosa differs considerably from that of older children and

adults. These developmental characteristics influence the susceptibility of newborns to infectious and inflammatory diseases, including oral candidiasis.

Recent studies have demonstrated that age-related anatomical and physiological characteristics of the oral mucosa play a crucial role in the initiation and progression of candidal infection. Therefore, understanding these factors is important for the development of effective preventive and therapeutic strategies.

The aim of this article is to analyze the age-related features of the oral mucosa and their significance in the pathogenesis of oral candidiasis in newborns.

Anatomical and Physiological Characteristics of the Oral Mucosa in Newborns

The oral mucosa of newborns possesses several distinctive features that differ significantly from those observed in older individuals.

The epithelial layer is relatively thin and incompletely differentiated. Cellular junctions are less developed, and the basement membrane remains immature. These characteristics reduce the protective capacity of the mucosal barrier and facilitate microbial penetration into deeper tissue layers.

Furthermore, neonatal oral tissues contain a high proportion of water, resulting in increased tissue permeability and a tendency toward rapid edema formation. The connective tissue beneath the epithelium is loose and richly vascularized, which contributes to the development of inflammatory reactions.

Table 1.

Age-Related Features of the Oral Mucosa in Newborns

Feature	Clinical Significance
Thin epithelium	Increased vulnerability to injury
Immature basement membrane	Reduced barrier function
High tissue hydration	Increased permeability
Rich vascular network	Rapid inflammatory response

Low keratinization	Enhanced susceptibility to infection
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These anatomical characteristics create favorable conditions for the adhesion and colonization of opportunistic microorganisms, including *Candida* species.

Development of Local Immune Defense

Local immunity is a key factor in maintaining oral health and preventing microbial overgrowth. In newborns, however, the oral immune system is not fully developed.

Secretory immunoglobulin A (sIgA), one of the most important components of mucosal immunity, is produced in relatively low quantities during the first weeks of life. As a result, the ability of the oral mucosa to prevent microbial adhesion and colonization is significantly reduced.

Other protective factors, such as lysozyme, lactoferrin, antimicrobial peptides, and cytokines, also demonstrate limited functional activity in neonates.

Table 2.

Major Components of Local Oral Immunity

Protective Factor	Biological Function
Secretory IgA	Prevention of microbial adhesion
Lysozyme	Antimicrobial activity
Lactoferrin	Inhibition of microbial growth
Mucins	Formation of protective barrier
Cytokines	Regulation of immune responses

The immaturity of these defense mechanisms contributes to increased susceptibility to fungal infections.

Oral Microbiome Formation in Newborns

The oral cavity of a newborn undergoes rapid microbial colonization immediately after birth. The composition of the microbiota is influenced by multiple factors, including mode of delivery, feeding practices, maternal microbiota, antibiotic exposure, and environmental conditions.

Unlike adults, newborns possess an unstable and developing oral microbiome. This ecological instability facilitates the proliferation of opportunistic microorganisms when protective mechanisms are compromised.

Candida albicans is frequently detected in the oral cavity during the neonatal period. Under normal conditions, fungal growth remains controlled by host defenses and microbial competition. However, disturbances in microbial balance may promote excessive fungal colonization and infection.

Role of Age-Related Oral Mucosal Features in the Pathogenesis of Oral Candidiasis

The pathogenesis of oral candidiasis in newborns is closely linked to developmental characteristics of the oral mucosa. The disease begins with fungal adhesion to epithelial cells. Due to reduced epithelial maturity and lower levels of protective immunoglobulins, *Candida* organisms can attach more easily to the mucosal surface.

Following adhesion, fungal cells proliferate and form pseudohyphae, enabling deeper penetration into mucosal tissues. The resulting inflammatory response leads to epithelial damage, vascular dilation, and leukocyte infiltration.

Prevention and Clinical Implications

Understanding the developmental characteristics of the oral mucosa is essential for preventing oral candidiasis in newborns.

Preventive measures include: Maintaining maternal and neonatal oral hygiene;

Promoting breastfeeding; Rational use of antibiotics; Early oral examination of newborns; Timely identification of risk factors; Monitoring of immunocompromised infants.

Pediatric dentists and neonatologists should pay particular attention to newborns with low birth weight, prematurity, prolonged hospitalization, or antibiotic exposure.

Conclusion. Age-related anatomical and physiological characteristics of the oral mucosa play a critical role in the pathogenesis of oral candidiasis in newborns. The immaturity of epithelial structures, reduced barrier function, incomplete development of local immunity, and instability of the oral microbiome create favorable conditions for fungal colonization and infection. Recognition of these developmental factors contributes to improved prevention, early diagnosis, and effective management of oral candidiasis in neonatal populations.

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