

THE ROLE OF ORAL FLUID IN THE PATHOGENESIS AND DIAGNOSIS OF ORAL CANDIDIASIS IN NEWBORNS

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Abstract. Oral candidiasis is one of the most common infectious diseases affecting the oral cavity of newborns. The development of this condition is associated with the immaturity of the neonatal immune system, the structural characteristics of the oral mucosa, and alterations in the composition of oral fluid. Oral fluid plays a crucial role in maintaining oral homeostasis through its mechanical, antimicrobial, immunological, and protective functions. This article reviews the role of oral fluid in the pathogenesis and diagnosis of oral candidiasis in newborns. Particular attention is paid to the biochemical and immunological components of oral fluid, including secretory immunoglobulin A (sIgA), lysozyme, lactoferrin, pH, and microbial colonization. The findings indicate that disturbances in oral fluid composition contribute significantly to fungal colonization and disease progression. Assessment of oral fluid parameters may serve as a valuable non-invasive diagnostic tool for the early detection and monitoring of oral candidiasis in neonates.

Keywords: newborns, oral candidiasis, oral fluid, saliva, local immunity, *Candida albicans*, pediatric dentistry, neonatal oral health, diagnosis.

Introduction. Oral candidiasis is a common opportunistic fungal infection observed during the neonatal period. The disease is primarily caused by *Candida albicans*, a microorganism that may exist as part of the normal oral microbiota but becomes pathogenic under conditions of impaired host defense.

The oral cavity of newborns represents a unique biological environment characterized by incomplete maturation of local immune mechanisms, ongoing microbial colonization, and developmental features of the oral mucosa. Among the numerous factors involved in maintaining oral health, oral fluid plays a central role.

Oral fluid is a complex biological medium composed of salivary gland secretions, gingival crevicular fluid, epithelial cells, microorganisms, enzymes, proteins, and immunological factors. It contributes to lubrication, digestion, tissue protection, and antimicrobial defense. Alterations in its composition may predispose newborns to oral infections, including candidiasis.

The purpose of this article is to analyze the role of oral fluid in the pathogenesis and diagnosis of oral candidiasis in newborns.

Biological Characteristics of Oral Fluid in Newborns

Oral fluid in newborns differs significantly from that of older children and adults. During the first weeks of life, salivary gland function remains immature, resulting in reduced secretion and lower concentrations of several protective molecules.

According to pediatric dental studies, oral fluid contains numerous components involved in maintaining oral homeostasis, including:

- Secretory immunoglobulin A (sIgA);
- Lysozyme;
- Lactoferrin;
- Mucins;
- Cytokines;
- Antimicrobial peptides;
- Electrolytes and proteins.

Table 1.

Main Components of Oral Fluid and Their Functions

Component	Function
Secretory IgA	Prevents microbial adhesion
Lysozyme	Antimicrobial activity
Lactoferrin	Inhibits microbial growth
Mucins	Formation of protective barrier
Cytokines	Regulation of immune responses
Antimicrobial peptides	Direct antimicrobial action

The reduced activity of these protective factors during the neonatal period contributes to increased susceptibility to opportunistic infections.

Oral Fluid and the Pathogenesis of Oral Candidiasis

The pathogenesis of oral candidiasis involves a complex interaction between fungal virulence factors and host defense mechanisms.

Under physiological conditions, oral fluid limits fungal colonization by:

- Washing microorganisms from mucosal surfaces;
- Preventing microbial adhesion;
- Neutralizing pathogens through antimicrobial proteins;
- Supporting normal microbial balance.

However, when the protective properties of oral fluid are impaired, fungal growth becomes uncontrolled.

Several studies have demonstrated that newborns with oral candidiasis exhibit significant alterations in oral fluid composition, including:

- Reduced levels of secretory IgA;

- Decreased lysozyme activity;
- Lower concentrations of lactoferrin;
- Increased protein content;
- Altered pH values.

These changes weaken mucosal defenses and facilitate colonization by *Candida albicans*.

Table 2.

Changes in Oral Fluid During Oral Candidiasis

Parameter	Healthy Newborns	Oral Candidiasis
pH	Near neutral	More acidic
Secretory IgA	Normal	Decreased
Lysozyme activity	Normal	Reduced
Lactoferrin	Normal	Reduced
Fungal colonization	Minimal	Increased

The acidic environment promotes fungal adhesion and biofilm formation, further enhancing disease progression.

Immunological Role of Oral Fluid

Local immunity is one of the most important defense systems of the oral cavity.

Secretory IgA represents the primary immunoglobulin found in oral fluid and serves as the first line of defense against microbial invasion. It prevents the attachment of microorganisms to epithelial surfaces and inhibits colonization.

Lysozyme contributes to the destruction of microbial cell walls, while lactoferrin restricts microbial growth through iron sequestration.

In newborns, the production of these protective molecules is physiologically reduced. Consequently, the immune barrier of the oral cavity remains incomplete during the neonatal period.

The decrease in these protective factors has been identified as a key pathogenetic mechanism underlying oral candidiasis.

Diagnostic Value of Oral Fluid in Oral Candidiasis

Because oral fluid directly reflects local biological processes within the oral cavity, it provides valuable diagnostic information.

Collection of oral fluid is:

- Non-invasive;
- Safe;
- Painless;
- Easily repeatable;
- Suitable for newborns.

Assessment of oral fluid allows clinicians to evaluate:

- Local immune status;
- Inflammatory activity;
- Microbial colonization;
- Response to treatment.

Table 3.

Diagnostic Markers of Oral Fluid

Marker	Clinical Significance
pH	Indicator of microbial environment
Secretory IgA	Assessment of local immunity
Lysozyme	Evaluation of antimicrobial defense
Lactoferrin	Marker of protective capacity
Candida count	Determination of fungal burden

Monitoring these indicators may facilitate early diagnosis and help assess the effectiveness of therapeutic interventions.

Clinical Implications

The study of oral fluid has important implications for neonatal dentistry and pediatrics.

Early identification of changes in oral fluid composition may allow clinicians to:

- Detect high-risk newborns;
- Implement preventive measures;
- Initiate timely antifungal therapy;
- Monitor treatment outcomes;
- Reduce disease recurrence.

Furthermore, oral fluid biomarkers may serve as objective indicators of mucosal health and immune competence.

The integration of oral fluid analysis into routine neonatal examinations may enhance the effectiveness of oral healthcare programs.

Conclusion. Oral fluid plays a fundamental role in maintaining oral health and preventing fungal infections in newborns. Its biochemical and immunological components provide essential protection against colonization by *Candida albicans*. Alterations in oral fluid composition contribute significantly to the pathogenesis of oral candidiasis by weakening local defense mechanisms and facilitating fungal proliferation.

The assessment of oral fluid represents a valuable non-invasive diagnostic approach that can improve early detection, monitoring, and management of oral candidiasis in newborns. A comprehensive understanding of oral fluid biology may contribute to the

development of more effective preventive and therapeutic strategies in neonatal dentistry.

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