

Oral Mucosal Infections

Insights into Specimen Collection and Medication Management



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KEYWORDS

- Oral infections • Bacterial pathogen • Microbiologic sampling • Specimen collection
- Specimen transportation • Medication

KEY POINTS

- This article highlights current scientific knowledge on diagnosis and management of bacterial infections of oral cavity, specimen collection and transportation, and medication management of oral microbiological diseases.
- Infections of oral mucosa are an increasing problem in many countries. Increased susceptibility to various types of oral mucosal infections is due to impaired immune response, medications that impair host immune system, increasing age, and sexual intercourse.
- Determining if the lesions are of infectious origin and detection of microorganism type are the most important aspects in the diagnosis and treatment of oral mucosal infections.
- In addition to clinical examination, microscopic examination, and special staining methods, culture techniques and/or molecular methods are considered to be the most important diagnostic approaches for identification of oral mucosal infections.

INTRODUCTION

Infections of the oral mucosa are raising problems in many countries. Impaired host resistance may allow pathogenic organisms to colonize the oral cavity. A pathogenic microorganism is a microbe that can cause disease, whereas a nonpathogenic organism may not cause disease but remains as a part of the normal flora. An infectious disease is caused by a microorganism.¹ An infection is a state in which microorganisms that are not normally present within the host have invaded the host and multiplication of such organisms is occurring. The microbe-host interaction may be transient,

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commensal, pathogenic, opportunistic, or accidental. A successful pathogen or commensal must be able to enter host tissue, colonize, multiply, acquire nutrients, invade the host system, fight against the immune system, disseminate, and eventually be transmitted to a new susceptible host.^{2,3}

The oral flora is diverse and abundant⁴ with a reservoir of more than 700 different microorganisms. The first oral flora develops at the time of birth and reaches its climax at puberty.⁵ The oral flora can be divided into resident and transient flora. The normal oral flora exists in a state of balance with the host and helps as a defense barrier against pathogenic microorganisms. Oral flora is regulated by a bacterial adhesion mechanism and by epithelial cell desquamation. When the keratinized epithelial surfaces, such as gingiva, palate, and dorsum of the tongue, become hyperkeratinized, they may be able to accommodate opportunistic microorganism such as fungi. Non-keratinized epithelial surfaces, such as buccal and labial mucosa, may be dominated by dead cells or by cells undergoing apoptosis that may be invaded by bacteria.⁶ The tissue-specific microbial differences are evident despite spatial proximity and constant contact between these sites. Bacterial translocation may occur in the presence of cytotoxic drugs, oral cancer, or atrophic epithelium as a result of trauma, chemical injury, or allergic reaction.⁷⁻⁹ The major source for microbes found in saliva and the major oral site for microbial multiplication is the tongue. Microbial colonization occurs by adhesion of microbe to a host cell (tongue, teeth, or gingiva) or to another microorganism.

Oral microbial infections develop from bacterial, fungal, or viral invasion of the oral mucosa. The observed oral mucosal manifestations of an infectious disease may be due to

1. Local site infection
2. A systemic infection that has oral manifestations
3. An opportunistic infection that causes oral manifestations as a result of systemic or local impairment of immunologic resistance.

Oral infections can have secondary systemic effects through 1 of 3 proposed mechanisms or pathways:

1. Metastatic spread of infection from the oral cavity as a result of transient bacteremia
2. Metastatic injury from the effects of circulating oral microbial toxins
3. Metastatic inflammation caused by immunologic injury induced by oral microorganisms.

Most infections of the oral mucosa appear clinically as localized lesions or a widespread oral manifestation of systemic infection. The symptoms may range from being almost asymptomatic, to mild discomfort, to severe pain. One diagnostic challenge is that oral mucosal infections may be subclinical or chronic, and not accompanied by strong clinical symptoms.¹ This article discusses oral and maxillofacial bacterial infections that are not widely seen in dental practice and not discussed elsewhere in this issue. Specimen collection, transportation, and medication management of oral microbial diseases are presented.

MICROBIOLOGIC SAMPLING METHODS IN ORAL MUCOSAL INFECTIONS

In current dental practice, most attempts of microbial diagnosis are made for fungal infections but not bacterial infections. It is very probable that dental surgeons are competent enough to differentiate fungal mucosal infections from other types of

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