

# Eye spy: Exploring the mouth-eye connection

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Emerging research suggests that infection and inflammation may travel between the mouth and the eyes. Dental hygienists offer valuable insights regarding oral health and eye health, including potential vision problems and blindness.

It is no surprise to dental professionals that a healthy mouth is critical to overall health and wellness. But could a healthy mouth also lead to healthier eyes? Emerging research suggests that infection and inflammation may travel between the mouth and the eyes. Dental hygienists offer valuable education and prevention regarding oral health and eye health, including potential vision problems and blindness.

With the infectious pathway, bacteria travel from the oral cavity and metastasize to the eye. The eye, just like the mouth, skin, and gut, has a unique and individualized microbiome. Factors that may influence the makeup of the eye microbiome include ethnicity, geographic region, age, contact use, and oral and intestinal health.<sup>1</sup>

Harmful pathogens can enter the bloodstream and lymphatic system and travel throughout the body to the eye. Dysbiosis can occur when bacteria, viruses, fungi, and parasites disrupt the normal eye microbiome. Eye diseases are more likely to emerge when the microbiome is out of balance. Some examples of eye diseases associated with non-ocular microbes include dry eye syndrome, keratitis, blepharitis, and conjunctivitis. High bacterial loads in the oral and intestinal parts of the body, including *Bacteroides* and *Prevotella*, have been implicated in an altered eye microbiome.<sup>2</sup>

# Human Eye Anatomy

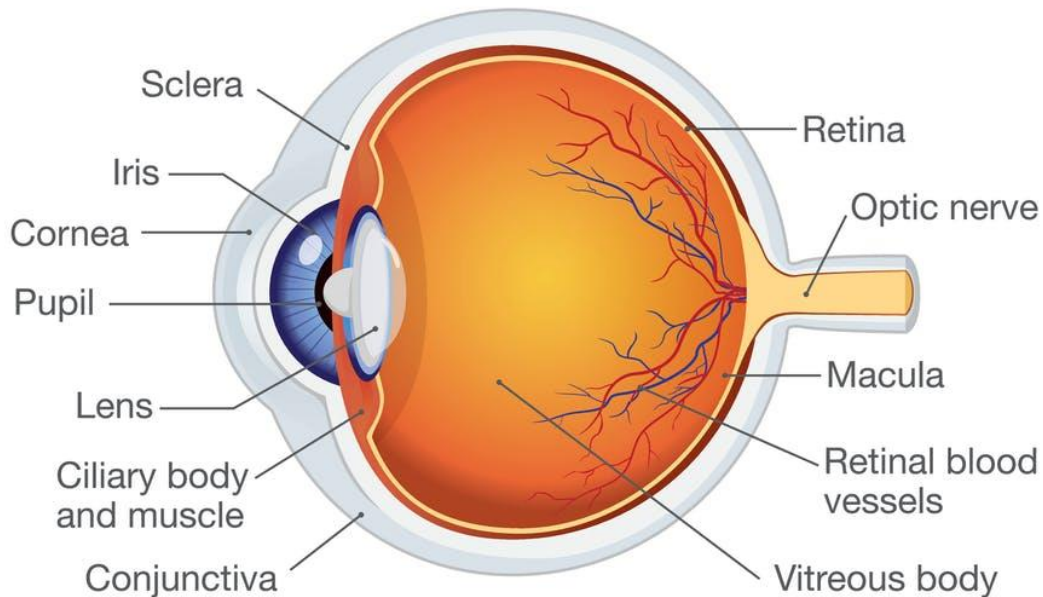


Figure 1: Illustration of the human eye

In 2017, a study published in the *Journal of Glaucoma* concluded that poor oral health, an altered oral microbiome, and the number of missing teeth all may be considered risk factors for glaucoma pathology.<sup>3</sup> With all types of glaucoma, the optic nerve in the back of the eye that connects the eye to the brain is damaged (figure 1). With the inflammatory pathway, the highly vascular supporting periodontal structures around the teeth become injured by harmful periodontal bacteria. The host inflammatory response is triggered. Chemicals in the form of histamine, bradykinin, and prostaglandins are released by the damaged cells. This results in tissue swelling caused by the chemicals leaking into the

surrounding blood vessels. The inflammatory cascade is marked by inflammation throughout the body, which increases pressure around the eye. Increased pressure in the eye irritates or damages the optic nerve.

In the June 2021 issue of *Investigative Ophthalmology & Visual Science*, research corroborated previous scientific studies regarding the association between poor oral health and primary open-angle glaucoma (POAG).<sup>4</sup>

Glaucoma is classified as a progressive optic nerve disease. POAG is the most common form of glaucoma and makes up approximately 90% of all cases. Glaucoma is one of the leading causes of blindness for people over the age of sixty. Glaucoma may have no symptoms in its earliest stages, and 50% of people with the condition may not even know they have it.<sup>5</sup> POAG may have no symptoms other than a slow loss of peripheral or central vision.

Other contributing factors for glaucoma may be family history, age, race, eye injury, and medical conditions.<sup>6</sup>

High-risk periodontal pathogenic microbes are not the only cause for concern. Untreated tooth decay, failing dental restorations that harbor bacteria, and abscesses may contribute to orbital cellulitis, an infection of the tissues around the eye. This condition can be dangerous when infections travel from the oral cavity into the sinuses and migrate to the brain via the optic nerve. Orbital cellulitis provides a pathway for infection to lead to brain abscesses, vision loss, and/or death.<sup>7</sup>

The theory that oral bacteria enter the bloodstream and travel to other parts of the body, with the potential to create systemic inflammation, has been discussed since the late 1800s.<sup>8</sup> Now, we know that harmful oral pathogens have been linked to a wide

range of conditions—including diabetes, obesity, certain cancers, cardiovascular disease, and much more.

Dental hygienists play a key role in health coaching for optimal oral and eye health. Here are some key strategies they many hygienists incorporate into their routine dental evaluations:

- **Ask** about and encourage routine eye examinations during the medical history review, including social and family history.
- **Raise** awareness by discussing the various oral-systemic links, including the mouth-eye connection.
- **Assess** oral health at every visit. Prevention of oral infections and eye diseases is ideal. If they are not prevented, early detection is key.
- **Promote** a healthy lifestyle for risk reduction, including tobacco cessation, nutritional counseling, breathing, weight management, and sun protection for the head, neck, lips, and eyes.<sup>9</sup>
- **Provide** effective biofilm removal during professional cleanings and consider the use of lasers,<sup>10</sup> ultrasonics,<sup>11</sup> and guided biofilm therapy.<sup>12</sup>
- **Recommend** evidenced-based biofilm removal techniques for home care, such as WaterPik<sup>13</sup> and PerioProtect trays.<sup>14</sup>

Dental hygienists are essential primary care providers who are highly qualified to provide education on emerging oral-systemic connections.

Under ideal circumstances, visiting the dental hygienist every 3 months for removal of dental plaque and surveillance of gum health and incorporation of rigorous home oral health hygiene measure is recommended.

An altered oral microbiome may not only affect the teeth and gums but also vision and eye health.

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