

Clinical Significance

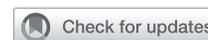
With the developments in biological factors and biomaterials, new pulp capping agents and regeneration strategies are becoming likely in the near future. The treatment options discussed will change endodontic therapies and improve patients' quality of life.

Morotomi T, Washio A, Kitamura C: Current and future options for dental pulp therapy. *Jpn Dent Sci Rev* 55:5-11, 2019

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SLEEP MEDICINE

Links between periodontal disease, sleep apnea, COPD, and xerostomia



BACKGROUND

Relationships between oral and systemic disease are often found to exist, with several associations between systemic health and periodontal disease (PD). Among the systemic disorders with possible associations with PD are obstructive sleep apnea (OSA), chronic obstructive pulmonary disease (COPD), and xerostomia. The links may involve shared risk factors, treatment responses, or causation. The possible causal relationships between PD and OSA, COPD, and xerostomia were outlined.

CHARACTERISTICS OF PD

PD affects the supporting structures of the teeth and is based on disruption of the balance in the oral biofilm. The oral cavity provides a warm, humid environment well-pleasing to harmful aerobic and anaerobic bacteria. These organisms can enter the bloodstream, resulting in bacteremia, which causes an inflammatory response. The inflammation factor has already been linked to cardiovascular disease, diabetes, stroke, preterm birth, cancer, and renal failure.

POSSIBLE LINKS TO OSA

OSA causes disordered breathing related to partial or complete collapse of the upper airway during sleep. This results in hypopnea or apnea. The minimum requirement for a diagnosis of OSA is at least an average of 5 episodes per hour of having airflow cessation. These episodes result in fragmentation of sleep, increased sympathetic activity, and decreased blood oxygen saturation. Risk factors include age, obesity, and craniofacial abnormalities that lead to nasal obstruction and mouth breathing.

The link between OSA and PD is postulated to be a bidirectional cause-effect relationship through the mediator of

systemic inflammation. The comorbidity of PD and OSA may result from their overlap in inflammatory responses, with both disorders associated with increased levels of systemic inflammatory markers. However, PD may also contribute to OSA through the aspiration of periodontal pathogens into the lungs, which causes a local inflammatory infection, decreased expiratory lung function, and ultimately can lead to OSA. Even healthy individuals aspirate a small amount of saliva, which in persons with PD would contain pathogens that could harm the airways. Patients with OSA or snoring have a 7 times greater risk for swallowing disorders than healthy persons, so OSA patients are at higher risk for aspirating harmful periodontal pathogens when PD is present. Then, during apnea, the upper airway collapses on inhalation, increasing the pressure needed to reopen the closed airway. With compromised lung function, the individual's ability to overcome an apneic episode is suppressed.

POSSIBLE LINKS TO COPD AND XEROSTOMIA COPD

In COPD, patients experience a chronic obstruction of airflow and excess production of sputum as a result of chronic bronchitis-increased mucosa in the airway and emphysema-distention of airspaces distal to the terminal bronchiole. As a result, they experience alveolar septa compromise. Risk factors for COPD include smoking history and age.

PD can be a comorbid condition with COPD because of their shared risk factors, inflammatory markers, and decreased lung function. Aspiration of saliva into the lungs is common during sleep, and both high levels of periodontal pathogens and increased inflammatory cytokine levels are found in PD patients compared to healthy persons, making it likely that these

could be spread via swallowed saliva. In COPD, these oral pathogens could contribute local damage to the airways. Treatment of PD can also improve COPD symptoms, further strengthening the evidence for a link between the two disorders.

Xerostomia

Patients with xerostomia experience the sensation of a dry mouth as a result of qualitative changes in saliva with or without an actual salivary volume decrease. Often the problem is a side effect of medications or a response to bodily stress or pain. Changes in salivary composition in xerostomia can increase bacterial plaque colonization, which can aggravate and contribute to an unhealthy periodontal status and eventually PD.

Xerostomia also directly affects OSA by increasing the surface tension of the upper airway lining liquid, which increases upper airway obstruction. Research shows that salivary surface tension correlates to airway obstruction. Thus the change in the quality and composition of saliva likely contributes to nocturnal upper airway obstruction.

Clinical Significance

Several possibilities exist to explain links between PD and OSA, COPD, and xerostomia. Aspirating periodontal pathogens and inflammatory cytokines into the lungs will decrease expiratory lung function and contribute to OSA. PD is often found in OSA patients, and treatment of PD can improve lung function. Dental professionals can help patients avoid these conditions by managing xerostomia and educating patients about the negative consequences related to this disorder. Providing treatment for PD can also reduce the likelihood that periodontal pathogens will be aspirated and contribute to respiratory problems.

Schames SE, Shauly O, Chuang RY, et al: Periodontal disease contributes to obstructive sleep apnea. *J Calif Dent Assoc* 46:701-705, 2018

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EXTRACTS

GERM-FREE MAY LEAD TO ALLERGIES



Children who suck their thumbs and bite their nails may be less likely to develop sensitivities to common allergens, such as dog dander and grasses. A study of 1037 children over a period of 30 years used skin prick tests done at age 13 years and again at age 32 years. At age 13, 38% of the children who bit their nails or sucked their thumbs were sensitive to certain allergens, compared to 49% of children who didn't have either habit. Thirty-one percent had both habits and showed sensitivity. At age 32, the link between allergen sensitivity and thumb sucking and nail biting was still seen. No link was seen between these habits and the likelihood the child would develop hay fever or asthma, however.

The "hygiene hypothesis" suggests that the higher rates of allergic disease in children may be related to adults' obsession with providing a germ-free environment. When the environment is too clean, the immune system starts looking for something to attack, which can produce allergies. The study coauthor Dr. Bob Hancox, from the Dunedin School of Medicine in New Zealand, explains that parents shouldn't encourage thumb sucking or nail biting but having pets such as cats and dogs may also protect against allergies by exposing children to the same less-sterile environment.

Dr. Allison Morris, professor of medicine at the University of Pittsburgh and director of the university's Center for Medicine and the Microbiome, finds the study intriguing. She said, "If parents can't get their kids to stop sucking their thumbs, this may make them feel better about that. But I don't think the study offers anything actionable at this point other than to be more relaxed about children's exposures to germs."

[Carroll L: Thumb Sucking, Nail Biting in Children May be Protective Against Allergies. *Today*, July 10, 2016]