

# The Oral-Systemic Link – A Synopsis

Dr. Charles H. Mayo, M.D. (1865-1939) in 1913, speaking before the Chicago Dental Society, said “It is evident that the next great step in medical progress in the line of preventive medicine should be made by the dentists. The question is ‘Will they do it?’”

David A. Tecosky, DMD, MAGD, in “General Dentistry,” a peer-reviewed Journal of the AGD, in December 2002, said “More than 90% of systemic diseases reveal signs and symptoms in the mouth. Most patients see their dentist on a regular basis more frequently than they do their physician. We are in a unique position to help our patients. Our mission as general dentists is no longer merely to wipe out dental decay, but to correct diseases in the mouth so that the patient’s overall health also benefits.”

Michael Roizen, M.D., Chair of the Wellness Institute and Chief Wellness Officer at the Cleveland Clinic says focusing on wellness and prevention is the key to saving costs in healthcare. Dr. Roizen sees the dental profession as a highly credible army of healthcare providers who can lead the wellness/prevention movement in the United States and throughout the world. In 2012 in a video interview with me he said: “You, the dentist, would be the healthiest people you could possibly be, your families would be there, you would be role models, and you’d be the army spreading it, because you get all those patient contacts, and what you say actually really influences the way people behave.”

Charles, Whitney, MD, President American Academy of Private Physicians said “Physicians often can’t improve vascular inflammation without identifying and treating existing high risk oral bacteria.”

Amy Doneen, DNP, owner of the Prevention Center for Heart and Brain Health said “The concern with inflammation and vascular disease isn’t only a Heart Attack, or Stroke, or Diabetes. It’s the accumulation over time of the micro vascular events in your heart, brain, eyes, lungs, and everywhere the vascular system supplies that are damaged over time, with the gradual reduction in health and function and quality of living that simply does not need to happen to you. And for the men I tell them this includes erectile dysfunction!”

Chris Kammer, DDS, Ron Schefdore, DMD, and I were each speaking around the country for many years about how the mouth affects the body, and the body affects the mouth. In February, 2006, at the Chicago Midwinter Dental Meeting we discussed starting an organization about the Oral-Systemic Link. Dr. Kammer sounded the bell and on Oct 15-16, 2010, in Madison, WI, 37 people participated in the founding meeting of the American Academy for Oral Systemic Health, [www.AAOSH.org](http://www.AAOSH.org). Dr. Kammer was elected our first president. His father, Dr. Jack Kammer, had founded the American Academy of Cosmetic Dentistry.

I have shot and edited over 1000 video interviews for my several web sites. Over 200 of the videos about blood-borne oral pathogens, airway, breathing, sleep apnea, orofacial myofunctional therapy, lifestyle, and other aspects of the Oral-Systemic Link are on my site [www.OralSystemicLink.net](http://www.OralSystemicLink.net).

The body of research is massive and growing quickly - the science is indisputable - the mouth is indeed connected to the body! An increasing number of physicians, dentists, and other healthcare providers are embracing the need for improved collaboration. Maybe I can help you, your staff, and your patients, get your arms around the Oral-Systemic Link. Let’s try.

## THREE MAIN CATEGORIES

The Oral-Systemic Link has many components. **Yet they are all interconnected.** Let's keep it simple. I like to think of three main categories of the Oral-Systemic Link:

1. Blood-Borne Oral Pathogens/Inflammation
2. Airway/Breathing/Sleep
3. Lifestyle

### 1. BLOOD-BORNE ORAL PATHOGENS/INFLAMMATION

BACTERIA AND THEIR TOXINS from the mouth can DIRECTLY infect other areas of the body by travelling through the cardiovascular system; and more importantly, they can INDIRECTLY cause problems in the mouth and other areas of the body by creating an inflammatory/immune response.

These bacteria from the mouth come from both:

- Periodontal infections (gum disease)
- Apical infections (abscessed teeth)

**The health problems related to these oral bacteria and their toxins have been shown to include:**

- **Heart Attack and Stroke** and other cardiovascular disease. Once oral bacteria and their toxins enter the body, they may cause inflammation, which weakens the arterial wall allowing soft fat deposits to move from within the arterial wall into the lumen, thrombus formation clogging blood flow, and embolus formation. These conditions may be responsible for heart attacks, strokes, and other dangerous health conditions. Brad Bale, MD, and Amy Doneen, DNP in their landmark article "High Risk Periodontal Pathogens Contribute to the Pathogenesis of Atherosclerosis," show that **periodontal disease** is CAUSAL of arteriosclerotic vascular disease, not simply ASSOCIATED. Research suggests **endodontic apical lesions** are the trigger for up to 50% of heart attacks!
- **Diabetes Complications** – periodontal disease can have a direct impact on glycemic control in diabetic patients, leading to diabetic complications. Conversely, people with diabetes, especially those with poor glycemic control, are much more likely to have periodontal disease.
- **Alzheimer's Disease** – the bacteria associated with Alzheimer's Disease have been isolated in the periodontal pockets and along the nerves from the teeth to the brain tissue. When these bacteria are introduced into brain cultures, beta amyloid is formed, which is the substance that is a cause of Alzheimer's disease. Dr. Judith Miklossy of Switzerland, and the International Alzheimer's Research Center, said "Indeed, six different oral periodontal pathogen spirochetes were found to be present in the brain of Alzheimer's patients so it is extremely important to take care of oral health in order to prevent Dementia." Bradley F. Bale, M.D. and Amy L. Doneen, DNP, also highlight the role of oral health in the prevention of Alzheimer's in their new book "Healthy Heart, Healthy Brain."
- **Pregnancy Complications** – Bacteria are passed through the endothelium of the gingival sulcus into the bloodstream, crossing the placental barrier, thereby spreading infection and inflammation to fetal membranes, amniotic fluid, and fetus, stimulating **preterm birth**. Women with severe periodontal disease were found to have seven times the risk of giving birth early as women who had healthy gums. They also had seven times the risk of having a baby with a **low birth weight**. Dr. Yiping Han, Professor at Case Western Reserve University, documented a case in which mild pregnancy-associated gingivitis led to sudden fetus death at 39 weeks term. In Dr. Christian Guilleminault's research at Stanford University School of Medicine, a study of

premature infants has shown that the more premature the infant, the more health problems are present... leading to absence of normal orofacial growth. His studies showed that **77% of 400 premature infants had Obstructive Sleep Apnea (OSA) at 4 years of age**. This absence of normal growth also leads to compromised bone support for the muscles forming the Upper Airway. David Gozal, MD, an international expert in the field of sleep medicine, stated that **“Pediatric OSA causes loss of IQ up to 15 points, cognitive dysfunction, problems with executive functions, high levels of anxiety, higher levels of social problems, and reduced attention and ADHD.”** So pregnant mothers need to have great oral health!

- **Respiratory Disease** – the bacteria present in gum disease have also been located in lung tissue in patients with lung abscesses. Biopsies of the diseased lung tissue found the same bacteria that are present in the gum disease.
- **Rheumatoid Arthritis** – high levels of bacteria found in periodontal disease (DNA and antibodies) have been found in the serum and synovial fluid of rheumatoid arthritis patients.
- **Head and Neck Cancer** risk is increased by gum disease.
- **Pancreatic Cancer** risk is increased by 64% in patients with gum disease a Harvard study shows. In addition, people with a history of gum disease, plus recent tooth loss, have a 2.7-fold higher risk of this fatal pancreatic cancer than people without gum disease or tooth loss. The worse the gum disease, the higher the risk.
- **Lung, Kidney, and Blood Cancers** – studies suggest that tooth loss and periodontal disease might increase the risk of developing these cancers.

**But here is what the vast majority of dentists, even periodontists don't know or practice:**

- Nearly 50% of American adults have periodontitis, the most severe form of periodontal disease.
- One cubic millimeter of dental plaque contains about 100 million bacteria. 700 species of bacteria can live in your mouth.
- 11 species of oral pathogens in particular are linked to oral & systemic disease (though there are others)
- **You cannot tell if a person has these oral pathogens clinically by looking without testing, no more than the physician can tell if a person has high cholesterol by looking without testing**
- 5 species of oral pathogens – research has shown if we can test for just these 5 and control them, that most of the other pathogenic bacteria will also be controlled, because they all work together. You must test, treat, then re-test and monitor.
- The major goal of Periodontal Therapy is now 1) To promote a shift from predominantly pathogenic microbiota to a host-compatible one, and 2) To achieve clinical and microbiological stability. **It is no longer acceptable just to control pocket depth and bleeding! You must also test for and control the specific pathogenic oral microbes!**

Also, periodontal disease is transmissible! So be careful who you kiss (including your pet), and be sure your spouse or significant other also has good periodontal health!

## **2. AIRWAY/BREATHING/SLEEP**

“Sleep disordered breathing in its various manifestations is arguably the #1 health problem in the United States, and probably throughout the world.” - William C. Dement, Founding Father of Sleep Medicine

**Roger Price, CEO of Breathing Well, LLC**, and others would say that is a misnomer, it should be called “breathing disordered sleep.” He states: “The majority of people with ‘sleep disorders’ do not wake up because they can’t ‘sleep’ - they wake up because they can’t ‘breathe’. When distilled right down - life is

nothing more than a breath-to-breath survival process because - simply put - if we fail to take the 'next breath' nothing really matters, does it? So we should primarily investigate what it is that gets in the way of that 'next breath' - and what options are open to the body to overcome this obstacle and to ensure survival. The compensations are not created in the 1/3 of the time we're 'in bed' trying to recover and regenerate - that is largely when they manifest themselves. The problems are created in the 2/3 of the time that we're awake and unconsciously doing whatever we have to do to keep on breathing. The smooth functioning of the human body depends on maintaining an optimal pH which falls in the range of 7.35 - 7.45. This pH is NOT controlled by what we eat or drink - it is controlled and maintained by the way we breathe. Therefore - any shift in pH - either side of the normal range - and into the danger zones - will result in a correction - and that manifests itself in breathing issues."

**Patrick McKeown lectures on the Buteyko Breathing Method.** The Buteyko Breathing Method is a discipline of breathing by which a study published in the leading rhinitis journal Otolaryngology showed a 70% reduction of nasal symptoms in participants, including snoring, loss of smell, nasal congestion and difficulty breathing through the nose. Named after Russian Dr. Konstantin Buteyko, the Buteyko Method consists of a series of breathing exercises and guidelines specifically designed to **reduce over-breathing**. The Buteyko Method involves:

- Learning how to unblock the nose using breath hold exercises
- Switching from mouth breathing to nasal breathing
- Relaxation of the diaphragm and **creating a mild air shortage**
- Making small and easy lifestyle changes to assist with better long-term breathing methods
- Measuring your breathing volume and tracking your progress using a special breath hold test called the Control Pause

Today about 60 million American adults have sleep or wakefulness disorder. About 22 million (6 to 9% of our population) suffer from Obstructive Sleep Apnea (OSA). Sleep apnea is associated with diabetes, asthma, acid reflux, weight gain, high blood pressure, heart failure, stroke, car accidents, and other concerns. Chronic headaches, migraines and TMD disorders are often related to and/or caused by airway, breathing and sleep disorders.

**Obstructive Sleep Apnea is diagnosed** either with a Polysomnogram at a sleep center, or now more commonly with a home sleep study. The dental office can provide home sleep study kits to patients, though only a physician can diagnose sleep apnea. Dentists and their staff can be highly proactive and helpful in detecting and treating sleep disorders including obstructive sleep apnea.

**Oral signs of Obstructive Sleep Apnea** include worn teeth, abfractions, bruxism, multiple fracture lines, fractured teeth, crowns on many posterior teeth (bruxism?), tori (buttressing bone), narrow dental arches; narrow high palate, lingual frenum, scalloped tongue, 4-bicuspid extraction, mouth breathing, retrognathic jaws, long face, gummy smile, large neck, large tonsils & adenoids, high Mallampati score (small airway at back of mouth), narrow nose, snoring, allergies & asthma, narrow airway on cephalometric X-ray, 3-D Cone Beam results, Epworth Sleepiness Scale, and STOP BANG scale.

**Treatment Options** and aids include sleep hygiene, positional therapy, nasal strips/dilators (Breathe Right), weight & nutrition, lifestyle improvements, posture, Orofacial Myofunctional Therapy, mouth taping, breathing re-training, lingual frenectomy, oral sleep appliances, dental arch development (lateral and A-P), CPAP, and surgery. The dental office can do all these except CPAP and some surgeries.

**CPAP is the gold standard** for treating sleep apnea, but about half or more people are intolerant of using it. So the dental office is often asked to help with therapy, and it can be very effective.

**Early recognition and interceptive therapy in children** to correct narrow palates, incorrect breathing, deviate swallowing patterns, and allergy problems can prevent many dental, airway, and medical problems later in their lives. I believe:

- BREATHING is the #1 most important physical thing we do as humans. “We can live for weeks without food, for days without water, but only a few minutes without air!”
- Dentists are integral to Airway SCREENING, DIAGNOSIS & THERAPY for adults & children
- Dentists can help PREVENT most Airway problems through EARLY patient education and therapy (children ages 2-10)
- The PRIMARY CONCERNS in orthodontics are AIRWAY, TONGUE SPACE, FACIAL BALANCE, and POSTURE. NOT straight teeth!

**Orofacial Myofunctional Therapy** teaches a patient proper POSTURE and FUNCTION of muscles in the face and mouth. Improper posture and function of these muscles can affect breathing, breast feeding, proper growth and development of the face and jaws, chewing, swallowing, crooked teeth, speech, bite, snoring, sleep, jaw joint movement & function & discomfort (TMJ), stability of orthodontic treatment, gum disease, and more.

- A person normally swallows 500 to 1000 times each day, so improper swallowing FUNCTION can cause a variety of problems.
- Yet the resting POSTURE of the tongue is what causes the most damage because it is constant, and because bone and muscles will change according to your posture. POSTURE of the lips is also extremely important.
- The STRUCTURE of the mouth and airway must allow for proper posture and function – for instance a tongue tie, lip tie, narrow airway, or narrow palate may not allow proper posture or function to occur.

Five major tenets of Orofacial Myofunctional Therapy are:

- Oral habits such as thumb sucking, finger sucking, and nail biting should be eliminated
- Your lips should always be together except when eating and speaking
- You should breathe through your nose
- Your tongue should always rest on your palate (roof of mouth) except when eating and speaking
- You should swallow correctly (most people today do not)

### **3. LIFESTYLE**

Wow – what a huge topic! Let’s talk about just a few examples of lifestyle factors that are related to Oral-Systemic health. There are MANY others!

- **Metabolic health** - Researchers from the University of North Carolina at Chapel Hill defined metabolic health as having ideal levels of blood sugar, triglycerides, high-density lipoprotein (HDL) cholesterol, blood pressure, and waist circumference, without using medications. These factors directly relate to a person's risk for heart disease, diabetes, and stroke.

Creating overall healthier tissues also creates healthier oral tissues. This can affect your immune system, your sleep, your temporomandibular joint health, etc.

How do you increase your metabolic health? Colleen Alrutz, health and fitness manager at [Piedmont Newnan Hospital](#) **shares these five tips to boost your metabolism:**

1. Exercise more. Add interval training to your cardio routine and burn more calories in less time.
  2. Weight train. Add muscle mass to your body and you can burn more calories at rest.
  3. Don't skip meals, especially breakfast. Keep the furnace burning and you actually burn calories as you digest food.
  4. Eat fat-burning foods. Protein, spicy peppers and green tea have been proven to bump up metabolism.
  5. Get a good night's sleep every night.
- **Nutrition** - Tooth loss, decay, periodontal disease, and thermal sensitivity, can all affect chewing, food choices, and getting the proper nutrition that is so essential for total body wellness. Conversely, proper nutrition can significantly affect dental health, including pocket depth and bleeding sites. So the mouth affects nutrition, and nutrition affects the mouth.
    - a. A 60-day, double-blind clinical study conducted at Loma Linda University in 2000 gave antioxidant vitamin supplements to subjects with various levels of periodontitis. After just 60 days, the actual Pocket Depth (PD) reduction was 44.6% for 7mm pockets, 46.8% for 6mm pockets, 34.1% for 5mm pockets, and 23.3% for 4mm pockets.
    - b. A clinical study I chaired for a billion dollar company using 9 dentists in private practice in the United States in 2004-2005, saw similar results to the Loma Linda study. Of 1,183 perio pockets in 47 people, after 60 days we saw about 30% average overall improvement in pocket depth, 42% improvement of the gingival index, and 57% improvement in the bleeding index.
  - **Epigenetics** is the study of how your behaviors and environment can cause changes that affect the way your genes work. Unlike genetic changes, epigenetic changes are reversible and do not change your DNA sequence, but they can change how your body reads a DNA sequence. Several lifestyle factors have been identified that might modify epigenetic patterns, such as diet, obesity, physical activity, tobacco smoking, alcohol consumption, environmental pollutants, psychological stress, and working on night shifts. For instance, the lifestyle behavior of mouth breathing behavior can cause low tongue posture, which causes your palate not to develop to its genetic potential; this results in a retruded mandible, compromised airway, potentiates sleep apnea, causes tooth crowding, and potentiates periodontal disease, in addition to other oral effects.
  - **Herpes Virus** - 150 million people in the United States (one-third of the population) suffer from the pain and embarrassment of cold sores each year, and it is growing. With a total of 380 million outbreaks annually nationwide, the average cold sore sufferer has 2 to 6 outbreaks, lasting about 7 to 10 days each.

Herpes Simplex Virus-1 (HSV-1) is historically the cause of oral herpes infections, whereas HSV-2 is historically the cause of genital herpes infections. With HSV-1, accidental self-inoculation of the eyes after touching one's own oral lesion or coming into contact with another's cold sore/fever blister can lead to herpes keratitis (ocular herpes), a leading cause of blindness.

HSV-1 genital infection is now being seen in increasing frequency around the world. Half of all first-time genital herpes infections in all age groups and more than 70 percent of patients under the age of 25 have first episodes of genital herpes that are caused by HSV-1, rather than the usual HSV-2, due to oral sex (a lifestyle behavior). These findings offer a strong argument for rapidly controlling the oral infection episodes as doing so may help prevent the spread of HSV-1 to the genital area. Dental offices can educate their patients and aid the early treatment and faster resolution of HSV-1 cold sores with laser, topical medications, &/or systemic medications.

## THE AMERICAN ACADEMY FOR ORAL SYSTEMIC HEALTH

The American Academy for Oral Systemic Health (AAOSH) is the CENTRAL HUB for information about the Oral-Systemic Link. It is the starting point and center point. From there you can branch out and learn more about whatever aspects interest you the most. At AAOSH we help you with the:

- Science
- Implementation
- Prevention
- Screening, diagnosis, education, communication with patients, therapy, and maintenance
- Marketing - internal and external; to your patients, the public, and to other healthcare providers
- Collaboration with other healthcare providers; referrals
- Improve your health and your life, as well as that of your family, friends, patients, and community
- And the very best part of all – amazing networking and friendships that will last forever!

For more information, and to start your incredible life-changing journey, go to [www.AAOSH.org](http://www.AAOSH.org).  
JOIN US!

### **Bio**

Dr. Mike Milligan graduated first in his class from Southern Illinois University School of Dental Medicine in 1978. Dr. Milligan and his daughter, Dr Marisa Milligan, own and maintain Eastland Dental Center, LTD, in Bloomington, Illinois. He is Founder and President of OralSystemicLink.net “Saving Lives through Oral-Systemic Health.” He is a Founding Member, past Board Member, Past President, and Master Fellow of the American Academy for Oral & Systemic Health. Dr. Milligan was Chief Investigator for a billion dollar nutritional company of a groundbreaking study: “The Effects of a Nutritional Supplement on Periodontal Health and Antioxidant Levels.” He was one of the early speakers and authors on the Oral-Systemic Link. He is a certified oral myofunctional therapist and is trained in the Buteyko breathing method. Dr. Milligan has authored articles, contributed to articles, and/or lectured on many dental topics to groups nationwide including 1000 Gems, Excellence in Dentistry, the Crown Council, Kisco Dental, The Richards Report, the Madow Brothers Monthly, Dental Equipment and Materials, Dental Economics, the American Academy for Oral & Systemic Health, and others.