STAGGERING NUMBERS

Recent advances in technology show that there are as many as 50 million microbes in a teaspoon of saliva.[1] Adults swallow about one quart of saliva a day--equivalent to 200 teaspoons. In 24 hours, therefore, the stomach receives roughly 10 billion microbes contained in saliva alone.

Additional microbes are added to saliva by secretions from accessory organs that drain into the oral cavity from the eyes, nose, middle ear, and facial sinuses plus expectorated phlegm from the lungs. The cumulative number of microbes that reach the stomach are, therefore, staggering.

Fortunately, the stomach protects the body from excess exposure to swallowed microbes by producing concentrated hydrochloric acid. Gastric acid destroys over 99% of swallowed microbes.

I. ACID REDUCING MEDICATIONS AS A RISK FACTOR

Individuals, however, with impaired production of gastric acid allow millions of microbes to pass unimpeded from the stomach into their intestines. The high concentration of microbes reaching the small intestine can produce a condition known as small intestinal bacterial overgrowth (SIBO) producing symptoms of abdominal pain, bloating, flatulence, diarrhea, and/or weight loss.

The most common cause of reduced acid concentration in the stomach is the use of acid reducing medications, most particularly, proton pump inhibitors (e.g. Prilosec®, Prevacid®, Protonix®, Nexium®, AcipHex® and Dexilant®).

Other reasons for reduced gastric acid include the following:

- Aging
- Atrophic gastritis
- Autoimmune gastritis
- Pernicious anemia
- Retrograde bile reflux from small bowel into the stomach
- Stomach infections, most particularly, Helicobacter pylori
- Weight reduction surgery

Reducing the number of microbes made in the mouth by employing effective oral hygiene methods and allowing acid production to proceed by limiting acid reducing medications may have a positive effect on intestinal function.

II. DRY MOUTH AS A RISK FACTOR FOR MICROBE PROLIFERATION IN THE ORAL CAVITY

It is well established that reduction of the flow of saliva causes higher concentrations of microbes to proliferate in the mouth. Higher concentrations of microbes in the mouth result in increased oral pathology (tooth decay, gum inflammation and gum tissue infection). Reduced flow rates also cause symptoms of dry mouth.

Reduced salivary flow rates, symptomatic dry mouth and higher rates of oral pathology may occur in any of the following diseases or conditions:

- Aging
- AIDS
- Alzheimer's dementia
- Diabetes
- Mouth breathing
- Nerve damage from surgery to the head and neck
- Parkinson's disease
- Sjogren's syndrome
- Sleep apnea
- Snoring
- Stroke
- Use of a CPAP breathing assist devices

The following types of medications, recreational drugs and treatment modalities are, likewise, associated with dry mouth and may lead to increased oral pathology:

- Alcohol
- Antihistamines
- Cancer chemotherapy
- Decongestants
- Marijuana
- Methamphetamines
- Muscle relaxants
- Radiation treatments to the head and/or neck
- Specific classes of medications for depression
- Specific classes of medications for high blood pressure
- Specific classes of pain medications

III. RECOMMENDED MEASURES

- Maintain good oral hygiene—brushing and flossing--with frequent visits to the dentist and dental hygienist particularly for those who have diseases and conditions that are associated with higher risk of oral pathology.
- Remain hydrated by drinking 2 or more liters of fluid a day.
- Limit the use of steroid containing nasal sprays and lung inhalers
- Only use acid reducing medications as directed by your care provider.
- Check over-the-counter, non-prescription medications or supplements for side effects of dry mouth.

[1]Maracas, C., Quantifying live microbial load in human saliva samples over time reveals stable composition and dynamic load, *msystems,* **6**:1-16 (2021).