

The oral and the systemic microbiome and the influence of ozonized water in dentistry and oral surgery.

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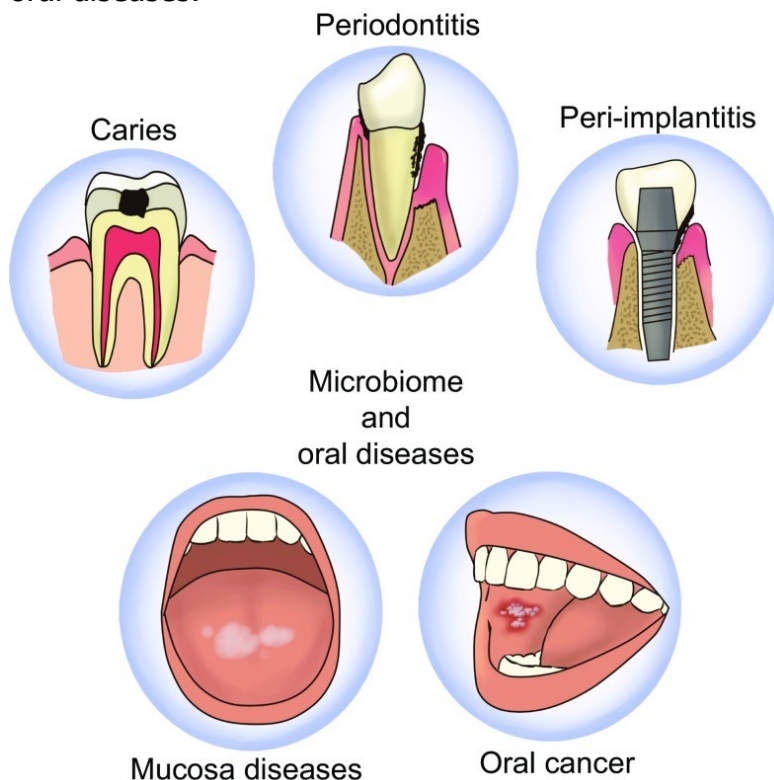
Key words: Oral microbiome; Periodontal medicine; Ozonized water; holistic dentistry; chronic inflammation

Introduction:

Chronic inflammation disrupts immune tolerance:

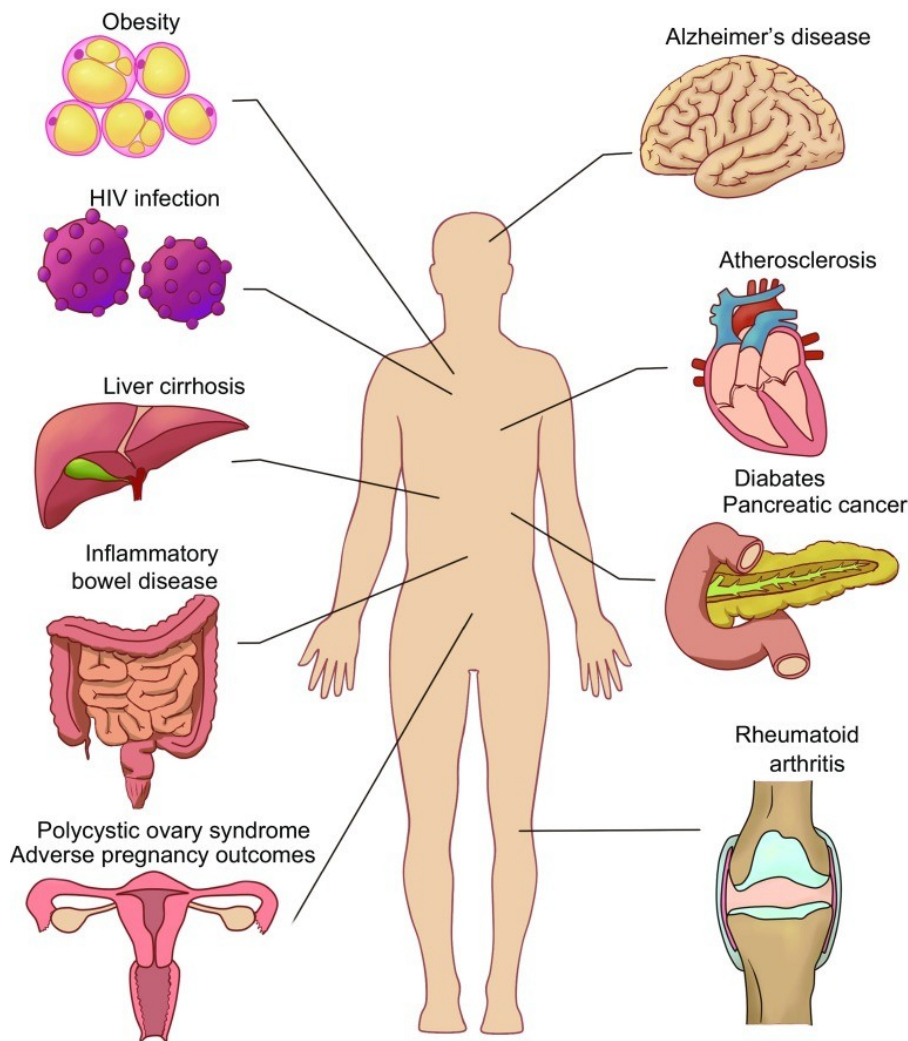
The Human microbiome project (HMP) distinguishes 9 different microbial habitats in the oral cavity

Different types and varying numbers of bacteria have been found in people with different oral diseases.



(Gao, L. 2018)

Oral microbes affect the process of systemic diseases by the inflammatory response caused by an oral infection or ectopic colonization of oral microorganisms in other organs or tissues of the human body, such as tumor, intestine, heart, blood, brain, joint, placenta.



(Gao L. 2018)

Patients with periodontitis possess a less diverse gut microbiota, and higher counts of oral taxa in the gut leads to more severe intestinal inflammation. Microbial toxins destroy intercellular junctions of gum and gut. Oral bacterial metabolites are very important for the growth and reproduction of oral bacteria and also play an important role in systemic diseases such as periodontitis, oral cancer, bowel disease, diabetes, atherosclerosis and intestinal cancer. Due to the long-term effect of chronic inflammation and/or chronic infection, the vicious circle arises by overstimulation and blockade of regulation.

Positive effects of the local and systemic use of ozone in medicine on inflammatory status, on composition of microbiome etc. are scientifically proven. Ozone, locally administered in the form of ozonized water, as ozonized water-oxygen-spray and ozonized olive oil is of no risk and easy to use. The clinical experiences show good results in all fields of dentistry. Due to its ability to breakdown microbial and other toxins and to disinfect, ozone is widely used in many fields of applications from wastewater treatment to food disinfection and in medicine.

In the oral cavity toxins, e.g. protein degradation products, like thiols and thioether, which tend to metastasis into the jaw bone structures can be broken down during the jaw bone surgery by ozonized-water-oxygen-spray.

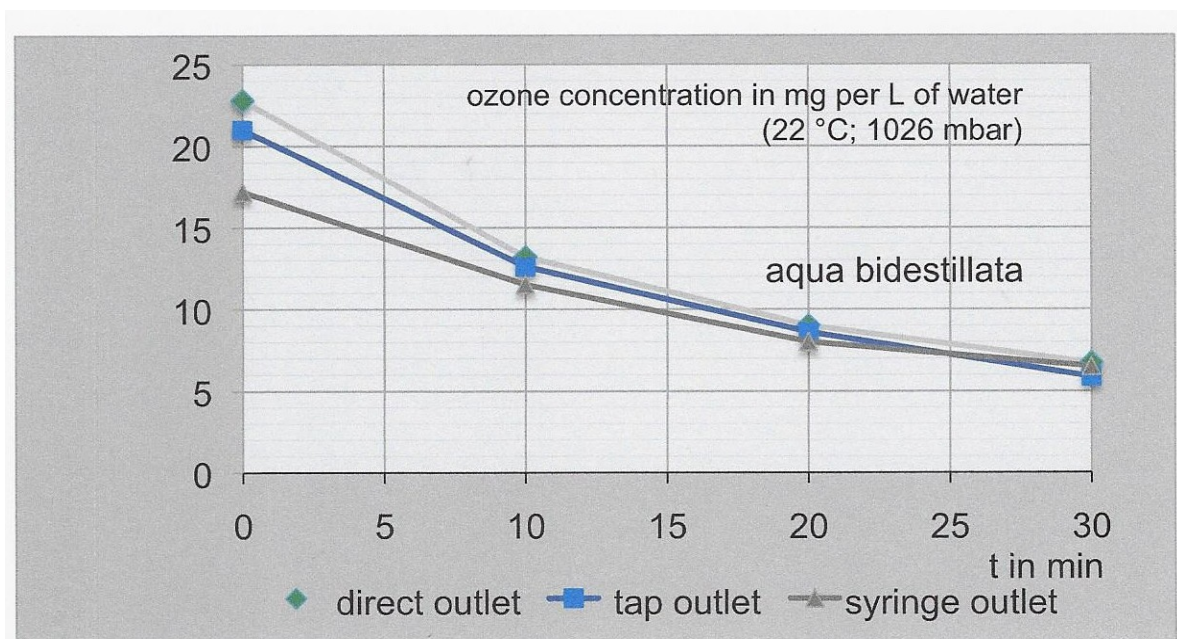
Chronical stress e.g. in the neurovegetative- and immunoregulative systems, which is caused by the toxic deposits in the oral tissues, become released by the surgical removal. This release of chronical stress in the oral tissues is the starter of bioregulatory processes.

Systemically administered ozone in the low concentration range of 10 to 30 µg/ml autohe-motherapy (MAH) or rectal insufflation (RI) work synergistically with the local surgical in-tervention in the jaw bone by induction of bioregulation and detoxification.

Materials and methods:

Preparation of ozonized water for the topical therapy Pictures of the preparation. Ozone is physically dissolved in the pure water. The concentration will yield a final ozone concentration of about 16-22 mcg/ml in the ozonized water. The concentration of the ozone in the ozonized water decreases rapidly.

At least within 30 minutes the concentration of the ozone in the ozonized water remains in the therapeutical sufficient range of concentration.



(Viebahn- Hänsler, 2016)

Role of ozone in dental caries therapy Ozonized water can be used as a powerful disinfectant and preserve dental pulp tissue. A low ozone concentration (about 4mcg/ml for a period of 10-20sec) appears sufficient to kill all micro-organisms present in the root caries .

Role of ozone in periodontics „Ozonated water (4mcg/ml) strongly inhibited the formation of dental plaque and reduced the number of subgingival pathogens both gram positive and gram negative organisms.“

„Gram negative bacteria, such as *P. Endodontalis* and *Porphyromonas Gingivalis* were substantially more sensitive to ozonated water than gram positive oral *Streptococci* and *C. Albicans*..“

„The application of ozone therapy in chronic gingival and periodontal diseases showed subjective and objective improvement...“

Role of ozone in wound healing „Ozone has been reported to accelerate the healing of soft tissue conditions i.e. aphthous ulcers, herpes labialis. ANUG [aggressive necrotizing ulcerative gingivitis] and other gingival infections, because ozone encourages physiological healing rate as well as it controls opportunistic infections ..“

Examples of treatments.

Role of ozonized water in pediatric dentistry The use of ozonized water eliminates the risk of inhalation of gaseous ozone.
Examples.

Role of ozone in alveolitis „In alveolitis, there is accelerated healing by irrigation with ozonated water after removal of the necrotic plug and debris...“
Examples.

Role of ozonized water in oral surgery

Example: Fatty degeneration of jaw bone marrow in the trifurcation of an upper molar.
Procedure. Prewashing and disinfection of the whole mouth and prewashing of the surgical sites by ozonized water. Decortication of the bone marrow in order to expose the toxin loaded jaw bone areas. In this case the alveolar bone marrow shows fatty degeneration in the trifurcation area.

Fat-soluble toxins can be stored in fat cells where they are protected from the body's detoxification systems.

By the use of the ozonized water-oxygen-spray the fatty degenerations can be dissolved and the toxins become degraded. The success of this procedure is controlled by olfactorial organoleptic detection of the toxins and their degradation products, such as sulfones, sulfoxides, acids etc.

Example: Focus surgery of the lower jaw bone:

Toxic, fatty degenerated bone material surrounds the nervus alveolaris inferior.

By the use of the ozonized water-oxygen-spray the fatty degenerated tissues become dissolved and the toxins around the nervus alveolaris inferior become degraded.

This is the most effective way to reach and to remove these toxins. The success of the procedure is controlled by olfactorial organoleptic detection of the toxins.

Detoxification of xenobiotics in two phases (Williams RT 1947) By the way the locally administered ozone in form of the ozonized water-oxygen-spray acts as a phase 1 activator of the detoxification process (Fig. 2).

Additionally the surgery itself exposes the toxic areas in the jaw bone and acts a drainage of toxins from their deposits *Ubi pus ibi evacua*. After the degradation of toxins by the ozonized water-oxygen-spray, the degradation products are immediately aspirated by the strong dental vacuum suction system. This avoids toxic hazard to the dental staff. Inside the oral tissues the local stress level is immediately reduced.

In the following step 2 of the detoxification process toxins become conjugated. Systemic ozone therapy in form of the low dose major ozone autohemotherapy (MAHT) a/o rectal ozone insufflation (RI) are obligate to support the liver and the kidney and the phase 2 process [5, 6]. Without the parallel activation of step 2, accumulation of toxins and toxic degradation products might occur.

Systemic ozone treatment in holistic dentistry and oral surgery MAHT and RI are used to support healing as regenerative, immunoregulatory, immunostimulatory therapies due to anti-inflammatory, anti-hypoxic, analgesic actions etc [5, 6].

The role of ozone in implantology: When ozone therapy is used in implants, prevention of infection and enhancement of bone regeneration is seen e.g. when ozone is being bubbled into the socket, followed by placement of the implant.

The role of ozone in endodontics: Ozone was found to be effective against endodontic pathogenic microorganisms like *E.faecalis* etc. for disinfecting of root canals and dentinal tubules.

Results, discussion and conclusion

Biofilms built on teeth surfaces, inside of endodontically treated root canal structures and on the surfaces of implants can accumulate for a lifetime if not well cared for.

Ozone, locally administered, can reduce bacterial load, change the microbiome composition and reduce toxic load. Ozone, systemically administered, can e.g, reduce inflammation, activate regulation and detoxification. The edentulous oral mucosa is free of gingival sulcus and junctional epithelium and is therefore less susceptible to infections.

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