OPINION ARTICLE

Integration of ozone therapy for head and neck infective and chronic disease

Philip J. Mollica

American College of Integrative Medicine and Dentistry, United States

OPEN ACCESS

Citation
Mollica PJ. Integration of ozone therapy for head and neck infective and chronic disease. *J Ozone Ther.* 2019:2(3)
doi: 10.7203/jo3t.2.3.2018.11332

Academic Editor
Jose Baeza-Noci,
School of Medicine, Valencia University, SPAIN

Editor
World Federation of Ozone Therapy, Bologna, ITALY

Received
January 5, 2018

Accepted
January 7, 2018

Published
December 15, 2018

Author Information
drphilmollica@gmail.com

ABSTRACT

Treatment and management of complex chronic disease states within the head and neck have traditionally been treated within the scope and philosophy of allopathic based dental/medical model. Success is therapeutically based upon three stanchions: symptomatology, pharmacology and surgical intervention. As with the successes of any therapeutic model some complications are possible. Symptomatic treatment does not address the root causality of the disease process. In addition, the patient can experience pharmaceutical side effects and post-surgical compilations such as infection and impaired healing processes. Ozone therapy as part of an Integrative Biologic Dental Medicine (IBDM) model has allowed for a paradigm shift in thinking and approach to the ever-growing problems of therapy resistant infection, aging population and chronic long term aliments. The management of acute and chronic infective disease is a critical factor in the overall health and wellness of patients. The head and neck are principle areas of infective disease. Primary contributors to this issue are infections of odontogenic and/or osteogenic origins. Ozone therapy has become one of the principle therapeutic modalities utilized in IBDM. The objective of this paper will be to explain and demonstrate specifically how ozone therapy is utilized in dental medicine. Through specific micro-dosing and anatomic placement of ozone enhanced healing processes can occur. Reparative osteogenesis is one corner stone in the restoration and maintenance of human jaw integrity.

Keywords: Ozone, integration, detoxification, reparative osteogenesis

Introduction

As stated above, symptomatic treatment does not address the root causality of the disease process. In addition, the patient can experience pharmaceutical side effects and post-surgical complications such as infection and impaired healing processes. Ozone therapy as part of an IBDM model has allowed for a paradigm shift in thinking and approach to the ever-growing problems of therapy resistant infection, aging population and chronic long term ailments.

Ozone when viewed and utilized as a biologic/ecologic therapeutic agent and combined with other synergistic biologic therapies, can be designed to support and enhance the patient's own inherent healing process. Recognition and understanding of biologic systems foundational goal of healing as a fundamental biologic process is critical. All biologic systems

function to maintain a relatively stable equilibrium via complex yet elegant physiologic processes. This process within the functional matrix of the biologic system is called homeostasis.

As described by physiologist Walter Cannon in his seminal work The Wisdom of the Body [1], homeostasis is “The coordinated physiological processes which maintains the steady states of the organism”. Within that concept lies a phenomenon called “biologic elasticity”. It is a mechanism where in the case of the human body it has the ability to react and compensate for external and internal stressors placed upon it. The human body can withstand winter storms, summer droughts, accidents, predators, bodily injury, hunger, thirst, overexertion, infection, and toxins. The clinician can be an advocate and promote the patient’s inherent biologic elasticity on the pathway to healing and wellness.

It is a wonder that the unstable stuff we are composed of learned the trick to maintain stability. But, the accumulation of petty misunderstandings can throw the body off. A misstep here, a stumble there, can escalate until there’s no turning back from a free-fall into disaster [2]. This disaster manifests itself in what we call disease.

Thinking in a Biologic Manner

The concept of the cell is, strictly speaking, only a morphological abstraction. Seen from a biologic viewpoint, a cell cannot be considered by itself without taking it’s environment into account. Linear thinking [3] in medicine as well as dentistry goes back to the time of Galileo and Virchow. The thinking that organisms are analogs to technical machines, cellular functional units, and has defects, which must be repaired. The fundamental concept of acute illness, cause and effect, drug to cell, lock and key, receptor, and then a reaction. This can be clinically objectified as a drug kills a bug (cause) then immediate repair (effect). This concept might apply to acute illness but with the ever-increasing rise in chronic disease and tumor it does not.

In an article written for The Physician Executive it was stated that: “Traditional medical training may actually impede a physicians ability to solve complex problems because it is based on vertical, linear and traditional thinking. Linear Thinking is developed through a existing pattern, methodical, stepwise, uncertainty is not tolerated, restricted by relevant information, with little interest in novel approaches. What is the outcome or reward “Depth of Knowledge”. Non-Linear thinking [4] allows for restructuring of an existing pattern, is multidirectional and creative, uncertainty is tolerated, not restricted by relevant information, open, and is welcoming of novel approaches. The resultant outcome and reward is a “Depth and Breath of Knowledge”.

The significance of these particular-thinking concepts lies in the essence of biologic systems. Biologic systems do not show linearity, they are highly interlinked and subject to a balance of biologic flow. Biologic systems are free to exchange energy and matter with their surroundings. The most important energy to give structure and organization to a biologic system is input or information. This information allows for a multitude of local and far-ranging reactions and interactions within the system itself [5]. Manifestations of chronic disease have many masks therefore symptomatology can be misleading. Thinking biologically thereby understanding the biologic underpinnings and processes regardless of the “disease” can give us new insight on treatment options and planning.

Unification of Cells, Tissues, Organs and Body

Whether on the micro or macro level the connectivity or oneness of a biologic system is critical to ultimately understand the human body. We have been taught human anatomy in a rather linear way. We learn this way to understand that parts of what we are made of the femur, temporalis muscle, mandible, so forth. What is lost at times is how the pieces are put together and better yet actually work together. The human body as a biologic system does not understand itself as millions of little pieces but itself as one completely unified system.

What could be so pervasive, so unifying, as have the ability to link the entire human body into one? This unifying system in the human body is what Alfred Pischinger called the Extracellular Matrix and Ground Regulation [3]. Every function and every process in the living body involves the matrix in one-way or the other. This matrix is the fabric that binds us together. The matrix allows nutrients, cytokines, hormones, vitamins, and oxygen to name a few substances to flow into the cell. At the same time allow waste products of cellular metabolism to flow out to this matrix milieu to be presented to the circulatory and lymphatic system for elimination. All immune responses and tissue repair takes place through the matrix. The extracellular matrix permeates the extracellular spaces of the entire organism, reaching each cell and always acting a one unit. This autoregulating matrix is a complex ordered aggregate composed of a number of different macromolecules whose structural integrity and functional compositions are important in maintaining normal tissue architecture, development, and tissue specific function. Utilization of the extracellular matrix as a delivery system for ozone therapy opens new vistas for healing.

Taking science and mechanisms of action into consideration

In 2011, Professor Olga Sonia Leon Fernandez, University of Havana, Cuba, presented at the European Ozone Congress what she calls “Fundamental Scientific facts about Medical Ozone”. This information reinforced the previous work done by Dr. Renate Viebahn-Hansler and Dr. Velio Bocci. These fundamental facts are significant in that they can directly influence biologic systems on multiple levels in a positive way to support and enhance the patient’s healing process [7,8,9]. These scientific facts include the following:

1. Disinfection properties: microbicidal effect (bactericide, fungicide, virostatic, parasiticidal)
2. Wound cleaning
3. Enhance wound healing
4. Activation of red blood cell metabolism with improved oxygen release, increase in ATP levels
5. Activation of immunocompetent cells and release of cytokines such as interferones and interleukins.
6. Modulation of the immune system.
7. Increase in antioxidant capacity through activation of cellular antioxidants (superoxide dismutase, catalase)
8. Anti-inflammatory effect
9. Endothelium cell increased release of nitric oxide
10. Equilibration of Redox Potential
11. Release of stem cells, autacoids and growth factors

Taking into consideration the multitude of positive therapeutic biologic effects ozone therapy has, one has to wonder if it is possible to support and enhance that process and ultimately improve the patient's outcome.

Setting the Stage for Ozone

Cyto-Restorative Therapy (CRF):

The architecture of Cyto-Restorative Therapy is to integrate foundational soluble nutrient, cellular membrane stabilizing, informational and stimulatory factors to support cellular metabolic function during transient oxidative therapeutics [10]. This pre-conditioning therapy is designed to stimulate drainage and detoxify the extracellular matrix, increases circulation, and modulates lymphatic function. Thus, this integrative formulation functions on multiple levels within the biologic system, both locally as well as globally. Cyto-Restorative Therapy infused into the patient prior to ozone delivery will enhance the beneficial multifactorial effects on normal as well as afflicted tissues.

The criterion for Cyto-Restorative Therapy is designed to be a synergistic therapy to support and enhance functional outcomes in ozone therapy. This criterion takes into consideration two principles: Hormesis and the Burgi Principle. "The Burgi Principle states that the effect of two substances that lead to same change in function or remove the same symptoms adds up when they have the same, and amplify when they have different, pharmacological target points" [11]. Hormesis is a term typically used in toxicology to describe a biphasic dose response with low dose stimulations or beneficial effect and a high dose inhibitory or toxic effect. The cellular responses to these principles are initially disruptive of homeostasis then followed by adaptive or compensatory beneficial changes [12].

With respect for the above-mentioned biologic principles the following foundational Cyto-Restorative formulation has been developed [10].

1. Procaine 2% buffered no preservatives – 3 cc
2. B-12 Methycobalamine 1mg/ml 1 cc
3. Folic Acid 10 mg/mL 1 cc
4. Homotoxicology

Procaine:

Procaine is an alcohol ester of P-aminobenzoic acid (PAB). It is readily broken down hydrolytically and detoxified via plasmacholinesterase. It is broken down to two components p-aminobenzoic acid (PABA) and diethyl-aminoethanol. Only a small portion of is not metabolized via the serum enzyme, this is completed through the liver and kidney [13]. Procaine exhibits several similar physiologic effects that support ozone. Procaine restores neurovegetative equilibrium, either by increasing or reducing neural tonicity. It improves circulation on the three levels of blood supply, cardiac, vascular, and the red blood cell. Has an influence on the formation and secretion of hormones and enzymes. According to Dosch, Fleckenstein and Pischinger procaine at the cellular level has a regulatory effect on the cell membrane. A challenged or dis-regulated cell membrane, which tends to be partly discharged, is influenced by procaine allowing for bioelectrical potential equilibrium and cell membrane stabilization. Procaine as well as ozone has a high redox potential which translates into both elements high

level of reactivity [14]. Redox systems are important catalysts for the energy supply of cells [13,15].

Methycobalamine B12 and Folic Acid:

The functions of Folic Acid and Methycobalamine B-12 are closely linked biochemically especially in the area of "one carbon" metabolism or methyl group transfer. Compared with other vitamins, the chemical structures of both B-12 and Folic acid are complex. Both of these vitamins are considered prosthetic groups for the enzymes that transfer methyl groups between compounds (-CH3). Carbon of the methyl group is more electronegative than hydrogen, so it allows the methyl groups to be slightly more electron rich. The methyl carbon pulls electron density out of the attached hydrogen atoms therefore has electron density to spare. Therefore methyl groups are electron donating, not electron withdrawing. The combination of these two vitamins working synergistically support cellular metabolism via electron donating influences on the mitochondria, synthesis of amino acids, DNA/RNA repair/protection, toxic homocysteine control via methylation to methionine, and red blood cell formation [16,17]. One of the interesting components of Folic Acid is that it consists of Para-aminobenzoic acid, as does procaine. Fundamentally these two vitamins are incorporated in Cyto-Restorative Formulation (CRF) to stimulate the foundational processes of biosynthesis.

Homotoxicology:

The human body as a biologic system is continuously confronted with toxic challenges. As a biologic system designed for self-preservation and as we have discussed maintaining a state of homeostasis, these toxins must be safely eliminated. These challenges under normal functional circumstance are regulated by what is called the autoregulating systems (ARS). As described by Alta Smit and Bruno Van Brandt in Introduction to Bioregulatory Medicine the ARS is a complex cybernetic system that merges and controls different disturbing or steering stimuli. Examples of the ARS systems are, maintenance of body temperature, blood pressure, blood glucose, inflammation, and the ground regulation system [18]. When these regulating systems become overloaded with a accumulation of toxins (homotoxin) the systems become dysregulated and contribute to the overall disease process. Homotoxins are substances that have a disruptive effect on the organism as a whole. Homotoxins can be generally divided into to two categories, exogenous homotoxins and endogenous homotoxins. In dentistry exogenous homotoxins are a daily encounter in the clinical setting for the dentist as well as the patient. Pathogenic forms that inoculate the oral cavity like bacteria, virus, fungus, and parasites excrete toxic metabolic byproducts. In addition to global environmental toxins, dental materials commonly used are considered exogenous toxins, such as mercury-based fillings, resins, and even some anesthetic compounds. Endogenous homotoxins are substances that are produced by the body during metabolic processes that are not metabolized properly allowing for normal excretion. Examples of this are nitrogen compounds, CO_2, lactic and uric acid [16,19,20,21].

Considering the overall picture of dysregulated tissue as a result of toxic overload and disease, the impaired detoxification pathways must be supported and reactivated. For any toxin to have a negative dysregulatory effect on a biologic system 5 proposed stages of normal toxin remediation either singularly or combination have to be dysfunctional: absorption,

transport, distribution and storage, metabolism and finally elimination [22]. Each of the proposed stages is unique in many ways yet detoxification and drainage ultimately boils down to the organs of elimination. The organs of elimination are the lungs, liver, bowel, skin, kidneys and lymph. Incorporation of remedies based on homeopathy and or herbal medicine specific to support detoxification and drainage of these organs are an integral part of the Integrative Dental and Bioregulatory philosophy.

Homotoxicology is a corner stone in Cyto-Restorative Therapy. It allows for drainage, detoxification, immunomodulation, cell and organ support. Homotoxicology is an integrated holistic bio-regulatory system of medicine as initiated and established by Dr H-H Reckeweg (1905-1985, doctor, homeopath, naturopath). Homotoxicology is based on modern-day bio-medical sciences in terms of diagnosis and therapy, utilizing progressive homeopathy in the form of anti-homotoxic remedies. Such therapeutics is basically nanopharmacological preparations of single, complex, combination, serial potency, and allopathic adjusted substances [23].

Homotoxicology represents a unique intellectual synthesis of healing disciplines, seeking to strengthen the organs of excretion (liver, kidney, lymphatic's), to remove the toxins accumulated in the extra-cellular matrix (ECM) (excretion), to stimulate and modulate the immune system, and to regulate the whole by rebalancing the "diseased" body. It is holistically orientated; its homeopathic antihomotoxic remedies integrate homeopathic principles with elements of organic, orthomolecular, and phytomedicine [23].

Integration of Therapies:

In the clinical setting ideal therapeutic goals to support healing would include the following: Pillars of Homeostasis:

1. Stimulation of the humoral antioxidant system
2. Restoration of proper oxygen metabolism
3. Proper circulatory and immune function
4. Regulated Autonomic Nervous System
5. Balanced metabolic function
6. Detoxification pathways open and functional
7. Enhanced drainage of metabolic waste and toxins
8. Pathogenic load reduction

The integration of Ozone Therapy and Cyto-Restorative Therapy fulfills the criteria necessary for homeostasis and healing for the patient. In the overall Integrative Model of Medicine and Dentistry these two therapies are just a part of the puzzle. Individualization of treatment is critical for successful outcomes. In IBDM as well as Medicine in general all possible therapies as well as philosophies should be made available to the patient. Being not subservient to any one school of thought opens many possible vistas for treatment. Ultimately the patient being an strong self- advocate and a integral part of the overall treatment decision process will have major implications on the overall outcome and healing process. The combination of ozone and Cyto-restorative therapy must be built on a sound foundation of good nutrition, proper supplementation, good hydration (clean water), probiotic, and enzyme therapy. Lifestyle modification with proper rest, stress reduction, and toxin avoidance will support contribute to the overall outcome of the patient.

Theory into practice

What should the treating practitioner take into consideration when treating infection and or disease states of the head and neck? Typically within the scope of dental medicine the jaws and surrounding tissue are the major focus. Yet it is important to view once again the patient as a whole unified system. The focus of the infection for example might clinically present in the jaws but we know scientifically that the pathogenic forms are wide spread within the entire body [24,25]. First, take into consideration the fundamental biochemical and physiologic aspects of ozone therapy [26]. Second, with any particular clinical presentation what are the most appropriate delivery modalities for the ozone to benefit the patient? Modalities to consider are, direct and indirect infusion of oxygen/ozone gas, irrigation with ozonated water, insufflation of ozone, and application with the use of ozonated oils [27].

An working clinical model is as a example the combination of all these modalities comes with the treatment of periodontal disease. This fundamental treatment model can be applied to any acute or chronic disease state of the head and neck.

Periodontal disease is an infective/inflammatory disease the results in damage to the soft tissue and bone that supports the teeth. The severity of the disease can range from a local infection isolated to a few teeth or to an advanced stage resulting in a loss of dentition [28]. In a biologic sense periodontal disease is an evolution into anerobiotic ecology. Anerobiosis based on the work of Otto Warburg is an altered pathologic state of oxygen metabolism, a fermentation process and uncontrolled oxidative injury. The typical clinical symptoms are vascular and lymphatic congestion as seen as swollen bloody gums. The goal of oxygen/ozone therapy is to shift to a balanced ecologic environment that supports and maintains the health of the periodontal tissue. Ozone is the perfect agent to do that.

Integration of synergistic treatment modalities starts with pre-conditioning the tissue with the Cyto-Restorative Formulas (CRF), customized to each specific patient. One the CRF has taken effect the next modality is irrigation of the periodontal sulcus, which is the space between the tooth, gum and bone. This modality lavages the periodontal sulcus dissolving the biofilm and inducing apoptosis of the pathogenic forms contained within the periodontal sulcus. This process debulks the pockets of the entire oral cavity protecting the patient from a possible sepsis due to premature mechanical intervention by the dentist. Following the Pathogenic Sulcus Lavage procedure typical mechanical debriment of the sulcus surrounding the dentition is performed. Followed once again by comprehensive sulcus lavage. Once mechanical curettage and secondary lavage is complete, ozone gas is place into the periodontal sulcus. Via a side delivery cannula 26 micrograms/cc is released. The result is multi-factorial biochemical and physiologic attributes CRF and ozone as described above. Beyond the disinfecting aspect the ozone gas has a desensitizing effect on the adjacent root structure. In a traditional model of dentistry all treatment of periodontal disease is within the sulcus area. With ozone therapy we utilize the anatomic blood supply to deliver all the resultant biologic cytokines and peroxides to the tissue. Therefore the next modality is direct and indirect infusion of oxygen/ozone. In the oral cavity infusion of the gas can be adjacent to the soft tissue or via a neurovascular bundle such as the Inferior and/or Superior Alveolar

Neurovascular bundle. As a result we can treat the deeper boney structures for infection at the same time benefit from the multifactorial physiologic/ biochemical responses such as increased blood flow, immunologic up-regulation therefore enhancing the healing process. Understanding how and why ozone therapy functions within a biologic system are the cornerstone to successful outcomes. Taking the example of periodontal disease model of treatment can lay the framework for the treatment of more advanced/ complex issues of the head and neck.

As a working clinical model IBDM allows for a comprehensive patient centered therapeutic approach. As a result of therapeutic biologic flexibility the ultimate outcome for the patient is enhanced.

References

1. Cannon WB. The Wisdom of the Body. New York: W. W. Norton; 1960.
2. Council NR. The language of life: How cells communicate in health and disease. Washington, DC: The National Academy Press; 2005.
3. Pischinger A. The extracellular matrix and ground regulation; basis for a holistic biological medicine. Berkeley (CA): North Atlantic Books; 2007. 205 p. ISBN: 1556436882.
4. Hernandez J, Varkey P. Vertical versus lateral thinking. Physician Exec. 2008;34(3):26-28.
5. Mollica P. Pischinger Memorial Lecture. Bozeman (MT): ACIMD Press; 2010.
6. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. Molecular biology of the cell. New York: Garland Science; 2002. 1616 p. ISBN: 9780815332183.
7. Fernandez O. Fundamental scientific facts about Medical Ozone In: Proceedings of European Ozone Congress. Vienna (AT): 2011.
8. Viebahn-Hansler R. The Use of Ozone in Medicine. 5th ed. Iffezheim (DE): ODREI-Publishers; 2007. ISBN: 1620556081.
9. Bocci V. Ozone A New Medical Drug. Dordrecht (NL): Springer; 2005. 295 p. ISBN: 1402031394.
10. Mollica P, Harris R. Cyto-Immunologic supportive therapies for ozone therapy in Dentistry. New Jersey (NJ): ACIMD Press; 2007.
11. Swayne J. Dictionary of Homeopathy. Bruxelles (BE): European Commission Medicine Research Group; 1996.
12. Calabrese EJ, Blain R. The occurrence of hormetic dose responses in the toxicological literature, the hormesis database: an overview. Toxicol Appl Pharmacol. 2005;202:289-301.
13. Dosch P. Manual of neural therapy according to Huneke. Stuttgart (DE): Thieme Publishers; 2007. 416 p. ISBN: 9783131406026.
14. Dore M. Chime des oxydants et traitemant des eaux. Technique et documentation. Paris (FR): Lavoisler; 1980. 350 p.
15. Schüring J, Schulz HD, Fischer WR, Böttcher J, Duijnisveld WH. Redox: Fundamentals, Processes and Applications. Heidelberg (DE): Springer-Verlag; 1999. 248 p. ISBN: 3540665285.
16. Nelson D, Cox M. Lehninger. Principles of Biochemistry. 5th ed. New York (NY): W.H. Freeman and Company; 2008. 1146 p. ISBN: 9780716771081.

17. Meisenberg G, Simmons W. Principles of Medical Biochemisty. St. Louis (MO): Mosbey; 1998. 742 p. ISBN: 0815144105.
18. Smit A, O'Byrne A, Van-Brandt B, Bianchi I, Kuestermann K. Introduction to Bioregulatory Medicine. New York (NY): Thieme; 2009. 166 p. ISBN: 9783131476111.
19. Gabreëls FJ, Prick MJ, Trijbels JM, Renier WO, Jaspar HH, Janssen AJ, et al. Defects in citric acid cycle and the electron transport chain in progressive poliodystrophy. Acta Neurol Scand. 1984;70(3):145-154.
20. Mainwood GW, Renaud JM. The effect of acid-base balance on fatigue of skeletal muscle. Can J Phy Pharmacol. 1985;63(5):403-416.
21. Crinnion WJ. Environmental medicine. Part 1: the human burden of environmental toxins and their common health effects. Altern Med Rev. 2005;5(1):52-63.
22. Blaylock R. Excitotoxins. The taste that kills. Santa Fe (NM): Health Press; 1994.
23. Bianchi I. Principles of Homotoxicology. Vol. 1. Baden-Baden (DE): Aurelia-Verlag Publishers; 1989. 201 p. ISBN: 9780224020831.
24. Schenkein HA, Loos BG. Inflammatory mechanisms linking periodontal disease to cardiovascular diseases. J Clin Periodontol. 2013;40(14): 51-69. doi: 10.1111/jcpe.12060.
25. Gude D, Koduganti R, Prasanna S, Pothini L. Mouth: A portal to the body. Dent Res J. 2012;9(6):659-664.
26. Bocci V, Di-Paolo N. Oxygen-ozone therapy in medicine: an update. Blood Purif. 2009;28(4):373-376. doi: 10.1159/000236365.
27. Mollica P, Harris R. Oxygen. Ozone Therapy: Healing Periodontal Disease. Bozeman (MT): ACIMD Press; 2014.
28. Abid M, Javed F. Knowledge of medical practitioners about Periodontal Diseases and its impact on overall health: A cross sectional study. Cureus. 2018;10(5):2694. doi: 10.7759/cureus.2694.