



The Gentle Art of Periodontal Maintenance A Protocol Using Essential Oils

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The greatest of historic castles, monuments, palaces, and homes continue to exist because their foundations remain strong and firm. So too, the most ideal dentition is only as good as the periodontal foundation that holds it in place. This foundation is constructed of a most unusual variety of cellular configurations, all exposed to an ever-fluctuating environment. This biologic conglomerate is unique to the body in that it is awash in a microbial population of galaxian proportion. In addition, the periodontium itself can be a fragile entity whose health can be driven by a variety of factors that include genetic predisposition, diet, medical conditions, and environmental dynamics.

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Periodontal disease is no longer considered a disease state whose impact is confined to the mouth. It has been directly implicated as a causal factor in many disorders, including cardiovascular disease¹⁻⁴ diabetes,^{4,5} rheumatoid arthritis,⁶ preterm delivery of low-birth-weight infants,⁷ respiratory infection,⁸ and gastric ulcers⁹ to name a few. The commonality between these disease states and manifestations appears to be the infection of periodontal origin with chronic, mostly Gram-negative microorganisms. This leads to the body's attempt to mount a defense and destroy the foreign invaders (host response). It is this response that creates the unfortunate side effect of not only eliminating the infection, but also destroying the periodontal tissue via an inflammatory cascade that begins with endotoxins, toxins, and cell membrane products, and ends with connective tissue destruction and bone resorption (See Chart 1).



Figure 1. Lower anterior teeth exhibiting severe periodontal inflammation because of the presence of calculus and plaque formation.



Figure 2. The same lower anterior teeth immediately following in-office periodontal nonsurgical therapy as well as the use of Tooth and Gum Tonic as both a subgingival irrigant during ultrasonic scaling and a post-treatment rinse.



Figure 3. The same lower teeth only 10 days following initial therapy. Tooth and Gum Tonic was used twice daily during the 10-day period.



Figure 4. Tooth and Gum Tonic in a Luer-lock syringe with a plastic sideport cannula.



Figure 5. Note that the tonic is expressed out the side of the cannula, preventing the patient from "injecting" it into tissues, but rather gently expressing it into the periodontal pocket.



Figure 6. The cannula is placed in the pocket and the area irrigated with Tooth and Gum Tonic by patients as part of their regular at-home therapeutic regimen.

REACTIVE VERSUS PROACTIVE CARE

For over a century, dentistry has treated periodontal disease based on the medical model of disease therapy. That is, a reactive intervention to the active disease state rather than a proactive approach to dealing with the predisease state. Reactive care includes both surgical and nonsurgical therapies. Both forms of care have engendered an increase in the use of systemic antibiotics and antimicrobial mouth-rinses. While these are acceptable for limited cases and short spans of time, they can be misused, being applied as "shotgun therapy" to the majority of cases over excessive periods of time.

It has been proven that this can cause the undesirable sequelae of allowing microbial strains to develop an increased resistance to other antibiotic therapies.¹⁰ This occurs because the longer a population of bacteria is subjected to an antibiotic, the more resistant the surviving bacteria become.

According to a recent study by the American Association of Endodontists, the time may be now approaching when even the

most powerful antibiotics will not be effective against pathogens that can now be rendered harmless by these same antibiotics.¹¹ In addition, according to a study by Meeker and Linke, microorganisms do not appear to develop tolerance or resistance to the antibacterial effects of essential oils such as clove oil (eugenol) and thyme oil (thymol).¹² In order to proactively prevent this disease state from occurring, the periodontal pathogens must be reduced to prevent a host-mediated response. Should such a response occur, then reactive therapy would be required that would not only reduce the bacterial population and avoid strain resistance to antibiotics, but also control the inflammatory cascade to prevent further tissue damage (See Chart 2). The ideal therapy would be able to act as both therapeutic (reactive) and preventive (proactive) by actually reducing, eliminating, and

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most importantly preventing the buildup of harmful pathogens (antimicrobial therapy), thus halting and preventing a future host-mediated response (anti-inflammatory therapy) (See Chart 3).

Proactive periodontal care is the direction dental and medical care is now taking. It involves recognition of the causative originating factors to disease states, with the attempt to prevent- rather than correct- problems. It also includes avoidance of damaging environmental influences such as smoking, recommending a proper diet, and the use of naturally occurring chemotherapeutic agents as part of a preventive maintenance regimen that can include the use of botanical remedies.

BOTANICAL REMEDIES AND PLANT EXTRACTS: A BRIEF HISTORY

There are numerous reports in both the medical and dental literature that demonstrate the popular and increasing usage of both essential oils and herbal remedies on a regular basis.¹²⁻¹⁵ Because of this factor, the dental profession is in an excellent position to gain greater expertise in this area and understand the methods for prescribing these therapeutic agents. In dentistry, the botanical remedies most commonly used have traditionally been in the form of essential oils. Essential oils are organic compounds found in nature in the "glands, veins, sacs, and glandular hairs of aromatic plants."¹⁶

Many of these oils were discovered by ancient civilizations to be highly therapeutic for a variety of physical ailments and as highly effective preventive care for numerous disorders.

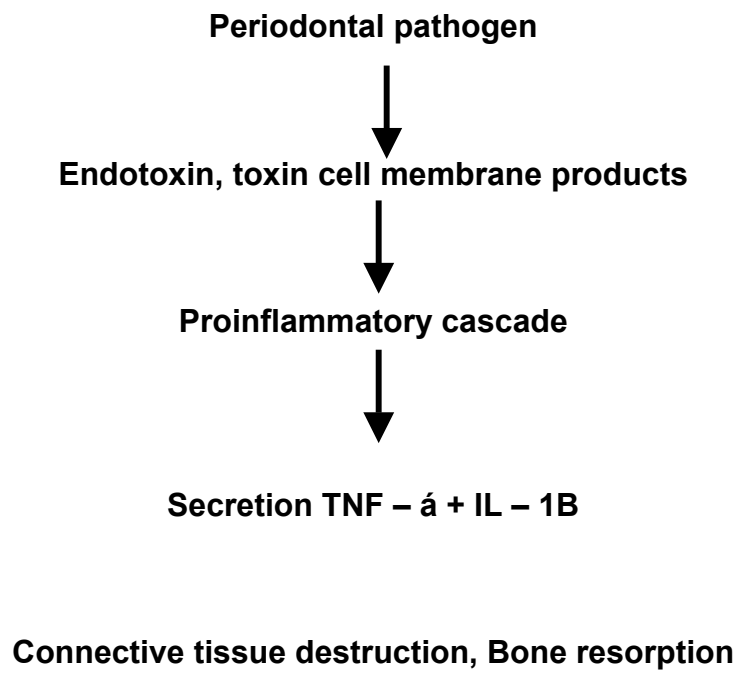
In 200 BC the emperor of China used cloves as a "mouth perfume." The first medicinal text reference to cloves was by Al-Gazzar in the 10th century, when they were used to control mouth odors and pain.¹⁷ Many centuries later, more refined uses of essential oils were discovered and used in routine dental care. In 1837, Bonastre used a combination of magnesium oxide and eugenol as a dental filling material.¹⁸ Chisholm later improved the formula by replacing magnesium oxide with zinc oxide and was the first to recommend ZOE as a temporary filling cement.¹⁹ As early as the 19th century, several essential oil components, including eugenol, thymol, and carvacrol, were used in root canal therapy, temporary fillings and cements, periodontal therapy, and treating alveolar abscesses and stomatitis.²⁰

ESSENTIAL OILS: A UNIQUE CHEMISTRY

The cellular building block of the essential oils is the isoprene unit, which joins in a regular head-to-tail way called the isoprene rule to form a multitude of organic compounds.²¹ These oils are fragrant, volatile essences that evaporate completely and can be rendered less effective in the presence of alcohol.¹² Phenol, a hydroxylated 6-carbon ring, was the foundation molecule for a host of the 19th century discoveries, including thyme oil, eucalyptus oil, peppermint oil, lemon oil, and clove oil, all of which were used in dentistry (See Chart 4).

Many of these essential oils went on to become famous as historical remedies for a variety of dental therapies. In 1923, Dr. Weston Price,²² the chairman of the research section of the ADA, recommended thymol for sterilization in root canal therapy. In 1938, the Accepted Dental Remedies of the ADA stated that the antiseptic efficiency of thymol was higher than that of phenol as a canal filling material and for direct pulp capping.²³

Chart 1. Schematic model of the pathogenesis of periodontal disease: “infection-mediated.”



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Chart 2. Schematic model of the reactive therapy approach using standard surgical and/or nonsurgical treatment with short or long-term antibiotics.

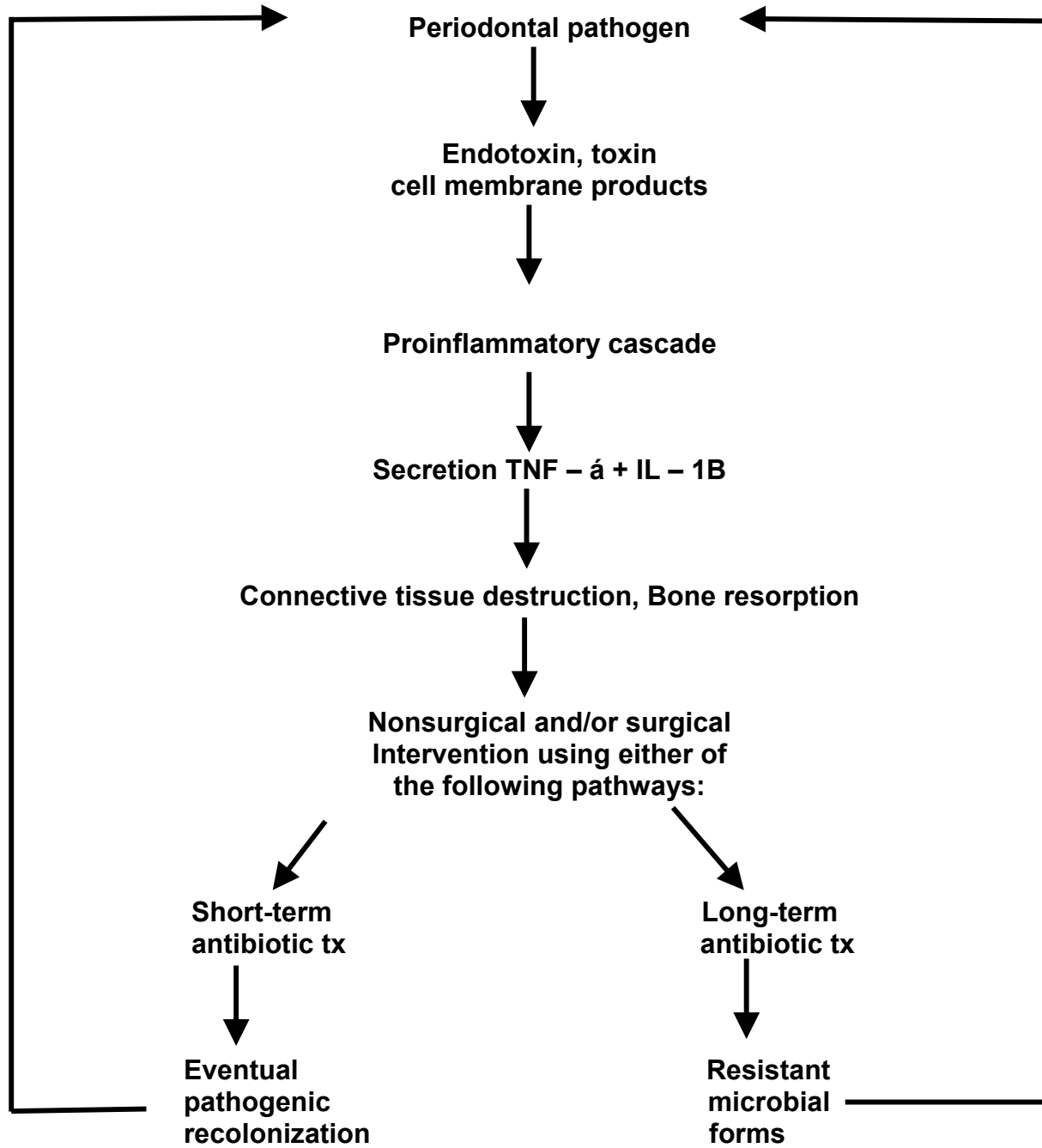


Chart 3. Schematic model of the proactive/reactive therapeutic approach using essential oil/herbal extract chemotherapeutic treatment.

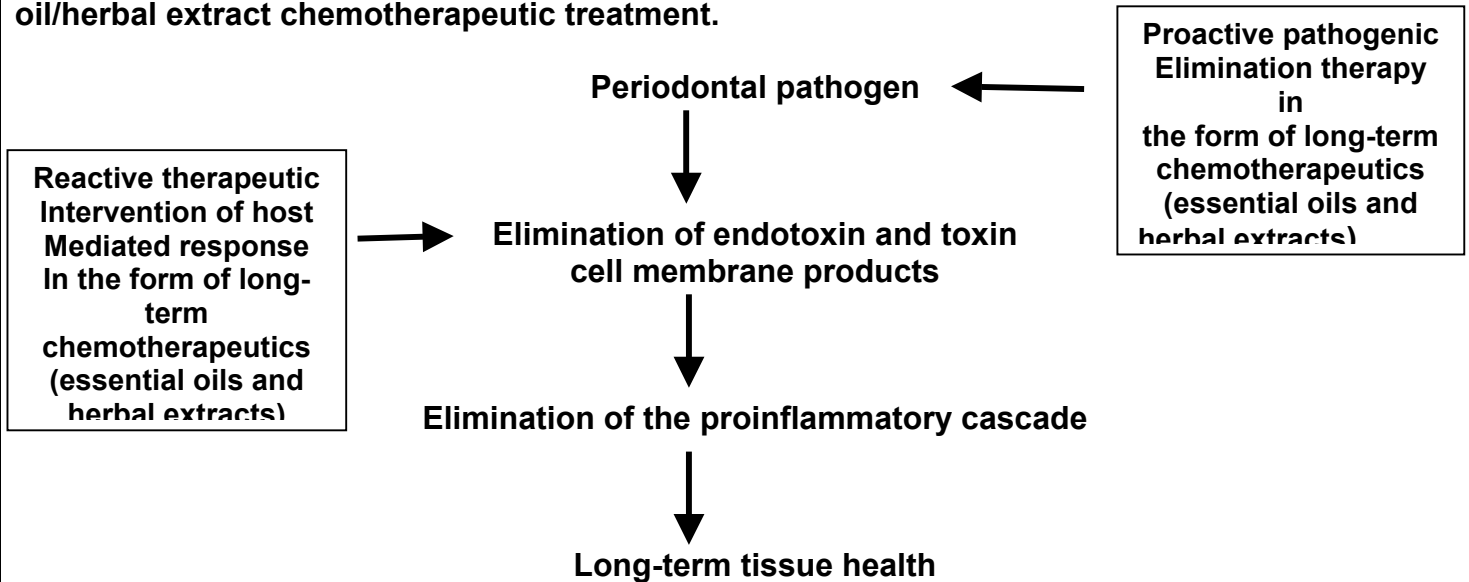
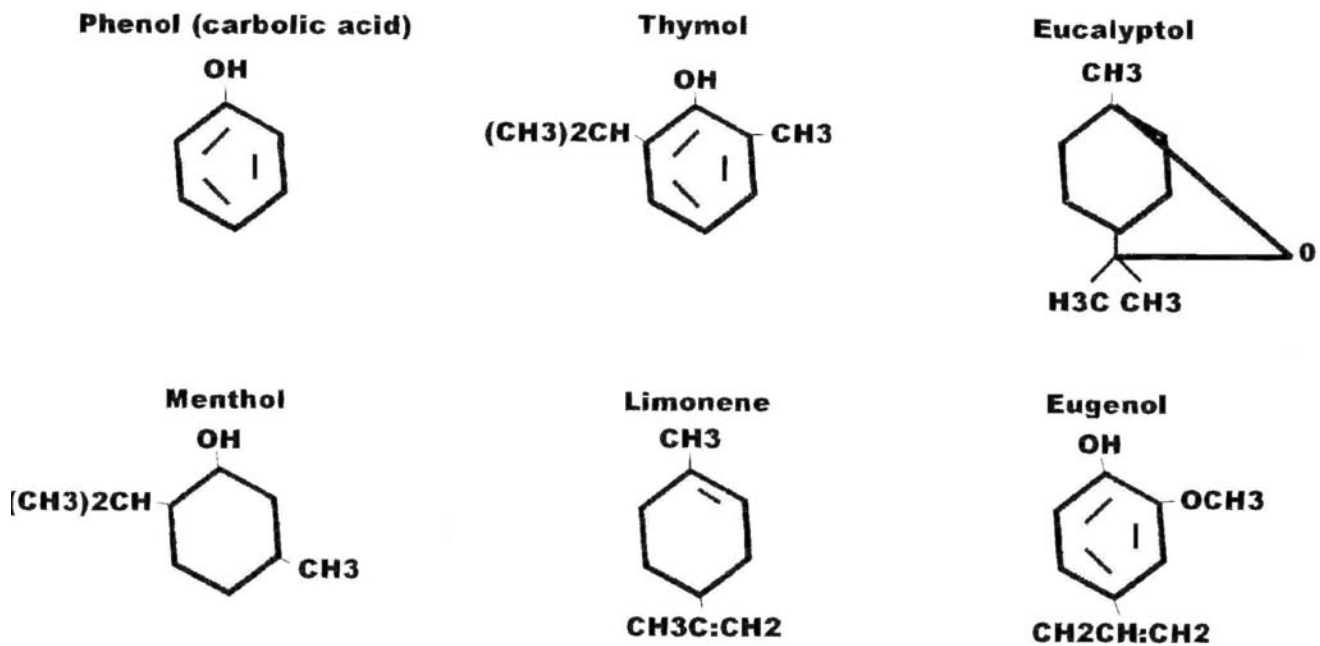


Chart 4. Shown are the chemical structures of phenol and of the active essential oil components currently used in today's dental therapeutics.



**ESSENTIAL OILS IN MOUTHRINSES:
PURE ESSENTIAL OILS**

One of the characteristics of pure essential oils is their ability to penetrate mucous membranes. Therefore, their supragingival use yields a beneficial subgingival effect. The clinical protocol presented in this article uses a group of products from Dental Herb Company (Tooth and Gum Tonic, Paste, Spritz, and Under the Gum Irrigant), which contain pure essential oils and herbal extracts with no ethyl alcohol. The pure

essential oils used are red thyme, eucalyptus, peppermint, cinnamon bark, and lavender. This group of products has the ability to act as a proactive therapeutic treatment as well as a reactive care solution, and has been recommended by a variety of dental researchers, authors, and clinicians. 16,24-32 The ingredients have been extensively researched and have the ability to work in 4 distinct, yet synergistic ways:(1) antimicrobial (2) tissue conditioning, (3) connective tissue rebuilding, and (4) anti-halitosis.

These products also include the herbal extracts of echinacea, gotu

kola, and green tea. These extracts are effective in the maintenance and health of the periodontium and dentition in the following manner...

Echinacea: The primary effect of the herb echinacea is the inhibition of the enzyme hyaluronidase, which is responsible for the breakdown of periodontal tissue structures. By inhibiting this effect, echinacea prevents this destruction and maintains the structure of the connective tissue. Echinacea also stimulates fibroblasts, which are the cells that manufacture ground substance.³³

Gotu kola: The essential action of the herb gotu kola (*Centella asiatica*) is as a builder and healer of connective tissue. It does this by increasing blood vessel formation within connective tissues, and it increases formation of mucin and structural components such as chondroitin sulfate and hyaluronic acid.^{15,34}

Green tea extract: Green tea extract is included only in Tooth and Gum Paste. It is a potent anticariogenic. The polyphenols in green tea extract interfere with the ability of *Streptococcus mutans* and other cariogenic bacteria to produce an enzyme (glucosyl transferase) that is necessary for the production of glucan. Glucan enables cariogenic bacteria to adhere to tooth surfaces, thereby readily secreting acid directly against the surfaces, causing carious lesions to occur. Because green tea extract can prevent the formation of glucan, bacterial adhesion is prevented and demineralization is significantly reduced.

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CLINICAL PROTOCOL

To administer pure essential oils as part of periodontal therapy, the following clinical protocol is used...

□ **Use Tooth and Gum Tonic** primarily as a supragingival rinse, but also subgingival when used with a handheld device. For intraoral care, it is recommended as follows...

(1) Use as an oral rinse, once or twice daily (Figures 1 through 3).

(2) Use in a manual subgingival irrigating device such as a pocket irrigator or a syringe with a sideport cannula³⁵ (Figures 4 through 6).

(3) Use with an interproximal brush (such as a Sulcabrush).

(4) For in-office care use as a pre-and/or postoperative rinse.

(5) Anti-halitosis: In a May 1999 fresh breath study by Clinical Research Associates, the "bad breath masking time" that lasted the

longest was Tooth and Gum Tonic when compared with a variety of current competitive brands, none of which contained pure essential oils.²⁸

□ **Dilute Under the Gum Irrigant** and use as a subgingival irrigant in a subgingival delivery system. For intraoral care it is recommended as follows.

(1) The concentrate is diluted in an at-home mechanical water irrigation device.

(2) Use for in-office care through an ultrasonic scaler.

□ **Tooth and Gum Paste** is designed to be used as the patient's routine at-home toothpaste. This toothpaste is the first toothpaste in the western world to contain green tea extract. This extract acts as an antimicrobial agent against periodontal pathogens and has the ability to prevent cariogenic bacteria from adhering to tooth surfaces.

□ **Use Tooth and Gum Spritz** as a mouth spray that acts as a mouth antiseptic and anti-halitosis agent. The mouth can be sprayed intraorally between 1 and 3 times daily as needed. Because subgingival periodontium is subject to reinfection from heavy bacterial loads contained in the mucous membranes and dorsum of the tongue, the spritz reduces bacterial populations. It comes in a small dispenser that can easily be carried in a purse or pocket. Because of its portability, patients can continue their periodontal care throughout the day.

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CONCLUSION

The treatment of periodontal disease is multifaceted, requiring therapy on many different levels. This care is generally initiated in a clinical setting and is a critical beginning to commencing a baseline for health. While this step is crucial, the long-term care of the periodontium can only be accomplished by the patient in the form of at-home care. This is done by using the appropriate home care products in the form of mechanical

aids and therapeutic agents in a regular, disciplined manner. In addition, the most recent scientific revelations linking the causes of multiple diseases from oral bacterial sources have made the demand for nonresistant antimicrobial therapies more critical than ever. Therefore, it behooves every clinician in the oral healthcare arena to investigate and recommend oral antibacterial agents as part of every patient's standard health care regimen. As discussed, the use of pure essential oils and herbal extracts in an exacting combination has been proven to accomplish these goals in a safe, simple, and highly effective manner.

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