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Bone One Session Treatment (Bost)

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Abstract: *Periodontal disease, a chronic inflammatory condition, poses significant management challenges for clinicians. It often progresses to destroy tooth-supporting tissues, ultimately leading to tooth loss, and even established therapies do not always completely eradicate harmful bacteria or effectively regenerate lost tissue. This review article aims to explore the concept, methodology, advantages, and overall significance of Bone One Session Treatment (BOST), a novel, minimally invasive, and aerobic approach that is a part of Tri-Immunophasic Periodontal Therapy (TIP), as a promising advancement in the periodontist's armamentarium. BOST focuses on eliminating anaerobic bacteria from deep pockets and facilitating natural bone healing and new attachment formation in a single, comprehensive session.*

Keywords: *Periodontitis, Periodontal therapy, BOST, Aerobic Periodontics, Tri-Immunophasic Periodontal Therapy, Non-surgical periodontics.*

I. Introduction

Periodontal disease, a widespread public health concern, is characterized by chronic inflammation of the tooth-supporting structures, resulting in clinical attachment loss (CAL), alveolar bone loss, periodontal pocket, and gingival bleeding. The primary etiological agents are dysbiotic plaque biofilms, particularly anaerobic bacteria, which not only induce local tissue destruction but can also contribute to systemic complications like coronary heart disease, osteoporosis, and preterm low birth weight[1].

For decades, the gold standard of periodontal therapy has revolved around mechanical debridement, such as scaling and root planing, followed by rigorous oral hygiene protocols. While effective, these methods may not always fully address the complex microbial challenges or promote optimal regeneration of lost tissues. In consideration to these limitations, clinicians and researchers have continuously sought innovative and more effective approaches.

Bone One Session Treatment (BOST), a component of the Tri-Immunophasic Periodontal Therapy (TIP) developed by Dr. William Hoisington, has emerged as a distinct paradigm in periodontal management[2,3]. BOST is an aerobic treatment designed to eliminate periodontal disease in the deepest pockets and supporting alveolar bone, aiming to restore lost alveolar support by leveraging the body's natural healing capabilities[4]. This review delves into the principles and clinical application of BOST, highlighting its potential as a significant stride in periodontal therapy.

II. Rationale Behind Aerobic Periodontics and BOST

Aerobic periodontics focuses on restoring an oxygen-rich environment in the periodontal tissues by shifting periodontal environment from an anaerobic, disease-promoting state to an aerobic, healing-conducive state. Regenerative therapies like guided tissue regeneration (GTR) and bone grafting have been shown to reduce periodontal pocket depth, increase oxygenation, and decrease inflammation, thereby shifting the microbial balance towards health-associated species such as *Streptococcus sanguinis* and *Actinomyces naeslundii*. These beneficial bacteria produce hydrogen peroxide and lactic acid, which inhibit the growth of anaerobic pathogens and promote a stable, health-associated microbiome[5].

BOST is a comprehensive, single-session approach, typically lasting 4 to 5 hours for a full mouth procedure[6]. A key distinguishing feature is its emphasis on minimizing damage to the gingiva, bone, and periodontal apparatus during treatment and recovery, thereby promoting faster and more predictable healing[7]. The underlying hypothesis of TIP, of which BOST is a part, is that the body can treat periodontitis in a defensive phase and then promote healing of lost periodontium in a repair and recovery phase, similar to how

other parts of the body heal. This procedure provides an effective, safe and less traumatic alternative for the treatment of periodontitis[8].

III. The BOST Procedure: A Multi-faceted Approach

The BOST protocol is structured around four key components:

3.1. Bacterial DNA Testing- Modern periodontal treatment initiates with precise identification of the bacterial species and their quantities responsible for the periodontal infection. Bacterial DNA testing, performed by collecting a plaque sample with a paper point inserted subgingivally for approximately 15 seconds, offers a comfortable, fast, and painless diagnostic tool. This molecular analysis allows for targeted therapy. In many cases, it confirms that antibiotics might not be necessary, preventing unnecessary immune system suppression. However, for aggressive species like *Aggregatibacter actinomycetemcomitans* and *Porphyromonas gingivalis*, which are resilient to traditional treatments, judicious use of antibiotics may be incorporated to ensure complete healing[2].

3.2. BOST Treatment (Stretch Flap Technique)[9]- The cornerstone of the BOST procedure is the innovative "stretch flap technique," which allows unparalleled access to the deepest areas of the roots and bone surface without the need for traditional incisions. This minimally invasive approach significantly reduces patient discomfort and complications. The procedure involves three distinct steps:

- **First Step:** A universal 4R-4L curette is gently inserted into the sulcus, with the working end facing the tooth surface. Slight pressure is applied to the tissue to initiate stretching, while simultaneously removing superficial plaque and calculus (Figure 1).
- **Second Step:** The curette's direction is changed to a circumferential motion, starting at the corner, to mobilize the tissue and prevent tearing of the papilla, effectively creating a "stretch flap" rather than an incisional one.
- **Third Step:** The curettes are inverted, allowing their rounded tips to gently plasty the bone surface. This step aims to remove any attached granulation tissue or degenerated attachment and achieve a smooth, regular bone surface with fresh bleeding, which helps flush out bacteria and toxins from bone porosities (Figure 2).

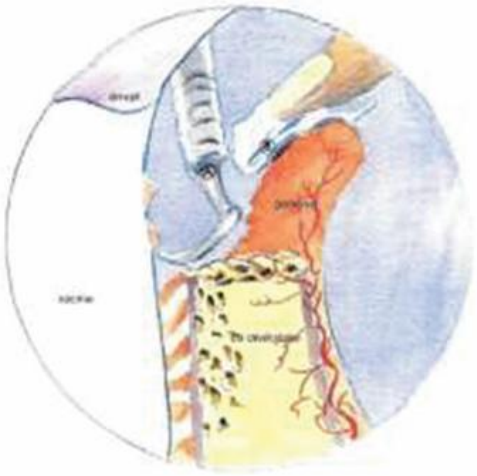

Figure 1: Stretching of tissue as instrument advances in the deeper surface

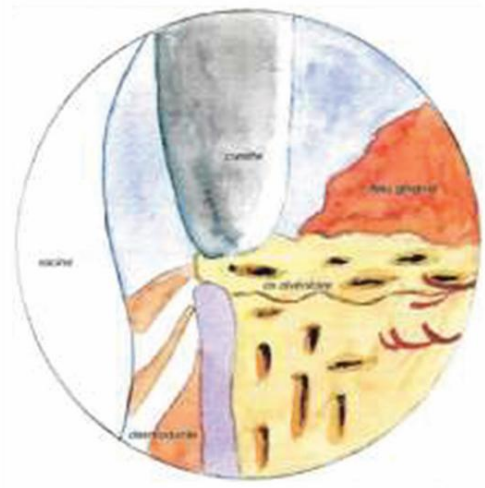

Figure 2: Cleaning and reshaping bone craters

3.3. Aerobic Oral Hygiene Regime- Post-BOST treatment, a specialized aerobic oral hygiene regimen is crucial for maintaining a healthy environment. Standard brushing and flossing are often insufficient to reach deep subgingival areas. Therefore, patients are instructed to use a "Perio-Aid" with specifically designed "aeros" tips. The goal is to reduce biofilm and effectively aerate the subgingival areas, including grooves and furcations, all the way to the attachment. Patients are trained to ensure the tip feels "squeaky clean" and observe no blood on the aero tip, indicating a firm attachment.

3.4. Adequate and Appropriate Nutrition (and Lifestyle Modifications)- Emphasize on the importance of adequate and appropriate nutrition, as well as boosting the consumption of vitamins and minerals such as zinc and vitamin C, along with lifestyle modifications and control of occlusal forces, as integral components of comprehensive healing and long-term periodontal stability. These elements contribute to supporting the host's immune response and overall tissue health[10].

IV. Healing After BOST

- **Defense phase**: The fresh bleeding clot formed on the surface of root and bone affords a scaffold for the stem cells to get embedded (Figure 3). The stem cells have been shown to move at a rate of 0.5mm along the blood clot for 8 days. This results in a thick outermost layer of the clot.

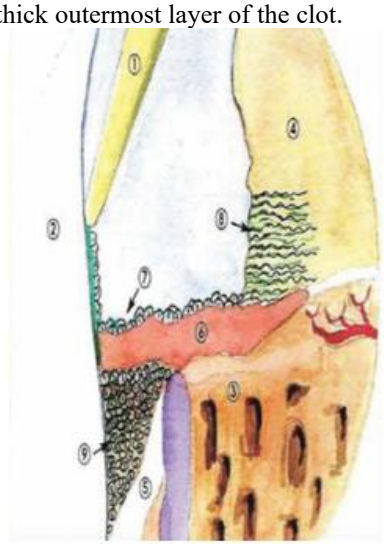

Figure 3: The clot firmly attached to the clean bone serves as a scaffold

- **Regeneration phase**: In about 4-6 weeks after the thickening of the clot, the pocket gets filled with a very dense and partially mineralized connective tissue from the base (Figure 4). As the healing advances, this connective tissue matrix becomes acellular.

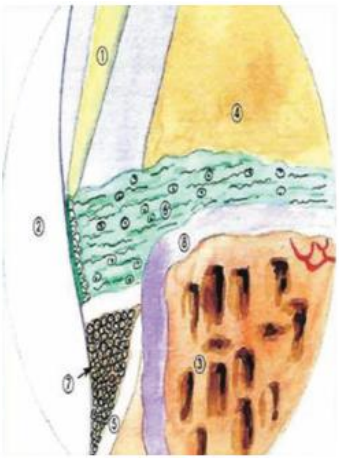

Figure 4: The pockets gradually fill in from the bottom with very dense, partially mineralized connective tissue.

- **Healing with a new attachment**: Bone naturally restores under this newly formed dense acellular mineralized connective tissue matrix. In about 8 months, a new thick layer of cortical bone will form over the healed inner (cancellous) bone.

V. Advantages of BOST[2,6]

BOST offers several significant advantages over traditional periodontal treatment modalities:

- **Non-invasive Method:** Eliminates the need for incisions and sutures, leading to reduced patient apprehension and discomfort.
- **Minimally Traumatic:** Minimizes damage to the gingiva, bone, and periodontal apparatus during the procedure.
- **Quick and Reliable:** The single-session nature of the treatment makes it efficient for both the clinician and the patient.
- **Faster Healing:** The non-incisional approach and creation of an ideal healing environment contribute to accelerated tissue repair.
- **Patient Comfort:** Patients experience relatively less pain and discomfort compared to conventional surgical procedures.
- **Less Complications:** Reduced risk of post-operative complications due to the minimally invasive nature.
- **No Bone Necrosis:** The procedure is designed to promote healthy bone regeneration without causing necrosis.
- **Aesthetically Acceptable:** Preserves gingival aesthetics, as the gingival margins tend to remain close to their initial height.
- **Less Sensitivity:** Reduced post-operative tooth sensitivity.

Limitations and Considerations:

The success of BOST depends on precise bacterial diagnosis and strict adherence to post-treatment oral hygiene protocols.

Long-term comparative studies with conventional therapies are limited; more research is needed to establish its efficacy across diverse patient populations.

Selective antibiotic use may still be required for highly aggressive bacterial profiles.

VI. Conclusion

Bone One Session Treatment (BOST), as an integral part of Tri-Immunophasic Periodontal Therapy, represents a paradigm shift in the management of periodontal disease. By effectively addressing the etiological factors through precise bacterial identification and a unique non-incisional approach, BOST facilitates remarkable tissue regeneration and new attachment formation. It overcomes many disadvantages associated with traditional surgical interventions by offering a minimally invasive, patient-friendly, and biologically driven treatment option. The ability of BOST to create conditions for the body to transition from a defensive phase against pathogens to a regenerative phase for healing makes it a highly promising and ambitious tool for periodontists seeking predictable and long-lasting outcomes in the fight against periodontal disease. Further extensive clinical trials with long-term follow-up are warranted to solidify its position as a universally adopted treatment modality.

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