

# Is tri-immuno-phasic periodontal therapy a holistic approach to periodontist – A review

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## Abstract

The clinician's revelation about treating periodontal disease is highly wide-ranging. They envisage a high success rate with the advanced technology that is available today. The primary concern has always been removing the etiological factors, resolution of inflammation, and restoration of the lost alveolar bone support. Disgruntled with the conventional surgical procedures, ingenious experts, clinicians, and researchers have curved to unique and sometimes extravagant approaches and have explored new edges for treating periodontal disease. Among the minimally invasive surgical techniques, bone one-session treatment (BOST) is an approach that empowers the clinician to get hold of the deepest areas of the pocket, eventually to the crest of the bone, and extinguish the anaerobic bacteria. BOST disturbs the vicious pathogens that not only cause degeneration of the gingiva and alveolar bone but also that invade the circulation leading to systemic complications. This results in an auspicious environment for tissue healing. This review depicts the benefits of BOST in treating periodontal disease in an entirely innovative way.

**Keywords:** Bone one session treatment, periodontitis, tri-immuno-phasic periodontal therapy

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## INTRODUCTION

Periodontitis, a chronic inflammatory disease of the periodontium ensues as a result of interaction between the periodontopathic pathogenic bacteria and the host response.<sup>[1]</sup> If left untreated at the earliest, the initial condition characterized by swelling and bleeding of the gums may deteriorate to the loss of periodontal ligament attachment, alveolar bone loss, and eventually tooth loss.<sup>[2]</sup> Anaerobic bacteria have been shown to play a prime role in the progression of periodontal disease.<sup>[3]</sup> Various advanced minimally invasive techniques like PerioProtect, S. M. A. R. T, and flapless techniques for bonegraft have been

evolved to treat the periodontal disease progression.<sup>[4]</sup> Among many minimally invasive periodontal treatments is the technique of tri-immunophasic periodontal (TIP) therapy. By providing an apposite environment, damaged tissue in the human body can rebuild on its own. Similarly, it is hypothesized that periodontium can also repair itself following disease conditions when provided with the positive environment by fluctuating the personal and local factors which can affect immune phases. Based on this notion, US Periodontal therapist William Hoisington technologically advanced the TIP therapy to treat periodontal disease in an utterly new mode.<sup>[5]</sup> TIP integrates the concept of altering

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various immune phases to prevent immune-related risk factors and bone one-session treatment (BOST) technique to get freed of anaerobic bacteria. As a minimally invasive technique, this procedure aptitudes itself to be a safe and effective approach in the treatment of periodontal disease. Currently, there are only limited reviews available on the concept of TIP in periodontitis.

### PHASES OF IMMUNE SYSTEM AND TRI-IMMUNOPHASIC PERIODONTAL

The rapid and short response owing to acute inflammation can turn out to be nonphysiological or pathological if unresolved. It is well known that the resolution of inflammation in accumulation to repair and regeneration of lost periodontal tissues is based on the harmonized balance between the active and passive immune systems.<sup>[6]</sup> Tri-immuno-phasic therapy keeps in track of this equilibrium, thereby improving the condition for healing by ministering the damaged periodontal tissues in all three phases of the immune system. The three immune phases that affect the restoration of tissues include.

1. Vigilant readiness
2. Défense phase and
3. Repair and regeneration.<sup>[7]</sup>

#### Tri-immuno-phasic periodontal therapy

TIP Therapy aids the periodontist not only in reaching the bony defect but also permits the oxygen to spread to the deeper surface of the pocket thereby extinguishing anaerobic bacteria. These mechanisms avert the migration of pathogens into the bloodstream and thus avoid systemic complications such as coronary heart disease, infertility, low-term birth weight, and osteoporosis.

Researchers have sensed periodontal pathogens in the atherosclerotic plaque of coronary arteries. The exact mechanism of bacterial entry into the artery and the blocking mechanism needs to be reiterated. These concerns can be potentially alarming since the bacteria which enter into the systemic circulation can cause connective tissue destruction at a distance.<sup>[8]</sup> Healing the alveolar bony defect alike other bone defects in the human body remains the definitive goal of aerobic periodontics.

TIP constitutes various steps: (1) Bacterial DNA testing, (2) BOST, (3) aerobic oral hygiene regime, and (4) adequate and appropriate nutrition, lifestyle, and exercise.

#### Bacterial DNA testing

Gingivitis with some exceptions appears to be a polymicrobial infection with no single bacterial species and can be regressed to healthy state with passable oral

hygiene measures. Differing from the above-mentioned feature, periodontitis is related to certain bacterial species acknowledged to be the marker bacteria or periodontal pathogens.<sup>[9]</sup>

Treatment can be concentrated specific if provided the causative organism has been spotted precisely and at right time. The concept entrenched in bacterial DNA testing is that each periodontal pathogen has its own fingerprint of genetic material. This fingerprint can be noticed in the laboratory from the reference database to disclose the special bacteria that root the periodontal tissue destruction.

Recommendations for bacterial DNA test:

- Anyone with current active periodontal (gum) disease
- Symptoms include: Bleeding gums, loose or shifting teeth, painful chewing, bad breath, gum recession, and bone loss
- People with a history of periodontal disease in their family can be screened and spotted early before the bacteria have a chance to cause an infection
- People about to have dental implants can take the test to make sure that any prior periodontal infection is under control to protect the implants from getting infested.<sup>[10]</sup>

The procedure encompasses the placement of paperpoints in the gingival sulcus for a period of 10 s which is adequate to collect the disease-causing periodontal pathogen. This is a trouble-free, comfortable, and fast procedure. It evades the usage of empirical therapy which can take down the immune system. Once the disease-causing bacteria have been recognized, specific antibiotics can be given to encourage complete healing of the periodontal tissues.

Advantages of the test:

- Treatment planning
- Antibiotic choice
- Patient motivation and
- Treatment control (ones a year).

#### Bone one session treatment

It usually takes a period of about 4–5 h to complete one full mouth BOST procedure. Gingiva, Bone, and Periodontal attachment apparatus displays minimal damage during the recovery after the BOST procedure.

Steps in BOST:

- Stretch flap technique<sup>[5]</sup>
  - First step: This is an incision-free flap technique that encompasses the use of a curette to reach the deepest parts of the roots and the surface of

the bone. In this technique, universal curette is positioned deep inside the pocket with working or cutting edge facing the tooth surface that harbor's plaque and calculus. The blunt nonworking instrument end should face the soft-tissue lining of the pocket. A gentle pressure is applied on the soft-tissue wall in concurrence with the effort to remove the plaque and calculus. This permits the flap to get stretched without an incision [Figure 1]

- Second step: A circumferential movement is wielded with the instrument commencing from one corner of the pocket to reflect the flap without incision
- Third step: This step results in a smooth and regular bone surface. In this step, the rounded end of the curettes are inverted and positioned in contact with the bone, and osteoplasty is performed [Figure 2]. It allows fresh bleeding to flush out bacteria and toxins from the porosities of bone.

Occlusal adjustments can be done after BOST treatment to facilitate a healing environment. Treatment such as coronoplasty, enameloplasty, and splinting to redistribute the forces.

### Phases of healing after bone one session treatment

#### Step 1: Defense phase

The fresh bleeding clot formed on the surface of root and

bone affords a scaffold for the stem cells to get embedded as shown in Figure 3. The stems cells have been shown to move at a rate of 0.5 mm along the blood clot for over 8 days. This results in a thick outermost layer of the clot.<sup>[5]</sup> To permit this activity, it is also central to keep the epithelial attachment away from the roots. This is done with the oral hygiene technique that retains the pocket open and also obstructs the reformation of the sticky layer.

#### Step 2: Regeneration phase

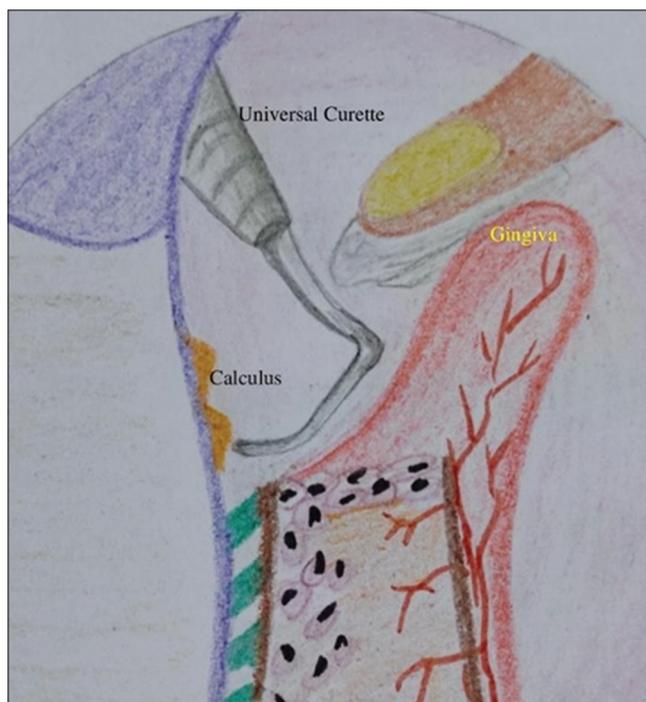
In about four to 6 weeks after the thickening of the clot, the pocket gets filled with a very dense and partially mineralized connective tissue from the base [Figure 4]. As the healing advances, this connective tissue matrix will become acellular.

#### Step 3: Healing with a new attachment

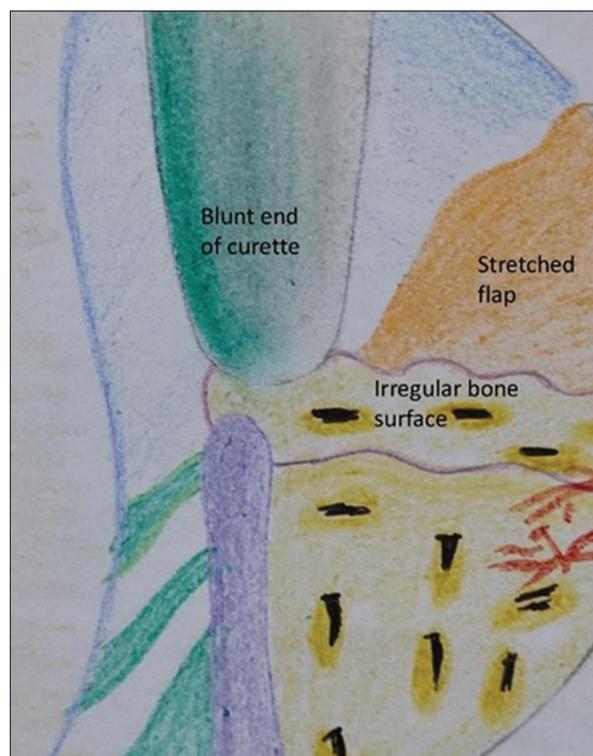
The bone naturally restores under this newly formed dense acellular mineralized connective tissue matrix. Approximately in 8 months, a new thick layer of cortical bone will be deposited over the rehabilitated inner (cancellous) bone. The final phase of healing occurs with the reformation of the bony crest cortical layer and the disappearance takes about 9 months. This healing has been stated to be visible on X-rays.<sup>[11]</sup>

Stepwise healing process:

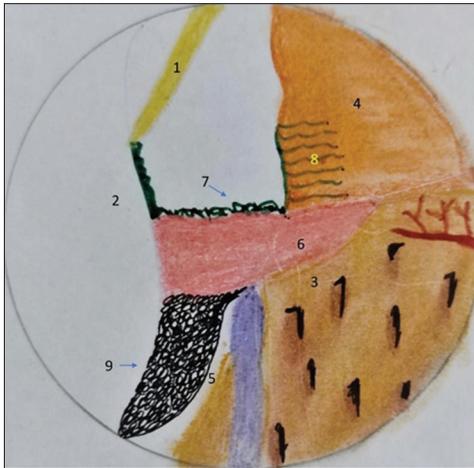
- 1<sup>st</sup> day– BOST



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



**Figure 2:** Degranulation and osteoplasty

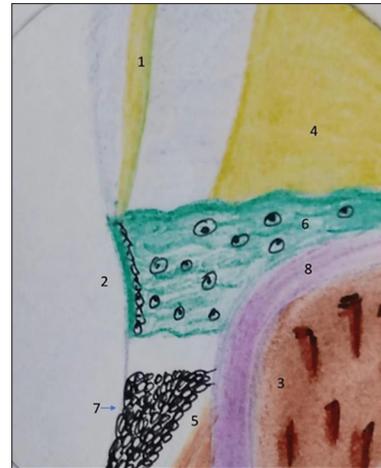


**Figure 3:** The clot that firmly attached to the clean bone serves as a scaffold. (1) Perio-aid, (2) tooth, (3) alveolar bone, (4) gingiva, (5) desmodont, (6) callus, (7 and 9) pluripotent stem cells, and (8) fibers

- Day 2 day– Oral hygiene regimen starts day 3 day– Blood clot is stabilized day 4 day– Pockets start to fill in
- Day 5 day– Lessening of inflammation day 8 day– Pocket sealing up
- Day 14 day– Normal chewing regimen starts day 30 day– Pocket filled up
- Day 35 day– Esthetic restorations can be commenced day 45 day–healing of bone begins
- By 9 months, the bone completely heals.

#### *Advantages of aerobic periodontal treatment<sup>[12]</sup>*

1. Less discomfort due to the absence of incision
2. Oral Hygiene can be resumed immediately
3. With incisional flaps, a millimeter of bone might be lost due to cut-off of the blood supply and exposure of the bone. In BOST procedure, where the tissue is just stretched, the bone surface stays covered with fluid, is protected, and retains its circulation ensuring minimal or no bone loss
4. The gingival tissue is upheld in its original height and is not transposed as it occurs in an incisional flap, thus preserving esthetics and minimizing sensitivity
5. Any minor retreatment afterward can be easily performed
6. Teeth with severe bone loss, considered despondent or too late for flap surgery, often are saved because they get tauten following BOST procedure
7. The treatment can be finished in a single appointment and thus reinfection can be prevented
8. Any esthetic procedures like crown and bridgework or implants can be proceeded immediately after the BOST procedure since the healing is faster and a healthy base is established



**Figure 4:** The pockets gradually fill in from the bottom with very dense, partially mineralized connective tissue. (1) Perio-aid, (2) tooth, (3) bone, (4) gingiva, (5) desmodont, (6) mineralized acellular connective tissue, (7) pluripotent stem cells (8) New dense layer of osteoid formation

9. Since the procedure is less traumatic, patient compliance is good
10. Less complications following the procedure.<sup>[12]</sup>

#### **Aerobic oral hygiene procedure**

The success of BOST depends not only on the technique but also is decided by the postoperative maintenance of the site. It is of importance to avert the apical migration of epithelium from the coronal end, to enable the population of cells from the base of the pocket. This step requires a special instrument called perio-aid to be used by the patient as a homecare method, where this aid is inserted deeper into the attachment and root surface to reduce the bacterial colonization as shown in Figure 4.

#### **Adequate and appropriate nutrition, lifestyle, and exercise**

Vitamin C and zinc are most significant for the healing of periodontal tissues. Lifestyle variations like quitting of alcohol and smoking can increase circulation and healing capacity of the gingiva and other supporting structures. Exercise should be counseled as it increases the circulation to bring in oxygen to the tissues as well as the vitamins and minerals that permit proper uptake.<sup>[13]</sup>

#### **CONCLUSION**

TIP therapy has led to the upsurge of new variations in treating periodontal disease. The procedure swings the body from the defensive phase to the regenerative phase to smooth the tissues for regeneration and new attachment by providing all the favorable environments around the healing area. Only restricted studies on these

techniques is available and it requires a larger number of studies in future to understand it entirely. This technique appears to be auspicious as far as the present evidence are concerned.

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### Conflicts of interest

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### REFERENCES

1. Arthiie Thangavelu, Rajasekar Sundaram, Tamilselvan Kumar, Sivakumar Annamalai. Evaluation of antimicrobial activity of *Punica granatum* against *Porphyromonas gingivalis*: An *in vitro* microbial study. J Soc Periodontol Implantol Kerela 2018;10:164-7.
2. Thangavelu A, Elavarasu S, Sundaram R, Kumar TS, Rajendran D, Prem F. Ancient seed for modern cure – Pomegranate review of therapeutic application in periodontics. J Pharm Bioallied Sci 2017;9:S11-4.
3. Elavarasu S, Suthanthiran T, Thangavelu A, Alex S, Palanisamy VK, Kumar TS. Evaluation of superoxide dismutase levels in local drug delivery system containing 0.2% curcumin strip as an adjunct to scaling and root planing in chronic periodontitis: A clinical and biochemical study. J Pharm Bioallied Sci 2016;8:S48-52.
4. Aeran H, Tuli AS, Rana MP, Aulakh BK, Vishnoi L. Minimally invasive periodontics – A future landscape. Int J Oral Health Dent 2019;5:180-3.
5. Hoisington W. Newer developments in perio: Tri-immuno-phasic therapy. Prev Dent 2006;1:30-4.
6. Cekici A, Kantarci A, Hasturk H, Van Dyke TE. Inflammatory and immune pathways in the pathogenesis of periodontal disease. Periodontol 2000 2014;64:57-80.
7. Kumar YP, Kalaivani V, Rajapandian K, Malakar M. Tri-immuno phasic periodontal therapy, WJPR World J Pharm Res 2016;5:356-60.
8. Harithra V, Siniya AG, Peter MR, Fenol A, Bhaskar A, Suresh R. Is bone one session treatment an ambit to A periodontist – Review. Int J Dent Sci Innovis Res 2020;3:265-9.
9. Flemmig TF. Periodontitis. Ann Periodontol 1999;4:32-8.
10. Slots J, Rams TE. New views on periodontal microbiota in special patient categories. J Clin Periodontol 1991;18:411-20.
11. Parikh H, Agrawal C, Shah K, Duseja S, Shah M, Virda R. Tri immunophasic periodontal therapy (Tip). World J Adv Sci Res 2019;2:192-8.
12. Priya JS, Yasaswini KP, Prasanna JS. Bone one session treatment: A new concept of treating periodontal diseases. J Oral Res Rev 2020;12:47-51.
13. Kumar KN, Mohan CP, Babu R, Srikanth C, Paul AR. New trends in periodontics. J Evol Med Dent Sci 2012;1:546-58.