



Current Innovative Non-Surgical Periodontal Treatment-Tri-Immunophasic Therapy: A Review

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Citation of this Article: Dr. Neelam Gavali, Dr. Vishakha Patil, Dr. Pramod Waghmare, Dr. Amit Chaudhari, Dr. Priya Lele, Dr. Prakash Vhatkar, “Current Innovative Non-Surgical Periodontal Treatment-Tri-Immunophasic Therapy: A Review”, IJMSAR – March – 2021, Vol. – 4, Issue - 3, P. No.46-51.

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Type of Publication: A Review Article

Conflicts of Interest: Nil

Abstract

Periodontitis is a group of inflammatory diseases that affect the connective tissue attachment and supporting bone around the teeth. It is widely accepted that the initiation and the progression of periodontitis are dependent on the presence of virulent microorganisms capable of causing disease. Although the bacteria are initiating agents in periodontitis, the host response to the pathogenic infection is critical to disease progression.

New research is demonstrating that a person’s total health is also related to their oral health. Elimination of all oral infections, including gingivitis and periodontitis, is important for overall health of the individual.

William Hoisington has developed a new technique (TIP technique) for the treatment of periodontal disease which is a non- invasive procedure. The human body has a capacity of healing and repair by

itself after any injury. TIP technique is the procedure which predicts the phenomenon in periodontal diseases healing and repair. Tri-immunophasic therapy acts by influencing the disease etiological factors and aiding healing by 3 immune phases. Immune phases are: vigilant readiness, defense phase, repair and regeneration. The tri-immunophasic therapy works by altering the pathogenesis and disease progression by changing the defensive phase against bacteria and other microorganisms into a regeneration phase to achieve a new attachment^{1,4}.

Keywords

Tri-immunophasic therapy, Bone one session treatment, Regeneration, DNA test.

Introduction

Advances in periodontal science and practice over the decade have changed the understanding of periodontal diseases and have opened new prospects for both non-surgical and surgical therapy of periodontal diseases. Mechanical methods of sub gingival debridement are accomplished by thorough scaling and root planing, accompanied with chemical plaque control procedures, have served as the gold standard of periodontal therapy for decades. The main objective in any periodontal treatment is control over the microorganisms and resolution of soft tissue inflammation and restoration of lost alveolar support. Resolution of soft tissue inflammation can be accomplished after scaling, root planning (SRP) and oral hygiene instructions.

TIP and BOST have been elaborated and tested over the past several years on over 2,500 patients with remarkably consistent success in saving teeth thought lost, and limiting anaerobic bacteria generated inflammation to an acceptable minimum (Hoisington et al 2005). Damaged bone can be healed similar to how a

broken bone heals. Damaged bone can regenerate with a gain in attachment.

US periodontal therapist, William Hoisington have developed a new technique for treatment that allegedly tackled the issue of periodontal disease in a new way. Tri-Immuno - Phasic periodontal therapy, otherwise known as TIP, allows practitioners to go up to the crest of the alveolar bone and destroy anaerobic bacteria – aggressive pathogens which not only causes degeneration of alveolar bone and gingiva, but also penetrate the body's circulation and contribute to systemic complications such as coronary heart disease, osteoporosis, pre term low birth weight and infertility⁴. Tri-immunophasic periodontal therapy methods include: Bone One Session Treatment, Controlling occlusal Forces, Oral Hygiene reinforcement with adjuvant modalities, Life Style modification, enhancing nutrition and exercise.

Hypothesis

The tri-immunophasic periodontal therapy, hypothesized that the body is capable of healing the periodontium as similar to the other forms of repair. When appropriate conditions are achieved damaged periodontal bone can heal as like other bones in the human body.

Immune System Phases

TIP periodontal therapy influence the local and personal factors which modify periodontal disease progression and improve the condition for healing by aiding the body in all three immune phases. The three immune phases are: vigilant readiness, defense phase, repair and regeneration⁴.

Phases of The Therapy

1. Defense phase (immune reaction to cleaning the bone after BOST),
2. Regeneration (stem cells)

3. Healing with new attachment(perio-aid)

First DNA test should be done to identify the bacteria to choose the antibiotic of choice.

Bone One Session Treatment

Hygiene that helps in formation of the new attachment and minimizes the risk reinjection, proper nutrition, exercise, stress release, smoking cessation.

Bost Steps

1. Stretched flap allows access all way down to the deep areas of the roots and the surface of the bone without incisions.
2. Removing local obstacles that prevent healing and contaminating roots or surfaces of the bone(plaque, calculus, granulations)
3. Cleaning and reshaping bone craters and necrotic surface of the bone

Bone one session treatment (BOST) is an aerobic treatment which eliminates periodontal disease in the deepest pockets. A typical BOST treatment of full mouth takes 4 to 5 hours during one day period. BOST treatment minimizes the damage to the gingiva, bone, and periodontal apparatus during treatment. It uses technique called stretch flap. The stretch flap technique allows access to the deepest areas of the roots and the surface of the bone, without giving incision.

Stretch Flap Technique^{1,4}

First Step

In this step universal 4R-4L curette is inserted inside the sulcus, where working end facing towards tooth surface and blunt non-working end facing tissue. A slight pressure is applied on tissue to begin stretching while removing superficial plaque and calculus. Access all the way down to the bone surface also means superb access to the deep root surfaces. If the sticky plaque layer and most of the calculus is removed the conditions are right, where the immune reaction of inflammation can

change into one of regeneration⁴. The goal is to achieve a smooth, regular bone surface and fresh bleeding to flush out bacteria and toxins from the porosities.

Second Step

The direction changes to a circumferential motion starting at the corner to mobilize the tissue and avoid pulling the papilla free and in essence creating an incisional flap. As healing time increases, the pockets gradually fill from the bottom with very dense partially mineralized connective tissue in a time period of 4-6weeks and finally it will become acellular.

Third Step

With the tip of the curette advancing first the surface of the bone can begin to be instrumented to remove attached granulation tissue, expose and plasty the bone porosities which help physically to remove microorganism and toxins in the pockets through the fresh bleeding.

The clot that is firmly attached to the clean bone serves as a scaffold. The stem cells can move along it and up the root surfaces at the rate of 0.05mm per day for eight days and thicken the layer on the clot. To permit this activity it is also important to keep the epithelial attachment away from the roots. This is done with the oral hygiene technique that keeps the pocket open and also inhibits the reformation of the sticky layer (yellow cone at the top)⁴.Mineralized acellular connective tissue (MAC) attachment is completed in one month.

Healing after Bost

After treatment the pockets gradually fill in from the bottom with very dense partially mineralized connective tissue in about four to six weeks and finally will become acellular. Once the new mineralized acellular connective tissue (MAC) attachment is in place in about a month, the bone naturally heals under it.A new

dense layer of cortical bone forms over the healed inner (cancellous bone) in about 8-9 months.

The final healed result with the bone crest cortical layer is reformed. This healing is visible on X-rays. Once this initial healing at four to six weeks has happened, whatever further treatment is required, whether selective surgery, implants, orthodontics, restorative or prosthetic dentistry, it will be easier in a better environment with a fully aware patient.

Coronoplasty & Splinting⁴

Objectives

Will control the Occlusal forces, prevent tooth mobility and further tissue damage.

With weekend periodontium, normal occlusal forces become traumatic and lead to shift of bite. Treatment includes enameloplasty, coronoplasty, and occlusal splint will redistribute the forces among all the teeth⁴ and help in healing by relieving traumatic forces.

New Oral Hygiene Routine

Brushing, flossing, and other conventional methods of dental hygiene used to maintain oral hygiene. Aerobic oral hygiene kit (Perio-aid) is created specifically to clean the area under gingiva and eliminate the disease causing anaerobic bacteria in deep pockets and into root concavities where brush and floss cannot reach. The idea is to reduce biofilm and aerate the subgingival areas all the way to the attachment and in the grooves and furcations. The patients are instructed to listen for the squeaky clean surface, look that no blood is on the aero tip and that the attachment feels firm.

Life Style, Nutrition and Exercise

The patients are advised to eat balanced diet and are instructed to avoid of excessive sugar, avoid of excessive snacks, avoid granular food like nuts, seeds, chips, whole grain breads etc. Increase intake of vitamins and minerals are advised. Vitamin c and zinc are most

important. The patients are advised cessation of smoking, smoking reduces circulation, smoking depresses certain immune cells. Exercise should be regular because it increases circulation to bring in building blocks and oxygen to the tissues as well as the vitamins and minerals that permit proper uptake.

Step Wise Recovery Process of Tip^{1,4}

Day 1: Bost Treatment Is Started Initially

Day 2: Patient Given Oral Hygiene Instructions

Day 3: Patient To Be Evaluated For Bleeding On Probing.

Day 4: Pockets Start To Fill In

Day 5: Process Of Reduction In inflammation Starts

Day 8: Pocket Sealing Up

Day 14: Resume Normal Chewing

Day 15: Check Up

Day 30: Pockets Have Filled In

Day 35: Esthetics Restoration Can Be Started..

Day 45: Bone Is Beginning To Heal

3 Months: Check - Up

In nine months bone is completely healed.

Advantages of Tip (BOST)

1. Non-invasive technique. Healing is much faster
2. Comfortable for a patient.
3. Less complications. No bone necrosis
4. Esthetically more acceptable.
5. Less sensitivity.
6. BOST is performed in a single session that sets up a better condition for healing.
7. Firm Mineralized acellular connective tissue attachment versus weak epithelium attachment that prevents from reinfection.
8. One final advantage of this process is the change to lifestyle and nutrition, encouraging better overall health¹.

Patients Ideally Treated With Tip And Bost Treatment

1. Patients concerned about esthetics
2. Patients who do not respond well to the initial periodontal therapy.
3. Everybody who has radiographically showing bone resorption.

DNA Test

Studies show that certain anaerobes can be best attacked inside the tissue with antibiotics (Beikler et al 2004). Using the Bacterial DNA test, we are able to identify exactly which bacteria are causing the infection. In the majority of cases, the DNA test will reveal that the type of bacteria that are present in the gums can be eliminated without the use of antibiotics.

DNA Test Significance

Bacterial DNA testing is based on the fact that each strain of bacteria has a specific "fingerprint" of genetic material. This fingerprint can then be analyzed in a laboratory to establish which species of bacteria are present in the infection.

Compared to culturing the bacteria, Bacterial DNA testing offers much greater accuracy as well as reduced cost.

Procedure for The Test

Administering the DNA test is a quick, safe, and a painless process.

Four tiny paper points are placed under the gums for a period of 15 seconds. This is long enough to collect disease causing bacteria from under the gums.

These bacteria thrive in the plaque--otherwise known as biofilm--that covers the tooth roots down to the attachment level.

Once they are removed, the paper points are packaged and sent to the laboratory where the bacterial

DNA will be analyzed to reveal which types of bacteria are present.

Necessity of DNA Test

The bacterial DNA test provides a scientifically accurate way of knowing which bacteria are causing the infection. Without the test, there is only one chance out of ten of choosing the right antibiotic combination to fight the bacteria under the gums.

When invasive bacteria are inside the tissue, on the roots and the bone, the B.O.S.T treatment can't reach them and antibiotics are needed to clear them out.

Without the focus given by the test, we are more likely producing resistant strains than good treatment results. Most patients find that it is very reassuring to know whether or not they have aggressive strains of bacteria in their gums.

If the Aa and Pg are not present, patients feel relieved immediately. Patients who test positive for the aggressive strains of bacteria, gain a better understanding of why they have had such a difficult time with periodontal problems in the past.

The patients can feel hopeful for the future because they know that they will receive properly targeted antibiotics in addition to effective local treatment.

Advantages of The Test

1. Is a quick reliable method⁵.
2. Several samples can be tested simultaneously.
3. Treatment planning.
4. Proper use of antibiotics.
5. Patient motivation

Conclusion

The BOST treatment uses a stretch flap technique that protects the tissue and the bone. Periodontally infected tissue loses its fibrous nature and becomes spongy, which allows the clinician to stretch it

out and provide access to the base of the pocket and bone surface without cutting the tissue. This keeps the blood supply to the bone intact, avoids bone necrosis, provides good access for removal of bacterial contaminants, and access to the infected bone. Using a brand new curette, instrumentation at the crest of the bone, stimulates the stem cell expression from the periodontal ligament. The healing process fills the pockets in from the bottom and stimulates new bone and connective tissue formation. The use of the aerobic oral hygiene acts like a membrane to keep the epithelium away from the roots.

To conclude, a non invasive technique (TIP) can alter the pathogenesis by removing the etiological factors as well as guide the tissue for regeneration and new attachment.

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(IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 13, Issue 2 Ver. IV. (Feb. 2014), PP 104-107 www.iosrjournals.org