The Effects of Locally Dėlivered Spirulina Gel with and without Diode LASER Therapy as an Adjunct to Non-Surgical Periodontal Treatment of Stage II Periodontitis: Randomized Controlled Study

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Introduction

Introduction

- Interleukin-1 beta (IL-1ß) is a powerful pro-inflammatory cytokine produced mainly by activated macrophages in response to infection or tissue damage.
- IL-1ß contributes to the destruction of the periodontal tissues by enhancing collagen breakdown and stimulating osteoclast activity, leading to bone loss.
- The primary cause of connective tissue breakdown and bone resorption in periodontitis is the host's inflammatory response to bacterial plaque
- The immune system releases pro-inflamatory mediators (like interleukins, TNF-a, and others)

Introduction

- Non-surgical periodontal therapy is aimed to eradicate periodontal pathogens. Although, scaling and root surface planing (SCR) is considered as a gold standard but there are some limitations however use systemic antimicrobial adjunct to overcome such previous limitation of SRP has many problem also .

- So, To avoid the complications associated with systemic administration of antibiotics we chose local drug delivery concept, where a sustained and controlled release is achieved in the deep of periodontal pocket

Introduction

- **Spirulina** is a blue-green alga which is rich source of proteins and vitamins, like B12 and provitamin A (β-carotenes),and minerals. Also, it contains high levels of phycocyanin, It has anti-inflammatory, immunomodulatory, antioxidant that it could inhibits proinflammatory cytokine formation

- ***Mahendra et al***, conducted a study to assess the clinical effects of Spirulina gel as an adjunct to SRP in the treatment of chronic periodontitis. The authors conducted that spirulina has strong anti-inflammatory effects and antioxidative activity

Introduction

- **Diode lasers (DL)** was used to eradicate periodontal pathogens . In research based on its bactericidal and detoxification effects. Also, a diode LASER can accelerate wound healing, facilitate collagen synthesis, accelerate angiogenesis and enable hemostasis
- ***Suprith et al*** conducted a study to compare the effects of a diode laser as an adjunct to SRP versus SRP alone. And the result has been shown SRP with diode laser produced a significant improvement in probing depth and clinical attachment level values when compared to SRP alone.

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Aim of Study

Aim of the study

The aim of this study is to evaluate the clinical and the immunological effects of locally delivered spirulina-gel with and without diode LASER therapy as an adjunct to non-surgical periodontal treatment of stage II periodontitis.

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Material and method

Forty five sites were selected from patients according to the following Criteria:

- Patient’s ages ranged from 25 to 55 for both genders.
- Systemically healthy patients.
- positive attitude toward oral hygiene.
- Nonsmoker, non-pregnant and non-lactating
- Having residual pockets showing probing depth of 5 mm.

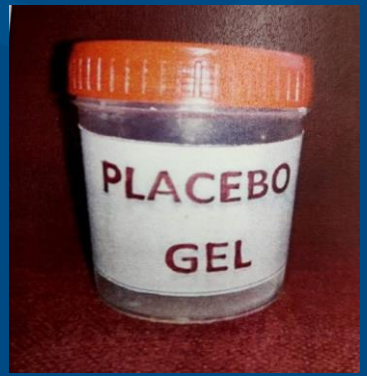
The selected participants were randomly assigned into three groups

Group A	Group B	Group C
treatment by SPR + sub gingival delivery of spirulina gel	treatment by SPR + sub gingival delivery of spirulina gel activation by Diode LASER.	treatment by SPR + Methyl cellulose (placebo gel).

Materials:

- Spirulina gel.
- Placebo gel (methyl cellulose gel).
- Diode LASER (Elexxion co.)
- ELISA kit for interleukin 1 beta



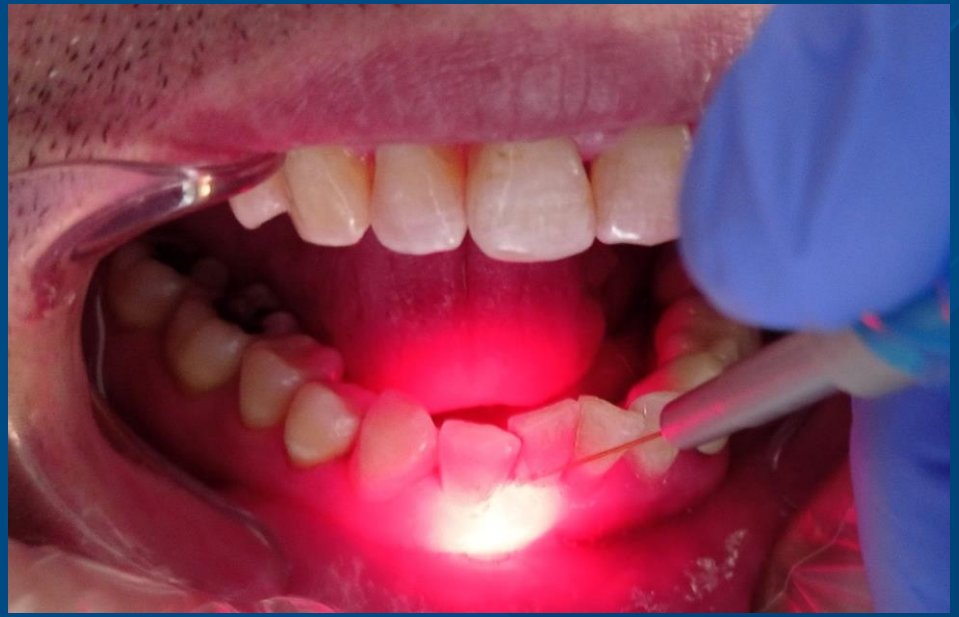








Spirulina Gel Application



LASER Application

The Study Groups Were Compared Via

(A)
Clinical assessment

(B)
Immunological assessment

Clinical Assessment

The following parameters were recorded at each selected site at baseline (before treatment), three and six months for all the patients:

1. **Probing pocket depth (PDL)**
2. **Clinical attachment level (CAL)**
3. **Bleeding on probing (BOP)**



Unc Probe



Measure probe depth



Acrylic Stent

Immunological Assessment

THE level of Interleukin- 1β (IL-1β) in GCF::

parameters were recorded, at Base line Then 6 months



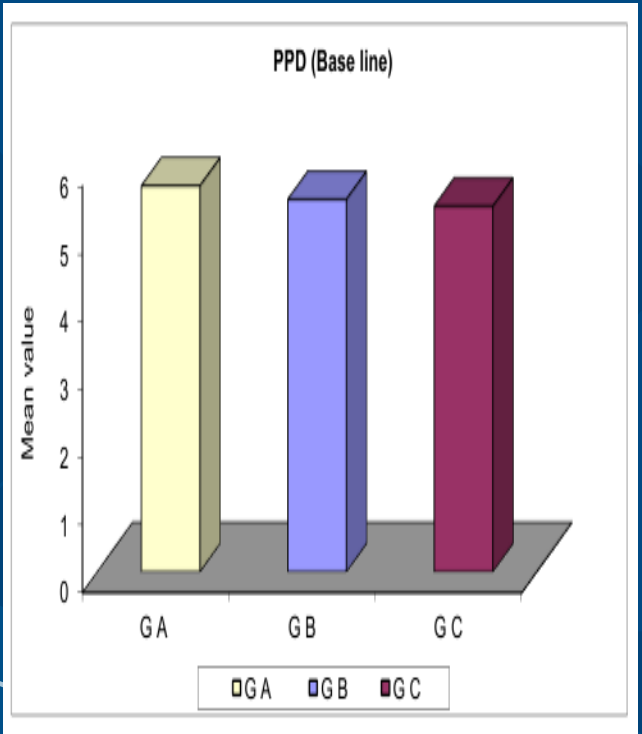
Sample collection

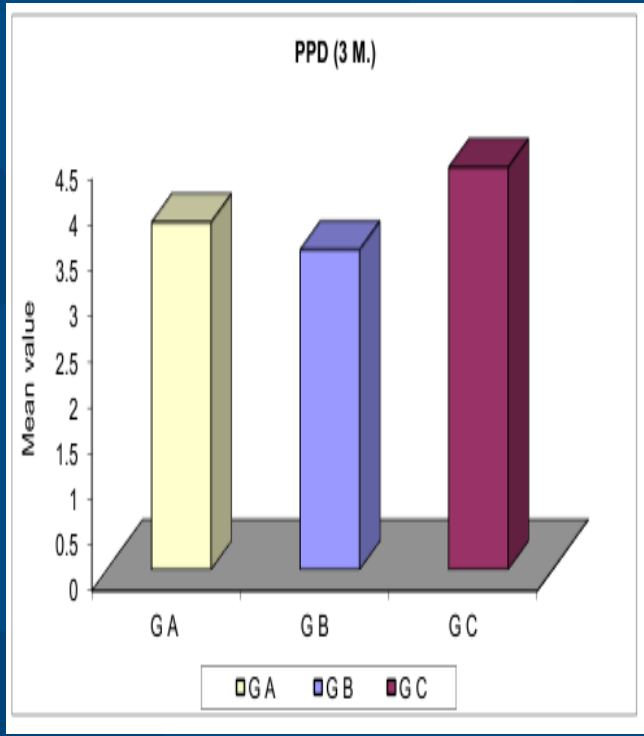
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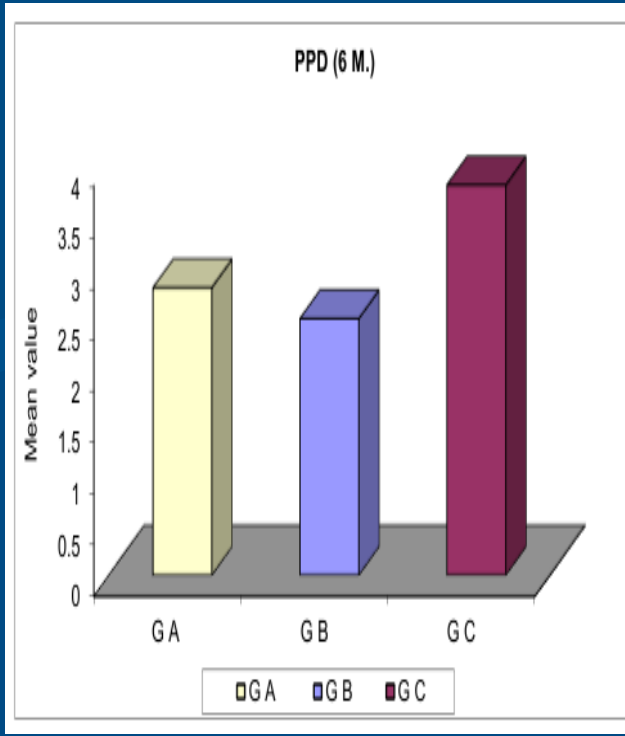
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Clinical Results

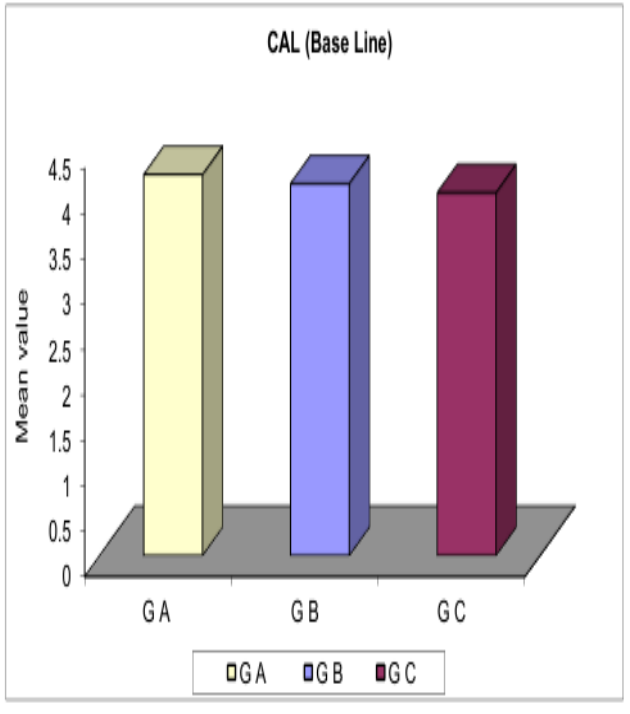
Probing pocket depth (PPD):

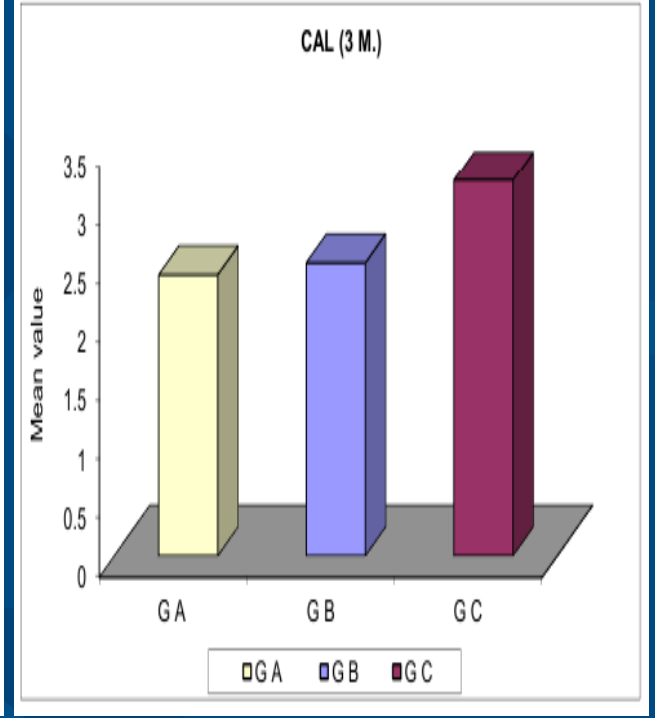


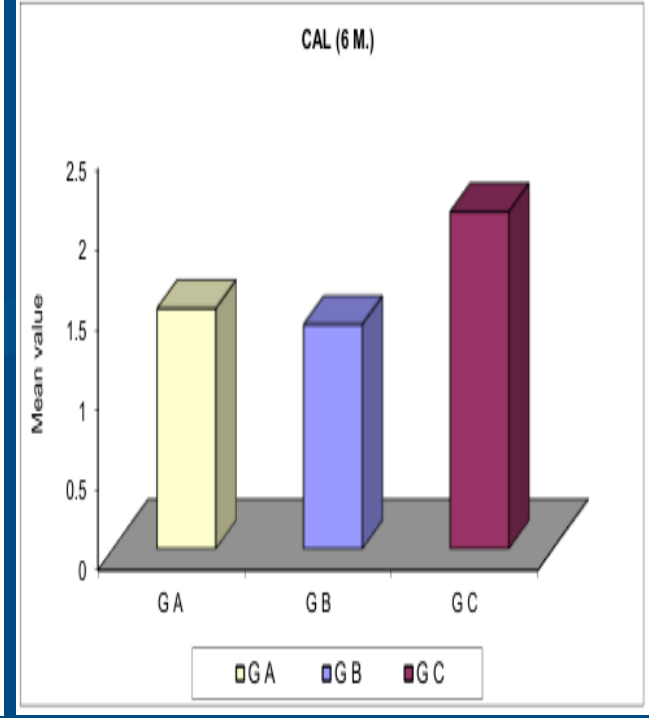




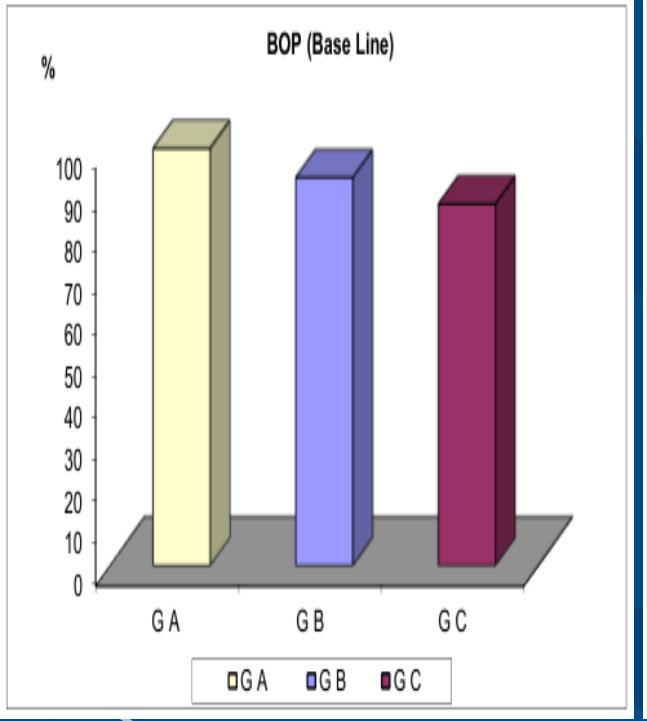
Clinical attachment level (CAL):

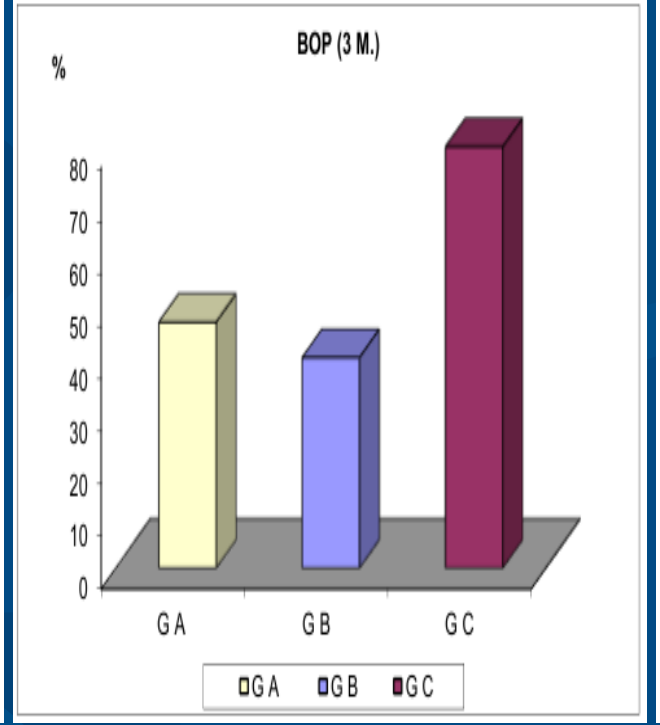


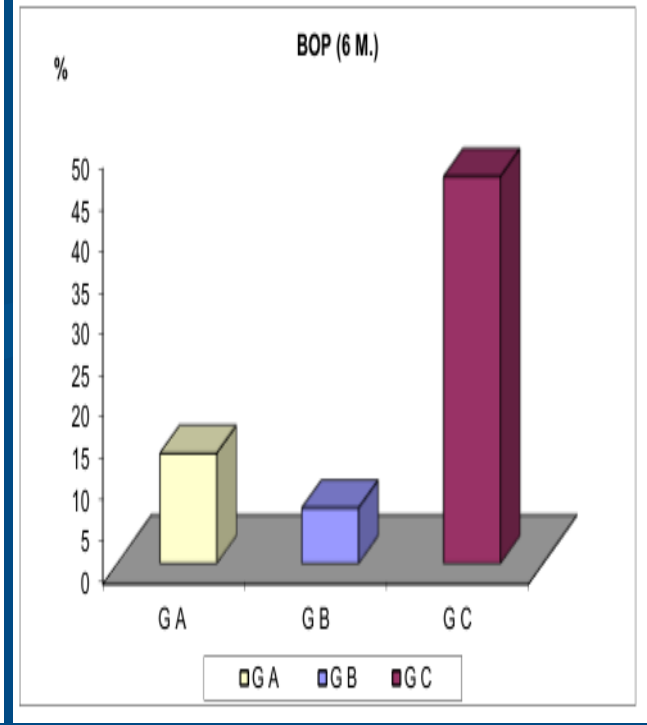




Bleeding on probing (BOP):







CASE I (Group A)



Baseline



After 3 month



After 6 month

CASE II (Group B)



Baseline



After 3 month



After 6 month

CASE III (Group C)



Baseline



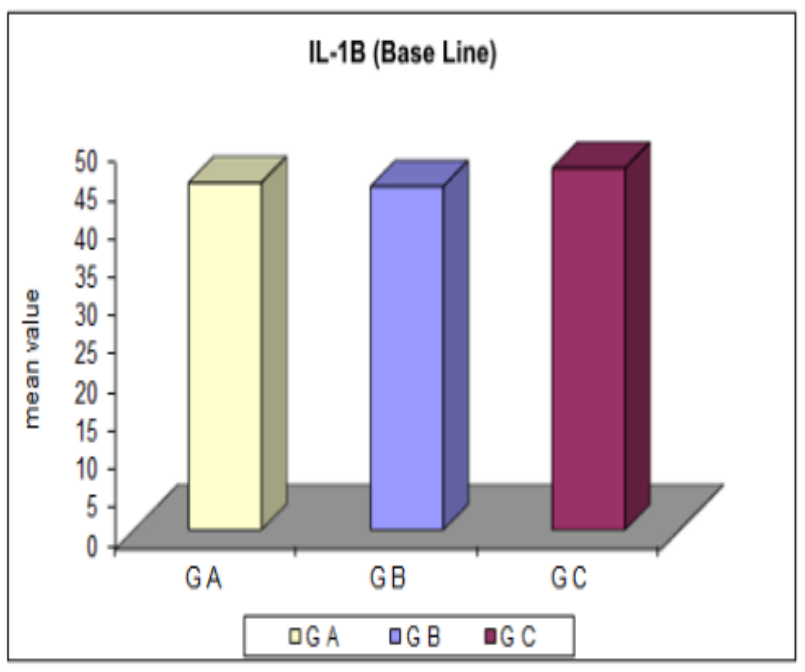
After 3 month

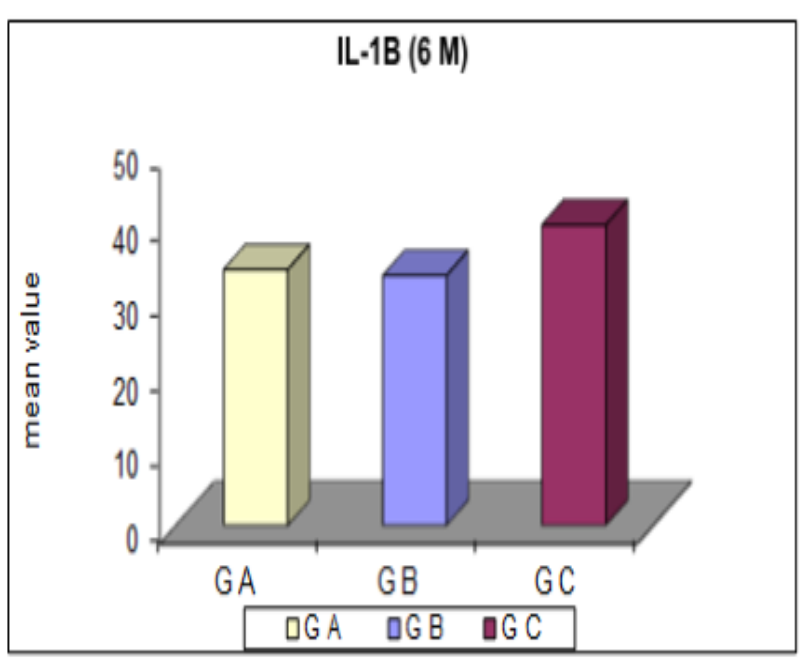


After 6 month

Immunological Results

Measurement of the levels of IL-1β in GCF samples.





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CONCLUSION

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- Spirulina demonstrates a potential anti-inflammatory therapeutic effect with a marked decrease in inflammatory mediator (IL-1β) concentrations in gingival cervical fluid.
- Spirulina gel potentially produces improve of periodontal condition with improvement of clinical and immunologic parameters
- Diode laser application offers sustained clinical benefits throughout the study period
- The combination of spirulina and diode laser therapy however, did not yield significantly better results than *Spirulina* alone diode laser activation may not enhance the efficacy of spirulina in this context.
- Subgingival application of spirulina gel can be used as adjunctive to SRP in the management of stage II periodontitis alone or with diode laser activation

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RECOMMENDATIONS

RECOMMENDATIONS

- Longer-term studies with larger sample sizes are required to fully evaluate the long-term effects of diode laser-activated spirulina gel in the treatment of Stage II periodontitis.
- We need to extend the research on herbal drug as an adjunctive therapy in periodontitis because herbal drugs are safe and it has an effective role
- Further studies, including histological analysis, are needed to determine the specific nature of tissue attachment achieved with the drugs under investigation.
- Future studies should try another parameter in diode LASER like, wavelength and watt to study effect of various wavelength on *Spirulina*

Thank you

