Evaluation of the effect of low energy laser on gingivitis


ABSTRACT
Background: Surgical lasers have been used in medicine for over a decade in the surgical specialties of the laryngology, dermatology, plastic surgery, urology, gynecology and cardio-vascular surgery. All the clinical applications of laser discussed previously require the use of relatively high power laser devices. In dentistry laser research and development is in its embryogenic stage and its use on hard dental structures has been scarcely reported. The treatments of gingivitis by laser radiation has not investigated; so the aim of the present study was to shed light on the effect of low-energy laser on gingivitis, and the main indication for the therapeutic affect of laser because of its anti-edematous and anti-inflammatory actions.

Materials and Methods: Twenty patients complaining from mild edematous gingivitis affecting the upper six anterior teeth were divided into two groups: 1: 10 laser treated patients group and 2: 10 patients (control group). The analysis of the results was according to the criteria of condition worsening, no change or improved and analysis of variance bleeding (G I) was performed.

Results: Five out of 10 patients exhibited no change while 4 out of 10 were better than from the beginning, while 1 out of 10 was worse than the beginning.

Key word: Soft laser, gingivectomy, gingivitis.

INTRODUCTION
The term "Laser" is an acronym derived from "light amplification by stimulated emission of radiation" and that the energy produced by a laser, is a function of the type of substance that is being stimulated to emit, the radiation. Since laser was first developed by Maiman in 1960 there have been many investigations of its possible medical applications.

The use of laser in its relationship to dentistry is a relatively new tool. Surgical lasers have been used in medicine for over a decade in the surgical specialties of the laryngology, dermatology, plastic surgery, urology, gynecology and cardio-vascular surgery. All the clinical applications of laser discussed previously require the use of relatively high power laser devices.

Gingivitis is one of the most common complaints in dental practice; and more than 90% of the population suffers from periodontal disease. Clearly laser can not improve the patient oral hygiene, nor can it remove plaque and for this reason, the dissemination of information, good patient motivation and of course scaling of dental calculus must be from the basis of treatment. However, patients often have difficulty in maintaining good teeth hygiene because of bleeding and pain, and for such patients they can helped by laser treatment of each papilla, after which the patient can be sent home, after a day or so, the patient return for further treatment, at which time it will be possible to depurate thoroughly, because of the anti-inflammatory and anti edematous effect of low-energy laser will have reduced bleeding from the inflamed gingiva and also reduced pain. Therefore, the quality of time depuration will be improved and the treatment will take less time because subgingival tarter will be for more visible owing to the elimination of the pseudo-pockets.

Aims of the Study
The aim of the present study was to shed light on the effect of low-energy laser on gingivitis, and the main indication for the therapeutic affect of laser because of its anti-edematous and anti-inflammatory actions.

MATERIALS AND METHODS
This investigation was carried on 20 patients attended College of Dentistry, University of Baghdad, chosen according to the following criteria :-
1- Patient age over than 21 years.
2- Minimal calculus.
3- Scores inflammation mild gingivitis "scores 2".
4- Intact crestal lamina dura.
5- No radiographic evidence of bone defect.

The 20 patients who complained from mild edematous gingivitis affecting the maxillary six anterior teeth divided into two groups:-
1- Laser treated group:
Ten patients were treated by low-energy 1. R 904 nm laser (Gallium Arsenid laser). Irradiatiot was made to the gingiva by continuous beam of laser fix*5 minutes for each papilla and labial gingival margin, then the patient was given another 4 laser treatments on alternate days. During treatment after 5 days we checked the gingival index of the anterior teeth, then after finishing the
treatment. The result was achieved by direct observation and inter-viewing patients to know how much they complained from their symptoms, "bleeding from the gums and pain.

2- Control group:
This group consists of 10 patients, and these patients were given instructions and motivation in the first day and in the second day we did scaling and polishing for the maxillary anterior teeth only and after 10 days the results were achieved by the same way as in the treated group.

The analysis of the results was according to the following criteria: the condition was worsening, no change and improved and it was performed using analysis of variance bleeding (GI)

RESULTS AND DISCUSSION
The result of this study was, by inter-viewing patients treated by laser who complained from mild gingivitis mean of gingival index (score 2). Five out of 10 patients had no change while 4 out of 10 experienced better results than from the beginning, while 1 out of 10 was worse.

By clinical examination (table 2) 4 out of 10 patients experienced a mean gingival index (0.5) which was the lowest score while one patient still had mild gingivitis which is score 2. This means that the patient responded to laser treatment while there is no significant difference between treated group and control group. The laser treatment decreases the pain and inflammation to help the patient who has gingivitis for motivation and to improve oral hygiene. Many studies reported that the low-energy laser has anti-inflammatory effect who suggested that the effect of low-energy laser depends on the fact that laser penetrates the tissues fluid (1-3). The energy may be absorbed where the concentration of fluid is highest and thus more easily absorbed by inflamed and oedematous tissues. Since the low-energy laser has these effects we tried it to reduce the inflammation and thus to reduce the gingivitis.

Mester reported on the use of low-energy laser radiation to stimulate tissue repair. (4) The effect of low-energy laser has shown that it improves healing of injured tissues by stimulation of fibroblasts proliferation, increased vascularization and accelerated epithelization of the irradiated area in the early healing period (5-7). These findings are supported by other studies as Escola et al. who claimed that He-Ne laser has a beneficial action on the processor kiranization of gingival tissues of following tooth extraction. (8) Takeda suggested that low-energy laser has a beneficial effect on initial bony wound healing. (9) Others suggested the use of laser for reduction of gingivitis and patient's complaint due to the anti-inflammatory and analgesic effect of laser as suggested by (11)

### Table 1: Mean of gingival index during treatment (after 5 days)

<table>
<thead>
<tr>
<th>Laser treated group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>Mean of GI</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>10</td>
<td>1 + 0.79</td>
</tr>
</tbody>
</table>

No Significance difference for P 0.5, T=0, df= 8.

### Table 2: Mean of gingival index after treatment

<table>
<thead>
<tr>
<th>Laser treated group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>Mean of GI</td>
</tr>
<tr>
<td>4</td>
<td>0.5</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>1.5</td>
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<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>1 + 0.79</td>
</tr>
</tbody>
</table>

No Significance difference for P 0.5, T=0, df= 8.

REFERENCES