Low level laser treatment for dentinal hypersensitivity

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ABSTRACT

Background: Dentinal hyper sensitivity is a problem in many ways in IRAQI patients, the cause of this hyper sensitivity usually exposure of dentinal tubular for many reasons, reduce or loss enamel and cementum covering which expose them to external stimuli, hot, cold, chemicals, sweat or even air.

Material and Methods: Seventy two patients had been examined and treated with 238 teeth affected, 29 males, 43 females from different causes of hypersensitivity and treated with low level laser Beams with different doses and durations without any chemical agents.

Results: The study revealed about 93 % successful result often receiving different doses with different visits.

Conclusion: Desensitization with LLLT to these patients was successful time consuming and easy for the patient and dentist.

Keywords: Laser, dentinal hypersensitivity. (J Bagh Coll Dentistry 2011;23(4):112-115).

INTRODUCTION

Dentinal hypersensitivity caused by exposed of (18,000-40,000) Tubules per mm² to external stimuli (1,2) which causes pain with different levels, and according the hypothesis of Branston et al (1) of hydrodynamic theory revealed that the mechanism of movement of the dentinal fluid inside tubules is capable of stimulation pulp nerve and causing pain, this theory is widely accepted (2).

To overcome pain many chemicals are used either alone or incorporated with dentifrices, all contains desensitized ingredients like with potassium nitrate 5% (19-14), resins like sodium citrate with sodium mono fluorophosphates (21), stannous fluoride (SNF²) gel also used with clamping of good results (11,15,16), all the above chemicals need multiple and longtime applications.

MATERIALS AND METHODS

A total of 72 patients had been seen in private clinic 43 females and 29 males with 238 teeth involved with some kind of hyper sensitivity age 23-51 with the main of 31.7 % initial examination includes; interview, condition of teeth involved, severity and duration of pain and any possible cause for that.

The selection criteria include:-

1- No carious lesion found or left.
2- No periodontal or apical involvement.
3- All patients are medically fit.
4- No pre-operative treatment preceded

These patients had been seen between Jan 2007-& dec-2010 and treated with (clean –line) diode laser machine which give LLLT Beam’s

- Visible red laser 50 MW 2mm Beam exposure time of 80 second with the sum of 4J/cm²
- And 5 second Blep, used for surface penetrations.
- Infra. Red 120 MW 2mm Beam 33 seconds giving the sum of 4J/cm² and 5 second Blep, this used for deep penetrations.

All teeth isolated and dried with cotton rolls, the treatments arranged in visits each case given different doses & point of application according to the tooth affected and nature of sensitivity.

RESULTS

It had been group in 4 groups.

1- Cervical hyper sensitivity, one point of application and 2 J/visit for central and lateral upper and lower incisors, for premolars upper and lower 4 J/visit, usually with red visible laser.

2- Prosthetic teeth 4 J/visit, 2 point of application buccal and lingual with IR laser.

3- Bleached teeth, 4 J/visit, one point of application (buccal).

4- Deep sensitive cavities – 4 J/visit one point of application inside the cavity against pulp.

All applications are perpendicular to the axis of the crowns, the application discontinue in cases of pain during treatments application.
Cervical hypersensitivity 2 J a 2/21 2/12 visit VR one point – B

Cervical hyper sensitivity 4 J a 43/543 34/345 visit VR one point – B

Prosthetic teeth 4 J a visit IR 2 432/4321 234/1234 point B xL.

Deep cavities 4 J a visit one 64/765 46/567 point V.R. inside

Bleaching hypersensitivity 4 J 2/421 2/124 a visit one point VR.B


Number of patients and teeth in different causes

- Cervical lower teeth 20 patients

12 expose cementum total 42 teeth 21/12

8 expose dentine total 29 teeth 54/45

-Prosthetic teeth

Total 23 patients

12 patient total 56 teeth 43/34

11 patients total 44 teeth 21/12

- Deep cavities without Pulp exposure.

22 patient total 45 teeth 64/765 46/567

- Bleached teeth total 22 teeth 2/21 2/12
Number of visit to control pain

<table>
<thead>
<tr>
<th>Number of teeth improved</th>
<th>percentage</th>
<th>no. of visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>23.2%</td>
<td>1</td>
</tr>
<tr>
<td>95</td>
<td>40%</td>
<td>2</td>
</tr>
<tr>
<td>64</td>
<td>27%</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>6%</td>
<td>4</td>
</tr>
</tbody>
</table>

The rest of patient’s teeth showed no improvements

<table>
<thead>
<tr>
<th>Group of teeth treated</th>
<th>No.</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower central &amp; lateral incisors</td>
<td>98</td>
<td>41.1%</td>
</tr>
<tr>
<td>Upper lateral incisors</td>
<td>17</td>
<td>7.14%</td>
</tr>
<tr>
<td>Lower and upper premolar</td>
<td>59</td>
<td>24.78%</td>
</tr>
<tr>
<td>Upper and lower canines</td>
<td>26</td>
<td>10.9%</td>
</tr>
<tr>
<td>Upper and lower molars</td>
<td>38</td>
<td>15.8%</td>
</tr>
</tbody>
</table>

DISCUSSION

In the cases of chemical treatment of dentinal hypersensitivity different desensitizing agents used like potassium nitrate 5%, Tarbet et al (19) Shiff (14) dental resins like sodium citrate and sodium mono fluorophosphates Silverman (21) dentifrice and gels containing stannous fluoride (SNF$_2$) also used by Boyd et al (15-16) Thrush et al (12) Snyder (11) all claim good results with multiple application.

The new LLLT applications act in two ways:
- Immediate action, which result in reduction of pain intensity immediately after application due to maintenance of resting potential of pulpal nociceptive receptors membrane, with suppression of the evoked potential of pulpal nociceptive fibers. (10).
- Delay effect, recent study of Sommer et al (9) suggested parameters for energy density and intensity should be a biologically independent and that correct way to deposit energy on treated area may be directly linked to success or failure of laser energy.

LLLT create photo modulation effect that increase the odontoblast cell metabolic activity to produce tertiary dentine, so obliterating canaliculi with intensified production (7,22).

Ladalarde et al observed immediate and delay analgesic effect of red and infrared laser controlling pain (11) also the perpendicular application of laser beam to pulp to promote odontoblastic stimulation. Brugnera junior et al (3) stated:-

1- Primary or immediate effect remission of painful symptoms.
2- Secondary late effect, intense cellular metabolism, proliferation of odontoblast, production of tertiary dentine (4).

According to Wakabayashi (10) the immediate effect reported immediately by patient after treatment, he added there is increase in nerve ending threshold for pain.

Kasai et al (11) justified the immediate analgesic effect as a result of the interruption of the nerve impulses path in affected nerve fiber, he conclude that laser act as reversible suppression directly on neuronal activity, the present study shows LLLT when used in moderate way without intensifying dose or visit without exceeding 4J a visit and 2-3 days or more between visits it can give good pain relieve to patients, also giving more time between visits may be helpful to patients because it has been observed different reaction of patients to the timing of the visits, some needs more time to have the effect of exposure than other. Out of the 72 patient treated 93% have good response and cure.

REFERENCES

6- Mezawa S, Iwata K, Naito K, Kameogawa H. The possible analgesic effect of soft laser irradiation on...
9- Sommer AP. Personal communications.