Diode-laser Management of Puberty-induced Gingivitis and Grade II Gingival Enlargement in a Female Patient: A Case Report

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Abstract:
Although gingival curettage is the conventionally recognized procedure for management of inflamed tissue, readily available and economical diode lasers – the most commonly used lasers – help in nonsurgical management of gingival inflammatory changes. A case report is described here in which diode laser is used to treat puberty-induced gingival enlargement. The case report shows a new approach to managing puberty gingivitis, which commonly shows inflammatory enlargement that does not completely regress after puberty is over. The enlargement is usually an exaggerated response to local plaque due to high amount of hormones, such as estrogen and testosterone. The changes are relatively nonspecific, with color and contour changes, and are associated with bleeding on mild stimulation. Diode lasers are the best option to eradicate bacteria from gingival pockets and achieve reliable long-term results.

Keywords: diode laser, puberty gingivitis, gingival enlargement, pocket disinfection, curettage.

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Puberty-associated gingival enlargement is sometimes seen in both males and females, and usually occurs in individuals with inadequate oral hygiene.[1] The enlargement associated with puberty has all the clinical features of chronic inflammatory enlargement and usually reduces after puberty. The enlargement does not disappear completely, due to the presence of local inflammatory factors.

In most cases, the enlargement is an exaggerated response to local plaque due to high amount of hormones, such as estrogen and testosterone.[2] The changes are relatively nonspecific, with color and contour changes, and are associated with bleeding on mild stimulation. Capnocytophaga sp. are implicated with initiation of pubertal gingivitis.[3] Other studies suggest Prevotella intermedia and Prevotella nigrescens are also associated with the condition.[4,5]

CASE REPORT

A 17-year-old female reported to the office with chief complaint of gingival bleeding on slight provocation and of unesthetic gingival overgrowth (Fig 1). She had had gingival enlargement and bleeding for the past 18 months. Upon examination, it was found that minimal local irritants were present and the response of tissue was exaggerated. She worked on a farm and had a low socioeconomic background. There was marginal and papillary enlargement suggestive of grade II gingival enlargement.[6]

The gingiva was reddish blue in color and inflammation extended from tooth 13-14 and 34-43 regions. Additionally, small flecks of calculus were present on tooth 11, but no other areas showed any deposits. The patient had Angle Class I malocclusion with the upper

Fig 1 Preoperative view showing gingival overgrowth.

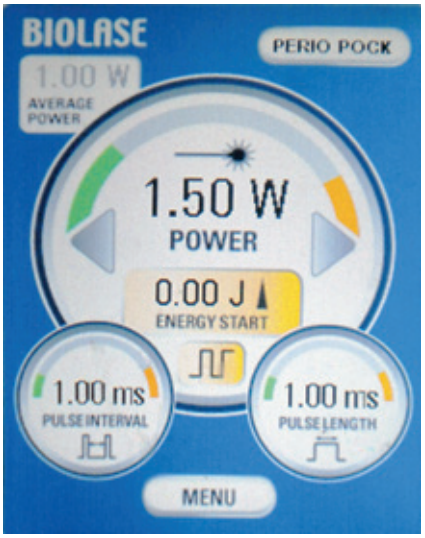

Fig 2 Laser settings for pocket disinfection: 1.5 W with pulse interval of 1.00 ms and pulse length of 1.00 ms.

Fig 3 Laser settings for debridement of granulation tissue and pocket epithelium: 3.5 W pulsed mode with a pulse length 0.50 ms and a pulse interval of 0.20 ms.

and lower midline not coinciding. The decision to perform laser-assisted curettage was made.

Procedure

Informed consent was obtained from the patient. The area was anesthetized using Xylocaine spray (Lignox 2% Warren Pharma; Navi Mumbai, Maharashtra, India).

The first step was pocket disinfection using a diode laser (Ezlase 940 nm; Irvine, CA, USA). For this, a non-initiated tip of 300 µm was used. The settings were 1.5 W with pulse interval of 1.00 ms and pulse length of 1.00 ms (Fig 2). The tip was moved from the apical to the coronal direction and was not kept at one site for more than 5 s.[7] After pocket disinfection, the area was scaled with an ultrasonic scaler (EMS; Nyon, Switzerland). After scaling a thorough root planing was done with Gracey curettes (Hu-Friedy; Chicago, IL, USA). The pocket was rinsed with normal saline to remove any blood clots formed. The third step included pocket debridement using a 300-µm initiated tip at 1.4 W in continuous mode. The granulation tissue and pocket epithelium were debrided using a sinusoidal movement of the tip from the apical to the coronal margin of the gingiva.[7] The setting used were 3.5 W pulsed mode with a pulse length 0.50 ms and a pulse interval of 0.20 ms (Fig 3). The pocket was again rinsed with normal saline to remove all the debris from the pocket. Then the outer surface epithelium was denuded and plasty

Fig 4 The outer surface epithelium was denuded and plasty was done to recontour the gingiva.

Fig 5 Postoperative view.

was done to recontour the gingiva (Fig 4). No postoperative dressing was applied. The patient was given standard postoperative instructions. The prescription included an analgesic to be taken if needed and Doxycycline Hyclate to be taken for 1 week postoperatively.[8] The patient was recalled after 1 week and then 3 weeks. After 4 weeks, only one site, ie, tooth 11, was found to have responded poorly to therapy (Fig 5).

DISCUSSION

Upon recall, the patient did not complain of any postoperative bleeding or pain. Analgesics were needed only during first 24 h. Three weeks postoperatively, there was complete regression of swelling and gingival color had changed to pink, except for tooth 11, which needed retreatment at that site.

Puberty usually occurs at an average age 15.4 years in an Indian female of low socioeconomic status.[9] The presence of gingival color and contour change in the presence of minimal local irritants suggested that puberty was associated with gingival changes. Absence of nodular and pink enlargement with lip competence helped to rule out mouth-breathing-associated overgrowth. Delaney and Kornman suggest levels of black pigmented bacteroides increase with increased levels of gonadotrophin hormones.[10] Kornman and Loesche also proposed that gram-negative bacteria usually substitute ovarian hormone for Vitamin K growth factor.[11] Capnocytophaga sp. also increases in level. These are assocated with increased bleeding tendency.[12] Studies have shown that Prevotella intermedia and Prevotella nigrescens are associated with progression from gingivitis to periodontitis and with increased activity at diseased sites.[13,14]

Laser is monochromatic light. Laser was chosen as the treatment method because it has photothermal, chemical, and plasma-mediated effects.[15] The absorption of UV or visible light by organic molecules leads to stimulation of π electrons or n electrons, causing a photochemical reaction. This causes deformation of the binding angle, and deformation vibrations can weaken or break up chemical compounds. Laser irradiation has a bactericidal effect based on changes in the cell membrane. An indirect irradiation of ca 1 W leads to vesicle formation, called "membrane blebbing", which is caused by splitting of the inner layer from the outer two layers.[16] Mortiz et al[17] suggested diode laser to be effective and a useful addition to conventional therapy. He also suggested that diode has a bactericidal effect and is able to reduce inflammation in combination with scaling. In a different study, Moritz et al[18] showed that, when used along with scaling, laser supports healing of periodontal pockets by eliminating bacteria. Coluzzi recommended laser soft tissue curettage at 0.4 W in continuous wave mode after mechanical debridement of the root surface, followed by irradiation at 0.6 W for hemostasis and bacterial reduction.[19]

Gingival curettage has been recommended as a means of eliminating chronically inflamed connective tissue, under the assumption that toxic and histolytic products would delay or interfere with wound healing.[20] It appears that after curettage, there is loss of clinical attachment level which is followed by a slight gain of 0.5 mm in 1 month.[21] Many conventional techniques, or the use of ENAP or caustic compounds, have

been suggested for curettage. Lasers have an advantage over all these techniques by accomplishing curettage of the soft tissue wall and providing favorable conditions more effectively than the conventional instruments. Basically, lasers have the potential advantages of a bactericidal and detoxifying effect, as well as the removal of the epithelial lining and granulation tissue, which are desirable properties for the treatment of periodontal pockets.[22] Studies have shown that a tooth surface covered with a blood clot had serious damage with partial to total carbonization.[23] Hence, it is advised to irrigate the pocket with saline every time before introducing the fiber in the pocket.

The procedure of denuding the outer gingival epithelium (personal communication, Wittschier M, September 2010, Pune, India) served two purposes. First, it helped sculpt the gingiva, and second it prevented ingress of epithelium from the marginal gingiva and formation of long junctional epithelial attachment. The poor response of tooth 11 to therapy may be attributed to improper irradiation of the site with laser and lack of complete debridement of diseased tissue. The site needed retreatment and must be kept under observation to judge the efficacy of treatment.

To conclude, it is clear that use of diode laser for pocket debridement and disinfection has a definite advantage over mechanical therapy.[22] In a young patient where esthetics is a prime concern, use of lasers helps to properly shape gingiva and treat pockets with minimal attachment loss. Also, judicious use of lasers can be beneficial in the management of periodontal patients with minimal use of antibiotics, and can provide desirable results. Thus, this case report suggests a positive application of laser in the management of puberty-induced gingivitis and grade II gingival enlargement.

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