

Combined Er:YAG and Nd:YAG Laser Treatment of Localized Gingival Overgrowth

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ABSTRACT

Localized gingival overgrowths belong to a common group of lesions designated as focal reactive overgrowths. They occur in response to chronic, low-grade irritation caused by plaque or any other irritant. They have multifactorial etiopathogenesis but exhibit similar clinical features with slight variations in patient complaints. The purpose of the case presentation is to evaluate the ability of neodymium and erbium lasers to non-surgically treat the localized gingival overgrowth. A 48-year-old female patient with a gingival overgrowth in the interdental area of teeth 22 and 23 was successfully treated by Nd:YAG and Er:YAG lasers. As the first step, Nd:YAG laser was used to lower the bacterial load in the periodontal pocket and thermally ablate the ulcerated pocket epithelium. In the second step, Er:YAG laser was used to debride the root surface and lengthen the clinical crown to restore the normal gingival biological width. The patient was extremely satisfied with the significant improvement in the contour and colour of her gingiva. The lesion retreated, and completely disappeared after eight weeks.

Key words: gingival overgrowth, erbium laser, neodymium laser, non-surgical periodontal treatment.

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I. INTRODUCTION

Localized gingival overgrowth is the accepted terminology for increased size of gingiva frequently seen in our day-to-day clinical practice and often presents a diagnostic dilemma to the clinicians. These lesions vary depending on the location, site, extent, histology, and/or etiopathogenesis. Although most of the localized gingival enlargements represent the reactive lesion to local plaque accumulation, caries, calculus, defective restorations the differential diagnosis ranges from peripheral fibroma to pyogenic granuloma to peripheral fibroma with ossification and/or calcification, peripheral giant cell granuloma, etc. [1]

Gingival enlargements are a common clinical finding and most represent a reactive hyperplasia as a direct result of plaque related inflammatory gingival disease. On the other hand, a small group of epulides grow from under the free gingival margin and not as a result of a primary inflammatory gingival enlargement [2].

Daley and co-workers [3] have considered localized overgrowths as focal fibrous hyperplasia, peripheral fibroma, peripheral ossifying fibroma, pyogenic granuloma and peripheral giant cell granuloma belonging to a common pathosis designated as focal reactive overgrowths (FROG) [4].

Although these growths are gingival responses to chronic, low grade irritation caused by plaque and calculus, or any other irritant, the histological appearance of each entity may be influenced by the intensity of the irritation, duration of the lesion and possibly hormonal effects like oestrogen and progesterone. Therefore instead of using different terminologies for each, they may be grouped as FROG wherein they represent the continuum of the same spectrum [4].

Most of these lesions have similar clinical findings such as sessile or pedunculated nodule with color variations from pale pink to erythematous in different sizes. The lesions can be located in interdental papilla, palatal area, marginal, or attached gingiva. The lesions are generally painless unless traumatized during tooth brushing, flossing, or mastication [5].

A treatment protocol consisted of nonsurgical periodontal treatment and when required surgical excision of lesion with/without reconstruction of remained periodontal tissues was performed for each patient. By nonsurgical treatment with elimination of potential causative factors, lesion usually regress or completely disappear. If the excision of lesion is required, various surgical approaches such as gingivectomy, flap surgery, free gingival graft, and connective tissue graft with coronally advanced flap can be performed according to location of localized gingival overgrowths, amount of keratinized tissue, or relation of them with alveolar bone [6].



Fig.1: Initial intraoral appearance of localized gingival overgrowth between teeth 22 and 23.

II. CASE PRESENTATIONS

A 48-year-old female patient with a gingival overgrowth non-pedunculated, hyperaemic and located in the interdental area of the teeth 22 and 23 was referred to Department of Oral Medicine and Periodontology, Dental Clinic, University Medical Centre Ljubljana. She was systemically healthy, non-smoker, without any significant medical history. Six months before she had got complete arch rehabilitation with metal ceramic crowns in the upper jaw. Three months later bleeding from oedematous gingiva appeared (Fig. 1). Following clinical and radiographic examinations, she was diagnosed as focal fibrous hyperplasia due to mechanical and dental plaque irritation. She was treated non-surgically by ultrasound and by hand scaling and root planning along with chemical plaque control using 0.2% chlorhexidine twice daily, yet without any significant improvement.

a) Nd:YAG and Er:YAG laser assisted treatments:

The patient was treated with local anaesthesia (mepivacaine 20mg/0.01mg epinephrine). As the first step Nd:YAG laser was used to lower the bacterial load

in the periodontal pocket and thermally ablate ulcerated pocket epithelium [7]. The Nd:YAG laser, 2W, SP, 20Hz (Fidelis Plus, Fotona d.o.o., Slovenia) fibre (320µm) was inserted in the pseudo-pocket beside tooth 22 and 23, directed towards the gingival tissue and continuously moved mesio-distally in coronal direction during the irradiation. In the second step Er:YAG laser was used to debride the root surface and lengthen clinical crown to restore the normal gingival biological width [8]. The Er:YAG laser (Fidelis Plus, Fotona d.o.o., Slovenia) was set at 60 mJ, 40 Hz, SP mode, 5 water, 2 air spray, and the 400µm fibre tip (Varian 400/14, Fotona d.o.o., Slovenia) was inserted to the bottom of the pseudo-pocket and again moved mesio-distally in coronal direction during the irradiation.

After surgery, the gingival hyperplastic tissue was covered with a periodontal pack (Reso-Pac, Hager & Werken GmbH & Co. KG, Germany). In addition, clinical parameters, such as wound healing, gingival colour, pain, discomfort and tissue deformity, were recorded at 1, 2, 3, 4 and 8 weeks after the procedure. The total duration of Nd:YAG and Er:YAG laser treatment was about 20 minutes.



Fig.2: A normal appearance of gingiva after two weeks, however the tips of papillae between teeth 22 and 23 were still inflammatory enlarged.



Fig.3: Eight weeks after combined laser treatment complete resolution of the inflammatory gingival hyperplastic tissue with a normal pink colour appearance and recovered thickness.

One week after surgery, the patient reported discomfort in the ablated area with mild pain, post-operative bleeding was not observed, and the gingival hyperplastic tissue was still present. After two weeks, the gingiva showed a normal appearance with light red colour, however the tips of papillae were still inflammatory enlarged (Fig. 2). After eight weeks the appearance of previously enlarged gingiva was set to normal, enabling proper oral hygiene (Fig. 3). Plaque index and BOP scores dropped from initial values of 48.3% and 92.6% to 21.7% and 33.8% after eight weeks, correspondingly.

The patient was extremely satisfied with the significant improvement in contour and colour of gingiva. The lesion retreated, and it completely disappeared after eight weeks. No recurrence occurred in the follow-up period of last six months.

III. CONCLUSIONS

The localized gingival overgrowths are reactive gingival hyperplasia that develops due to interactions between the host and the various local stimuli. The plaque accumulation appears to be an etiological or a stimulating factor for localized gingival overgrowth. Therefore, plaque control is an essential aspect of management in these lesions. Selection of the appropriate surgical technique following the excision of lesion, when it is required, and maintenance of patient have pivotal role in preventing recurrence.

Combination of Nd:YAG and Er:YAG lasers was recently found to additionally improve the microbiological and clinical outcomes of nonsurgical periodontal therapy in patients with moderate to severe chronic periodontitis [9]. In our case the combination of nonsurgical Nd:YAG and Er:YAG laser treatment resulted in effectively healing of localized gingival overgrowth.

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