



**THE USE OF ND:YAG LASER IN PATIENTS WITH ORAL PYOGENIC
GRANULOMA AND MELANIN PIGMENTATION: A CASE REPORT AND
REVIEW OF THE LITERATURE**

**ORAL PİYOJENİK GRANÜLOMU VE MELANİN PİGMENTASYONU OLAN
HASTADA ND:YAG LAZER KULLANIMI: BİR VAKA RAPORU VE LİTERATÜR
DERLEMESİ**

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ABSTRACT

Pyogenic granuloma (PG) is a well known oral lesion which occurs as response of tissue to chronic low-grade irritation, traumatic injury, hormonal factors and some drugs. PG occurs cosmetic deformity, recurrent hemorrhage, and functional problems in speaking, swallowing and chewing. Beside this, oral melanin pigmentation on gingiva may cause esthetic problem. A 28-year old female applied to our clinic with nodular gingival enlargement in the maxillary gingiva on the vestibular surface of the right central and lateral incisors. Also she complained from gingival hyperpigmentation in her mandibular and maxillar gingival region. In this case report, we presented the use of surgical Nd:YAG lasers for gingivectomy of soft mass and depigmentation of vestibular gingiva without any complication. Treatment with laser presents minimal postoperative problems, discomfort and scarring.

Key Words: Pyogenic granuloma, melanin pigmentation, Nd:YAG laser, gingivectomy, depigmentation

ÖZET

Piyojenik granülom (PG) iyi bilinen bir oral lezyondur. PG travmatik yaralanmalar, hormonal faktörler, bazı ilaçlar ve düşük şiddetli kronik irritasyonlara tepki sonucu oluşur. Genellikle estetik problemlere, tekrarlayan kanamalara ve konuşma, yutma, çiğneme problemleri gibi fonksiyonel problemlere neden olur. Ayrıca, hastalarda estetik açıdan problem oluşturan oral melanin pigmentasyonu görülebilir. 28 yaşındaki bayan hasta kliniğimize sağ santral ve lateral kesicilerin fasiyal yüzeyinde maksiller gingivaya atake nodular gingival büyüme şikayetiyle başvurdu. Hasta aynı zamanda maksiller ve mandibular gingival bölgedeki pigmentasyonlardan estetik olarak rahatsızlık duyduğunu ifade etti. Bu vaka raporunda, Nd:YAG lazer kullanımı ile cerrahi yumuşak kitlenin eksizyonu ve vestibül gingival depigmentasyon tedavisinin herhangi bir komplikasyon olmadan sunumu amaçlanmıştır. Lazer ile tedavi postoperatif problemleri, rahatsızlıkları ve skar oluşumunu minimal düzeye indirerek avantaj sağlamaktadır.

Anahtar Kelimeler: Piyojenik granülom, melanin pigmentasyonu, Nd:YAG lazer, gingivektomi, depigmentasyon

INTRODUCTION

Pyogenic granuloma (PG) is a comparatively common, inflammatory, soft tissue tumor of oral cavity. It occurs as response of tissue to chronic low-

grade irritation, traumatic injury, hormonal factors and some drugs.^{1, 2} Gingival inflammation due to bad oral hygiene may be cause of PG.³

Clinically; these lesions vary in appearance from smooth or lobulated, sessile or pedunculated,

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ulcerated, may vary in size.⁴ PG is usually color varies from red/pink to purple. It occurs more commonly on the anterior areas of maxillary gingiva and can also occur on the buccal mucosa, palate, tongue, lips, and floor of the mouth.⁵ Except of the oral cavity, it is a common disease in the skin and rarely in the gastrointestinal tract.⁶

PG may occur in patients at all ages, but it is predominant in young adult females, presumably related to hormonal stimulation.^{7,8} In related to hormonal changes and increased organism's response to irritation PG of the gingiva occurs in up to 5% of pregnancies, therefore the terms "pregnancy tumors" and "granuloma gravidarum" are often used.⁹

When PG occurs and grows by time, can cause speech, deglutition, mastication and cosmetic deformity.¹⁰ In these situations treatment of PG would be performed. In pregnant women if necessary and possible, periodontal and surgical therapies should be completed during second trimester.¹¹ But if there is no compliance treatment can be delayed. Because sometimes lesion may shrinkage after the birth and surgery can be unnecessary.¹²

There are several options for the treatment of PG: surgical, cryosurgery, electrodesiccation, intra-lesional administration of corticosteroids or sclerosant (sodium tetradecyl), radiotherapy and embolization with steel coil, gel foam, silicone beads, or cyan-oacrylate.^{13, 14}

Beside this melanin pigmentation of gingival tissues can be seen which cause color changes and occurred with melanin granules which are produced by melanosomes in melanocytes.¹⁵ This may cause esthetic problem because the color of gingiva has an important impact on speaking and attractive smile. Different factors affect the color of the gingiva such as the size and the number of blood vessels, epithelial thickness, rate of keratinization and the presence or amount of epithelial pigments.¹⁶ Physiologic pigmentation mainly caused by melanin and are typically more generalized than non-physiologic tip. The etiological factors of these pigmentations may be related with hereditary, due to pregnancy, or medication.¹⁷ There are different techniques for depigmentation of gingiva such as: gingivectomy, electro surgery, cryosurgery, bur abrasion and scalpel blade technique.^{18, 19}

Additionally to these treatment modalities for PG and depigmentation, in the past decade, therapy with the Nd:YAG laser has emerged as a new alternative.^{20, 21} In soft tissue surgery, such as previous treatments, use of Nd:YAG laser has been widely accepted, because of its various advantages versus scalpel surgery. The Nd:YAG laser increases coagulation, support hemostasis, which leads a dry surgical field; the ability to accomplish smooth curvatures and tissue contours; tissue surface sterilization; decreases swelling, edema and pain; presents less side effects such as scarring and pigmentar changes.²²⁻²⁵ In this case report, we presented the successful treatment of a case of PG and melanin depigmentation of the gingiva with the long-pulsed Nd:YAG laser.

CASE REPORT

A 28-year old female presented with nodular gingival enlargement in the maxillary attached gingiva on the facial surface of the right central and lateral incisors; she announced that the lesion had been presented at the eighth month of her pregnancy. The lesion was soft in consistency with a pedunculate base. She also complained of localized bleeding in that area, and there was moderate pain and discomfort on eating and brushing. On clinical examinations, it was observed that the patient's oral hygiene care was low. There were no mobility on effected tooth. The medical history indicated that the patient's pregnancy was ended three months ago, and she has no other systemic diseases. In addition the patient gave a history of PG during her first pregnancy and she said that the lesion shrinkaged after the birth. Beside this the patients has gingival melanin pigmentation in her mandibular and maxillar gingival region. Patient's panoramic imagine and intra-oral view before the treatment are seen in figure 1 and figure 2.



Figure 1. Patient's panoramic imagine



Figure 2. Intra-oral view of the PG and melanin pigmentation before the treatment.

The treatment plan consisted of scaling and root planing to remove the local factors and oral hygiene education at first session. At second session for surgical operations, labial surface of the anterior segment of the upper and lower jaws were anesthetized with infiltration injection using 4% articain. (articain 4% with 1:200.000 epinephrine Ultracain D-S Forte; Aventis Pharma, Istanbul, Turkey). For excision of soft mass and depigmentation of vestibul gingiva the Nd:YAG laser was used (DEKA, Smarty A10, Firenze, Italy; 1064 nm wavelength, pulsed wave laser) with the following irradiation parameters: power output 3.2 W, energy 80 mJ, frequency 40 Hz, pulsed emission mode.

For histopathological evaluation excised tissues were fixed in 10% formalin. Histopathologically proliferation of vessels with inflammation in a loose and oedematous stroma and epidermis were observed (Figure 3.) After the surgical operations parasetamol thrice a day for 3 days and chlorhexidine 0.12% was prescribed as thrice a day for one week to prevent post-operative infectious and pain.

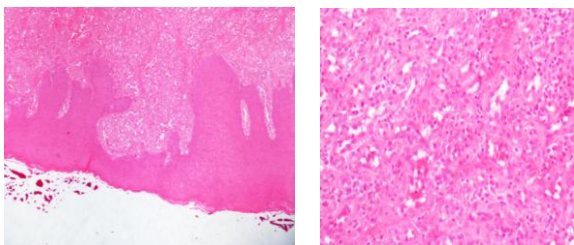


Figure 3. Histopathological view of tissue. There is proliferation of vessels with inflammation in a loose and oedematous stroma and epidermis at top. (HE,100x)



Figure 4. Clinical aspect of PG and melanin pigmentation 1 week after laser surgery.



Figure 5. Clinical aspect of PG and melanin pigmentation 1 month after laser surgery.

Clinical Results

The patient was examined periodically after 1 week, 1 month for any complication. After surgery the infection did not occur during the healing process in operation area and there were mild pain, no swelling and bleeding. After a follow-up of one month. operation area showed good healing which no scar tissue. Clinical aspect of intra-oral view 1 week and 1 month after laser surgery are seen in figure 4 and figure 5.

DISCUSSION

Oral PG increases susceptibility to minor trauma, bleeding, ulceration, swallowing difficulties and breathing problem; although, the major concern is cosmetic in most cases.^{4, 10, 26} In our case, visible lesion of PG can be described as a localized lobular gingival mass with well-defined margins. Additionally, melanin pigmentation of the gingiva is completely benign and does not present a medical problem, the major problem is thought as cosmetic. Thus complaints of "black gums" are common and a demand for depigmentation is usually made for esthetic reasons.¹⁶ Mostly surgical procedure are used

for the treatment of both cases. Surgical procedures are safety and present accurate results. But may be resulted with some complications. Scarring and bleeding complications are frequently seen after the excision procedure of PG. Also, as known PGs are extensive and diffuse lesions and are commonly refractory to this therapy. When the melanin depigmentation of the gingiva was made by scalpel technique, after surgery, it was necessary to cover the exposed lamina propria with periodontal dressings for 7 to 10 days; the wound took 6 weeks to heal and left a delicate scar. Also frequently repigmentation can be seen after surgical techniques.

Thus recently, the use of laser energy as a therapeutic option can be advised as one of the most effective, comfortable and reliable techniques for PG¹³ and gingival depigmentation.²⁸ Acceptable healing, good patients' satisfaction, and excellent treatment outcomes are the advantages of laser. The laser procedure required injecting of no or less amount of local anesthesia and absence of post-operative pain and hemorrhage. Also, for operators performing of the laser technique was easier and faster than the scalpel excision techniques, because it present no or less bleeding. Laser beam even destroys the epithelial cells including those at the basal layer, and hence reduces repigmentation.²⁹

The post-operative experience of pain in the routine clinical dental treatments and surgical procedures is a complex phenomenon, which influence from psychological, environmental and physical factors. Laser treatment, additionally decreases pain due to effects on the nerve endings; and increases patient acceptance. It was reported, pain perception was little in the laser group as protein coagulum is formed on the wound surface, which serves as a biological wound dressing and seals the ends of the sensory nerves.³⁰ The conventional surgery procedures of vascular lesions and gingival tissues create a wound surface after incision, so that bleeding occurs. Thus suturing and/or dressing packs are necessary for closing of the wound area. That can cause additive postoperative pain, bleeding and discomfort. According to Atsawasuwan and Greethong³¹, laser beam, causes minimum damage to the periosteum and underlying bone, and the treated gingiva and mucosa, thus do not need any dressing packs.

For excision of PG and gingival depigmentation therapy Nd:YAG laser can be choosed as an effective treatment tool.^{14, 32-34} The wavelength of Nd:YAG laser is 1064 nm and produces near infrared, invisible light. The laser energy is selectively absorbed by hemoglobin and converted to heat, coagulating the blood vessels in combination with an adequately long pulse width.³⁵ Additionally tissue penetration of a Nd:YAG laser is more than that of the other lasers. Nd:YAG Laser wavelength exhibits minimal tissue absorption and maximal penetration.³⁶ Besides, the Nd:YAG lasers have a particularly affinity for melanin and other dark pigments which resulting in much selective destruction and little damage.³⁷ Thus decreases post-operative pain and swelling. The advantage of a Nd:YAG laser usage has been in terms of a virtually bloodless surgical field as a result of the hemostatic mechanism of the laser, providing an accurate resection of the lesion with suitable margins and tissue contours. Also leads surface sterilization of the tissues, which support less swelling and edema, due to sealing of small lymphatic vessels and less inflammatory response.³¹ Also thus reducing the risk of haematogenous transport disease and rates of postoperative infection. As a result it can be said Nd:YAG laser surgery have fewer functional complications than conventional surgery after surgical operations.

Currently, in the various areas of medicine and dentistry lasers are useful and available with a wide range of modality. Treatment with laser presented advantages in a reduction of treatment time discomfort, pain and prevention for recurrence of lesions/pigmentations. The Nd:YAG laser therapy can be an alternative to conventional strategies as an effective treatment for vascular malformations and melanocytes. In our treatment, the Nd:YAG laser was chosen over the other devices because of its greater specificity for hemoglobin and melanosits. It can be said that more selective and safer photocoagulation and resulted therapies could be performed by using a Nd:YAG laser.

CONCLUSION

Treatment with laser presents minimal postoperative problems, discomfort and scarring. The



application of laser is quick, bloodless, and safe. With this method risks and complications can be reduced during and after the surgical intervention. When used appropriately, the Nd:YAG laser is a very useful tool for removal of vascular lesions and gingival pigmentation.

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