

# Adjunct Use of Low-Level Laser Therapy on the Treatment of Necrotizing Ulcerative Gingivitis: A Case Report



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## Abstract

Necrotizing ulcerative gingivitis (NUG) is a microbial disease of the gingiva in the context of an impaired host response. This form of gingivitis is relatively rare. NUG is an infection characterized by gingival necrosis presenting as “punched-out” papillae, spontaneous bleeding, pain, oral malodor, and pseudomembrane formation. The primary predisposing factors are bacterial plaque and an inadequate diet, but smoking and psychological stress may also affect the disease severity. NUG is associated with a characteristic bacterial flora, which includes fusiform bacteria, spirochetes, and *Prevotella intermedia*. Conventional treatment includes control of both the bacterial plaque and the secondary factors, as well as topical or systemic treatment biostimulative effect on wound healing, pain control, and inflammatory processes. Patients with NUG were treated using adjunct use of a diode laser (980 nm) for the control of pain and to accelerate the wound healing at day 2. 3. 5. 9, energy density was 9 J/cm<sup>2</sup>. After treatment, the patients’ quality of life improved faster than with conventional treatment. These results suggest that low-level laser therapy (LLLT) is an effective treatment for the reduction of pain levels and healing times. As a result, our case report shows that LLTT has a positive effect in relieving the symptoms of NUG.

**Keywords:** Low level laser therapy; Necrotizing ulcerative gingivitis; Non-surgical periodontal treatment.

## Introduction

Necrotizing ulcerative gingivitis (NUG) is a type of necrotizing periodontal disease. It is a painful periodontal disease limited to the gingival tissues and characterized by red, ulcerated gingivae, oral malodor and “punched-out” interdental papillae.<sup>1,2</sup>

The prevalence of NUG appears to have been rather low in the United States and Europe before 1914.<sup>3</sup> NUG generally affects females and males equally, at all ages, presenting most commonly in 18-30-year-old patients.<sup>2</sup>

The etiology of NUG is not known. Its presence causes a great increase in fusiform bacilli and spirochetes, and the clinical signs of this disease have been attributed to this increase in the fusospirochetal complexes, and other bacilli.<sup>4</sup>

NUG generally begins with increased psychological stress, increased physical demands, a decreased nutrient intake, smoking, and, especially, bacterial plaque.<sup>1</sup> Pain (usually rapid onset), interdental necrosis, and bleeding are the specific clinical symptoms to diagnose NUG. If one of

these 3 symptoms is absent, NUG cannot be diagnosed. Pain is the hallmark of NUG, and this pain affects the patient’s quality of life. Generally, patients complain of pain.<sup>1</sup> Sometimes, systemic symptoms like fever, malaise, and both cervical and submandibular lymphadenopathy can accompany NUG.<sup>2</sup>

Conventional treatment of NUG aims to eliminate the acute inflammation by reducing microbial dental plaque, and removing necrotic tissue. If patients have systemic symptoms related to NUG, antibiotics are recommended.<sup>3</sup> Low-level laser therapy (LLLT) is the application of light to increase tissue healing, reduce inflammation, and offer pain control.<sup>5</sup> LLLT is used in different dental procedures, such as nonsurgical and surgical periodontal treatments, and in many clinical conditions, such as temporomandibular disorders, hypersensitive dentine, post-extraction and bone-healing therapy, traumatic ulcerations, herpes simplex virus infection of the lips, aphthous ulcers, mucositis, paresthesiae, and trigeminal neuralgia.<sup>6</sup> The biostimulative effects of LLLT have been

shown in the literature, and LLLT is indicated in cases of pain and tissue healing.<sup>7</sup> Pain reduction is among the claimed effects of LLLT.<sup>8</sup> In this case report, we aimed to show a rare NUG case treated with adjunct use of LLLT.

### Case Presentation

A 34-year-old, systemically healthy, heavy-smoker, male patient was referred to our department with severe pain. Clinical and radiographic examination showed clinical attachment loss and poor oral hygiene. A clinical diagnosis of NUG was made (Figure 1A). First of all, we removed the pseudomembrane with a hydrogen peroxide cotton roll (Figure 1B). The patient received 500 mg amoxicillin and 400 mg metronidazole 3 times a day for 5 days, and chlorhexidine 0.2% mouthwash twice a day, for the treatment of his necrotizing gingivitis. On the second visit, scaling and root planing was performed, after which laser was performed at 2, 3, 5, and 9 days as an adjunct to conventional NUG treatment (Figure 1C). LLLT was applied with a 980 nm diode laser, that was set 0.4 W, continuous wave (CW), energy density was 9 J/cm<sup>2</sup>, for 60 seconds in non-contact but very close to the tissue, distance was approximately 1-2 mm, using LLLT tips. After LLLT, there were no adverse effects. The patient showed spontaneous relief of pain and was carefully followed up until complete healing occurred, with no complications documented. After 5 weeks, we performed a gingivectomy procedure (Figure 1D).

### Discussion

NUG is a severe inflammatory periodontal disease caused by the proliferation of plaque bacteria associated with a diminished host defense. In NUG, loss of clinical attachment and alveolar bone are very rare findings, but patients can have NUG after periodontal disease.<sup>1</sup>

NUG has 3 specific clinical findings. These are pain, interdental necrosis, and gingival bleeding. Pain has long been among the most significant effects of NUG and affects the patients' quality of life. Generally, pain is the major factor in patient referral for treatment.<sup>1</sup>

NUG treatment involves the alleviation of acute inflammation by removing microbial dental plaque and necrotic tissue. If patients have systemic symptoms like fever, oral malodor, or lymphadenopathy, then prescribing medicine<sup>3</sup> and analgesics remains the principal option for the management of NUG pain. However, analgesics (such as non-steroidal anti-inflammatory drugs [NSAIDs]) have common adverse effects, such as allergies, gastric ulcers, and bleeding disorders, for which reason they are not widely used in clinical practice.<sup>9</sup>

The adjunct use of LLLT in the treatment of various diseases has increased gradually during the last ten years.<sup>10</sup> It has been demonstrated in the literature that LLLT stimulates wound healing without adverse effects and has a relieving role. Anti-inflammatory and especially analgesic



**Figure 1.** (A) Clinical Examination. (B) Application of H<sub>2</sub>O<sub>2</sub>. (C) Application of LLLT. (D) Final Situation.

effects of the use of LLLT in dentistry have frequently been investigated. Furthermore, there have been the clinical reflections of studies on temporomandibular joint disorders, dentine hypersensitivity, the use of LLLT in addition to orthodontic treatment and after the extraction of impacted wisdom tooth.<sup>11</sup> Some of these studies have focused on the analgesic effect after periodontal treatments. In the study carried out by Masse et al,<sup>12</sup> it was emphasized that LLLT administered after free gingival graft does not have a pain-relieving effect. However, Tomasi et al<sup>13</sup> concluded that the administration of LLLT after periodontal treatment decreases the pain. There is a limited number of studies on the clinical use of LLLT as pain reliever.<sup>14</sup> This case report emphasizes that the use of LLLT, which is a non-pharmacological technique and does not have any side effect, in NUG patients, may be good, especially in terms of patient comfort and healing speed.<sup>11</sup>

Our case report shows that the use of LLLT as an adjunct to conventional NUG treatment reduces the use of analgesic, anti-inflammatory drugs, and accelerates healing, with the purpose of improving the quality of life for these patients. The use of LLLT in adjunct to NUG treatment can be used with the aim of reducing pain and accelerating wound healing. However, multicenter randomized controlled trials are needed even though it is a rare case.

### Conflict of Interests

The authors have no conflict of interest to declare.

### Ethical Considerations

Written informed consent was obtained from the patient for publishing this case report.

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