Low-level-laser Therapy as an Alternative Treatment for Primary Herpes Simplex Infection: A Case Report

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Gingivostomatitis is the most common primary and symptomatic clinical manifestation of HSV-1 infection. Painful oral lesions appear as ulcerative erosions on the gingiva, palate, buccal mucosa, and tongue, leading to eating and drinking difficulties with an evolution between 10-14 days. This paper describes a case of a 19-month-old boy with severe painful Gingivostomatitis lesions. Low level laser therapy (LLLT) was used with an immediate outcome.

Key words: *Low-level-laser therapy, herpetic stomatitis, child*
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INTRODUCTION

Primary infection with herpes simplex virus type 1 (HSV-1) is usually subclinical but may cause acute gingivostomatitis, rhinitis, vulvovaginitis, keratoconjunctivitis, meningoencephalitis, eczema herpeticum and herpetic whitlow.[1]

Gingivostomatitis is the most common primary and symptomatic clinical manifestation of HSV-1 infection with an age of incidence between 6 months and 5 years old, however it may be seen in older children and adults.[2,3] Transmission occurs by close interpersonal contact (secretions and body fluids, or muco or cutaneos). The incubation period is about six days.[1,4] The onset usually consists of fever, malaise, myalgias, irritability, cervical lymphadenopathy, drooling, and oral and perioral lesions.

Oral lesions appear as ulcerative erosions on the gingiva, palate, buccal mucosa, and tongue, and persist for about 12 days.[1] Vesicular lesions develop on the oral mucosa, tongue and lips. They later they rupture and coalesce, leaving ulcerated plaques. Painful perioral vesicular lesions are also found a few days after the appearance of oral lesions in 72% of children and may last up to two weeks. Many patients develop eating and drinking difficulties, which can lead to dehydration in as many as 10% of cases.[1,4]

The diagnosis is essentially clinical and is based on the presence of oral lesion, fever, halitosis, and gingivitis with marked features such as swollen, erythematous and friable gums.[4] The presence of perioral lesions is pathognomonic for HSV and helps to differentiate this infection from herpangina, aphthous stomatitis, and hand-foot-and-mouth disease.[5]

The treatment strategies are usually symptomatic and consist of a soft diet, ample fluid intake, analgesics and antipyretics. Alternative therapy includes application of low-level-laser therapy (LLLT), which has many physiological effects such as anti-inflammatory and analgesic properties, and stimulation of wound healing.[6,7,8] This case report describes laser therapy as a treatment for oral lesions associated with primary herpes simplex infection.

CASE REPORT

A 19-month-old boy was referred to the dental clinic of LELO (Special Laboratory of Lasers in Dentistry) at the university of Sao Paulo with a 4-day previous diagnosis of herpetic gingivostomatitis by his pediatrician. The patient presented an abrupt onset, high temperature (102-104°F), anorexia and listlessness. He had been taking analgesics and antipyretics. Clinical examination revealed ulcerated lesions on the oral mucosa, especially on the lips (Figure 1), tongue ventrum, alveolar mucosa (Figure2). Visible dental plaque was present since the mother could not perform oral hygiene due to the painful lesions, causing gingivitis.

The treatment proposed included oral hygiene instructions, dental plaque removal with gauze and application of low-level-laser therapy. A diode laser, 660nm wavelength (TWIN FLEX, MM Optics, San Carlos, Brazil), 10mW power, with a 7,5 J/cm^2 density of energy, was irradiated in contact with each lesion for 5-minute on continuous emission mode (Figure 3). Previous to the laser treatment, the parents were informed of the risks and benefits with respect to laser safe use, parameters of laser radiation. They signed the inform consent form. During all clinical

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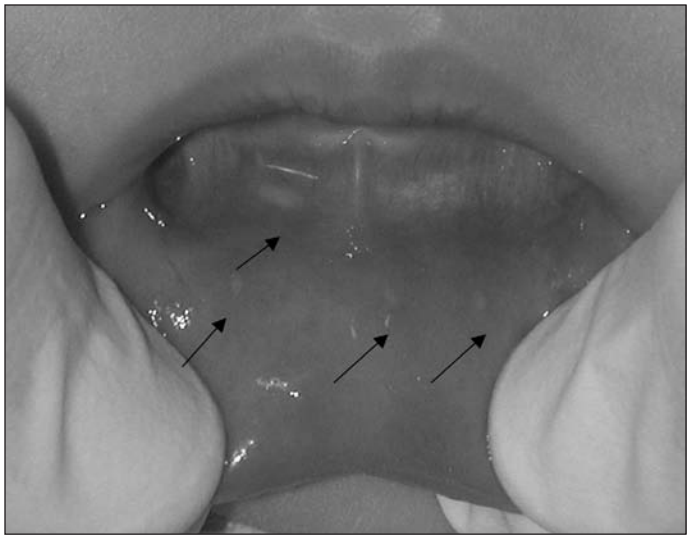

Figure 1: Patient presented ulcerated lesions on lower lips.

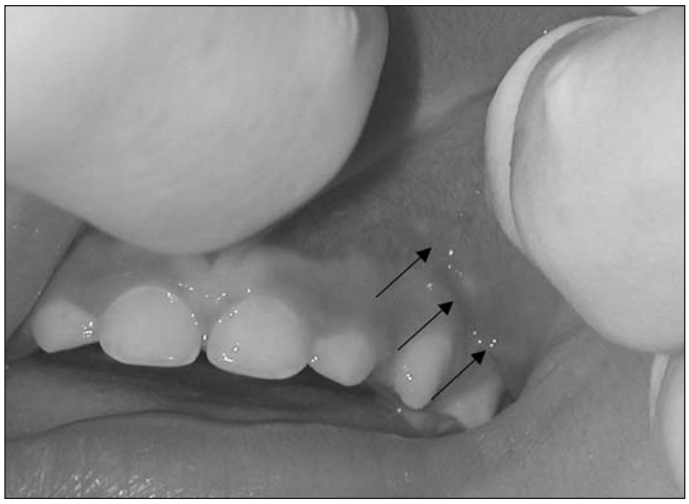

Figure 2: Patient also presented ulcerated lesions on upper lip mucosa.

appointments the international safety rules were observed with use of appropriated glasses for this laser wavelength[8].

Since it was the child's first dental appointment, the clinician had to manage the child's behavior using the tell-show-do technique.[9] On the second appointment (3 days later), the lesions on the lips had disappeared (Figure 4) indicating an accelerated wound healing, although some lesions remained on the upper alveolar mucosa. Therefore, a second laser application was performed again using the previously described parameters. The mother also reported that immediately after the first LLLT, she noticed a remarkable pain relief because her child began eating and allowed her to perform oral hygiene. One week later, at the follow-up appointment, the lesions were no longer present, revealing total wound healing.

DISCUSSION

The paper described a typical gingivostomatitis case presenting the clinical symptoms of fever, oral lesions and eating difficulties. According to Amir *et al*.(1999)[1], herpetic oral lesions appear in 85% of children during the first day of illness and persist for 12.0+/-3.4 days; fever is present in 85% and lasts for 4.4+/-2.4; and eating-drinking difficulties also occur in 53%-89% of the cases, lasting for 9.1+/-3.0 and 7.1+/-3.1 days.

Figure 3: First LLLT application on lower lips.

Figure 4: After 3 days, patient presented no ulcerated lesions on lower lips.

The clinical course of the disease depends upon the age and immune status of the host, the anatomic site of involvement and the antigenic type of the virus. It has been suggested that tooth eruption in infants may frequently and erroneously be blamed for symptoms caused by an undiagnosed primary herpetic infection.[1] Coincidentally, primary tooth eruption begins at about the same time as infants are losing maternal antibody protection against the herpes virus. Also, reports on teething difficulties have recorded symptoms which are remarkably consistent with primary oral herpetic infection such as fever, irritability, sleeplessness and difficulty with eating[10], however in the present case the lesions and medical history are consistent with a primary HSV infection.

The treatment for gingivostomatitis is essentially based on a symptomatic approach with analgesics and antipyretics. The topical drugs, widely used, have no benefits for the patient and

they may even cause an additional discomfort.[5] In some cases, antiretroviral therapy may be considered.[11-14] Studies have concluded that the administration of oral acyclovir (15 mg/kg/dose, 5 times a day, with an eight-hour night break for 7 days[13]; or the daily dose divided in 4 times[12-14]), prescribed during the first 3 days of the disease, is useful to reduce fever, diminish the onset of oral manifestations and viral elimination. Severe oral pain may cause eating refusal. Patients are recommended to have a cold and liquid diet. The patient's pediatrician had prescribed the appropriate diet and an analgesic-antipyretic; however the symptomatic treatment was not providing resolution and the patient continued to refuse to eat. The pediatrician referred the patient for laser therapy.

Low-intensity-laser therapy (LILT) or low-level-laser therapy (LLLT) represents a nonthermic phototherapy utilizing light sources emitting low energies of visible red or near infrared monochromatic light and is used for acceleration of wound healing and in pain therapy.[15] There have been many claims for the therapeutic effects of LLLT on a broad range of disorders. A short selection from the list of LLLT applications includes: acceleration of wound healing, enhanced remodeling and repair of bone, restoration of normal neural function following injury, normalization of abnormal hormonal function, pain attenuation, stimulation of endorphin release, and modulation of the immune system.[16-18]

The LLLT treatment protocol for ulcerative lesions uses a dosimetry from 2 to 4J/cm^2 to scan the lesions.[19] Previous studies have indicated that laser therapy may have an analgesic effect on tissues[8,19,21] and it is speculated that the modulation of pain by modification of nerve conduction may be improved by the local release of endorphins and enkephalins.[6,16] The present case corroborates the analgesic effect of LLLT since the mother reported the patient's pain relief which enabled him to start eating again.

LLLT also improves wound healing by stimulating mitochondrial activity which results in an increase of adenosine triphosphate (ATP), that can provide the necessary energy for all (exsudative, proliferative and regenerative) phases of healing.[22-24] It stimulates microvasodilation and neovascularization, significantly reducing the microedema which corresponds to an increased lymphatic drainage[25], granulation tissue, collagen synthesis, activity and number of fibroblasts and mast cells[26], leading to a significantly faster re-epithelialization of the wound margins.[19] The biostimulatory effect of laser energy decreases healing time, making the ulcerative lesions resolve 3-4 days. When such lesions are not treated, their evolution cycle takes about 10 to 14 days.[7]

Fast wound healing was observed in the patient from the present case. In three days, some ulcerative lesions had disappeared and one week later of the first LLLT application, no lesions were observed. However, randomized controlled clinical trials should be conducted in order to give power to the proven benefits of LLLT and to establish standardized protocols for gingivostomatitis treatment.

CONCLUSION

Low-level laser therapy should be considered as an alternative treatment for Gingivostomatitis once it provides great outcomes such as pain relief and faster healing of ulcerative lesions.

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