

## Mucositis

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**Laser phototherapy as topical prophylaxis against head and neck cancer radiotherapy-induced oral mucositis: comparison between low and high/low power lasers.**

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**BACKGROUND AND OBJECTIVE:** Oral mucositis is a dose-limiting and painful side effect of radiotherapy (RT) and/or chemotherapy in cancer patients. The purpose of the present study was to analyze the effect of different protocols of laser phototherapy (LPT) on the grade of mucositis and degree of pain in patients under RT. **PATIENTS AND METHODS:** Thirty-nine patients were divided into three groups: G1, where the irradiations were done three times a week using low power laser; G2, where combined high and low power lasers were used three times a week; and G3, where patients received low power laser irradiation once a week. The low power LPT was done using an InGaAlP laser (660 nm/40 mW/6 J cm<sup>-2</sup>/0.24 J per point). In the combined protocol, the high power LPT was done using a GaAlAs laser (808 nm, 1 W/cm<sup>2</sup>). Oral mucositis was assessed at each LPT session in accordance to the oral-mucositis scale of the National Institute of the Cancer-Common Toxicity criteria (NIC-CTC). The patient self-assessed pain was measured by means of the visual analogue scale. **RESULTS:** All protocols of LPT led to the maintenance of oral mucositis scores in the same levels until the last RT session. Moreover, LPT three times a week also maintained the pain levels. However, the patients submitted to the once a week LPT had significant pain increase; and the association of low/high LPT led to increased healing time. **CONCLUSIONS:** These findings are desired when dealing with oncologic patients under RT avoiding unplanned radiation treatment breaks and additional hospital costs.

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## **Low-level laser therapy in the prevention and treatment of chemotherapy-induced oral mucositis in young patients.**

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**Abstract Objective:** A pilot clinical study was conducted to evaluate the efficacy and feasibility of low-level laser therapy (LLLT) in the prevention and treatment of chemotherapy (CT)-induced oral mucositis (OM) in young patients. **Background Data:** Besides compromising the patient's nutrition and well-being, oral mucositis represents a portal of entry into the body for microorganisms present in the mouth, which may lead to sepsis if there is hematological involvement. Oncologic treatment tolerance decreases and systemic complications may arise that interfere with the success of cancer treatment. LLLT appears to be an interesting alternative to other approaches to treating OM, due to its trophic, anti-inflammatory, and analgesic properties. **Materials and Methods:** Patients undergoing chemotherapy (22 cycles) without mucositis were randomized into a group receiving prophylactic laser-irradiation (group 1), and a group receiving placebo light treatment (group 2). Patients who had already presented with mucositis were placed in a group receiving irradiation for therapeutic purposes (group 3, with 10 cycles of CT). Serum granulocyte levels were taken and compared to the progression of mucositis. **Results:** In group 1, most patients (73%) presented with mucositis of grade 0 ( $p = 0.03$  when compared with the placebo group), and 18% presented with grade 1. In group 2, 27% had no OM and did not require therapy. In group 3, the patients had marked pain relief (as assessed by a visual analogue scale), and a decrease in the severity of OM, even when they had severe granulocytopenia. **Conclusion:** The ease of use of LLLT, high patient acceptance, and the positive results achieved, make this therapy feasible for the prevention and treatment of OM in young patients.

[Oral Surg Oral Med Oral Pathol Oral Radiol Endod.](#) 2008 Feb;105(2):180-6, 186.e1.

## **Efficacy of He-Ne Laser in the prevention and treatment of radiotherapy-induced oral mucositis in oral cancer patients.**

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**OBJECTIVE:** The objective of this study was to evaluate the efficacy of low-level lasers for the prevention and treatment of radiotherapy-induced oral mucositis in oral cancer patients. **MATERIAL AND METHODS:** Twenty-four hospitalized patients with oral cancer, scheduled to undergo radiotherapy at KMC, Manipal, were enrolled in the present study and assigned to laser (Group I)/control group (Group II). They were treated using He-Ne laser ( $\lambda = 632.8\text{nm}$ , output = 10 mW and energy density =  $1.8\text{ J/cm}^2$ ). Patients were subjected to treatment using laser scanner for 8 days and subsequently were treated using laser probe at 6 anatomic sites in the oral cavity for 5 minutes each. The patients were evaluated on each day of treatment for pain severity (NRS), functional impairment (FIS), and oral mucositis (RTOG) and were followed until the end of cancer

treatment. Statistical analysis was done using SPSS version 10. RESULTS: Laser therapy applied prophylactically during radiotherapy can reduce the severity of oral mucositis, severity of pain, and functional impairment.

[Oral Dis.](#) 2007 Nov;13(6):538-43.

## **Low-energy laser therapy for prevention of oral mucositis in hematopoietic stem cell transplantation.**

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AIM: To evaluate the clinical effects of laser therapy on the prevention and reduction of oral mucositis in patients who underwent hematopoietic stem cell transplantation (HSCT). PATIENTS AND METHODS: From January 2003 to September 2004, 24 patients received prophylactic laser therapy (L+ group). The applications started from the beginning of the conditioning regimen up to day +2. The oral assessment was performed daily until day +30. This group was compared with historical controls, namely 25 patients, who did not receive laser therapy (L- group). RESULTS: All patients developed some grade of mucositis. However, the L- group presented initial mucositis by 4.36 days, whereas the L+ group presented it in 6.12 days ( $P = 0.01$ ). The maximum mucositis occurred between day +2 and day +6 with healing by day +25 in the L- group and between day +2 and day +7 with healing by day +14 for the L+ group ( $P = 0.84$ ). Laser therapy also reduced the time of oral pain from 5.64 to 2.45 days ( $P = 0.04$ ), and decreased the consumption of morphine ( $P = 0.07$ ). CONCLUSION: This study suggests that laser therapy can be useful in oral mucositis to HSCT patients and improve the patient's quality of life. However, controlled randomized trials should be performed to confirm the real efficacy of laser therapy.

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## **Effect of low level helium-neon (He-Ne) laser therapy in the prevention & treatment of radiation induced mucositis in head & neck cancer patients.**

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BACKGROUND & OBJECTIVES: Oral mucositis is a common debilitating complication of radiotherapy occurring in about 60 per cent of cancer patients.

Considerable buccal toxicity of radiotherapy or chemotherapy in cancer patients to become discouraged and can affect their quality of life. In addition, such toxicity can alter the treatment plan. At present, there is no clinically appropriate prophylaxis efficacious antidote for mucositis. The low level laser (LEL) appears to be a simple, non-traumatic technique for the prevention and treatment of radiation induced mucositis. Therefore the present study was carried out to find out the effect of low-level helium-neon (He-Ne) laser in the prevention and treatment of radiation induced mucositis in head and neck cancer patients. **METHODS:** The patients with carcinoma of oral cavity with stages II-IV a being uniformly treated with curative total tumour dose of 66 Gy in 33 fractions over 6 wk were selected for the study. The patients were divided based on computer generated randomization into laser (study group) and control groups with 25 patients in each group. Both study and control groups were comparable in terms of site of the lesion, stage of the cancer and histology. The study group patients were treated with He-Ne laser (wavelength 632.8 nm and output of 10mW) and control group patients were given oral analgesics, local application of anaesthetics, 0.9 per cent saline and povidine wash during the course of radiotherapy. **RESULTS:** All patients tolerated the laser treatment without any adverse effect or reactions. The result showed a significant difference in pain and mucositis ( $P < 0.001$ ) between the two groups. At the end of radiotherapy (after 6 wk) mean pain score and mucositis grade were significantly lower ( $P < 0.001$ ) in the study group compared to control. **INTERPRETATION & CONCLUSION:** The low-level He-Ne laser therapy during the radiotherapy treatment was found to be effective in preventing and treating the mucositis in head and neck cancer patients. Further studies need to be done on a larger sample to find the mechanism.

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### **Patients with moderate chemotherapy-induced mucositis: pain therapy using low intensity lasers.**

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**BACKGROUND:** Intensive cancer therapy normally affects malignant and normal cells with high replication rates. Cells in the gastrointestinal tract are therefore commonly affected by cytotoxins. This often results in the development of chemotherapy-induced oral mucositis (COM). COM is the inflammatory response of the oral mucous membrane to the chemotherapy drugs. Low level laser therapy (LLLT) has proved to be effective in treating and repairing biologically damaged tissue and to reduce pain. LLLT has also proven to be an efficient method for the prevention of oral mucositis. **OBJECTIVE:** To investigate the effect of LLLT on pain relief among patients who have developed COM. **METHOD:** The study was performed as a clinical test with a sample consisting of 13 adult patients receiving oncology treatment. The patients were treated during a 5-day period, and the pain was measured before and after each laser application. The laser used was an AsGaAl, with a wavelength of 830 nm and a potency of 250 mW. The energy given was 35 J cm<sup>-2</sup>. **ANALYSIS:** The results were analysed using the Wilcoxon test.

**RESULTS:** There was a significant ( $P = 0.007$ ) 67% decrease in the daily average experience of pain felt before and after each treatment, confirming that LLLT can relieve pain among patients who have developed COM. **STUDY LIMITATIONS:** The low number of COM patients at the hospital did not allow a control group to be included in the study, and therefore the results contain a potential placebo effect. **IMPLICATIONS FOR NURSING CARE:** The most important benefit the authors consider to be the value for the patients of better and quicker treatment with a drastic reduction in painful mucositis..

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### **Pilot study of laser effects on oral mucositis in patients receiving chemotherapy.**

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**PURPOSE:** The purpose of this study was to examine the effectiveness of laser therapy in the prevention and/or healing of chemotherapy-induced oral mucositis lesions. This study also evaluated the ease and feasibility of the laser therapy and the impact of the treatment on improving the patient's quality of life. **PATIENTS AND METHODS:** Fifteen patients with an episode of prior chemotherapy-induced grade 3 or 4 mucositis with 5-fluorouracil continuous infusion consented to participate in this study. All patients were provided with standardized mouth care instructions at the initiation of chemotherapy treatments.

Enrolled patients received laser therapy treatments 24 hours before the chemotherapy and then recommenced weekly with evenly distributed exposure to the standardized designated areas by one operator during the entire cycle of chemotherapy at the same doses until the mucositis resolved or the chemotherapy cycle was completed. Intraoral perfusion was measured by laser Doppler technology. Patients were assessed for response to laser therapy according to standardized mucositis grading criteria by evaluating development of lesions, extent and duration of lesions, and time to healing. The effect of laser therapy on ability to continue planned chemotherapy, the reduction in dose, delays, and ability to maintain planned dose intensity were assessed. The impact of laser therapy on pain control was evaluated using the visual analogue score. A quality-of-life survey was completed by each patient at the initiation of chemotherapy and then weekly throughout the chemotherapy. **RESULTS:** Eleven of 15 patients experienced grade 0 mucositis, three patients experienced grade 1 to 2 mucositis, and one patient experienced grade 3 to 4 mucositis. Fourteen patients completed the lasertherapy as planned, and none of the patients withdrew from the laser therapy treatments because of noncompliance. One patient continued to experience grade 4 mucositis that necessitated an interruption in the planned chemotherapy regimen and, consequently, the laser treatment. Patients tolerated the laser therapy very well and did not report any increased discomfort. No significant changes in perfusion were observed as a result of laser therapy.

**DISCUSSION:** In this pilot study, laser therapy significantly reduced the incidence and the severity of mucositis in chemotherapy patients. The laser therapy does not appear to

promote wound healing by affecting the intraoral perfusion, as assessed by Doppler measurements. The mechanisms involved in the mediating of the observed effects remain unknown at this time. Continued research is warranted to determine the optimal laser wavelength and parameters.

[Support Care Cancer](#). 1999 Jul;7(4):244-52.

## **Low-energy He/Ne laser in the prevention of radiation-induced mucositis. A multicenter phase III randomized study in patients with head and neck cancer.**

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Use of the low-energy helium-neon laser (LEL) appears to be a simple atraumatic technique for the prevention and treatment of mucositis of various origins. Preliminary findings, and significant results obtained for chemotherapy-induced mucositis in a previous phase III study, prompted a randomized multicenter double-blind trial to evaluate LEL in the prevention of acute radiation-induced stomatitis. Irradiation by LEL corresponds to local application of a high-photon-density monochromatic light source. Activation of epithelial healing for LEL-treated surfaces, the most commonly recognized effect, has been confirmed by numerous in vitro studies. The mechanism of action at a molecular and enzymatic level is presently being studied. From September 1994 to March 1998, 30 patients were randomized. Technical specification: 60 mW (25 mW at Reims, 1 patient), He-Ne, wavelength 632.8 nm. The trial was open to patients with carcinoma of the oropharynx, hypopharynx and oral cavity, treated by radiotherapy alone (65 Gy at a rate of 2 Gy/fraction, 5 fractions per week) without prior surgery or concomitant chemotherapy. The malignant tumor had to be located outside the tested laser application areas (9 points): posterior third of the internal surfaces of the cheeks, soft palate and anterior tonsillar pillars. Patients were randomized to LEL or placebo light treatment, starting on the first day of radiotherapy and before each session. The treatment time (t) for each application point was given by the equation :  $t(s) = \text{energy (J/cm}^2) \times \text{surface (cm}^2) / \text{Power (W)}$ . Objective assessment of the degree of mucositis was recorded weekly by a physician blinded to the type of treatment, using the WHO scale for grading of mucositis and a segmented visual analogue scale for pain evaluation. Protocol feasibility and compliance were excellent. Grade 3 mucositis occurred with a frequency of 35.2% without LEL and of 7.6% with LEL ( $P < 0.01$ ). The frequency of "severe pain" (grade 3) was 23.8% without LEL, falling to 1.9% with LEL ( $P < 0.05$ ). Pain relief was significantly reduced throughout the treatment period (weeks 2-7). LEL therapy is capable of reducing the severity and duration of oral mucositis associated with radiation

therapy. In addition, there is a tremendous potential for using LEL in combined treatment protocols utilizing concomitant chemotherapy and radiotherapy.

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## **Low energy Helium-Neon laser in the prevention of oral mucositis in patients undergoing bone marrow transplant: results of a double blind randomized trial.**

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**PURPOSE:** To evaluate the efficiency of Helium-Neon (He-Ne) laser in the prevention of oral mucositis induced by high dose chemoradiotherapy before autologous bone marrow transplantation (BMT). **METHODS AND MATERIALS:** Between 1993 and 1995, 30 consecutive patients receiving an autologous peripheral stem-cell or bone marrow transplant (BMT) after high dose chemoradiotherapy were randomized to possibly receive prophylactic laser to the oral mucosa after giving informed consent. Chemotherapy consisted of cyclophosphamide, 60 mg/kg intravenously (I.V.) on day (d)-5 and d-4 in 27 cases, or melphalan 140 mg/kg I.V. on d-4 in three cases. Total body irradiation (TBI) consisted of 12 Gy midplane dose in six fractions (4 Gy/day for three days). He-Ne laser (632.8 nm wavelength, power 60 mW) applications were performed daily from d-5 to d-1 on five anatomic sites of the oral mucosa. Oral examination was performed daily from d0 to d + 20. Mucositis was scored according to an oral exam guide with a 16 item scale of which four were assessed by the patients themselves. Mean daily self assessment scores for oral pain, ability to swallow and oral dryness were measured. A daily mucositis index (DMI) and a cumulative oral mucositis score (COMS) were established. Requirement for narcotics and parenteral nutrition was recorded. **RESULTS:** The COMS was significantly reduced among laser treated (L+) patients ( $p = 0.04$ ). The improvement of DMI in L+ patients was also statistically significant ( $p < 0.05$ ) from d + 2 to d + 7. Occurrence and duration of grade III oral mucositis were reduced in L+ patients ( $p = 0.01$ ). Laser applications reduced oral pain as assessed by patients ( $p = 0.05$ ) and L+ patients required less morphine ( $p = 0.05$ ). Xerostomia and ability to swallow were improved among the L+ patients ( $p = 0.005$  and  $p = 0.01$ , respectively). Requirement for parenteral nutrition was not reduced ( $p = \text{NS}$ ). **CONCLUSION:** Helium-Neon laser treatment was well tolerated, feasible in all cases, and reduced high dose chemoradiotherapy-induced oral mucositis. Optimal laser treatment schedules still needs to be defined.

**HeNe laser reduces mucositis**

a) Barasch B et al. Helium-neon laser effects on conditioning-induced mucositis in bone marrow transplantation patients. *Cancer*. 1995; 76 (12): 2550-2556.

Oral mucositis is a common complication of bone marrow transplantation conditioning therapy. Different drugs are given in order to reduce rejection of the implant. These drugs induce an oral mucositis. The mucositis is painful and complicates nutrition. Sometimes the intake of the drug has to be stopped due to complications. In the study above 20 patients received HeNe to their oral mucosa, either right or left of midline. One side was sham irradiated. Laser treatment was well-tolerated and reduced the severity of oral mucositis.

b) Cowen D et al. Low energy helium-neon laser in the prevention of oral mucositis in patients undergoing bone marrow transplant: results of a double blind randomized trial. *Int J Radiat Oncol Biol Phys*. 1997; 38 (4): 697-707. Significant reduction of oral mucositis using a 60 mW HeNe laser.

*Eur Arch Otorhinolaryngol*. 2001 Nov;258(9):481-7.

### **Chemotherapy- and radiotherapy-induced mucositis in head and neck cancer patients: new trends in pathophysiology, prevention and treatment.**

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Mucositis is the intensity-limiting toxicity in the management of locally advanced non-resectable head and neck cancer with radiotherapy and chemotherapy. New radiation modalities (hyperfractionation and/or acceleration) as well as combined modality regimens in this situation induce higher rates of acute toxicity. Hyperfractionation, for example, allows higher control rates, with few late toxicities, but it slightly increases acute mucositis. The addition of chemotherapy introduces systemic toxicity and can exacerbate local tissue reactions when used concurrently with radiotherapy. Mucositis is recognized as the principal limiting factor to further treatment intensification. As local regional control and overall survival are related to dose-intensity in this case, further research into the assessment, analysis, prevention and treatment of mucosal toxicity is not only crucial to improvement in quality of life, but certainly also to improved rates of disease control. Several topical and systemic treatments are directed to the decrease and the acceptance of this acute toxicity, but few have shown a significant preventive effect. The efficacy of low-level laser therapy in the management of such toxicity could hence yield important developments with this method in the field of oncology.

### **CHEMO-AND RADIATION-INDUCED MUCOSITIS : RESULTS OF MULTICENTER PHASE III STUDIES.**

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Considerable buccal toxicity of radiotherapy and/or chemotherapy in patients with cancer can cause patients to become discouraged and can alter their quality of life. In addition, such toxicity often necessitates alterations of treatment planning, with grave consequences in term of tumor response and even survival (concept of dose-intensity). With 5-fluorouracil and head and neck radiotherapy for example, acute mucosal toxic effect is the main limiting factor for which no clinically appropriate prophylaxis or efficacious antidote has been found to date. Management of oral mucositis is currently primarily directed at palliation of the symptoms, and prevention of infections. Low Level Laser Therapy (LLLT) has been reported effective in reducing the severity of oral mucositis lesions in a non-randomized trial, initiated in Nice (France) by Ciais et al. (1). The efficacy of this method in the prevention of chemotherapy induced oral mucositis has been subsequently confirmed in two prospective, double-blind randomized trials, in patients undergoing bone marrow transplant (2 ; 3). These initial findings and the high incidence of radiation-induced mucositis prompted a randomized multicenter trial to evaluate LLLT for the prevention of acute radiation-induced oropharyngeal mucosal lesions. The trial was open to patients with carcinoma of the oropharynx, hypopharynx and oral cavity being treated by external radiotherapy, with a total dose of 65 Gy at a rate of 1 fraction of 2 Gy/day, 5 days a week, from cobalt-60 or linear accelerator photons, without prior surgery or concomitant chemotherapy. Between September 1994 and March 1998, thirty patients entered this double-blind randomized study conforming to the Huriet law. The goal was to determine whether preventive HeNe laser beam applications could reduce or prevent oropharyngeal mucositis caused by radiotherapy.

Patients characteristics: There were 26 men and 4 women. Mean age was 60.4 years (range 36 - 78). Oral examination and preventive dental management were performed prior to radiotherapy. Daily oral hygiene (cleaning of the teeth and dental prosthesis) during treatment was recommended. Patients were assigned to either laser treatment (L+) or sham-treatment (L-) by computer blocked randomization. The protocol called for the inclusion of 30 patients, 15 in each arm. No associated anti-inflammatory or other treatment was authorized. Analgesics could be prescribed, but not during the 2 days preceding each week evaluation. Patients received HeNe laser applications daily for five consecutive days (Monday to Friday) each week, during the seven weeks of radiotherapy. The malignant tumor had to be located outside the areas selected for randomized preventive LLL application. Laser was delivered to the tissues by a straight optical fiber with a 1.2 mm spot size. The 9 treatment areas included : posterior third of buccal mucosa, soft palate and anterior tonsillar pillars. Laser illumination consisted of a continuous beam (wavelength: 632.8 nm; power: 60 mW), calibrated at the end of the optical fiber every day. The treatment time (t) for each application point was given by the equation :  $t \text{ (sec)} = \text{energy (J/cm}^2) \times \text{surface (cm}^2) / \text{Power (W)}$ . The average energy density delivered to the treatment areas was 2 J/cm<sup>2</sup>, and was applied on these nine points, equally distributed on the treated surfaces, for 33 s per point (each specific LLL session lasted approximately 5 minutes). The 60 mW lasers were designed and produced by Fradama S.A. (Geneva, Switzerland). All laser illuminations were performed by the same individual in each center. This operator was the only person to know whether or not the patient was sham-treated, and did not participate in the evaluation and scoring mucositis. During the sessions, patients wore wavelength-specific dark glasses and were

instructed to keep their eyes closed, to assure that they did not know whether they were sham-treated or whether they received laser applications. The laser made the same noises, and the probe was held in the mouth exactly the same way, when treating control subjects and when treating laser patients. The whole irradiation field, the oral cavity and the visible oropharynx were inspected weekly during seven weeks by the same physician (head and neck surgeon, or radiation oncologist), blinded to the result of randomization. The evaluation of mucositis and pain was performed on the oropharyngeal areas (9 points). Criteria for evaluation were the standard WHO scale for mucositis in the oropharynx; and a segmented visual analogic scale for pain (patient self evaluation). In this phase III study, no adverse effect was noted with the use of a 60-mW HeNe laser, though it is important to emphasize the importance of preventing retinal damage by the use of wavelength-specific goggles. This is consistent with previous reports. Laser applications delayed time of onset, attenuated the peak severity and shortened the duration of oral mucositis. The difference between L+ and L- patients was statistically significant from week 4 to week 7. With the total delivered dose of 65Gy, conventionally fractionated, all L- patients developed mucositis at week 2, with a peak at week 5 (13 with grade 3 mucositis, and 2 with grade 2 mucositis). All L+ patients also had mucositis at week 2, with a peak at week 5 (5 with grade 3 mucositis, 9 with grade 2, 1 with grade 1). During the 7 weeks of treatment, the mean grade of mucositis in L+ patients was significantly lower ( $p=0.01$ ) than the mean grade in L- patients. Results on decrease in pain intensity were also quite convincing. Laser applications reduced the incidence and duration of morphine administration. Ability to swallow was also improved. These results confirm previous data collected with this method, especially for patients undergoing bone marrow transplant (BMT). In a prospective study, Barasch et al. (2) used a 25- mW laser on one side of the mouth only and reported a statistically significant reduction in oral mucositis on that side, according to the scoring system they used. In the Barasch study, each patient was his or her own control, which could be of importance, since mucosal damage on the sham-treated side could have benefited also from a distant systemic laser effect. Cowen et al. (3), using a 60 mW HeNe laser, performed a double-blind randomized phase III trial, in which laser was administered to the treatment group during conditioning, prior to the day of transplant. This study showed a 33% reduction of grades 3 and 4 mucositis in L+ patients. In this trial, mucositis was scored according to an oral examination guide, with a 16 items scale, of which 4 were assessed by the patients themselves. Daily mucositis index was significantly lower in L+ patients ( $p < 0.05$ ) from d+2 to d+7 after BMT. The duration of grade 3 stomatitis was also reduced in L+ patients ( $p = 0.01$ ). Oral pain was lower ( $p = 0.05$ ), and L+ patients required less morphinomimetics ( $p = 0.05$ ). Finally, xerostomia and ability to swallow were improved among L+ patients ( $p = 0.05$ , and  $p = 0.01$ , respectively). All these results were in keeping with previous observations, suggesting the efficacy of the method (1, 4). Schubert et al. for example (4), identified a trend towards lower oral mucositis scores, on all examination days, in an interim results report of a phase I/II study, in which laser application was performed prophylactically during conditioning before BMT.

In conclusion, LLLT seems to be a safe and efficient method for the prevention of chemo- and radiation-induced mucositis, with a tremendous potential interest for combined modality treatment. The concomitant use of chemo- and radiotherapy is

becoming the new standard of care in advanced head and neck cancer, with very encouraging results, even in nonresectable cases. Since the main limiting factor of these combined protocols is the acute mucositis, this complementary treatment option with low level HeNe laser could be important in enhancing the feasibility of such regimens, and especially in the conservation of dose-intensity effect. At Nice, where the method is now used routinely during head and neck radiation, we project a new study testing LLL in patients being treated with concomitant chemo- and radiotherapy for advanced head and neck cancer. Even more than the improvement of patient comfort, the therapeutic index of combined specific treatment should be increased by the use of LLLT, besides standard supportive care, oral care and enteral nutrition (5). During this study, other laser wavelengths and powers could be tested, and compared to 60-mW HeNe laser.

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