LASER THERAPY IN PAEDIATRICS

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Efficacy of pulsed high-intensity laser therapy on pain, functional capacity, and gait in children with haemophilic arthropathy.

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Abstract

AIM:

The aim of this study was to evaluate the effects of pulsed high-intensity laser therapy (HILT) on pain, functional capacity, and gait in children with haemophilia.

METHODS:

Thirty children with haemophilia type A with ages ranging from 9 to 13 years were selected for this study. They were assigned randomly, into two equal treatment groups. The laser group received the traditional physical therapy programme plus active laser (total energy of 1500 J through three phases/3 sessions/week), whereas the placebo group received the same physical therapy programme plus placebo laser over three consecutive months. Baseline and post-treatment assessments used the visual analogue scale (VAS) to evaluate pain, a 6-min walk test (6MWT) to evaluate functional capacity, and the GAITRite® system to evaluate gait parameters.

RESULTS:

Children in the laser group showed significant improvement in pain, functional capacity, and gait parameters compared to those in the placebo group ($p < 0.05$). Post-treatment functional capacity for the laser and placebo groups were 316.6 ± 35.27 and 288 ± 43.3 m, respectively.

CONCLUSIONS:

HILT is an effective modality in reducing pain, increasing functional capacity, and improving gait performance in children with haemophilic arthropathy. Implications for Rehabilitation Haemophilic arthropathy due to recurrent joint bleeding leads to physical, psychological, and socioeconomic problems in children with haemophilia and reduces their quality of life. Early physiotherapeutic interventions help to prevent and treat the sequelae of recurrent haemarthrosis. High-intensity laser therapy has been introduced as non-invasive and an effective physiotherapy modality for rapid pain control, with consequent improvement in children's quality of life. High-intensity laser therapy should be used as an adjunct to exercise programme in the rehabilitation of children with haemophilic arthropathy.

Lasers Med Sci. 2016 Aug;31(6):1231-6. doi: 10.1007/s10103-016-1975-y. Epub 2016 Jun 6.

Low-level laser therapy for treatment of chemotherapy-induced oral mucositis in childhood: a randomized double-blind controlled study.

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Abstract

The aim of this study was to verify if low-level laser therapy could be useful to reduce chemotherapy-related oral mucositis grading and pain in childhood undergoing chemotherapy. A randomized double-blind clinical trial was carried out. Patients from 3 to 18 years of age undergoing cancer therapy and presenting OM grade 2 or more were eligible for this study. Patients were randomly divided in two groups: group A received laser therapy from the day of OM diagnosis and other 3 consecutive days (830 nm wavelength, power 150 mW, spot size 1 cm(2), 30 s per cm(2), energy density 4.5 J/cm(2)); group B received sham therapy (placebo) with the same timing. Two blind clinicians performed OM scoring and pain evaluation at day 1 (immediately before the beginning of laser treatment-T0), day 4 (after finishing laser therapy cycle-T1) and at day 7 (T2) as follow-up. A total of 123 patients were included in the study. Group A was composed of 62 children while group B is 61; in both groups, there was a progressive reduction in grade of OM, and at day 7, not every mucosal lesion disappeared. The difference in the decline of OM grading between the two groups resulted not statistically significant ($p = 0.07$). A statistically significant difference in pain reduction between two groups both at T1 and at T2 ($p < 0.005$) was observed. This study demonstrated the efficacy of LLLT in reducing pain due to chemotherapy-induced oral mucositis in children, while no significant benefit was noted in reducing OM grade.

Lasers Med Sci. 2016 Aug;31(6):1061-7. doi: 10.1007/s10103-016-1951-6. Epub 2016 May 4.

Laser acupuncture as an adjunctive therapy for spastic cerebral palsy in children.

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Abstract

Laser acupuncture is widely used as an alternative line of treatment in several chronic pediatric diseases. To investigate whether biostimulation by low-level laser on acupuncture points adds a clinical benefit to conventional physiotherapy in hemiplegic spastic cerebral palsy (CP) children. Forty spastic hemiplegic cerebral palsy children by age 1-4 years were chosen from the pediatric outpatient clinic of the National Institute of Laser Enhanced Sciences (NILES), Cairo University, and Menofyia University hospitals. They were randomly divided into control and study groups; 20 children each. Both groups received physiotherapy for 3 months, while only the study group also received laser acupuncture (low-level laser 650 nm with 50 mW power was applied at each acupoint for 30 s giving an energy density of 1.8 J/cm(2)). Preassessment and postassessment of muscle tone, the range of motion (ROM), and gross motor function measurements (GMFMs) were obtained, and the results were statistically analyzed. Comparison between posttreatment measures for the control vs. study groups showed significant difference in muscle tone (wrist flexors and plantar flexors) in favor of the study group, while range of motion showed no significant differences. GMFM showed no significant difference in total score while there was a significant difference in goal total score (sum of % scores for each dimension identified as goal area divided by number of goal areas) in favor of the study group. Laser acupuncture has a beneficial effect on reducing spasticity in spastic cerebral palsy and may be helpful in improving their movement.

J Biomed Opt. 2016 Feb;21(2):28001. doi: 10.1117/1.JBO.21.2.028001.

Evaluation of low-level laser therapy in the treatment of masticatory muscles spasticity in children with cerebral palsy.

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3 Mogi das Cruzes University (UMC), Biomedical Engineering Research and Post-Graduate Center, Av. Dr. Cândido Xavier de Almeida e Souza 200, Mogi das Cruzes, SP CEP 08780-911, Brazil.

Abstract

Spasticity is a motor disorder frequently present in individuals with cerebral palsy (CP). This study aimed to evaluate the effect of low-level laser therapy (LLLT) on the spasticity of the masseter and anterior temporal muscle fibers in children with CP over three weeks of intermittent laser exposures. The bite force (BF) of the masticatory muscles and the amplitude of mouth opening were evaluated before and after laser irradiation in 30 children with CP. Both sides of the masseter and temporalis muscles were irradiated with low-intensity diode laser pulses of 808-nm wavelength six times over three consecutive weeks. During the subsequent three weeks of postlaser exposures, although no laser treatment was applied, the evaluation parameters were measured and recorded. A significant improvement in the amplitude of mouth opening and a decrease in the BF were observed in the weeks following LLLT ($P<0.05$). However, by the sixth week post-LLLT, the BF and the amplitude of mouth opening reverted to values equivalent to those obtained before the first application of LLLT. Our investigation revealed low-level energy exposures from a 808-nm diode laser to be an effective short-term therapeutic tool. This method increased the amplitude of mouth opening and decreased the muscle tonus of children with spastic CP over a time course of three weeks of intermittent laser applications.

Vopr Kurortol Fizioter Lech Fiz Kult. 2015 Sep-Oct;92(5):50-3.

[The application of laser therapy for the medical rehabilitation of the children presenting with chronic osteomyelitis].

[Article in Russian]

Trunova OV, Mashkov AE, Khan MA, Prikuls VF, Nazarenko NN, Supova MV, Smirnova SN, Larionov KS.

Abstract

The objective of the present study was to develop a scientifically sound rationale for the application of infrared laser radiation (IRLR) either separately or in the combination with fluctuation magnetic therapy in the medical rehabilitation of the children presenting with chronic hematogenous osteomyelitis. Another objective was to evaluate the clinical effectiveness of this therapeutic modality. To achieve these goals, the clinical observations and special research studies were conducted in two directions with the participation of 95 patients at the age varying from 1 to 15 years. The study has demonstrated the effectiveness of the inclusion of IRLR in the medical rehabilitation program for the children with chronic hematogenous osteomyelitis in different periods of the disease. It was shown that the transcutaneous infrared irradiation of the affected area during the exacerbation of chronic osteomyelitis had a well apparent immunostimulatory effect and reduced the activity of the inflammatory process. The application of IRLR in combination with fluctuation magnetic therapy during the period of partial remission, had a more pronounced influence on the microcirculation and stimulated the regenerative and trophic processes.

Dermatology. 2016;232(2):237-41. doi: 10.1159/000442666. Epub 2016 Feb 3.

Successful Treatment of Segmental Vitiligo in Children with the Combination of 1-mm Minigrafts and Phototherapy.

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Abstract

BACKGROUND:

Minigrafts using a 1-mm biopsy punch (1-mm minigrafts) are being increasingly used to treat vitiligo. However, there have been few reports of the use of 1-mm minigrafts in pediatric patients.

OBJECTIVE:

To examine the effectiveness of combination therapy with 1-mm minigrafts and phototherapy in children with segmental vitiligo.

METHODS:

Minigrafts were placed in 13 patients aged ≤16 years with segmental vitiligo. Following surgery, 11 patients underwent irradiation with excimer laser light and 2 with narrow-band ultraviolet B light.

RESULTS:

A mean repigmentation of 81.6% was obtained. A particularly high mean repigmentation of 87.9% was seen in patients aged ≤12 years, indicating greater efficacy in these patients than in patients aged ≥13 years (mean, 67.5%). Although a transient cobblestone appearance occurred as an adverse effect, it improved over time.

CONCLUSIONS:

Combined treatment of segmental vitiligo with 1-mm minigrafts and phototherapy can be performed safely and is highly effective in young patients.

J Clin Diagn Res. 2016 Jan;10(1):ZC67-70. doi: 10.7860/JCDR/2016/13218.7140. Epub 2016 Jan 1.

Clinical Evaluation of Low Level Diode Laser Application For Primary Teeth Pulpotomy.

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Abstract

INTRODUCTION:

Inspite of latest advances in the materials and techniques practiced for the treatment of pulpally infected teeth with better reported success rate, still the question arises for safety and effectiveness of these medicaments.

AIM:

The objective of the present study was to compare the effectiveness of the Low Level Laser Therapy to Mineral Trioxide Aggregate (MTA) when used for pulpotomy in vital human primary molars.

MATERIALS AND METHODS:

The sample consisted of 40 primary molars from 29 children aged four to seven years. The teeth were selected based on clinical, radiographic criteria and randomly allocated to two groups. All the 40 primary molars were subjected to standard pulpotomy procedure, where in 20 molars received MTA (Group I) and 20 molars received LLLT (Group II) pulpotomy. Children were recalled at 3, 6 and 12 months intervals and pulpotomised molars were examined clinically and radiographically. Data was analysed using chi-square test.

RESULTS:

MTA showed 94.7% success rate at all the three intervals, where as LLLT showed a success of 95% at three months, which decreased gradually to 85% at six months and 80% at 12 months. Intergroup comparisons were not significant.

CONCLUSION:

Low level laser therapy can be considered for primary teeth pulpotomy and its success is comparable to MTA pulpotomy technique.

Acta Otorrinolaringol Esp. 2016 Nov - Dec;67(6):339-344. Epub 2016 Apr 13.

Using low level laser therapy to reduce early postoperative airway obstruction following modified Hogan's flap.

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Abstract

INTRODUCTION AND OBJECTIVE:

The most common postoperative complications of velopharyngeal insufficiency surgery are postoperative bleeding and airway obstruction or obstructive sleep apnoea. Consequently, the aim of this study was to evaluate the effect of low level laser therapy (LLLT) during the first postoperative days in children undergoing superiorly based pharyngeal flap (SBF) surgery.

MATERIALS AND METHODS:

A randomized double blind clinical study on 30 children divided on two groups 15 patients each, who underwent SBF. LLLT was used in a group and the other was a control group. The study was conducted in academic tertiary care medical centres between 2013 and 2015. The degree of edema, oxygen saturation, occurrence of obstructive sleep apnoea (OSA) and steroid administration were recorded.

RESULTS:

The mean of the average oxygen saturation was significantly less in the control group in the 1st and 2nd day as compared to the laser group. The need for oxygen and the incidence of OSA in the first 3 days were significantly higher in the control group as compared to the laser group. The degree of edema showed no significant difference in the first day but was significantly higher in the control group in the 2nd and 3rd days. Hence, the need of steroids was significantly higher in the control group in the first 3 days.

CONCLUSIONS:

Preliminary results showed that low level laser therapy is effective in reducing the incidence of early postoperative airway obstruction after SBF operations.

Lasers Med Sci. 2016 Aug;31(6):1185-94. doi: 10.1007/s10103-016-1970-3. Epub 2016 May 28.

Effect of low-level laser therapy after rapid maxillary expansion: a clinical investigation.

Garcia VJ[1], Arnabat J[2], Comesaña R[3], Kasem K[4], Ustrell JM[4], Pasetto S[5], Segura OP[5], ManzanaresCéspedes MC[6], Carvalho-Lobato P[6].

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Abstract

To evaluate the effectiveness low-level laser therapy (LLLT) on the repair of the mid palatal suture, after rapid maxillary expansion (RME). A single-operator, randomized single-blind placebo-controlled study was performed at the Orthodontic Department at the Dental Hospital of Bellvitge. Barcelona University, Hospitalet de Llobregat, Spain. Thirty-nine children (range 6-12 years old), completed RME and were randomized to receive active LLLT (n = 20) or placebo (n = 19). The laser parameters and dose were 660 nm, 100 mW, CW, InGaAlP laser, illuminated area 0.26 cm(2), 332 mW/cm(2), 60 s to four points along midpalatal suture, and 30 s to a point each side of the suture. A total of seven applications were made on days 1, 7, 14, 28, 42, 56, and 70 of the retention phase RME. A cone beam computed tomography (CBCT) scan was carried out on the day of the first laser treatment, and at day 75, a second CBCT scan was performed. Two radiologists synchronized the slices of two scans to be assessed. P = 0.05 was considered to be statistically significant. At day 75 of the suture, the irradiated patients presented a greater percentage of approximate zones in the anterior (p = 0.008) and posterior (p = 0.001) superior suture-and less approximation in the posterior superior suture (p = 0.040)-than the placebo group. LLLT appears to stimulate the repair process during retention phase after RME.

Int J Pediatr Otorhinolaryngol. 2016 Oct;89:183-6. doi: 10.1016/j.ijporl.2016.07.038. Epub 2016 Aug 10.

The effectiveness of low-level laser on postoperative pain and edema in secondary palatal operation.

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Abstract

OBJECTIVE:

The postoperative period after palatal surgery is usually very painful, requiring the use of pain-relieving drugs. Hence, the aim of this study was to evaluate the efficacy of Low-level laser therapy (LLLT) in post-operative pain control and edema after secondary palatal operations.

METHODS:

A randomized double blinded clinical study on 20 children undergoing secondary palatal operations between 2013 and 2015 was done. Patients were randomly divided on two groups 10 patients each. In one group patients received local application of therapeutic laser immediately after surgery while patients received nothing in the control group. The mean age was 5.22 years ± 2.53 SD in the laser group and 6.42 years ± 0.76 in the control group. Postoperative pain was assessed by using visual analog scale scores and by recording the need of analgesics. The degree of postoperative edema was also recorded.

RESULTS:

The pain scale showed significantly less postoperative pain in the laser group than in the control group from the first day (P-value = 0.006) to the 6th day (P-value = 0.014). The number of postoperative analgesic doses needed were significantly less in the laser group in the second and third days (P-value = 0.014). The postoperative edema was significantly higher in the control group from the 2nd (P-value = 0.004) to the 7th (P-value = 0.014) postoperative days.

CONCLUSIONS:

Preliminary results showed that low-level laser therapy is effective in the reduction of postoperative pain and edema, and minimizing the need of analgesic medication after secondary palatal operations.

Dev Period Med. 2016 Jan-Mar;20(1):40-6.

Impact of low level laser therapy on skin blood flow

[Article in Polish]

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Abstract

The aim of this study was to objectively assess the impact of low level laser therapy on skin blood flow, in terms of two of its components - the flow and trophic and therapeutic effect.

MATERIAL AND METHODS:

Nineteen children aged 3-15 years have been included in the study (seven boys and twelve girls) with a diagnosis of meningomyelocele in the lumbosacral area. In nine of them (47.3%) bedsores were found in the area of paresis location. Studies of skin blood flow were performed using xenon 133 clearance in the Department of Nuclear Medicine of the Children's Memorial Health Institute. Xenon 133 radioisotope in saline with intrinsic activity 74 MBq in 1 ml was used as the marker. Laser application was performed immediately prior to the application of the marker with a tag shower 60 mW probe, emitting 680 nm red light with surface power density of 0.5 J/cm2.

RESULTS:

Within the tested children the laser application resulted in a significantly increased skin blood flow. Average results in tested group before LLLT are 7.47 ml/100 g/min, after LLLT 11.08 ml/100 g/min.

CONCLUSIONS:

1. LLLT significantly increases the perfusion of the skin. 2. The effect of the increased perfusion as the result of laserotherapy in the most evident in children with skin trophic abnormalities. 3. Results confirmed by clinical observation indicate, that perfusion increase in relation to LLLT takes place with participation of trophic component of skin blood circulation.

J Orofac Orthop. 2015 Sep;76(5):431-9. doi: 10.1007/s00056-015-0306-4.

Pain reduced by low-level laser therapy during use of orthodontic separators in early mixed dentition.

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Abstract

OBJECTIVE:

The purpose of this work was to investigate whether low-level laser therapy (LLLT) applied at a defined distance from the gingiva has a pain-reducing effect in young patients undergoing orthodontic separation during the early mixed-dentition stage.

MATERIALS AND METHODS:

A total of 40 children in early mixed dentition (mean age 8.05 years) who required separation of molars were included. The study comprised a group of 20 patients whose treatment included laser application on the day of separation and a control group of 20 patients not receiving LLLT. All patients recorded their maximum pain intensities on the day of separation (day 1) and on the following 4 days.

RESULTS:

Compared to the control group, pain perception was significantly reduced ($p < 0.05$) in the LLLT group on day 1 and continued to be reduced on day 2. Equivalent pain levels were recorded in both groups on days 3-5.

CONCLUSION:

Given our findings of a pain-reducing effect in young patients undergoing orthodontic separation during the early mixed-dentition stage, LLLT is an interesting alternative option of providing analgesia even in very young patients.

Dermatol Ther. 2015 Jul-Aug;28(4):201-9. doi: 10.1111/dth.12240. Epub 2015 Jun 2.

Comparison of quality of facial scars after single low-level laser therapy and combined low-level with high-level (PDL 595 nm) laser therapy.

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Abstract

The main goal of our study was to compare the quality of resulting facials scar 12 weeks after single and combined laser therapy. Forty-one children from age 1.5 to 5 years with facial scars after injury participated in the study. Thirty-one underwent laser therapy, 14 were treated using single low-level laser therapy (670 nm, fluence 3-5 J/cm(-2)), and 17 underwent combined high-level laser therapy with non-ablative pulsed dye laser (PDL; 595 nm, spot size 7 mm, delay 0.45 ms or 1.5 ms, fluence 9-11 J/cm(-2) , cryogen spray/delay 20/30 ms) and low-level laser therapy. The control group consisted of 10 untreated children. Before treatment and at week 4, 8, and, 12 the scars were evaluated using the POSAS questionnaire. A statistically significant improvement in scars (between ratings before treatment and 4 weeks after therapy, before treatment and 8 weeks after therapy and before treatment and 12 weeks after therapy) was observed in all parameters in both treatment groups ($p < 0.0001$). For the HLLT+LLLT group the most significant enhancement in the quality of scars was found for all items and at all evaluations, except pigmentation and pliability. There was no improvement observed in quality of facial scars in the control group.

Laser Ther. 2014 Dec 27;23(4):243-7. doi: 10.5978/islsm.14-OR-17.

The effect of LLLT on bone metabolism in children with severe cerebral palsy (a secondary publication).

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Abstract

BACKGROUND AND AIMS:

It is said that the average frequency of bone fracture in hospitalized children with severe cerebral palsy (unable to remain seated) is 1% (0.2 to 2.0%). Cerebral palsy patients' bones are known to be vulnerable to fracture, and refractory bone atrophy may be observed. However, the effect of low level laser therapy (LLLT) on bone density or bone metabolism has not been fully investigated. In recent years, tests for bone density or bone metabolism markers have become available.

MATERIAL AND METHODS:

In this study, we evaluated changes in bone density and bone metabolism markers in 4 children with severe cerebral palsy who underwent LLLT for an average of 22 days.

RESULTS:

B-ALP, a marker of ossification, increased 1 month after the start of irradiation in 3 of the 4 subjects and returned to a level close to the pre-irradiation level 2 months after the start of irradiation. In the remaining subjects in whom B-ALP failed to increase, B-ALP had been low before irradiation. Urinary N-terminal telopeptide (NTx) levels, a marker of bone resorption, decreased in 3 of the 4 subjects after the start of irradiation and remained low even 10 months later. Serum NTx levels tended to decrease in 3 of the 4 subjects. The levels of serum NTx/Crea, Deoxy-Pyridinoline (DPd) and DPd/Crea (DPd/Crea) also decreased in 3 of the 4 subjects. Transient decreases in intact parathyroid hormone (PTH) levels were observed in all 4 cases. Changes were particularly apparent in 2 cases: one with high NTx levels, which showed enhanced bone resorption, and one with high PTH levels, probably due to a vitamin D (VitD) deficiency. Although the metacarpal bone density measured by DIP was found to be lower than in normal children, there were no changes due to LLLT.

CONCLUSION:

These results suggest that LLLT has a positive influence on bone metabolism in that it temporarily increases bone formation and suppresses bone resorption while also tending to improve secondary hyperparathyroidism caused by VitD deficiency. Enhanced bone resorption in the case with high NTx levels was noteworthy, together with marked changes in the case with high PTH levels due to VitD deficiency. These positive influences on bone metabolism merit attention as potential new indications of LLLT.

Int J Clin Pediatr Dent. 2014 May;7(2):125-9. doi: 10.5005/jp-journals-10005-1249. Epub 2014 Aug 29.

Alternative approach to the management of postoperative pain after pediatric surgical procedures.

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Abstract

AIM:

This paper reports two clinical cases in which the application of low-level laser therapy (LLLT) enhanced the postoperative symptoms after pediatric surgical procedures.

BACKGROUND:

The uses of novel technologies allow more comfort to the patients and ensure a rapid procedure, and LLLT application has shown a positive effect in the prevention of discomfort after invasive procedures.

CASE DESCRIPTION:

Low-level laser therapy protocol was applied after surgical removal of supernumerary tooth and frenectomy resulting in less swallow and pain with no need of medication intake.

CONCLUSION:

The laser application was well accepted by both children and parents and showed a clinical efficiency in the follow-up examinations beyond the satisfactory quality of wound healing.

CLINICAL SIGNIFICANCE:

The LLLT approach is an excellent adjuvant therapy resource for delivery an optimal postoperative after surgical procedures in children. How to cite this article: Paschoal M, Souza J, Santos-Pinto L, Pansani C. Alternative Approach to the Management of Postoperative Pain after Pediatric Surgical Procedures. Int J Clin Pediatr Dent 2014;7(2):125-129.

Photomed Laser Surg. 2013 Jan;31(1):10-6. doi: 10.1089/pho.2012.3338. Epub 2012 Nov 15.

Low-level laser therapy for treatment of pain associated with orthodontic elastomeric separator placement: a placebo-controlled randomized double-blind clinical trial.

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Abstract

OBJECTIVE:

The objective of this study was to evaluate the effectiveness of the use of irradiation with a low-level laser therapy (LLLT), wavelength 830 nm, for treating pain inherent to tooth movement caused by orthodontic devices, simulated by positioning interdental elastomeric separators.

METHODS:

Sixty orthodontic patients were randomly assigned to two groups: GA (ages 12-25 years; mean 17.1 years) was the control, and GB (ages 12-26 years; mean 17.9 years) the intervention group. All patients received elastomeric separators on the mesial and distal surfaces of one of the lower first molars, and immediately after insertion of the separators received irradiation as randomly indicated. The intervention group (GB) received irradiation with LLLT (aluminum gallium arsenide diode), by a single spot in the region of the radicular apex at a dose of 2 J/cm(2) and application along the radicular axis of the buccal surface with three spots of 1 J/cm(2) (wavelength 830 nm; infrared). Control group (GA) received irradiation with a placebo light in the same way. This was a double-blind study. All the patients received a questionnaire to be filled out at home describing their levels of pain 2, 6, and 24 h and 3 and 5 days after orthodontic separator placement, in situations of relaxed and occluded mouth.

RESULTS:

The patients in the intervention group (LLLT) had lower mean pain scores in all the measures. The incidence of complete absence of pain (score=0) was significantly higher the intervention group.

CONCLUSIONS:

Based on this study, authors concluded that single irradiation with LLLT of wavelength 830 nm efficiently controlled the pain originating from positioning interdental elastomeric separators, to reproduce the painful sensation experienced by patients when fixed orthodontic devices are used.

J Altern Complement Med. 2013 Apr;19(4):376-82. doi: 10.1089/acm.2011.0531. Epub 2012 Nov 9.

Low-level laser therapy in pediatric Bell's palsy: case report in a three-year-old child.

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Abstract

OBJECTIVES:

The objective of this study was to apply low-level laser therapy (LLLT) to accelerate the recovery process of a child patient with Bell's palsy (BP).

DESIGN:

This was a prospective study.

SUBJECT:

The subject was a three-year-old boy with a sudden onset of facial asymmetry due to an unknown cause.

MATERIALS AND METHODS:

The low-level laser source used was a gallium aluminum arsenide semiconductor diode laser device (660 nm and 780 nm). No steroids or other medications were given to the child. The laser beam with a 0.04-cm(2) spot area, and an aperture with approximately 1-mm diameter, was applied in a continuous emission mode in direct contact with the facial area. The duration of a laser session was between 15 and 30 minutes, depending on the chosen points and the area being treated. Light was applied 10 seconds per point on a maximum number of 80 points, when the entire affected (right) side of the face was irradiated, based on the small laser beam spot size. According to the acupuncture literature, this treatment could also be carried out using 10-20 Chinese acupuncture points, located unilaterally on the face. In this case study, more points were used because the entire affected side of the face (a large area) was irradiated instead of using acupuncture points.

OUTCOME MEASURES:

The House-Brackmann grading system was used to monitor the evolution of facial nerve motor function. Photographs were taken after every session, always using the same camera and the same magnitude. The three-year-old boy recovered completely from BP after 11 sessions of LLLT. There were 4 sessions a week for the first 2 weeks, and the total treatment time was 3 weeks.

RESULTS:

The result of this study was the improvement of facial movement and facial symmetry, with complete reestablishment to normality.

CONCLUSIONS: LLLT may be an alternative to speed up facial normality in pediatric BP.

Photomed Laser Surg. 2012 Mar;30(3):167-71. doi: 10.1089/pho.2011.3089. Epub 2012 Jan 11.

Low-level laser therapy improves visual acuity in adolescent and adult patients with amblyopia.

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Abstract

OBJECTIVE:

The purpose of this study was to examine the effects of low-level laser therapy (LLLT) on visual acuity in adolescent and adult patients with amblyopia.

BACKGROUND DATA:

Currently, amblyopia can be treated successfully only in children.

METHODS:

In this single-blinded, placebo-controlled study, 178 patients (mean age 46.8 years) with amblyopia caused by ametropia (110 eyes) or strabismus (121 eyes) were included.
For LLLT, the area of the macula was irradiated through the conjunctiva from 1 cm distance for 30 sec with laser light (780 nm, 292 Hz, 1:1 duty cycle; average power 7.5 mW; spot area 3 mm(2)). The treatment was repeated on average 3.5 times, resulting in a mean total dose of 0.77 J/cm(2). No occlusion was applied, and no additional medication was administered. Best corrected distant visual acuity was determined using Snellen projection optotypes. In 12 patients (12 eyes), the multifocal visual evoked potential (M-VEP) was recorded. A control group of 20 patients (20 eyes) received mock treatment.

RESULTS:

Visual acuity improved in ~90% of the eyes treated with LLLT ($p<0.001$), increasing by three or more lines in 56.2% and 53.6% of the eyes with amblyopia caused by ametropia and strabismus, respectively. The treatment effect was maintained for at least 6 months. The mean M-VEP amplitude increased by 1207 nV ($p<0.001$) and mean latency was reduced by 7 msec ($p=0.14$). No changes were noted in the control group.

CONCLUSIONS:

LLLT led to a significant improvement in visual acuity in adolescent and adult patients with amblyopia caused by ametropia or strabismus.

Am J Orthod Dentofacial Orthop. 2012 Apr;141(4):444-50. doi: 10.1016/j.ajodo.2011.10.023.

Effect of a low-level laser on bone regeneration after rapid maxillary expansion.

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Abstract

INTRODUCTION:

In this study, we evaluated the effects of a low-level laser on bone regeneration in rapid maxillary expansion procedures.

METHODS:

Twenty-seven children, aged 8 to 12 years, took part in the experiment, with a mean age of 10.2 years, divided into 2 groups: the laser group (n = 14), in which rapid maxillary expansion was performed in conjunction with laser use, and the no-laser group (n = 13), with rapid maxillary expansion only. The activation protocol of the expansion screw was 1 full turn on the first day and a half turn daily until achieving overcorrection. The laser type used was a laser diode (TWIN Laser; MMOptics, São Carlos, Brazil), according to the following protocol: 780 nm wavelength, 40 mW power, and 10 J/cm(2) density at 10 points located around the midpalatal suture. The application stages were 1 (days 1-5 of activation), 2 (at screw locking, on 3 consecutive days), 3, 4, and 5 (7, 14, and 21 days after stage 2). Occlusal radiographs of the maxilla were taken with the aid of an aluminum scale ruler as a densitometry reference at different times: T1 (initial), T2 (day of locking), T3 (3-5 days after T2), T4 (30 days after T3), and T5 (60 days after T4). The radiographs were digitized and submitted to imaging software (Image Tool; UTHSCSA, San Antonio, Tex) to measure the optic density of the previously selected areas. To perform the statistical test, analysis of covariance was used, with the time for the evaluated stage as the covariable. In all tests, a significance level of 5% ($P < 0.05$) was adopted.

RESULTS:

From the evaluation of bone density, the results showed that the laser improved the opening of the midpalatal suture and accelerated the bone regeneration process.

CONCLUSIONS:

The low-level laser, associated with rapid maxillary expansion, provided efficient opening of the midpalatal suture and influenced the bone regeneration process of the suture, accelerating healing.

Acupunct Med. 2005 Mar;23(1):31-3.

The use of laser acupuncture for the treatment of neurogenic pruritus in a child--a case history.

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Abstract

This report describes the successful treatment using laser acupuncture of a six year old girl with neurogenic pruritus of the abdomen. It is the first case report of neurogenic pruritus treated by laser acupuncture. The main advantage of using low energy laser, as opposed to acupuncture needles, to stimulate points, is that low energy laser causes little or no sensation, which is particularly useful when treating children.

Int J Clin Pediatr Dent. 2014 May;7(2):140-3. doi: 10.5005/jp-journals-10005-1252. Epub 2014 Aug 29.

Recurrent Labial Herpes Simplex in Pediatric Dentistry: Low-level Laser Therapy as a Treatment Option.

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Abstract

Recurrent labial herpes simplex is a pathology of viral origin that is frequently observed in children. The signs and symptoms are uncomfortable and, in many cases, the efficacy of treatment is unproven. However, several studies have demonstrated good results from the use of low-level laser therapy (LLLT), primarily due to acceleration of the healing process and pain relief, which make it a promising resource for use with this pathology. This paper describes a clinical case of a 7-year-old patient affected by this pathology and the therapeutic resolution proposed. How to cite this article: Stona P, da Silva Viana E, dos Santos Pires L, Weber JBB, Kramer PF. Recurrent Labial Herpes Simplex in Pediatric Dentistry: Low-level Laser Therapy as a Treatment Option. Int J Clin Pediatr Dent 2014;7(2):140-143.

Lasers Med Sci. 2015 Nov;30(8):2179-87. doi: 10.1007/s10103-015-1794-6. Epub 2015 Aug 26.

LASER versus electromagnetic field in treatment of hemarthrosis in children with hemophilia.

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Abstract

Children with hemophilia usually have recurrent joint bleeding that leads to joint damage, loss of range of motion, and restriction of mobility, therefore affecting the quality of life in these children. The purpose of this study was to compare the effects of low-level laser therapy (LLLT) to that of pulsed electromagnetic field (PEMF) in treatment of hemarthrosis in children with hemophilia. Thirty boys with hemophilia A with ages ranging from 9 to 13 years were selected and assigned randomly, using sealed envelopes, into two equal intervention groups. The study group I received the traditional physical therapy program in addition to LLLT, whereas the study group II received the same physical therapy program given to the study group I in addition to PEMF. Both groups received the treatment sessions three times per week for three successive months. Pain, laboratory investigations, swelling, and range of motion (ROM) of the affected knee joint, in addition to physical fitness were evaluated before, at the end of the sixth week and at 12 weeks of the treatment program. Laser group showed significant improvement in all measured variables after the sixth week of treatment when compared with PEMF. By 12 weeks of treatment, there was a significant improvement in pain, ROM, ESR and leucocytes levels in laser group compared with PEMF, while there was no significant difference in knee circumferences and the 6-min walk test (6MWT) between both groups. Both groups showed significant improvement at 12 weeks of treatment compared with that at 6 weeks. Both LLLT and PEMF are effective modalities in reducing pain, swelling, increasing ROM and improving physical fitness. Twelve weeks of treatment of both modalities demonstrated significant improvement than 6 weeks of treatment. Laser therapy induced significant improvement than electromagnetic therapy in treatment of hemarthrosis-related problems in children with hemophilia.

Braz Dent J. 2004;15 Spec No:SI29-33.

Efficiency of laser therapy applied in labial traumatism of patients with spastic cerebral palsy.

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Abstract

The aim of this study was to report the effectiveness of laser therapy applied to traumatic labial injury of patients with spastic cerebral palsy. We report two cases of patients with internal mucosa and lower lip traumatism caused by oral reflex automatism with spastic tonic bite and lower lip interposition. One patient presented extensive lower lip ulceration, loss of tissue, crusty and hemorrhagic areas, with increasing pain and spasticity. The other patient presented local congestion signs, extremely enlarged tissue growth and increased labial volume. Laser therapy was applied to all injured areas, with a low-potency diode InGaAlP laser [685 nm Quasar (Dentoflex), 190 J/ cm2, with a 24-h interval between the first and second administration, and a 7-day interval between the two subsequent ones. At first re-evaluation, 24 h later, there was a striking reduction in inflammation, a decrease in vascular congestion, and a reduction of the ulcerated area with spasticity and pain reduction. At the 14-day re-evaluation, significant clinical differences in the advanced healing process were seen. Low-intensity laser showed to be effective in traumatic soft tissue treatment in cerebral palsy patients by accelerating the healing process, reducing secondary contamination, promoting analgesia; thus, it can be an important tool in the treatment of these patients.

Photomed Laser Surg. 2010 Aug;28(4):565-8. doi: 10.1089/pho.2009.2594.

The association of low and high laser treatments on self-inflicted lip injury: a case report.

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Abstract

OBJECTIVE:

Report a clinical case of surgical lip lesion removal owing to self-injury in a 9-year-old male quadriplegic, spastic cerebral palsy (CP) patient using low and high lasers in association.

BACKGROUND:

Various management methods for oral trauma have been suggested, depending on the severity, frequency, and cause of injury, including medication, behavioral techniques, and oral appliances or dental extractions.

METHODS:

Initially, low-level laser therapy (LLLT) was used on the injured labial tissue measuring 2.2 cm externally and 3.4 cm in the internal mucosal, followed by surgical removal using a CO(2) laser. After 30 days, a significant reduction in injury to the oral tissues was observed, and the region presented normal color and good healing conditions.

CONCLUSION:

The association of different laser therapies to remove and heal a lip lesion owing to self-injurious behavior was effective and promoted improvement in the patient's quality of life by establishing painless mastication.