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laser

the international C.E. magazine of laser dentistry

1 2012

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Pediatric laser-assisted dentistry

_case report
The use of the Er:YAG in laser-assisted broken abutment screw treatment

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A new year means setting new goals

Torsten Oemus, Publisher
Dental Tribune International

All of us at Dental Tribune International hope that 2012 has gotten off to an excellent start for you and your staff. If you made any New Year's resolutions concerning your dental practice, we believe that ***laser*** can be an integral part of helping you meet your goals.

As the "Dentist CEO," you wear many hats, none of which allow for time away to pursue continuing education credits. This edition's C.E. articles include two that you can really sink your teeth into, so to speak: pediatric laser-assisted dentistry and the Er:YAG laser in periodontal surgery.

After you read the articles, visit *www.DTStudyClub.com* to take the short quiz and earn one unit of ADA CERP-certified C.E. credit. Because this is a quarterly magazine, you'll have the opportunity to earn at least three more C.E. credits this year. Annual subscribers to the magazine ($50) need only register at the Dental Tribune Study Club website to access these C.E. materials free of charge. Non-subscribers may take the C.E. quiz after registering on the Dental Tribune Study Club website and paying a nominal fee.

In order to round out your learning experience in this edition, the non-C.E. articles include: meeting patient expectations with lasers; Er:YAG lasers in broken abutment screw treatment; optical imaging; Er,Cr:YSGG lasers in endodontic therapy; and photosensitizers.

It's also quite easy to extend your learning experience beyond the pages of laser with the other C.E. magazines we offer on ***implants, cosmetic, CAD/CAM,*** as well as three new editions launching this year titled ***roots, cone beam, ortho*** and ***hygiene.*** You will be able to find copies of every magazine upon publication on our *www.dental-tribune.com* website as ePaper or a PDF.

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We wish you a successful 2012 and look forward to being with you every step of the way as you pursue your goals. If you have comments, concerns, suggestions or even a gripe or two you'd like to share with us, please do not hesitate to let us know at *feedback@dental-tribune.com*.

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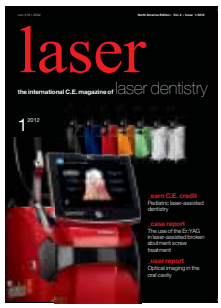

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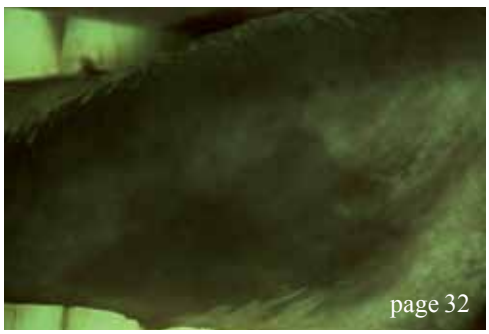
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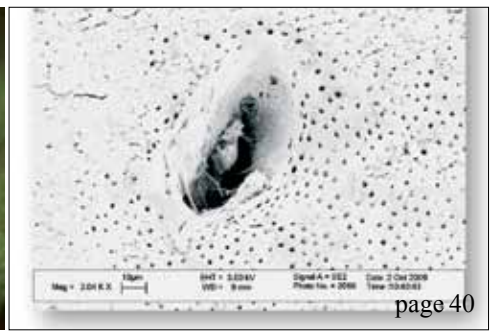
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Pediatric laser-assisted dentistry: A clinical approach

Authors_Claudia Caprioglio, DDS, MS, Giovanni Olivi, MD, DDS, and Maria Daniela Genovese, MD, DDS

_c.e. credit part 1

This article qualifies for C.E. credit. To take the C.E. quiz, log on to *www.dtstudyclub.com*. The quiz will be available on Feb. 16.

_Abstract

The approach to pediatric dental patients demands close cooperation between dentists, parents and the children. Laser-assisted therapy is a modern and effective strategy. Laser technology has a wide application in dental care and treatment, oral traumatology and minor surgical procedures, and is suitable for the treatment both of primary and permanent teeth. The authors' aim is to stimulate more extensive scientific research in this area and to offer a clinical overview, showing also some clinical procedures.

_Introduction

One of the main roles of the pediatric dentist is to provide effective education on prevention in order to reduce the incidence of dental and oral disease throughout childhood and adolescence and into adulthood.

In this context, it is essential never to lose sight of a key aim: tissue preservation. Preferably, this is achieved by preventing disease from occurring in the first place, and by arresting its progress when it does occur. But tissue preservation also means removing diseased tissue and restoring defects with as little tissue loss as possible.

Today, we are assisted in this endeavour by techniques allowing early diagnosis (digital radiology with low radiation emission, diagnostic lasers and the dental operative microscope) and minimally invasive therapy (ozone therapy, air abrasion, rotary instruments for micropreparation and lasers). Laser-supported dental diagnosis and treatment, which allows us to meet the important aim of "filling without drilling," is an excellent approach from the tissue preservation point of view and, as reported by Martens[1] and reiterated by Gutknecht[2], "children are the first in line to receive dental laser treatment."

In this paper we will look at the use of the Erbium family of lasers in soft- and hard-tissue ablation, and also at how other lasers (diode, Nd:YAG, CO_2) can help to make a trip to the dentist a minimally invasive and stress-free experience,[3,4] which for children is particularly important.

The laser is a new instrument in pediatric dentistry that sometimes complements and sometimes replaces traditional techniques. Lasers, which are available in a variety of types with different wavelengths

Fig. 1_Female patient, 6.2 years old. Due to 3.6 eruption, hyperplastic tissue has formed.

Figs. 2 a, b_Immediately after erbium excision: laser-assisted gingivoplasty procedure (a) and clinical outcome (b).


Fig. 1


Fig. 2a


Fig. 2b


Fig. 3a


Fig. 3b


Fig. 3c


Fig. 4a


Fig. 4b


Fig. 5a


Fig. 5b

(see Table I, page 15), have a number of possible applications and can be used to treat both soft and hard oral tissue (see Table II, page 15).

Without going into the physics of laser therapy in detail, it is necessary to appreciate that different wavelengths interact differently with different chromophores (hemoglobin, water, hydroxyapatite) contained in the target tissue (mucous membranes, gingiva, dental tissue) and therefore that the therapeutic effect is determined by the optical affinity and coefficient of absorption of the target tissue for the given wavelength.

_Soft-tissue applications of lasers in pediatric dentistry

Oral surgery

Lasers offer a series of important advantages in the treatment of oral soft tissues: They are simple and rapid to use, they reduce the need for local anesthesia, they allow excellent control of bleeding during incision and they can also eliminate the need for sutures. Furthermore, the postoperative recovery is often asymptomatic thanks to the decontaminating, antalgic and biostimulant effects of laser radiation.

In short, the procedure, which produces excellent clinical results, is less invasive and less traumatic than the traditional approach. This is a particularly important consideration in children, who will more readily accept this treatment. Furthermore, laser treatments, compared with conventional procedures, are associated with a greatly reduced need for analgesics and anti-inflammatory medications.

Lasers are used in soft-tissue management to remove or treat lesions of the oral mucosa. All wavelengths of light with an affinity for hemoglobin and water (chromophores contained in the gingiva and mucosa) can be used for these applications: the argon, KTP, diode, Nd:YAG and CO_2 lasers are useful for soft-tissue cutting, vaporization and decontamination, achieving very good coagulation and hemostasis; they are also ideal for vascular lesions.[5,6]

The erbium lasers, Er,Cr:YSGG and Er:YAG, are also suitable for these applications due to the good absorption of their light wavelengths by the water contained in the gingiva and oral mucosa, however, they are less effective at controlling bleeding. The performance of erbium lasers can be enhanced by the use of an air-water spray delivered through the laser handpiece. This ensures a clean incision and helps to avoid excessive increases in the temperature of the soft tissue during vaporisation; furthermore, the absence of peripheral necrotic tissue allows accurate biopsies (Figs. 1, 2).[7,8]

Periodontics and orthodontics

The decontaminating effect of different lasers in pockets of periodontal disease has been widely demonstrated in adults, but data on laser-assisted therapy of periodontitis in young patients are lacking. Conversely, in the context of orthodontic treatments, there emerge many clinical situations

Figs. 3a–c_Female patient, 9.2 years old. An orthodontic band was placed on 1.6: hyperplastic tissue (a). A minor laser-assisted treatment of oral soft tissue was performed to insert the palatal barr and elastic ligation.

Fig. 4a, b_Male Patient, 7.4 years old. Interproximal caries of 7.5 (a). Before isolation with rubber dam, an Er:YAG laser preparation with minimum intervention is performed and analgesia is obtained by lasing (b).

Figs. 5a, b_Enamel and dentin are etched, rinsed and dried (a). Final outcome (b).