Fascination of Laser Dentistry

From 28 October until 29 October 2011 both the 20th annual congress of the German Association of Laser Dentistry (DGL) as well as the congress for laser beginners, LASER START UP, were held in Düsseldorf, Germany. Over the two congress days we welcomed up to 200 participants from all over Germany, Europe and Middle East. Here you can read another abstract of the lectures given during the congresses.

Laser-assisted Pediatric Dentistry

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Fig. 1a


Fig. 1b

Fig. 1a-c_First laser treatment of a four-year old girl. Treatment protocol followed the Laserkids® concept using behavioral management method (here with the help of magic bag and wand). The child was very cooperative during treatment and happy after her sucessful laser treatment.

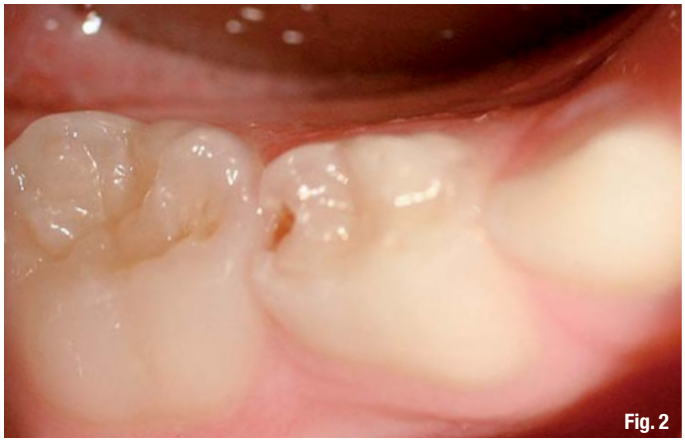
_Introduction

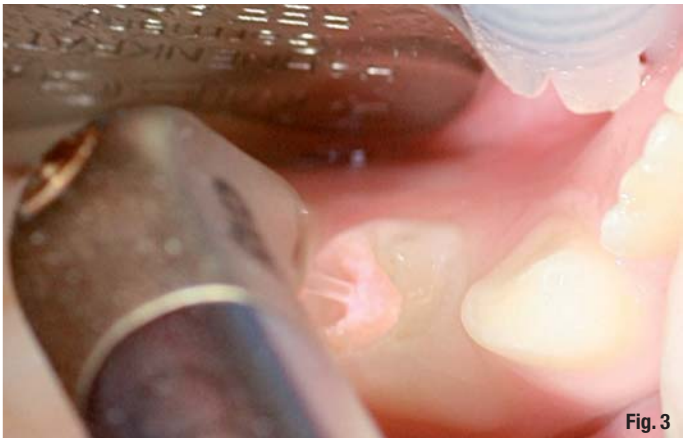
A clear indication for the application of different laser wavelengths is a prerequisite for a successful therapy in pediatric dentistry. Erbium lasers (Er,Cr:YSGG 2,780 nm, Er:YAG 2,940 nm) mainly find their application in operating on dental hard tissue, such as in cavity preparation for fillings, fissure sealing, minimally invasive preparation, and the creation of a micro-retentive surface structure which is also useful in orthodontic treatments. Erbium lasers are also used for caries removal and for pulpotomy. In the field of pediatric oral surgery, frenectomy, uncovering or the removal of retained and impacted teeth as well as the treatment of pericoronitis and gingivectomy are the main indications for laser use, for which either diode lasers (wavelengths around 810 nm) or erbium lasers are suitable.


Fig. 1c

_Material and methods

Using the Laserkids® Concept (Schindler RWTH Aachen University 2008) as guideline for laser-assisted pediatric dentistry, the operational sequences for the small patients are shown step by step and clinical examples illustrate this approach and the clinical proceeding. The Laserkids® Concept consists of four pillars: setting, desensitizing with the tell-show-show-do method, behavioral management, and laser application (indications, special pediatric laser settings and parameters, treatment plan and proceedings), and shows the requirements for a successful implementation of laser technology in the dental treatment standards. The laser-assisted treatment protocol includes eight steps:


Fig. 2


Fig. 3

- laser-assisted caries removal (with Er,Cr:YSGG laser [Biolase Inc., Waterlase MD™ turbo]: 2,780 nm: 3,5 W, 35 Hz, water: 35 %, air: 45 %)
- laser-assisted cavity preparation(Er,Cr:YSGG laser: 2,780 nm: 5 W, 30 Hz, water: 75 %, air: 90 %)
- laser-assisted enamel conditioning (with Er,Cr:YSGG laser: 2,780 nm: 2 W, 30 Hz, water: 75 %, air: 90 %)
- etching with Ultraetch 35 % phosphoric acid (Ultradent Products, Inc., USA)
- application of resin-based dental adhesive system bond Clearfil™ SE Bond (Kuraray Europe GmbH);
- filling layer by layer with restorative material X-flow™ and Dyract® eXtra (Dentsply De Trey GmbH, Konstanz, Germany);
- curing with bluephase lamp (Ivoclar Vivadent AG, Liechtenstein);
- polish

On the basis of clinical cases, various laser treatments are demonstrated and presented with their short-term and long-term results.

_Discussion and final conclusion

Advantages of laser-assisted pediatric dentistry are an opportunity for minimally invasive cavity preparation and the selective removal of caries tissue. The resulting good micro-retentive surface structure plays an important role for subsequent adhesive techniques for composites. Further advantages are the bactericidal effect, the biostimulation of the tissue and accelerated wound healing.

Due to the reduced pain sensation of laser treatment, local anestesia often is not needed and resulting lip bite injuries especially in very small children, can be avoided. Also, because of the fact that the application of laser light has a coagulating effect with the positive consequence of less bleeding in the operating field during the surgery and post-operatively, no sutures are needed and a second appointment for suture removal is not required in many cases.

The good compliance of children and adolescents under the precondition of a good clinical approach and appropriate use of laser technology opens an additional field of pediatric dental treatments and in some cases helps reducing the necessity of general anesthesia.

In summary, laser-assisted treatment methods show considerable advantages compared to conventional treatment methods and constitute an important step in extending the pediatric treatment options available._

Fig. 2_First right primary molar and second primary molar with caries lesion.
Fig. 3_Laser treatment with Er,Cr:YSGG laser: 2,780 nm, gold handpiece, Tip: MGG6, 2–5 W, 30 Hz, 140 µs, water: 40-75 % and air: 60–90 %.

Fig. 4_After treatment.
Fig. 5_Final result.

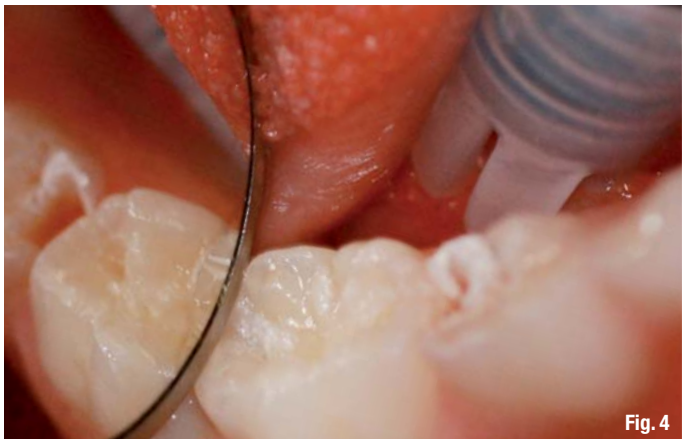

Fig. 4


Fig. 5