Influences on the treatment of recurrent aphthous ulcers with the Nd:YAG laser

An initial first clinical investigation—Part I

Author_Dr Iris Brader, Germany

_Introduction

The Greek word aphthi, which means "burning, to set on fire or to inflame", was first used by Hippocrates for the clinical symptoms of recurrent aphthous stomatitis (Ship 2000; Scully 2002). These ulcerations affect 5 to 25 % of the general population and in select groups, for example students at examination time, prevalence can be more than 50 % (Reichardt 2000; Scully 2002). The typical lesion involves self-limited, painful, clearly defined, shallow, round or oval 1 to 3 mm ulcers, each with a shallow necrotic centre. They are covered with a yellow-greyish pseudomembrane and are surrounded by minimally raised margins and an erythematous halo, and they tend to heal within ten to 14 days. We differentiate between three forms: minor, major and herpetiform aphthae (Ship 2000; Scully 2002; Scully 2003).

The diagnosis is almost entirely made on the basis of clinical criteria and the history of an otherwise usually healthy person. The aetiology is still unclear and it is probable that it is multifactorial, resulting in a variety of predisposing and immunological factors. These may be provoked by one or several different contributing factors and associated conditions. Recurrent aphthae can also be associated with systemic disorders (such as Behçet's disease, Reiter's syndrome, gastro-intestinal diseases), drug reactions or immune disturbances (Scully 2002; Porter 2005). Since there is no conclusive evidence for the aetiology, the therapy is non-specific and attempts to treat symptoms (Scully 2002). This can be achieved through:

- exclusion of triggers;
- physical methods (surgery, laser ablation, cauterisation);
- topical agents (local anaesthetics), antimicrobials (chlorhexidine), corticosteroids, immunomodulatory agents (prostaglandin E2);
- systemic treatments (corticosteroids, thalidomide);
- laser treatment (low-level laser, Nd:YAG in non-contact mode).

Fig.1a_In this case we see a five year-old girl. Her grandmother brought her into our praxis, because she had been suffering from acute ulcer pain for five days.
Fig. 1b_The aphthous ulcer was treated with the described parameters. On the next day, the girl was free of pain and the ulcer was smaller.


Fig. 1a


Fig. 1b


Fig. 1c


Fig. 2a

Systemic treatment should be warranted only in patients with severe and frequent ulcerations because they may have many severe adverse side-effects.

_Aim of the investigation

Treatment with the Nd:YAG laser may reduce or stop ulcer pain and promote healing, but not in all cases. The aim of this investigation is to determine the extent to which certain factors influence treatment with the Nd:YAG laser.

_Method and materials

A total of 61 aphthous ulcers were treated, but only 45 could be documented completely. Patients suffering from a painful aphthous ulcer at the time were chosen to participate in clinical trials. Informed consent was obtained. In documenting the cases, we first took a complete and detailed patient history using a standardised form, followed by the specific history and diagnostic investigations of the aphthous ulcer, especially with regard to the following: day of formation; size; location; morphological description; intensity of the pain (intense/moderate/none).

In addition, two pictures of the ulcer were taken at each session. We used an Nd:YAG laser (Pulsmaster 1000, ADT) with a 300 µm fibre for treatment. Following Gutknecht (1999), the applied physical parameters were a pulse energy of 80 mJ and a frequency of 30 Hz (power setting 2.4 W). The pulse width was 100 µs and the effective energy density amounted to 113 J/cm^2. The irradiation was done in non-contact mode from 10 to 2 mm towards the ulcer at a rate of approximately

Fig. 1c_Three days after the treatment with the Nd:YAG laser the ulcer had healed.
Fig. 2a_11/05/05: extremely painful ulcer with a size of 8 x 5 mm.

AD





Fig. 2b & c_12/05/05 and 13/05/05: no change in size or pain relief.
Fig. 2d_Ulcer four days after treatment.
Fig. 2e_Six days after treatment: scar-like impression.

30 s/cm^2. We examined and documented the ulcers every one and three days (Figs. 1a–c). The effectiveness of the treatment was evaluated according to whether patients experienced no or reduced pain and the healing time.

_Case report

A 24-year-old female patient came to us on 11 May 2005 with an extremely painful ulcer in the base of her mouth. The patient had no systemic disorders but had compromised general health because ingestion had been nearly impossible for days. The patient was a non-smoker.

The aphthae appeared ten days before and she had suffered from acute and intense pain for five days (Fig. 2a). Swallowing, speaking and even rinsing her mouth with water caused an intense burning sensation. The patient had occasionally had ulcers of this kind in the past, but normally they healed within three to four days. The patient had tried to treat the ulcer with chlorhexidine, but the pain was too intense. Our first treatment was the smoothing of the distolingual cusp and application of a topical local anaesthetic (Dynexan, Kreussler). Since there was no change in either pain or size (Figs. 2b & c), we decided to modify the treatment and use laser. The irradiation was done as described for 50 seconds. The patient told us by phone that as early as the afternoon of the same day the pain was reduced. On the next day, she felt no pain at all. Four days later, the re-epithelisation was nearly complete (Fig. 2d). Six days after the laser treatment, the tissue appeared to be rough and scarred (Fig. 2e).

The topical drugs used initially (chlorhexidine) had no or only a limited pain-relieving effect for some minutes (local anaesthetics) and resulted in no changes in size. After the laser treatment, we obtained symptomatic relief almost immediately and the patient did not feel any further pain the following day. Symptomatic relief is possible also in aphthous ulcers that persist for longer periods._

Editorial note: To be continued in our next issue of Laser. A list of references is available from the publisher.

_contact laser

Dr Iris Brader
Bernhardtstr.1
98617 Meiningen
Germany

Iris.Brader@t-online.de

Lay the Foundations to your successful Future now!

The next Master programme starts on **24 September 2012** *in Aachen*





Master of Science (M.Sc.) in Lasers in Dentistry

Become a part of the International Dentists' Elite!

- *The first accredited M.Sc. programme in dentistry in Germany*
- *Career-accompanying postgraduate programme of two years at the University of Excellence RWTH Aachen*
- *Combination of lectures, skill training sessions, live ops, tutorials, and practical workshops*
- *Internationally accepted and accredited by the German Government, the European Union, the Washington Accord and the Bologna Process*
- *Science-based and practice-orientated on highest national and international level*

AALZ
Aachen Dental Laser Center

More information:

AALZ GmbH · Pauwelsstrasse 17 · 52074 Aachen · Germany
Tel. +49 - 2 41 - 47 57 13 10 · Fax +49 - 2 41 - 47 57 13 29
www.aalz.de · info@aalz.de

RWTH AACHEN UNIVERSITY