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Review article

Treatment of dentine hypersensitivity by lasers: a review

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Abstract
Background, aims: Since the development of the ruby laser by Maiman in 1960, a variety of papers on potential applications for lasers in dentistry have been published. The purpose of this paper is to summarise laser applications for the treatment of dentine hypersensitivity. The effects of laser on pulp tissue and problems on laser treatment are also reviewed. This article reviews the role of lasers for the treatment of dentine hypersensitivity since 1985, summarises many research reports from the last decade, and surmises what the future may hold for lasers in this treatment.
Method: To date, 4 kinds of lasers have been used for the treatment of dentine hypersensitivity, and the effectiveness ranged from 5.2 to 100%, which was dependent on the laser type and parameters used. The mechanism involved in laser treatment of dentine hypersensitivity are relatively unknown.
Results: These require clarification to result in safely effective treatment optimization. In general, the efficiency for the treatment of dentine hypersensitivity using lasers is higher than other methods, but in severe cases, it is less effective.
Conclusion: It is necessary to consider the severity of dentine hypersensitivity before laser use.

Key words: dental; laser treatment; laser therapy use; dentinal hypersensitivity; tooth

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Dentine hypersensitivity is characterized by short, sharp pain arising from exposed dentine in response to stimuli typically thermal, evaporative, tactile, osmotic or chemical and which cannot be ascribed to any other form of dental defect or pathology (Holland et al. 1997). Dentinal hypersensitivity can arise through incorrect tooth brushing, gingival recession, inappropriate diet, and because of other factors (Dowell & Addy 1983, Matsumoto 1988, Schuurs et al. 1995). It is claimed that 14.3% of all patients have some degree of sensitivity (Dowell & Addy 1983), and a range of therapies have been devised to alleviate this condition (Addy & Dowell 1983, McFall 1986). The sensation of pain is generally accepted to be associated with patent dentinal tubules not covered by smear layer terminating on the root surface. Stimulus transmission across dentine in hypersensitive teeth may be mediated by a hydrodynamic mechanism (Brännström et al. 1967, Brännström & Åström 1972, Dowell & Addy 1983, Absi et al. 1987). Grossman (1935) suggested a number of requirements for treatment of this condition; these still hold true today. Therapy should be non-irritant to the pulp; relatively painless on application; easily carried out; rapid in action; effective for a long period; without staining effects; consistently effective. To date, most of the therapies have failed to satisfy one or more of these criteria, but some authors report that lasers may now provide reliable and reproducible treatment (Matsumoto et al. 1985a, b, Renton-Harper & Midda 1992).

Since the ruby laser was developed by Maiman (1960), researchers have investigated laser applications in dentistry. Laser is a device which transforms light of various frequencies into a chromatic radiation in the visible, infrared, and ultraviolet regions with all the waves in phase capable of mobilizing immense heat and power when focused at close range. The word "laser" is an acronym derived from Light Amplification by the Stimulated Emission of Radiation. Stern & Sognnaes (1964) and Goldman et al. (1964) were the first investigate the potential uses of the ruby laser in dentistry. They began their laser studies on hard dental tissues by investigating the possible use of a ruby laser to reduce subsurface demineralization. Indeed, they did find a reduction in permeability, to acid demineralization, of enamel after laser irradiation. After initial experiments with the ruby laser, clinicians began using other lasers, such as argon (Ar), carbon dioxide (CO_2), neodymium:yttrium-aluminum-garnet (Nd:YAG), and erbium (Er):YAG lasers. The first laser use for the treatment of dentine hypersensitivity was reported by Matsumoto et al. (1985a) using Nd:YAG laser. Since then, many papers on laser applications for dentine hypersensitivity treatment have been published (Kimura et al. 2000), with growing interest in this topic in the last 10 years. Many papers have been published on laser applications for dentine hypersensitivity treatment and much information has been gathered. Nevertheless, acceptance of this technology by clinicians has remained limited, perhaps partly due to the fact that this technology blurs the border between technical, biological, and dental research. Moreover, the mechanisms involved remain multiple and unclear, leading to questions regarding reproducibility and safety of this technique. Many of the lasers investigated in this context can induce significant thermal effects, if laser parameters are inadequately controlled, giving rise to concerns regarding thermal damage to temperature-sensitive pulpal tissues.

The purpose of this paper was to summarise our current knowledge regarding laser applications for the treatment of dentine hypersensitivity.

The lasers used for the treatment of dentine hypersensitivity are divided into two groups: low output power (low-level) lasers [helium-neon (He-Ne) and gallium/aluminum/arsenide (GaAlAs) (diode) lasers], and middle output power lasers (Nd:YAG and CO_2 lasers). The characteristics and parameters used for the treatment of each laser were described below.

Low Output Power (Low-level) Lasers

Low output power laser therapy has been utilized in humans since the early 1970s. Initially, this form of energy delivery was used to support wound healing (Kimura et al. 1991, 1993, 1997). Subsequently, in the 1980s, the benefit of low output-delivery systems as an anti-inflammatory tool was delineated (Karu 1988, 1989). Then, it was demonstrated that low output power laser therapy stimulates nerve cells in a clinical environment (Rochkind et al. 1986, 1987, Jarvis et al. 1990).

He-Ne laser

Table 1 shows the laser parameters used for the He-Ne laser, and their treatment effectiveness. The first use of He-Ne laser for the treatment of dentine hypersensitivity was reported by Senda et al. (1985), then, consecutively by several other investigators. Senda et al. (1985) initially used only an output power of 6 mW for the treatment of hypersensitivity. Irradiation modes were two types: pulsed (5 Hz only) and continuous wave (CW) mode. Treatment effectiveness rate ranged from 5.2 to 100%.

The mechanism involved is mostly unknown. According to physiological experiments, He-Ne laser irradiation does not affect peripheral Aδ- or C-fiber nociceptors (Jarvis et al. 1990), but does affect electric activity (action potential), which in the healthy nerve increased by 33% following a single transcutaneous irradiation (Rochkind et al. 1986, 1987). This was found to be a long-lasting effect, inducing an increase in the size of nerves action potential for more than eight months after cessation of irradiation (Rochkind et al. 1986). He-Ne laser irradiation at 6 mW does not affect the enamel or dentine surface morphologically, but a small fraction of the laser energy is transmitted through enamel or dentine to reach the pulp tissue (Watanabe 1993). With low output power lasers, there is no danger of causing skin burns, or damaging cells (Strang et al. 1988).

Table 1. Laser parameters and treatment effectiveness of He-Ne laser (wavelength 632.8 nm)

Investigators	Irradiation parameters	Effectiveness
Senda et al. (1985)	6 mW, 5 Hz or CW for 2–3 min	84%
Matsumoto et al. (1986)	6 mW, 5 Hz for 1–3 min	90%
Gomi et al. (1986)	6 mW, 5 Hz for 3 min	100%
Wilder-Smith (1988)	6 mW, 5 Hz for 2.5 min for 3 days	5.2–17.5%
Matsumoto et al. (1988)	6 mW, CW for 0.5–3 min	90%
Mezawa et al. (1992)	6 mW, CW for 5 min	55%

GaAlAs laser

GaAlAs (diode) lasers were initially restricted to GaAs systems. In their early stages of development, GaAs systems were difficult to run for long periods in a CW mode because of the propensity of the chip to overheat. However, by 1979 experiments using a new diode were looking very promising. This new chip, which used water-thin crystals of GaAlAs, could produce a variety of wavelengths from 720 to 904 nm, all within the infrared spectrum. It could also generate a continuous wave with no likelihood of overheating. Three wavelengths (780, 830, and 900 nm) of GaAlAs have been used for the treatment of dentine hypersensitivity.

Table 2 shows the laser parameters used for the GaAlAs laser at 780 nm and their treatment effectiveness. The first use of this laser for the treatment of dentine hypersensitivity was reported by Matsumoto et al. (1985b), then, consecutively by some other investigators. An output power of 30 mW was used for the treatment. Irradiation mode was CW, and irradiation time ranged from 0.5 to 3 min. Treatment effectiveness ranged from 85 to 100%.

Table 3 shows the laser parameters used for the GaAlAs laser at 830 nm and their treatment effectiveness. The first use of this laser for the treatment of dentine hypersensitivity was reported by Matsumoto et al. (1990), then, consecutively by some other investigators. Output power ranged from 20 to 60 mW, and irradiation mode was CW. Irradiation time ranged from 0.5 to 3 min. Treatment effectiveness rate was dependent on the output power, and ranged from 30 to 100%.

Table 4 shows the laser parameters used for the GaAlAs laser at 900 nm and their treatment effectiveness. Treatment effectiveness ranged from 73.3 to 100%.

It is postulated that this type of low output power lasers mediates an analgesic effect related to depressed nerve transmission. According to physiological experiments using the GaAlAs laser at 830 nm, this effect is caused by blocking the depolarization of C-fiber afferents (Wakabayashi et al. 1992b, 1993). GaAlAs laser emissions at 904 nm have an analgesic effect on the cat tongue although the mechanism remain unclear (Mezawa et al. 1988). GaAlAs laser irradiation at a maximum power of 60 mW does not affect the enamel or

Table 2. Laser parameters and treatment effectiveness of GaAlAs laser (wavelength 780 nm)

Investigators	Irradiation parameters	Effectiveness
Matsumoto et al. (1985b)	30 mW, CW for 0.5–2.5 min	100%
Matsumoto et al. (1985c)	30 mW, CW for 0.5–3 min	85%
Ebihara et al. (1988)	30 mW, CW for 1–2 min	58.5%
Kawakami et al. (1989)	30 mW, CW for 0.5–3 min	95%

Table 3. Laser parameters and treatment effectiveness of GaAlAs laser (wavelength 830 nm)

Investigators	Irradiation parameters	Effectiveness
Matsumoto et al. (1990)	60 mW, CW for 0.5–3 min	100%
Setoguchi et al. (1990)	30 mW, CW for 1 min	85%
Hamachi et al. (1992)	40 mW, CW for 0.5–3 min	83.9%
Wakabayashi et al. (1992a)	40 mW, CW for 0.5–3 min	97%
Mezawa et al. (1992)	30 mW, CW for 5 min	58%
Tachibana et al. (1992)	40 mW, CW for 0.5–3 min	92.5%
Tachibana et al. (1992)	20 mW, CW for 0.5–3 min	30%
Gerschman et al. (1994)	30 mW, CW for 1 min	65–67%
Liu & Lan (1994)	40–100 mW, CW for 15–60 s	70–88%

Table 4. Laser parameters and treatment effectiveness of GaAlAs laser (wavelength 900 nm)

Investigators	Irradiation parameters	Effectiveness
Iida et al. (1993)	2.4 mW, 1.2 kHz for 2.5 min	73.3–100%

Table 5. Laser parameters and treatment effectiveness of Nd:YAG laser (wavelength 1.064 μm)

Investigators	Irradiation parameters	Effectiveness
Matsumoto et al. (1985a)	10 W, for 0.1 s, 5 times	100%
Renton-Harper & Midda (1992)	100 mJ/pulse, 10 Hz	90%
Gelskey et al. (1993)	30–100 mJ/pulse, 10 Hz	58–61%
Kawada et al. (1996)	2 W for 1 s, 20 times	74.8–85.7%
Lan & Liu (1996)	30 m J/pulse, 10 Hz for 2 min	65–72%
Gutknecht et al. (1997)	0.3–1.0 W, 10 Hz for 30–90 s	83–93%
Yonaga et al. (1999)	2 W, 20 Hz for 0.5–60 s	75.5–95.6%
Kobayashi et al. (1999)	1.5 W, 15 Hz for 1 min	51.5–95.8%

dentine surface morphologically, but a small fraction of the laser energy at 830 nm wavelength is transmitted through enamel or dentine to reach the pulp tissue (Watanabe et al. 1991).

Middle Output Power Lasers

Nd:YAG laser

Table 5 shows the laser parameters used for the Nd:YAG laser and their treatment effectiveness. The first use of this laser for the treatment of dentine hypersensitivity was reported by Matsumoto et al. (1985a), then, consecutively by some other investigators. The output power was varied and ranged from 0.3 to 10 W, but 1 or 2 W output was most common. Irradiation methods were dependent on the laser powers and varied. Treatment effectiveness ranged from 5.2 to 100%. When using Nd:YAG laser irradiation, the use of black ink as absorption enhancer is recommended, to prevent deep penetration of the Nd:YAG laser beam through the enamel and dentine and excessive effects in the pulp (Launay et al. 1987). According to Morioka et al. (1984), the use of black ink for Nd:YAG laser irradiation is suitable to absorb the laser beam, and various effects of this laser would be considered to be enhanced by black ink. There have been some reports on use of black ink for enhancing the effects of Nd:YAG laser irradiation to treat dentine hypersensitivity (Gelskey et al. 1993, Yonaga et al. 1999, Kobayashi et al. 1999), and indeed treatment effectiveness using black ink was better than without (Yonaga et al. 1999).

The mechanism of Nd:YAG laser effects on dentine hypersensitivity is thought to be the laser-induced occlusion or narrowing of dentinal tubules (Lan & Liu 1995, 1996, Yonaga et al. 1999) as well as direct nerve analgesia (Whitters et al. 1995). In hypersensitive dentine, most dentinal tubules appear open when visualised by scanning electron microscopy (Matsumoto et al. 1980, 1982). There is a significantly high correlation between open dentinal tubule morphology and dentine hypersensitivity (Oyama & Matsumoto 1991). Nd:YAG and CO_2 lasers effectively cause occlusion of dentinal tubules. Laser energy at 1064 nm is transmitted through dentine (Zennyu et al. 1996), producing thermally mediated effects on microcirculation (Funato et al. 1991), and pulpal analgesia via its nerve system (Whitters et al. 1995). A variety of theories have been put forward as to how the laser produces its analgesic effect. It has been hypothesized that the laser energy interferes with the sodium pump mechanism, changes the cell membrane permeability and/or temporarily alters the endings of the sensory axons (Myers & McDaniel 1991). Irradiation by semiconductor laser has a suppressive effect by blocking the depolarization of very slowly conducting C-fiber afferents only, but it was reported that the blocking of not only C-fibers, but also rapidly conducting Aβ-fibers is performed by Nd:YAG laser irradiation (Orchardson et al. 1997). The sealing depth achieved by Nd:YAG laser irradiation at 30 mJ/pulse and 10 pps on dentinal tubules is usually measured to be less than 4 μm (Liu et al. 1997), but it is dependent on the irradiation parameters.

CO_2 laser

Table 6 shows the laser parameters used for the CO_2 laser and their treatment effectiveness. The first use of this laser for the treatment of dentine hypersensitivity was reported by Moritz et al. (1996), then, consecutively by other investigators. Output powers of 0.5 and 1 W, and the CW mode were used. Irradiation time ranged from 0.5 to 5 sec, and irradiation was repeated 5–10×. Treatment effectiveness ranged from 59.8 to 100%.

CO_2 laser effects on dentine hypersensitivity are due to the occlusion or narrowing of dentinal tubules (Moritz et al. 1995). There have been no reports on nerve analgesia by CO_2 laser irradiation. Using the CO_2 laser at moderate energy densities, mainly sealing of dentinal tubules is achieved, as well as a reduction of permeability (Bonin et al. 1991). CO_2 laser irradiation may also

Table 6. Laser parameters and treatment effectiveness of CO_2 laser (wavelength 10.6 μm)

Investigators	Irradiation parameters	Effectiveness
Moritz et al. (1996)	0.5 W, CW for 5 s, 6×	59.8–98.6%
Zhang et al. (1998)	1 W, CW for 0.5 s, 5–10×	50–100%
Moritz et al. (1998)	0.5 W, CW for 5 s, 6×	94.5–96.5%

cause dentinal desiccation, yielding temporary clinical relief of dentinal hypersensitivity (Fayad et al. 1996). The sealing depth achieved by CO_2 laser irradiation at 0.3 W for 0.1 s on dentinal tubules is usually measured to be 2–8 μm (Kimura et al. 1998).

Combination of Laser Treatment with Fluorides

There have been some reports on combination use of laser irradiation with chemical agents such as sodium fluoride (Lin & Lan 1994) and stannous fluoride (Moritz et al. 1996, 1998). The combined use of the GaAlAs laser (830 nm wavelength) with fluoridation enhances treatment effectiveness by more than 20% over that of laser treatment only (Lin & Lan 1994). In an in vitro study, most dentinal tubule orifices were occluded after treatment by Nd:YAG laser irradiation followed by topical sodium fluoride (Lan et al. 1999).

Effect of Laser Irradiation to Dental pulp

In the use of laser in vivo, thermal effects on pulpal tissues are of concern. Compared to other lasers, the Nd:YAG laser beam penetrates deeply through dentine (Zennyu et al. 1996), bone, and non-pigmented soft tissues (Dederich 1993). Irradiation causing temperature rises exceeding the threshold of pulpal tolerance will cause thermal injury to the pulp. Previous studies have demonstrated that healthy pulp tissue is not injured thermally if the laser equipment is used at a correct parameter so that any temperature rise within the pulp remains below 5 °C (Zach & Cohen 1965).

Pulpal effects of the laser devices previously discussed have been investigated. The GaAlAs laser at a wavelength of 780 nm, and an output power of 30 mW for 3 min caused no thermal or other damage to pulp tissues in monkeys (Matsumoto et al. 1985d). According to an in vitro thermometric study, GaAlAs laser irradiation at the parameters of 30 mW (CW) at 780 nm wavelength, 60 mW (CW) at 830 nm wavelength, and 10 W (pulsed) at 900 nm wavelength do not cause significant intrapulpal temperature rises (Arrastia et al. 1994). Pulpal disruption did occur in laser-treated specimens with remaining dentine thickness of less than 1 mm, while pulps of intact and prepared teeth with remaining dentine thickness exceeding 1 mm were the same as controls, and no significant pulpal disruption was observed after laser exposures up to 240 J (2 W, 20 pps for 2 min) using the Nd:YAG laser (White et al. 1991). After exposure to the Nd:YAG laser, no histologically measurable response was observed using a power of 50 mJ/ pulse at 10 Hz for 30 sec (total energy: 15 J) using rats (White et al. 1995). However, treatment effects must be well controlled when using black ink as absorption enhancer. It was reported that irradiation at 2 W and 20 pps for 10 sec induced pulpal temperature rises through 2 mm of remaining dentine thickness of 13.4 °C (White et al. 1994). Using the CO_2 laser, no damage was reported after pulpal exposure to 3 W of power for 2 s in the CW mode using monkeys and dogs (Melcer et al. 1985). With the CO_2 laser, the enamel and dentine surfaces reach very high temperatures, but only low temperatures are measured in the pulp chamber (Launay et al. 1987). At parameters of 0.5 or 1 W an intrapulpal temperature rise below 1 °C was measured (Miserendino et al. 1989). This is related to the very high absorption and low penetration of light in hard dental tissues at this wavelength. Laser Doppler examination revealed no change in pulpal blood flow due to laser treatment. All patients showed absolutely identical perfusion indices immediately before and after CO_2 laser treatment at 0.5 W in the CW mode for 5 s twice with 20 s interval as well as 1 week after treatment (Moritz et al. 1996).

Considerations Regarding Laser Treatment for Dentine Hypersensitivity

The possibility of a placebo effect must be taken into consideration, especially as patient reports were positive immediately after laser treatment, whereas normally one would expect the cumulative effect of any therapy to provide a gradual improvement from visit to visit. A strong placebo effect is commonly described in clinical dentine hypersensitivity trials. This effect consists of a complex mixture of physiologic and psychological interactions, depending considerably on the doctor-patient relationship, with both parties needing to believe that the treatment is valuable and desiring to obtain relief of symptoms. Investigators have described patients obtaining relief without any treatment due to the placebo effect. This is

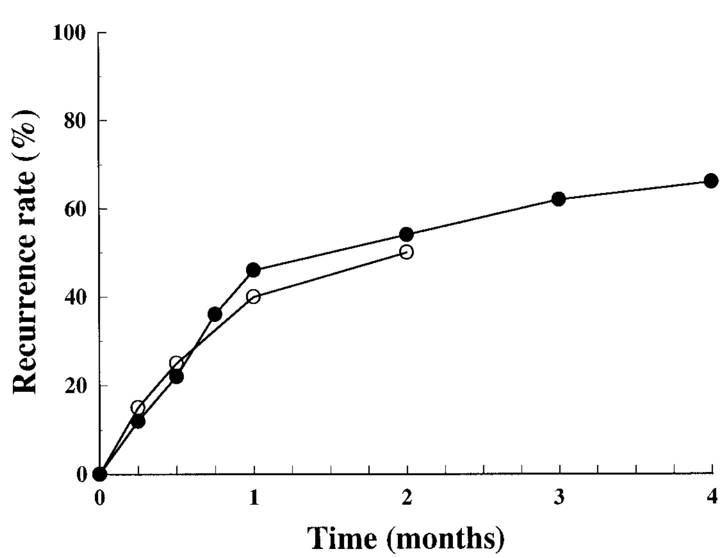

Fig. 1. The time course of hypersensitivity recurrence rate using He-Ne (○) and GaAlAs (830 nm wavelength) (●) lasers (derived from Matsumoto et al. 1985b, 1986).

thought to vary from 20 to 60% in dentine hypersensitivity clinical trials (West et al. 1997).

Recurrence of hypersensitivity varied with each laser and treatment protocol and depended on the irradiation methods and time after treatment. Fig. 1 shows the time course of recurrence using He-Ne and GaAlAs (780 nm wavelength) lasers (Matsumoto et al. 1985b, 1986). The recurrence rate of hypersensitivity after He-Ne laser treatment has been reported to range from 7.4 to 66.0%; that of the GaAlAs laser (830 nm wavelength) from 6.0 to 75.0%, that of the Nd:YAG laser measured up to 34.0%, and that of the CO_2 laser measured up to 50.0%. The mechanism of recurrence is unknown. As laser effects are considered to be due to the effects of sealing of dentinal tubules, nerve analgesia or placebo effect. The sealing effect is considered to be durable, whereas nerve analgesia or a placebo effect are not.

In the treatment of dentinal hypersensitivity, irradiation of the cervical region is the most popular and effective, followed by the apical region (Matsumoto et al. 1985c). Other areas of laser irradiation for cervical dentine hypersensitivity treatment induce the nerve fibers related to the symptomatic region and acupuncture of sites such as M. adductor pollicis (Goukoku) and lobulus auriculae (Matsumoto et al. 1985c). Treatment effectiveness is dependent on the area irradiated.

Although there are many methods of clinically assessing dentine hypersensitivity, most investigators use either a sharp explorer or a blast of cold air to measure sensitivity. These are the oldest and most frequently used methods (Addy & Dowell 1983). However, the evaluation of treatments for dentine hypersensitivity is extremely difficult regardless of the methods or materials employed. In estimating treatment effects in hypersensitive teeth, investigations are handicapped by an inability to observe patient response objectively and are dependent upon the patient's interpretation, which is, in turn, subject to suggestion. A visual analog scale (VAS) test, which has been useful and popular in the fields of internal medicine and psychology, is considered to be good for objective judgement (Ohnhaus & Adler 1975), and this is effective for evaluation of human dental pain (Kuriwada-Satoh et al. 1996). As another method, a double blind testing protocol is useful for evaluation of dentine hypersensitivity (Ebihara et al. 1988).

Conclusion

With the development of thinner, more flexible and durable laser fibres, laser applications in dentistry will increase. Since laser devices are still relatively costly, access to them is limited. To date, four kinds of lasers have been used for the treatment of dentine hypersensitivity, but other lasers have potential for this application. Ideally, the laser in the future will have the ability to produce a multitude of wavelengths and pulsewidths, each specific to a particular application. The mechanism involved in laser treatment of dentine hypersensitivity are relatively unknown. These require clarification to result safely effective treatment optimization. Once this knowledge is established, the potential for developing lasers for the treatment of hypersensitivity can be fully explored and realised.

Zusammenfassung

Behandlung der Zahnhalsüberempfindlichkeit mit Laser: Eine Übersicht

Seit der Entwicklung des Rubin-Lasers durch Maiman im Jahre 1960 wurde eine Vielzahl von Arbeiten zu möglichen Anwendungen des Lasers in der Zahnmedizin veröffentlicht. Diese Arbeit hat den Zweck, Anwendungen des Lasers zur Behandlung der Zahnhalsüberempfindlichkeit zusammenfassend darzustellen. Die Wirkung des Lasers auf Pulpagewebe und Probleme der Laseranwendung werden ebenfalls behandelt. Dieser Artikel gibt eine Übersicht über die Rolle des Lasers bei der Behandlung der Zahnhalsüberempfindlichkeit seit 1985, faßt dabei zahlreiche Untersuchungen des letzten Jahrzehnts zusammen und stellt Vermutungen über zukünftige Entwicklungen auf diesem Gebiet an. Bisher sind 4 Arten von Lasern für die Behandlung der Zahnhalsüberempfindlichkeit benutzt worden, deren Effektivität von 5.2 bis 100% reichte in Abhängigkeit von Lasertyp und technischen Parametern. Die Mechanismen, die der Laserbehandlungen bei Zahnhalsüberempfindlichkeit zugrunde liegen, sind weitgehend unbekannt. Hier ist eine Klärung erforderlich, um zukünftig eine Optimierung der Behandlungseffektivität bei ausreichender Sicherheit für die Patienten zu erreichen. Insgesamt liegt die Effektivität der Laserbehandlung bei Zahnhalsüberempfindlichkeit höher als bei anderen Methoden. Bei schweren Fällen ist der Laser allerdings weniger wirksam. Vor Anwendung eines Lasers muß der Schweregrad der Zahnhalsüberempfindlichkeit berücksichtigt werden.

Résumé

Traitement de l'hypersensibilité dentinaire par laser: une analyse critique

Depuis le développement du laser Rubis par Maiman en 1960, un grand nombre d'articles ont été publiés sur les applications potentielles du laser en dentisterie. L'objet de cet article est de résumer les applications du laser dans le traitement de l'hypersensibilité dentinaire. Les effets du laser sur le tissus pulpaire et les problèmes posés par le traitement au laser sont également analysés. Cet article reprend le rôle des lasers dans le traitement de l'hypersensibilité dentinaire depuis 1985, résume un grand nombre de rapport de recherche de la dernière décennie et envisage ce que l'on pourrait attendre du laser, à l'avenir en ce qui concerne ce traitement. A ce jour, 4 types de laser ont été utilisés pour le traitement de l'hypersensibilité dentinaire et leur efficacité allait de 5.2 a 100% selon le type de laser et les paramètres considérés. Les mécanismes impliqués dans le traitement de l'hypersensibilité dentinaire sont relativement inconnus. Des éclaircissements sont nécessaires afin d'obtenir des traitements optimisés efficases et présentant toutes les garanties de sécurité. En géneral, l'efficacité des traitements lasers pour le traitement de l'hypersensibilité est meilleure que les autres méthodes, mais pour les cas sévères, il est moins efficace. Il est nécessaire de considérer la sévérite de l'hypersensibilité dentinaire avant l'utilisation du laser.

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