

HOW TO HARNESS THE POWER OF THE LITE TOUCH ER:YAG LASER SYSTEM IN A DENTAL PRACTICE



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BACKGROUND

The arrival of LiteTouch, which boasts incredible enamel fragmentation capabilities, will likely bring about a major change in dental medicine. This next-generation Er:YAG laser fragments tooth structure in a way that makes the cut and grind of traditional rotary drills obsolete.

The Japanese dental community has failed to clearly establish its identity within popular consciousness regarding the treatment of dental caries, which is also to say that intentional regular maintenance of oral health has never taken root among the population at large. Indeed, people tend to give the dentist a wide berth because there is a widespread impression that dental care sits upon some unassailable high. Even today, attitudes so outdated as to be prehistoric are still prevalent, and it speaks volumes about our society when a majority of people delay going to the dentist until their teeth start to hurt and even choose to ignore anodontia.

As a community-based dentist, I hope to eliminate as many of those hurdles as possible. I have introduced the latest LiteTouch as the next-generation Er:YAG laser treatment system in an effort to motivate my patients to keep their teeth healthy rather than seeing them as things that need to be drilled from time to time.

In order to observe LiteTouch's capabilities, I have observed the use of LiteTouch at Smile Art Kamiya Pediatric Dental Clinic, following the process of caries treatment from start to finish. Below are the results of that study.

Caries treatment is not a two-step, drill-and-fill process. The ultimate goal of any dental treatment is to create healthier tissue and function; surely the aim is to leave the teeth stronger after caries treatment. Therefore, I believe that treatments should follow the following four steps regardless of the degree of tooth decay.

Seek Out the Cause

The initial cause of tooth decay is not necessarily bacterial and although plaque is an aggravating factor, it is important to look at the immune capacity of the host teeth rather than focusing exclusively on plaque.

Control Bacteria, Relieve Pain

When treating tooth decay - and acute decay in particular - it is important to make every effort to preserve tooth structure and dental pulp at the same time as trying to provide comfort. This role is performed mainly by such drugs as alkaline agents, antibacterial agents and sterilizing metal ions. LiteTouch figures largely in this process; its painless drilling allows the drugs to be accurately applied to the decayed tooth structure. Conversely, rotary drills can cause crushed wounds in weakened tooth structures, which lead to persistent post-treatment pain. Accordingly, this causes people to delay treatment and, therefore, use of rotary drills should be avoided. Using LiteTouch to remove decayed tooth structure in wet conditions allows two seemingly contradictory processes to be carried out at the same time: not only does it disinfect the affected area, it also protects healthy tooth structure from friction heat that would otherwise be caused by drilling.

Disinfect, Seal

To prevent new infection after the decayed tooth structure has been carefully removed (including cases in which decayed portions are not completely removed but the cavity is nonetheless deemed to be disinfected), adhesive is used to form a protective layer over the dental pulp and restore the tooth structure. Cavity preparation with LiteTouch is most effective at this stage because using LiteTouch to remove decayed tooth structure not only disinfects the pertinent area, it is painless, too.

Strengthen Teeth to Guard against Subsequent Infection

Having completed restoration of the tooth structure, it is necessary to take steps to prevent secondary caries, taking into account the causes of each tooth's decay thus far. When doing so, using LiteTouch as a tool to help maintain the health of the gums that support the teeth and the dental sockets helps build an awareness of the oral cavity as an organ, an "immunological collective," so to speak.

SAMPLE CASES RELEVANT TO EACH OF THE AFOREMENTIONED STEPS

Case 1: Seek Out the Cause

It was hard to imagine that the distal pit-and-fissure caries (Figure 1-1) in this case was so close to the dental pulp until identified by X-ray (Figure 1-2). As long as it is impossible to brush down to the bottom of the pit-and-fissure, it is the dentist's responsibility to prevent this caries.



Figure 1-1



Figure 1-2

Figure 1-3: Enamel fragmented at 4W/20Hz; tooth decay exposed. Decayed tooth structure cleaned at 2W/20Hz; decay not completely removed.

Figure 1-4: After washing with a hypochlorous solution and drying with mild air, 3Mix solution applied.

Figure 1-5: Sealed using photopolymerized glass ion-omer cement.



Figure 1-3



Figure 1-4



Figure 1-5

Case 2

I believe it is the responsibility of the family dentist to prevent tooth decay beyond the realm of regular plaque control by patients. LiteTouch is greatly useful for the cleaning and disinfecting of tooth structure in molar pit-and-fissure, blind foramen on the maxillary front teeth and enamel hypoplasia.

Figure 2-1: Tooth # 3 in which fissure caries is suspected.

Figure 2-2: Fissure is carefully cleaned at 3W/15Hz; no caries infiltration was found in dentin.

Figure 2-3: Fissure sealed using photopolymerized ionomer cement; teeth are being monitored regularly.



Figure 2-1



Figure 2-2



Figure 2-3

Case 3: Control Bacteria, Relieve Pain

Patient complained of pain in tooth # 5. In cases such as this where plaque was well under control but proximal caries develop rapidly, it is better to refrain from treating dental pulp at first. Relieving pain at first and then conducting follow-up observations to find the cause of the pain increase stability of treatment and prognosis.

Figure 3-1: Cavity cleaned at 2W/20Hz. After thorough rinsing with lukewarm water, laser energy is irradiated from a distance of approximately 1 cm and brought gradually closer, thus laser cleaning is carried out without pain to the patient. Care must be taken to avoid pointing the beam towards dental pulp horns.

Figure 3-2: 3Mix solution applied.

Figure 3-3: Temporarily sealed with photopolymerized ionomer cement; corrected to fit occlusion. Cold water pain disappeared after three days.



Figure 3-1



Figure 3-2



Figure 3-3

Case 4: Disinfect, Seal

When treating caries in the front teeth of young children, using local anesthetics when conducting repair work is fraught with difficulties. However, LiteTouch allows for stress-free treatment even with children who cannot bear the impact and noise of rotary drills.

Figure 4-1: Proximal caries between baby teeth # D and # E.

Figure 4-2: Preparation at 2W/20Hz took approximately ten seconds. Faster than a rotary drill and painless.

Figure 4-3: Micro-tagging when performing LiteTouch preparation is believed to be effective with resin adhesives. This means that excessive preparations are usually not required to ensure the durability of adhesive restorations.

Figure 4-4: Treatment that takes only around three minutes per tooth and keeps front teeth beautiful is a pleasant surprise not only for the patient, but for the parents as well.



Figure 4-1



Figure 4-2



Figure 4-3



Figure 4-4

Case 5

When treating front teeth of adults it is necessary to meet aesthetic criteria, but the issue that keeps patients away is the discomfort of having dental work done (i.e., pain, noise, vibration, post-anesthetic numbness).

Figure 5-1: Having undergone caries treatment on teeth # 9 and 10 (at 3W/15Hz), the patient became bothered by discoloration of the cervical area on the other side and wanted that fixed as well. Indeed, the patient was very pleased with the LiteTouch treatment: "It was great to have my teeth fixed up nicely without any pain whatsoever. If I'd know it would be this painless, I'd have had the porcelain crown fixed on the tooth # 10, as well."

Figure 5-2: The patient, who had previously been very reticent when it came to visiting the dentist, was like a different person, asking to have the discoloration in the cervical area of tooth # 6 and to have a porcelain cap cover the root right there and then. This indicates that LiteTouch can be successfully used to motivate people to visit the dentist more often.



Figure 5-1



Figure 5-2

STRENGTHEN TEETH TO GUARD AGAINST SUBSEQUENT INFECTION

Case 6

The marginal ridges of the molars in relatively unworn teeth play a major role in ensuring smooth movement of opposing teeth and conveyance of food. When treating proximal caries in teeth which still have marginal ridges remaining, I believe the teeth should be restored in such a way as to maintain the ridges as much as possible.

Figure 6-1: Caries can be seen in the distal proximal surface of tooth # 20: occlusal view shows some blackening under the marginal ridge.

Figure 6-2: Cavity was prepared at 4W/20Hz from the distal pit in a distal direction. Having confirmed that the carious cavity had been reached, power was reduced to 2W/20Hz to remove the weakened tooth structure within the cavity. Given the LiteTouch system's sterilizing capacity, small amounts of weakened tooth structure can be left in the cavity provided that due care is taken regarding exposed pulp.

Figure 6-3: Restoration completed using low-viscosity adhesive resin with care taken to preserve marginal ridges as much as possible.



Figure 6-1



Figure 6-2



Figure 6-3

Case 7

In some cases, proximal caries cause decay to spread under the gums and marginal gingival hyperplasia causes carious cavities to burrow inside the gums. Using rotary drills to prepare, fill and restore the area affected by such subgingival decay often leads to bleeding from the marginal gingival. However, unlike other kinds of dental caries, subgingival decay requires that care be taken to control infection from the gingival crevice. I believe that, given the LiteTouch system's ability to sterilize the gingival crevice, using the laser for cavity preparation in cases of subgingival decay and cleaning the subgingival area without worrying about bleeding offers a more stable prognosis than ever before.

Figure 7-1: A case of caries in which the cavity has burrowed into the subgingival area due to gingival hyperplasia.

Figure 7-2: An incision is made at 2W/20Hz and, at the same time, weakened tooth structure within the cavity is removed, and the cavity cleaned and sterilized. There is some bleeding from the incision.

Figure 7-3: Bleeding stops after compression for approximately three minutes. Arresting bleeding following LiteTouch treatments is said to be more difficult than with other lasers, but with incisions of this size, I feel it would be much more difficult to stop bleeding if the affected area had been scraped with a rotary drill.

Figure 7-4: Because the tooth is in mid-eruption, a temporary restoration was made using ionomer cement.



Figure 7-1



Figure 7-2



Figure 7-3



Figure 7-4

Case 8

Using the LiteTouch system to treat dental caries has many benefits including painlessness. With its capability to sterilize in moisture, it should also be widely used on the tissue surrounding the teeth because the oral cavity is vulnerable to burns and dryness.

Figure 8-1: The affected tooth # 6 has a proximal/centrifugal crack. The patient had undergone repeated in-pocket curettage with another laser for the past year; the tooth was constantly purulent and shaky. The patient steadfastly refused to have the tooth removed and so was stuck in a rut of temporary fixes and observation.

Figure 8-2: Based on the idea that as long as there was drainage it would not matter if bleeding continued for a while, the pocket was thoroughly cleaned at 0.5W/20Hz.

Figure 8-3 (next page): Blood and pus continued to flow from the pocket for a while, but stopped almost completely after approximately five minutes.

Figure 8-4 (next page): Swelling of the gingival margin remains static, and there is a miniscule amount of blood in the exudate.

Figure 8-5 (next page): Immediately following the LiteTouch treatment, the patient said that the constant, uncomfortable irritation had completely disappeared. This view is common among people who undergo LiteTouch treatments.

Figure 8-6 (next page): The patient, who had previously visited the clinic monthly to drain pus, next came to the clinic after an absence of four months - perhaps because the constant discomfort had been relieved. At this time, it was discovered that the root was exposed but, incredibly, there was no swelling of the marginal gingiva and the pus had completely cleared up.

Figure 8-7 (next page): The gums on the tongue-side of the tooth were generally healthy, there was no blood congestion, and looseness of the teeth had been reduced dramatically. The patient said that approximately three days after the previous treatment, the affected teeth had become much better and chewing was no longer painful so the patient completely forgot about coming to the dentist. Due to the complete lack of inflammation symptoms, no decision has yet been made regarding future treatment for this patient.



Figure 8-1



Figure 8-2



Figure 8-3



Figure 8-4



Figure 8-5



Figure 8-6



Figure 8-7

CONCLUSION

Dental treatments that patients cannot comprehend are destined to become obsolete regardless of how useful they might be. Even the most talked about treatments will fail to gain the support of patients if they do not offer some tangible improvement that patients can feel using their five senses. Indeed, “painless treatment” has been turned on its head by the arrival of LiteTouch. Patients have experienced the move from treatment that does not entail pain to painless treatment that brings results that make them feel much better. I am sure that word-of-mouth generated by patients that experience LiteTouch treatment will make dental care a much more approachable experience for the general citizenry.

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