

Principles of cosmetic dentistry in orthodontics: Part 3. Laser treatments for tooth eruption and soft tissue problems

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One of the clinical orthodontist's biggest occupational stress factors is the constant pressure from patients and their parents to finish treatment.¹ Many predictable factors must work together for treatment to run on schedule, including patient cooperation and timeliness of appointments. But unanticipated impediments, such as tooth eruption problems and certain soft tissue characteristics, can prolong treatment. This purpose of the article, the last in a 3-part series devoted to cosmetic dentistry in orthodontics,^{2,3} is to describe how we use a diode soft tissue laser to solve many clinical and cosmetic problems.

DIODE SOFT TISSUE LASER APPLICATIONS

Gaining access for bracket placement on partially erupted teeth

The progress of orthodontic treatment is often delayed by the incomplete or late eruption of teeth, because there is insufficient access to the labial surface of the tooth for bracket placement. We must either wait for the tooth to erupt completely or refer the patient to a periodontist to have the tissue removed. Either choice could add significant time to the overall treatment. Now a soft tissue laser can be used in the orthodontic office to uncover the crown, and, because the laser seals the incision during the procedure, brackets can generally be placed on the same day. The patient in [Figure 1](#) had a mandibular canine that had erupted into the arch, but gingival tissue was retained on the facial aspect of the tooth. Naturally, the patient and her family were pressing us to finish treatment as rapidly as possible. Before the availability of the soft tissue laser, our choices to access the tooth would have been (1) to attempt to bond a bracket subgingivally, (2) to bond a button to the tip

of the tooth and try to extrude it, or (3) to refer the patient to a periodontist to remove the tissue so that we could access the crown and place a bracket. Instead, we were able to remove the excess tissue with the laser ([Fig 1, B](#)). The entire facial surface of the tooth was uncovered, and because the incision was sealed with what is termed a "biologic dressing," we could place the bracket during the same visit ([Fig 1, C](#)).

Managing the tissue on impacted canines

Many treatment options are available for uncovering and erupting impacted canines. We have often uncovered a tooth surgically, bonded a bracket, and moved the tooth into the arch. Occasionally, the tooth emerges with tissue attached to it; this hinders treatment progress, as shown in [Figure 2](#). Before the availability of the laser, we would refer the patient back to the surgeon and make a new appointment to bond the bracket; today, we can use the laser to uncover the tooth immediately. For this patient, we removed the overlying tissue with the laser ([Fig 2, B](#)) and placed an attachment immediately ([Fig 2, C](#)) to keep treatment on track.

Removal of redundant tissue created by space closure

In patients who require large amounts of space closure, often the gingival tissue becomes redundant in the interdental spaces. This problem, although often exacerbated by poor oral hygiene, is largely a function of the amount of space closure. When a large amount of tissue builds up, a periodontal referral is warranted. However, minor tissue redundancy can be reduced with the laser. The patient shown in [Figure 3](#) is a good example. We had just removed tissue over a maxillary canine and had tied it to the archwire to begin its movement. We had not only uncovered the tooth but had troughed the soft tissue to reduce its bulk. Eight weeks later, the tooth had moved into the arch, but redundant tissue was piled up in front of it ([Fig 3, B](#)), blocking access to the bracket. We used the laser to

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Fig 1. **A**, Mandibular canine had erupted into arch, but gingival tissue remained on facial aspect of tooth, preventing bracket placement. **B**, Soft tissue laser was used to excise excess tissue. **C**, Facial surface of tooth was uncovered and canine bracket placed in same visit.



Fig 2. **A**, Impacted canine emerged with attached tissue, hindering treatment progress. **B**, Overlying tissue was removed with laser. **C**, Canine bracket was placed and archwire tied in to keep treatment on track.

remove the excess tissue, the tooth was religated, and the archwire completely engaged. Twelve weeks later, the tooth was in alignment (Fig 3, C).

Removal of operculae on second molars

Although modern orthodontic materials allow for successful bonding of second molars, some patients still require banding of these teeth to avoid excessive repair visits. A frequent frustration, however, is the patient for whom you would prefer to band the second molars but cannot do so because an operculum is present (Fig 4). Operculae can be successfully removed with the soft tissue laser (Fig 4, B) and a band placed at the same appointment or after the wound has healed (Fig 4, C). This allows for earlier banding of these teeth and more efficient use of treatment time.

Removal of redundant tissue due to poor oral hygiene

We all have experienced the frustration of cajoling patients to practice good oral hygiene, only to have varying degrees of success. Some parents will manage the situation at home, but regrettably that is not always the case. A vicious circle can develop, whereby the patient's poor hygiene results in swollen gingival tissues, and then the patient will not brush and floss adequately because of bleeding and discomfort. In this situation, we might remove redundant tissue to elimi-

nate the inflammation, creating gingival contours that are again amenable to cleaning. Once the tissue has healed, the patient is likely to maintain better oral hygiene, so he or she will not have to go through the procedure again. When treatment is finished, and hypertrophic gingival contours are unesthetic, laser contouring can yield a much nicer cosmetic result.

Treatment of aphthous ulcers

One of the most uncomfortable experiences for orthodontic patients is the formation of aphthous ulcers (Fig 5). In the past, we have offered salt water rinses, various anesthetic and palliative mouth rinses, and, in particularly persistent and painful lesions, a prescription rinse of tetracycline and topical anesthetic. Some of these solutions help to varying degrees, but often they only make the situation tolerable. The diode laser offers a potential solution. The recommended technique involves using the laser on a very low-wattage setting, out of contact with the lesion (a distance of 1-2 mm), visualizing a spot large enough to cover the entire lesion. The laser is activated for 30 seconds, and in our experience, the patient reports an immediate elimination of pain. The aphthous ulcer will generally heal and disappear (Fig 5, B) approximately 1 day after laser treatment, compared with 10 to 14 days for an untreated lesion to heal.



Fig 3. **A**, Maxillary canine was uncovered and tied in to archwire. Note soft tissue troughing to reduce thick palatal tissue, which would impede tooth movement. **B**, Eight weeks later, tooth had moved significantly, but redundant tissue had piled up in front of it, covering bracket. **C**, Laser was used to remove excess tissue, and tooth and archwire were completely engaged. Twelve weeks later, canine was in alignment.



Fig 4. **A**, Operculum on mandibular second molars prevented banding. **B**, Operculum and soft tissue behind it were removed with laser. **C**, Healed surgical site 1 week later, ready for banding.



Fig 5. **A**, Aphthous ulcers can be irritating to patient and can delay treatment. **B**, Ulcer was exposed to low-wattage laser beam for 30 seconds and disappeared in 24 hours.

CONCLUSIONS

The orthodontist must consider many issues when deciding whether to incorporate soft tissue laser technology into the clinical setting. These issues include (1) the orthodontist's comfort level with the potential discomfort, albeit minimal, that the patient might experience, (2) the orthodontist's comfort level in using the instrument to perform soft tissue modification, (3) the orthodontist's comfort with assuming the responsibility of soft tissue "surgery" in the orthodontic office, and (4) the cost of the instrument.

We have found that incorporating this technology into our practice has been very useful in terms of the final esthetic outcome for our patients, and patient response has been remarkably positive. The only anes-

thesia we use is a topical one, so local injections are not an issue. In addition to esthetic contouring, a big advantage of soft tissue lasers has been the increased efficiency of treatment.

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