



Diastema Sliding Curtain Graft with Er,Cr:YSGG Laser

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Summary: The present paper extends the use of lasers to produce a "sliding curtain graft" to treat the problems of the central incisor diastema by closing periodontal pockets, providing a firm reattachment site, and enhancing later bone re-growth within the bony defects.

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A number of gingival conditions have been difficult to treat. One cosmetic problem has been the central incisor diastema with the absence of incisive papilla and the appearance of a black triangle, which is sometimes called "black hole disease." Past attempts to do coronal repositioning to fill these black triangles have typically created deep periodontal pockets, which often result in later osseous breakdown. Laser techniques used recently to treat periodontal disease have been found effective for cleaning diseased tissue, enhancing the development of new cementum and bone, and promoting the reattachment of soft tissue to roots.¹⁻⁶ This paper extends the use of lasers to produce a "sliding curtain graft" to treat the problems of central incisor diastema by closing periodontal pockets, providing a firm reattachment site, and enhancing later bone re-growth within the bony defects.

The treatment included three basic phases, described in greater detail below. The first phase included use of the Er,Cr:YSGG laser (Biolase; Irvine, CA, USA) to treat existing periodontal disease by cleaning and preparing root surfaces and allowing them to heal to healthy and stable 2- to 3-mm pockets. The second phase was completion of minor orthodontics to cor-

rect the diastema. The third phase included the correction of the black triangle using a sliding curtain graft, with the most crucial step being the use of the laser to re-clean and re-prepare the root on the day of surgery to allow root reattachment of the coronally repositioned tissue and the blood clot beneath it.

CASE REPORT

A 47-year-old healthy female presented with a chief complaint of the "space between her front teeth" (Fig 1). We informed her that orthodontics could only be performed if we eliminated the 7- to 8-mm periodontal pockets she had throughout her mouth, including between the central incisors. The patient gave informed consent for treatment with initial periodontal therapy, orthodontics, and finishing with the sliding curtain graft.

The first phase of the patient's treatment was to complete periodontal care with the Er,Cr:YSGG laser with a new radially firing tip. With the laser set at 2 W, we cleaned and prepared the roots for 20 to 30 s for the buccal surface and 20 to 30 s for the lingual sur-



Fig 1 Pre-operative view of diastema.

face, followed by application of the ultrasonic scaler for 20 to 30 s per surface. The laser was then reused on each surface for another 20 to 30 s. Two follow-up applications of the laser were used, one week apart, with an 810 nm diode laser (Lasersmile, Biolase). Using 0.7 W continuous and interrupted pulses (30/30) to help continue the sterilization, we removed the down-growth of epithelium into the pocket as well as providing photobiostimulation.⁷ At the 3-month recall visit, it was determined that all pockets were eliminated to a healthy 2 to 3 mm and ready for orthodontics.

Phase two of treatment was the completion of minor orthodontics. At this point, the black triangle was still present because of the initial absence of an incisive papilla.

Phase three of treatment produced the sliding curtain graft surgery. The first step on the day of surgery was to ready the root surfaces for reattachment by re-cleaning and re-preparing them using the Er,Cr:YSGG laser with the new radially firing periodontal tip set at 2 W for approximately 20 to 30 s per root surface. The second step of the graft surgery was to prepare a split thickness flap above the margin of tissue of the central incisors, making the length of the graft ("A" in Fig 2) long enough to slide down 4 mm to fill the space of the black triangle ("B" in Fig 2). As this split thickness flap reached the crest of the incisive papilla, it was then changed to a full thickness flap on the interradicular bone of the central incisors and continued to the palatal incisive papilla, preserving this as the primary blood supply (Fig 3). As the graft slid down the facial aspect of the surgical site, it filled the black triangle with a curtain of tissue and the blood clot beneath it

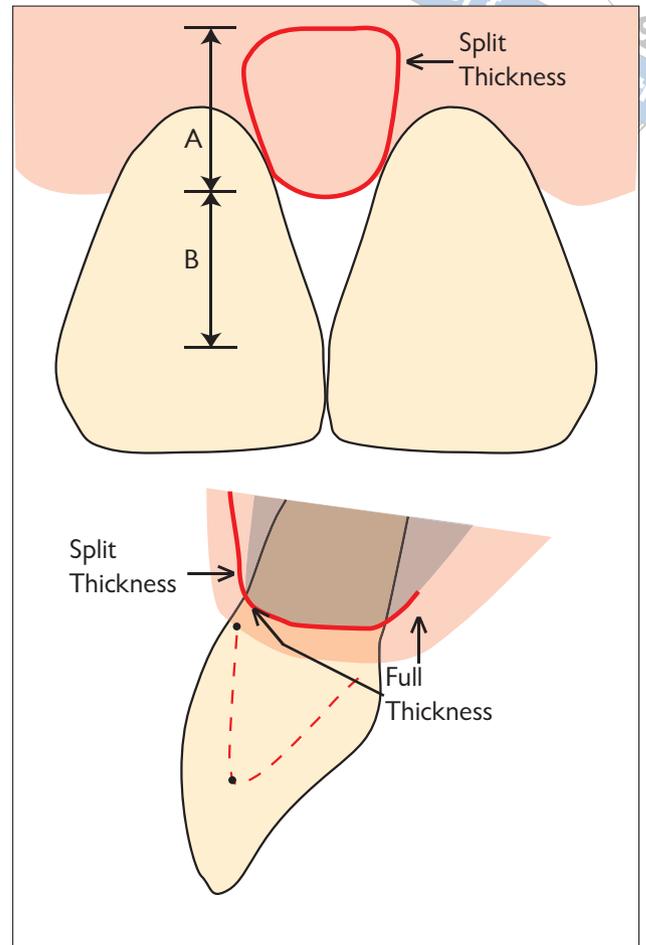


Fig 2 Graft surgery technique. A: length of graft; B: triangle to be filled.

(Fig 3). The graft was held with light pressure until the clot set. Then a gelatin bandage was placed (Stomadhesive, Bristol Meyers; USA), which typically lasts only 24 h and allows the clot to mature without pressure. After the gelatin bandage dissolved, the patient needed to take great care that floss and tooth brush damage did not occur for 2 to 3 weeks. The one week follow-up showed early healing with a report of absolutely no pain (Fig 4). Healing continued uneventfully for two weeks (Fig 5).

DISCUSSION

The present paper offers a new laser technique to relieve the cosmetic deformity sometimes called "black

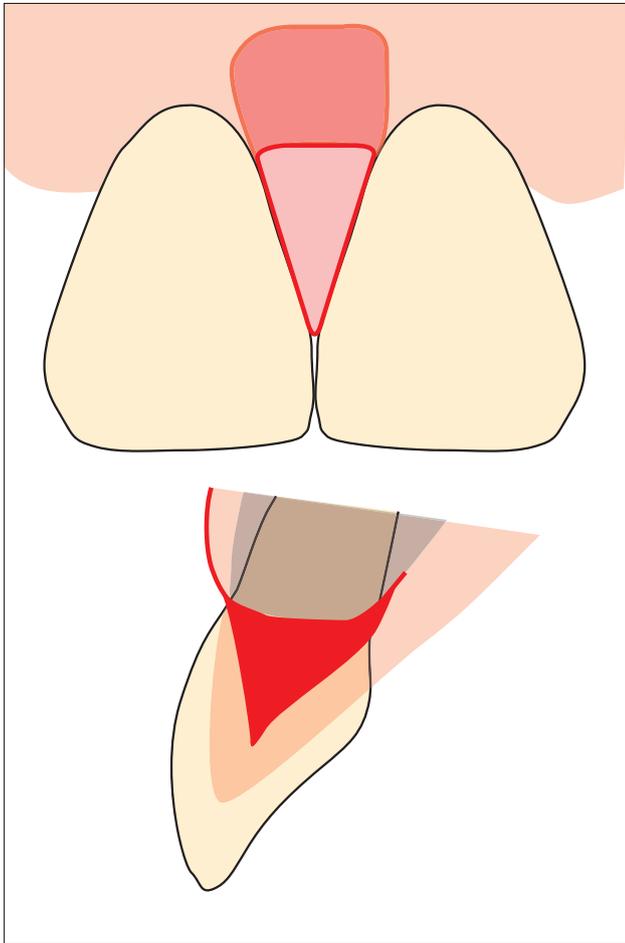


Fig 3 Graft sliding down facial aspect of surgical site.



Fig 4 Early healing 1 week postoperatively.



Fig 5 Uneventful healing at 2 weeks postoperatively.

hole disease.” The essential preparation of this case was to establish good periodontal health at the time of surgery. Also important was the proper laser preparation of root surfaces the day of surgery to accept the graft, to reattach with healthy pocket readings, and to develop a beautiful cosmetic result.

The patient's initial radiograph prior to treatment showed bone loss on the mesial aspect of both central incisors and 7- to 8-mm pockets (Fig 6). After the laser periodontal therapy in phase one of treatment, the bone had filled back into the vertical defects and the density of the bone had greatly improved, with approximately 3 to 4 mm of horizontal bone growth gained in this area (Fig 7). We believe this bone growth could continue to develop at the site where the blood clot formed between the periosteum of the full thickness

flap and the interradicular bone of the central incisors. We are continuing to take measurements of this area because we believe it has potential for future bone apposition.

At two months after surgery, the site was probed firmly (see blanching of tissue in Fig 8) and it was found to have only a 3-mm pocket. Without the successful reattachment of this 4 to 5mm of graft, the patient would have had a 7- to 8-mm pocket; instead, she has a 3-mm healthy pocket with beautiful tissue and a beautiful smile (Fig 9).



Fig 6 (left) Pretreatment radiograph shows bone loss.

Fig 7 (right) After laser therapy in phase one, 3 to 4 mm of horizontal bone growth was evident.



Fig 8 Two month after surgery showed healthy 3-mm pocket and no bleeding upon probing.



Fig 9 Successful reattachment of 4- to 5-mm graft produced a beautiful smile.

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