

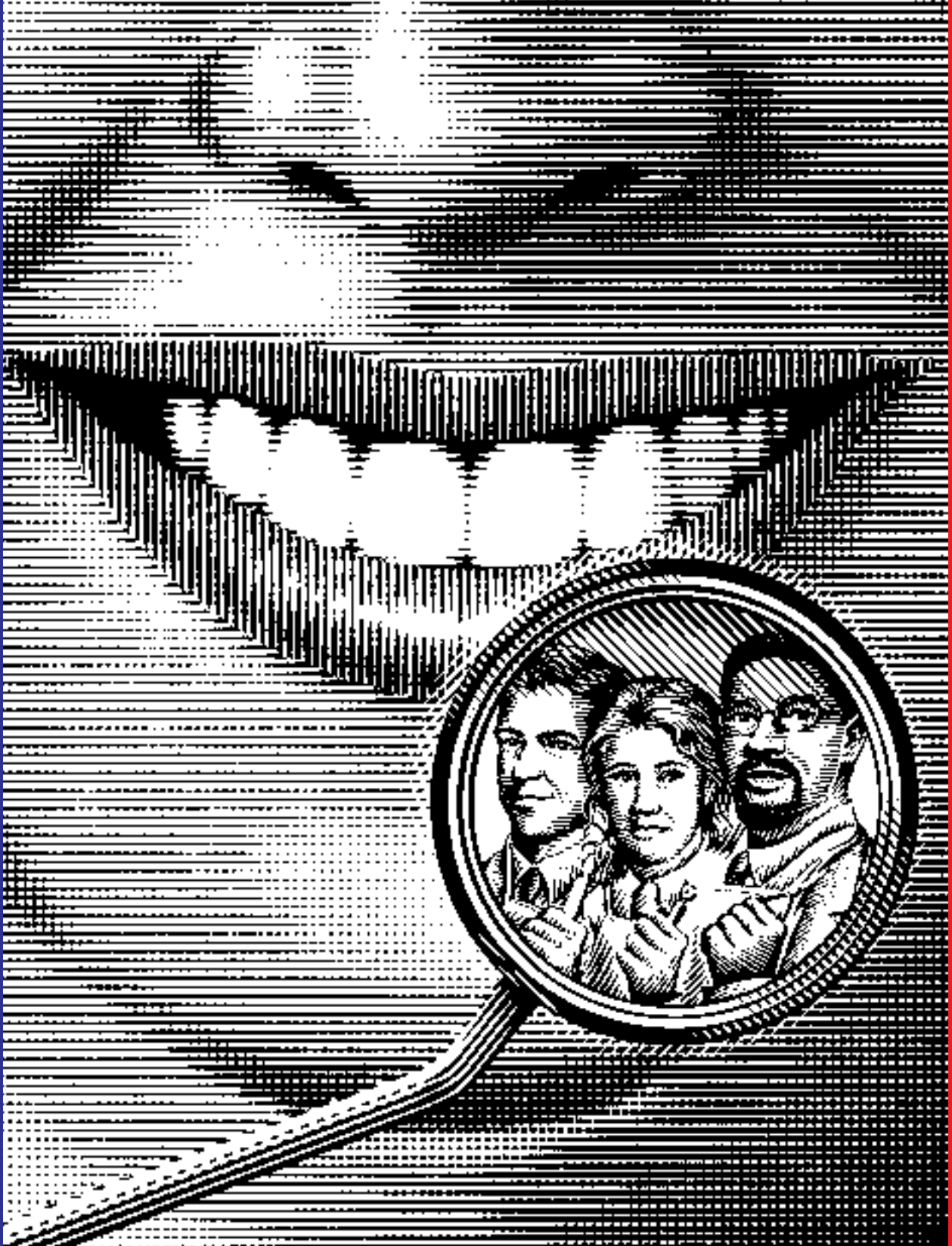


American Association of Orthodontists

VOLUME TWELVE

NUMBER ONE

WINTER 2000



**ORTHODONTIC**  
**DIALOGUE**  
**ENGLAND**

**ADJUNCTIVE PERIODONTAL PROCEDURES FOR ORTHODONTIC PATIENTS**

## ADJUNCTIVE PERIODONTAL PROCEDURES FOR ORTHODONTIC PATIENTS

A healthy periodontium is essential for successful therapy in every branch of dentistry. Providing appropriate treatment also often necessitates cooperation between the various disciplines within our profession. The purpose of this article is to describe three periodontal procedures that can assist in the achievement of successful orthodontic results. We will discuss autogenous gingival grafts, including free gingival and connective tissue grafts, maxillary frenectomy and circumferential fiberotomy.

### AUTOGENOUS GINGIVAL GRAFTS

The free gingival graft procedure was first suggested by Sullivan and Atkins, and subsequently proved to be a viable means for augmenting the zone of attached gingiva by Dordick et al., James and McFall, and Caffesse et al.<sup>1,2,3,4,5</sup> Essentially, the procedure involves the preparation of a recipient site, which is accomplished by supra-periosteal dissection to remove epithelium, connective tissue and muscle fibers down to the periosteum. A graft is harvested, traditionally from the palate, and secured at the recipient site. Soehren et al. determined that the ideal thickness of graft tissue should be 0.75 mm to 1.25 mm.<sup>6</sup> In a two-year study comparing grafts versus no grafts, Dorfman et al. found that the free autogenous soft tissue graft was a predictable way to augment the zone of attached gingiva.<sup>7</sup> In a subsequent study, Dorfman et al. confirmed these results and also concluded that non-grafted areas showed additional recession when compared with grafted ones.<sup>8</sup> This procedure is very predictable, creates adequate zones of



attached gingiva, reduces the possibility of future recession, eliminates aberrant frena, and enhances the health of the affected area. This procedure is most often performed prior to commencement of orthodontic treatment. Figures 1 through 4 illustrate the use of this graft procedure.

In instances where recession is present, Raetzke presented a technique for obtaining root coverage using free connective tissue grafts.<sup>9</sup> This procedure involves the creation of a split thickness envelope around a denuded root into which connective tissue harvested from the palate is anchored. The high success rate of this procedure is attributed to the dual blood supply from the underlying periosteum and the overlying gingival tissue. Even though this is a relatively new grafting technique, it has gained tremendous popularity because of the predictability and positive esthetic result. This procedure is most often performed at the conclusion of active orthodontic treatment. Figures 5 through 7 illustrate the technique.

### MAXILLARY FRENECTOMY

Maxillary midline diastemas are relatively simple to close during orthodontic treatment, but there are a number of factors that can contribute to the reopening of this space. The most frequently alleged etiologic agent in this relapse scenario is the presence of an “abnormal” maxillary labial frenum. Most practitioners agree that this band of tissue must be surgically excised at some point to achieve a successful long-term result. Consequently, the questions surrounding this issue are:

- 1) What constitutes an “abnormal” maxillary labial frenum?
- 2) When should it be removed?
- 3) What success rate should be expected to avoid relapse?

These questions are nicely answered in a classic paper by Edwards.<sup>10</sup> Most clinicians agree that at least three or, perhaps, four conditions exist in the presence of an abnormal frenum. First, the frenal attachment closely approximates the interdental margin and/or inserts palatally lingual to the incisors. Second, the attachment is wider than usual at its insertion point. Third, there is movement and “blanching” of the interdental and/or palatal tissue upon stretching of the frenum and upper lip. The fourth condition that many clinicians agree upon is the presence of an invagination of the interseptal bone between the central incisors as demonstrated in a periapical radiograph.

Almost all authors on the subject agree that an abnormal frenum should not be excised until the space is closed orthodontically because there is little evidence that spontaneous closure will result. Removing

**Fig. 1**  
This 25-year-old patient presented for treatment of a high labial frenum. Note the close proximity to the free gingival margin of #26 and the associated inflammation.

**Fig. 2**  
A full thickness gingival graft is harvested from the palate.

**Fig. 3**  
The graft is immobilized to ensure stability.

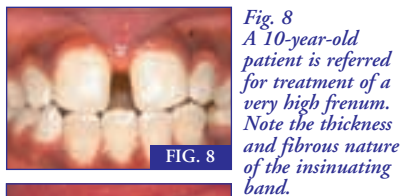
**Fig. 4**  
Six weeks later, the graft has taken. The frenum has been displaced, and the zone of attached gingiva has been augmented.



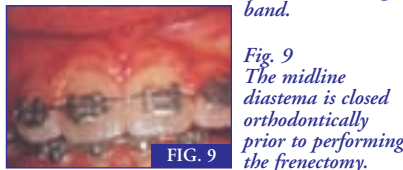
this tissue prior to space closure can run the risk of scar tissue formation, which can slow down subsequent attempts at space closure.

Edwards recommends a three-stage procedure when performing a frenectomy. The frenum is repositioned apical with denudation of the alveolar bone. The transept fibers are severed between the approximated central incisors, and the labial and/or palatal gingival papillae are recontoured in cases of excessive tissue accumulation.

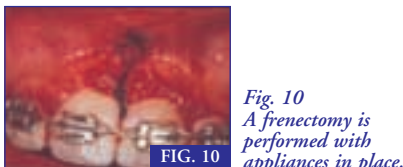
Edwards' study demonstrates that this procedure greatly increases the long-term stability of an orthodontically closed maxillary midline diastema. Figures 8-10 illustrate such a case.



**Fig. 8**  
A 10-year-old patient is referred for treatment of a very high frenum. Note the thickness and fibrous nature of the insinuating band.



**Fig. 9**  
The midline diastema is closed orthodontically prior to performing the frenectomy.



**Fig. 10**  
A frenectomy is performed with appliances in place.

## CIRCUMFERENTIAL FIBEROTOMY

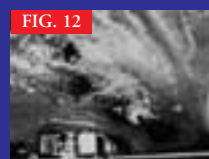
The propensity for relapse of corrected rotated teeth is well recognized by all orthodontic practitioners. In a study that investigated the incidence of relapse, Swanson concluded that the amount of rotational relapse tends to be a function of the severity of the original rotation.<sup>11</sup> In other words, the more severely rotated a tooth is before treatment, the more severe the rotational relapse will be.

Several clinical and histologic investigations indicate that the major relapse pull on a rotated tooth appears to be in the supracrestal fibers.<sup>11,12,13,14,15,16</sup> The suspected culprit was demonstrated by Edwards in a classic study using tattoo marks on the gingiva opposite the rotated teeth (Figures 11-14).<sup>17</sup> The tattoo marks

**Fig. 11**  
Tattoo marks on gingiva before rotation of tooth.



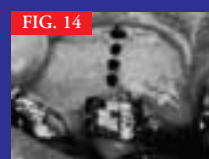
**Fig. 12**  
Deviated tattoo line on gingiva following rotation of tooth.



**Fig. 13**  
No. 11 Bard-Parker blade entering gingival sulcus to sever supracrestal fibrous attachment around circumference of tooth.



**Fig. 14**  
Periodontal probe showing normal sulcular depth one week after surgical procedure. Note that tattoo marks have reverted to original vertical alignment.



moved in the direction the tooth was rotated and returned toward their original position as the rotation relapsed after the orthodontic force was released and retention relinquished. The tattoo marks also returned to their original position after completion of a circumferential fiberotomy procedure while the tooth remained stationary.

The surgical procedure consists of inserting the point of a #11 surgical blade into the depth of the gingival sulcus and severing all fibrous attachments surrounding the tooth below the crest of the alveolar bone. It is generally agreed that this procedure is best performed when the rotated tooth has been oriented in its final position prior to removal of the fixed appliances. In the presence of gingival inflammation, the procedure should be postponed until the inflammation has subsided. Edwards' study demonstrated that the tattoo marks reverted to their original configuration within 20 to 40 hours after completion of the fiberotomy while negligible rotational relapse of the tooth occurred.

Since the circumferential fiberotomy procedure is simple and the complications are few, this procedure may be a routine component of a comprehensive retention regimen.

## INTERDISCIPLINARY COOPERATION IS KEY

A strong relationship between the general dentist, orthodontist, patient and the periodontal therapist must exist in order to achieve successful orthodontic therapy. A comprehensive periodontal examination is essential prior to orthodontic therapy

to establish a baseline from which to monitor changes in the patient's home care and any possible changes in periodontal tissues. Depending on the presence or absence of disease and a patient's motivation and manual dexterity, an appropriate recall period needs to be established to maintain health throughout and after orthodontic treatment. It is through this type of patient/interdisciplinary cooperation that the long-term success of orthodontic treatment can be achieved.

For the reader interested in learning more about orthodontic and periodontic relationships during orthodontic treatment, the authors recommend reviewing Sanders' excellent 1999 paper.<sup>18</sup>

## REFERENCES

1. Sullivan H, Atkins J. Free autogenous gingival grafts: Part I. Principles of successful grafting. *Periodontics* 1968;6:121-129.
2. Dordick B, Coslet JG, Seibert JS. Clinical evaluation of free autogenous gingival grafts placed on alveolar bone. Part I. Clinical predictability. *J Periodontol* 1976;41:559-567.
3. James WC, McFall WT. Placement of free gingival grafts on denuded alveolar bone. Part I. Clinical evaluations. *J Periodontol* 1978;49:283-290.
4. James WC, McFall WT, Burkes EJ. Placement of free gingival grafts on denuded alveolar bone. Part III. Microscopic observations. *J Periodontol* 1978;49:291-300.
5. Caffesse RG, Burgett FG, Nasjleti CE, Castelli WA. Healing of free gingival grafts with and without periosteum. Part I. Histologic evaluation. *J Periodontol* 1979;50:586-594.

The American Association of Orthodontists is a national dental specialty organization that was founded in 1900. The AAO comprises more than 13,000 members. Among its primary goals are the advancement of the art and the science of orthodontics; the encouragement and sponsorship of research; and the achievement of high standards of excellence in orthodontic instruction, practice and continuing education.

Orthodontic Dialogue is published to help communicate with the dental profession about orthodontics and patient care. Unless stated otherwise, the opinions expressed and statements made in this publication are those of the authors and do not imply endorsement by or official policy of the AAO. Reproduction of all or any part of this publication is prohibited without written permission of the AAO.

Correspondence is welcome and should be sent to: American Association of Orthodontists, Council on Communications, 401 N. Lindbergh Blvd., St. Louis, MO 63141-7816.

**Dr. Mervin W. Graham**, President  
Denver, Colorado

**Dr. Michael D. Rennert**, President-Elect  
Montreal, Quebec

**Dr. Frederick G. Preis**, Secretary-Treasurer  
Bel Air, Maryland

**Dr. Christopher W. Carpenter**, Chair  
Council on Communications  
Denver, Colorado

**Dr. John R. Barbour**, Chair  
Orthodontic Dialogue Subcommittee  
Carmel, Indiana

**Ronald S. Moen**, Executive Director  
St. Louis, Missouri

Contributors to this issue:

**Dr. Stanley Ross**,  
San Leandro, California

**Dr. Steve Chang**,  
San Leandro, California

6. Soehren AE, Allen AL, Cutright DE, Seibert JS. Clinical and histologic studies of donor tissue utilized for free grafts of masticatory mucosa. *J Periodontol* 1973;44:727-741.

7. Dorfman HS, Kennedy JE, Bird WC. Longitudinal evaluation of free gingival autografts. *J Clin Periodontol* 1980;7:316-324.

8. Dorfman HS, Kennedy JE, Bird WC. Longitudinal study of free autogenous gingival grafts. A 4-year report. *J Periodontol* 1982;53:349-352.

9. Raetzke P. Covering localized areas of root exposure employing the 'envelope' technique. *J Periodontol* 1985;56:397-402.

10. Edwards JG. The diastema, the frenum, the frenectomy - a clinical study. *Am J Orthod* 1977;71:489-508.

11. Swanson WA, Reidel RA and D'Anna, JA. Postretention study: Incidence and stability of rotated teeth in humans. *Angle Orthod* 1975;45:198.

12. Boese LR. Increased stability of orthodontically rotated teeth. *Am J Orthod* 1969;56:273-290.

13. Edwards, JG. A study of the periodontium during orthodontic rotation of teeth. *Am J Orthod* 1968;54:441-459.

14. Reitan K. Retention and avoidance of post-treatment relapse. *Am J Orthod* 1969;55:784.

15. Reitan K. Tissue rearrangement during retention of orthodontically rotated teeth. *Angle Orthod* 1959;29:105-113.

16. Thompson HE. Orthodontic relapses analyzed in a study of connective tissue fibers. *Am J Orthod* 1959;45:93-103.

17. Edwards JG. A surgical procedure to eliminate rotational relapse. *Am J Orthod* 1970;57:35.

18. Sanders, NI. Evidence based care in orthodontics and periodontics: a review of the literature. *JADA* 1999;130:521-527.

The AAO encourages you and your patients to visit the AAO Web site, *Orthodontics Online*, to learn more about the AAO and orthodontics.

[www.braces.org](http://www.braces.org)

American Association of Orthodontists  
401 N. Lindbergh Blvd.  
St. Louis, MO 63141-7816

Non-Profit Org.  
U.S. Postage  
**PAID**  
St. Louis, MO.  
Permit No. 343

The AAO recommends that every child should have an orthodontic screening no later than age 7.