

Coverage of the denuded root surface using the free soft tissue autograft

Michael K. McGuire, DDS

This paper presents a new soft tissue graft technique that allows the surgeon not only to increase the zone of attached gingiva, but also to cover previously denuded root surfaces. Predictability of the procedure is discussed and the results are related to the health of the periodontium and to the patient's self-image.

The specialty of periodontics has evolved rapidly in the past decade.¹ As our practices change, we can provide new services capable of not only improving patients' periodontal health, but also enhancing their quality of life.

Free soft tissue autografts were first described by Bjorn.² During the 20 years after that report, free autogenous grafts were used in different clinical situations. Currently, they are used primarily to increase the zone of attached gingiva in patients who have a minimal amount of attached gingiva around a tooth that will be restored and in areas of increasing recession.

In our practice, we did not attempt to cover recession with the free autogenous graft because we believed (and knew by practical experience) that the graft, because it had no blood supply of its own, would not survive on top of the avascular root surface.³ The broader and more convex the area of recession, the less chance the graft would have to bridge the defect. To overcome this problem, most attempts to cover denuded roots involved pedicle grafts⁴ or two stage coronally repositioned grafts.⁵ Unfortunately, adjacent

donor material for pedicle grafts was not always available, and many patients objected to the two-stage surgical procedure of the coronally repositioned grafts.

In 1982, Miller⁶ described a new technique to cover denuded root surfaces with the free soft tissue autograft (Fig 1). There were a number of major differences between this technique and the conventional free autogenous graft. Miller used extensive root planing and scaling not only to remove altered cementum, but also to flatten the convex root surface to permit a more intimate adaptation of the graft to the root surface. A saturated citric acid was burnished for 5 minutes onto the root after the root planing (Fig 2). The citric acid was used to facilitate connective tissue attachment of the graft to the root surface by: widening the dentinal tubules, accelerating cementogenesis, removing the smear layer, eliminating the last remnants of endotoxin, and removing the

cementum, but leaving the Sharpey's fibers, allowing for easy linkage with the connective tissue fibers.

Miller's incisions at the recipient site created "butt joints," and the same type of perpendicular "butt joint" incisions were made when harvesting the donor tissue from the palate. He believed that this type of joint between the graft and the recipient site, especially in the papilla area, might be important for rapid revascularization.⁷ The size of the recipient site was also made much larger than the conventional graft bed to supply the vascularity to the graft needed to bridge the avascular root surface. The thickness of the graft was increased to include the lamina propria (Fig 3), retaining most of the vascular network, which would allow for rapid linkup to capillaries in the papillas and decrease the initial dependency on plasmotic circulation to provide nutrients to the graft.

The final step in Miller's technique was



Fig 1 ■ The canine before treatment.

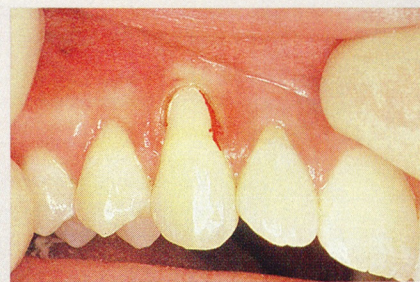


Fig 2 ■ The canine after scaling, root planing, and citric acid demineralization.

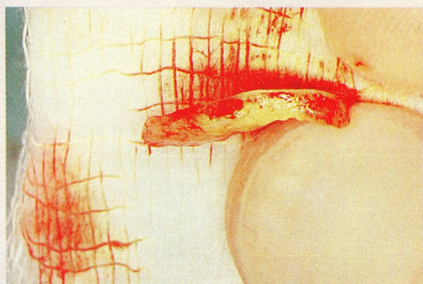


Fig 3 ■ Donor tissue demonstrating thickness of the graft and the "butt joint" type of incision.

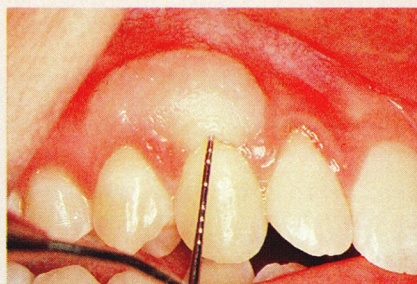


Fig 4 ■ Postoperative view showing complete coverage and attachment of the graft to the root. Note the tissue blanching under the pressure of the probe.

careful suturing to ensure the graft was completely adapted to the recipient site and root surface without any dead spaces. When performed correctly, this technique allowed for complete coverage of the denuded root (Fig 4).

Holbrook and Ochsenbein⁸ described a technique similar to Miller's technique.^{6,7} The primary difference between this procedure and Miller's was the use of a more intricate suturing technique between the graft and the recipient site. Their suture not only ensured complete adaptation of the graft to the bed, but it also attempted to stretch the graft to counteract primary contraction and make the graft more receptive to revascularization. Another difference in technique was the lack of citric acid demineralization of the root surfaces.

Miller stated that total root coverage was achieved when the marginal tissue, after complete healing, was at the cemento-enamel junction and the sulcus was 2 mm or less and there was no bleeding on probing.⁷ In 1985, Miller created a new classification of recession to help in determining which types of recession could be covered successfully.⁹ He believed complete coverage was possible in both Class I and II

recession. In both classifications there was no periodontal (bone and soft tissue) loss in the interdental area. Class I recession did not extend to the mucogingival junction and Class II recession extended to or beyond the mucogingival junction. If there was bone or soft tissue loss interdentally, or if there was a malpositioned tooth (Class III recession), only partial root coverage could be anticipated. If the bone or soft tissue loss in the interdental area or malpositioning was severe (Class IV), then root coverage could not be anticipated. This type of classification is important because it allows the practitioner to advise the patient on the projected outcome of the graft.

During the past 4 years, I have done more than 100 root coverage grafts. The outcome is predictable, routinely achieving 100% root coverage in Miller's Class I and II recession. The grafts have been dimensionally stable, with the gingival margin remaining at the cemento-enamel junction, and no further recession has been noted. Improper home care techniques require retraining. The procedure itself is, as are most regenerative procedures, technique sensitive. A great deal of

experience is required to perform these grafts and all aspects of the technique must be performed correctly. Patient selection is important, as smoking seems to decrease the chance for root coverage. If the patient must smoke, it should be minimized as much as possible for the first 2 weeks after the procedure.

The main disadvantage of the procedure is postoperative morbidity. Because a thicker and larger graft is taken, there is more chance for postoperative bleeding and significant discomfort. Prevention, therefore, continues to be important. It is best to intercede before the recession becomes a significant problem and requires augmentation. There is considerable controversy in the literature¹⁰ in regard to the efficacy of citric acid demineralization in humans. We found that this type of graft is more successful with the use of citric acid. No one has shown what type of attachment is achieved between the root surface and the graft, but there is no doubt that it is firmly attached (Fig 4).

One of the most rewarding aspects of this procedure is that a result is achieved that the patient can appreciate. For many years, patients were disappointed when they were informed that the graft would prevent further recession and make the area healthy, but would not cover the existing recession. Most patients thought the graft would cover the recession. This misconception of the classic free autogenous graft is widespread. Now denuded root surfaces can predictably be covered in one surgical procedure. A smile with inconsistent gingival margins can be changed to a smile with proper gingival dimensions (Fig 5-7).

These grafts can also improve patients' lifestyles in a number of other ways. Grafts can cover areas that have thermal sensitivity or that are sensitive to normal home care procedures. Miller¹¹ reported covering areas in which there had been root

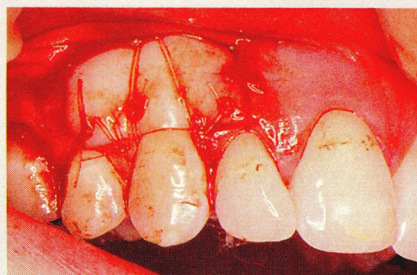


Fig 5-7 ■ This patient objected, for esthetic reasons, to the length of the maxillary right canine. Through the use of the grafting procedure reported in this paper, coverage of the root was possible, satisfying esthetic demands. Note the intricate suture technique in Figure 6 and the excellent color match of the graft to the adjacent tissue in Figure 7.

caries and the present author has covered a number of carious roots and roots that had been previously restored. Not only is the graft more attractive, but it also prevents the patient from having the tooth restored again every few years as the restoration deteriorates.

Conclusion

This free soft tissue autograft technique can rebuild the periodontium, not only making it healthy, but also restoring it to its original form and function.

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Dr. McGuire is in private practice, periodontics, Houston, and is an associate clinical professor, peri-

odontics, University of Texas Health Science Center-Dental Branch at Houston and at San Antonio. Address requests for reprints to the author, 3400 S Gessner, Suite 102, Houston, 77063.

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