

Treating Advanced Gingival Recession: A Review of Treatment Options for Advanced Recession Defects

Nkem Obiechina*

Department of Periodontology, Pannu Dental Group, Somerset, NJ, USA

***Corresponding Author:** Nkem Obiechina, Department of Periodontology, Pannu Dental Group, Somerset, NJ, USA.

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Abstract

Gingival recession involves apical migration of gingival margin around teeth. It has potential to impair not only esthetics but can result in significant damage to the periodontium. A number of classification systems exist to classify extent of gingival recession. Based on two of the highly utilized classification systems on gingival recession it was noted that Miller Type I and Type II recession as well as Cairo's RT1 recession seem to have the best overall prognosis for gingival coverage because they do not involve interproximal bone or attachment loss. With more advanced types of recession defects such as the Miller Type III and Cairo RT2 defects, there is diminished potential for complete root coverage, but it is possible that complete root coverage can still occur. The goal of this article is to provide a review of some advanced gingival recession defects and the grafting procedures that best result in gingival coverage, as well as conditions that maximize chances of achieving complete root coverage when advanced gingival recession exists.

Keywords: *Gingival Recession; Recession Defects; Grafting Procedures*

Introduction and Discussion

Gingival recession involves the apical migration of the gingival margin around teeth from the cemento-enamel junction [1-3]. It can occur in all surfaces of teeth including the buccal, lingual and interproximal surfaces [4]. The causes of recession are multifactorial ranging from iatrogenic causes such as toothbrush abrasion, occlusal problems such as tooth mal-positioning, to anatomic conditions such as ectopic frenal attachment and shallow vestibule. Other causes can include poor oral hygiene and improper brushing technique [5]. Anatomic causes of recession also involve teeth with mucogingival problems such as those that have thin buccal plate and thin gingival phenotypes, these conditions can lead to fenestration and dehiscence defects over time [4,6]. Teeth with improperly performed orthodontics, restorative and periodontal therapy such as those with improperly placed orthodontic bands, overhanging restorations and impinging cervical gingival margins are also prone to gingival recession as are teeth with periodontal disease [4].

When treating gingival recession, while complete gingival coverage has been reported routinely for Miller Class I and Miller Class II gingival recession and Cairo RT1 recession defects without interproximal bone loss or attachment loss, Miller Class III and Cairo RT2 recession defects typically have significantly less success rate for complete root coverage [8]. The goal of this article is to review some of the conditions under which complete gingival root coverage can be able to be accomplished for Miller class III defects and other advanced recession defects as well as potential grafting procedures that maximize chances of obtaining gingival coverage.

In 1985, the Miller classification gave guidelines on categorizing marginal gingival recession with regard to the mucogingival junction, interproximal bone and attachment level, and included four categories: Miller class one recession involves marginal recession that does

not extend to the mucogingival junction, Miller class II recession is marginal recession that extends to the mucogingival junction without interproximal attachment or bone loss, Miller Class III recession is gingival recession that extends to the mucogingival junction with interproximal attachment loss or bone loss. Miller class IV recession refers to sites with recession to mucogingival junction and severe interproximal attachment or bone loss [7].

The Cairo system was recently recommended by the 2017 World Workshop on periodontal and peri-implant diseases and classifies recession with regard to interproximal clinical attachment loss and used clinical attachment level to predict root coverage outcome [4,9]. The classification system involves RT1 recession which includes gingival recession with no interproximal loss of attachment. RT2 recession includes gingival recession defects associated with interproximal attachment loss less or equal to the buccal site. RT3 recession involves recession defects associated with higher interproximal attachment loss than the buccal site. While RT1 recession is usually related to gingival health and is associated with loss of facial tissue through trauma, RT2 and RT3 recession are related to periodontal pathology [9].

In assessing Miller type III and RT2 defects the goal is to identify potential factors that are necessary in order to accomplish complete root coverage [8,10]. Esteibar, *et al.* evaluated Miller Class III defects in a study involving 121 recession defects in 50 patients and following grafting procedures, had complete root coverage after surgical intervention 47% of the time. They evaluated presurgical and surgical factors that affect root coverage including the sex and age of the patient, type of tooth undergoing soft tissue grafts, integrity of the interproximal soft tissue and interproximal bone distance, as well as surgical factors involving graft thickness and surgical technique [10]. In evaluating what factors were most important to achieving complete root coverage, they indicated that the integrity of the interproximal soft tissue, with more intact tissue having increased chance of root coverage and the amount of interproximal bone present are the most important factors in achieving complete root coverage for class III recession defects, with sites that have 3 mm or less of interproximal bone loss having improved chances of complete root coverage. They also indicated that gingival graft tissue thickness that is more than 2 mm resulted in the best chances of achieving complete root coverage compared to less than 2 mm [10].

Average recession depth and width, interproximal soft tissue and interdental bone loss was found to be lower in the group where complete coverage was achieved compared to those with partial coverage [10]. Increased rate of sites without complete root coverage was observed for sites grafted with tissue with less than 2 mm of gingival graft thickness [10]. Graft tissue thickness was identified as being critical to obtaining complete gingival coverage sites treated with thicker tissue grafts having increased possibility of complete coverage [11].

In assessing therapy to treat deep recession defects comprised of Miller type II and type III defects, Cesar Neto, *et al.* utilized three modalities comprised of coronally advanced flap with connective tissue grafts, Double papilla flap with connective tissue grafts and laterally positioned flap with connective tissue grafts and found mean root coverage of 81.7% for all three procedures, and no significant difference between deep class II and class III defects with regard to complete root coverage [12].

Recession defects for the Neto, *et al.* study were assigned using a decision tree, and recession defects greater or equal to 5 mm were evaluated. 9 Miller class II and 7 Miller class III defects were selected and treated. Based on their case series, they concluded that deep recession can be treated predictably similar to mild and moderate recession defects utilizing connective tissue grafts [12] (Figure 1-3).



Figure 1: Miller Class III defect.

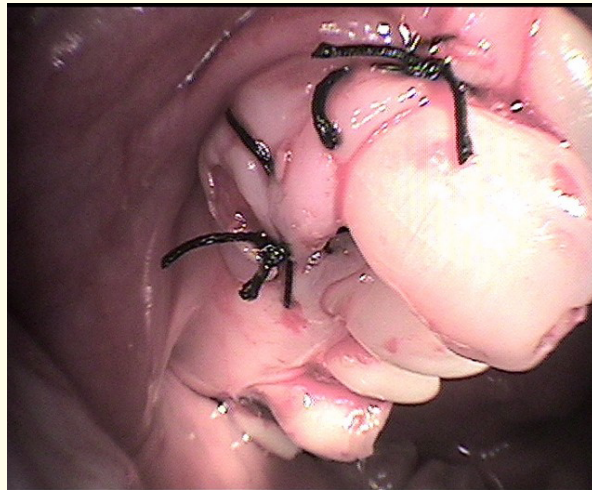


Figure 2: Coronally positioned flap and connective tissue graft.

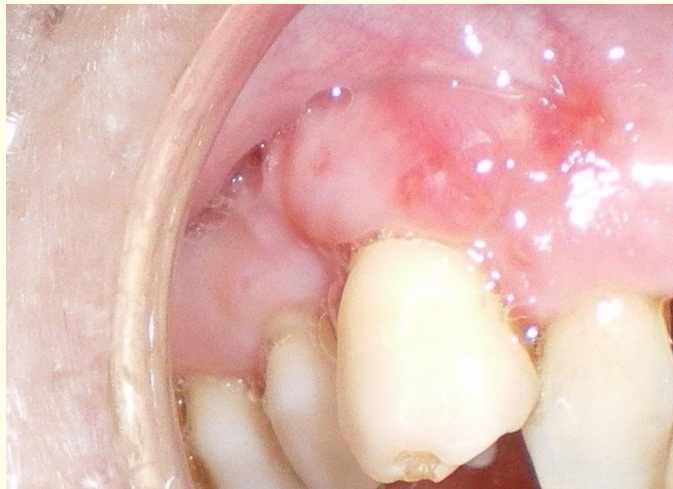


Figure 3: Result showing complete coverage.

Graziani, *et al.* evaluate multiple studies on treatment of gingival recession and concluded that coronally positioned flap combined with connective tissue graft provided the best outcome for treatment of recession [13]. Tonetti, *et al.* as part of consensus report of 10th European workshop on Periodontology concluded that connective tissue grafts improved outcomes for coronally positioned flap for single deep recession defects without attachment loss [14]. They also reported the same outcome for defects with mild attachment loss (early Miller III and Cairo RT2 defects) [14]. Cairo, *et al.* performed a systematic review and found that coronally positioned flaps with connective grafts with and without enamel matrix proteins provided the best esthetic outcomes for root coverage procedures [17] (Figure 4-8).



Figure 4: Miller Class III early defect.



Figure 5: *CT graft incision.*



Figure 6: *CT graft in place.*



Figure 7: *Sutures in place.*



Figure 8: 6 months follow up.

PD Miller in a recent article identified that there are conditions in which complete root coverage can be obtained for Miller Class III recession defects. He indicated that with the advent of procedures such as tunneling procedure combined with connective tissue grafts was able to retain interproximal blood supply in the papilla area to nourish the graft, and can facilitate obtaining complete coverage for Miller Class III defects [15]. Aguilar, *et al.* presented a case report utilizing tunneling technique to address Miller class 1 and multiple Miller Class III recession defects and achieved complete coverage for both Class I and Class III defects [16].

Aroca, *et al.* evaluated treatment of Class III recession defects using modified tunnel technique and connective grafts with or without enamel matrix derivative (EMD) [18]. Eight out of 20 surgeries performed on Miller III recession defects had complete coverage, while both groups had mean coverage of 83% and 82% for Modified tunnel and connective tissue graft with or without EMD [18]. Based on their results they concluded that Modified tunnel and connective tissue graft was an effective way to treat Class III Miller defects [18].

Chambrone and Tatakis completed a review for the AAP workshop on 234 studies on gingival recession and regeneration and found that while connective graft procedures resulted in the best results for Miller class I and Class II defects, they also improved results for Miller class III recession defects, enhancing mean root coverage and complete root coverage [19]. Using a decision tree for what procedures resulted in the best outcomes for Miller Class III recession, they found while connective tissue grafts provided the best outcome, other surgical techniques such as emdogain and coronally positioned flap (CAF), acellular dermal matrix graft (ADMG) and clinically advanced flap (CAF) and guided tissue regeneration (GTR) with CAF could also be utilized for Class III defects with comparable results [19]. In assessing what factors were most important in achieving root coverage, they found that marginal level of tissue of adjacent teeth to the recessed site was the factor most significantly affecting the clinical outcome of the grafting procedure with adjacent sites with intact tissue resulting in better chances of success compared with adjacent sites with tissue loss [19].

Conclusion

A number of studies involving treatment of Advanced recession defects involving Miller class III and Cairo RT2 recession classifications have indicated that use of connective tissue grafts have provided the best outcome for root coverage. Other techniques such as coronally positioned flaps with alloderm, emdogain and GTR could also be found to be also effective in treating Class III recession defects. In evaluating what factors most affect the ability to achieve complete root coverage, the amount of interproximal tissue and bone present factored

very highly in ability to achieve root coverage in addition to the thickness of the connective tissue graft. Thicker grafts that were 2 mm or more resulted increased chances of obtaining complete root coverage. Because a limited amount of studies exist that have evaluated advanced gingival recession defects and ways of treating these defects, significantly larger samples are needed to draw conclusions, but based on the findings of preliminary studies have indicated that complete root coverage is possible. Additional research is needed with regard to understanding ways to better improve success rate in treating Miller Class III and Cairo RT2 recession defects.

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