

Benefits of Different Techniques for the Treatment of Miller Class Iii-Iv Recession: A Systematic Review

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Abstract

The final goal of periodontal treatment is to achieve functional and anatomical tissue regeneration. Numerous techniques have illustrated favorable effects on anatomical and functional periodontal regeneration, but long-term results are highly variable. In addition, techniques for closure of class I-II recessions have results up to 100% with high predictability, in contrast to Miller class III-IV recessions, according to the literature.

This systematic review aims to define the different techniques for closure of Miller class III-IV recessions and to identify their characteristics in different clinical situations.

A study of publications in the electronic databases PubMed, Google Scholar and eLIBRARY was performed through a literature review. Articles concerning various techniques for closure of class III-IV recessions were included.

A total of 100 articles were reviewed during the revision process. After analyzing the literature according to the inclusion criteria, the final number of articles had become 46.

The features of the various techniques as well as long-term surgical outcomes were reviewed. Many techniques should be further investigated, due to insufficient clinical data and a few number of cases.

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Introduction

The comprehensive alteration of the mucosal-gingival complex, through exogenous, endogenous and genetic factors, is a key factor in the occurrence of recession.

It has been noted that any trauma of oral tissues can cause gingival recession, but the thin gingival biotype is more prone to recession.¹

Thus, nowadays, a distinction is made between predisposing and causative factors for the occurrence of gingival recession.²

Gingival recession and root exposure can cause such problems as tooth hypersensitivity,

aesthetic disturbances, loss of epithelial attachment, and subgingival caries.³

The aim of the present article is to review methods and results of studies in which authors used different techniques of Miller class III-IV recession closure.

Materials and methods

• Information Sources

This review article was written through a search of suitable data in electronic databases such as Google Scholar, PubMed, and prefatory reference lists.

• Literature search strategy

Search terms included: «recession closure», «techniques of Miller recession closure», «class III-IV recession», «connective tissue graft», «gingival recession», «tunnel technique of recession closure», «sling suturing method».

• Eligibility Criteria

Publications based on the following criteria were included:

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1. Articles dated 1956 and later.
2. Examination of the relevant data on various techniques for closing recessions on maxillary and mandibular recessions of Miller classes III-IV.
3. Reviewing the methods and results of research on the effectiveness of various techniques for closing Miller class III-IV recessions.

The review and analysis of articles was done in a stepwise manner. The first selection criterion was the selection of publications with titles that included at least 1 search term. Further, works dated later than 2000 were excluded. The content of full-text versions of the selected articles was studied at the last stage (Figure 1).

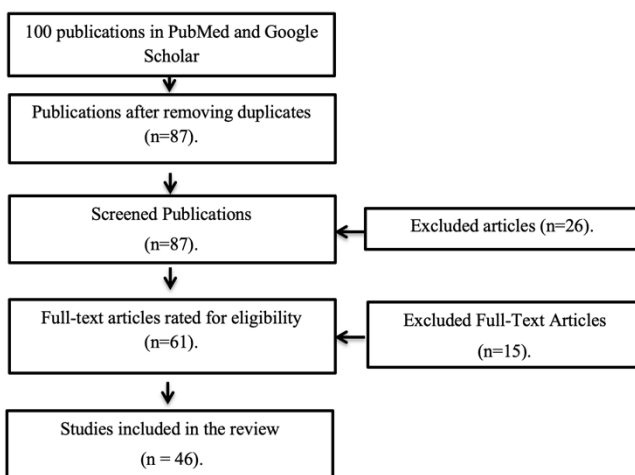


Figure 1. Article selection process.

The 100 identified articles were reviewed by two operators. 34 studies were from PubMed database, 44 - from Google Scholar and 22 - references from the reference list in the retrieved publications. The final number of papers had become 46 after making a selection according to the exclusion criteria. The methods and research results of different recession closure techniques were analyzed in the selected articles. Table 1 shows the characterization of some presented studies.

Discussion

There are a number of techniques for closure of Miller class III-IV recessions, according to the analyzed literature. Allen et al. describe a technique of using a continuous subpapillary loop suture for graft fixation when a tunnel technique is used.^{4,5}

Again, as with the subgingival double continuous loop suture, the subpapillary continuous loop suture captures the edges on the distal side of each tooth and engages the mesial edges. This method of pocket edges and graft connection with a single suture is indicated particularly for areas with shallow recessions and areas for subsequent augmentation. The single suture method can also be used for areas with significant root exposure, but it is essential to keep the graft and pocket margins at the same level. The disadvantages of the single suture method are the possibility of graft misalignment and graft mobility during movement of the pocket muscles.^{6,7,8,9}

Aroca et al. in the study confirmed the key role of the distance between the tip of the papilla and the interdental contact point evaluation in the prediction of the root coverage that can be achieved in the treatment of multiple Class III recession defects.^{10,11,12,13}

The use of a biodegradable matrix barrier has been discussed, in addition to the use of modified graft fixation. The use of a biodegradable matrix barrier has the following advantages: a high degree of predictability, highly aesthetic appearance, single surgical intervention, shortened duration of surgical intervention, increased amount of keratinizing tissue, and the possibility of new attachment zone regeneration. The disadvantages of this technique are contraindication in areas with insufficient vestibular depth and longer healing time.¹⁴⁻¹⁹

Surgical technique with the use of a subepithelial connective tissue graft can help to reconstruct the lost interdental papilla. The reconstructed papilla has been maintained stable, without signs of clinical inflammation for 4 years after surgery. The results of the studies suggest that the combination of graft and EMD results mainly in adhesion between the graft and the root surface. In some cases, there may be a certain periodontal regeneration.²⁰⁻²⁴

The analysis of published studies shows that the resorption is a late complication, usually 1 year after treatment, and therefore time is an important factor to consider. Doctor cannot predict future evolution when early assessments of resorption are performed. It is assumed that root conditioning with tetracycline probably causes root resorption in long-term studies. Therefore, the clinician should consider this in

the design of the treatment plan.²⁵⁻²⁹

The treatment of Miller class III gingival recession is considered to be a challenging task in periodontal practice, and among the various methods used, autogenous connective tissue graft has shown the most favorable results. More than one procedure may be required in some cases. In some clinical cases, authors described the simultaneous use of a combination of three techniques (tunnel technique, connective tissue graft and laterally placed flap) to treat Miller class III gingival recession localized in the lower anterior region. Twelve months after the surgical interventions, partial root coverage, favorable aesthetic results and increased clinical attachment were observed, without periodontal pockets or bleeding on probing.³⁰⁻⁴⁶

GUT can be a predictable surgical procedure for the treatment of Miller class III gingival recession. While it is a simple and less invasive method, it has been shown that factors such as proper plaque control, biocompatibility of

the root surface, careful surgical manipulation, and tissue thickness can affect the outcome of the grafting procedure.

Conclusions

Numerous methods of recession closure were analyzed in this systematic review. The conclusions regarding the acceptability of different techniques in relation to different classes of defects were summarized in a table. The features of the different techniques as well as the long-term results of the surgeries were reviewed.

Many techniques should be further investigated, due to insufficient clinical data and cases.

Declaration of Interest

The authors report no conflict of interest.

Reference	Technique	Conclusion
King and Pennel's free graft series: a defining moment revisited [4]	Connective tissue graft	This method has advantages over the traditional free gingival graft method due to significantly superior clinical and aesthetic results.
Subpapillary continuous sling suturing method for soft tissue grafting with the tunneling technique [5]	Method of subpapillary continuous sling suturing method for graft fixation by using the Tunnel technique	It is a simplified method of fixing the allograft inside the tunnel and bringing the edges of the pocket closer together through a single suture. This method requires less time and only one knot, which is more comfortable for the patient and the sutures are less visible during the healing period.
Treatment of class III multiple gingival recessions: a randomized-clinical trial [10]	Combination of a modified tunnel technique with a connective tissue graft (CTG) and an enamel matrix derivative (EMD)	One-year results show that this technique is successful in treating Class III recessions, but EMD has no effect on average clinical outcomes.
The use of a bioabsorbable barrier for regenerative management of marginal tissue recession. I. Report of 100 consecutively treated teeth [14]	Coronary displacement flap technique with biodegradable matrix barrier	Favorable outcome with a properly selected clinical case
Histological evaluation of 4 cases of root coverage following a connective tissue graft combined with an enamel matrix derivative preparation [20]	Combination of connective tissue graft (CT) and enamel matrix preparation (EMD)	All operated cases had a favorable outcome
Progressive root resorption associated with the treatment of deep gingival recession. A clinical case [25]	The double pedicle graft technique (subepithelial connective tissue), root treatment with tetracycline solution	The cheek recession was closed with a connective tissue graft and treated with tetracycline solution. Resorption appeared again 20 months after treatment.
Clinical evaluation of a porcine acellular dermal matrix for the treatment of multiple adjacent class I, II, and III gingival recessions using the modified coronally advanced tunnel technique [30]	Modified coronal dilated tunnel technique (MCAT) combined with PADM	Results show that this technique can be successfully used to close Miller class I, II, and III recessions.
Simultaneous application of combination of three surgical techniques for treatment of gingival recession: a case report [35]	tunnel method, subepithelial connective tissue graft (SCTG) laterally positioned flap	A combination of techniques (tunnel technique, SCTG and lateral flap placement) was found to be the best method of treatment
Management of Miller's class III recession defect with gingival unit transfer-a promising technique [40]	GUT technique, connective tissue graft	GUT may be a predictable surgical procedure for the treatment of Miller class III gingival recession. Although this method is simple and minimally invasive, it has been shown that factors such as proper plaque control, biocompatibility of the root surface, careful surgical manipulation, and tissue thickness can affect the outcome of the grafting procedure.

Table 1. Characteristics of the studies included in the review.

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