

## Treatment of Multiple Gingival Recessions in Maxilla and Mandible: a Case Report

### Tratamento de Recessões Gengivais Múltiplas em Maxila e Mandíbula: um Relato de Caso

Pedro Paulo de Almeida Dantas<sup>a</sup>; Leonardo Stephan Caporossi<sup>b</sup>; Giana da Silveira Lima<sup>c</sup>; Francisco Wilker Mustafa Gomes Muniz<sup>d</sup>

<sup>a</sup>Universidade Federal de Pelotas, School of Dentistry, RS, Brazil.

<sup>b</sup>Centro Universitário Univag, School of Dentistry, MS, Brazil.

<sup>c</sup>Universidade Federal de Pelotas, School of Dentistry, Graduate Program in Dentistry, Department of Restorative Dentistry, RS, Brazil.

<sup>d</sup>Universidade Federal de Pelotas, School of Dentistry, Department of Periodontology, RS, Brazil.

\*E-mail: wilkermustafa@gmail.com

#### Abstract

This study aimed to report a treatment of multiple gingival recession in a 43-year-old female patient. After clinical and tomographic evaluation, Miller's class I and II (or Cairo RT1) gingival recessions were observed in several teeth of maxilla and mandible. Non-cariou cervical lesions, poorly adapted crowns and unbalanced occlusion were also diagnosed, with the absence of canine guides. A thin gingival phenotype was also found. Orthodontic treatment was not performed, as a thin vestibular bone wall in the mandible was detected. Therefore, correction of the occlusion was performed by means of selective wear on cusps of the posterior teeth to relieve premature contacts. For root coverage, tunneling technique was used in the first, second and fourth sextants. In the fifth sextant, full covering occurred only after a second surgery. A third surgery was performed in the fourth quadrant, and the modified Bruno technique was chosen. The donor region was the palate in all the procedures. The two techniques employed reached up to 100% root coverage in all areas that received the surgery. The patient was satisfied with the final result. It was concluded that complete root coverage is possible when using tunneling technique in patients without interproximal bone loss.

**Keywords:** Gingival Recession. Periodontics. Gingival Retraction Techniques.

#### Resumo

*Esse estudo objetivou reportar um tratamento de recessões gengivais múltiplas em uma paciente do sexo feminino de 43 anos. Após avaliação clínica e tomográfica, recessões gengivais classe I e II de Miller (ou RT1 de Cairo) foram observadas em diversos dentes da maxila e mandíbula. Lesões cervicais não cariosas, coroas mal adaptadas e oclusão desbalanceada também foram diagnosticadas, com ausência de guias caninas. Um fenótipo gengival fino foi observado. Tratamento ortodôntico não foi realizado, pois uma parede óssea vestibular fina na mandíbula foi detectada. Portanto, correção da oclusão foi realizada com desgastes seletivos de cúspides dos dentes posteriores para avaliar os contatos prematuros. Para o recobrimento radicular, técnica de tunelização foi utilizada no primeiro, segundo e quarto sextantes. No sexto sextante, recobrimento completo foi conseguido apenas após a segunda cirurgia. Uma terceira cirurgia foi realizada no quarto quadrante, e a técnica modificada de Bruno foi escolhida. O palato foi a região doadora em todos os procedimentos. As duas técnicas cirúrgicas empregadas chegaram até a 100% de recobrimento radicular em todas as áreas que receberam a cirurgia. A paciente ficou satisfeita com o resultado final. Foi concluído que o recobrimento radicular completo é possível quando se utiliza a técnica da tunelização em pacientes sem perda óssea interproximal.*

**Palavras-chave:** Retração Gengival. Periodontia. Técnicas de Retração Gengival.

#### 1 Introduction

Gingival recession is an apical displacement of a gingival margin concerning the cemento-enamel junction (CEJ), causing insertion loss and root exposure<sup>1,2</sup>. This condition has a high prevalence,<sup>3,4</sup> can affect most adult population<sup>5</sup> and is frequently associated with dentin hypersensitivity, root caries, cervical abrasion in the root, difficulty in biofilm control and aesthetic complains<sup>2</sup>. Gingival recessions can be localized, when only one tooth is affected, or generalized, when multiple dental elements are affected<sup>6</sup>. It is worth mentioning that such defects are not only limited to soft tissue and may be associated with bone loss<sup>1,6</sup>.

Moreover, gingival recession has a multifactorial etiology,<sup>7</sup> which can be associated with local anatomic factors,<sup>6</sup> such as alveolar bone thickness,<sup>8</sup> dehiscence,<sup>9</sup> thin gingival biotype,<sup>10</sup>

poorly positioned teeth,<sup>11</sup> muscular insertion presence (lip frenulum)<sup>9, 11</sup> and inadequate keratinized gingiva band.<sup>12</sup> Moreover, reduction of buccal bone plate thickness,<sup>13</sup> factors related to periodontal disease, such as plaque accumulation<sup>14</sup> and poorly adapted dental restorations or prostheses, invading supracrestal structures,<sup>15</sup> are also etiological factors of gingival recession. Continuous traumatic factors, such as oral cavity piercings,<sup>7</sup> brushing with inadequate technique and strength<sup>6,16</sup> and trauma by occlusion defects<sup>16</sup> also are part of the multiple etiological factors of this clinical condition.

Miller's classification (1985)<sup>1</sup> is used to define the case prognosis and assist the professional in the choice of the best surgical technique, presenting the best predictability for classes I and II without bone or soft tissue loss in the interproximal region. Similarly, according to the Cairo's

classification<sup>17</sup>, these defects of Recession Type 1 (RT1) are those which the gingival recession when there is no loss of interproximal attachment. Many different techniques for root covering are reported in the literature,<sup>18</sup> among the main techniques are pedicle flap, coronally positioned flap, such as in modified Bruno technique,<sup>19</sup> laterally positioned flap, associated or not with subepithelial connective tissue grafts, in addition to surgeries without opening flap, such as tunneling technique<sup>20</sup>. Therefore, the present study aimed to report a case of multiple gingival recession coverage in the maxilla and mandible.

## 2 Case Report

A 43 years-old female patient sought the dental office reporting dentin hypersensitivity due to root exposure caused by gingival recession. This case report was approved by the Ethics Committee of the School of Dentistry – Federal University of Pelotas (protocol # 6.297.519). Patient reported having already undergone three surgeries in order to cover the defect, but without success. Patient did not complain about esthetical damage. It was also reported no systemic impairment, no use of medications and no exposure to smoking.

During intraoral clinical examination, gingival recession, classified as Miller class I or Cario's RT1, were found in dental elements 12, 13, 32, 33, 42, 43, 44, 45 (Figure 1). Miller class II or Cario's RT1 gingival recession in teeth 31 and 41 (Figure 1). Plaque Index and Gingival Index was evaluated. The patient showed several sites with visible supragingival biofilm (64%). However, no sites show bleeding on probing. Supragingival care was performed with oral hygiene instructions. Non-carious cervical lesions of the type abfraction in element 34 and possible corrosion in element 44 (Figure 1) were found. In addition, poorly adapted crowns (Figure 1) and unbalanced occlusion (Figure 2), with absence of canine guide, were observed. Disocclusion occurred in the upper side lateral incisor tooth.

**Figure 1** - Gingival recessions Miller class I/Cairo's RT1 in elements 12, 13, 32, 33, 43, 44 and 45; Gingival recessions Miller class II/Cairo's RT1 in elements 31 and 41; Non-carious cervical lesion in element 34 and possible corrosion in element 44; Poorly adapted crowns



Source: the authors.

**Figure 2** - Unbalanced occlusion detected at the first appointment



Source: the authors.

After initial exams and supragingival care, the patient was referred to an orthodontist in order to verify possible occlusal correction with orthodontic movement, but this treatment modality was not possible due to a small amount of bone in the mandibular buccal wall (Figure 3). Furthermore, the patient was diagnosed suffering from stress and reported bruxism, due to the great amount of wear on posterior cuspid tips associated with muscle fatigue in the masseter muscle.

**Figure 3** - Small amount of bone in the mandibular buccal wall, which did not allow orthodontic treatment



Source: the authors.

To diagnostic assessment, the auxiliary exam used was computerized tomography, to check the dental positioning in arches and possibility the orthodontic treatment. The impossibility of orthodontic treatment was diagnosed, which led to the use of another strategy and gingival recessions were classified as Miller's class I and II or Cario's RT1.

In order to start root coverage treatment, etiological factors were removed. In this case, malocclusion associated with thin

phenotype were corrected. Class V lesion was diagnosed as result of hard force of brushing. Facial muscle hyperactivity, caused bruxism. In this sense, canine guide was reestablished with nanoparticulate composite resin Filtek Z350XT, A2B (3M ESPE) and selective wear in those teeth with greater chewing load. Botulinum toxin was used for dental clenching and in order to diminish bruxism consequences. In this case, masseter and temporal muscles was sensibilized with intramuscular injection of Botox® (Allergan, Dublin, Ireland). For temporal muscle, 10 IU was applied, and for masseter muscle, 20 IU was used, bilateral for both muscles. After these procedures, the patient was dismissed until she felt greater masticatory comfort.

After removing these etiological factors, it was possible to perform root coverage. Initially, the procedure was performed in lower region, elements 32 to 42. Prior the surgery, intraoral antiseptis was performed with 0.2% chlorhexidine digluconate for one minute and local anesthesia was used with anesthetic based on 2% mepivacaine hydrochloride with Epinefrine 1:100.000 (DFL Ind. E Com. Ltda., Rio de Janeiro, Brazil). In this region, connective tissue graft was performed, using the tunneling and coronal repositioning technique. The procedure was initiated with preparation of the recipient site through intrasulcular incision with micro blade (Surgistar, CA, USA) from the gingival margin apically towards the alveolar mucosa and laterally towards the middle third of the buccal surfaces of the adjacent teeth, extending the flap to the base of proximal papillae, tunneling to gain flap elasticity in order to bring it to coronal level. After that, root preparation was carried out with scraping and smoothing with mini-five 5-6 curettes. The site was washed with saline solution to remove any fragment, the root was conditioned with EDTA for two minutes, washed again with saline solution and EmdoGain was applied (Straumann Brasil, São Paulo, SP).

Before root preparation, a connective graft was collected from palate, using extraoral desepitalization technique, using a 15C scalpel blade (Swann Morton, Sheffield, United Kingdom). Afterwards, a connective tissue thickness ranging between 1mm to 1.5mm was achieved. Graft was then immersed in saline solution. The graft was placed in teeth 32 to 42 (Figure 4) and then sutures (RESOLON®, Resorba, Nuremberg, Germany) were performed. The donor area also received compression in 'X' sutures. Subepithelial insertion of connective tissue was performed, with sutures of the gingiva of the tunneled regions and at the ends of graft. To stabilize the recipient area, sutures were made to approach the flap edges and total graft coverage, leaving it completely subepithelial (Figure 5).

**Figure 4** - Connective tissue graft placed in teeth 32 to 42



Source: the authors.

**Figure 5** - Graft stabilized in recipient area, sutures were made to approach the flap edges with the intention of recovery of a total root coverage.



Source: the authors.

Three months later, the second procedure was performed on teeth 12 and 13, using the same surgical technique as previously reported. The difference between the two procedures was the final suture, which in this case was performed with anchoring in a composite resin button fixed in the vestibular region to help in the flap coronally position.

The third procedure was performed in the fourth quadrant, three months after the second procedure. In this stage, the modified Bruno's technique was used, with partial and total displacement of the flap, using a subepithelial connective tissue graft. Therefore, after the preoperative step, the surgery started with the design of horizontal incisions, preserving papillae, and intrasulcular incisions in the teeth that have gingival recession. A partial-thickness flap is raised up above the mucous-gingival line to give elasticity to the tissue. The mesiodistal length of the incision was extended to provide easy access to the root. Root preparation was previously described. After collecting the connective tissue graft from the palate, it was placed in the flap from the recipient area. This flap was brought coronally with the aid of simple sutures attached to the papillae, leaving the graft completely subepithelial.

The fourth surgical step was a reintervention in region 32 to 42, which occurred five months after the third procedure. Patients agreed with this intervention in order to increase the percentage of root coverage, as up to this moment, a root coverage of approximately 60% was observed (Figure 6). The technique performed was the tunneled conjunctive graft, following the step-by-step described above.



**Figure 6** - Post operatory of first surgery with approximately 60% of root coverage



Source: the authors.

When considering all the surgical procedures, sutures of the donor region (palate) were removed after six to seven days, and sutures from the recipient beds were removed after 12 to 14 days. Regarding the postoperative recommendations, after each procedure, analgesic and anti-inflammatory drugs were prescribed to control pain (750 mg paracetamol, every eight hours, for four days and 100mg nimesulide, every twelve hours for three days). Use of 0.12% chlorhexidine digluconate was prescribed twice a day for 14 days. Returns were also scheduled at intervals of three to four days in order to clean and observe the surgical areas until the sutures were removed.

In the second procedure (teeth 12 and 13), after seven months, root coverage was observed around 95% (Figure 7). The third procedure brought coverage of 90%. In the fourth procedure, the region from tooth 32 to 42, a 95% of root coverage was obtained. After 1 year of follow-up since the first surgery was performed, the patient reported dentin absence of dentin hypersensitivity and satisfaction with the results achieved (Figure 8).

**Figure 7** - Post operatory of second surgery with around 95% of root coverage



Source: the authors.

**Figure 8** - Final result in 1 year of follow-up



Source: the authors.

The present study aimed to report a case of root coverage of multiple gingival recessions. Overall, a good percent of root coverage, using different techniques, was obtained. Gingival recession is a highly prevalent gingival condition,<sup>3,4</sup> which is detected also in individuals with a high standard of oral hygiene<sup>3</sup>. In the present case, her main complaint was dentin hypersensitivity associated with these multiple recessions. Bruxism was diagnosed based on muscle fatigue of the masseter and wear at the tip of posterior cusps. Gingival recessions were diagnosed as Miller's class I and II or Cairo's RT1<sup>17</sup>. The main etiological factors found were malocclusion and thin gingival phenotype, which are classic etiological factors<sup>10,13,16</sup>. Therefore, the planning for the partial and total covering of these recessions was approved by the patient, within the limitations of the techniques chosen for each region.

Many studies have supported all the performed techniques in the present case report, however, they fail to demonstrate superiority of one technique over another<sup>18</sup>. In this case, clinical experience must be considered when deciding the best technique for root coverage, taking into account other factors, such as the size of the defect, based on the Miller or Cairo classification, location and number of the gingival recessions, depth of the vestibule, amount of keratinized gingiva and gingival phenotype<sup>18</sup>.

Tunneling technique, associated with the connective tissue graft, was originally described as a modification of the supraperiosteal envelope technique<sup>20</sup> and has a good number of reports in the literature, which provides good predictability for the technique<sup>6, 21</sup>. Among the advantages of the technique are the absence of scars, making it ideal for aesthetic zones<sup>6</sup>. However, it can be considered a sensitive technique and require greater operator specialization<sup>21</sup>. The choice of microsurgical instruments also supports the minimum trauma in the region, better vascularization and higher healing capacity<sup>22</sup>. Despite being a sensitive technique, it can be considered a predictable option for root coverage of Miller's class I and II gingival recession<sup>21</sup>.

Bruno's technique was originally described in 1994, as a coronally positioned flap technique<sup>19</sup> and later had its design modified to preserve the papillae. The technique was performed with partial and total flap survey. Partial flap was associated with a lower risk of bone resorption adjacent to the flap,<sup>23</sup> as it does not involve the detachment of the periosteum, being more indicated for some critical regions, such as aesthetic areas. Despite this, in clinical studies, no significant differences were found when considering an average reduction in the vertical recession, recession width or probing depth<sup>24</sup>.

Selection and harvesting technique of the material used as a graft is also fundamental for the success of the surgery. The connective graft, such as used in the present case, was considered superior to tissue substitutes, including acellular dermal matrix grafts and guided tissue regeneration with resorbable membranes, taking into consideration significant root coverage, clinical adhesion and gain of keratinized

tissue<sup>25</sup>. In this sense, a connective tissue graft is considered the “gold standard” in treatment of gingival recessions<sup>25</sup>. In addition, the technique used to harvest the graft is equally important for the success and longevity of the treatment. In the present case report, the extraoral de-epithelization was used. When taking into account other alternatives from donor areas, tuberosity is an option, however, the graft harvested from palate has greater vascularization, especially closer to the epithelium<sup>26</sup>. Regarding that, the graft harvested from the palate may bring less patient morbidity and better tissue aesthetics<sup>25</sup>. The technique of extraoral de-epithelization is well established in the literature, which may provide a better quality of graft, leading to less contraction of connective tissue and change in the gingival biotype, making the result more stable in the long term<sup>25, 27</sup>. However, the literature lacks of a direct comparison between intra and extraoral de-epithelization.

The control of bruxism was performed with the application of intramuscular botulinum toxin type A, 10 IU in the temporalis muscle and 20 IU in the masseter muscle, bilaterally. Recent literature has demonstrated a good basis for the use of botulinum toxin in the daily clinic for the reduction of muscle pain, frequency of bruxism episodes and occlusal strength<sup>28</sup>. Moreover, treatment with botulinum toxin can be considered safe, as the doses used to neutralize facial muscles are unlikely to have adverse effects on the patient’s health. Adverse effects are commonly reported in applications of doses higher than 100 UI. However, it must be highlighted that other treatment modalities may be necessary in order to treat bruxism, considering that long-term clinical trials on botulinum toxin alone are scarce in the literature.

Regarding the patient’s perception, in the last appointment, no discomfort was reported and absence of dentine hypersensitive was noticed. In fact, the patient also reported being pleased with the root coverage.

### 3 Conclusion

Although challenging, the present case shows that it is possible to completely cover class I and II lesions of Miller or RT1 of Cairo, when there is no interproximal bone loss, allowing to reach patient’s expectations and eliminate the pain caused by root exposure.

### Acknowledgements

The authors report no conflict of interest related to this study. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001. All other funding was self-supported by the authors.

### References

1. Miller PD Jr. A classification of marginal tissue recession. *Int J Periodontics Restorative Dent* 1985;5(2):8-13.

2. Kassab MM, Cohen RE. The etiology and prevalence of gingival recession. *J Am Dent Assoc* 2003;134(2):220-5.
3. Albandar JM, Kingman A. Gingival recession, gingival bleeding, and dental calculus in adults 30 years of age and older in the United States, 1988-1994. *J Periodontol* 1999;70(1):30-43.
4. Susin C, Haas AN, Oppermann RV et al. Gingival recession: epidemiology and risk indicators in a representative urban Brazilian population. *J Periodontol* 2004;75(10):1377-86.
5. Richmond S, Chestnutt I, Shennan J et al. The relationship of medical and dental factors to perceived general and dental health. *Community Dent Oral Epidemiol* 2007;35(2):89-97.
6. Saadoun AP. Current trends in gingival recession coverage-part I: the tunnel connective tissue graft. *Pract Proced Aesthet Dent* 2006;18(7):433-8.
7. Chambrone L, Chambrone LA. Gingival recessions caused by lip piercing: case report. *J Can Dent Assoc* 2003;69(8):505-8.
8. Gorman WJ. Prevalence and etiology of gingival recession. *J Periodontol* 1967;38(4):316-22.
9. Bernimoulin J, Curilović Z. Gingival recession and tooth mobility. *J Clin Periodontol* 1977;4(2):107-14.
10. Cortellini P, Bissada NF. Mucogingival conditions in the natural dentition: Narrative review, case definitions, and diagnostic considerations. *J Periodontol* 2018;89:204-13.
11. Stoner JE, Mazdyasna S. Gingival recession in the lower incisor region of 15-year-old subjects. *J Periodontol* 1980;51(2):74-6.
12. Chambrone L, Tatakis DN. Periodontal soft tissue root coverage procedures: a systematic review from the AAP Regeneration Workshop. *J Periodontol* 2015;86:8-51.
13. Wennström JL, Lindhe J, Sinclair F et al. Some periodontal tissue reactions to orthodontic tooth movement in monkeys. *J Clin Periodontol* 1987;14(3):121-9.
14. Løe H, Ånerud Å, Boysen H. The Natural History of Periodontal Disease in Man: Prevalence, Severity, and Extent of Gingival Recession. *J Periodontol* 1992;63(6):489-95.
15. Parma-Benfenali S, Fugazzoto PA, Ruben MP. The effect of restorative margins on the postsurgical development and nature of the periodontium. Part I. *Int J Periodontics Restorative Dent* 1985;5(6):30-51.
16. Miller N, Penaud J, Ambrosini P et al. Analysis of etiologic factors and periodontal conditions involved with 309 abfraction. *J Clin Periodontol* 2003;30(9):828-32.
17. Cairo F, Nieri M, Cincinelli S et al. The interproximal clinical attachment level to classify gingival recessions and predict root coverage outcomes: an explorative and reliability study. *J Clin Periodontol* 2011;38(7):661-6.
18. Rocuzzo M, Bunino M, Needleman I et al. Periodontal plastic surgery for treatment of localized gingival recessions: a systematic review. *J Clin Periodontol* 2002;29:178-94.
19. Bruno JF. Connective tissue graft technique assuring wide root coverage. *Int J Periodontics Restorative Dent* 1994;14(2):126-37.
20. Allen AL. Use of the supraperiosteal envelope in soft tissue grafting for root coverage. I. Rationale and technique. *Int J Periodontics Restorative Dent* 1994;14(3):216-27.
21. Ribeiro FS, Zandim DL, Pontes AE. Tunnel technique with a surgical maneuver to increase the graft extension: case report with a 3-year follow-up. *J Periodontol* 2008;79(4):753-8.

22. Burkhardt R, Lang NP. Coverage of localized gingival recessions: comparison of micro- and microsurgical techniques. *J Clin Periodontol* 2005;32(3):287-93.
23. Fickl S, Kerschull M, Schupbach P, Zühr O, Schlagenhaut U and Hürzeler MB. Bone loss after full-thickness and partial-thickness flap elevation. *J Clin Periodontol* 2011;38(2):157-62.
24. Ranjbari A, Gholami GA, Amid R, Kadkhodazadeh M, Youssefi N, Mehdizadeh AR and Aghaloo M. Clinical Comparison of Full and Partial Double Pedicle Flaps with Connective Tissue Grafts for Treatment of Gingival Recession. *J Dent (Shiraz)* 2016;17(30):193-200.
25. Tatakis DN and Trombelli L. Gingival recession treatment: guided tissue regeneration with bioabsorbable membrane versus connective tissue graft. *J Periodontol* 2000;71(2):299-307.
26. Chambrone L and Pini Prato GP. Clinical insights about the evolution of root coverage procedures: The flap, the graft, and the surgery. *J Periodontol* 2019;90(1):9-15.
27. Chambrone L and Tatakis DN Long-Term Outcomes of Untreated Buccal Gingival Recessions: A Systematic Review and Meta-Analysis. *J Periodontol* 2016;87(7):796-808.
28. Fernández-Núñez T, Amghar-Maach S and Gay-Escoda C. Efficacy of botulinum toxin in the treatment of bruxism: Systematic review. *Med Oral Patol Oral Cir Bucal* 2019;24(4):e416-24.