

Vertically Coronally Advanced Flap with Connective Tissue Graft for Treatment of Single Miller's Class II Recession Defect in the Anterior Zone of Mandibula: A Case Report

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Abstract: *Gingival recessions disturb patients aesthetically and are sometimes accompanied by increased sensitivity and an increased risk of developing caries and plaque-induced gingival inflammation in this area. The indications for treatment of gingival recessions in the frontal area of the dentition can be except aesthetic dissatisfaction for the patients, also plaque retention and dentin hypersensitivity. In dental practice there are two main groups of surgical techniques for treatment of the exposed root surface - pedicle and free soft-tissue grafting methods. When there is no enough keratinized tissues apical to the root exposure, the most popular technique that is proposed is coronally advanced flap with connective tissue graft. The literature review reports that this technique shows good results in treatment of Miller's class I and class II gingival recessions. The aim of this case report is to present the efficiency of bilaminar technique (subepithelial connective tissue graft and vertically coronally advanced flap) for root coverage in treatment of Miller's class II gingival recession, affecting tooth 31, in mandibular anterior region. The presented surgical technique shows satisfactory aesthetic outcome and satisfactory gain of clinical attachment level and keratinized attached gingiva. The dentin hypersensitivity in the cervical area is reduced postsurgically.*

Keywords: recession defect, Miller class II, coronally advanced flap, root coverage

1. Introduction

Gingival recessions (GRs) at the anterior teeth can be unsatisfactory condition for patients who can complain by crown lengthening, dentin hypersensitivity and plaque retention accompanying by gingival inflammation. The aim of mucogingival surgery in treatment of such GRs is a complete root coverage and satisfaction of patient's aesthetic demands - the soft tissues post-healing should be indistinguishable from the adjacent soft tissues in color, thickness and surface texture [1].

The aim of this case report is to present the augmentation of gingival thickness and the improvement of the quality of attachment in the part of the root exposure in treatment of single Miller's class II GR, using vertically coronally advanced flap (CAF) in the anterior zone of the mandibula.

2. Literature Survey

One of the etiologic factors for isolated GRs in mandibular frontal area is as a result of post-orthodontic treatment [2,3]. It is considered that reason of such GR is probably due to repeated mechanical trauma and creating a torquing movement around the orthodontic wire. Occlusally such tooth is in ideal position but its angulation is completely different of the adjacent teeth, due to the apex of the tooth is tilted in vestibular position and this leads to greater buccal bone dehiscence. Clinically usually there is a deep recession defect with bright red tissue lateral to the root exposure [4].

Over the years different surgical techniques are proposed for treatment of GRs – lateral sliding flap, coronally advanced flap, double papilla flap, semilunar flap, bilaminar technique

[5, 6, 7]. There are two types of the design of CAF: trapezoidal flap and triangular flap [8]. The triangular variant is the technique of choice for patients with high aesthetic demands [9].

Trapezoidal CAF with releasing incisions is the technique of choice for treatment of isolated recessions if there is a presence at least 1 mm keratinized gingival tissues apically or 2 mm for recessions ≥ 5 mm, absence of severe mal position or root prominence. A connective free tissue graft with a CAF (bilaminar technique) is indicated in a case of insufficient keratinized tissue apical and lateral to the exposed root surface. So that when there is enough width of keratinized gingival tissues apically to the gingival recession (more than 2 mm), a CAF alone is recommended [5,6,7,10]. On the other hand when there are insufficient keratinized gingival tissues apically to the gingival recession, a bilaminar technique with a free gingival connective tissue graft is planned [11-13].

Due to the presence of the very short interdental papillae and very shallow vestibule, treatment of GRs at the lower incisors is much more challenging in respect of the treatment in upper jaw [14]. When there is a lack of keratinized tissues apically to the exposed root surface, it is necessary to establish whether there is traction from muscle insertions or frenula near by the gingival margin. It is also important the depth of the vestibule to be assessed in advanced. In these cases of GRs in lower incisors the technique of choice is the so called trapezoidal vertically CAF plus connective tissue graft [15]. The vertically coronally advanced flap technique shows good healing results in treatment of class II and class III Miller gingival recessions in lower jaw and has good predictability for root coverage [12,13,16].

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In cases when there is no interproximal clinical attachment level (CAL) loss and interdental alveolar bone loss (Miller class I and II) full root coverage is possible. When there is a severe interproximal CAL loss and bone loss (Miller Class IV) is not possible to cover the exposed root surface [17]. Different studies of treatment success with bilaminar technique reported for complete root coverage from 42% to 89% [18-20].

3. Methods

This case report describes the treatment of isolated-type recession defect buccally in the left lower central incisor in post-orthodontic patient, using a subepithelial connective tissue graft and vertically CAF [15, 21].

A patient is a 19years old female, non-smoker, no systemic diseases, no medicaments intake. She complains of hypersensitivity and aesthetic dissatisfaction in region of left lower incisor due to the excessive crown length (pic.1). A medical history and periodontal status (probing depth, recession depth and width, CAL, height of keratinized gingiva) were recorded.

Miller's class II GR, affecting tooth #31 is registered. The depth of GR (distance from CEJ to the gingival margin) is 5 mm and the width is about 3 mm. There is an insufficient keratinized gingival tissues apically to the GR. The probing depth at the left lower incisor is 1mm and the clinical attachment level on vestibular surface is 6 mm(pic.2). No mobility of lower left incisor is established. The radiographic assessment reveals no interdental alveolar bone loss medially and distally to the lower left central incisor (pic.3).



Pic.1: Miller's Class II recession defect in the mandibular anterior region (initial status)



Pic.2: Preoperative view



Pic.3: Radiographic view of regio (41,31)

After the examination, oral hygiene instructions are given to the patient and motivation for adequate personal oral hygiene is done. The deposits of dental plaque and calculus are removed by ultrasonic scaling and the dental hard tissues are polished with a rubber cup and low abrasive prophylaxis paste.

Mucogingival surgery therapy is required. The area planned for surgery must be free both by dental plaque and bleeding on light probing - plaque index of O'Leary (<10%) and gingival index of Ainamo&Bay also below 10%.

An informed consent is signed by the patient before the surgical procedure.

Due to absence of keratinized gingival tissues apically to the mucogingival defect of tooth #31 and the minimal thickness of marginal gingival tissues (less than 1 mm thickness) a subepithelial connective tissue graft and vertically CAF are proposed as a choice of root coverage technique [15]. Atrapezoidal design of the flap is performed [14].

After local anesthesia, the technique is initiated with two horizontal incisions in the keratinized gingiva in the base of neighboring interdental papillae near to the anatomical papilla tips. An intrasulcular incision is also done. Two diverging oblique vertical incisions run parallel and extend only to the mucogingival line for better blood control in splitting of surgical papillae. The surgical papillae are elevated split-thickness with a microblade held parallel to the root surface. After that the vertical incisions are extended a little bit in the alveolar mucosa. The flap is elevated in split-thickness with deep vertical incision parallel to the bone until 5 mm of the periosteum apically to bone dehiscence is exposed and the periosteum is free of any muscle attachments. The both vertical incisions are increased in length into the alveolar mucosa. A second very horizontally orientated superficial incision in a split-thickness is done to detach a part of the muscle of the inner surface of the alveolar mucosa and to permit the coronal advancement of the flap. This incision is parallel to the lower lip so that the flap is isolated from muscles of the lip. This part of the muscle tissue between the both incisions that is detached previously from the periosteum and the mucosa, must be removed with deep incision perpendicular to the bone.

Root planing of the exposed root surface is performed with Mini-Five Gracey 5/6 periodontal curette but only of that part of the exposed root surface where clinical attachment has been lost. The healthy radicular cementum in area of anatomical bone dehiscence must be avoided due to damaging of the connective tissue fibers inserting into the intact cementum in this zone. In this cases slightly more aggressive root planning is indicated to reduce the natural buccal convexity.

The facial portion of the anatomical papillae is deepithelialized with surgical blade and microsurgical scissors, to allow the replacement of the flap margin coronal to the CEJ and suturing the surgical papillae to the connective tissue beds in the anatomical papillae regions.

In mucogingival surgery for many years are used different acid agents for conditioning of the exposed root surface (EDTA, citric acid, etc) [22,23]. Their function is to remove the smear layer and to expose the collagen fibers in the dentine tubules, allowing the adhesion of blot clot to the root surface [22]. After debridement, a chemical conditioning is done with EDTA gel 24%, applied over the root surface and left for 2 minutes. The root surface after that is rinsed abundantly with sterile saline solution for a minute. Enamel matrix derivatives gel (Emdogain, Straumann®) is applied to the root surface after that. This layer of proteins leads to attraction of clot cells that are transformed in cementoblasts, fibroblasts and osteoblasts. Its purpose is to improve attachment quality between the exposed root surface and the soft tissues [24].

After local anesthesia and measuring the primary thickness of palatal mucosa a full-thickness autograft is taken from the palatal mucosa in the area of first and second molar with dimensions equal to the width of gingival recession plus 6 mm for the recipient adjacent beds and height apicocoronally at least 4-5 mm. The inner aspect of the autograft is inspected for any fatty and glandular tissue and the outer site is deepithelialized with the surgical blade. The thickness of the graft is preferred to be approximately 0,7-0,8 mm.

The deepithelialized connective tissue autograft is placed at the level of CEJ of the lower left central incisor and sutured with andresorbable PGA7/0 surgical suturesto the adjacent connective tissues bed of deepithelialized anatomical papillae.(pic.4)



Pic.4: Suturing of connective tissue graft in the recipient bed

Suturing of the flap starts with sling suture that compress the surgical papillae against to the corresponding anatomical ones and ensures that marginal gingival tissues of the flap fit tightly to the facial surface of the tooth crown [19]. After that the releasing incisions are sutured with interrupted sutures from apically to coronally and the first sutures from medially and distally are anchored to the periosteum. The final suture is again a sling suture without any tension for precise fit of the keratinized tissues of the buccal flap in this zone. Resorbable PGA 6/0 sutures with 11 mm long needle are used for this reason (pic.5).



Pic.5 Suturing of the covering flap

A part of collagen graft material with the same size is applied over the wound palatal area and sutured with mattress suture from distal to mesial to compress the wound and control the bleeding, and to reduce the postoperative pain in this zone.

Postoperatively achemical plaque control with chlorhexidine-based 0,12% mouth rinse solution (GUM Paroex® 0,12% CHX) was prescribed to the patient for 1 minute, 2-3 times per day for 2 weeks. The patient was informed to avoid tooth brushing and flossing in the area of surgical manipulation(pic.6).



Pic.6 Sutures removal (14 days after surgical manipulation)

The sutures are removed 2 weeks later (pic.6). She was instructed to resume brushing with an ultrasoft bristle postoperative toothbrush (GUM Delicate®) with non-traumatic vertical apico-coronal modified Stillman technique. The chemical control is continued for further 2 weeks with 0,06% CHX solution (GUM Paroex® 0,06%). After first month the patient may brush with soft toothbrush, but still without interdental flossing. After 6-8 weeks the mouth rinse is no longer necessary. The first 8 weeks post surgery the patient is followed-up every week for control of

the healing process and supragingival scaling and polishing of the area.



Pic.10: Postoperative clinical view (1 year after)

The patient was followed up every month for 1 year and the results are stable (pic.10).

4. Results

After 6 months on the vestibular site of tooth #31 gain of CAL and root coverage are registered. Root coverage is stable. The recession depth and the width of keratinized gingival tissues (KWT) are assessed and compared to the baseline before the mucogingival surgery.

The recession depth is already 1 mm and root coverage is partially attained. As a result there is an increase in the thickness and width of attached keratinized gingiva - 3 mm KWT gain buccally at tooth #31. There is no post-healing white-scar appearance or mucogingival junction unevenness that are typical for free gingival graft - a nice camouflage of the adjacent gingival tissues is obtained.

From an aesthetic point of view the outcome is almost satisfactory one year after surgery (pic.10). Root coverage meets the patient's aesthetic demands. The dentin hypersensitivity in the cervical area is reduced postsurgically.

5. Discussion

Different techniques are proposed for root coverage treatment - different pedicle flaps [6,25], tunnel technique [26], guided tissue regeneration [27], bilaminar technique [8]. The efficiency of bilaminar technique in treatment of isolated or multiple recession-type defects is already described in the literature [28,29]. This technique leads not only to complete or partial root coverage but also to gain of keratinized attached gingiva, gingival augmentation thickness and gain of CAL [14,30].

For less experienced clinicians trapezoidal variant of the CAF alone or in combination with connective tissue graft can be used in treatment of localized deep recession defects when the keratinized tissues apical to the root exposure are at least 2 mm in height. [21] The drawback of trapezoidal CAF is the fact that the trapezoidal surgical papillae are adapted over triangular recipient beds of anatomical papillae. As a result there is an excess of soft tissues over a vascular tooth surface. The advantage is that the presence of a good amount of soft tissues around the suture material

reduces the risk of inflammation due to possible bacterial colonization.

Due to the presence of very small interdental papillae and the very shallow vestibule, treatment at the lower incisors is much more challenging in respect of the treatment in upper jaw [7,10]. It is difficult to stabilize the flap satisfactory in its coronal position due to the limited vestibular depth and muscle tension from the lip that is almost perpendicularly of the tooth's root surface. In these cases of GRs in lower incisors the technique of choice is the so called trapezoidal vertically CAF [15]. A good color match and satisfactory gingival augmentation are obtained post surgically with this technique. Augmenting keratinized tissues quantity and quality in order to ensure better plaque control by the patients has an imperative meaning [14].

6. Conclusion

This case report demonstrated that the proposed bilaminar technique results to an increase of buccal gingival thickness, presents a satisfactory aesthetic outcome in the treatment of Miller class II gingival recession in the anterior zone of the mandibula.

Abbreviations:

CAF - coronally advanced flap
 CAL - clinical attachment level
 CEJ - cemento-enamel junction
 CHX - chlorhexidine
 EDTA - ethylene diamine tetraacetic acid
 GR - gingival recession
 PGA - polyglycolic acid
 KWT - width of keratinized tissues

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