The Role of Keratinized Tissue to Reduce Gingival Recession around Natural Teeth: A Case Report of Apically Repositioned Flap with Tissue Graft after 3-Years Follow-Up

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Abstract

A variety of surgical techniques have been introduced to treat gingival recession, improve the clinical attachment level and, if needed, increase the width of keratinized tissue around natural teeth. Gingival recession is very common in human population and to treat them the clinicians have to reduce risk factors such as periodontal disease, buccal inclination of the teeth, lack of keratinized gingiva around the teeth; to teach proper tooth brushing technique and then to perform Periodontal Plastic Surgery.

This case report shows the surgical precedure of the treatment of a single recession in lower incisors of a young female patient and the 3-years follow-up. The young patient had only 1 mm of keratinated gingiva in correspondence of the recession so that a modified apically repositioned flap was performed with free gingival graft sutured apically to inferior incisal teeth. The present clinical case shows that this technique may have good results on gingival recession after 3-years of follow-up.

Keywords: Keratinized gingival; Gingival recession; Gingival graft; Periodontal plastic surgery; Apically repositioned flap

Introduction

The Gingival Recession (GR) is an oral condition represented by the exposure of the root surface in oral cavity for a displacement of the gingival marginal and an incrementation of the clinical crown’s dimension. The gingival margin often shifts apically to the cement-enamel junction resulting an exposition of cementum surface giving dental hypersensitivity to the patients increasing the risk of root caries, and aesthetic consequences on white and pink line for the patient.

Gingival recession is very common in human population: 50% of subjects of 25 years old have at least one or more sites of 1 mm of root exposure but the prevalence becomes higher in older ages [1]. Several surgical techniques have been proposed by authors to treat Gingival Recession (GR), as well as to improve clinical attachment level and, whether needed, increase the width of keratinized mucosa around natural teeth [2].

The Width of Keratinized Tissue (WKT) measures the distance between the Mucogingival Junction (MGJ) and the coronal margin of the gingival sulcus and it is considered a critical factor for the prevention and the management of healthy tissues around natural teeth [3]. The importance of WKT about the risk of gingival recession is well-known since the publications of Lang and Löe in 1972, but in literature it is a discussed argument around dental implants even if the stability of keratinized gingiva actually could positively influence the long-term success of dental implants [4].

All the surgical techniques used to treat GR and other aesthetics gingival needs are named Periodontal Plastic Surgery (PPS) first by Miller and co-workers who classified them in 1988 [5]. Regardless of treatment plan is important to consider and identify the potential causes and risk factors of the GR: periodontal disease or other infections; teeth anatomy; coronally muscular insertion; vestibular tooth axes and thin alveolar bone; mechanical trauma; bruxism; horizontal and manual toothbrushing; previous orthodontic treatment or other iatrogenic causes; parafunctional activities; alveolar dehiscence and/or fenestrations [6].

The surgical root coverage must be always preceded by a detailed anamnesis, so by the elimination of risk factors and, after the determination of the causes, the PPS have to be performed on a healthy gingival [7]. Several surgical techniques have been developed inlast 65 years to treat GR. The pedicle flap was the first periodontal plastic surgery procedure proposed in 1956 for root coverage [8].

This procedure consisted in the repositioning of the gingival tissue graft from an area adjacent to the recession defect to cover the exposed root surface. Then the laterally positioned flap were modified by Grupe (1966) and other procedures were then proposed such as doubler papillae flap (DPF) by Cohen and Roos (1968), the coronally advanced flap (CAF) by Bernimoulin (1975) [9–11].

Pini and Prato (2005) reported that with this coronally repositioned technique to have 100% root coverage, the flap needs to be overcompensated coronally by at least 2 mm [12]. Infact, other techniques were developed considering also autogenous (from Palate or retromolar trigone) gingival graft and/or the apically repositioned flap (APP) of Friedman (1962).

Friedman emphasized the fact that displacing the gingiva in an apical direction needs to increase the WKT, but this procedure had collateral effects on bone resorption so that the technique was then modified by several authors such as the modified apically repositioned flap (MARF) involving a single horizontal incision of Carnio and Miller (1999) [13]. Nowadays, are often used a combination of traditional technique intervening on risk factor that caused the GR [14,15].
Figure 1: Clinical aspect of gingival recession at baseline, one week after professional oral hygiene (a); full-thickness flap (1 mm up to the MCJ) to cut muscle insertion and to perform apically repositioning of MCJ (b); free tissue graft taken from palate site and positioned apically to the inferior incisors (c); free tissue graft sutured to perform the apically repositioning of MCJ and increase the width of keratinized tissue (d).

Figure 2: Clinical aspect of pink and white line after 6 months of follow-up (a); after 1 year (b); after 2 years (c); after 3 years of follow-up (d).
Case Presentation

A 20 years old female with no systemic disease referred in 2015 to the Tuscan Stomatologic Institute (Forte deiMarmi, Italy) with a gingival recession of 3,5 mm in left lateral inferior incisor (3.2) and only 1,5 mm of Width of Keratinized Tissue (WKT). The patient asked to treat this gingival recession (GR) because of dental hypersensitivity and aesthetic needs. The professional oral hygiene was performed by scaling with ultrasonic devices and root planing of the root exposure finishing it with polishing by rotary instruments.

Considering the anamnesis and clinical parameters, the only relevant risk factors for GR were: orthodontic treatment concluded 4 years before To and the presence of only 2–3 mm of keratinized band in inferior incisors, especially 1 mm in tooth 3.2 [16]. Moreover, the patient seems to have a thin gingival bio-type. Periodontal disease was excluded due to absence of bleeding of probing and plaque, but a professional oral hygiene session was performed to reduce the plaque index. One week, after periodontal non-surgical therapy mucogingival surgery was performed. The clinical aspect at the baseline (To), after plaque removal with ultrasonic devise is shown in Figure 1a.

The inclination of incisors was in the range of normality so that the most important risk factor of this case was considered by authors the lack of keratinized gingiva in correspondence of tooth 3.2. The following surgical technique was chosen to increase the width of AG: a modified apically repositioned flap with free autologous gingival graft sutured de-epithelised papillary pedicle over the tooth surface of inferior incisal teeth. Local anaesthesia (Mepivacaine chloride with 1:1,00,000 adrenaline) was injected in the palate (donor site) and in correspondence of mucogingival junction (MGJ) in the receiving site. A free epithelial and connective graft was withdrawn from the palate (donor site).

At receiving site one horizontal incision in the keratinized gingiva was performed with a blade number n 15, parallel and one-millimetre coronal to MGJ. The incision was perpendicular to the bone to elevate a full-thickness flap as shown in Figure 1B [17]. The purpose of this technique is to cut muscle insertions close to the gingival margin of the recession and to relocate the MGJ apically. As it is shown in Figure 1C the free gingival palatal graft was positioned in correspondence of the de-epithelised bone and in Figure 1D the flap repositioned apically was sutured over the one-millimetre keratinized tissue near the MGJ and sutured over the keratinized gingiva adherent to the bone in the coronal site of the incision.

In correspondence of tooth 3.2 the pedicle flap was sutured over the de-epithelised papillary basis. After surgical procedures Nonsteroidal anti-inflammatory drugs (NSAIDs) were administered to the patient for 5 days and a gel with Chlorhexidine (0.2%) for 21 days was given to domiciliary and daily use. The patients received oral hygiene instruction by modified bass technique toothbrushing and was asked for a professional oral hygiene section one time a year. In figure 2 are shown different time of follow-up after the surgery.

Discussion

Orthodontic patients are often young patients with irregular eating and domiciliary oral hygiene habits. Moreover, the orthodontic therapy is also a long-term treatment and could make increase the risk of dehiscence or fenestration in the bone, due to the extreme vestibular inclination of teeth, so that it could be an important iatrogenic factor to develop gingival recessions [18]. In the present clinical case, patient have a quite normal teeth inclinations, even though the previous orthodontic treatment (4-years before muco-gingival surgery) still remains a risk factor of GR and relapsing after treatment [19].

Authors opted for an augmentation of keratinized band of gingiva because is one effective way to treat and prevent GR, and also because the patient had only 1,5 mm of gingiva in correspondence of dental element 3.2. The technique is similar to surgical cases proposed by Nabers in 1966 [20,21]. The ideal thickness of an autogenous gingival graft is still discussed in literature because, form a clinical point of view, a thick autogenous gingival graft has a major success rate after the treatment, but could not integrate entirely giving a not natural aspect to the gingival recession treated, instead a thin autogenous gingival graft integrates easily because it receives the vascularization but could not be enough to solve the recession resulting with relapse after few months from the treatment [22,23].

Some papers reported keratinized gingiva as not relevant to the gingival health because the causes of GR are others [24,25]. Even thought, other researchers and clinicians reported that an inadequate band of keratinize tissue around teeth increase the plaque formation and the risk of periodontal attachment loss as well gingival recession because of the less resistance of mucosa in comparison with gingival [26,27]. Authors agree with these second opinion so that treat this clinical case with a gingiva augmentation also because by this technique is possible to relocate and depart muscular insertions so that mechanical stress on periodontium [28].

Of course, incisor’s inclination and a thin gingival bio-type could be important risk factors causing gingival recession, but the presence of a wide band of keratinize tissue around teeth could reduce the progression of the GR improving the prognosis of these teeth. In figure 2 B,C, it is shown the follow-up of the clinical cases respectively after 1 and 2 years. The gain of keratinized gingiva was stable as well as the gingival margin. In figure 2D, after 3-years from the surgery it is possible to appreciate 0,5 mm of gingival recession, probably due to the inclination of the tooth and manual tooth brushing. At this time of follow-up, the young patient has been instructed to the use of sonic toothbrush to remove another risk factor of gingival recession.

Conclusion

Within the limitation of only one case report, our findings suggest that the prognosis of gingival recession after treatment, regardless of surgical technique, is better if width of keratinized tissue around natural teeth has been increased making the mucogingival junction apically.

Conflict of Interest

All the authors declared that there are no conflicts of interest to disclose.

References
