International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 06, 2020
ISSN: 1475-7192

MODERN VIEW OF THE ETIOPATHOGENESIS AND TREATMENT OF GUM RECESSION

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Annotation. *The reasons, conditions of development and classification of gum recessions have been described. The role of traumatic factors, important features of treatment planning and prevention have been indicated, analysis and evaluation of various treatment methods have been carried out.*

Keywords. *Etiology, developmental conditions, gum recession, periodontal plastic, atrophy*

I. Topicality.

Today, the problem of aesthetics in dentistry comes to the fore, and one of the important tasks of periodontal plastic surgery is the elimination and prevention of gum recession. Periodontal plastic surgery is a priority. Currently, the possibilities of periodontal surgery are increasingly expanding with the advent of improved surgical techniques and tools that stimulate the reparative processes of soft tissues [1,2].

In the case of multiple gingival recessions (MGR), the avascular root surface is more extensive, which, along with a thin gingival biotype, a narrow zone of attached keratinized gingiva (AKG) and protruding tooth root surfaces, complicates the choice of a surgical method of treatment. The main goal of periodontal plastic surgery in MGR is the predictable closure of the exposed root surface of all involved teeth, an increase in the thickness of the gums and the efficiency zone [2]. The pursuit of predictable aesthetic results has led to the development of new modified surgical techniques over the past decade.

Surgical interventions are an integral part of modern periodontology, such as: flap operations; plastic of the bridles and cords of the oral mucosa; correction of the size of the vestibule of the oral cavity; closure of gum recession; an increase in the volume of the keratinized gums [1,5].

There are several theories of gum recession, which consider both genetic factors (I) and the influence of exogenous stimuli (II). One of the most popular theories is the genetic theory (Dr.Dieter, E.Lange, 1999).

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Received: 18 Mar 2020 | Revised: 16 Apr 2020 | Accepted: 21 May 2020

I. Gingivo-alveolar atrophy occurs primarily after the eruption of teeth, because the wrong ratio of the size, shape (signs of curvature) of the roots in relation to the thickness of the bone of the alveolar process of the jaw is genetically laid. After the eruption of teeth, clinically undetected areas of bone resorption are formed under the mucous membrane, as well as fistulous passages above the roots. During the period of tooth functioning and with age, the patient experiences thinning of the gingival ligament and trophic disorders, which especially increase with stretching of the ligaments and with insufficient volume of the attached gum. One of the unfavorable anatomical factors is a violation of the anatomy of the crown of the tooth, in which the equatorial part is not expressed and is close in volume to its cervical part. As a result of the incorrect redistribution of the chewing pressure on the crown of the tooth, the cervical surface and the ligamentous apparatus of the tooth experience increased stress.

II. The exogenous recession theory takes into account the effect of orthopedic structures on the periodontal (Maynard and Wilson, 1979), the effect of orthodontic appliances (Maynard and Ochenbein, 1975), the tension of the mucous cords and frenulum, the shallow vestibule of the mouth, and crowding of teeth. Bad habits such as holding a pen or pencil, sucking the tongue and its forward position (infantile type of swallowing), which often persists from an early age, can also affect the state of the periodontal tissues. In such a situation, the language rests against the lingual surface of the gums of the lower incisors, which leads to recession and subsequent inflammation in this area. Rapidly progressing processes in the periodontal tissues, especially in juvenile forms, as well as surgical treatment (curettage, flap operations, etc.) can contribute to gingival recession. Deep incisal overlap can also be an important factor in exposing the necks and roots of the teeth, this condition can contribute to mechanical trauma to the marginal edge, especially in the palatal surface of the upper incisors and the vestibular surface of the lower incisors. According to morphological and functional studies of the periodontium (rheoperodontography and polarography), in the area of gingival recession, the initial level of partial oxygen pressure decreases, which contributes to the course of degenerative processes [3,4]. Gingival recession is also characterized by increased vascular tone. Gingival recession can be localized and generalized. Local recession, most often occurs in the places of a low-attached frenum or epithelial cords (folds) of the vestibule of the oral cavity, the vestibular arrangement of teeth, most often canines. Generalized recession, first of all, occurs with anomalies of the bite and a shallow vestibule of the oral cavity and constitutional characteristics of the patient. Generalized recession is often the result of long-term periodontitis without pronounced periodontal pockets, as well as atypical forms of manifestation of rapidly progressive periodontitis, in which gum loss may be the patient's only complaint. This process occurs in patients with an insufficient volume of the attached gums, the vestibular arrangement of anatomically large teeth and a pronounced contraction of the circular muscle of the lip (most often it occurs in actors, opera singers and among other specialties where professional diction and constant work of mimic muscles are needed). Often, the formation of gingival recession is facilitated by a traumatic situation (tooth overload, the presence of supracontacts) in those areas where lateral forces arise. If the rules for brushing teeth with a toothbrush are not followed, gum recession appears as a result of chronic trauma to the gingival margin (Fig. 1).

Fig. 1 Localized gingival recession caused by aggressive brushing techniques.

In the modern classification according to WHO (Geneva, 1997), the recession is distinguished by: post-infectious; postoperative; generalized; localized; not specified etiology (idiopathic). The most popular for the clinician is the classification of gum recession proposed by R. Miller in 1985. The author distinguishes four classes of recession, the main criteria of which are the width and length of gum loss.

Class 1 - narrow or wide recession at the level of the periodontal junction without its structural abnormalities (Fig. 2).

Class 2 - a narrow and wide recession at the level of the periodontal junction with a violation of its integrity. The bone tissue in the area of the root of the studied tooth is not changed (Fig. 3).

Class 3 - the level of recession is below the gingival junction, there is bone resorption in the root of the tooth under study (Fig. 4).

Class 4 - is the most severe form of gum recession. The dentogingival connection is completely absent, bone resorption is noted not only in the root of the studied tooth, but also captures the interalveolar region (Fig. 5).

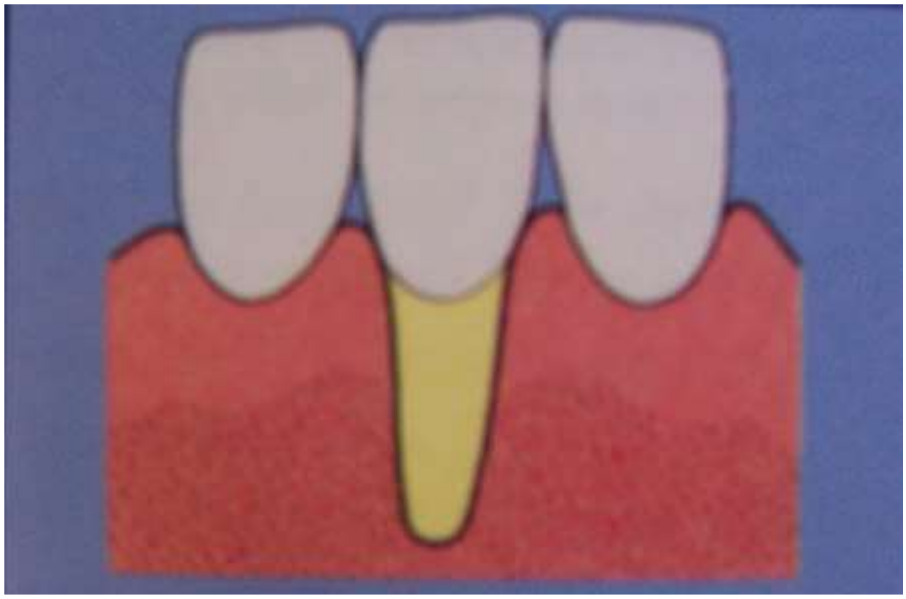


Fig. 2. Miller Class1 gum recession.

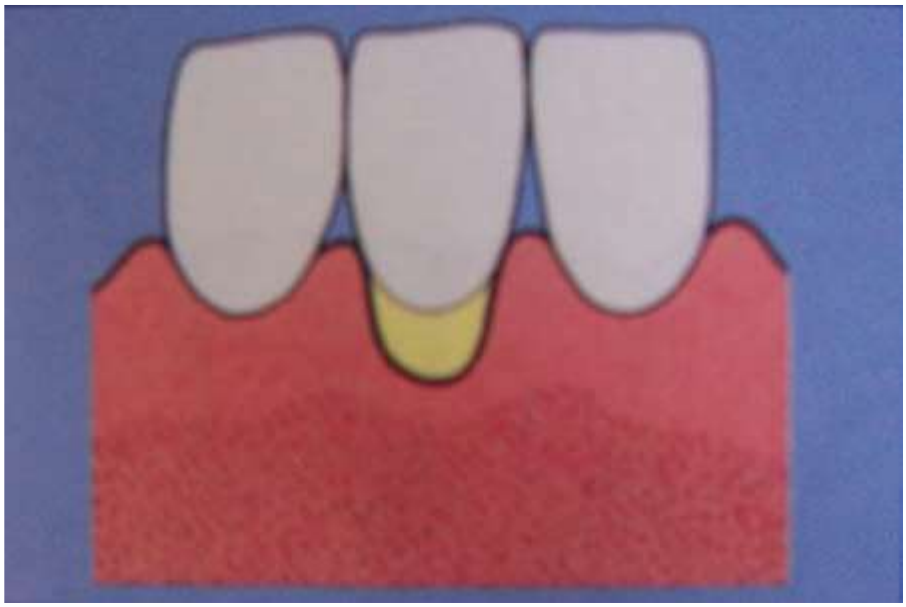


Fig. 3. Gingival recession Class 2 according to Miller.

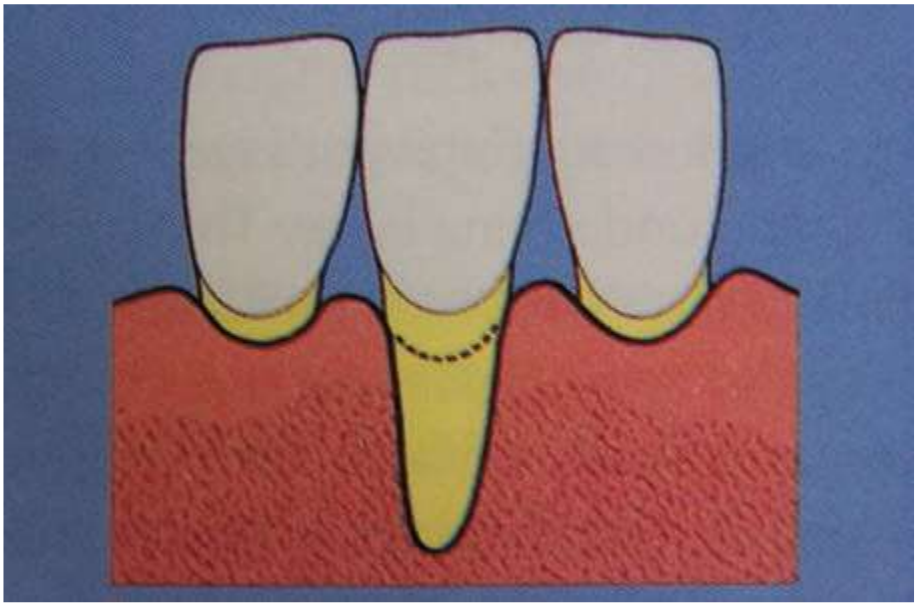


Fig. 4. Gingival recession Class 3 according to Miller.

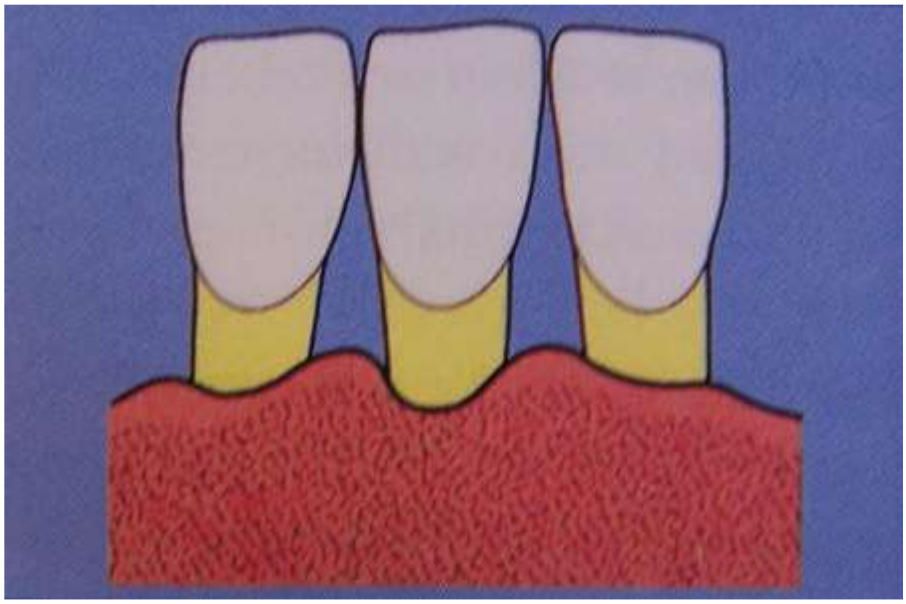


Fig. 5. Gum recession Class 4 according to Miller.

Objective. Analysis of the problem of modern etiopathogenesis and surgical treatment of gum recession.

II. Materials and methods.

The research was carried out through content analysis of literature data with elements of structural analysis. Object was the data on modern techniques for eliminating gum recession.

III. Research results and discussion.

Various techniques proposed for the elimination of cosmetic defects in the gums have been combined under the term "periodontal plastic surgery". This term was proposed by Miller in 1969. The author believes that "periodontal plastic surgery is a whole direction in periodontology, using surgical methods to correct anatomical or traumatic deformities of the gums and alveolar bone". To date, the prognosis for gingival grafting is considered favorable in relation to recessions in Classes 1 and 2. Surgical operations to close defects of Classes 3 and 4 are of little promise. At present, the possibilities of periodontal surgery are increasingly expanding with the advent of improved surgical techniques and tools that stimulate the reparative processes of soft tissues. Modern materials and tools used for plastic surgery on the periodontium have undergone significant changes. We can rightfully speak about periodontal microsurgery, because microscopes, microsurgical instruments and improved suture material are used for modern surgical interventions [5,6]. At present, a rather promising direction has emerged in periodontal surgery - the method of directed tissue regeneration (DTR) using membranes that perform a barrier function. DTR allows improving the long-term results of surgical interventions due to more perfect transformation of the blood clot under the membrane.

Another group of surgical techniques has established itself relatively recently - the use of matrix proteins as growth factors. This group includes the technique using AlloDerma and Emdogain. Research on matrix proteins is in its early stages. The first clinical trials were conducted in 1991. It should be noted that during periodontal regeneration, the alveolar bone, cementum and periodontal ligament of the tooth are restored (American Academy of Periodontology, 1993). One of the important conditions for successful closure of gum recession is the creation of a sufficient volume of keratinized tissue. The attached gingiva is covered with stratified squamous epithelium, consisting of a basement membrane, basaliocytes, basal and spine layers, several rows of polygonal cells, and a keratinized layer where keratinocytes are located. This structure contributes to the fact that this part of the alveolar gum is a "buffer zone" and performs a shock-absorbing and protective function for the teeth and deeper layers of the periodontium.

According to B. Lange and Loe (1972), the width of the keratinized gingiva should be at least 2 mm. In the 1980s. vestibuloplasty and gingival autograft were considered the main methods used to increase the volume of keratinized gums. Today, various procedures are used to increase the volume of keratinized gums.

N. Sato in 2000, summarizing the experience of a number of authors, lists the following procedures to increase the volume of keratinized gums:

1. The apically directed flap is split.

2. Moving a fully or partially split flap:

Laterally directed;

Double papillary;

multiple interdental papillary flap.

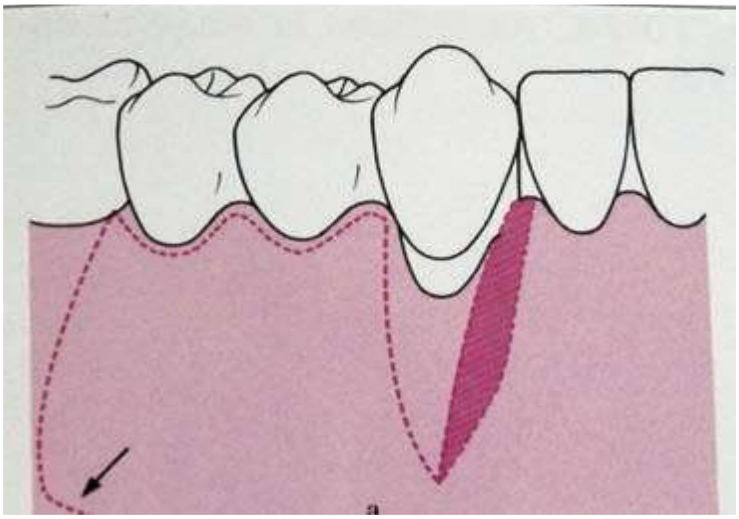
3. Free tissue autograft:

gingival graft from the palate;

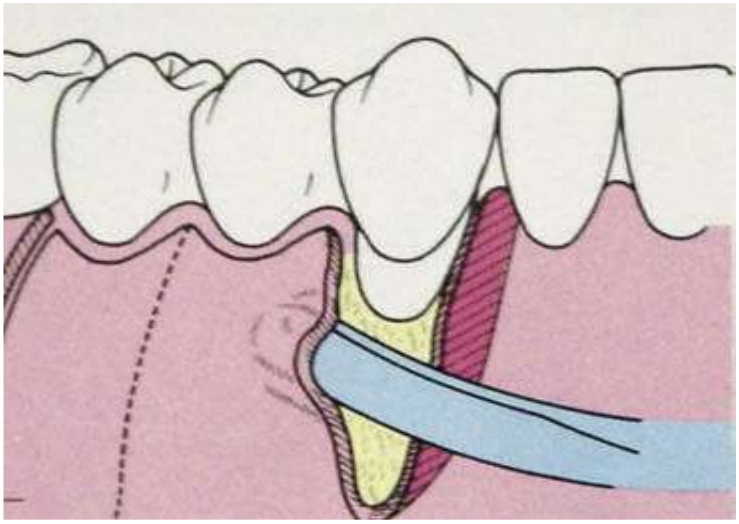
subepithelial;

allograft - AlloDerm.

4. Plastic surgery of the frenum and vestibule of the oral cavity



A)



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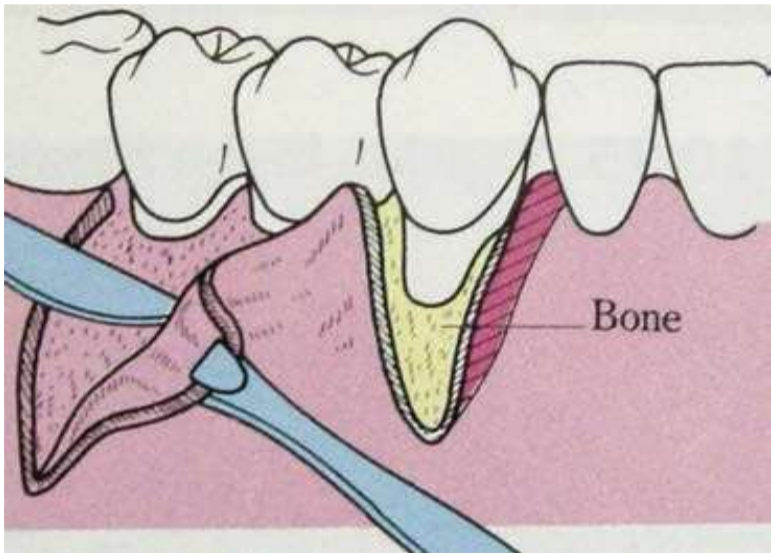

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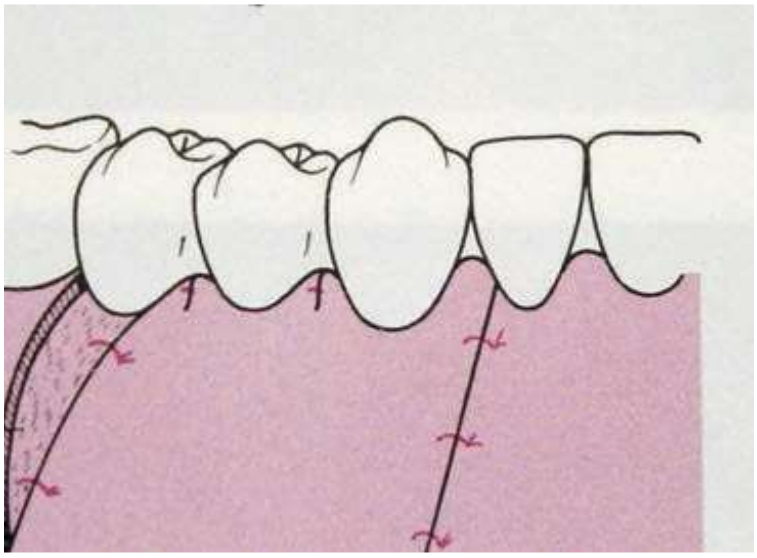

D)

Fig. 6. Scheme of using a one-layer method of closing a bare tooth root with a laterally displaced flap: a) planning the intervention, b) creating a flat-layered flap, c) creating a split flap, d) moving the flap and fixing it with separate interrupted sutures.

P.D.Miller, N.E. Grupe, R.G.Cafesse, S.Nyman (1982) indicate in their articles that for the choice of the method of gingival grafting, the following parameters must be taken into account: the number of teeth limiting the recession area, the width and depth of the recession, the location of the recession in the area molars.

N.Sato (1990) supplements this list with several conditions: the volume and thickness of the keratinized gingiva bordering the recession area, the ratio between the height of the intergingival papillae adjacent to the recession area, the location of the recession in the smile area, the need for gingival grafting after restoration or orthopedic treatment of teeth [9].

J. Lindhe, S. Nyman (1980) note that for successful closure of gingival recession, the donor tissue must have the following characteristics: a sufficient volume of keratinized tissue is required, its width must be at least 1 mm, the surface of the alveolar bone at the donor site must be without signs of resorption.

J.L. Wennstrom (1981) supplements this list with the fact that in the case of vertical flap movement, the size of the adjacent gingival papillae should be sufficient for successful gingival grafting. In the literature, various authors refer to a variety of parameters that confirm the successful outcome of gingival grafting.

N.Com, N.M. Goldman, D.W.Cohen (1980) the following clinical indicators are referred to the criteria for successful gingival plasty: in the area of recession, the gingival margin is at the level of the cement-enamel border of the tooth, the depth of the gingival sulcus does not exceed 1 mm, there is no bleeding when sounding. An important indicator of a successful gingival recession repair is an increase in the volume of keratinized (attached) gums (Fig. 6).

However, according to Zucchelli et al. (2000), multiple gingival recessions occur in clinical practice much more often than single ones [5,7]. In the case of multiple gingival recessions (MGR), the avascular root surface is more extensive, which, along with a thin gingival biotype, a narrow zone of attached keratinized gingiva (AKG) and protruding tooth root surfaces, complicates the choice of a surgical method of treatment. The main goal of periodontal plastic surgery in MGR is the predictable closure of the exposed root surface of all involved teeth, an increase in the thickness of the gums and the efficiency zone [10]. The pursuit of predictable aesthetic results has led to the development of new modified surgical techniques over the past decade. Coronally displaced flap technique in combination with free connective tissue graft (FCTG) allows to achieve an increase in the level of clinical attachment and favorable aesthetic results during closure of recessions, making it the “gold standard” in periodontology (Rocuzzo M, et al. 2002) [3].

Fig. 7. In the areas 1-3 and 1-4, the recession of II Class according to Miller

Fig. 8. After anesthesia, the trapezoidal mucoperiosteal flap was detached and mobilized. Root surfaces are smoothed, biomodification is carried out

Fig. 9. The flap is displaced coronally. Sutures are placed 1-2 mm above the enamel-cement joint in order to prevent postoperative retraction.

Langer (1985) was the first to use a surgical technique in which the FCTG is overlapped with a split flap. The disadvantage of the coronal displacement of the flap was the need to perform vertical laxative incisions, which negatively affected the aesthetic result (Fig. 7,8,9).

Subsequently, Raetzke (1985) proposed an “envelope” technique for closing single recessions, in which the FCTG is placed in an envelope made according to the technique of a coronal displaced flap, but without making vertical laxative incisions. Allen (1994) described the application of this technique in the elimination of multiple recessions [4]. Zabelgui et al. (1999) developed a tunneling technique, which was the connection of "multiple envelopes" while preserving the gingival papillae. In 2002, Azzi described a modification of this technique: he proposed the formation of a muco-periosteal tunnel through intrasulcular incisions.

In 2007, Otto Zuhr proposed the use of a modified microsurgical tunneling technique to eliminate multiple recessions. The modification consists in fixing the FCTG under the partially split flap from the vestibular side. The advantage of this technique is the elimination of not only vertical, but also horizontal incisions, thereby improving the blood supply to the FCTG from the area of the gingival papilla and adjacent tissues. The flap being peeled off is split, which reduces the possibility of bone resorption, which is often observed when full-thickness flaps are peeled off. Due to the fact that FCTG is supplied with blood from the external and internal sides, the predictability of graft survival is higher than with the formation of a full-thickness flap (Guiha R. 2001) [8].

In 2000, Zucchelli and De Sanctis described a technique for the simultaneous elimination of multiple recessions using a coronal flap displacement. This technique involves exfoliation of the envelope flap using a lateral or frontal approach without vertical laxative incisions, which is then displaced in the coronal direction to eliminate recessions. The length of the flap depends on the number of recessions, the type of teeth affected and the depth of extreme recessions. With the coronal displacement of the envelope flap, all surgical papillae, which are part of it, undergo not only coronal, but also some lateral displacement, overlapping the de-epitalized anatomical papillae. The prognosis for the elimination of single gingival recessions has been discussed in detail in a number of reviews (Roccuzzo et al. 2002, Cheng et al. 2007, Oates et al. 2003), while determining the prognosis for the elimination of MGR and the choice of surgical techniques are promising research areas (Chambrone et al. 2009).

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