
COMPARISON OF THERAPEUTIC EFFECTS OF FREE GINGIVAL GRAFT VERSUS MUCOGRAFT IN MUCOGINGIVAL ESTHETIC SURGERY – CYTOLOGICAL EVALUATION

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Abstract: Gingival recession is not a disease, but it is defined as an apical dislocation of the marginal gingiva towards the enamel-cement border, a condition that is conditioned primarily by morphology and structure, poor oral hygiene (rough brushing of the teeth) and eventual functional overload (traumatic occlusion). The aim of this study was to make a cytological verification and comparison in the intervened segment after the application of the two types of graft: free gingival graft and mucograft.

Methodology. With the cytological analysis, the maturation index of the cells was determined by taking a swab with the help of brushes, and the material taken was applied to glass slides that were stained according to the method of Papanikolaou and Gimza, which determined the maturation index, which implies a percentage ratio of basal, parabasal, intermediate and superficial squamous cells, which show us the surface healing of the injured gingiva in relation to the surrounding tissue in both groups of 30 patients who were treated with the same surgical technique but a different membrane.

Results. In the cytological research, the graduation index was determined as a percentage ratio of parabasal, intermediate and superficial, ie squamous cells from smears that were taken postoperatively on the 7th, 14th and 30th day. With multiple linear regression, it was determined that gender and age as parameters together affect the variability of all three types of cells from the graduation index: parabasal, intermediate and superficial, but none of them is a significant predictor of the variability of the finding on day 30 from the intervention. The statistical monitoring of the graduation index in both groups showed that the surface healing of the epithelium was faster in the group of patients who were operated with Mucograft, but without significant significance.

Conclusion. Cytological analysis showed a faster maturation index, a more robust surface healing process in the sample treated with Mucograft, but no significance was registered.

Recommendation and Additional date. Cytological examinations are always recommended as non-invasive methods that are favorable for patients and do not disturb their comfort.

Keywords. Gingival recession, gingival graft, cytological analysis, graduation index.

1. INTRODUCTION

The basic and main role of the periodontal tissue is to secure the tooth in the alveolus, which is why it is essential to maintain health of the periodontal tissue (bone and periodontal ligament) to preserve proper function of the masticatory apparatus. In certain conditions, conservative therapy is sufficient enough to achieve desired results, but sometimes conservative approach only is insufficient and requires additional surgical treatment. Levels of destruction does not always occur under the same circumstances, nor under different circumstances. In practice often

there are periods of active progression of periodontal loss and destruction of alveolar bone, contrary to periods where these processes stagnate. The answer to this dilemma lies in the existence of various factors that influence periodontal health. The body's weakened immunity in the presence of many other risk factors, including pro-inflammatory mediators and bacteria from dental plaque, lead to inflammation of the periodontium. Inflammation of the gingiva that is not treated at all or is treated inadequately, progresses further and affects the remaining structures of the periodontium and causes damage to the periodontium, which is the most common cause of gingival recession. It is necessary knowing the properties of the materials so any therapist can make the right choice using their advantages and disadvantages, which can enable their maximum use in the interest of patients' A. Dumitrescu, 2011. The etiology of gingival recession is multifactorial, and the factors that cause recessions are mostly heterogeneous and diverse. According to Zucchelli, are divided into the following three groups: anatomical, physiological and pathological.

Anatomical factors associated with gingival recession include the presence of fenestration and dehiscence of alveolar bone, abnormal position of the tooth in the dental arch, inappropriate pathway of eruption of the tooth, and the shape of the tooth affected with recession, CEJ, 2001.

Physiological factors include the orthodontic movements of the teeth outside the alveolar arch, which leads to the formation of dehiscence, (Joss-Vassali, 2010 and Zucchelli, 1999), consensually making that part of the supporting tissue around the moving teeth "locus minoris resistentiae" for the development of recession (Ruf S. et al. 1998 and Wennstrom JL 1987).

Pathological factors include: inadequate brushing caused by various factors of potentially confounding variables such as: pressure, time, strength and the cleaning agent used, then the use of dental floss, perioral and intraoral piercings (Greif J, 1999 and Mayers LB, 2002), direct trauma due to malocclusion, partial restorative therapy, diseases such as herpes simplex virus, as well as the presence of dental plaque Baker DI, 1976. Recession is most common in the area of lower frontal incisors in class Miller I classification. Concerning etiological causes dental plaque has the leading role, and in second place comes improper brushing technique. To obtain a successful final result, periodontal surgery should ensure not only to achieve complete coverage of the root, but also to strive in gaining perfect match of the transplanted tissue in terms of color and texture. It is necessary to initially start from the clinical observation of defects and structures that will guide the doctor through the most appropriate surgical technique to achieve an ideal aesthetic outcome - Martina Stefanini, 2018. The aim of this study was to make a cytological verification and comparison in the intervened segment after the application of two types of graft: free gingival graft and mucograft.

2. MATERIAL AND METHOD

The research was carried out at the Clinic for Oral Surgery at the University Dental Clinical Center "St. Panteleimon" in Skopje in collaboration with the Institute of Pathological Anatomy at the Faculty of Medicine in Skopje. The surgical and cytological protocols have been approved by the Ethics Committee of the Faculty of Dentistry at the University "St. Cyril and Methodius" in Skopje - Republic of Macedonia. The study includes 60 patients selected from the Oral Surgery Clinic with a diagnosis of Miller recession type I, II and III, with an indication for a surgical therapy. A cytological analysis (determination of cell maturation index) was also performed. The material taken by the swab method was applied to glass slides and stained according to the Papanikolaou and Gimza methods. The graduation index implies a percentage ratio of basal, parabasal, intermediate and superficial squamous cells, and represents the surface healing of the injured gingiva in relation to the surrounding tissue. Swabs were taken after the 7th, 14th and 30th day after the operation. Determination of the graduation index is an index of epithelial maturation and is a quantitative method aimed at assessing cellular maturation. The maturation index is actually a percentage ratio of epithelial cells that can be used to monitor the dynamics of surface healing of tissue wounds. It determines the size of the nucleus and the thickness of the cytoplasm of epithelial cells. At the same time, the graduation index can have diagnostic significance and recognition of variations of normal oral mucosa. According to the applied surgical technique (Autograft/Mucograft), the respondents in the sample - 60 were divided into two groups of 30 patients each. The surgical technique used for the correction of gingival recession was a coronary displaced flap - CAF, and two types of grafts were used in one group of patients - autograft CTG and the second group of patients xenograft - Mucoderm membrane.

3. STATISTICAL ANALYSIS

The data obtained during the research were statistically processed using the SPSS software package, version 22.0 for Windows (SPSS, Chicago, IL, USA).

The analysis of the attributive (qualitative) series was done by determining the coefficient of links, proportions and ratios, and they were shown as absolute and relative numbers. Numerical (quantitative) series were analyzed with

measures of central tendency (average, median, minimum and maximum values, interactive ranks), as well as with measures of dispersion (standard deviation and standard error). To determine the normality of the frequency distribution of the studied variables we utilized Shapiro-Wilk W test, and comparison of the proportions was done with “difference” testing. The Mann Whitney U test was used for the comparison of two independent variables with irregular distribution. T-test for independent sample and One way ANOVA were used for the analysis of two or more numerical independent variables with regular distribution. The analysis of two or more dependent numerical variables was done with Friedman test and Wilcoxon Signed Rank Test. Bonferroni correction was used to determine the level of significance in order to avoid Type 1 error. Pearson Chi square test and Fisher Freeman Halton test was used to determine the association between certain attributes. The Spearman rank correlation coefficient was used to determine the association between numerical variables with irregular frequency distributions.

4. RESULTS AND DISCUSSION

After the statistical processing of the obtained data, we obtained the following results: we obtained that the depth of the periodontal pocket depends on the age and the number of teeth with recession.

5. INTERGROUP COMPARISON OF CYTOLOGICAL FINDINGS

An individual analysis was made for each of the two groups treated with different surgical techniques (Avtograft and Mucograft) regarding the representation of parabasal, intermediate and superficial squamous cells at the three times (7th, 14th and 30th day) (Table 23).

In addition, a Post Hoc Test analysis was applied to determine the significance of the differences in the representation of squamous cells at the three times. Differences in three time combinations were analyzed by Wilcoxon Signed Rank Test. In order to avoid a Type 1 error according to the Bonferroni correction for the interpretation of the obtained results, a significance level of $p < 0.017$ was accepted (Table 24).

Table 23 Intergroup comparison of cytological findings according to groups at three times

parameter	Num ber (N)	\bar{X}	SD	min/max (Min)	Percentiles			I_p
					25th	50th (Median)	75th	
Parabasal cells								
Group - Avtograft								
7 days	30	25,43	17,94	0,80	13,75	20,00	35,00	Chi-Square=5,892; df=2; p=0,053
14 days	30	20,00	25,93	0,85	3,75	10,00	26,25	
30 days	30	25,03	28,13	0,90	5,00	10,00	37,50	
Group - Mucograft								
7 days	30	25,03	20,38	0,75	10,00	21,50	36,25	Chi-Square=11,912; df=2; p=0,003*
14 days	30	16,83	14,09	0,60	10,00	15,00	21,25	
30 days	30	12,60	15,97	0,70	2,50	10,00	15,00	
Intermediate cells								
Group - Avtograft								
7 days	30	52,77	20,39	15,80	30,00	60,00	70,00	Chi-Square=14,308; df=2; p=0,001*
14 days	30	46,03	19,76	0,80	30,00	45,00	60,00	
30 days	30	52,33	14,89	5,65	23,75	30,00	41,25	
Group - Mucograft								
7 days	30	50,23	18,01	15,80	35,00	50,00	70,00	Chi-Square=11,911; df=2; p=0,003*
14 days	30	51,13	14,25	15,80	40,00	50,00	60,00	
30 days	30	32,23	19,61	0,80	17,50	35,00	40,00	
Superficial cells								
Group - Avtograft								
7 days	30	20,70	22,24	0,70	5,00	10,00	24,00	Chi-Square=8,936; df=2; p=0,011*
14 days	30	34,30	25,38	0,100	10,00	35,00	52,50	
30 days	30	42,10	26,96	0,90	20,00	45,00	61,25	
Group - Mucograft								
7 days	30	24,73	19,80	0,70	10,00	20,00	32,75	Chi-Square=14,557; df=2; p=0,001*
14 days	30	31,53	18,19	0,75	15,00	32,50	45,00	
30 days	30	54,83	23,90	2/100	40,00	57,00	70,00	

¹Friedman Test
*Significant sa $p < 0,0$

Table 24 Comparison of cytological findings in three time combinations according to groups

Wilcoxon Signed Ranks Test	Z	Group - Avtograft			Group - Mucograft		
		14/7 ден	30/7 ден	30/14 ден	14/7 ден	30/7 ден	30/14 ден
Parabasal cells	Z	(1,244) ^c	(,626) ^c	(1,156) ^d	(2,037) ^c	(3,012) ^c	(1,711) ^c
	p (2-tailed)	,214	,531	,248	,042	,003*	,087
Intermediate cells	Z	(1,445) ^c	(3,345) ^c	(3,378) ^c	(,149) ^c	(3,135) ^d	(3,680) ^d
	p (2-tailed)	,149	,001*	,001*	,882	,002*	,000*
Superficial cells	Z	(2,086) ^c	(2,933) ^c	(1,885) ^c	(1,389) ^c	(3,776) ^c	(3,604) ^c
	p (2-tailed)	,037	,003*	,059	,165	,000*	,000*

* according to Bonferroni correction significant for $p < 0,017$

c. based on positive ranks

d. based on negative ranks

In the two studied groups, the distribution of patients according to gender was: 35 female patients, namely: 19 treated with autograft and 16 treated with Mucograft. We have 25 male patients of which: 11 treated with autograft and 14 treated with Mucograft.

With exfoliative cytology, we got important information about the structure and function of individual parts of the tissue. The use of this special examination method is characterized by simplicity, non-invasiveness and accuracy. In addition, with this method we obtain clear and comprehensive results from which we gain can resolution of diagnostic dilemmas or definition of certain therapeutic procedures. The biological regeneration of the periodontal tissue does not need to be registered through a biopsy, for that the application of exfoliative cytology is sufficient, with the monitoring of certain indicative parameters in the healing process.

The statistical monitoring of the graduation index in both groups showed that the surface healing of the epithelium was faster in the group of patients who were treated and applied with Mucograft, but without any significant difference. In fact, the application of oral cytology first proved to be an effective tool in the screening of malignant diseases and this procedure has already been used in monitoring the healing process during various periodontal surgical interventions, Mehrotra, 2013.

In periodontology, exfoliative - cytological examinations are used in basic research to support diagnosis as well as to evaluate the effectiveness of periodontal therapeutic procedures. Thanks to the applied oral cytology, possible errors in the diagnostic interpretation are successfully avoided, using clearly defined or verified cell indices.

Stavrevska, 1994 obtained findings indicating that after periosteal separation surgical treatment in the vestibular area, the index values of keratinization and the superficial cell index reached the control preoperative sizes. These findings were gained after the application of periosteal separation, the index values of keratinization and the superficial cell index reach the control preoperative sizes.

6. CONCLUSION

Cytological examinations, which are faster and non-invasive for patients in contrast to histological examinations, provide solid results regarding the surface maturation of cells. Cytological maturation in the Mucograft group was faster but without significant significance, with a note that the cells of the autograft mature later, which requires longer-term studies.

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