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Evaluation of Gingival Hyperplasia Caused by Medications

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***Abstract*—**Purpose: Drug gingival hyperplasia is an uncommon pathology encountered during routine work in dental units. The purpose of this paper is to present the clinical appearance of gingival hyperplasia caused by medications. There are already three classes of medications that cause hyperplasia and based on data from the literature, the clinical cases encountered and included in this study have been compared. Materials and Methods: The study was conducted in a total of 311 patients, out of which 182 patients were included in our study, meeting the inclusion criteria. After each patient's history was recorded and it was found that patients were in their knowledge of chronic illness, undergoing treatment of gingivitis hypertrophic drugs was performed with a clinical examination of oral cavity and assessment by vertical and horizontal evaluation according to the periodontal indexes. Results: Of the data collected during the study, it was observed that 97% of patients with gingival hyperplasia are treated with nifedipine. 84% of patients treated with selected medicines and gingival hyperplasia in the oral cavity has been exposed at time period for more than 1 year and 1 month. According to the GOI, in the first rank of this index are about 21% of patients, in the second rank are 52%, in the third rank are 24% and in the fourth grade are 3%. According to the horizontal growth index of gingival hyperplasia, grade 1 included about 61% of patients and grade 2 included about 39% of patients with gingival hyperplasia. Bacterial index divides patients by degrees: grading 0 - 8.2%, grading 1 - 32.4%, grading 2 - 14% and grading 3 - 45.1%. Conclusions: The highest percentage of gingival hyperplasia caused by drugs is due to dosing of nifedipine for a duration of dosing and application for systemic healing for more than 1 year.

***Keywords*—**Drug gingival hyperplasia, horizontal growth index, vertical growth index.

I. Introduction

INFLAMMATORY hyperplasia is conspicuous in distinct induration swelling, which, depending on clinical signs, progression and agitation, is always associated with the cause of this pathology manifestation. Inflammatory hyperplasia may appear in red color, associated with pain at affected area and with sensation and visibility of gingival bleeding. On the other hand hyperplasia with pink color is painful, but with distinct swelling and with no signs of gingival bleeding. It is understood that in the first case this clinical appearance comes more from the action of the local factor of bacterial plaque. It is the latter presence that promotes the production of inflammatory mediators to show inflammation with all typical clinical signs. While pink gingival hyperplasia has always a systemic reason at the backstage, clinical signs of this pathology are quite distinct and evaluable by the clinician. This classification explains also expectations of the protocol for treating this pathology after discontinuing the clinical course of congestive inflammation of the gingival tissue. There are already three classes of drugs that cause this hypertrophy characterizing.

There are certain medicament classes that promote the production of fibroblasts in the typical family of collagen found in gingival tissues, producing a tissue mass which may have a curved gingival shape or a clinical view of the increased tissue mass more than a clinical place in the mouth cavity. The inflammatory acute enlargement appears as a distinct swelling, which, by extension, is divided into generalized or localized hypertrophy. As basic clinical signs that serve for initial diagnosis, there is acute pain, a manifestation of rapid onset of pathology, which appears to be the beginning of an abstention, but unlike the latter, localization and clinical appearance leave room for the typical hyperplasia gingival. Inflammatory gingival hyperplasia has a typical reddish, reddish, mild, sensitive reddish surface with a flat, shiny surface, accompanied by a clinically sensitive and spontaneous bleeding tendency. The patient is self-declared for the treatment of systemic pathology, reason for taking the medication. It is the medicine that, with the minimal amount of bacterial plaque, can cause the maximum overgrowth of the gingival tissue, depending on the duration of the drug taking, or depending on the replacement of a drug with a drug of another class but within the diaphragm of medicines that treat the disease by suffering the patient [1]. Gingival hypertrophy is classified with indexes that determine the increase in width and increase in height of gingival tissue, an increase that can be measured with the help of periodontal probe. Cases are documented prior to periodontal routine treatment and after treatment to further document the role of the bacterial slab element acting in conjunction with the drug in estimated amounts of blood to provide gingival overgrowth.

II. Materials and Methods

The patients included in the study were patients at the University of Dentistry "Albanian University". After recording the anamnesis of each patient, only patients previously diagnosed with selected specific diseases, for which they were also treated with medication, are included in the specific part of the study, for oral examination. Oral examination was performed on soft tissue and soft tissues of the oral mucous

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membrane, always respecting the air-drying procedure and then checking the eye free of the differences in the oral mucus relief.

The study was conducted in a total of 311 patients, out of which 182 patients were included in our study, since they met the inclusion criteria. Patients included in the study are divided by age, sex and socio-health status. Every patient involved in the study is well informed, and then it has been agreed upon in full consensus to become part of the study, and then proceed with the established protocol.

The study includes patients of both groups: randomly presented patients at the University Clinic AU and patients in the Pediatric Department, QSUT, period between November 2017 and January 2018. Patients were informed before being included in the study on the protocol of recording the necessary data to be collected.

For evaluation of gingival hyperplasia, vertical growth index and Miranda & Brunet index (MBi) were used. Both indices are readily applicable for the evaluation of gingival hypertrophy. Various studies indicate that vertical growth index has sensitivity in detecting gingival hypertrophy at the earliest stages of its occurrence, for the assessment of the population of the risky population [2]-[5].

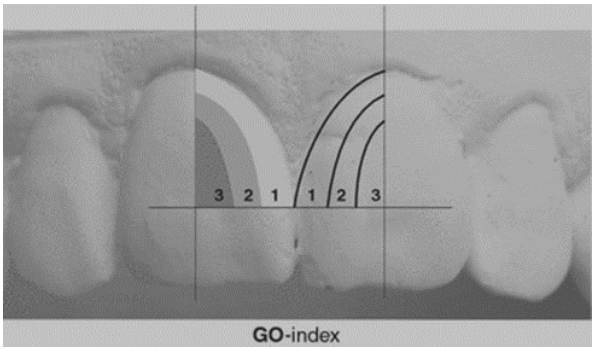

Fig. 1 Vertical Growth Index [2]

The periodontal probe is positioned perpendicular to the interdental papilla, to measure the distance from the enamel-cement join to the surface to contact point [3].

The bacterial tissue index was evaluated only at the teeth of Ramfjord. Ramfjord's teeth are seized on basis of the salivary gland salivary base, based on the fact of the areas where the median frenulum and the lateral frenulum in the oral cavity work. Nowadays, the teeth are widely used in the patient's regular parodontal evaluation, as they facilitate much work and increase the accuracy of the data collection.

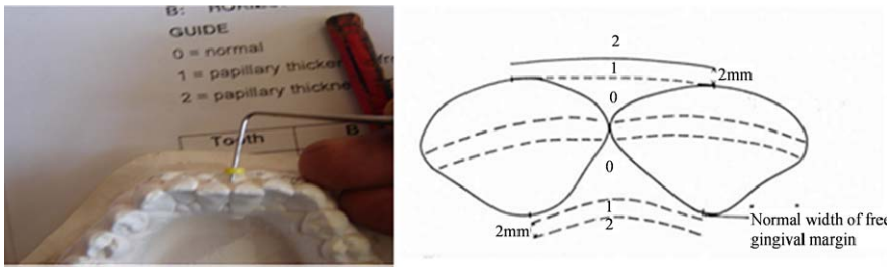

Fig. 2 Horizontal Growth Index [3]

III. Results

The collected results were reflected at Tables I-VI.

TABLE I
TOTAL NUMBER OF PATIENTS DIVIDED INTO CHRONICALLY ILL, TREATED WITH HYPERTROPHIC AND HEALTH-PROMOTING MEDICINES

Patients	Healthy	% of healthy	Ill	% of illness	% total
Female	75	24%	75	24%	48%
Male	54	18%	107	34%	52%
Total	129	42%	182	58%	100%

TABLE II
PATIENTS DIVIDED DEPENDING ON THE DRUG THAT CAUSED HYPERTROPHY

Patients	Nifedipin	%	Phenytoin	%	Cyclosporine A	%
Female	73	40%	2	1%	0	0%
Male	103	56.5%	3	2%	1	0.5%
Total	176	96.5%	5	3%	1	0.5%

Figs. 9-12 show some cases of patients presented at the University Clinic AU. Fig. 7 presents the patients photographed in the Pediatric Surgery Department, posed for the treatment of epilepsy.

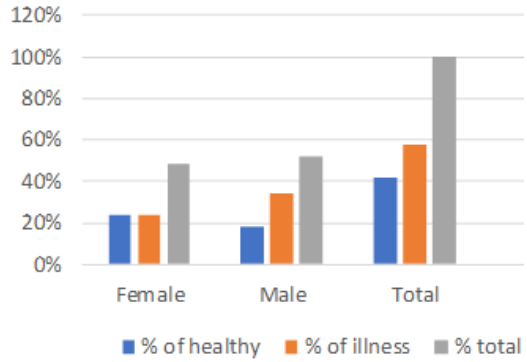

Fig. 3 Data in Table I, about% of healthy and sick patients

TABLE III
PATIENTS WITH GINGIVAL HYPERTROPHY DIVIDED ACCORDING TO THE DURATION OF THE MEDICATION

Patients	Nifedipine	%	Phenytoin	%	Cyclosporine A	%
≤ 1 year	28	15%	0	0%	1	0.5%
≥ 1 year and 1 month	148	81.5%	5	3%	0	0%
Total	176	96.5%	5	3%	1	0.5%

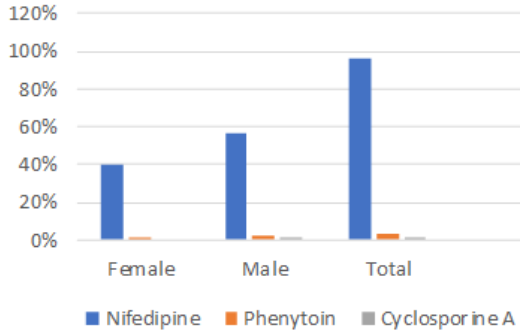

Fig. 4 Percentage of registered patients, depending on the type of drug used

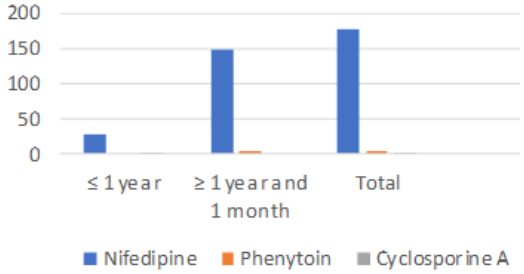

Fig. 5 Patients with gingival hypertrophies depending on the duration of the drug used for the treatment of the disease

TABLE IV
GINGIVAL HYPERTROPHY OF PATIENTS EVALUATED BY VERTICAL GROWTH INDEX

Grade - GOi	Nifedipine	Phenytoin	Cyclosporine A
0	38	0	0
1	90	4	1
2	43	1	0
3	5	0	0
Total	176	5	1

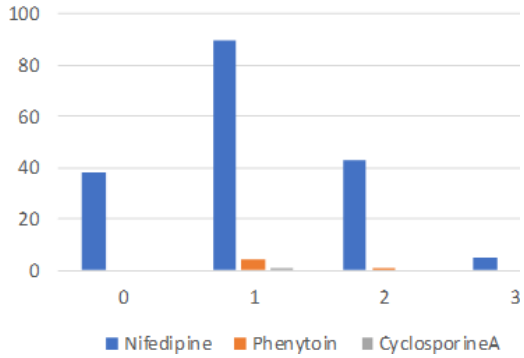

Fig. 6 Graphic representation of patients dependent on the recorded vertical growth index

TABLE V
GINGIVAL HYPERTROPHY OF PATIENTS EVALUATED BY HORIZONTAL GROWTH INDEX

Index rank	Nifedipine	Phenytoin	Cyclosporine A
0	0	0	0
1	105	5	1
2	71	0	0
Total	176	5	1

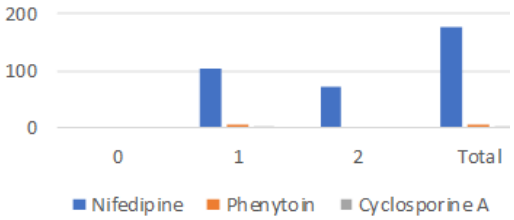

Fig. 7 Graphic representation of patients dependent on the horizontal growth index

TABLE VI
PATIENTS WITH GINGIVAL HYPERTROPHY, EVALUATED BY BACTERIAL PLAQUE INDEX

Patients / Table index	Nifedipine	Phenytoin	Cyclosporine A
0	15	0	0
1	54	4	1
2	25	1	0
3	82	0	0
Total	176	5	1

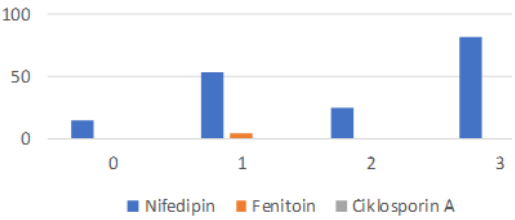

Fig. 8 Patient Assessment by Bacterial Tissue Index

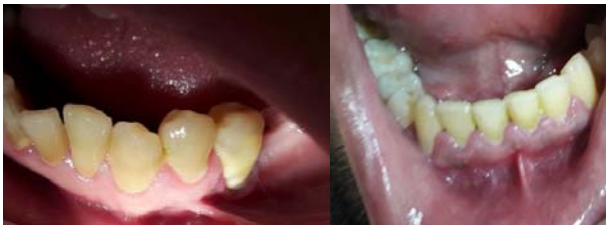

Fig. 9 the nifedipine-treated patient for period of time 2.5 years and the second patient for period of time 4 years

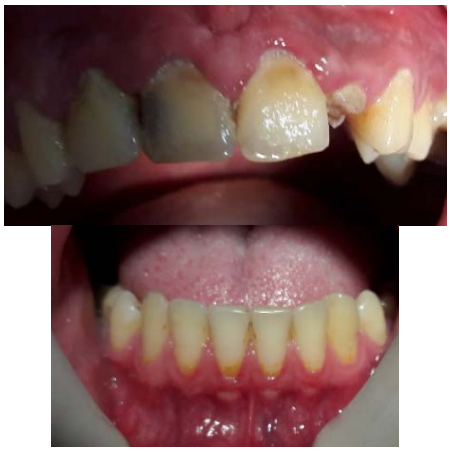

Fig. 10 The gingival hypertrophy of the phenytoin-treated patient for 10 years and the second patient for 3 years

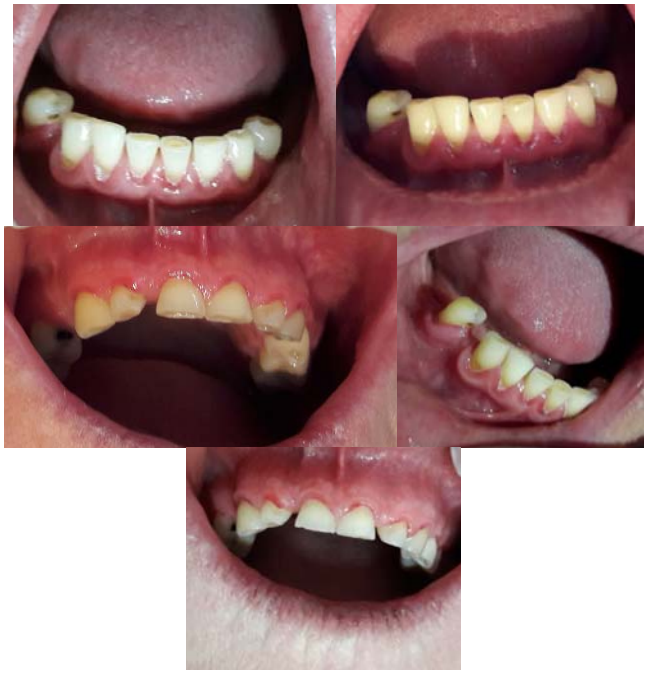

Fig. 11 Female patient treated with nifedipine before and after treatment

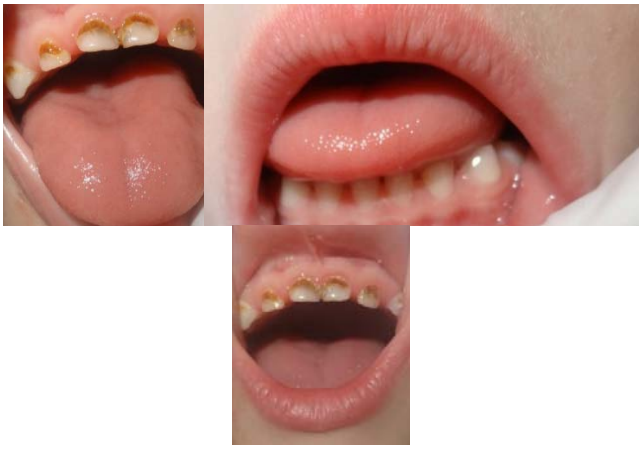

Fig. 12 Patients in Pediatric Surgery, that are treated for epilepsy. The 5 years old, who has been treated for 6 months since the first crises started at this age. The picture shows the denture teeth in the maxillary and mandible of the 5 years old patient. The patient is treated with Orphiril Long and Topamac. Diagnostic Refractory Epilepsy, Dravet Syndrome

IV. Discussion

Among anti-hypertensives, nifedipine shows a higher spread of gingival hyperplasia [4]. Hyperplasia begins as an extension of the interdental papilla and later turns into a lobular mass or nodule. It can stretch over the crown and reach the occlusal heights, thus interfering with chewing. These increases may exacerbate the accumulation of bacterial plaque and help shape the depth of the pocket, which increases the periodontal problems. Calcium antagonists such as nifedipine block the flow of calcium ions, thus affecting collagen homeostasis. Synthesis and degradation of collagen lead to the abnormal growth of the gingiva [5]. With these factors, there is a lack of clarity among the different researchers in the pathogenesis and progression of gingivitis in the treatment of nifedipine.

Our case showed gingival expansion when the teeth were present. Of course, high-indexed bacterial tissue teeth were a key factor in pathogenesis and disease progression in our case. In this regard, the deep areas showed no expansion, which indicates that the platelet is a key factor in the appearance of gingival hyperplasia due to nifedipine [6]. Other features that include inflammation and dosage of the drug emphasize the problem. Histopathology of our patient showed increases in plasma cells and other chronic inflammatory cells, proving that the bacterial plaque has an inflammatory effect on the gingiva that results in gingival expansion [7]. The drug dose also has an effect on hyperplasia growth. A study [8] reported that it appears 15 to 16 times with increases in nifedipine sputum in the gingival fluid, more in comparison to plasma levels. They also found that the highest concentration of nifedipine in the gingival fluid could increase the weight of gingival hyperplasia enlargement. From the earliest studies, it was clear that good oral hygiene and drug dosage were the main factors in decreasing and augmenting gingival hypertrophy. Gingiva hyperplasia was significantly reduced by applying the appropriate prophylactic method, coupled with the control measures against bacterial plaque [8], [9].

Patients taking certain medications may develop gingival enlargement. In contrast to inflammatory gingival enlargement, tissues in such cases are usually stable, not mild, pale pink, and do not bleed easily. In more severe cases, the gingiva can completely cover the dental crowns that cause periodontal disease (due to the difficulties in keeping the teeth clean) and may also show problems with eruption and dental lining. Expansion of drug-induced gingivitis can be resolved (partially) or partially, or completely, when the drug is discontinued. If the drug cannot be discontinued, excessive gingival surgery (gingivectomy) can be performed, but the condition is likely to be repeated. Since this condition, termination of the drug, does not depend on the patient's wishes, but the gravity of the disease, the level of accumulation of bacterial toothpaste, the effective oral hygiene measures will reduce its severity, gravity and its consequences, to gingival hyperplasia.

108 patients who received phenytoin for one year or more, whether alone or in combination with other drugs, were examined for tissue hypertrophy by three observers independently (based on a literature study) [10]. Approximately 90% of patients exhibited soft tissue hypertrophy and uncomplicated swelling occurred in only 1% of cases. Observed oral hygiene standards were extremely poor. There is a tendency for higher levels of serum phenytoin, associated with greater hypertrophy of the gingival tissues. Because the condition does not cause problems in over 90% of patients, it is thought that tissue hypertrophy itself should not prevent a physician from using phenytoin in the treatment of epilepsy [11]. Particularly, pediatric patients were maintaining the recommended levels of the drug and in fact

had failed in treatment. Also, neutropenia itself is contributory and the growth of the gingiva can be an exponential feature of the disease [11]. The incidence of gingival hyperplasia is reported to be lower with the newer formulation of cyclosporine A, based on micro-emulsion technology [12]. Various therapeutic approaches have been proposed. [13] If not treated, gingival hyperplasia patients may develop heavier and even cyclic periodic illnesses.

Based on recent studies on gingival hyperplasia caused by drugs, it is suggested that periodontal monitoring of immunosuppressive, antipyretic and anticonvulsant patients is important, as these medications are a potential risk factor for gingival hyperplasia, especially when used [14]. On the other hand, recent studies point out that gingival hyperplasia caused by drugs is that local factors (bacterial plaques) promote the gravity of existing hyperplasia [15].

V. Conclusions

The data collected from the study showed that the highest percentage of gingivitis hyperplasia caused by drugs is due to dose of nifedipine for prolonged duration of administration and application for systemic healing for more than 1 year.

Gingival hyperplasia from the drug tends to vertical growth at 2 mm, gingiva covers one third of the cervix, or less of the anatomic crown and horizontal growth at the level of 1-2 mm. Bacterial tablet index for patients treated with nifedipine ranked patients at 3: the presence of soft material inside the gingival pocket and/or on the tooth and the gingival margin. As for phenytoin and cyclosporine, patients are ranked at 1 of the bacterial plaque tissue value: adhered to the free gingiva plate and to the tooth area. The plate is distinguished in situ only after application of the coloring solutions, or by using the periodontal probe on the tooth surface. This can be explained by the frequency of the occurrence of hypertension, compared to epilepsy and immunosuppression.

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